Meeting Packet

Board of Supervisors
May 1, 2023

PUBLIC HEARING

TOWNSHIP OF NEW BRITAIN

MEMO

TO: New Britain Township Board of Supervisors; Matt West

FROM: David Conroy

DATE: April 21, 2023

RE: Birch Run Conditional Use Review

A Conditional Use Review was conducted by the Township Planning & Zoning Department in accordance with Section 27-3008 of the Township Zoning Ordinance.

In conjunction, the Township requested that the Township Engineer, Gilmore & Associates, Inc., conduct a Conditional Use Review. Their review (Exhibit A) is dated April 19, 2023.

The overall site of this Planned Community Center Mixed (PCCM) use contains three parcels that are approximately 15 acres in total area near the intersection of West Butler Avenue and County Line Road. The Applicant proposes to redevelop the 8.65-acre northern parcel of the site with a 44-Unit Townhome Community. According to an August 6, 2018 Conditional Use Adjudication (Exhibit B) that originally approved the PCCM use, which was previously granted dimensional variance relief by a May 17, 2018 Zoning Hearing Board Decision (Exhibit C), any additional use within the PCCM must be approved by a Conditional Use. The Applicant is seeking to amend the original Conditional Use, or in the alternative, to grant Conditional Use approval for the Townhome Community.

To meet the standards for a conditional use, the applicant must meet the following listed requirements:

- In accordance with the Township Comprehensive Plan
    - This application is not contrary to what the Comprehensive Plan intended for this area, but development here must not negatively affect conditions such as traffic congestion, access, and compatibility with existing development

- In the best interests of the Township, the convenience of the community, the public welfare
    - The proposed use will not be a detriment to the best interests of the Township, the convenience of the community, or the general welfare of the public

- Suitable for the property in question, and designed, constructed, operated and maintained so as to be in harmony with and appropriate in appearance to the existing or intended character of the general vicinity
    - This use would not negatively affect the appearance and character of the general vicinity, as long as the property is designed and built in harmony with the neighboring area

- In conformance with all applicable requirements of Part 30 of the Township Zoning Ordinance and all other Township ordinances
    - Upon submission of a preliminary plan to the Township, a review of the plan in accordance with the Subdivision and Land Development Ordinance and Stormwater Ordinance will take place

- Suitable in terms of effect on highway traffic and safety with adequate access arrangements to protect streets from undue congestion and hazard
    - Please refer to the Gilmore & Associates, Inc. letter dated April 19, 2023 in regards to highway traffic and safety

- In accordance with sound standards of subdivision and land development practice where applicable
    - Please refer to the Gilmore & Associates, Inc. letter dated April 19, 2023 in regards to subdivision and land development practices

- In accordance with the specific standards and criteria of Part 30 of the Township Zoning Ordinance
    - As referenced per the Gilmore & Associates, Inc. Conditional Use Review letter dated April 19, 2023, if an amendment to the August 6, 2018 Conditional Use Adjudication is considered, a request by the Applicant has been made that the Board consider permitting 2 monument signs where only 1 is permitted. Per §27-305.J.J31.e.11.(e)(1) of the Zoning Ordinance, one ground sign is permitted per 500ft of street frontage on one street. Road A meets this criteria, but Road B only has 302' of street frontage. §27-305.J31.e.13.(d) states that the Board of Supervisors, at its sole discretion, may waive, increase, decrease, or otherwise modify any particular aspect of the sign regulations as part of the conditional use process up to a maximum of 50% dimensionally.
    - As referenced per the Gilmore & Associates, Inc. Conditional Use Review letter dated April 19, 2023, if a Conditional Use for the Townhome Community is considered, it is noted that Creamery Tire is deficient by 30 parking spaces. However, this new proposal will not make the parking nonconformity any worse than it currently is. It was also noted that there appears to be a discrepancy between aerial imagery and the existing features plan with regard to the parking area.

EXHIBIT A

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

April 19, 2023

File No. 22-01266

Matt West, Township Manager
New Britain Township
207 Park Avenue
Chalfont, PA 18914

Reference: Toll Mid-Atlantic L.P. Company, Inc. – Conditional Use Review
County Line Road and West Butler Avenue
TMP Nos. 26-006-101-004, 26-006-101, and 26-006-101-003

Dear Matt:

Pursuant to your request, Gilmore & Associates, Inc. has reviewed the Conditional Use Application for the above-referenced project which includes the following:

I. Submission

Application for Conditional Use Hearing dated March 6, 2023, Addendum thereof, and the following Exhibits:

- Exhibit 1 – Agreement of Sale dated September 13, 2022;
- Exhibit 2 – Site Plans for Birch Run at New Britain, by ESE Consultants, Inc. dated February 21, 2023;
- Exhibit 3 – Architectural Rendering of proposed townhomes;
- Exhibit 4 – Environmental Impact Statement Report;
- Exhibit 5 – Fiscal Impact Analysis;
- Exhibit 6 – Traffic System Inventory & Analysis;
- Exhibit 7 – Conditional Use Stormwater Management Narrative; and
- Exhibit 8 – Stormwater Management Plans Pre-Development

II. Reference Document

A. Conditional Use Adjudication for Provco Pineville Acquisitions, LLC Order dated August 6, 2018 establishing the Property with a J31 Planned Community Center Mixed Use.

III. General Information

The J31, Planned Community Center Mixed (PCCM), tract consists of three parcels near the intersection of West Butler Avenue (S.R. 4202) and County Line Road (S.R. 2038) within New Britain Township's C-1 Commercial Zoning District. The parcels make up almost 15 acres established as a PCCM Use via a Zoning Hearing Board Decision dated May 17, 2018 and Conditional Use Adjudication dated August 6, 2018. The three parcels making up the PCCM currently contain a 2-story, non-residential building with multi-tenant use (Creamery Tire), an accessory storage building (CTP Mgmt), and a Wawa with fuel pumps. Woodlands were previously preserved by means of a recorded Conservation Easement.

The Applicant proposes to redevelop an 8.65-acre northern parcel of the PCCM site. The property is proposed to contain a 44-Unit Townhome Community, Use B5, as permitted as a Conditional Use within the C-1 Zoning District. Two new roads are proposed to serve the townhomes. The plan proposes 1.74 acres of Open Space in addition to the required buffer yards and stormwater management areas which will be maintained by an HOA. Fourteen (14) guest parking spaces are proposed along Road A. Approximately 4,300 sf of protected woodlands are proposed to be disturbed to allow for vehicular and pedestrian access to Wawa via Road B.

IV. Review Comments

A. Conditional Use Amendments Requested

The Applicant has submitted a Conditional Use application to establish a new use, Use B5, within the PCCM located within the C-1 District. As a condition of the August 6, 2018 Adjudication, all future associated uses within the PCCM are required to be approved as a conditional use. Per the Addendum to Conditional Use Application of Toll Mid Atlantic L.P. Company, Inc., the Applicant is requesting to amend the 2018 conditional use or, in the alternative, to grant a new conditional use approval to permit the proposed B5 Single-Family Attached use with the following specific requests for consideration by the Board of Supervisors:

1. §27-305.J31.e.11.(e)1) – To permit two (2) community identification signs on the development parcel at the intersection of the Access Road and Road A and along Road B where a maximum of one ground sign is permitted based on a rate of one sign per 500 feet of street frontage. The Board of Supervisors, at its sole discretion, may waive, increase, decrease, or otherwise modify any particular aspect of the sign regulations as part of the conditional use process up to a maximum of 50% dimensionally in accordance with §27-305.J31.e.13.(d). We defer to the Zoning Officer regarding the applicability of the sign regulations and relief being sought.
2. §27-305.J31.h.3 – At its sole discretion, the Board of Supervisors may increase building heights upon submission by the applicant of increased green and/or buffer areas on site, and provided that any proposed building heights can be safely serviced by local fire service providers. The Applicant is requesting a maximum building height of 37 feet where a maximum height of 35 feet is permitted by ordinance. We recommend the Fire Marshal determine if the requested building height is acceptable prior to approval. We note that the Applicant is providing 1.74 acres of open space where 0.69 acres are required. A landscape buffer is proposed along the along the residential neighbors and Extra Space Storage including canopy, ornamental, evergreen trees and shrubs. We recommend the Board of Supervisors consider the property line buffer be planted with more evergreen trees than deciduous trees.
3. Based on feedback from the Township to provide a second access into the site, the Applicant requests permission to disturb 4,300 sf within an existing conservation easement for the construction of Road B and sidewalk between the proposed development and the existing Wawa. We recommend any trees removed be replaced at a rate of 200 trees per acre for a total of 20 trees in accordance with the woodlands replacement requirement listed in §27-2400.f.2.(a). In addition, as noted in the Environmental Impact Statement, we recommend any diseased or dying trees found at the time of construction within the woodlands to remain, that could potentially be hazardous, be removed. If this condition is approved, the requirement shall be documented on the Record Plan.

B. Conditional Use Comments

The Board of Supervisors shall grant a conditional use only if it finds adequate evidence that any proposed development submitted will meet all of the following general requirements as well as any specific requirements and standards listed [in this section] for the proposed use. We offer the following comments with respect to the current New Britain Township Conditional Use general conditions:

1. §27-3008.b.1. – We find the proposal to be consistent with the Comprehensive Plan for the Township's Planning Area 2, which is characterized by commercial, office uses and comparatively dense residential development. This proposal touches on several goals and objectives of the Township's Comprehensive Plan by providing open space.
2. §27-3008.b.4. – The Board of Supervisors shall, among other things, require that any proposed use and location be in conformance with all applicable requirements of this chapter and all Township ordinances. Upon submission of the preliminary plan, the stormwater design will be required to manage the runoff from the total proposed increase in impervious in accordance with the Township's requirements including times of concentration, curve number calculations, basin modeling, etc.

3. §27-3008.b.5. & -2500 – The proposed use shall be suitable in terms of effect on highway traffic and safety with adequate access arrangements to protect streets from undue congestion and hazard. A Transportation System Inventory & Analysis was prepared by Traffic Planning and Design, Inc., in support of this condition. The report indicated that the project would generate 21 new weekday peak A.M. trips, 25 new weekday P.M. trips. Upon review, we offer the following:

   a. Existing traffic conditions shall be documented for all major roadways and intersections in the study area and any other intersections the Township deems will be affected by the proposed development. Roadways and/or intersections experiencing levels of service D, E or F shall be noted as congested locations. All roadways and intersections showing a level of service below C shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed. We recommend the narrative be updated.

   b. Regarding the above required existing traffic conditions and recommendations, the study is required to include the intersection of County Line Road and Richardson Road and a potential future traffic signal. However, we note that as discussed during the Sketch Plan review, the Applicant indicated they would offer a contribution towards traffic improvements in the area in lieu of analyzing this intersection. We have no objection to this request.

   c. Emergency access locations for developments shall be recommended by the Township Fire Marshal's office and approved by the Board. We recommend the Fire Marshal's Office review the plans relative to the proposed emergency access, street design, building height, water system, fire hydrant locations, etc. and truck turning templates be provided with the preliminary plans to confirm that the proposed design provides adequate maneuvering space for the largest anticipated vehicles accessing the site, school buses, and emergency vehicles.

   d. The study included analyses from both Synchro 10 and Synchro 11. We recommend the report be revised to be consistent in which version is used and the Synchro files provided for review.

   e. Condition 26 of the Conditional Use Adjudication for the PCCM Use required all proposed sidewalks along the frontage of the property be interconnected to any existing sidewalks. In addition, the PCCM shall have internal walkways to provide pedestrian access from adjacent residential developments and to connect to adjacent commercial, office, and institutional uses. While a sidewalk is proposed to County Line Road and to West Butler Avenue, additional connections shall be discussed. Since the trail previously shown within the open space has been removed, the feasibility of this connection, as well as a sidewalk to Extra Space Storage shall be discussed.

   f. Crosswalks shall be required at intersections and at other locations where necessary to facilitate pedestrian circulation and to provide access to community facilities. We recommend the plan be revised to relocate the midblock crossing on Road B to the Road A intersection and ADA-compliant curb ramps provided at each crossing.

   g. The parking requirement for a B5 use is based on the number of bedrooms per dwelling unit. The plan notes 3 bedrooms and 2 parking spaces for each unit. The Record Plan shall have a note restricting the number of bedrooms to 3 due to limited parking. We recommend the Record Plans and deeds for the dwellings include language requiring each unit to always maintain a minimum of 2 parking spaces.

   h. Sheet 4 indicates the Existing Flex Building is deficient by 30 parking spaces. We defer to the Zoning Officer with regard to the current Uses and parking requirements. We also note that there appears to be a discrepancy between an aerial image of the parking area versus the Existing Features Plan.

   i. Due to Road B being proposed at a 24-foot cartway where 28 feet is required, we recommend "No Parking" signs be installed along the entire length of the road.

   j. Belgian block curb is required to be used for proposed residential streets. We recommend the plans shall clearly depict the curb and identify the type of curb.

   k. We note that guest parking is provided along Road A directly in front of the cluster mailbox. We recommend no parking be permitted in front of the mailbox and the parking space relocated.

4. §27-3008.b.6. – The Board of Supervisors shall, among other things, require that any proposed use and location be in accordance with sound standards of subdivision and land development practice where applicable. The purpose of the Butler Avenue Corridor Overlay District is to enhance the Corridor which serves as a gateway to the Township. We note that the proposed patios for several townhome units extend into the 75-foot buffer along the Airy Avenue properties. In addition, streetlights, public benches, trash receptacles crosswalks, etc. are required in accordance with the Butler Corridor Overlay District. Two benches are shown at the Community Mail area and the Environmental Impact Analysis indicates a trash receptacle will also be provided.

The Applicant will be responsible for any other variances and waivers required from the Township's Zoning and Subdivision and Land Development Ordinances for any other deficiencies that may arise during a formal Land Development Review of the Preliminary Plans and revised Traffic Impact Study.

If you have any questions regarding the above, please contact this office.

Sincerely,

Craig D Kennard

Craig D. Kennard, P.E.
Executive Vice President
Gilmore & Associates, Inc.
Township Engineers

CDK/jm/tw

cc: Michael Walsh, Assistant Township Manager
Dave Conroy, Director of Planning and Zoning
Ryan Gehman, Assistant Planning and Zoning Officer
Randy Teschner, Code Enforcement Officer/Fire Marshall
Sean Gresh/Jeffrey P. Garton, Esq., Township Solicitors
Nate D. Fox/Stephen Zaffuto, Obermayer, Rebmann, Maxwell & Hippel LLP
Brian Thiernin, Toll Brothers, Inc.
Jeff Madden, P.E., ESE Consultants
Janene Marchand, P.E., Gilmore & Associates, Inc.

EXHIBIT B

BEFORE THE NEW BRITAIN TOWNSHIP BOARD OF SUPERVISORS
BUCKS COUNTY, PENNSYLVANIA

IN RE: CONDITIONAL USE APPLICATION :
OF PROVCO PINEVILLE ACQUISITIONS, LLC :

ADJUDICATION

Provco Pineville Acquisitions, LLC ("Applicant") has filed a Conditional Use Application ("Application") with New Britain Township concerning the development of a parcel of land located near the corner of West Butler Avenue and County Line Road within New Britain Township. Applicant is the equitable owner of two of the four parcels of land that make up the development site ("Property") and is seeking conditional use approval under Section 27-1201.c of Chapter 27, Zoning, of the Township Code ("Zoning Ordinance") to permit a J31 Plan Community Center Mix Use upon the Property. The Property is located within the C-1 Commercial Zoning District.

Pursuant to the Pennsylvania Municipalities Planning Code, Act 247, as amended, ("MPC") the New Britain Township Board of Supervisors ("Board") held a hearing on July 2, 2018 ("Hearing") in the New Britain Township Municipal Building located at 207 Park Avenue, Chalfont, Pennsylvania for the purposes of receiving testimony on this Application. Notice of the same was sent to Applicant and was advertised pursuant to law. Board Chairman, A. James Scanzillo; Board Vice-Chair, Helen B. Haun; and Board members, Gregory T. Hood, Cynthia Jones, William B. Jones, III were in attendance at the Hearing and took part in the Board's deliberation. In addition, Peter Nelson, Esquire, the Board's Solicitor was in attendance, as was the Board's stenographer. Applicant was represented by its attorney, John VanLuvanee, Esquire.

Only Daryl Presti of 517 West Butler Avenue requested party status in this matter, which was granted by the Board without objection from Applicant.

Based on the testimony and evidence presented at the Hearing, the Board, after discussion and due deliberation, makes the following Findings of Fact and Conclusions of Law.

FINDINGS OF FACT

1. Applicant is Provco Pineville Acquisitions, LLC with a mailing address of 795 East Lancaster Avenue, Building 2, Suite 200, Villanova, PA 19085.

2. Co-Applicant is CPT Management, LLC 4123 Creamery Road, P.O. Box 8, Creamery, PA 19430.

3. The Property is made up of four separate parcels of lands, otherwise identified as Bucks County Tax Map Parcel Numbers 26-006-101, 26-006-101-003, 26-006-101-004, and 26-006-101-005.

4. Applicant is the equitable owner of the two parcels denoted as Bucks County Tax Map Parcel Numbers 26-006-101 and 26-006-101-004 and a related entity is the equitable owner of Bucks County Tax Map Parcel Number 26-006-101-005.

5. Co-Applicant is the legal owner of the two parcels denoted as Bucks County Tax Map Parcel Numbers 26-006-101-003 and 26-006-101-004.

6. Applicant is currently seeking land development approval to establish a J31 Plan Community Center Mixed Use development upon the Property.

7. Co-Applicant is not actively involved with the Application.

8. Applicant is proposing to construct a new Wawa store of 5,585 square feet upon the Property along with 6 fueling stations beneath a canopy ("Project").

9. Applicant is currently involved with four Wawa projects and plans to complete its 20th Wawa development project this year.

10. Applicant is a classified preferred developer by Wawa. Wawa currently does not own properties where a new facility is located, rather they contract with preferred developers to develop the property that Wawa then leases from the preferred developer for the new facility.

11. Applicant has experience doing other types of development jobs in addition to Wawas, including pharmacies, banks, and shopping centers.

12. This is the 17th year Applicant has operated as a land developer.

13. In 2008, the Property was a part of a larger site involved in an earlier conditional use application to establish a different J31 Use; a conditional use adjudication approving that application was issued on October 28, 2008.

14. The Property currently contains a commercial building housing automotive and office uses ("Flex Building"), an accessory storage building ("Pole Barn"), several outbuildings, and two existing residences that will be demolished.

15. The Property is located entirely within the C-1 Commercial Zoning District of the Township.

16. The Property has frontage on both West Butler Avenue and County Line Road.

17. The Property is surrounded by other existing uses including the legacy Wawa, Target World, an eye doctor, a florist, a dental laboratory, a barbershop, an indoor storage facility, and a residential development.

18. The proposed Wawa facility will replace the legacy Wawa Store that is located southwest of the Property at the intersection of West Butler Avenue and County Line Road.

19. At this time Applicant does not have any plans for the development of the balance of the Property.

20. The Pole Barn and Flex Building shall remain as part of this Project at this time.

21. The existing two houses fronting West Butler Avenue on the Property will be demolished, along with the appurtenant improvements, in conjunction with the construction of the Wawa facility.

22. Applicant is working with Co-Applicant to re-design the parking area around the Flex Building to provide additional parking spaces for that building on the Property and to eliminate the middle driveway to that Building from County Line Road.

23. Changes to the Flex Building parking area will include those necessary to ensure that no traffic backs out into the access drive connecting the Wawa facility to County Line Road.

24. As part of this Project, Applicant is proposing to construct a new full access signalized intersection across from the entrance to the New Britain Village Square shopping center on West Butler Avenue.

25. The Applicant is also improving the existing non-signalized, full access driveway along County Line Road to provide further access to the Property.

26. Applicant stated that the Wawa could be constructed as shown in Exhibit A-11 or the proposed stone facing could be replaced with brick depending on what is desired by the Township; likewise the stone facing on the supports for fueling canopy illustrated on Exhibit A-12 can be replaced by brick at the request of the Township.

27. Applicant would be willing to replace the proposed canopy illustrated on Exhibit A-12 with an A-frame canopy at the request of the Township.

28. The largest truck making deliveries to the Wawa facility would be a WB-50.

29. Applicant is proposing a double faced internally illuminated 20 foot pylon sign along with a digital display of fuel prices along the frontage of West Butler Avenue.

30. Applicant is proposing a double faced internally illuminated monument sign along with a digital display of fuel prices along the frontage of County Line Road.

31. The existing signs located on the New Britain Village Square shopping center property, the legacy Wawa property, and the Lukoil property all are taller than the 15 foot height limitation set forth in the J31 regulations.

32. Applicant opined that the proposed signage is the minimum signage needed by Wawa to ensure the success of this facility.

33. The Wawa facility will be served by public water and sewer.

34. Applicant wishes to delay the installation of the required plantings in the buffer against the adjoining residential zoning district until the remainder of the Property is developed.

35. Applicant proposes to provide loading areas along the side of the Wawa building, instead of the rear, which does not comply with the requirements of §27-305.J.J31.c.13.(b).

36. Applicant presented three witnesses in support of its Application: Joseph Botta who is a representative and principal of Applicant; Jason R. Korczak, P.E., who was accepted as an expert witness in civil engineering; and Matthew I. Hammond, P.E., who was accepted as an expert witness in traffic engineering.

37. Mr. Korczak testified that the environmental assessment complies with all the Township zoning requirements.

38. Mr. Korczak determined that the proposed project would not have any adverse environmental impacts and would be compatible with the Township's Comprehensive Plan.

39. Mr. Korczak testified that there is a quarter acre of wetlands existing on the Property and 0.04 acres of these wetlands will be disturbed by the driveway going from the Wawa facility out to County Line Road.

40. Mr. Korczak stated that Applicant will need to apply for and receive a General Permit from the Pennsylvania Department of Environmental Protection for this wetland disturbance.

41. Mr. Korczak testified that the Project would disturb woodlands as defined by the zoning provisions of the Township Code; however such disturbance would be less than the maximum 65% allowed under zoning.

42. Mr. Korczak testified that the proposed trash enclosure will comply with the Township's zoning regulations.

43. The trash enclosure will be approximately 375 feet from the nearest residential property.

44. Applicant filed a scoping application with PennDOT in January of 2018.

45. Mr. Hammond testified that 76% of the trips created by the proposed Wawa will be pass-by trips meaning that these are cars already on the road going somewhere else that stop at the Wawa along the way instead of cars that are on the road specifically to go to the Wawa.

46. Mr. Hammond testified that all traffic improvements will comply with all applicable PennDOT standards.

47. Mr. Hammond testified that there will be gore area in the median of West Butler Avenue allowing vehicles making left turns into the commercial business abutting the Property to get out of the way of the through traffic on West Butler Avenue.

48. Mr. Hammond testified that PennDOT has not proposed any type of median barrier along the center of West Butler Avenue in the vicinity of this Project.

49. At the Hearing, the following Exhibits were submitted to the Board and accepted into evidence by the Board without objection:

Exhibit B-1 – Conditional Use Application, dated May 18, 2018

Exhibit B-2 – Legal Notice and Proof of Advertisement, dated June 21, 2018

Exhibit B-3 – Gilmore and Associates Conditional use review letter, dated June 21, 2018

Exhibit B-4 – Township Planning Commission Memo from Devan Ambron, Township Zoning Officer, dated June 27, 2018

Exhibit B-5 – Letter from Peter Nelson, Esq. to Chuck Coxhead, dated April 19, 2018

Exhibit A-1 – New Britain Township Zoning Hearing Board Decision, dated May 17, 2018

Exhibit A-2 – Conditional Use Application, dated May 18, 2018

Exhibit A-3 – Existing conditions aerial plan

Exhibit A-4 – Agreement of Sale between Jenta Corp and Provco Pineville Acquisition LLC, dated September 18, 2017

Exhibit A-5 – Agreement of Sale between Wawa Inc. and Provco Pineville Chalfont, LLC, dated May 22, 2018

Exhibit A-6 – Agreement of Sale between CPT Management, LLC and Provco Pineville Acquisitions, dated August 1, 2017

Exhibit A-7 – Easement Agreement between CPT Management LLC and Provco Pineville Acquisition LLC, executed January 12, 2017

Exhibit A-8 – Overall site plan, dated May 18, 2018

Exhibit A-9 – Existing conditions aerial plan

Exhibit A-10 – Proposed aerial plan

Exhibit A-11 – Wawa building elevations

Exhibit A-12 – Wawa fuel canopy elevations

Exhibit A-13 – Signage details plan, dated March 2, 2018

Exhibit A-14 – Curriculum vitae of Jason R. Korzak, P.E.

Exhibit A-15 – Existing conditions/demotion plan, last revised May 18, 2018

Exhibit A-16 – Environmental impact statement, dated June 26, 2018

Exhibit A -17 – Curriculum vitae of Matthew I. Hammond, P.E.

Exhibit A-18 – Transportation impact study, dated May 18, 2018 (narrative only)

Exhibit A-19 – Gilmore and Associates conditional use review letter, dated June 21, 2018

Exhibit A-20 – Gilmore and Associates preliminary plan review letter, dated June 22, 2018

Exhibit A-21 – Gilmore and Associates technical review letter, dated June 22, 2018

Exhibit A-22 – Bucks County Planning Commission review letter, dated June 19, 2018

Exhibit A-23 – Letter from Peter Nelson, Esq. to Church Coxhead, dated April 19, 2018

50. Also accepted into evidence as Appendix A to Applicant's exhibit packet was the prior conditional use adjudication involving the Property dated October 28, 2008

51. Exhibits B-1 and A-2 are the same document; Exhibits B-3 and A-19 are the same document; and Exhibits B-5 and A-23 are the same document.

52. Exhibit B-5/A-23 contains ten proposed conditions of approval; Applicant stated conditions 1-4, 6-8, and 10 are acceptable as stated in this document.

53. Concerning condition No. 5 listed in Exhibit B-5/A-23, Applicant is willing to abide by the condition of no video being played but would like the ability to put sound over the intercom in compliance with all Township noise/sound regulations.

54. Applicant believes that restrictions on sound are not necessary due to the distance between the proposed Wawa facility and any neighboring residential properties.

55. Applicant asks that condition No. 9 on Exhibit B-5/A-23 be altered to restrict deliveries from 11 pm to 6 am and not apply to fuel deliveries.

56. Applicant acknowledged that the Property could not be made smaller under the J31 Use and the May 17, 2018 ZHB Decision and would be okay with a condition of approval restricting any subdivision of the Property that would reduce the size of the Property; however Applicant would like the ability to do subdivisions of the Property provided such subdivisions are consistent with the Use J31 requirements.

57. Applicant would be willing to consider modifications to the Plan to discourage cut through traffic.

58. Section 27-305.J31.c.2 of the Zoning Ordinance provides that during the Conditional Use Hearing the Board may modify the area and dimensional criteria for a proposed J31 Use; while Section 27-305.J31.c.12(p)4) of the Zoning Ordinance provides that the Board can modify sign requirements for a proposed J31 Use.

59. In accordance with Sections c.2 and c.12(p) of the J31 Use, Applicant requested at the Hearing the following modifications of the applicable area, dimensional, and sign requirements for their proposed use:

- Section 27-2904.a.5 to allow striping and bollards instead of raised curbs to control and direct traffic around the Wawa facility, so as to minimize tripping hazards caused by the curbing and to make the building more ADA accessible;

- Section 27-2904.d.1 to allow the proposed West Butler Avenue driveway to exceed a maximum width of 30 feet at the street line by 18 feet, so that a 48 foot boulevard style drive that matches up with the existing access drive to the New Britain Village Square shopping center can be installed;

- Section 27-2904.g.5 to allow the paved parking area to be located within 20 feet of the exterior structural wall of the proposed Wawa building to allow these high traffic parking spots to be closer to the building and make it more easily accessible;

- Section 27-305.J31.c.12(o)(6) to allow Applicant to erect one ground sign along the County Line Road frontage and one ground sign along the West Butler Avenue frontage; and

- Section 27-305.J31.c.12(o)(6)(iv) to allow the ground sign along West Butler Avenue to be 20 feet in height.

DISCUSSION

Applicant is seeking approval to develop the Property with a J31 Planned Community Center Mixed Use ("PCCM") which is permitted as a conditional use within the C-1 Zoning District. Specifically, Applicant is proposing to construct a Wawa store with six fueling stations as a part of this J31, along with appurtenant improvements. In this first phase of the development of the Property, no new development shall take place on the remainder of the Property, except for new and revised access drives and parking areas as shown on the Exhibits.

A conditional use is nothing more than a special exception that falls within the jurisdiction of the municipal governing body rather than the zoning hearing board. 53 P.S. §603(c)(2). The applicant in a conditional use hearing bears the burden of proving that its proposal meets the requirements provided for in the zoning ordinance for the use sought as a conditional use. *Northampton Area S.D. v. East Allen Twp. Bd. of Supervisors*, 824 A.2d 372, 376 (Pa.Commw.Ct. 2003), *alloc. denied*, 834 A.2d 1144 (Pa. 2003); *Bray v. ZBA*, 48 Pa.Commw. 523, 526, 410 A.2d 909, 911 (1980).[1] These requirements are generally classified as follows:

1. The kind of use (or area, bulk, parking, or other approval) – i.e., the threshold definition of what is authorized as a conditional use;

2. Specific requirements or standards applicable to the conditional use – e.g., special setbacks, size limits; and

3. Specific requirements applicable to such kind of use even when not a conditional use – e.g., setback limits or size maximums or parking requirements applicable to that type of use whenever allowed, as a permitted use or otherwise.

Bray, 48 Pa.Commw. at 526, 410 A.2d at 911. It is not enough for an applicant to prove that a proposed conditional use complies with the specific conditional use zoning ordinance requirements. *Sheetz, supra.* The applicant must also clear a second step by proving that the proposal does not violate other applicable sections of the zoning ordinance. *McMann v. Kingston Twp. Bd. of Supervisors*, 771 A.2d 96 (Pa.Commw.Ct. 2001).

A conditional use can only be granted or refused in accordance with the terms of the ordinance itself. *McGinty v. ZBA*, 717 A.2d 34, 36 (Pa.Commw.Ct. 1998). Whether an applicant has met its burden of proof is within the discretion of the governing body. *Accelerated*

[1] Bray involves a special exception application. A special exception is merely conditional use that is decided by the zoning hearing board instead of the governing body (i.e. Board of Commissioners). Therefore, the standards that apply to one also apply to the other. *Sheetz, Inc. v. Phoenixville Borough Council*, 804 A.2d 113, n.3 (Pa.Commw.Ct. 2002), *alloc. denied*, 573 Pa.669, 820 A.2d 706 (2003).

Enterprises, Inc. v. Hazle Twp. ZHB, 773 A.2d 824, 826 (Pa.Commw.Ct. 2001). Failure to comply with any one specific requirement constitutes the basis for denying a conditional use application. *Levin v. Bd. of Supervisors of Benner Twp.*, 669 A.2d 1063, 1069 (Pa.Commw.Ct. 1995), *aff'd*, 547 Pa.161, 689 A.2d 224 (1997).

Additionally, the activity sought as a conditional use must not be injurious to the public's health, safety, and general welfare. This requirement, along with any general policy concerns regarding conditional uses provided for in the zoning ordinance, are commonly referred to as general requirements for the conditional use. The applicant does not have to show that its proposal meets these general requirements. Instead, those parties objecting to the conditional use application bear the burden of showing that the use sought violates any of the general requirements. Once the objectors have identified specific issues concerning these general requirements, however, the burden shifts to the applicant to rebut or negate issues raised by the objector. *Bray*, 48 Pa.Commw. at 529, 410 A.2d at 912; *see also Graterton Properties, Inc. v. Lower Merion Twp.*, 796 A.2d 1038, 1045-1046 (Pa.Commw.Ct. 2002). To meet this burden, the objectors must show that the proposed use's "impact would be greater than would be normally be expected from that type of use and that this use would pose a substantial threat to the health, safety, and welfare of the community." *Amerikohl Mining, Inc. v. ZHB of Wharton Twp.*, 142 Pa.Commw. 249, 258, 597 A.2d 219, 223 (1991), *alloc. denied*, 602 A.2d 861 (Pa.1992).

In this matter, Applicant is seeking conditional use approval to establish a J31 PCCM upon the Property. As set forth above, the burden is on Applicant to show compliance with Section 27-305.J.J31 setting forth the requirements for a PCCM. In addition, Applicant needs to show compliance with Part 12 of Chapter 27 of the Township Code which sets forth the regulations for all uses within the C-1 Commercial District, as well as the requirements of Section 27-3008 concerning

conditional uses in general. Lastly, Applicant bears the burden of showing that their proposal meets all the zoning requirements generally applicable to applications within the Township. If this burden of proof is met, any objectors to this proposal would then bear the burden of showing that this proposal does not meet the general requirements applicable to conditional uses as described above.

The evidence presented via the exhibits admitted by Applicant along with Applicant's three witnesses shows that Applicant has met its burden of proof. The evidence in the Record illustrates that Applicant meets all the applicable requirements of the J31 use; the applicable requirements of the C-1 zoning district; the requirements of Section 27-3008, and the generally applicable requirements of Chapter 27 such as natural resource protections, open space requirements, buffer requirements, traffic impact, etc. Where the proposal does not meet the requirements of the J31 use, Applicant has requested modification of those specific requirements from the Board of Supervisors as is allowed under the language of this Use.

The intervening party in the hearing, as well as other persons that commented upon this proposal, failed to provide any evidence that this proposal does not meet the general conditions of a conditional use, would have a greater negative impact than other types of J31 Uses, or would constitute a substantial threat to the public's health, safety, and welfare. Based on the foregoing, the Board finds that Applicant meets its burden and that its proposal meets the specific requirements for the requested conditional use as provided for in Chapter 27, Zoning, the Township Code. For all the above stated reasons, the Board finds that Applicant is entitled to the relief requested subject to the conditions set forth below.

CONCLUSIONS OF LAW

1. Applicant has established that its Application to develop the Property with a J31 Use as testified to and shown on the accepted Exhibits meets all the specific requirements for this conditional use as provided for in Section 305.J.J31 of Chapter 27, Zoning, the Township Code, when the granted modifications are taken into consideration.

2. Applicant has established that its Application to develop the Property with a J31 Use as testified to and shown on the accepted Exhibits meets all the specific requirements for this conditional use as provided for in Article 12 of Chapter 27, Zoning, the Township Code.

3. Applicant has established that its Application to develop the Property with a J31 Use as testified to and shown on the accepted Exhibits meets all the specific requirements for this conditional use as provided for in Section 27-3008 of Chapter 27, Zoning, the Township Code.

4. In accordance with Section 27-305.J.J31.c.2, Applicant has presented substantial evidence supporting its request for modifications to the following area and dimensional criteria requirements:

   a. Section 27-2904.a.5 to allow striping and bollards instead of raised curbs to control and direct traffic around the Wawa facility;

   b. Section 27-2904.d.1 to allow the proposed West Butler Avenue driveway to exceed a maximum width of 30 feet at the street line by 18 feet; and

   c. Section 27-2904.g.5 to allow the paved parking area to be located within 20 feet of the exterior structural wall of the proposed Wawa building.

5. Although Applicant did not specifically request a modification to Section 27-305.J.J31.c.13.(b) to provide loading areas along the side of the Wawa building instead of the rear, the Board believes such a configuration works in this situation and meets the intent of the requirements of the J31 Use.

6. Applicant has presented substantial evidence showing sufficient fire access and safety and sufficient areas for pedestrian and vehicular traffic to and from the Wawa facility necessary to meet the requirements of Section 27-305.J.J31.c.2 for the requested waivers.

7. In accordance with Section 27-305.J.J31.c.12(p), Applicant has presented substantial evidence supporting its request for modifications to the following sign regulations:

a. Section 27-305.J31.c.12(o)(6) to allow Applicant to erect one ground sign along the County Line Road frontage and one ground sign along the West Butler Avenue frontage; and

b. Section 27-305.J31.c.12(o)(6)(iv) to allow the ground sign along West Butler Avenue to be 20 feet in height.

8. Applicant has presented substantial evidence showing the requested sign regulation modifications satisfy the purpose and intent of Section 27-305.J.J31.c.12 and improve the overall appearance of the sign plan for the Project and thus meet the requirements of Section 27-305.J.J31.c.12(p) for the requested waivers.

9. The proposed conditional use will not have a substantial negative impact upon the public's health, safety and/or welfare.

10. Any possible negative impacts of this proposed conditional use will be ameliorated by the imposition of the following conditions of approval:

a. To minimize damage from fuel leaks and spills and to prevent infiltration of fuels into the stormwater management system, automatic shut-off valves shall be installed on every fueling station and fossil fuel filters shall be installed within onsite stormwater inlets as determined necessary by the Township Engineer.

b. The Township shall be immediately notified, via a phone call to the Township-designated official, of any fuel leak or spill of over five gallons or of any fuel leak or spill that enters the stormwater management system, infiltrates into the ground, or flows off-site.

c. High-speed diesel pumps shall not be installed at this facility.

d. The façade of the Wawa building and fuel canopy pillars/columns shall be faced with stone as shown on Exhibits A-11 and A-12.

e. No video shall be played at the fueling stations. Any amplified sound produced outside of the Wawa building shall fully comply with all Township noise/sound regulations.

f. The canopy over the fueling stations shall have an A-frame design with recessed lighting.

g. All outdoor lighting shall be fully shielded, LED fixtures.

h. Outdoor lighting fixtures shall be no taller than twenty (20) feet.

i. No supply deliveries (not including fuel) or trash pick-ups shall occur after 11:00 p.m. or before 6:00 a.m.

j. Any truck or vehicle making any delivery to the site shall turn off its engine while making such delivery.

k. The access drives from West Butler Avenue and County Line Road shall be designed and built to discourage cut-through traffic.

11. This approval is conditioned upon Applicant designing and constructing the traffic signal at the West Butler Avenue entrance to the Property as show on the plans.

12. This approval is conditioned upon Applicant installing the plantings for the buffer, required under §27-305.J.J31.c.5 and Part 28 of Chapter 27 of the Township Code, in conjunction with any future development of the Property or within five (5) years of the issuance of the certificate of occupancy for the Wawa facility, whichever occurs first. Applicant shall escrow sufficient funds to fully guarantee compliance with this condition.

13. Applicants shall amend the Plan to provide customer parking for larger vehicles (such as box trucks and landscape vehicles with trailers) that does not conflict with or impinge upon the use of the other parking spaces provided upon the portion of the Property that will be developed as the Wawa facility.

14. Any future development of the Property with new or expanded uses or buildings shall require a new conditional use application and approval.

15. This approval is conditioned upon the Property not being further subdivided to reduce the size of the property subject to this Use J31 conditional use approval. This restriction shall not be construed to prevent future subdivisions of the Property that are consistent and in accordance with the provisions of Use J31 and the May 17, 2018 Zoning Hearing Board Decision (Exhibit A-1).

16. This approval is conditioned upon Applicant purchasing and merging the three parcels it has under agreement denoted as Bucks County Tax Map Parcel Numbers 26-006-101, 26-006-101-004, and 26-006-101-005.

17. This approval is conditioned upon Applicant and Co-Applicant executing cross-access easements between their respective parcels that make up the Property as a whole. Such easements shall be to the Township's satisfaction.

18. This approval is conditioned upon Applicant developing and using the Property in conformity with the Application and the evidence presented at the Hearing.

19. This approval is conditioned upon Applicant complying with all other Township, County, State, and Federal statutes, ordinances, codes, rules, and regulations.

ORDER TO FOLLOW

BEFORE THE NEW BRITAIN TOWNSHIP BOARD OF SUPERVISORS
BUCKS COUNTY, PENNSYLVANIA

IN RE: CONDITIONAL USE APPLICATION :
OF PROVCO PINEVILLE ACQUISITIONS, LLC :

ORDER

AND NOW, this 6th day of August, 2018 after due deliberation and discussion at a public hearing, the New Britain Township Board of Supervisors hereby grants Provco Pineville, LLC the requested conditional use to establish and develop the Property located between West Butler Avenue and County Line Road with a J31 Planned Community Center Mixed Use in accordance with Section 27-305.J.J31 and Article 12 of Chapter 27, Zoning, the Township Code; in compliance with the all the conditions of approval set forth in the attached Adjudication; and to extent set forth in the attached Findings of Fact and Conclusions of Law.

NEW BRITAIN TOWNSHIP
BOARD OF SUPERVISORS

A. James Scanzillo, Chairman

Helen B. Haun, Vice Chair

Cynthia Jones, Member

William B. Jones, III, Member

Gregory P. Hood, Member

EXHIBIT C

DATE OF DECISION: MAY 17, 2018

DATE OF MAILING: MAY 18, 2018

BEFORE THE NEW BRITAIN TOWNSHIP ZONING HEARING BOARD

RE: APPLICATION OF PROVCO PINEVILLE ACQUISITION, LLC, FOR THE PROPERTIES LOCATED ALONG THE NORTH SIDE OF WEST BUTLER AVENUE AND THE EAST SIDE OF COUNTY LINE ROAD, NEAR THE INTERSECTION OF WEST BUTLER AVENUE AND COUNTY LINE ROAD, NEW BRITAIN TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA, FURTHER IDENTIFIED AS TAX MAP PARCEL NOS. 26-6-101, 26-6-101-3, 26-6-101-4 AND 26-6-101-5

FINDINGS OF FACT

1. On Thursday, April 19, 2018, 2014 at 7:00 p.m. at the New Britain Township Building, 207 Park Avenue, Chalfont, New Britain Township, the New Britain Township Zoning Hearing Board ("Board") held a duly noticed hearing on the application of Provco Pineville Acquisition, LLC (the "Applicant").

2. The following four (4) parcels comprise the property that is the subject of the application:

   a. Bucks County Tax Map Parcel No. 26-6-101 ("Parcel A") has a street address of 525 West Butler Avenue and is owned by Jenta Corp. ("Jenta"). Jenta is a Pennsylvania for-profit corporation.

   b. Bucks County Tax Map Parcel No. 26-6-101-3 ("Parcel B") has a street address of 4309 County Line Road and is owned by CTP Management, LLC ("CTP"). CTP is a Pennsylvania limited liability company.

   c. Bucks County Tax Map Parcel No. 26-6-101-4 ("Parcel C") does not have an assigned street address. It is located along County Line Road and is owned by CTP.

   d. Bucks County Tax Map Parcel No. 26-6-101-5 ("Parcel D") has a street address of 527 West Butler Avenue and is owned by Wawa, Inc. ("Wawa"). Wawa is a New Jersey for-profit corporation, authorized to do business in Pennsylvania.

3. Where relevant, Parcel A, Parcel B, Parcel C and Parcel D are collectively referred to herein as the "Property." Where relevant, Parcel A and Parcel D are referred to herein as the "Premises."

4. Notice of the April 19, 2018 hearing was published in advance of the hearing in the Thursday, April 5, 2018 and Thursday, April 12, 2018 editions of The Intelligencer, a newspaper publication of general circulation in New Britain Township.

5. Notice of the April 19, 2018 hearing was sent by first class mail on April 3, 2018 by Devan Ambron ("Ambron"), the New Britain Township Zoning Officer to (a) all record owners of properties within New Britain Township surrounding the Property; and (b) to the adjoining municipality for any surrounding properties that are located in that municipality.

6. Ambron posted notice of the April 19, 2018 hearing on the Property on April 4, 2018 at 10:55 a.m.

7. The Applicant is a Pennsylvania limited liability company. As further described in these Findings of Fact, the Applicant is a business partner and agent of Wawa, with the authority to act on Wawa's behalf in connection with this application.

8. Parcel A is subject to an Agreement of Sale dated September 18, 2017, between Jenta and the Applicant, making the Applicant the equitable owner of Parcel A. *See* Exhibit B-1, Parcel A Agreement.

9. Parcel B is subject to an Easement Agreement dated January 29, 2017, between CTP and the Applicant, granting the Applicant certain rights in Parcel B relevant to the application. *See* Exhibit A-3, Parcel B Easement.

10. Parcel C is subject to an Agreement of Sale dated August 1, 2017, between CTP and the Applicant, making the Applicant the equitable owner of Parcel B. *See* Exhibit B-1, Parcel C Agreement.

11. Parcel D is owned by Wawa. As found previously, the Applicant has the express approval from Wawa to act on its behalf in connection with the instant application.

12. As either an equitable owner, easement holder and/or an agent of the record owner of all the parcels comprising the Property, the Applicant has the requisite standing to prosecute this zoning hearing board application.

13. The Property is located in the C-1, Commercial, zoning district under the New Britain Township Zoning Ordinance (the "Zoning Ordinance").

14. The Applicant proposes to merge Parcel A and Parcel D to create the Premises. The Applicant proposes to construct a Wawa-brand 5,855 square feet convenience store / service station building with six (6) multiple product dispensers (i.e. gas station islands) (12 pumps total) on the Premises. *See* Exhibit B-2, Zoning Plans, Sheet 1.

15. The Applicant proposes an improved road access from West Butler Avenue to the Premises to serve the use. The Applicant also proposes a travel lane from the rear of the Premises across Parcel C, to tie-in to an existing drive aisle on Parcel C and the easement on Parcel B out to County Line Road. *See* Exhibit B-2, Zoning Plans, Sheet 1.

16. In its application, the Applicant describes the proposed use as either a Planned Community Center Mixed Use (use J31) with a Service Station or Car Wash component use (use J19); or alternatively, a stand-alone Service Station or Car Wash Use (use J19).

17. A J31 use is permitted upon conditional use approval in the C-1, Commercial, zoning district. A J19 use is a permitted sub-use within a J31 use. A stand-alone J19 use is permitted by right in the C-1, Commercial, zoning district *See* Zoning Ordinance §§27-305, 27-1201.a and 27-1201.c.

18. In its application in connection with the proposed Planned Community Center Mixed use (use J31), the Applicant requests the following variances from the Zoning Ordinance:

a. from §27-305.J31.c.1 to permit the Planned Community Center Mixed Use on the Property which has a base site area of 14.864 acres, where the required minimum base site area is 15 acres;

b. from §27-305.J31.c.12(o)6)(i) to permit two (2) ground signs, one along West Butler Avenue, and one along County Line Road, where only one ground sign is permitted on a property per 500 square feet of street frontage on one (1) street;

c. from §27-305.J31.c.12(o)6)(iv) to permit each ground sign to be 20 feet high, where the maximum permitted height of any ground sign is 15 feet;

d. from §27-2904.a.5 to permit striping to direct traffic within certain areas of the parking lot surrounding the Wawa service station building, where raised curbs and landscaped areas are required to direct traffic;

e. from §27-2904.d.1 to permit a 48 feet wide two-way street access at the West Butler Avenue street line, where the maximum permitted width for a two-way street access is 30 feet at the street line; and

f. from §27-2904.g.5 to permit paved areas other than curbs or concrete sidewalks to be within 20 feet of the exterior structural walls of the proposed commercial building, where the required minimum setback for such paved areas from the exterior structural building wall is 20 feet.

19. In its application in connection with the alternatively proposed stand-alone Service Station or Car Wash use (use J19), the Applicant requests the following variances from the Zoning Ordinance:

a. from §27-305.J19.b.2 to permit the sale of convenience-type products from the 5,585 square feet proposed Wawa-brand style building, where the maximum permitted floor area for the sale of convenience-type products is 2,000 square feet;

b. from §27-2400.d to permit the disturbance of wetlands for the proposed driveway access to County Line Road, where the disturbance of wetlands is generally prohibited;

c. from §27-2400.h to permit impervious surfaces to be located within 25 feet of a wetland boundary, where impervious surfaces in the wetland margin is prohibited;

d. from §27-2400.i to allow disturbance of zone 1 and/or zone 2 of the required riparian buffer, where no disturbance is permitted;

e. from §27-2605.a to permit each ground/freestanding sign to be 20 feet high, where the maximum permitted height of any ground/freestanding sign in a non-residential zoning district is 12 feet;

f. from §27-2607.a.3(b)(2) to permit the second ground/freestanding sign at the driveway access on County Line Road, and to permit the two (2) proposed ground/freestanding signs to have an aggregate sign area greater than 50 square feet, where a second ground/freestanding sign is permitted if the use has a total linear road frontage of more than 300 square feet, and the maximum sign area is 50 square feet, whether for the 2 signs together or for one sign;

g. from §27-2904.a.5 to permit striping to direct traffic within certain areas of the parking lot surrounding the Wawa service station building, where raised curbs and landscaped areas are required to direct traffic;

h. from §27-2904.d.1 to permit a 48 feet wide two-way street access at the West Butler Avenue street line, where the maximum permitted width for a two-way street access is 30 feet at the street line; and

i. from §27-2904.g.5 to permit paved areas other than curbs or concrete sidewalks to be within 20 feet of the exterior structural walls of the proposed commercial building, where the required minimum setback for such paved areas from the exterior structural building wall is 20 feet.

20. Introduced as exhibits at the zoning hearing are the documents identified on Schedule A attached to this decision. Schedule A is incorporated by reference as though fully set forth herein at length.

21. The following individuals testified on behalf of the Applicant in support of the application at the hearing:

a. Michael Cooley ("Cooley"), officer of the Applicant; and

b. Jason R. Korczak, P.E. ("Korczak"), professional civil engineer.

22. The following individuals and entities requested and were granted party status to the application:

a. Darryl Presti ("Presti"), 517 West Butler Avenue, Chalfont, PA (the "Presti Property");

b. Linda Cummings, 514 Airy Avenue, Chalfont, PA; and

c. Lukoil North America, LLC ("Lukoil"), 550 West Butler Avenue, by and through Mark Ferrari, territory manager; and Laura DeLuca, Esq., corporate counsel.

23. Represented by its solicitor, New Britain Township (the "Township") appeared at the hearing as an active party to the application at the hearing. The Board notes that by law, the Township is automatically granted party status to participate in this hearing. *See* 53 P.S. §10908(3).

24. As a threshold procedural matter, the Applicant's attorney stated that the Applicant's representatives previously appeared before the New Britain Township Board of Supervisors (the "Supervisors") to discuss the instant zoning application.

25. The Applicant's attorney stated that while the Supervisors took no position on the application pending before the Board, the Supervisors informally considered the proposal to be a Planned Community Center Mixed Use (use J31). The Township solicitor confirmed this position.

26. The Board finds that Ambron made no determination in her review of the application that the proposed use does not potentially qualify as a J31 use under the Zoning Ordinance.

27. As a result of its representatives' discussion with the Supervisors, the Applicant's attorney stated that the Applicant intends to submit the required conditional use application to permit the J31 use on the Property.

28. To facilitate the conditional use filing, the Applicant's attorney stated that the Applicant is only seeking a variance from §27-305.J31.c.1 to permit the Planned Community Center Mixed Use on the Property which a base site area of 14.864 acres.

29. The Applicant's attorney maintains that other than the base site area variance, all the other items of relief requested in its application in connection with the J31 use are addressable in a conditional use proceeding. The Board makes no findings or conclusions on that position.

30. The Applicant's attorney stated that, other than the base site area variance, all other variances requested in connection with the proposed J31 use, as well as all variances alternatively sought in connection with the proposed stand-alone Service Station or Car Wash use (use J19), are withdrawn.

31. The Applicant's attorney stated, and the Board concludes, that the removed variance requests are withdrawn without prejudice to the Applicant's right to re-file an application seeking any or all such relief and/or pursuing a stand-alone J19 use.

32. As background, Cooley, Korczak and the Applicant's attorney stated, and the Board finds, the Township amended the Zoning Ordinance in 2008 to create the J31 use. *See* Exhibits A-10 and A-11.

33. By prior a conditional use adjudication dated September 29, 2008, the Supervisors approved a J31 use for several tracts, including the Property, along West Butler Avenue and County Line Road. This 2008 project was eventually discontinued. *See* Exhibits A-10 and A-11.

34. Parcel A is 3.3 gross acres. It is oddly shaped with 187.9 feet of frontage along West Butler Avenue. Parcel A widens in the rear portion of the tract. Its eastern side lot line shares a common border with a portion of the Presti Property. *See* Exhibits B-2, Zoning Plans, Sheet 2; and A-1, Aerial Plan.

35. Parcel A is improved with a 2 story masonry building, 1 story frame barn, a spring house and wetlands. The building and barn are vacant and in poor condition. The protected wetlands are along the rear lot line. *See* Exhibit B-2, Zoning Plans, Sheet 2.

36. Parcel B is 2.6 gross acres. It is shaped like a square, with frontage along County Line Road. It is improved with a large U-shaped masonry structure containing non-residential uses. It has multiple existing drive accesses on to County Line Road, the northern most of which straddles the common lot line with Parcel C. *See* Exhibits B-2, Zoning Plans, Sheet 2; and A-1, Aerial Plan.

37. Parcel C is 8.9 gross acres. It is a large "flag shaped," multi-tier lot, with approximately 129 feet of frontage along County Line Road. Parcel C widens behind and around the Premises. In its widest eastern portion, Parcel C abuts the rear lot line of the Presti Property. *See* Exhibits B-2, Zoning Plans, Sheet 2; and A-1, Aerial Plan.

38. Parcel C is improved with a 1 story metal building, located just beyond the narrowest portion of the tract. The regulated wetlands originating on Parcel A cross on to Parcel C and travel west until reaching the rear lot line of Parcel B. *See* Exhibit B-2, Zoning Plans, Sheet 2.

39. Parcel D is 1.1 gross acres. It is a narrow tract, located next to Parcel A. It is wider along its frontage along West Butler Avenue. It is improved with a 2-story frame building and 3 frame sheds, all in poor condition. *See* Exhibits B-2, Zoning Plans, Sheet 2; and A-2, Aerial Plan.

40. Cooley stated, and the Board finds, that the Applicant is a development partner of Wawa. In its history, the Applicant has constructed at least 20 projects for Wawa, with an additional 12 presently in the permitting stage.

41. Cooley stated, and the Board finds, that the Applicant acquires suitable properties to improve. Working with Wawa, the Applicant develops Wawa's well-known convenience store / gas canopy stations. Wawa leases the developed properties from its partners and operates its stores.

42. Cooley stated, and the Board finds, that Wawa presently has a "legacy" site, located at the northeast corner of West Butler Avenue and County Line Road, identified as Bucks County TMP No. 26-6-101-1. A "legacy" site is a smaller, older store that does not sell motor vehicle fuel. *See* Exhibit B-2, Zoning Plans, Sheet 2.

43. Cooley stated, and the Board finds, that neither the Applicant nor Wawa control this legacy location. It leases the property from an unrelated third party. If the J31 use is approved for the Property, the Applicant and Wawa will close this legacy store.

44. Cooley stated, and the Board finds, that only the proposed J19 sub-use presently comprises the J31 master use. The balance of Property has yet to be designed. While Parcel B is

used, via the easement, in furtherance of the J31 use, the commercial building itself is an existing stand-alone use. *See* Exhibit B-2, Zoning Plans, Sheet 2.

45. Cooley stated, and the Board finds, that the proposed convenience store building will be 5,885 square feet, located in the center of the Premises. The gas station island will be in front of the convenience store building. It will contain 12 pumps on 6 islands, located under a canopy. *See* Exhibits A-2, Site Plan; A-4, Building Elevations; and A-5, Fuel Canopy Elevations.

46. Cooley stated, and the Board finds, that sixty-two (62) parking spaces will be provided on the Premises to support the J31 use. Twenty-six (26) of those spaces will abut the walkway that surrounds the convenience store building. *See* Exhibit A-2, Site Plan.

47. Cooley stated, and the Board finds, that primary ingress to and egress from the Premises will be from an upgraded two-way fully signalized access on to West Butler Avenue, aligned with an existing entrance to the existing New Britain Village shopping center across the road. *See* Exhibit A-2, Site Plan.

48. Cooley stated, and the Board finds, that a secondary access to the Premises will be through a rear driveway out to County Line Road. This driveway will exit the Premises behind the convenience store building, cross Parcel C, then turn west and exit to County Line Road over Parcel C and the easement on Parcel B. *See* Exhibit A-2, Site Plan.

49. Korczak stated, and the Board finds, that this secondary access will cross the wetlands on Parcel C. Korczak confirmed that the Applicant will require conditional use approval, as well as federal and state approvals, to allow this wetland crossing. *See* Exhibit A-2, Site Plan.

50. Korczak stated, and the Board finds, that the existing structures on the Premises are in poor condition. All such structures, other than the spring house near the wetlands on Parcel A, will be removed from the Premises to permit the J31 use. The 1 story metal building on Parcel C will remain, as will the commercial building on Parcel B. *See* Exhibit B-2, Zoning Plans, Sheet 1.

51. Regarding the Property's size, Korczak stated, and the Board finds that the Property's site area is 15.775 acres. This dimension was determined by an actual site survey. *See* Exhibit A-2, Site Plan.

52. Korczak stated, and the Board finds, that the Property's base site area is 14.864 acres. As found previously, the required minimum base site area (total tract) for a J31 use is 15 acres. *See* Exhibit A-2, Site Plan; *see also* Zoning Ordinance §27-305.J31.c.1.

53. To calculate the Property's base site area, Korczak stated, and the Board finds that he deducted the Property's following locations and areas:

a. County Line Road ultimate right-of-way (0.574 acres);

b. West Butler Avenue legal right-of-way (0.080 acres); and

c. West Butler Avenue ultimate right-of-way (0.257 acres).

54. Korczak stated, and the Board finds, that located within these areas are the existing portions of the County Line Road and West Butler Avenue cartways, driveway accesses to the abutting property, and open grass areas. *See* Exhibit B-2, Zoning Plans, Sheet 1.

55. Korczak stated, and the Board finds, that that legal and ultimate right-of-way areas are intended for road widening and other street related improvements. The Applicant intends to widen West Butler Avenue and County Line Road (where required), installed controlled accesses, sidewalks and the traffic signal within these right-of-way areas in connection with the proposed J31 use. *See* Exhibit A-2, Site Plan.

56. Korczak stated, and the Board finds, that the convenience store, fuel dispensers and canopy, and parking areas proposed as part of the J31 use are located outside these legal and ultimate right-of-way areas. *See* Exhibit A-2, Site Plan.

57. Upon questioning from Presti, Korczak stated, and the Board finds, that while the Applicant does not intend any modifications to the existing West Butler Avenue road conditions in front of the Presti Property, the Pennsylvania Department of Transportation ("PennDOT") will make the final determination of any required road improvements to West Butler Avenue.

58. Korczak stated, and the Board finds, that upon completion of the County Line Road and West Butler Avenue road improvements, the Applicant intends to dedicate these right-of-way areas to the appropriate governmental authority, whether it be PennDOT and/or the Township.

59. Korczak stated, and the Board finds, that none of the other limitations set forth in the Zoning Ordinance definition of "base site area," such as easements or major stream, apply to the Property for the purpose of determining the Property's base site area. *See* Zoning Ordinance §27-201.

60. Korczak stated, and the Board finds, the Property's base site area is only .136 acres (5,924.16 square feet) short of required minimum of 15 acres. Said another way, the Property contains 99.1% of the required minimum base site area. Korczak described this difference as "de minimis." *See* Exhibit A-2, Site Plan.

61. The Township solicitor stated that the Township requests that the Board attach 3 conditions to any relief granted by the Board. Such conditions are identified as the first 3 bullet points in the correspondence dated April 19, 2018 and identified as Exhibit T-1. *See* Exhibit T-1, Letter.

62. Counsel for the Applicant registered an objection to the request, specifically on the grounds that the requested 3 conditions do not reasonably relate to the one variance request before the Board and are more suitable for the conditional use proceeding for the J31 use.

63. The surrounding properties consist of a variety of mixed uses. Behind the Property (specifically Parcel C) are single-family detached residences. To the Property's east is a former supermarket building being converted to an indoor self-storage facility. *See* Exhibit A-1, Aerial Plan.

64. Adjacent to Parcel D and Parcel B is an "L" shaped property, improved with a local gun shooting range. This "L" shaped property separates the Property from the existing "legacy"

Wawa store located at the corner of County Line Road and West Butler Avenue. *See* Exhibit A-1, Aerial Plan.

65. In front of the Property along West Butler Avenue are four (4) smaller non-residentially used properties, including the Presti Property which is used as a flower shop. These uses also include an optometrist, dental lab and barber shop. *See* Exhibit A-1, Aerial Plan.

66. Across West Butler Avenue and County Line Road in the vicinity of the Property are a variety of commercial uses, including the New Britain Village shopping center, Lukoil's gas service station, a CVS Pharmacy, and a joint BP gas service station / Dunkin' Donuts structure. *See* Exhibit A-1, Aerial Plan.

67. Due to the Property's odd shape, its frontage along two (2) heavily traveled streets in the Township, the numerous out parcels between the Property and the adjoining roads, the J31 use cannot be constructed in compliance with the required minimum base site area zoning regulation.

68. The required minimum base site area of 15 acres dimensional limitation found at Zoning Ordinance §27-305.J31.c.1 imposes a hardship on the Property and the Applicant in that this provision prevents the reasonable use of a large property, previously part of an approved J31 use, in a mixed use area of the Township.

69. Subject to the conditions imposed herein, the proposed J31 use on the Property with a base site area of less than 15 acres is harmonious with the Property's size and is consistent with uses of other properties in the surrounding neighborhood.

CONCLUSIONS OF LAW

1. Required public notice of the hearing was made by sufficient publication, posting and mailing to affected property owners.

2. In order to show entitlement to a variance, use or dimensional, an applicant must demonstrate all the following elements:

a. an unnecessary hardship stemming from unique physical characteristics or conditions will result if the variance is denied;

b. because of such physical circumstances or conditions, there is no possibility that the property can be developed in strict conformity with the provisions of the zoning ordinance and a variance is necessary to enable the reasonable use of the property;

c. the hardship has not been created by the applicant;

d. granting the variance will not alter the essential character of the neighborhood nor be detrimental to the public welfare; and

e. the variance sought is the minimum that will afford relief.

3. The Board finds that the base site area variance requested is a dimensional variance. A dimensional variance involves a request to adjust or vary a Zoning Ordinance provisions by degree to be able to otherwise use a property consistent with the regulations. *See Dunn v. Middletown Township Zoning Hearing Board,* 143 A.3d 494 (Pa Commw. 2015); *see also Constantino v. ZHB of Forest Hills Borough*, 636 A.2d 1266 (Pa. Commw. 1994).

4. An applicant can demonstrate "unnecessary hardship" for a use or dimensional variance by showing that a property's physical characteristics are such that the property cannot be used for any permitted purpose, or can only conform to a permitted purpose at prohibitive expense; or that the property has either no value or only distress value for any permitted purpose.

5. However, under Pennsylvania law, a dimensional variance is subject to a lesser standard of proof to establish unnecessary hardship than a use variance. *See Hertzberg v. Zoning Board of Adjustment of City of Pittsburgh*, 721 A.2d 43 (Pa. 1998) (when seeking a dimensional variance within a permitted use, the owner is asking only for a *reasonable adjustment* of the zoning regulations. The grant of a dimensional variance is of lesser moment than the grant of a use variance, since the latter involves a proposal to use the property in a manner that is wholly outside the zoning regulation).

6. When deciding whether a hardship has been established in dimensional variance cases, the *Hertzberg* rationale authorizes the Board to consider multiple factors, including the characteristics of the surrounding neighborhood. *See Hertzberg, supra,* at 47.

7. Nevertheless, the reasons for granting a variance must be substantial, serious and compelling. The party seeking the variance bears the burden of proving that (a) unnecessary hardship will result if the variance is denied; and (b) the proposed use will not be contrary to the public interest. *See Wilson v. Plumstead Township Zoning Hearing Board*, 936 A.2d 1061 (Pa. 2007).

8. The Board concludes that the Property's odd shape, its frontage along two (2) heavily traveled streets in the Township, and the numerous out parcels between the Property and the adjoining roads establish a hardship under the *Hertzberg* standard.

9. The Board notes that the Zoning Ordinance defines "site area" as "all the land within the site as defined in the deed. This area shall be determined from an actual site survey rather than from a deed description." *See* Zoning Ordinance §27-201.

10. Based upon Korczak's credible testimony, the Board concludes that the Property's "site area" is 15.775 acres. On a gross area basis, the Property is greater than 15 acres in size.

11. The Board notes that the Zoning Ordinance defines "base site area," in relevant part, as "the area of site remaining after subtracting land: within the ultimate road rights-of-way of existing roads; within existing utility rights-of-way or easements; preserved through easement or other means;...which is cut off from the main parcel by a road, railroad, existing land use, and/or major stream;...used and/or to be used for another type of use...; and/or located in a different zoning district than the rest of the development." *See* Zoning Ordinance §27-201.

12. Based upon the credible evidence presented, applying this definition, the Board concludes that the only areas of the Property affecting the base site area calculation are the sections

of the Property located within the legal and/or ultimate right-of-way of County Line Road and West Butler Avenue.

13. Critical to the Board's conclusions herein is that the Property lacks any other feature, such as a utility easement or protected resource, that would further impact calculating the Property's base site area. Said another way, the Property's base site area is effectively all portions of the Property outside the adjoining roadways. *See* Exhibit A-2, Site Plan.

14. The Board notes that the base site area of every property in the Township is likely affected by the adjoining road right-of-way. Conversely, each property's internal characteristics, such as protected resources, are unique to that property when determining its base site area.

15. The Board concludes that the proposed J31 use, however ultimately designed, will not be affected by removing Property's areas within the legal and ultimate right-of-way from the calculation of the base site area.

16. Even with all J31 use improvements placed beyond the boundaries of the legal and ultimate rights-of-way, the Board concludes the Property is sufficiently sized at 14.864 acres to support the proposed J31 use.

17. The Applicant's representatives describe this 0.136 acre base site area deficiency as "de minimis." The Board notes that under Pennsylvania zoning law, it is empowered to grant a *de minimis* variance as a narrow exception to an applicant's traditional heavy burden of proof in seeking a variance.

18. The *de minimis* doctrine applies only where (a) a minor deviation from the dimensional requirements of a zoning ordinance is sought; and (b) rigid compliance with the zoning ordinance is not necessary to protect the public policy concerns inherent in the ordinance. *See Dunn v. Middletown Township Zoning Hearing Board*, 143 A.3d 494 (Pa. Commw. 2016).

19. The Board declines to apply the *de minimis* doctrine in this instance. The Board concludes that the Applicant has sufficiently demonstrated that the applicable provisions of the Zoning Ordinance inflict an unnecessary hardship on the Property, and therefore has met the requisite elements supportive of a traditional variance.

20. Moreover, the Board finds that the proposed J31 use is consistent with the purpose and intent of the C-1 zoning district. *See* Zoning Ordinance §27-1201.a (the purpose of the C-1 district is to provide for a variety of commercial uses and associated levels of traffic in the areas of the community suited for business development).

21. Regarding the Township's request that the Board impose certain conditions to the base site area variance relief granted herein, the Board notes that its jurisdiction enables it to "attach such reasonable conditions and safeguards as it may deem necessary to implement the purposes of...the [Zoning Ordinance]." *See* 53 P.S. §10910.2(b); *see also* Zoning Ordinance §27-3104.b.

22. Pennsylvania caselaw instructs that while the Board may impose conditions that bear a reasonable relation to the protection of the public interest and are reasonable under the facts of the case, it cannot attach conditions wholly irrelevant to the affected regulations. *See Township*

of Harrison v. Smith, 636 A.2d 288 (Pa. Commw. 1993); *see also In re Appeal of Board of Supervisors of Solebury Township*, 412 A.2d 163 (Pa. Commw 1980).

23. The 3 conditions sought by the Township, set forth in the first 3 bullet points of Exhibit T-1, specifically relate to operating the gasoline / diesel fuel pumps, preventing leaks therefrom, and notifying the Township of any leak. *See* Exhibit T-1, Letter.

24. The Board concludes that none of these conditions are related to the size of the Property. To the extent they relate to the proposed J31 use, the conditions speak to the operation of the fuel dispenser facilities. That is a topic wholly reserved to the Supervisors as part of the Zoning Ordinance's requirement that a J31 use be approved by conditional use.

25. As such, the Board declines to attach the Township's requested conditions to the relief granted herein. However, the Board will attach certain reasonable standard conditions in order to protect the public interest and further the purposes of the Zoning Ordinance.

26. Provided the Applicant complies with the reasonable conditions attached to the relief granted herein, the Applicant has met the Zoning Ordinance and Pennsylvania law requirements for the variance, including hardship, to install and operate, subject to further conditional use approval, a J31 use on a tract with a base site area of 14.864 acres.

27. The approved variance will not alter the essential character of the neighborhood in which the Premises is located nor substantially impair the appropriate use or development of adjacent properties.

28. The approved variance will not be detrimental to the public welfare.

29. The conditions and circumstances imposing a hardship upon the Premises for the approved variance are not of the Applicant's own doing.

30. The approved variance represents the minimum variance that will afford relief and represents the least modification of the zoning regulations under the circumstances.

***** REMAINDER OF PAGE INTENTIONALLY LEFT BLANK *****

DECISION

AND NOW, this 17th day of MAY, 2018, upon consideration of the foregoing Findings of Fact and Conclusions of Law, the New Britain Township Zoning Hearing Board hereby **GRANTS** the Applicant's request for a variance from Zoning Ordinance from §27-305.J31.c.1 to permit the Planned Community Center Mixed Use (use J31) on the Property which has a base site area of 14.864 acres, where the required minimum base site area is 15 acres, subject to the following conditions:

1. Subject to further conditional use approval, the proposed J31 use's dimensions, size, location and appearance shall be materially in accordance with Exhibits B-2, Zoning Plans, and A-2, Site Plan, and the supportive evidence, exhibits, representations and credible testimony made at the hearing.

2. All other variance requests set forth in the submitted application are considered withdrawn without prejudice to the Applicant's right to re-file an application seeking any or all such relief.

3. This decision does not waive any requirements of any other applicable New Britain Township Ordinance(s); and the proposed addition must meet all other applicable federal, state, county and New Britain Township regulations and codes.

NEW BRITAIN TOWNSHIP
ZONING HEARING BOARD

DATE: 5/17/18

Chuck Coxhead, Chair

DATE: 5/17/18

Catherine B. Basilii, Member

DATE: 5/17/18

Michelle Martin, Member

Thomas J. Walsh III, Esquire
Solicitor, New Britain Township Zoning Hearing Board
2500 York Road, Suite 120
Jamison, PA 18929

Note to Applicant: This Decision is NOT an authorization to build. Zoning and building permits must be obtained from New Britain Township prior to the commencement of any construction.

/Users/tjwalsh3/Documents/New Britain Township/2018/Wawa/DECISION.Provco-Wawa.2018-04-19 hearing.docx

SCHEDULE A – TABLE OF EXHIBITS

Exhibit	Description
B-1	Zoning Hearing Board application dated 2/20/18. Attachments: • Summary of relief requested dated 3/2/18 prepared by Bohler Engineering • List of property owners with 500 feet of Property with hand-drawn map showing locations of such properties • Agreement of Sale dated 8/1/17 (REDACTED) between Applicant and CTP Management, LLC • Agreement of Sale dated 9/18/17 (REDACTED) between Applicant and Jenta Corp
B-2	Zoning Plans, prepared by Bohler Engineering, consisting of 6 sheets, dated 3/2/18
B-3	Letter to The Intelligencer dated 3/28/18 forwarding public notice of 4/19/18 hearing for advertisement
B-4	Public Notice of the hearing on 4/19/18
B-5	Proof of publication of public notice of 4/19/18 hearing in 4/5/18 and 4/12/18 editions of The Intelligencer
B-6	Letter to Applicant and attorney dated 3/28/18 providing notice of the 4/19/18 hearing
B-7	List of the record owners of all properties surrounding the Property
B-8	Affidavit of mailing to property owners – notice of 4/19/18 hearing mailed by Zoning Officer on 4/3/18
B-9	Affidavit of posting of public notice at property – notice of 4/19/18 hearing posted on Property by Zoning Officer on 4/4/18 at 10:55 a.m.
A-1	Existing Conditions Aerial Plan
A-2	Site Plan (rendered and colored) (Sheet 1 of Exhibit B-2)
A-3	Easement Agreement (REDACTED) between CTP Management, LLC and Applicant
A-4	Wawa Building Elevations

Exhibit	Description
A-5	Wawa Fuel Canopy Elevations
A-6	Curriculum Vitae of Jason R. Korczak, P.E.
A-7	Site Plan (Sheet 1 of Exhibit B-2)
A-8	Existing Conditions / Demolition Plan (Sheet 2 of Exhibit B-2)
A-9	Signage Details (Sheet 6 of Exhibit B-2)
A-10	Appendix A – Legal Notice and Ordinance
A-11	Appendix B – Adjudication of the New Britain Township Board of Supervisors dated 9/22/2008
T-1	Letter dated April 19, 2018 from Township Solicitor to Board Chair

MEMO

TOWNSHIP OF NEW BRITAIN

TO: Matt West, Township Manager

FROM: Ryan Gehman, Assistant Planning & Zoning Officer

DATE: April 26, 2023

RE: April 25, 2023 Planning Commission Meeting – Birch Run Conditional Use

---

At the 4/25/2023 Planning Commission meeting, the following topics were discussed regarding the Conditional Use Application for the proposed Birch Run Development at County Line Rd & W Butler Ave.

1. The applicant stated that all of the comments in the Gilmore & Associates review letter were will comply.

2. The applicant noted 3 items of relief that they would be requesting from the Board of Supervisors and provided justification as to why they feel it should be granted. The relief is related to the number of monument signs permitted within the site, the height of the proposed buildings, and encroachment of an existing conservation easement to provide connectivity to the neighboring Wawa parcel.

3. A discussion ensued about the possibility of prohibiting left hand turns out of the site onto County Line Rd. The applicant stated they are considering limiting the times that left turns are permitted, and that if PennDOT deems any additional restrictions necessary, they will comply.

4. The Planning Commission recommended approval of the Conditional Use subject to compliance with the April 19, 2023 Gilmore & Associates letter, along with the condition that additional benches and other public amenities be added to the plan. One member opposed the motion.

OBERMAYER

Nate D. Fox, Esquire
Direct Dial: 215.606.0178
nate.fox@obermayer.com
www.obermayer.com

Obermayer Rebmann Maxwell & Hippel LLP
10 S. Clinton Street, Suite 300
Doylestown, PA 18901
P: 215.606.0760
F: 215.348.1804

www.obermayer.com

March 6, 2023

VIA HAND DELIVERY
AND EMAIL
New Britain Township
Ryan Gehman, Zoning Officer
207 Park Avenue
Chalfont, PA 18914
rgehman@nbtpa.us

Re: ***County Line Road and West Butler Avenue***
TMP Nos. – 26-006-101-004, 26-006-101, and 26-006-101-003
Conditional Use Application of Toll Mid-Atlantic L.P. Company, Inc.

Dear Ryan:

Attached please find seven (7) copies of Applicant, Toll Mid-Atlantic L.P. Company, Inc.'s Conditional Use Application in connection with the above-referenced property along with a check for the required filing fee of $2,500 and a flash drive containing an electronic copy of the complete application.

Please let me know if you have any questions or require any further information. Thank you.

Very truly yours,

Nate D. Fox, Esq.

Enclosures

NEW BRITAIN TOWNSHIP

207 Park Avenue • Chalfont, PA 18914 • Telephone: (215) 822-1391

CONDITIONAL USE HEARING APPLICATION

Please Note:

It is the applicant's responsibility to complete all pertinent sections of this form. Please contact the Zoning Officer prior to submittal if you need any assistance.

TOWNSHIP USE ONLY	
Application #:	
Date Filed:	
Payment:	
Check #:	
Receipt #:	

1. Date: 3/6/2023

2. Applicant:
   - (a) Name: Toll Mid-Atlantic L P Company, Inc
   - (b) Mailing address: 250 Gibralter Road, Horsham, PA 19044
   - (c) Telephone number: 215-606-0178 (Attorney)
   - (d) State whether owner of legal title, owner of equitable title, or tenant with the permission of owner of legal title: Equitable title

3. Applicant's attorney, if any:
   - (a) Name: Nate Fox, Esq.
   - (b) Mailing Address: 10 S. Clinton Street, Suite 300, Doylestown, PA 18901
   - (c) Telephone number: 215-606-0178
   - (d) Fax Number: 215-665-3165

4. Property:
   - (a) Present Zoning Use Classification: C-1 Commercial
   - (b) Tax Parcel Number: See attached Addendum
   - (c) Location (With reference to nearby intersections or prominent features): Frontage on West Butler Avenue and County Line Road

5. Proposed use: Use J31 - Planned Community Center Mixed (PCCM) with B5 Single-Family Attached Dwelling Use

6. Has any previous zoning applications been filed concerning this property? If yes, specify: Yes, a ZHB Decision granting dimensional relief for a PCCM including the Property was issued on May 17, 2018; Additionally a Conditional Use Decision dated August 8, 2018 approved the J31 PCCM Use on the Property

I (We) hereby certify that the above information is true and correct to the best of my (our) knowledge, information or belief.

Signature

Notes:

(1) One copy of plans (if size 8 1/2" x 11") or seven copies (if larger than size 8 1/2" x 11") must be attached to the application. The plan or plans must be prepared by a professional engineer or surveyor. The plan or plans must contain all information relevant to the application, including but not limited to, the following: the property related to a street, the dimensions and area of the lot, the dimensions and location of existing buildings or improvements, the dimensions and locations of proposed uses, buildings or improvements.

(2) Filing fee, which must accompany this application, and which is not returnable once the application is accepted. Conditional Use Application Fee: $2,500.00, plus Professional Services Agreement and escrow.

NEW BRITAIN TOWNSHIP - BOARD OF SUPERVISORS

ADDENDUM TO CONDITIONAL USE APPLICATION OF

TOLL MID-ATLANTIC L.P. COMPANY, INC.

BIRCH RUN AT NEW BRITAIN

Tax Parcel Nos. 26-006-101-004, 26-006-101, and 26-006-101-003

Background

Applicant, Toll Mid-Atlantic L.P. Company, Inc., is the equitable owner of certain real property with frontage on County Line Road and West Butler Avenue in New Britain Township, Bucks County, more specifically identified as Tax Parcel Nos. 26-006-101 ("Wawa Parcel"), 26-006-101-003 ("Creamery Parcel"), and 26-006-101-004 ("Development Parcel")(collectively, the "Property").

The Property is located within the C-1 Commercial Zoning District pursuant to the New Britain Township Zoning Map and Zoning Ordinance ("ZO"). The Property has been approved as a Planned Community Center Mixed Use (PCCM), by an August 6, 2018 Conditional Use Adjudication, and was previously granted dimensional variance relief by a May 17, 2018 ZHB Decision.

The Property includes an existing Wawa convenience store and gas station on the Wawa Parcel and a flex space use on the Creamery Parcel, which have previously been approved and developed as part of the PCCM. The Development Parcel is unimproved except for an access drive and stormwater facilities which were approved under a previous application, and a structure and driveway which will be removed. Applicant now proposes to develop the Development Parcel with a B5 Single-Family Attached Dwelling use, including 44 three-story townhomes, as depicted on the Site Plans For Birch Run at New Britain attached hereto as Exhibit 2.

As a condition of the August 6, 2018 Adjudication, all future associated uses within the PCCM are required to be approved as a conditional use. By this Application, Applicant requests the Board of Supervisors hold a hearing on this application to amend the approved Conditional Use of the Property, or alternatively, to grant a new conditional use approval to permit the B5 Single-Family Attached Dwelling use as a sub-use within the PCCM.

In order to develop the Property as proposed, Applicant requests approval from the Board of Supervisors for the following deviations from the PCCM design regulations:

1. To the extent the ordinance restriction to a maximum of one ground sign per 500 feet of street frontage applies to the proposed internal roadways, Applicant requests a

modification of sign regulations pursuant to Section 27-305.J31.e.13.(d), to permit community identification ground signs on the Development Parcel at the intersection of the Access Road and Road A, and along Road B, as shown on the Site Plans. No signs will be located along the frontage of either County Line Road or West Butler Avenue. In the event the Board determines that this restriction applies, a waiver or modification is requested to permit a ground sign along Road B which has 302 feet of street frontage;

2. To permit maximum building heights of 37 feet under the Board's discretion pursuant to Section 27-305.J31.h.3, due to grade variation around the buildings, and where increased green and/or buffer areas are proposed for the site and the proposed building heights can be safely served by local fire service providers;

3. To permit disturbance of roughly 4,300 square feet of an existing conservation easement on the Wawa Parcel, as necessary to provide additional vehicular and pedestrian circulation between parcels in combination with a water line easement.

Applicant's request to amend the approved Conditional Use (or alternatively to grant conditional use approval) should be granted, as it satisfies all other applicable requirements under the ZO for the J31 PCCM Use, as well as the B5 residential sub-use. Specifically:

a. All applicable area and dimensional requirements for the B5 residential sub-use are satisfied, except for the maximum building height deviation requested above;

b. Less than 25% of the base site area will be part of the residential sub-use;

c. Compliant open space will be provided in an amount greater than 1/3 of the residential sub-use and greater than 5% of the overall base site area;

d. Minimum 25-foot buffers will be provided between the proposed residential and existing or proposed commercial uses; and

e. The PCCM will comply with all Performance and Design, Signage, Parking, and Natural Resource Protection Standards, except for the signage and conservation easement disturbance requested above.

Additionally, the application satisfies the general requirements for conditional use approval pursuant to §27-3008 of the Zoning Ordinance. Specifically, the B5 residential sub-use will be:

1. In accordance with the Township Comprehensive Plan objectives as a compact, walkable community near the existing commercial Butler Avenue Corridor;

2. In the best interests of the Township, the convenience of the community, and the public welfare;

3. Suitable for the property in question, and designed, constructed, operated and maintained so as to be in harmony with and appropriate in appearance to the existing or intended character of the general vicinity;

4. In conformance with all applicable requirements of this chapter and all Township ordinances;

5. Suitable in terms of effect on highway traffic and safety with adequate access arrangements to protect streets from undue congestion and hazard;

6. In accordance with sound standards of subdivision and land development practice where applicable; and

7. In accordance with the specific standards and criteria of this chapter.

Applicant is entitled to the grant of a conditional use when its application meets the requirements of the Zoning Ordinance. *In re Thompson*, 869 A.2d 659 (Pa. Cmwlth. 2006) (citing *Sheetz, Inc. v. Phoenixville Borough Council*, 804 A.2d 113 (Pa. Cmwlth. 2002); *Levin Board of Supervisors of Benner Township*, 669 A2d 1063 (Pa. Cmwlth. 1995); and *Bailey v. Upper Southampton Towsnhip*, 690 A.2d 1324 (Pa. Cmwlth. 1997)).

NEW BRITAIN TOWNSHIP - BOARD OF SUPERVISORS

CONDITIONAL USE APPLICATION OF

TOLL MID-ATLANTIC L.P. COMPANY, INC.

BIRCH RUN AT NEW BRITAIN

Tax Parcel Nos. 26-006-101-004, 26-006-101, and 26-006-101-003

EXHIBITS

1. Agreement of Sale, dated September 13, 2022;
2. Site Plans for Birch Run at New Britain, by ESE Consultants, Inc. dated February 21, 2023;
3. Architectural Rending of proposed townhomes;
4. Environmental Impact Statement Report;
5. Fiscal Impact Analysis;
6. Traffic System Inventory & Analysis;
7. Conditional Use Stormwater Management Narrative; and
8. Stormwater Management Plans Pre-Development

AGREEMENT OF SALE

THIS AGREEMENT OF SALE (this "**Agreement**") is made this 13th day of September 2021, between **CTP MANAGEMENT LLC,** a Pennsylvania limited liability company having an address at 4309 County Line Road, Unit C, Chalfont, PA 18914 ("**Seller**") and **TOLL MID-ATLANTIC LP COMPANY, INC.**, a Delaware corporation having an address at 1140 Virginia Drive, Fort Washington, PA 19034, or its nominee ("**Buyer**").

WITNESSETH:

In consideration of the covenants and provisions contained herein, and subject to the terms and conditions hereinafter set forth, the parties hereto, intending to be legally bound, agree as follows:

1. Sale. Seller hereby agrees to sell and convey to Buyer, who hereby agrees to purchase from Seller, all that certain tract of land of approximately eight and eighty-five one hundredths (8.85) acres situate in the Township of New Britain, County of Bucks, Commonwealth of Pennsylvania, designated as Bucks County Tax Map Parcel Number 26-006-101-004, as more particularly described on Exhibit "A" attached hereto (the "**Property**"). The Property includes (i) all tenements, hereditaments, appurtenances, easements, covenants, permits, approvals, escrows and other rights arising from or appertaining to the land; (ii) all structures (including the existing residence), fixtures, systems, improvements, topsoil, trees, shrubbery and landscaping situated on, in or under or used in connection with the land; (iii) all agreements that are in force and effect and benefit the Property; (iv) all intangible property now or hereafter owned by Seller and used by Seller in the ownership or operation of the Property including all trademarks, logos and tradenames; and (v) all surveys, plans, specifications, reports, engineering work-product and other information to which Seller has access relating to the Property (all items set forth in this subparagraph (v) collectively, the "Seller's Plans"), which Seller's Plans shall be provided in electronic format and/or hard copy as requested by Buyer. Seller agrees to provide to Buyer copies of Seller's Plans on or before the date of this Agreement in electronic format and/or hard copy as requested by Buyer.

2. Purchase Price. [redacted]

(a) [redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

(e) [redacted]

[redacted]

[redacted]

(f) [redacted]

[redacted]

3. Title.

(a) [redacted]

(b) [redacted]

(i) [redacted]

(ii) [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

4. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

5. [redacted]

6. [redacted]

(a) [redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

7. [redacted]

8. [redacted]

9. [redacted]

10. [redacted]

(a) [redacted]

(b) [redacted]

11. [redacted]

12. [redacted]

13. Due Diligence Period.

(a) [redacted]

(b) [redacted]

14. [redacted]

(a) [redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

(e) [redacted]

(f) [redacted]

(g) [redacted]

(h) [redacted]

(i) [redacted]

(j) [redacted]

(k) [redacted]

15. [redacted]

(a) [redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

(e) [redacted]

(f) [redacted]

(g) [redacted]

16. Conditions to Buyer's Obligations.

(a) [redacted]

(i) [redacted]

(ii)

(iii) [redacted]

[redacted]

(iv) [redacted]

(v) [redacted]

(vi) [redacted]

(vii) [redacted]

[redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

(e) [redacted]

[redacted]

(f) [redacted]

(g) [redacted]

17. [redacted]

18. [redacted]

19. [redacted]

To Seller:

CTP Management, LLC
4309 County Line Road, Unit C
Chalfont, PA 18914
Attn: Mr. James D Shainline
Mr. Richard K. Shainline
Mr. Joseph J Franklin
Email: jshainline@creamerytire.com

To Buyer:

Toll Mid-Atlantic LP Company, Inc.
c/o Toll Bros., Inc.
1140 Virginia Drive
Fort Washington, PA 19034
Attn: Thomas J. Smith, III, Esquire, Assistant Vice President and Counsel
Email: tsmith@tollbrothers.com and
legalnotices@tollbrothers.com

With a copy to:

Toll Mid-Atlantic LP Company, Inc.
c/o Toll Bros., Inc.
1140 Virginia Drive
Fort Washington, PA 19034
Attn: Christopher Gaffney, Regional President
Email: cgaffney@tollbrothers.com

and

Toll Mid-Atlantic LP Company, Inc.
c/o Toll Bros., Inc.
1140 Virginia Drive
Fort Washington, PA 19034
Attn: John Dean, Division President
Email: jdean@tollbrothers.com

20. [redacted]

21. [redacted]

22. Miscellaneous.

(a) [redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

[redacted]

(e) [redacted]

(f) [redacted]

(g) [redacted]

(h) [redacted]

(i) [redacted]

23. Escrow of Deposit.

(a) [redacted]

(i) [redacted]

(ii) [redacted]

(iii) [redacted]

(iv) [redacted]

(b) [redacted]

(c) [redacted]

(d) [redacted]

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals the day and year first above written.

BUYER:
TOLL MID-ATLANTIC LP COMPANY, INC.,
a Delaware corporation

By:_____
Name: JOHN A. DEAN
Title: DIV. PRESIDENT

Date of Execution: 9/13/21

SELLER:
CTP MANAGEMENT LLC,
a Pennsylvania limited liability company

By:_____
Name: Jim Shainline
Title: Member

Date of Execution: 9-3-21

EXHIBIT "A"

DESCRIPTION OF PROPERTY

CONTROL POINT ASSOCIATES, INC.
traditional methods | modern approaches
th ANNIVERSARY

New Britain Corporate Center
1600 Manor Drive, Suite 210
Chalfont, PA 18914
Tel. 215.712.9800
Fax. 215.712.9802
www.cpasurvey.com

January 8, 2018
02-060168-02

METES AND BOUNDS DESCRIPTION
T.M.P. 26-06-101-004
LANDS NOW OR FORMERLY
CTP MANAGEMENT LLC
NEW BRITAIN TOWNSHIP, BUCKS COUNTY
COMMONWEALTH OF PENNSYLVANIA

BEGINNING AT A POINT ON THE TITLE LINE IN THE BED OF COUNTY LINE ROAD (A.K.A. L.R. 09033, S.R. 2038, VARIABLE WIDTH RIGHT-OF-WAY) AT THE INTERSECTION OF THE DIVIDING LINE BETWEEN T.M.P. 26-06-101-003, LANDS NOW OR FORMERLY CTP MANAGEMENT LLC AND T.M.P. 26-06-101-004, LANDS NOW OR FORMERLY CTP MANAGEMENT LLC, AND FROM SAID POINT OF BEGINNING RUNNING, THENCE;

1. ALONG THE TITLE LINE IN THE BED OF COUNTY LINE ROAD (A.K.A. L.R. 09033, S.R. 2038, VARIABLE WIDTH RIGHT-OF-WAY), NORTH 49 DEGREES - 44 MINUTES - 00 SECONDS WEST, A DISTANCE OF 126.05 FEET TO A POINT, THENCE;

2. ALONG THE COMMON DIVIDING LINE BETWEEN T.M.P. 26-06-101-004; T.M.P. 26-06-065; T.M.P. 26-06-083; T.M.P. 26-06-084; T.M.P. 26-06-085; T.M.P. 26-06-086; 26-06-087; T.M.P. 26-06-088; 26-06-089 AND 26-06-090, NORTH 41 DEGREES - 26 MINUTES - 00 SECONDS EAST, A DISTANCE OF 1226.20 FEET TO A POINT, THENCE;

3. ALONG THE DIVIDING LINE BETWEEN T.M.P. 26-06-101-004 AND T.M.P. 26-06-096, LANDS NOW OR FORMERLY AMERICAN STORES PROPERTIES, INC., SOUTH 48 DEGREES - 07 MINUTES - 00 SECONDS EAST, A DISTANCE OF 506.01 FEET TO A POINT, THENCE;

4. ALONG THE COMMON DIVIDING LINE BETWEEN T.M.P. 26-06-101-004; 26-06-097, LANDS NOW OR FORMERLY GENCO; T.M.P. 26-06-098, LANDS NOW OR FORMERLY TA AND T.M.P. 26-06-099, LANDS NOW OR FORMERLY PRESTI, SOUTH 41 DEGREES - 26 MINUTES - 00 SECONDS WEST, A DISTANCE OF 301.73 FEET TO A POINT, THENCE;

5. ALONG THE DIVIDING LINE BETWEEN T.M.P. 26-06-101-004 AND T.M.P. 26-06-101, LANDS NOW OR FORMERLY JENTA CORP., NORTH 48 DEGREES - 34 MINUTES - 00 SECONDS WEST, A DISTANCE OF 180.01 FEET TO A POINT, THENCE;

6. ALONG THE COMMON DIVIDING LINE BETWEEN T.M.P. 26-06-101-004; T.M.P. 26-06-101 AND T.M.P. 26-06-101-005, LANDS NOW OR FORMERLY WAWA, INC., SOUTH 41 DEGREES - 26 MINUTES - 00 SECONDS WEST, A DISTANCE OF 563.86 FEET TO A POINT, THENCE;

7. ALONG THE COMMON DIVIDING LINE BETWEEN T.M.P. 26-06-101-004; T.M.P. 26-06-101-003 AND T.M.P. 26-06-101-005, NORTH 49 DEGREES - 44 MINUTES - 00 SECONDS WEST, A DISTANCE OF 200.00 FEET TO AN IRON PIPE, THENCE;

8. ALONG THE DIVIDING LINE BETWEEN T.M.P. 26-06-101-004 AND T.M.P. 26-06-101-003, SOUTH 41 DEGREES - 26 MINUTES - 00 SECONDS WEST, A DISTANCE OF 350.00 FEET TO THE POINT AND PLACE OF BEGINNING.

CONTAINING 382,680 SQUARE FEET OR 8.785 ACRES

THIS PROPERTY SUBJECT TO RESTRICTIONS, COVENANTS AND/OR EASEMENTS EITHER WRITTEN OR IMPLIED.

THIS DESCRIPTION WAS WRITTEN BASED UPON A MAP ENTITLED "ALTA/NSPS LAND TITLE SURVEY, PROVCO PINEVILLE ACQUISITION LLC, WEST BUTLER AVENUE & COUNTY LINE ROAD, T.M.P. #'S 26-06-101, 26-06-101-004, 26-06-101-003, 26-06-101-005, NEW BRITAIN TOWNSHIP, BUCKS COUNTY, COMMONWEALTH OF PENNSYLVANIA", PREPARED BY CONTROL POINT ASSOCIATES, INC., DATED 10/18/2017, REVISION NO. 1 DATED 11/20/2017, FILE NO. 02-060168-02, SHEETS 1 & 2 OF 2.

CONTROL POINT ASSOCIATES, INC.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAMES C. WEED — No. SU075250

01/08/2018

JAMES C. WEED, P.L.S. DATE
COMMONWEALTH OF PENNSYLVANIA
PROFESSIONAL LAND SURVEYOR # SU075250

S:\06\CP06168\02-060168-02-BEI\M&B\1-8-18\M&B_26-06-101-004.docx
PREPARED BY: JAA
REVIEWED BY: JCW

BIRCH RUN AT NEW BRITAIN

(AKA NEW BRITAIN CTP PROPERTY)

CONDITIONAL USE APPLICATION

TMP #26-06-101, #26-06-101-003, # 26-06-101-004

COUNTY LINE ROAD AND WEST BUTLER AVENUE

NEW BRITAIN TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

OWNER OF RECORD

CTP MANAGEMENT LLC
4123 CREAMERY ROAD
CREAMERY, PA 19430
610-489-2122

EQUITABLE OWNER/APPLICANT

TOLL MID-ATLANTIC LP COMPANY, INC.
1140 VIRGINIA DRIVE
FORT WASHINGTON, PA 19034
215-938-8000

ENGINEER, PLANNER, LANDSCAPE ARCHITECT

ESE CONSULTANTS, INC.
1140 VIRGINIA DRIVE
FORT WASHINGTON, PA 19034
215-914-2050

CONTACT:
JEFF MADDEN, P.E.
PROJECT ENGINEER

EMILY STEWART, RLA, AICP
PLANNER & LANDSCAPE ARCHITECT

SITE IMPACT NOTES:

1.) THE EXISTING GARAGE AND SUBSEQUENT STRUCTURES, ALONG WITH THE GRAVEL ACCESS DRIVE AND PARKING AREA WILL BE REMOVED. THE SHARED ACCESS DRIVE AND STORMWATER FACILITY NEAR COUNTY LINE ROAD WILL REMAIN.

2.) THE APPLICANT SEEKS TO AMEND THE CONDITIONAL USE APPROVAL TO PERMIT 44 TOWNHOMES, UNDER THE J31 PCCM - PLANNED COMMUNITY MIXED USE, SUB-USE B5 SINGLE FAMILY ATTACHED.

3.) THE APPLICANT SEEKING BOARD OR SUPERVISORS APPROVAL FOR THE FOLLOWING DEVIATIONS FROM THE PCCM DESIGN REGULATIONS:

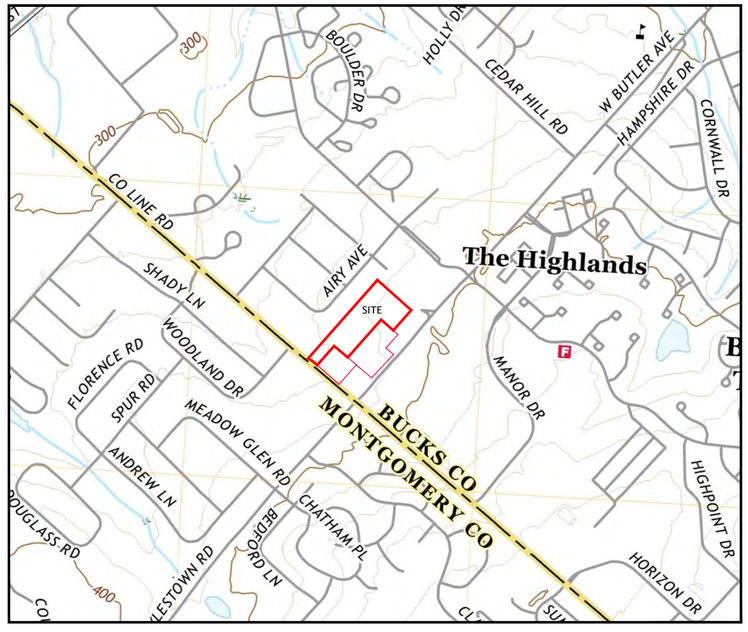
- SIGNAGE: AS PERMITTED BY 27-305.J31.13.(d)
  APPLICANT IS REQUESTING TO PROVIDED A COMMUNITY IDENTIFICATION SIGN AT EACH ENTRANCE. THIS VIOLATES THE MAXIMUM PERMITTED NUMBER OF SIGNS PER 500 FEET OF STREET FRONTAGE.
- BUILDING HEIGHT: AS PERMITTED BY 27-305.J31.13.h.3.
  APPLICANT IS REQUESTING A MAXIMUM BUILDING HEIGHT OF 37 FT. (35 FT PERMITTED). SITE PLAN HAS INCREASED GREEN OPEN SPACE AREA AND DECREASED IMPERVIOUS BY PROPOSING A MORE VERTICAL TOWNHOME FOOTPRINT THUS SLIGHTLY EXCEEDING THE 35 FT BUILDING HEIGHT REQUIREMENT.
- CONSERVATION EASEMENT DISTURBANCE:
  APPLICANT IS REQUESTING TO DISTURB ROUGHLY ±4,300 SF OF AN EXISTING CONSERVATION EASEMENT ON THE WAWA PARCEL TO PROVIDE ADDITIONAL VEHICULAR AND PEDESTRIAN CIRCULATION BETWEEN PARCELS IN COMBINATION WITH A WATER LINE EASEMENT. MINIMAL IMPACT TO AREAS CLASSIFIED AS WOODLANDS IS EXPECTED.

4.) THE MAIN ENTRANCE TO THE PROPOSED RESIDENTIAL PORTION OF THE DEVELOPMENT IS PROPOSED FROM THE EXISTING SHARED ACCESS DRIVE ON COUNTY LINE ROAD. A SECONDARY MEANS OF ACCESS HAS BE ACQUIRED VIA A 30-FOOT WIDE EASEMENT ON THE WAWA PARCEL. THE ADDITIONAL ACCESS PROVIDES BOTH ADDITIONAL VEHICULAR AND PEDESTRIAN CIRCULATION TO ADJACENT PARCELS AS WELL AS THE SITE OUT TO W BUTLER AVE. SITE PLAN PROVIDES A 45 FOOT WIDE BUFFER ALONG THE NORTHERN EXISTING RESIDENTIAL AND COMMERCIAL PROPERTIES. EXISTING INVASIVE AND TREES IN POOR HEALTH ARE PROPOSED TO BE REMOVED AND NEW NATIVE LANDSCAPE BUFFER PLANTINGS ARE PROPOSED.

5.) THE PROPOSED DEVELOPMENT PROPOSES DISTURBANCE OF WETLAND MARGIN AREA FOR SITE GRADING DISTURBANCE FOR STORMWATER MANAGEMENT FACILITIES. NO DISTURBANCES TO WETLANDS AREA PROPOSED.

GENERAL NOTES:

1. THIS PLAN IS THE EXCLUSIVE PROPERTY OF ESE CONSULTANTS INC., AND TOLL BROTHERS INC. ALL RIGHTS AND REMEDIES ARE HEREBY RESERVED. THIS PLAN MAY NOT BE REPRODUCED OR DISTRIBUTED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF ESE CONSULTANTS INC., AND TOLL BROTHERS INC.
2. PROJECT PARCELS INCLUDE: WAWA PARCEL (TMP #26-06-101), CREAMERY TIRE PARCEL (TMP #26-06-101-003), RESIDENTIAL PARCEL (TMP #26-06-101-004).
3. BOUNDARY & TOPOGRAPHY-EXISTING CONDITIONS PROVIDED BY: CONTROL POINT ASSOCIATES, INC. PLAN TITLED: ALTA/NSPS LAND TITLE SURVEY DATED: 1-24-2023.
4. SITE DOES NOT CONTAIN AREAS WITHIN 100-YEAR FLOODPLAIN FEMA COMMUNITY PANEL: 42017C0288K DATED: 3/21/2017.
5. SOILS INFORMATION PROVIDED BY THE NATURAL RESOURCE CONSERVATION SERVICES BUCKS COUNTY, PA
6. WETLANDS INFORMATION HAS BEEN DELINEATED BY ESE CONSULTANTS, INC. FEBRUARY 2023. WETLAND JURISDICTION DETERMINATION FROM US ARMY CORPS OF ENGINEERS IS PENDING.
7. ALL BASE INFORMATION IS CONSIDERED PRELIMINARY AND SUBJECT TO FIELD VERIFICATION AND SURVEY. SITE PLAN MAY VARY PENDING MORE ACCURATE INFORMATION.



LOCATION MAP

SCALE: 1"=800'

GRAPHIC SCALE

800 0 400 800 1600 3200

(IN FEET)
1 inch = 800 ft.

WAIVERS REQUESTED:

1.) 22-705.1.D
TO PROVIDE DEAD END STREET TO ADJACENT PROPERTY FOR POTENTIAL FUTURE EXPANSION.

2.) 22-705.1.D 22-705.3.A
- TO PROVIDE A 30-FOOT WIDE RIGHT-OF-WAY-WIDTH, LESS THAN REQUIRED 50-FOOT
- TO PROVIDE A 24-FOOT CARTWAY, LESS THAN REQUIRED 28-FOOT
- TO NOT PROVIDE THE REQUIRED 3-4 FOOT GRASS STRIP BETWEEN SIDEWALK AND CARTWAY

3.) 22-705.13.J
DRIVEWAYS WILL NOT PROVIDE MINIMUM 10X20 TURNAROUND.

4.) 22-722.4.C.(7)(A)
TO PROVIDE STREET TREES 50 FEET ON CENTER. TOTAL STREET TREES TO BE PROVIDED AS CALCULATED AND PLACED ALONG STREET WHERE FEASIBLE WITHOUT DRIVEWAY AND UTILITY CONFLICTS.

5.) 22-722.4.C.(7)(B)
TO PROVIDE STREET TREES OUTSIDE PLANTING STRIP.

6.) 22-722.4.G.
15% OF SITE TO BE DESIGNED, BUILT AND MAINTAINED AS GREEN SPACE.

SHEET INDEX

PROPOSED USE:

THE PURPOSED SITE PLAN PROPOSES THE DEMOLITION OF THE EXISTING 1-STORY METAL GARAGE AND ELIMINATION OF ITS GRAVEL ACCESS ROAD AND PARKING AREA. THE PROJECT IS INTENT IS TO PROVIDE 44 SINGLE FAMILY ATTACHED TOWNHOMES. SITE PLAN PROPOSES THESE RESIDENTIAL DWELLINGS IN CONJUNCTION WITH OPEN SPACE, LANDSCAPE BUFFERS, NATURAL RESOURCE PROTECTION AND STORMWATER MANAGEMENT FACILITIES. ALL COMMON LANDS ARE TO BE OWNED AND MAINTAINED BY A HOMEOWNERS ASSOCIATION.

ZONING:

ZONING DISTRICT: C-1 COMMERCIAL
PROPOSED USE: J31 PCCM- PLANNED COMMUNITY MIXED USE
PROPOSED SUB-USE: B5 SINGLE FAMILY ATTACHED TOWNHOMES

SITE DATA:

GROSS SITE AREA (TO TITLE LINE):	15.775 AC
-W.BUTLER AVE EX & ULT ROW:	.9090 AC
TOTAL SITE AREA:	14.866 AC (1)
WAWA PARCEL (TMP #26-06-101):	4.137 AC
CREAMERY TIRE PARCEL (TMP #26-06-101-003):	2.124 AC
RESIDENTIAL PARCEL (TMP #26-06-101-004):	8.605 AC

ZONING REQUIREMENTS: (J31 PLANNED COMMUNITY CENTER MIXED-USE)

BULK REQUIREMENTS	REQUIRED	PROPOSED
MIN. BASE SITE AREA:	15 ACRES	14.866 AC (1)
UPDATED BASE SITE AREA:		13.37 AC
MAX. RESIDENTIAL SUB-USE:	25% (3.34 AC)	15.5% (2.08 AC)
MIN. OPEN SPACE:	1/3 RES.SUB-USE (.69 AC)	1.74 AC
BUFFER YARD:	25 FT	45 FT
BUILDING HEIGHT:	35 FT	37 FT (2)

(1) BASE SITE AREA BASED ON PREVIOUSLY APPROVED PLANS WITH VARIANCE GRANTED 4/19/18 PER WAWA SUBDIVISION PLANS PREPARED BY BOHLER ENGINEERING DATED LAST DATED 2019.11.01
(2) SEE SITE IMPACT NOTES (3.)

	CREAMERY TIRE	WAWA	RESIDENTIAL	TOTAL
SITE AREA:	2.124 AC	4.137 AC	8.605 AC	14.866 AC
-EXISTING ULT. RIGHTS-OF-WAY:	0 AC	0 AC	.56 AC	.56 AC
-EXISTING UTILITY EASEMENTS:	0 AC	.39 AC	0 AC	.39 AC
-NATURAL RESOURCE PROTECTION:	0 AC	.82 AC	.10 AC	.92 AC
BASE SITE AREA	2.12 AC	2.92 AC	7.94 AC	13.37 AC
-ULT. ROW PROPOSED ROADS:	0 AC	0 AC	1.31 AC	1.31 AC
-PROPOSED UTILITY ROW/EASEMENTS:	0 AC	0 AC	0 AC	0 AC
-%100 PROTECTED RESOURCES:	0 AC	0 AC	.18 AC	.18 AC
SITE AREA, RATIO BASE	2.12 AC	2.92 AC	6.45 AC	11.49 AC
PERMITTED IMPERVIOUS:	75% (1.59 AC)	75% (2.19 AC)	35% (2.25 AC)	65% (7.46 AC)
PROPOSED IMPERVIOUS:	93.5% (1.98 AC)*	63.3% (1.85 AC)	24.8% (1.60 AC)	47% (5.43 AC)

* EXISTING NON-CONFORMING CONDITION

27-2402 SITE CAPACITY CALCULATIONS (RESIDENTIAL DEVELOPMENT):

NATURAL RESOURCES	PROTECTION RATIO	ACRES OF LAND IN RESOURCES	RESOURCE PROTECTION LAND	ACRES OF LAND TO BE DISTURBED
WATERCOURSES	1.00	0 AC	0 AC	0 AC
RIPARIAN BUFFER	1.00	0 AC	0 AC	0 AC
FLOODPLAIN	1.00	0 AC	0 AC	0 AC
FLOODPLAIN (ALLUVIAL SOILS)	1.00	0 AC	0 AC	0 AC
WETLANDS	1.00	.21 AC*	.21 AC*	0 AC*
LAKES/PONDS	1.00	0 AC	0 AC	0 AC
WETLANDS MARGINS	.80	.61 AC*	.48 AC*	.13 AC*
WOODLANDS	.65	0 AC	0 AC	0 AC
STEEP SLOPES 8%-15% **	.60	0 AC	0 AC	0 AC
STEEP SLOPES 15%-25% **	.70	0 AC	0 AC	0 AC
STEEP SLOPES 25% OR MORE **	.85	0 AC	0 AC	0 AC
TOTAL LAND IN RESOURCES		.82 AC		
TOTAL RESOURCE PROTECTION LAND			.69 AC	
TOTAL RESOURCE LAND PROVIDED			.69 AC	
TOTAL DISTURBED RESOURCES				.13 AC

*AREAS ON RESIDENTIAL LOT ONLY
**PLAN ASSUMES ALL MAN-MADE SLOPES ARE EXEMPT

BASE SITE AREA:	7.94 AC
X MIN. OPEN SPACE:	x 5%
STANDARD MIN. OPEN SPACE:	.39 ACRES
REQUIRED OPEN SPACE:	.60 AC
LANDS WITH 1.00 PROTECTION RATIO:	.21 AC
+STANDARD MIN. OPEN SPACE:	.39 AC
NET BUILDABLE SITE AREA:	7.34 AC
BASE SITE AREA:	7.94 AC
SUBTRACT REQUIRED OPEN SPACE:	.60 AC
NUMBER OF DWELLINGS/LOTS:	N/A
NET BUILDABLE SITE AREA:	7.34 AC
MAX. DENSITY:	N/A
DWELLINGS PERMITTED:	N/A
RATIO BASE SITE AREA:	6.45 AC
PERMITTED IMPERVIOUS:	35%
MAXIMUM PERMITTED IMPERVIOUS SURFACE:	2.25 AC

ESE CONSULTANTS
ENGINEERING • PLANNING • SURVEYING • ENVIRONMENTAL
ESE Consultants, Inc.
1140 Virginia Drive • Fort Washington, PA 19034
T: 215-914-2050

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JEFFREY M. MADDEN PROJECT MANAGER

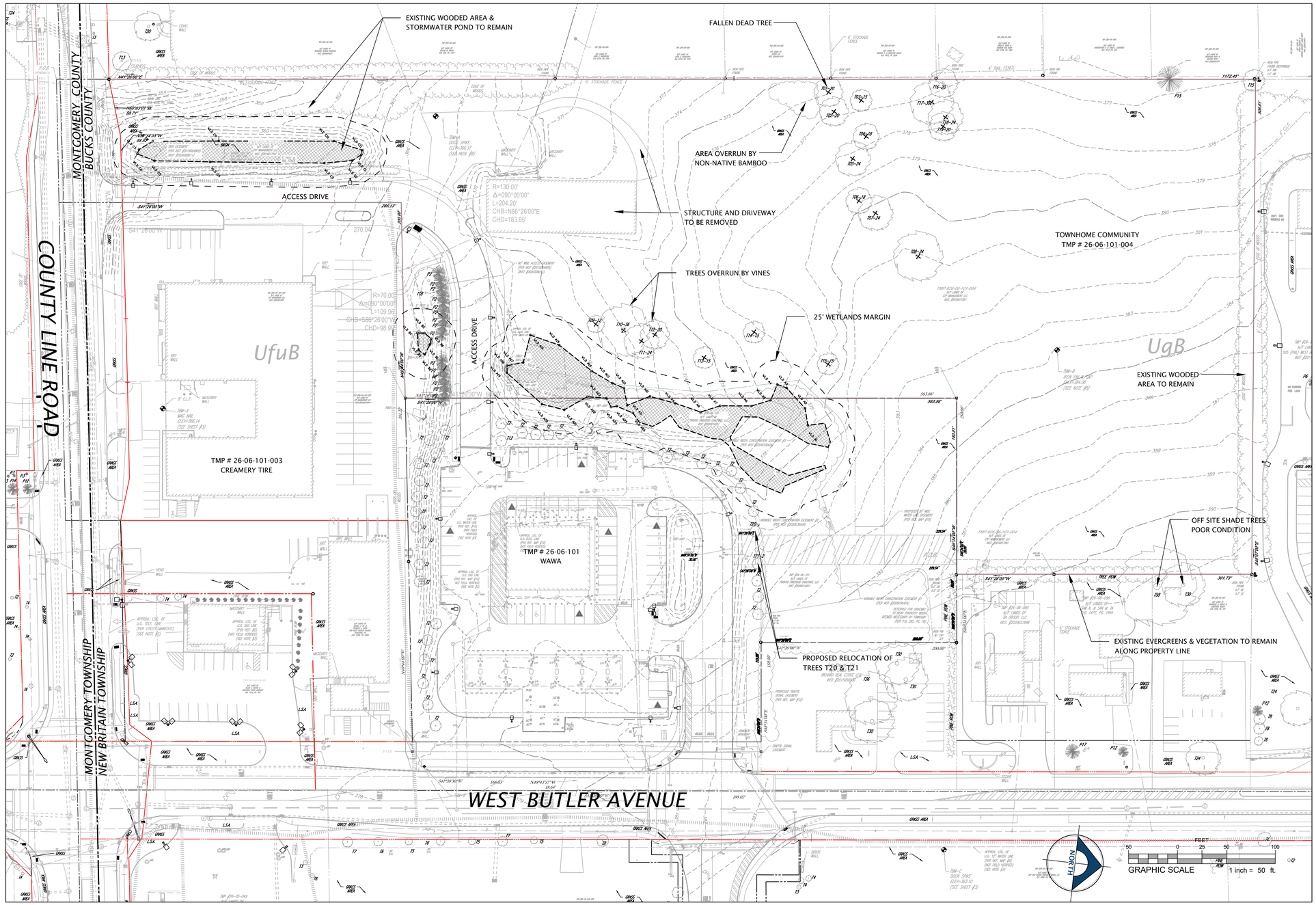
REV.:	DATE	DESCRIPTION	DRAWN

COVER SHEET & NOTES

BIRCH RUN AT NEW BRITAIN
NEW BRITAIN TOWNSHIP, BUCKS COUNTY

DATE: 2-21-23	SCALE: AS NOTED
DESIGN: ESE	DRAWN: EES
JOB NO.: 8363	FILE NAME: 01-COVER
REF. NO.: CU 01.01	
SHEET NO.: 1 OF 4	

Feb 22, 2023 - 12:05 pm N:\Projects\Pennsylvania\X8363-New Britain (CTP)\Zoning\Conditional Use\X8363-01-COVER.dwg ESTEWART



INDIVIDUAL TREES TO BE IMPACTED

TREE #	SIZE	SPECIES	NOTES
T01	20"	N/A	FALLEN DEAD
T02	20"	CHESTNUT	
T03	15"	OAK	
T04	18"	CHESTNUT	
T05	24"	CHERRY	
T06	18"	OAK	
T07	24"	ASH	
T08	34"	ASH	
T09	12"	ELM	
T10	36"	OAK	POOR CONDITION
T11	24"	ELM	POOR CONDITION
T12	20"	ELM	POOR CONDITION
T13	15"	ELM	
T14	15"	ASH	
T15	15"	OAK	
T16	20"	ASH	
T17	30"	MAPLE	
T18	24"	WILLOW	
T19	20"	WILLOW	
T20	2"	MAPLE	TO BE RELOCATED
T21	2"	SWEET GUM	TO BE RELOCATED

LEGEND

- EXISTING STRUCTURE
- EXISTING CONTOURS
- EXISTING SPOT ELEVATION
- EXISTING IRON PIN
- EXISTING UTILITY POLE
- EXISTING SOIL LINE
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- EXISTING TREE LINE
- EXISTING OVERHEAD WIRE
- LOD/TREE PROTECTION
- EXISTING STREET LIGHT
- EXISTING FENCE LINE
- WETLANDS

NATURAL RESOURCE PROTECTION (TOTAL SITE)

NATURAL RESOURCES	PROTECTION RATIO	ACRES OF LAND IN RESOURCES	REQUIRED PROTECTION	PROPOSED PROTECTION
WATERCOURSES	1.00	0 AC	0 AC	0 AC
RIPARIAN BUFFER	1.00	0 AC	0 AC	0 AC
FLOODPLAIN	1.00	0 AC	0 AC	0 AC
FLOODPLAIN (ALLUVIAL SOILS)	1.00	0 AC	0 AC	0 AC
WETLANDS	1.00	.39 AC	.39 AC	.39 AC
LAKES/PONDS	1.00	0 AC	0 AC	0 AC
WETLANDS MARGINS	.80	.97 AC	.77 AC	.77 AC
WOODLANDS	.35	2.28 AC	.80 AC	1.32 AC
STEEP SLOPES 8%-15% **	.60	0 AC	0 AC	0 AC
STEEP SLOPES 15%-25% **	.70	0 AC	0 AC	0 AC
STEEP SLOPES 25% OR MORE **	.85	0 AC	0 AC	0 AC

NATURAL RESOURCE PROTECTION
EXISTING WOODLANDS: 2.28 AC

PERMITTED DISTURBANCE:	APPROVED WAWA PLAN PROPOSED DISTURBANCE:	ADDITIONAL PROPOSED DISTURBANCE:	TOTAL PROPOSED DISTURBANCE:
65% = 1.48 AC	38.7% = .883 AC	+ .08 AC	42.2% = .96 AC

SOIL SURVEY OF BUCKS COUNTY, PA
SOURCE: NATURAL RESOURCES CONSERVATION SERVICE MAP

SYMBOL	NAME	HYDROLOGIC SOIL GROUP	SLOPES %	DEPTH TO WATER TABLE	DEPTH TO RESTRICTIVE FEATURE	CONTAINS HYDRIC COMPONENTS	SURFACE RUNOFF
UfuB	URBAN LAND	NOT RATED	0-8%	NA	NA	NO	NA
UgB	URBAN LAND-ABBOTTSTOWN COMPLEX	D	0-8%	6"-18"	15 TO 30INCHES TO FRAGIPAN; 40 TO 60 INCHES TO LITCHIC BEDROCK	NO	VERY HIGH

JEFFREY M. MADDEN
PROFESSIONAL ENGINEER
ENGINEERING & SURVEYING CONSULTANTS
PENNSYLVANIA

ESE CONSULTANTS
ENGINEERING • PLANNING • SURVEYING • ENVIRONMENTAL
ESE Consultants, Inc.
1140 Virginia Drive • Fort Washington, PA 19034
T: 215-914-2050

REV.:	DATE	DESCRIPTION	DRAWN

EXISTING FEATURES & SITE ANALYSIS

BIRCH RUN AT NEW BRITAIN
NEW BRITAIN TOWNSHIP, BUCKS COUNTY

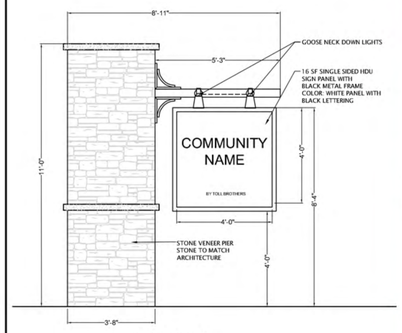
DATE: 2-21-23	SCALE: 1"=50'
DESIGN: ESE	DRAWN: EES
JOB NO.: 8363	FILE NAME: 02-EXIST
REF. NO.: CU 02.01	
SHEET NO.: 2 OF 4	

PROPOSED COMMUNITY SIGNAGE

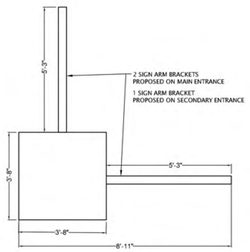
PROPOSED GROUND SIGNS:

MAIN ENTRANCE: SINGLE PIER STRUCTURE WITH 2 SIGN ARM BRACKETS	32 SF
SECONDARY ENTRANCE: PIER STRUCTURE WITH SIGN ARM BRACKET	16 SF
TOTAL SIGN AREA PROPOSED:	48 SF

APPLICANT IS REQUESTING TO PROPOSE MORE THAN ONE SIGN PER 500 LF OF ROAD FRONTAGE.



ELEVATION



PLAN VIEW

TYPICAL SIGNAGE DIMENSIONS
SCALE: 1"=3'

TYPICAL BENCH

All Aluminum Construction

SALSBURY INDUSTRIES

CLUSTER MAILBOX

ESE CONSULTANTS
ENGINEERING • PLANNING • SURVEYING • ENVIRONMENTAL
ESE Consultants, Inc.
1140 Virginia Drive • Fort Washington, PA 19034
T: 215-914-2050

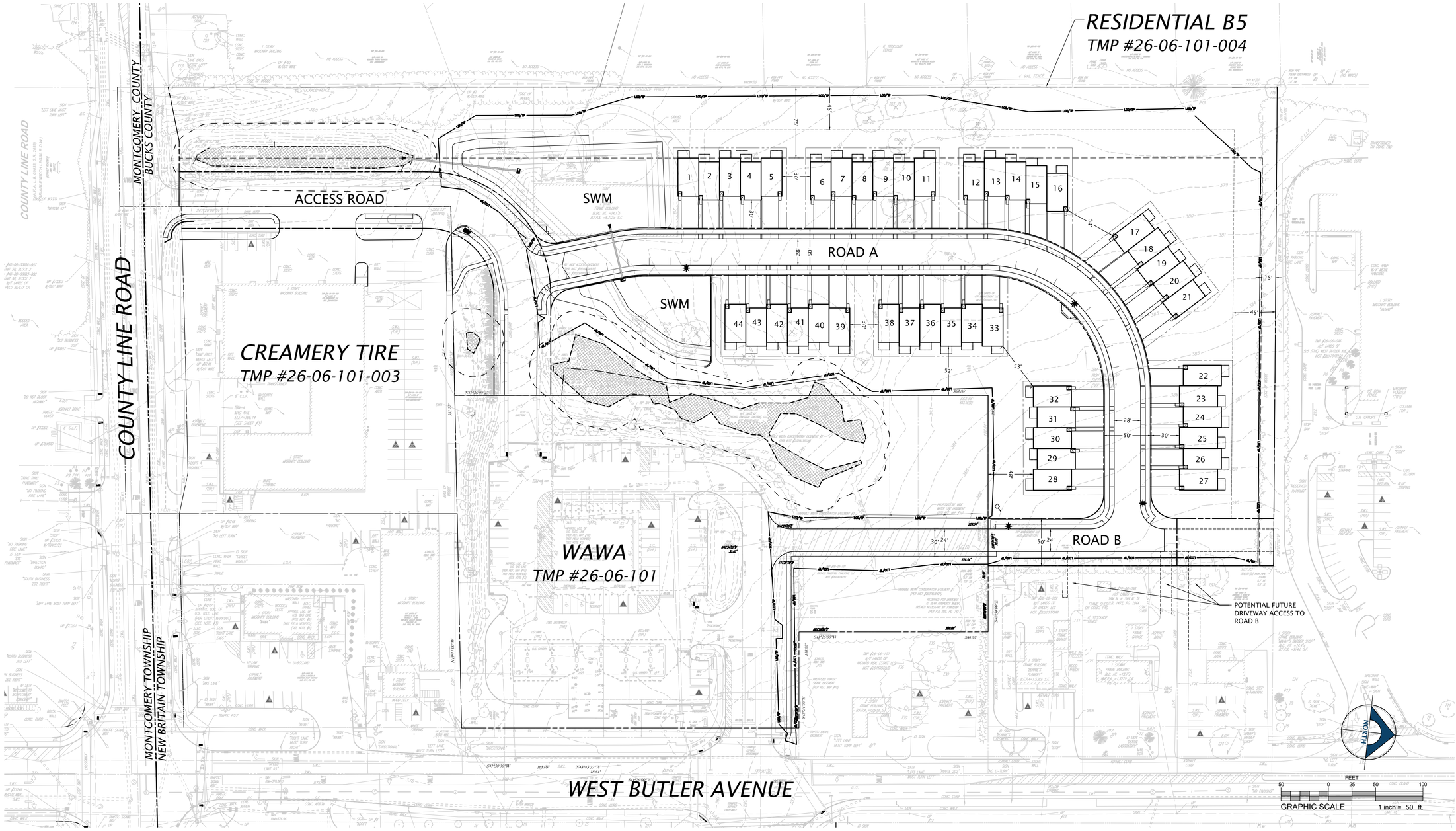
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JEFFREY M. MADDEN ENGINEER No. PE039703 PROFESSIONAL ENGINEER

REV.	DATE	DESCRIPTION	DRAWN

SCHEMATIC LANDSCAPE & SITE DETAILS

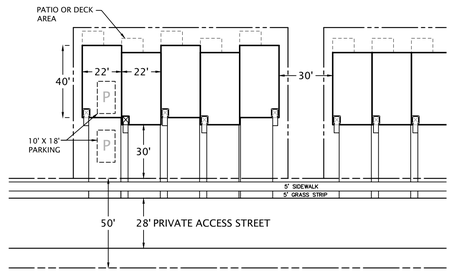
BIRCH RUN AT NEW BRITAIN
NEW BRITAIN TOWNSHIP, BUCKS COUNTY

DATE: 2-21-23	SCALE: 1"=50'
DESIGN: EES	DRAWN: EES
JOB NO.: 8363	FILE NAME: 03-SITEPLAN
REF. NO.:	CU 04.01
SHEET NO.:	3 OF 4



PARKING REQUIREMENTS:	REQUIREMENT:	REQ.	PROVIDED:
TMP #26-06-101-004 USE B5 - SINGLE FAMILY ATTACHED DWELLING GUEST PARKING: (44 DU X .3)	2 SPACES PER DU (3 BDRM) .3 SPACES PER DU	88 14	88 14
TMP #26-06-101 USE J1 - EXISTING WAWA CONVENIENCE STORE (5,585 SF /200 SF) + 5 EMPLOYEES USE J19 - SERVICE STATION (6 BAYS X 2)	1 SPACE PER 200 SF + 1 PER EMPLOYEE 2 SPACES PER BAY	28 5 12	28 5 12
TMP #26-06-101-003 EXISTING FLEX SPACE BUILDING		88	58

UNIT	AREA / FLOOR AREA	TENANT	USE	PARKING REQUIREMENT	SPACES REQ
A	2,500 SF / 2,500 SF	VACANT	N/A	N/A	N/A
B	6,400 SF / 1,981 SF	CREAMERY TIRE	J21/J22	2 SPACES/BAY+ 1/100 SF	14 SP + 19 SP
C	3,364 SF / 3,364 SF	VACANT	N/A	N/A	N/A
D	3,600 SF / 3,600 SF	VACANT	N/A	N/A	N/A
E	12,500 SF / 12,500 SF	VACANT	N/A	N/A	N/A
F	1,250 SF / 1,250 SF	LAST CHANCE AUTO	J17: REPAIR SHOP	1 SP/200 SF	6 SP
G	2,500 SF / 2,500 SF	EASTERN PA FOXBODY	I3: GENERAL OFFICE	1 SP/200 SF	12 SP
H	3,750 SF / 3,750 SF	HELLFISH MARTIAL ARTS	J9: INDOOR ENTERTAINMENT	1 SP/100 SF	37 SP
I	3,750 SF / 3,750 SF	VACANT	N/A	N/A	N/A
J	1,250 SF / 1,250 SF	VACANT	N/A	N/A	N/A



TYPICAL TOWNHOME DIMENSIONS
SCALE: 1"=40'

ZONING REQUIREMENTS: (B5 SINGLE FAMILY ATTACHED)

BULK REQUIREMENTS	REQUIRED	PROPOSED
MIN. LOT AREA:	FOOTPRINT+200 SF	FP+200 SF
MIN. LOT WIDTH: 1 CAR	20 FT	22 FT
MAX. IMPERVIOUS: (LOT)	35%	25%
MIN. FRONT YARD SETBACK:		
FROM ULT. STREET ROW:	30 FT	30 FT
FROM PARKING:	20 FT	20 FT
MAX. UNITS ATTACHED:	8 DU	6 DU
MIN. BLDG. SEPARATION:	30 FT	30 FT
REQUIRED PARKING: (3 BDRM)	2 SP/DU	2 SP/DU
REQUIRED VISITOR PARKING:	.3 SP/DU (14 SP)	.3 SP/DU (14 SP)
PROPOSED GROSS DENSITY:	N/A	5.12 DU/AC

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JEFFREY M. MADDEN PROJECT MANAGER
Jeff Madden

ESE CONSULTANTS
ENGINEERING • PLANNING • SURVEYING • ENVIRONMENTAL
ESE Consultants, Inc.
1140 Virginia Drive • Fort Washington, PA 19034
T: 215-914-2050

REV.	DATE	DESCRIPTION	DRAWN

SITE PLAN & STORMWATER GRADING

BIRCH RUN AT NEW BRITAIN
NEW BRITAIN TOWNSHIP, BUCKS COUNTY

DATE: 2-21-23	SCALE: AS NOTED
DESIGN: EES	DRAWN: EES
JOB NO.: 8363	FILE NAME: 03-SITEPLAN
REF. NO.: CU 04.02	
SHEET NO.: 4 OF 4	

Feb 22, 2023 - 1:13 pm N:\Projects\Pennsylvania\8363-New Britain (CPI)\Zoning\Drawings\Conditional Use\8363-04-SNAP.dwg ESTEBAN

ESE CONSULTANTS
ENGINEERING · PLANNING · SURVEYING · ENVIRONMENTAL

ARCHITECTURAL RENDERING

NEW BRITIAN TOWNSHIP, BUCKS COUNTY, PA

Toll Brothers

THE APPLICANT IS SEEKING BOARD OF SUPERVISORS APPROVAL FOR DEVIATION OF MAXIMUM BUILDING HEIGHT OF 35 FT. 35' 9-3/4" + 1'-2" FOR GRADE VARIATION AROUND BUILDINGS. (37 FT MAX. PROPOSED)

ESE CONSULTANTS
ENGINEERING · PLANNING · SURVEYING · ENVIRONMENTAL

ARCHITECTURAL ELEVATION
NEW BRITIAN TOWNSHIP, BUCKS COUNTY, PA

Toll Brothers

STUDY POINT "B" (002)

DRAINAGE AREA B
AREA= 0.40 AC
Tc= 5.0 MIN
CN=78.0

STUDY POINT "C" (003)

DRAINAGE AREA C
AREA= 2.63 AC
Tc= 19.1 MIN
CN=78

STUDY POINT "D" (004)

DRAINAGE AREA D
AREA= 2.63 AC
Tc= 13.1 MIN
CN=78

STUDY POINT "A" (001)

STUDY POINT "A-1" (001-A)

DRAINAGE AREA A-1 (CTP BASIN)
AREA= 0.55 AC
Tc= 5.0 MIN
CN=78.0

DRAINAGE AREA A' (CULVERT)
AREA= 3.88 AC
Tc= 17.5 MIN
CN=79

COUNTY LINE ROAD
(N.K.A. NORTH MAIN ST. (SR 313) - VARIABLE WIDTH LEGAL R.O.W.)

WEST BUTLER AVENUE
(A.K.A. DOYLESTOWN ROAD)
(F.K.A. PENNSYLVANIA STATE HIGHWAY U.S. ROUTE 202)
(A.K.A. I.R. 1 (TWP.S.R. 4202))
(VARIABLE WIDTH WITH 4' WIDE PUBLIC ROADWAY)

LEGEND

- 100 — EXISTING CONTOURS
- EXISTING TREE LINE
- SOILS LINE
- A B — TC PATH
- WATERSHED DRAINAGE BOUNDARY

GRAPHIC SCALE
50 0 25 50 FEET 100 200
1 inch = 50 ft.

ESE CONSULTANTS
ENGINEERING • PLANNING • SURVEYING • ENVIRONMENTAL
ESE Consultants, Inc.
1140 Virginia Drive • Fort Washington, PA 19034
T: 215-914-2050

REV.:	DATE	DESCRIPTION	DRAWN

STORMWATER MANAGEMENT PLAN
PRE-DEVELOPMENT

NEW BRITAIN CTP
NEW BRITAIN TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

DATE: 2/16/2023	SCALE: 1"= 50'
DESIGN: JMM	DRAWN: LJP
JOB NO.: 8363	FILE NAME: 8363-S-SWM
REF. NO.: SD40.01	
SHEET NO.: 1 OF 2	

\\ESE\DEPTS\CADD\PROJECTS\PENNSYLVANIA\8363-NEW BRITAIN CTP\ENGDEPT\DRAWINGS\CONDITIONAL USE\8363-S-SWM.DWG-Luke Pistrowicz-2/16/2023 2:51 PM

STUDY POINT "B" (002)

DRAINAGE BYPASS B
AREA= 0.34 AC
Tc= 5.0 MIN
CN=78

STUDY POINT "C" (003)

DRAINAGE BYPASS C
AREA= 0.92 AC
Tc= 5.0 MIN
CN=82

DRAINAGE BYPASS D
AREA= 1.51 AC
Tc= 11.5 MIN
CN=82

RESIDENTIAL B5
TMP #26-06-101-004

STUDY POINT "D" (004)

COUNTY LINE ROAD
(A.K.A. L.R. 09033, S.R. 3039)
(FORMERLY PENNSYLVANIA S.H. 413)

ACCESS ROAD

STUDY POINT "A" (001)

STUDY POINT "A-1" (001-A)

SWM

PRIMARY COMMUNITY ENTRANCE SIGN

COMMUNITY MAIL

ROAD A

DRAINAGE BASIN 1
AREA= 3.02 AC
Tc= 5.0 MIN
CN=92

OPEN SPACE

BENCHES

CREAMERY TIRE
TMP #26-06-101-003

DRAINAGE BYPASS A-1
AREA= 0.09 AC
Tc= 5.0 MIN
CN=80

SECONDARY COMMUNITY ENTRANCE SIGN

DRAINAGE BYPASS A
AREA= 2.08 AC
Tc= 13.8 MIN
CN=80

WAWA
TMP #26-06-101

ROAD B

STREET LIGHT (TYP.)

POTENTIAL FUTURE DRIVEWAY ACCESS TO ROAD B

DRAINAGE BASIN 2
AREA= 2.12 AC
Tc= 5.0 MIN
CN=86

WEST BUTLER AVENUE
(A.K.A. DOYLESTOWN ROAD)
(F.K.A. PENNSYLVANIA STATE HIGHWAY, U.S. ROUTE 202)
(A.K.A. L.R. 17, S.R. 4202)
(VARIABLE WIDTH WITH VARIABLE RIGHT-OF-WAY) (PUBLIC ROADWAY)

LEGEND

- 100 — EXISTING CONTOURS
- EXISTING TREE LINE
- SOILS LINE
- A — B TC PATH
- WATERSHED DRAINAGE BOUNDARY

GRAPHIC SCALE
50 0 25 50 FEET 100 200
1 inch = 50 ft.

ESE CONSULTANTS
ENGINEERING • PLANNING • SURVEYING • ENVIRONMENTAL

ESE Consultants, Inc.
1140 Virginia Drive • Fort Washington, PA 19034
T: 215-914-2050

REV.	DATE	DESCRIPTION	DRAWN

STORMWATER MANAGEMENT PLAN
POST-DEVELOPMENT

NEW BRITAIN CTP
NEW BRITAIN TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

DATE: 2/16/2023	SCALE: 1"= 50'
DESIGN: JMM	DRAWN: LJP
JOB NO.: 7662	FILE NAME: 8363-S-SWM
REF. NO.: **SD40.02**	
SHEET NO.: **2** OF **2**	

\\ESEVDFS\CADD\PROJECTS\PENNSYLVANIA\8363-NEW BRITAIN CTP\ENGDEPT\DRAWINGS\CONDITIONAL USE\8363-S-SWM.DWG - Last Plotted:2/16/2023 2:53 PM

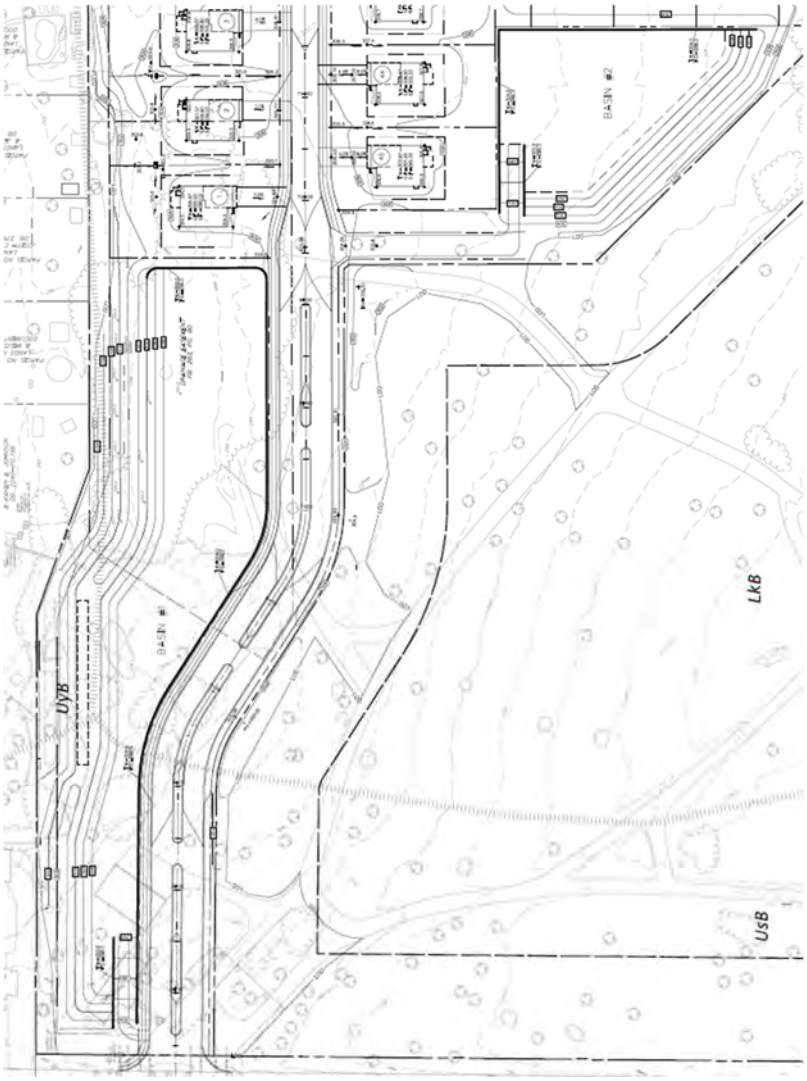
ESE CONSULTANTS
ENGINEERING · PLANNING · SURVEYING · ENVIRONMENTAL

ESE Consultants, Inc.
1140 Virginia Drive
Fort Washington, PA
19034
TEL: 215-914-2050
FAX: 215-293-5488

CONDITIONAL USE STORMWATER MANAGEMENT NARRATIVE

FOR

BIRCH RUN AT NEW BRITAIN (A.K.A NEW BRITAIN CTP)



LOCATED IN:

NEW BRITAIN TOWNSHIP, BUCKS COUNTY, STATE OF PENNSYLVANIA

Jeffrey M. Madden
Professional Engineer
Pennsylvania License No.
PE 070760

FEBRUARY 2023

Associated plans and documents:

- Cover Sheet, Existing Features Plan, Site Plan, and Grading Plans –dated February 17, 2023.
- Pre-Construction Stormwater Management Drainage Area Plans – dated February 16, 2023.
- Post-Construction Stormwater Management Drainage Area Plans – dated February 16, 2023.

Table of Contents

Appendices

I

Site Information

Location and Surrounding Uses

Birch Run at New Britain in New Britain Township, Bucks County, PA consists of 8.607 acres in the residential parcel (TMP 26-06-101-004) located in the J-2 Planned Community Center Mixed Use Zoning District. The proposed development site is part of a larger parcel known as tax parcel numbers 26-06-101, 26-06-101-003, and 26-06-101-004 consisting of 14.866 acres. The other 2 included TMPs in the zoning district on the overall site are a Wawa and a Tire Store with other commercial.

The overall property is bounded to the south east by W. Butler Avenue (S.R. 202) and to the south west by County Line Road for a portion of the tract boundary. Along the northwest outbound of the tract boundary existing residential dwellings adjoin the property. Along the northeast outbound of the tract boundary existing storage facility adjoin the property.

The Zoning Ordinance permits the development of land located in the J-2 District to include a portion of the construction of single-family attached dwellings. This design proposes 44 single-family detached homes with 1.7 acres of open space and +/- 7 acres of disturbance.

The site is located within District B of the Neshaminy Creek Watershed with runoff discharging off-site to an unnamed tributary to the West Branch of the Neshaminy Creek. The UNT West Branch of Neshaminy Creek has a Chapter 93 designation of WWF (Warm Water Fishes).

There are nine (4) study points for stormwater runoff noted within this report as Drainage Area A through Drainage Area D.

Existing Conditions

The site contains natural resource areas such as federally regulated wetlands, and mature trees. Existing contours range in elevation from 392 to 355. The residential portion of the site has one (1) existing stormwater management basin along the south west boundary, installed during an earlier property subdivision. The existing topography generally slopes from a ridgeline (high point) on the south east portion of site toward the existing basin along the south west boundary. Some of the site bypasses the basin and slopes towards the north west boundary line and is conveyed in a swale toward County Line Road. A portion of the residential site also drains to the north and flows onto adjoining residential lots. The proposed residential portion of the property is used a vehicle maintenance area and storage maintenance structures, and woodlands on-site. Impervious areas include a small driveway network and maintenance structures.

Soil Types and Limitations

The soils information for the project is found on the 'Natural Resources Conservation Service" on the "Web Soil Survey, http://websoilsurvey.nrcs.usda.gov". The Soil Survey Area is Bucks County, PA and the Survey Area Data is Version 17, June 4, 2020.

The following soil types are found on the site:

Soil Type	Symbol	Soil Group
Urban land, 0 to 8 percent slopes	UfuB	D
Urban land-Abbottstown complex, 0 to 8 percent slopes	UgB	D
Urban land-Udorthents complex, 0 to 8 percent slopes	UzcB	D

II

Hydrology

Stormwater Management Design Criteria

The Stormwater Management Plan described herein has been designed according to the following publications and criteria:

- New Britain Township Stormwater Management Ordinance, Chapter 26.
- New Britain Township Subdivision and Land Development Ordinance, Chapter 22.
- Neshaminy Creek Stormwater Ordinance.
- Pennsylvania Stormwater Best Management Practices Manual – Final Draft -April 2006,
- "Urban Hydrology for Small Watersheds" (Technical Release No. 55), published by the United States Department of Agriculture, Soil Conservation Service, dated June 1986.

Peak Runoff Rate Control

Per Chapter 26, Part 124 of the Stormwater Management Ordinance, the reductions shown in the table below have been applied to and achieved for the overall site. The rainfall intensities for these events are taken from the upper bound of the 90% confidence interval of NOAA Atlas 14, Volume 2, Version 3 as 2.70, 3.25, 4.09, 4.78, 5.79, 6.64 and 7.55 inches for the 1, 2, 5, 10, 25, 50 and 100- year events, respectively. The site is in watershed B in the Neshaminy Creek Ordinance.

§26-124 states that the stormwater management site area is the only area subject to the management district criteria, the stormwater management site area includes on-site areas that are not proposed to be disturbed but drain to a proposed stormwater management facility. The site was designed to only account for the disturbed site area to be reduced. In order to account for the non-disturbed areas, an “Allowable Post Developed Flows” chart was setup. Starting with the 1-year storm allowable flows have been calculated by using the 1-year pre-developed design flow multiplied with the percentage UN-disturbed of the shed. That number is then added to the product of the 2-year frequency storm multiplied by the percent disturbed of the shed. As an example:
(Q-1-pre x % disturbed) + (Q-2-pre x % undisturbed) = Q-2 post-allowable.

Post Construction Storm	Pre-Construction Storm for new development
2-year	1-year
5-year	2-year
10-year	5-year
25-year	10-year
50-year	25-year
100-year	50-year

The *'NewBritain CTP – Watershed Summaries'* table, included in the appendix section, summarizes the peak runoff rates and reductions for each point of interest.

Impervious surface

For the SWM calculations, the maximum on lot allowable impervious area includes what is shown on the plan for each house plus +/-400 sf additional impervious (for decks, patios, or larger home). This area shown includes the driveway, proposed dwelling, service walk and attached options.

The sum of the impervious shown per lot plus additional impervious, proposed roadways, parking, sidewalk and driveway aprons within the right-of-way totals 1.6 acres of on-site impervious or 25% of the total site area which is below the ordinance stated maximum of 35% impervious cover.

Stormwater Management Overview

Dry Extended Detention Basin 1 is proposed to have a Managed Release Concept (MRC) component. Per the PA DEP the MRC is a post-construction stormwater management (PCSM) strategy that comprises the collection, management, and filtration of captured runoff from the contributing drainage area through a best management practice (BMP) that is preferably vegetated and includes release of a portion of the captured runoff through an underdrain. MRC is intended to be used for project areas or subareas where infiltration is considered infeasible. The underdrain and the designed volume managed through is approximately the expected rate of interflow (lateral movement of stormwater to a stream) after a 2-year/24-hour storm event. This release rate is similar to what would be expected during and after the storm in the undeveloped condition and would not be expected to impact the storm event's effects on flooding and erosion. Additional design information can be found in Appendix 9.

Dry Extended Detention Basin 2: Is interconnected to Basin 1 and will provide storage. To achieve reduced peak flows off-site and to meet the MRC design standards Basin 2 is proposed to pond and drain into basin 1. Additional design information can be found in Appendix 9.

Existing Basin near County Line Road: Is to remain in its current state. The drainage area to the Existing Basin is proposed to be reduced in the post-development condition for the flows coming from the residential portion of the site.

Delta 2-year storm event Volume Requirement and Water Quality

Infiltration is not proposed within Basin 1 or Basin 2 due to poor infiltration characteristics encountered during the preliminary soil testing performed on the site. In order to provide for water quality on-site, the Managed Release Concept (MRC), an approved PCSM strategy, is proposed in Basins 1 and 2.

§26-123 outlines the calculation for the minimum recharge volume to be treated on-site. The Re_V for the proposed site is 17,921.1 cuft, see Appendix 2.

Per worksheet 4, which has been included in Appendix 2 of this report, the 2-year volume increase equals 20,872 cuft for the full developed area of the site.

Below are the required volumes as calculated by using worksheet 4 for the site which drains to UNT Neshaminy Creek.

Pre-dev 2-year volume	=	49,596 cubic-feet
Post-dev 2-year volume	=	70,468cubic-feet
2-year volume increase to be treated	=	**20,872** cubic-feet

Downstream Conveyance

Two (2) points of interest, POI A (total) to CTP basin & POI D, of consequence contributing to flow off-site at a critical points been significantly reduced in the post-construction condition. In the pre-developed condition POI A (Total) discharge 24.35 cfs, vs. in the post-developed condition 16.42 cfs is proposed to discharge in the 100-year storm. In the pre-developed condition POI D discharge 17.91 cfs, vs. in the post-developed condition 11.27 cfs is proposed to discharge in the 100-year storm. A similar reduction for all design storms is achieved to the CTP basins in all storms.

Extended Detention Basin Tc Calculations

The Tc calculations are shown in Appendix 4.

Summary Report

1

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

Date: 9-Feb-23
By: JMM
Chk'd:
Rev'd:

Allowable Post Developed Flows - SCS

Area Summaries

Area	Pre Q -1 yr (cfs)	Pre Q -2 yr (cfs)	Pre Q -5 yr (cfs)	Pre Q -10 yr (cfs)	Pre Q -25 yr (cfs)	Pre Q - 50 yr (cfs)	Pre Q - 100 yr (cfs)	Pre Total Area (Ac.)	Total Area Disturbed (Ac.)	% of shed (%)	Total Area Undisturbed (Ac.)	% of shed (%)
POI A	4.42	6.31	9.38	12.03	16.01	19.43	23.13	3.88	1.70	43.8%	2.18	56.2%
POI A-1	0.94	1.34	2.00	2.57	3.41	4.13	4.91	0.55	0.55	100.0%	0.00	0.0%
POI A Total	5.36	7.65	11.38	14.60	19.42	23.56	28.04	4.43	2.25	50.8%	2.18	49.2%
POI B	0.68	0.98	1.46	1.87	2.48	3.01	3.57	0.40	0.05	12.6%	0.35	87.4%
POI C	2.73	3.95	5.96	7.68	10.29	12.52	14.93	2.63	2.08	79.1%	0.55	20.9%
POI D	3.35	4.81	7.21	9.27	12.38	15.04	17.91	2.63	1.37	52.1%	1.26	47.9%

Weighted Allowable

Area	Post Q-2 yr (cfs)	Post Q-5 yr (cfs)	Post Q-10 yr (cfs)	Post Q-25 yr (cfs)	Post Q-50 yr (cfs)	Post Q-100 yr (cfs)
POI A	5.48	8.03	10.87	14.27	17.93	21.51
POI A-1	0.94	1.34	2.00	2.57	3.41	4.13
POI A Total	6.49	9.49	12.96	16.97	21.46	25.76
POI B	0.94	1.40	1.82	2.40	2.94	3.50
POI C	2.99	4.37	6.32	8.23	10.76	13.02
POI D	4.05	5.96	8.20	10.76	13.65	16.41

Note: The allowable post developed flows are calculated by using the previous year pre developed design flow multiplied with the percent **UN-**disturbed of the shed. That number is then added to the product of the actual year frequency storm multiplied by the percent disturbed of the shed.

Example:
(Q-1-pre * % disturbed) + (Q-2-pre * % undisturbed) = Q-2 post-allowable
(Q-2-pre * % disturbed) + (Q-5-pre * % undisturbed) = Q-5 post-allowable
(Q-5-pre * % disturbed) + (Q-10-pre * % undisturbed) = Q-10 post-allowable
(Q-10-pre * % disturbed) + (Q-25-pre * % undisturbed) = Q-25 post-allowable
(Q-25-pre * % disturbed) + (Q-50-pre * % undisturbed) = Q-50 post-allowable
(Q-50-pre * % disturbed) + (Q-100-pre * % undisturbed) = Q-100 post-allowable

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

Date: 2/9/2023
By: JMM
Chk'd:
Rev'd:

New Britain CTP - WATERSHED SUMMARIES (MRC)

WATERSHED DESCRIPTION		PEAK RUNOFF RATES (CFS)						
		1 Year	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
POI A (001)	To Pre Developed A (Pervious)	3.89	5.66	8.56	11.07	14.85	18.10	21.61
	To Pre Developed A (Impervious)	0.53	0.65	0.82	0.96	1.16	1.33	1.52
	Total Pre Developed A (Culvert)	4.42	6.31	9.38	12.03	16.01	19.43	23.13
	To Post By-Pass to A (Pervious) (To Culvert)	2.16	3.13	4.73	6.10	8.17	9.94	11.85
	To Post By-Pass to A (Impervious) (To Culvert)	0.86	1.04	1.32	1.54	1.87	2.15	2.45
	Total Post Developed to A (To Culvert)	3.02	4.17	6.05	7.64	10.04	12.09	14.30
	ALLOWABLE POST DEVELOPED FLOW	---	*5.48*	*8.03*	*10.87*	*14.27*	*17.93*	*21.51*
POI A-1 (001)	To Pre Developed A-1 (Pervious)	0.94	1.34	2.00	2.57	3.41	4.13	4.91
	To Pre Developed A-1 (Impervious)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Pre Developed A (CTP Ex. Basin)	0.94	1.34	2.00	2.57	3.41	4.13	4.91
	Post Basin 2 (into Basin 1)	0.12	0.45	1.14	1.41	1.50	1.56	1.64
	Post Basin 1	0.29	0.85	1.59	1.96	2.39	2.69	2.98
	To Post By-Pass to A-1 (Pervious) (To CTP Basin)	0.11	0.16	0.23	0.30	0.39	0.47	0.56
	To Post By-Pass to A-1 (Impervious) (To CTP Basin)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Post Developed to A-1 (To CTP Basin)	0.37	0.93	1.68	2.06	2.50	2.82	3.16
	ALLOWABLE POST DEVELOPED FLOW	---	*0.94*	*1.34*	*2.00*	*2.57*	*3.41*	*4.13*

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

Date: 2/9/2023
By: JMM
Chk'd:
Rev'd:

New Britain CTP - WATERSHED SUMMARIES (MRC)								
WATERSHED DESCRIPTION		PEAK RUNOFF RATES (CFS)						
		1 Year	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
POI A Total (to CTP Basin) (001)	Total Pre Developed A (CTP Ex. Basin)	0.94	1.34	2.00	2.57	3.41	4.13	4.91
	Total Pre Developed A (Culvert)	4.42	6.31	9.38	12.03	16.01	19.43	23.13
	Total Pre Developed A (CTP Ex. Basin)	4.62	6.60	9.84	12.63	16.84	20.45	24.35
	Total Post Developed to A (To Culvert)	3.02	4.17	6.05	7.64	10.04	12.09	14.30
	Total Post Developed to A-1 (To CTP Basin)	0.37	0.93	1.68	2.06	2.50	2.82	3.16
	Total Post Developed to CTP Basin (from Site)	3.10	4.27	6.72	8.79	11.62	13.95	16.42
	ALLOWABLE POST DEVELOPED FLOW	---	*6.49*	*9.49*	*12.96*	*16.97*	*21.46*	*25.76*
BYPASS POI B (002)	To Pre Developed B (Pervious)	0.68	0.98	1.46	1.87	2.48	3.01	3.57
	To Pre Developed B (Impervious)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Pre Developed B	0.68	0.98	1.46	1.87	2.48	3.01	3.57
	To Post By-Pass to B (Pervious)	0.58	0.83	1.24	1.59	2.11	2.56	3.04
	To Post By-Pass to B (Impervious)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Post Developed to B	0.58	0.83	1.24	1.59	2.11	2.56	3.04
	ALLOWABLE POST DEVELOPED FLOW	---	*0.94*	*1.40*	*1.82*	*2.40*	*2.94*	*3.50*

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

Date: 2/9/2023
By: JMM
Chk'd:
Rev'd:

New Britain CTP - WATERSHED SUMMARIES (MRC)

WATERSHED DESCRIPTION		PEAK RUNOFF RATES (CFS)						
		1 Year	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
BYPASS POI C (003)	To Pre Developed C (Pervious)	2.60	3.80	5.76	7.45	10.01	12.20	14.57
	To Pre Developed C (Impervious)	0.13	0.15	0.20	0.23	0.28	0.32	0.36
	Total Pre Developed C	2.73	3.95	5.96	7.68	10.29	12.52	14.93
	To Post By-Pass to C (Pervious)	1.41	2.00	2.95	3.75	4.96	5.99	7.09
	To Post By-Pass to C (Impervious)	0.55	0.66	0.84	0.98	1.19	1.37	1.56
	Total Post Developed to C	1.96	2.66	3.79	4.73	6.15	7.36	8.65
	ALLOWABLE POST DEVELOPED FLOW	---	*2.99*	*4.37*	*6.32*	*8.23*	*10.76*	*13.02*
BYPASS POI D (004)	To Pre Developed D (Pervious)	3.20	4.63	6.98	9.00	12.05	14.66	17.48
	To Pre Developed D (Impervious)	0.15	0.18	0.23	0.27	0.33	0.38	0.43
	Total Pre Developed D	3.35	4.81	7.21	9.27	12.38	15.04	17.91
	To Post By-Pass to D (Pervious)	1.66	2.40	3.60	4.65	6.21	7.55	9.00
	To Post By-Pass to D (Impervious)	0.80	0.97	1.22	1.43	1.74	1.99	2.27
	Total Post Developed to D	2.46	3.37	4.82	6.08	7.95	9.54	11.27
	ALLOWABLE POST DEVELOPED FLOW	---	*4.05*	*5.96*	*8.20*	*10.76*	*13.65*	*16.41*

2-Year Volume

2

Worksheet 3
Worksheet 4
Worksheet 5
Recharge Volume (Re_V)

Worksheet 3. Nonstructural BMP Credits - On-Site

PROTECTED AREA

1.1 Area of Protected Sensitive/Special Value Features (see WS2) 0.00 Ac.

1.2 Area of Riparian Forest Buffer Protection 0 Ac.

3.1 Area of Minimum Disturbance/Reduced Grading 0 Ac.

TOTAL **0.00 Ac.**

Site Area	Minus	Protected Area	=	Stormwater Management Area
0.00	-	0.00		0.00

This is the area that requires stormwater management

VOLUME CREDITS

3.1 Minimum Soil Compaction (See Chapter 8, page 22 - SW BMP Manual)

Lawn _____ ft^2 x 1/4" x 1/12 = 0 ft^3

Meadow _____ ft^2 x 1/3" x 1/12 = 0 ft^3

3.3 Protect Existing Trees (See Chapter 8, page 23 - SW BMP Manual)

For Trees within 100 feet of impervious area:

Tree Canopy _____ ft^2 x 1/2" x 1/12 = 0 ft^3

5.4.3 Protect/Utilize Natural Flow Pathways (See Chapter, page 20 - SW BMP Manual)

Vegetated Area _____ ft^2 x 1/4" x 1/12 = 0 ft^3

For all other disconnected roof areas

Roof Area _____ ft^2 x 1/4" x 1/12 = 0 ft^3

5.6.3 Re-vegetate and Re-forest Disturbed Areas, Using Native Species (See Chapter 8, page 23 - SW BMP Manual)

For Runoff directed to areas protected under 5.8.1 and 5.8.2

Deciduous Trees 0 trees x 6 CF / tree = 0 ft^3

For all other disconnected roof areas

Evergreen Trees 0 trees x 10 CF / tree = 0 ft^3

TOTAL NON-STRUCTURAL VOLUME CREDIT* **0** ft^3

*For use on Worksheet 5

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: **New Britain CTP (8363)**
Drainage Area: On-Site
2-Year Rainfall 3.25 in

Total Site Area: 10.08 acres
Protected Site Area: 0.00 acres
Managed Area: 10.08 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia	Q (in)	Runoff Volume (cf)
Woodland	B	0	0.00	55	8.18	1.64	0.27	0
	C	0	0.00	70	4.29	0.86	0.86	0
	D	34,848	0.80	77	2.99	0.60	1.25	3,622
Meadow	B	0	0.00	58	7.24	1.45	0.36	0
	C	0	0.00	71	4.08	0.82	0.91	0
	D	359,806	8.26	78	2.82	0.56	1.31	39,267
Impervious as Meadow	D	31,363	0.72	78	2.82	0.56	1.31	3,423
Impervious	---	13,068	0.30	98	0.20	0.04	3.02	3,285
TOTAL:		439,085	10.08					49,596

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia	Q (in)	Runoff Volume (cf)
Lawn	B	0	0.00	61.0	6.39	1.28	0.46	0
	C	0	0.00	74	3.51	0.70	1.07	0
	D	125,017	2.87	80.0	2.50	0.50	1.44	15,001
Meadow	B	0	0.00	58	7.24	1.45	0.36	0
	C	0	0.00	71	4.08	0.82	0.91	0
	D	132,858	3.05	78	2.82	0.56	1.31	14,499
Woodland	B	0	0.00	55	8.18	1.64	0.27	0
	C	0	0.00	70	4.29	0.86	0.86	0
	D	31,799	0.73	77	2.99	0.60	1.25	3,305
Existing Impervious	---	0	0.00	98	0.20	0.04	3.02	0
New Impervious	---	110,207	2.53	98	0.20	0.04	3.02	27,700
Building Impervious	---	39,640	0.91	98	0.20	0.04	3.02	9,963
TOTAL:		439,520	10.09					70,468

2-Year Volume Increase (CF): 20,872

Worksheet 5. Structural BMP Volume Credits - On-Site

PROJECT: New Britain CTP (8363)
SUB-BASIN: On-Site

Required Control Volume (ft^3) - *from Worksheet 4*: 20,872

Non-structural Volume Credit (ft^3) - *from Worksheet 3*: - 0
(maximum is 25% of required volume)

Structural Volume Reqmt (ft^3) 20,872
(Required Control Volume minus Non-structural Credit)
Required Control Volume (ft^3) - *from Worksheet 4*:

	Proposed BMP	Area (ac)	Volume Reduction Permanently Removed (ft^3)
6.4.1	Porous Pavement		
6.4.2	Infiltration Basin		
6.4.3	Infiltration Bed		
6.4.4	Infiltration Trench		
6.4.5	Rain Garden/Bioretention		
6.4.6	Dry Well / Seepage Pit		
6.4.7	Constructed Filter		
6.4.8	Vegetated Swale		
6.4.9	Vegetated Filter Strip		
6.4.10	Berm		
6.5.1	Vegetated Roof		
6.5.2	Capture and Re-use		
6.6.1	Constructed Wetlands		
6.6.2	Wet Pond / Retention Basin		
6.7.1	Riparian Buffer/Riparian Forest Buffer Restoration		
6.7.2	Landscape Restoration / Reforestation		
6.7.3	Soil Amendment		
6.8.1	Level Spreader		
6.8.2	Special Storage Areas		
Other	MRC Basin	5.18	22,356

Total Structural Volume (ft^3): 22,356
Structural Volume Requirement (ft^3): 20,872
DIFFERENCE 1,484

Recharge volume requirements applicable (§26-123)

Equation for determining WQv (acre-feet)

Pre Developed	Post Developed
Q = (P - 0.2S)^2 / (P + 0.8S)	Q = (P - 0.2S)^2 / (P + 0.8S)
P = Rainfall depth in inches, using 2 year	P = Rainfall depth in inches, using 2 year
S = (1000/CN) - 10	S = (1000/CN) - 10
P 3.25	P 3.25
S (1000/78) - 10	S (1000/85) - 10
Q = 1.31	Q = 1.80
WQv = [Q*A]/12	WQv = [Q*A]/12
A = Project area in square feet	A = Project area in square feet
A 438649.2 sf	A 438649.2 sf
WQv 47,890.2 CF	WQv 65,811.3 CF

Rescharge Volume Required = 17,921.1 CF

Pre-developed Tc

3

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed A-1 (CTP Basin) (001)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID			
Surface Description				
Manning's Roughness Coefficient, n				
Flow Length, L	ft.			
Two Year 24 Hour Rainfall, P2	in.			
Land Slope, s	ft/ft			
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr			
Sheet flow Subtotal Tt =	**hr**			

Shallow concentrated flow

	Segment ID			
Surface Description (paved or unpaved)				
Flow Length, L	ft			
Watercourse Slope, s	ft/ft			
Average Velociity, V	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Shallow concentrated flow Subtotal Tt =	**hr**			

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =
USE Tt (min) = 5.0

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: Jmm
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed A (Culvert) (001)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

		Segment ID	A - B			
Surface Description			Meadow			Elev. A = 390.5
Manning's Roughness Coefficient, n			0.24			Elev. B = 388.3
Flow Length, L		ft.	100			Chg. Elev. = 2.20
Two Year 24 Hour Rainfall, P2		in.	3.25			
Land Slope, s		ft/ft	0.0220			
Tt =	0.007(nL)^0.8 / (P2^0.5)(s^0.4)	hr	0.2272			
	Sheet flow Subtotal Tt =	**hr**			**0.2272**	

Shallow concentrated flow

		Segment ID	B - C			
Surface Description (paved or unpaved)			Unpaved			Elev. B = 388.3
Flow Length, L		ft	550			Elev. C = 367.0
Watercourse Slope, s		ft/ft	0.0387			Chg. Elev. = 21.30
Average Velociity, V		fps	3.18			
Tt =	L / (3600 x V)	hr	0.0481			
	Shallow concentrated flow Subtotal Tt =	**hr**			**0.0481**	

Channel flow

		Segment ID
Cross Sectional Flow Area, a		sq ft
Wetted Perimeter, Pw		ft
Hydraulic Radius, r = a/Pw		ft
Channel Slope, s		ft/ft
Manning's Roughness Coefficient, n		
Velocity, V = (1.486)(r^2/3)(s^1/2)/n		fps
Flow length, L		ft
Tt =	L / (3600 x V)	hr
	Channel flow Subtotal Tt =	**hr**

Pipe flow

		Segment ID	C - D			
Structure 'From' - 'To'			varies			Elev. C = 367.00
Flow Length, L		ft	varies			Elev. D = 359.00
Pipe Diameter, D		in	varies			Chg. Elev. = 8.00
Manning's Roughness Coefficient, n			varies			
Pipe Slope, s		ft/ft	varies			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n		fps	varies			
Tt =	L / (3600 x V)	hr	0.0167			
	Pipe flow Subtotal Tt =	**hr**			**0.0167**	

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =	**0.2920**
USE Tt (min) =	**17.5**

Total Hydraulic Length =	#VALUE!
Total Elevation Change =	#VALUE!
Average Slope =	#VALUE!

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed B (002)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID			
Surface Description				
Manning's Roughness Coefficient, n				
Flow Length, L	ft.			
Two Year 24 Hour Rainfall, P2	in.			
Land Slope, s	ft/ft			
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr			
Sheet flow Subtotal Tt =	**hr**			

Shallow concentrated flow

	Segment ID			
Surface Description (paved or unpaved)				
Flow Length, L	ft			
Watercourse Slope, s	ft/ft			
Average Velociity, V	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Shallow concentrated flow Subtotal Tt =	**hr**			

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =
USE Tt (min) = 5.0

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed C (003)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID	A - B		
Surface Description		Meadow		
Manning's Roughness Coefficient, n		0.24		
Flow Length, L	ft.	100		
Two Year 24 Hour Rainfall, P2	in.	3.25		
Land Slope, s	ft/ft	0.0180		
Tt = $\frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr	0.2462		
Sheet flow Subtotal Tt =	**hr**			**0.2462**

Elev. A = 391.2
Elev. B = 389.4
Chg. Elev. = 1.80

Shallow concentrated flow

	Segment ID	B - C		
Surface Description (paved or unpaved)		Unpaved		
Flow Length, L	ft	677		
Watercourse Slope, s	ft/ft	0.0257		
Average Velociity, V	fps	2.59		
Tt = $\frac{L}{(3600 \times V)}$	hr	0.0727		
Shallow concentrated flow Subtotal Tt =	**hr**			**0.0727**

Elev. B = 389.4
Elev. C = 372.0
Chg. Elev. = 17.40

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
Tt = $\frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Tt = $\frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =	**0.3189**
USE Tt (min) =	**19.1**

Total Hydraulic Length =	777
Total Elevation Change =	19.2
Average Slope =	2.47%

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed D (004)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID	A - B		
Surface Description		Meadow		
Manning's Roughness Coefficient, n		0.17		
Flow Length, L	ft.	100		
Two Year 24 Hour Rainfall, P2	in.	3.25		
Land Slope, s	ft/ft	0.0210		
Tt = $\frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr	0.1756		
Sheet flow Subtotal Tt =	**hr**			**0.1756**

Elev. A = 391.3
Elev. B = 389.2
Chg. Elev. = 2.10

Shallow concentrated flow

	Segment ID	B - C		
Surface Description (paved or unpaved)		Unpaved		
Flow Length, L	ft	429		
Watercourse Slope, s	ft/ft	0.0308		
Average Velociity, V	fps	2.83		
Tt = $\frac{L}{(3600 \times V)}$	hr	0.0421		
Shallow concentrated flow Subtotal Tt =	**hr**			**0.0421**

Elev. B = 389.2
Elev. C = 376.0
Chg. Elev. = 13.20

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
Tt = $\frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Tt = $\frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =	**0.2177**
USE Tt (min) =	**13.1**
Total Hydraulic Length =	528.97
Total Elevation Change =	15.3
Average Slope =	2.89%

Post-developed Tc

4

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Basin 1**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID			
Surface Description				
Manning's Roughness Coefficient, n				
Flow Length, L	ft.			
Two Year 24 Hour Rainfall, P2	in.			
Land Slope, s	ft/ft			
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr			
Sheet flow Subtotal Tt =	**hr**			

Shallow concentrated flow

	Segment ID			
Surface Description (paved or unpaved)		Unpaved		
Flow Length, L	ft			
Watercourse Slope, s	ft/ft			
Average Velociity, V	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Shallow concentrated flow Subtotal Tt =	**hr**			

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =
USE Tt (min) = 5.0

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Basin 2**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID			
Surface Description				
Manning's Roughness Coefficient, n				
Flow Length, L	ft.			
Two Year 24 Hour Rainfall, P2	in.			
Land Slope, s	ft/ft			
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr			
Sheet flow Subtotal Tt =	**hr**			

Shallow concentrated flow

	Segment ID			
Surface Description (paved or unpaved)		Unpaved		
Flow Length, L	ft			
Watercourse Slope, s	ft/ft			
Average Velociity, V	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Shallow concentrated flow Subtotal Tt =	**hr**			

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =
USE Tt (min) = 5.0

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Developed A (Bypass)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

		Segment ID	A - B		
Surface Description			Lawn		
Manning's Roughness Coefficient, n			0.24		
Flow Length, L		ft.	100		
Two Year 24 Hour Rainfall, P2		in.	3.25		
Land Slope, s		ft/ft	0.0400		
Tt =	0.007(nL)^0.8 / (P2^0.5)(s^0.4)	hr	0.1789		
Sheet flow Subtotal Tt =		**hr**			**0.1789**

Elev. A = 387.0
Elev. B = 383.0
Chg. Elev. = 4.00

Shallow concentrated flow

		Segment ID	B - C		
Surface Description (paved or unpaved)			Unpaved		
Flow Length, L		ft	400		
Watercourse Slope, s		ft/ft	0.0400		
Average Velociity, V		fps	3.23		
Tt =	L / (3600 x V)	hr	0.0344		
Shallow concentrated flow Subtotal Tt =		**hr**			**0.0344**

Elev. B = 383.0
Elev. C = 367.0
Chg. Elev. = 16.00

Channel flow

		Segment ID			
Cross Sectional Flow Area, a		sq ft			
Wetted Perimeter, Pw		ft			
Hydraulic Radius, r = a/Pw		ft			
Channel Slope, s		ft/ft			
Manning's Roughness Coefficient, n					
Velocity, V = (1.486)(r^2/3)(s^1/2)/n		fps			
Flow length, L		ft			
Tt =	L / (3600 x V)	hr			
Channel flow Subtotal Tt =		**hr**			

Pipe flow

		Segment ID	C - D		
Structure 'From' - 'To'			varies		
Flow Length, L		ft	varies		
Pipe Diameter, D		in	varies		
Manning's Roughness Coefficient, n			varies		
Pipe Slope, s		ft/ft	varies		
Velocity, V = (1.486)(r^2/3)(s^1/2)/n		fps	varies		
Tt =	L / (3600 x V)	hr	0.0167		
Pipe flow Subtotal Tt =		**hr**			**0.0167**

Elev. C = 367.00
Elev. D = 359.00
Chg. Elev. = 8.00

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt = 0.2300
USE Tt (min) = 13.8

Total Hydraulic Length = #VALUE!
Total Elevation Change = #VALUE!
Average Slope = #VALUE!

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Developed A-1 (Bypass)**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

	Segment ID			
Surface Description				
Manning's Roughness Coefficient, n				
Flow Length, L	ft.			
Two Year 24 Hour Rainfall, P2	in.			
Land Slope, s	ft/ft			
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr			
Sheet flow Subtotal Tt =	**hr**			

Shallow concentrated flow

	Segment ID			
Surface Description (paved or unpaved)		Unpaved		
Flow Length, L	ft			
Watercourse Slope, s	ft/ft			
Average Velociity, V	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Shallow concentrated flow Subtotal Tt =	**hr**			

Channel flow

	Segment ID			
Cross Sectional Flow Area, a	sq ft			
Wetted Perimeter, Pw	ft			
Hydraulic Radius, r = a/Pw	ft			
Channel Slope, s	ft/ft			
Manning's Roughness Coefficient, n				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
Flow length, L	ft			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Channel flow Subtotal Tt =	**hr**			

Pipe flow

	Segment ID			
Structure 'From' - 'To'				
Flow Length, L	ft			
Pipe Diameter, D	in			
Manning's Roughness Coefficient, n				
Pipe Slope, s	ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps			
$Tt = \frac{L}{(3600 \times V)}$	hr			
Pipe flow Subtotal Tt =	**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =
USE Tt (min) = 5.0

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass B**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

		Segment ID			
Surface Description					
Manning's Roughness Coefficient, n					
Flow Length, L	ft.				
Two Year 24 Hour Rainfall, P2	in.				
Land Slope, s	ft/ft				
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr				
Sheet flow Subtotal Tt =	**hr**				

Shallow concentrated flow

		Segment ID			
Surface Description (paved or unpaved)					
Flow Length, L	ft				
Watercourse Slope, s	ft/ft				
Average Velociity, V	fps				
$Tt = \frac{L}{(3600 \times V)}$	hr				
Shallow concentrated flow Subtotal Tt =	**hr**				

Channel flow

		Segment ID			
Cross Sectional Flow Area, a	sq ft				
Wetted Perimeter, Pw	ft				
Hydraulic Radius, r = a/Pw	ft				
Channel Slope, s	ft/ft				
Manning's Roughness Coefficient, n					
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps				
Flow length, L	ft				
$Tt = \frac{L}{(3600 \times V)}$	hr				
Channel flow Subtotal Tt =	**hr**				

Pipe flow

		Segment ID			
Structure 'From' - 'To'					
Flow Length, L	ft				
Pipe Diameter, D	in				
Manning's Roughness Coefficient, n					
Pipe Slope, s	ft/ft				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps				
$Tt = \frac{L}{(3600 \times V)}$	hr				
Pipe flow Subtotal Tt =	**hr**				

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =
USE Tt (min) = 5.0

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass C**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

		Segment ID			
Surface Description					
Manning's Roughness Coefficient, n					
Flow Length, L	ft.				
Two Year 24 Hour Rainfall, P2	in.				
Land Slope, s	ft/ft				
$Tt = \frac{0.007(nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$	hr				
Sheet flow Subtotal Tt =	**hr**				

Shallow concentrated flow

		Segment ID			
Surface Description (paved or unpaved)					
Flow Length, L	ft				
Watercourse Slope, s	ft/ft				
Average Velociity, V	fps				
$Tt = \frac{L}{(3600 \times V)}$	hr				
Shallow concentrated flow Subtotal Tt =	**hr**				

Channel flow

		Segment ID			
Cross Sectional Flow Area, a	sq ft				
Wetted Perimeter, Pw	ft				
Hydraulic Radius, r = a/Pw	ft				
Channel Slope, s	ft/ft				
Manning's Roughness Coefficient, n					
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps				
Flow length, L	ft				
$Tt = \frac{L}{(3600 \times V)}$	hr				
Channel flow Subtotal Tt =	**hr**				

Pipe flow

		Segment ID			
Structure 'From' - 'To'					
Flow Length, L	ft				
Pipe Diameter, D	in				
Manning's Roughness Coefficient, n					
Pipe Slope, s	ft/ft				
Velocity, V = (1.486)(r^2/3)(s^1/2)/n	fps				
$Tt = \frac{L}{(3600 \times V)}$	hr				
Pipe flow Subtotal Tt =	**hr**				

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt =

USE Tt (min) = 5 min

Total Hydraulic Length =
Total Elevation Change =
Average Slope =

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass D**

TIME OF CONCENTRATION
(S.C.S. TR-55 method)

Sheet Flow

		Segment ID	A - B		
Surface Description			Lawn		
Manning's Roughness Coefficient, n			0.24		
Flow Length, L		ft.	100		
Two Year 24 Hour Rainfall, P2		in.	3.25		
Land Slope, s		ft/ft	0.0450		
Tt =	0.007(nL)^0.8 / (P2^0.5)(s^0.4)	hr	0.1706		
Sheet flow Subtotal Tt =		**hr**			**0.1706**

Elev. A = 387.0
Elev. B = 382.5
Chg. Elev. = 4.50

Shallow concentrated flow

		Segment ID	B - C		
Surface Description (paved or unpaved)			Unpaved		
Flow Length, L		ft	210		
Watercourse Slope, s		ft/ft	0.0310		
Average Velociity, V		fps	2.84		
Tt =	L / (3600 x V)	hr	0.0206		
Shallow concentrated flow Subtotal Tt =		**hr**			**0.0206**

Elev. B = 382.5
Elev. C = 376.0
Chg. Elev. = 6.50

Channel flow

		Segment ID			
Cross Sectional Flow Area, a		sq ft			
Wetted Perimeter, Pw		ft			
Hydraulic Radius, r = a/Pw		ft			
Channel Slope, s		ft/ft			
Manning's Roughness Coefficient, n					
Velocity, V = (1.486)(r^2/3)(s^1/2)/n		fps			
Flow length, L		ft			
Tt =	L / (3600 x V)	hr			
Channel flow Subtotal Tt =		**hr**			

Pipe flow

		Segment ID			
Structure 'From' - 'To'					
Flow Length, L		ft			
Pipe Diameter, D		in			
Manning's Roughness Coefficient, n					
Pipe Slope, s		ft/ft			
Velocity, V = (1.486)(r^2/3)(s^1/2)/n		fps			
Tt =	L / (3600 x V)	hr			
Pipe flow Subtotal Tt =		**hr**			

*Manning's Roughness Coefficients, n taken from Table 3-1 of the Urban Hydrology for Small Watersheds TR-55 manual

Total Tt = 0.1912
USE Tt (min) = 11.5

Total Hydraulic Length = 310
Total Elevation Change = 11.0
Average Slope = 3.55%

Pre-developed Cn

5

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed A-1 (CTP Basin) (Pervious) (00**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Existing Impervious TBR (Counted as Meadow)	78	0.26	20.28
D	Meadow (good)	78	0.29	22.62

Totals =	0.55	42.90

Composite Cn = $\frac{42.90}{0.55}$ = 78.00

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed A-1 (CTP Basin) (Impervious) (**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Existing Impervious	98	0.00	0.00

Totals =	0.00	0.00

Composite Cn = 0.00 / 0.00 = ---

USE Cn = ---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed A (Culvert) (Pervious) (001)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Existing Impervious TBR (Counted as Meadow)	78	0.38	29.64
D	Meadow (good)	78	2.48	193.44
D	Woods (good)	77	0.80	61.60

Totals =	3.66	284.68

Composite Cn = $\frac{284.68}{3.66}$ = 77.78

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed A (Culvert) (Impervious) (001)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Existing Impervious	98	0.20	19.60

Totals =	0.20	19.60

Composite Cn = $\frac{19.60}{0.20}$ = 98.00

USE Cn = 98

---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed B (Pervious) (002)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Existing Impervious TBR (Counted as Meadow)	78	0.04	2.75
D	Meadow (good)	78	0.36	28.27
Totals =			0.40	31.02

Composite Cn = $\frac{31.02}{0.40}$ = 78.00

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed B (Impervious) (002)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Existing Impervious	98	0.00	0.00

Totals =	0.00	0.00

Composite Cn = 0.00 / 0.00 = ---

USE Cn = ---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed C (Pervious) (003)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Existing Impervious TBR (Counted as Meadow)	78	0.04	2.75
D	Meadow (good)	78	2.55	198.81

Totals =	2.58	201.55

Composite Cn = $\frac{201.55}{2.58}$ = 78.00

USE Cn = 78

---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed C (Impervious) (003)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Existing Impervious	98	0.05	4.99

Totals =	0.05	4.99

Composite Cn = $\frac{4.99}{0.05}$ = 98.00

USE Cn = 98

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed D (Pervious) (004)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	2.58	201.29

Totals =	2.58	201.29

Composite Cn = 201.29 / 2.58 = 78.00

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Pre Developed D (Impervious) (004)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Existing Impervious	98	0.05	4.95

Totals =	0.05	4.95

Composite Cn = $\frac{4.95}{0.05}$ = 98.00

USE Cn = 98

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

Post-developed Cn

6

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Basin 1 (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	0.00	0.00
D	Lawn/Open Space	80	0.95	76.00

Totals =	0.95	76.00

Composite Cn = $\frac{76.00}{0.95}$ = 80.00

USE Cn = 80

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Basin 1 (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	1.47	144.40
B/C/D	Building Impervious	98	0.60	58.80
Totals =			2.07	203.20

Composite Cn = $\frac{203.20}{2.07}$ = 98.00

USE Cn = 98

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Basin 2 (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Lawn/Open Space	80	1.38	110.40
D	Meadow (good)	78	0.09	7.02

Totals =	1.47	117.42

Composite Cn = $\frac{117.42}{1.47}$ = 79.88

USE Cn = 80

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Basin 2 (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	0.38	37.24
B/C/D	Building Impervious	98	0.31	30.60
Totals =			0.69	67.84

Composite Cn = $\frac{67.84}{0.69}$ = 98.00

USE Cn = 98

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Developed A (Bypass) (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	1.06	82.68
D	Woods	77	0.73	56.21

Totals =	1.79	138.89

Composite Cn = $\frac{138.89}{1.79}$ = 77.59

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Developed A (Bypass) (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	0.29	28.42

Totals =	0.29	28.42

Composite Cn = $\frac{28.42}{0.29}$ = 98.00

USE Cn = 98

---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Developed A-1 (Bypass) (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	0.00	0.00
D	Lawn	80	0.06	4.80

Totals =	0.06	4.80

Composite Cn = $\frac{4.80}{0.06}$ = 80.00

USE Cn = 80

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Developed A-1 (Bypass) (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	0.00	0.00

Totals = 0.00 0.00

Composite Cn = 0.00 / 0.00 = ---

USE Cn = ---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass B (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	0.33	26.12
D	Lawn/Open Space	80	0.01	0.80
Totals =			0.34	26.92

Composite Cn = $\frac{26.92}{0.34}$ = 78.06

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass B (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	0.00	0.00

Totals = 0.00 0.00

Composite Cn = 0.00 / 0.00 = ---

USE Cn = ---

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass C (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	0.56	43.68
D	Lawn/Open Space	80	0.22	17.60
Totals =			0.78	61.28

Composite Cn = $\frac{61.28}{0.78}$ = 78.56

USE Cn = 79

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass C (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	0.14	13.72

Totals =	0.14	13.72

Composite Cn = 13.72 / 0.14 = 98.00

USE Cn = 98

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass D (Pervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
D	Meadow (good)	78	1.01	78.78
D	Lawn/Open Space	80	0.25	20.00

Totals =	1.26	98.78

Composite Cn = $\frac{98.78}{1.26}$ = 78.40

USE Cn = 78

24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd:

Watershed: **To Post Bypass D (Impervious)**

RUNOFF CURVE NUMBER CALCULATIONS:

(S.C.S. TR-55 method)

Soil name and hydrologic group	Cover Description	Cn	Area (acres)	Product of CN x Area
--				0.00
B/C/D	Impervious	98	0.25	24.50

Totals =	0.25	24.50

Composite Cn = 24.50 / 0.25 = 98.00

USE Cn = 98

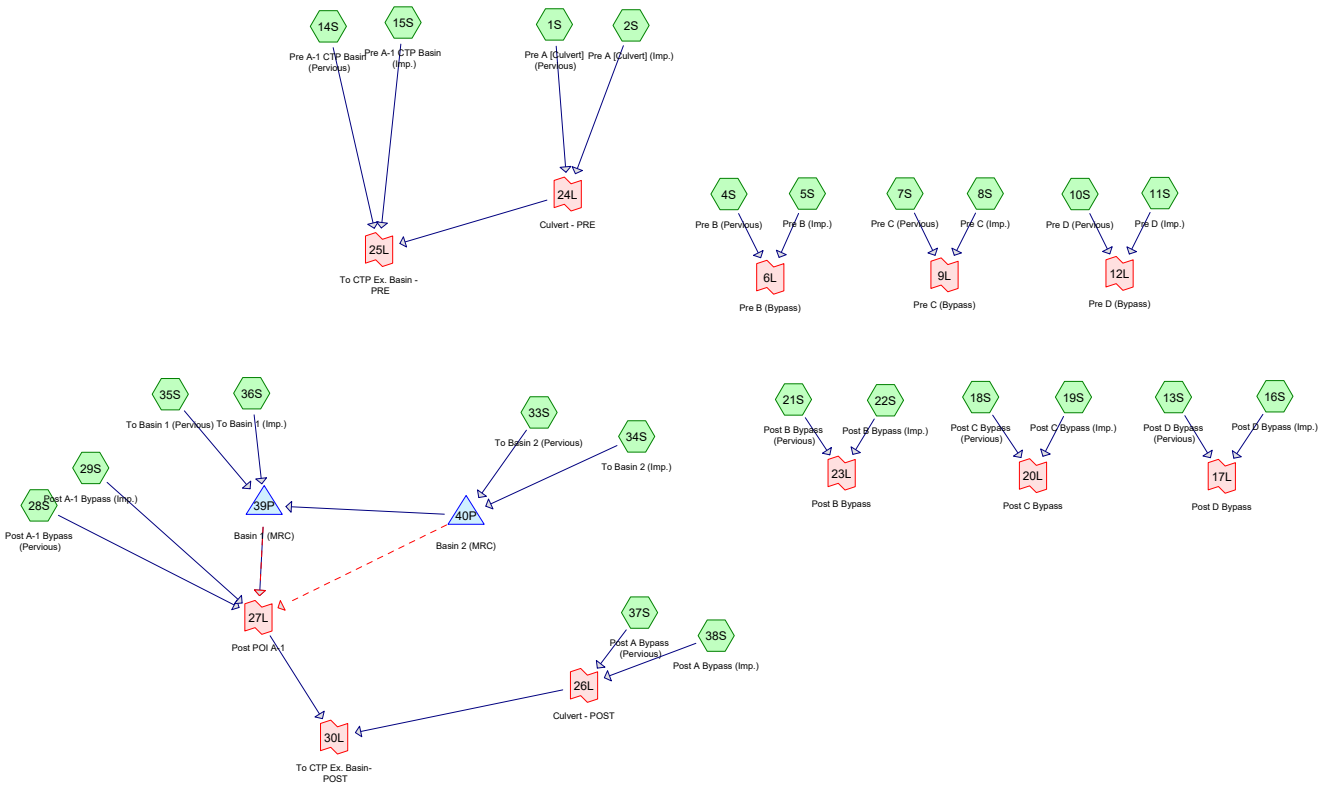
24 hr RAINFALL for New Britain Township

(per NOAA)

1 year	2 year	5 year	10 year	25 year	50 year	100 year
2.70	3.25	4.09	4.78	5.79	6.64	7.55

Pre- and Post-Developed Hydrographs and Rainfall Report

7



Subcat Reach Pond Link

Routing Diagram for 8363 - Pre-Post SWM-MRC
Prepared by ESE Consultants, Inc, Printed 2/13/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-YR	Type II 24-hr		Default	24.00	1	2.70	2
2	1.2-IN./2-HR.	NJ DEP 2-hr		Default	2.00	1	1.20	2
3	2-YR	Type II 24-hr		Default	24.00	1	3.25	2
4	5-YR	Type II 24-hr		Default	24.00	1	4.09	2
5	10-YR	Type II 24-hr		Default	24.00	1	4.78	2
6	25-YR	Type II 24-hr		Default	24.00	1	5.79	2
7	50-YR	Type II 24-hr		Default	24.00	1	6.64	2
8	100-YR	Type II 24-hr		Default	24.00	1	7.55	2

Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=0.92"
Tc=17.5 min CN=78 Runoff=3.89 cfs 12,229 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=2.47"
Tc=17.5 min CN=98 Runoff=0.53 cfs 1,793 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=0.92"
Tc=5.0 min CN=78 Runoff=0.68 cfs 1,336 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=0.92"
Tc=19.1 min CN=78 Runoff=2.60 cfs 8,620 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=2.47"
Tc=19.1 min CN=98 Runoff=0.13 cfs 448 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=0.92"
Tc=13.1 min CN=78 Runoff=3.20 cfs 8,620 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=2.47"
Tc=13.1 min CN=98 Runoff=0.15 cfs 448 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=0.92"
Tc=11.5 min CN=78 Runoff=1.66 cfs 4,210 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=0.92"
Tc=5.0 min CN=78 Runoff=0.94 cfs 1,838 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=2.47"
Tc=11.5 min CN=98 Runoff=0.80 cfs 2,241 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=0.97"
Tc=5.0 min CN=79 Runoff=1.41 cfs 2,758 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=2.47"
Tc=5.0 min CN=98 Runoff=0.55 cfs 1,255 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=0.92"
Tc=5.0 min CN=78 Runoff=0.58 cfs 1,136 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=80 Runoff=0.11 cfs 224 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=80 Runoff=2.82 cfs 5,495 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=2.47"
Tc=5.0 min CN=98 Runoff=2.71 cfs 6,186 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=1.03"
Tc=5.0 min CN=80 Runoff=1.82 cfs 3,551 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=2.47"
Tc=5.0 min CN=98 Runoff=8.12 cfs 18,557 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=0.92"
Tc=13.8 min CN=78 Runoff=2.16 cfs 5,981 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=2.47"
Tc=13.8 min CN=98 Runoff=0.86 cfs 2,600 cf

Pond 39P: Basin 1 (MRC) Peak Elev=365.00' Storage=16,420 cf Inflow=9.93 cfs 24,637 cf
Primary=0.29 cfs 8,278 cf Secondary=0.04 cfs 13,787 cf Outflow=0.33 cfs 22,065 cf

Pond 40P: Basin 2 (MRC) Peak Elev=365.71' Storage=8,048 cf Inflow=5.51 cfs 11,681 cf
Primary=0.12 cfs 2,528 cf Secondary=0.03 cfs 8,313 cf Outflow=0.15 cfs 10,842 cf

Link 6L: Pre B (Bypass) Inflow=0.68 cfs 1,336 cf
Primary=0.68 cfs 1,336 cf

Link 9L: Pre C (Bypass) Inflow=2.73 cfs 9,068 cf
Primary=2.73 cfs 9,068 cf

Link 12L: Pre D (Bypass) Inflow=3.35 cfs 9,068 cf
Primary=3.35 cfs 9,068 cf

Link 17L: Post D Bypass Inflow=2.45 cfs 6,451 cf
Primary=2.45 cfs 6,451 cf

Link 20L: Post C Bypass Inflow=1.96 cfs 4,013 cf
Primary=1.96 cfs 4,013 cf

Link 23L: Post B Bypass Inflow=0.58 cfs 1,136 cf
Primary=0.58 cfs 1,136 cf

Link 24L: Culvert - PRE Inflow=4.42 cfs 14,022 cf
Primary=4.42 cfs 14,022 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=4.62 cfs 15,859 cf
Primary=4.62 cfs 15,859 cf

Link 26L: Culvert - POST
Inflow=3.02 cfs 8,581 cf
Primary=3.02 cfs 8,581 cf

Link 27L: Post POI A-1
Inflow=0.37 cfs 30,603 cf
Primary=0.37 cfs 30,603 cf

Link 30L: To CTP Ex. Basin- POST
Inflow=3.13 cfs 39,184 cf
Primary=3.13 cfs 39,184 cf

Total Runoff Area = 878,170 sf Runoff Volume = 89,527 cf Average Runoff Depth = 1.22"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

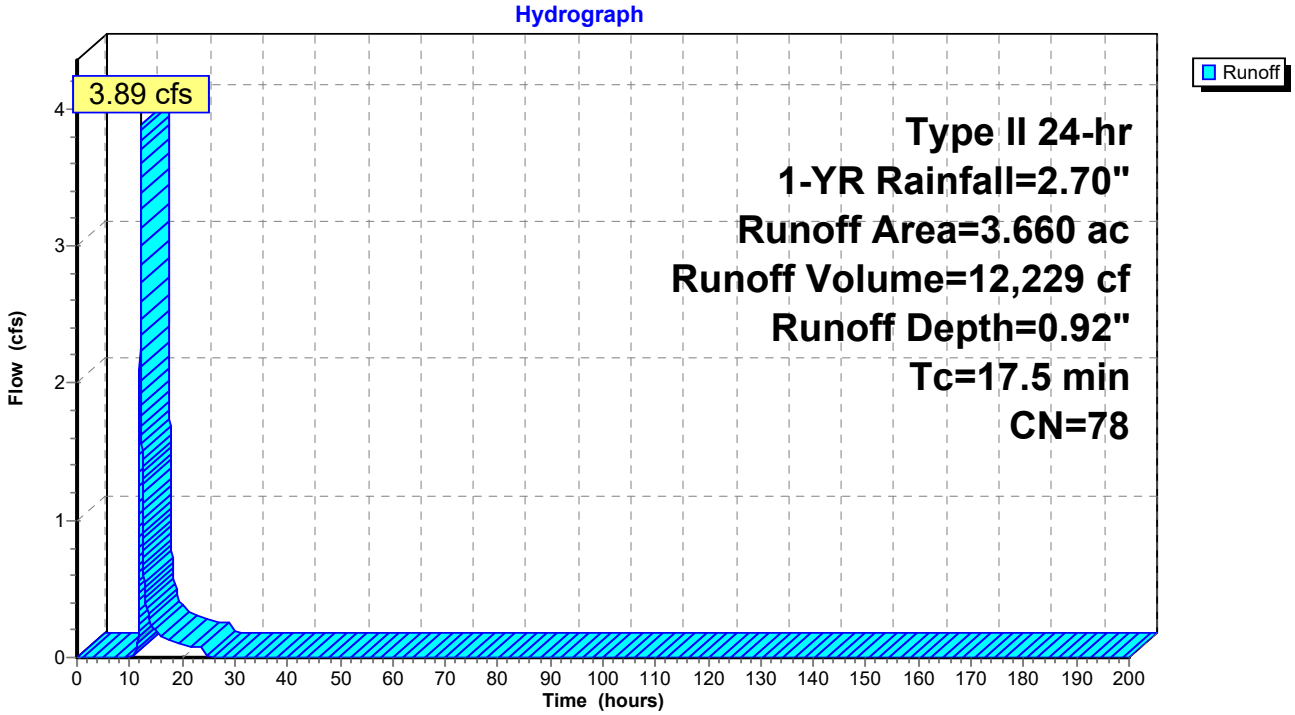
Runoff = 3.89 cfs @ 12.11 hrs, Volume= 12,229 cf, Depth= 0.92"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

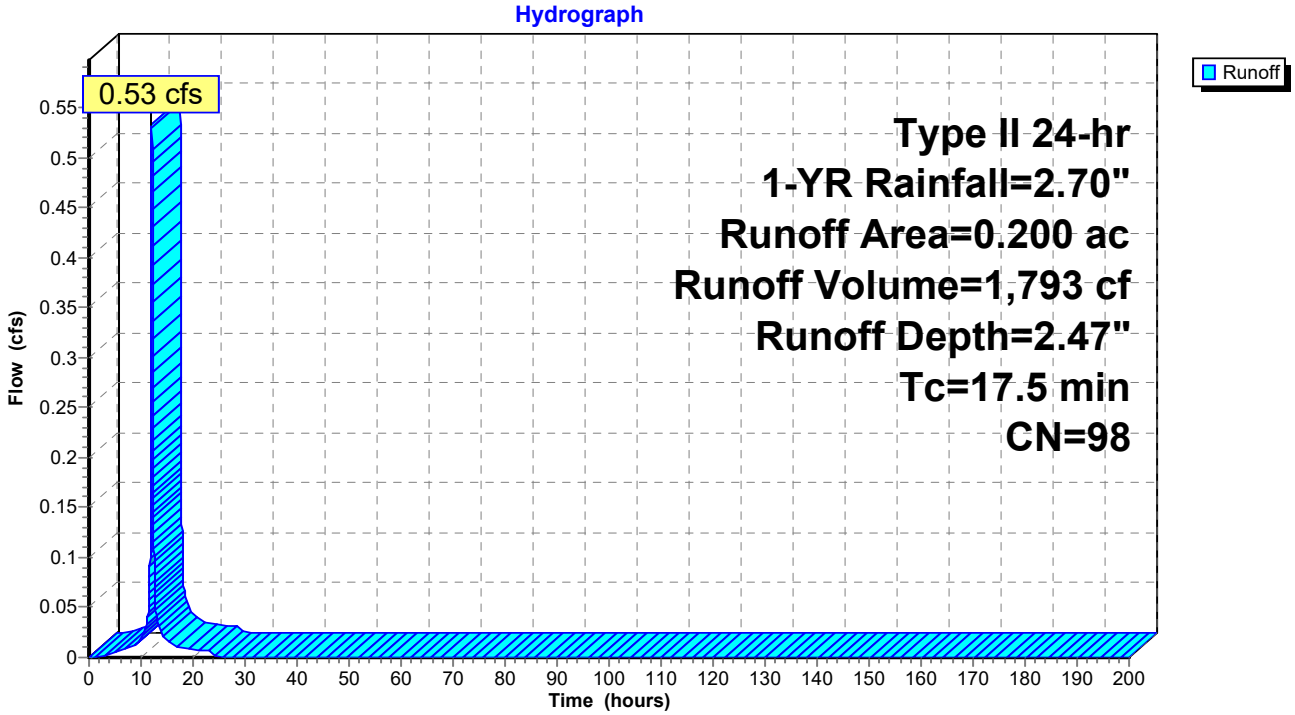
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 1,793 cf, Depth= 2.47"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

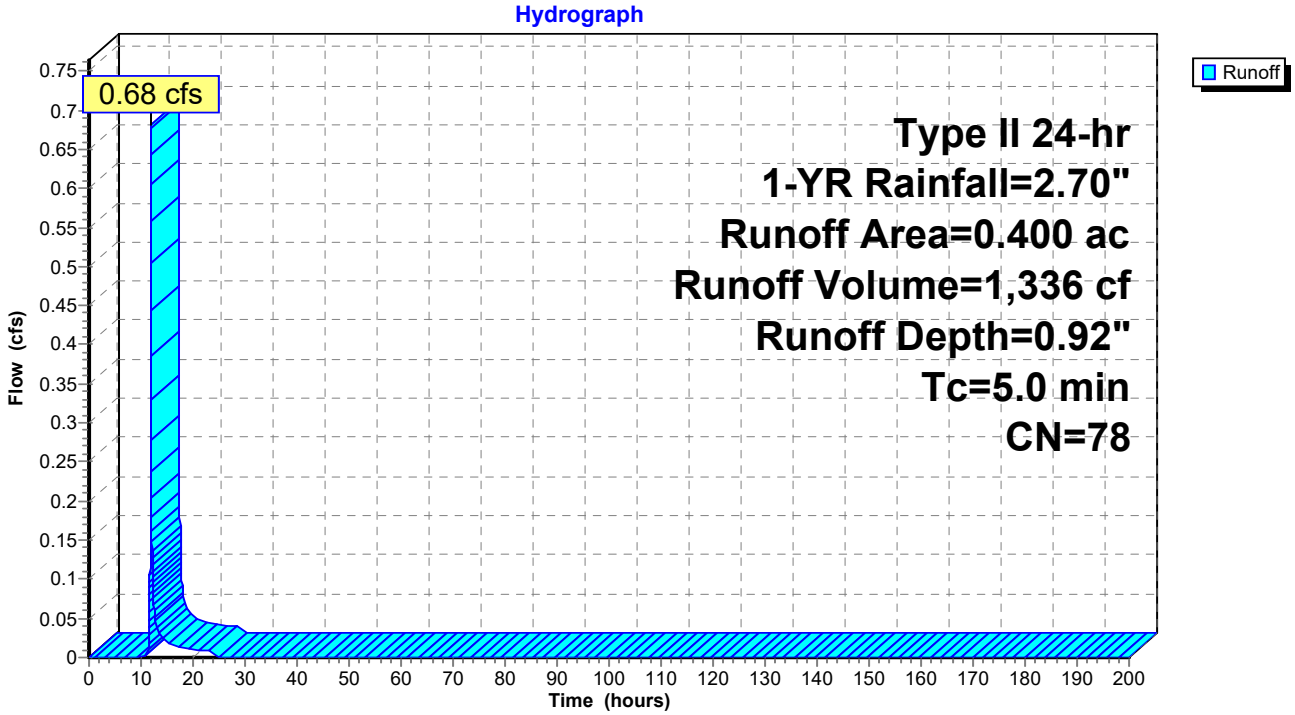
Runoff = 0.68 cfs @ 11.97 hrs, Volume= 1,336 cf, Depth= 0.92"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

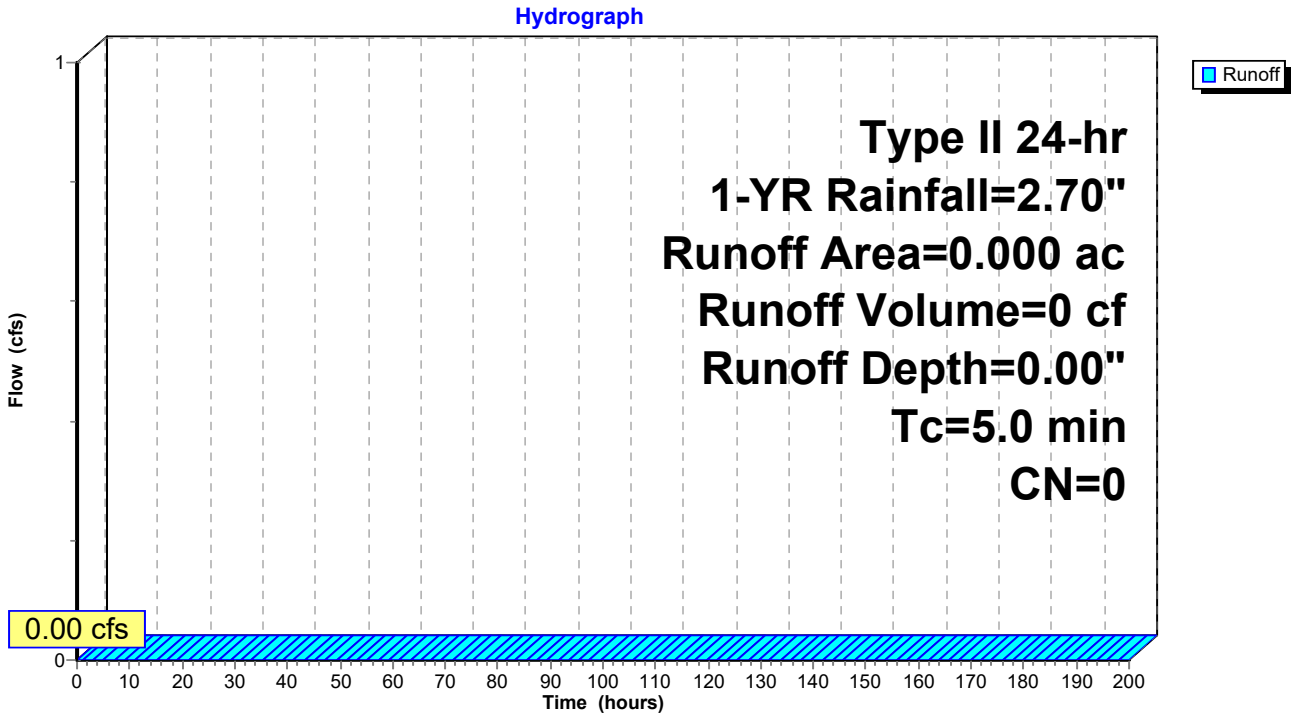
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

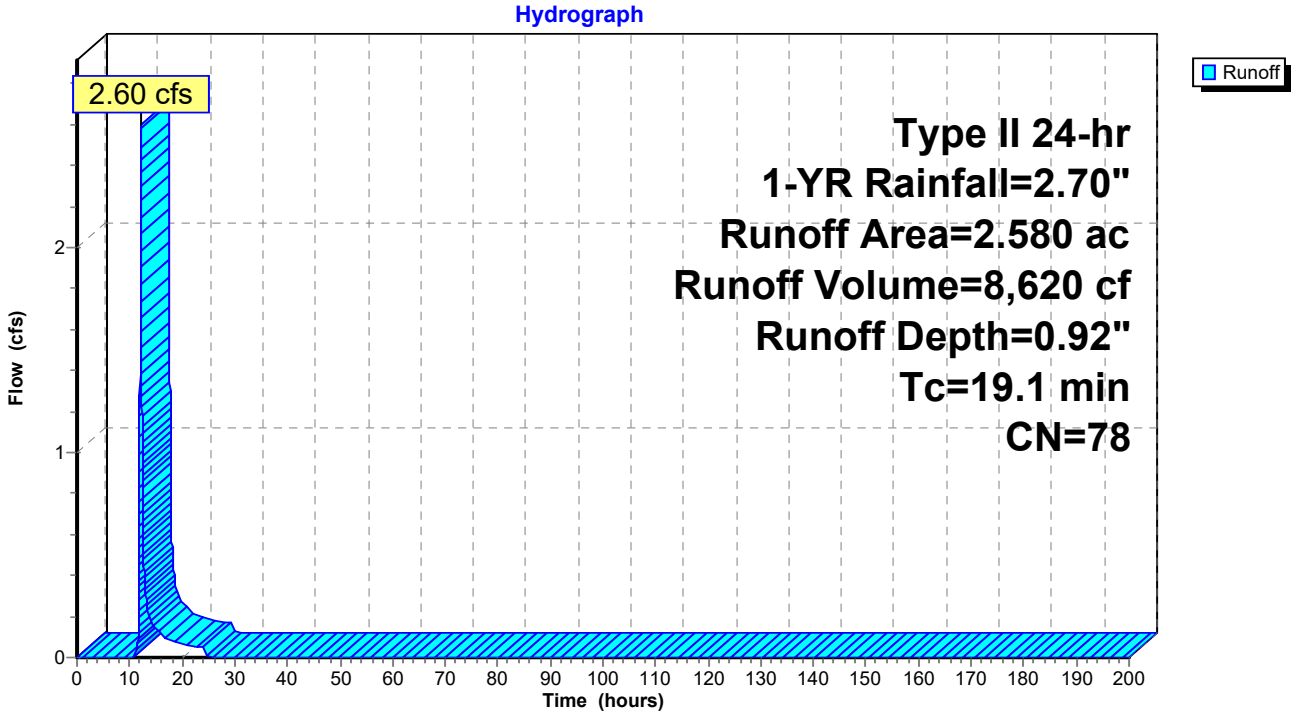
Runoff = 2.60 cfs @ 12.12 hrs, Volume= 8,620 cf, Depth= 0.92"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

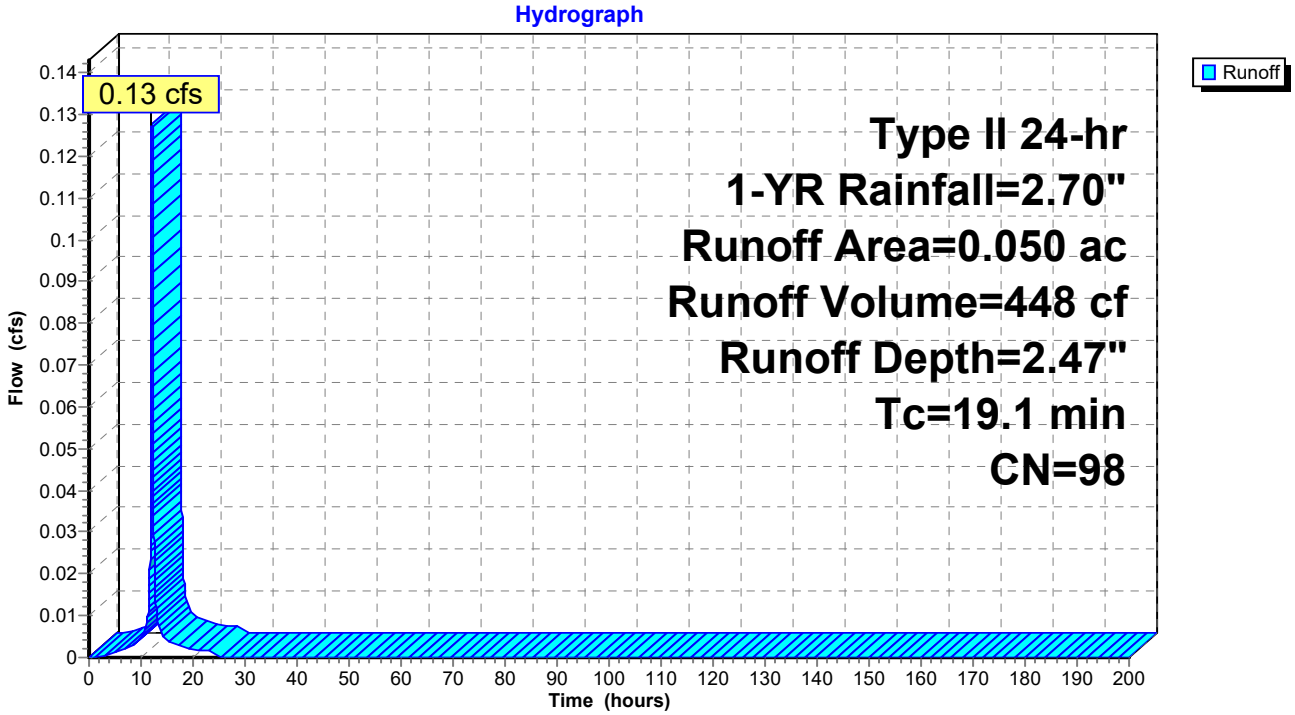
Runoff = 0.13 cfs @ 12.11 hrs, Volume= 448 cf, Depth= 2.47"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

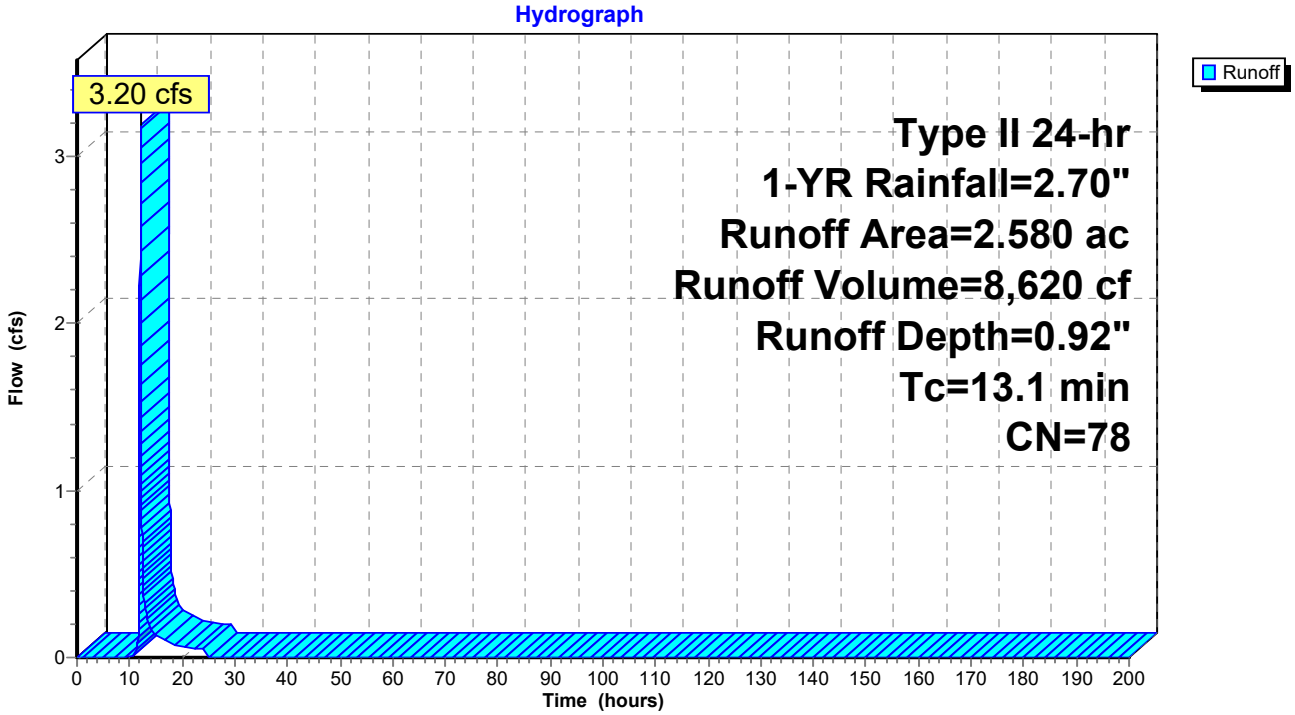
Runoff = 3.20 cfs @ 12.06 hrs, Volume= 8,620 cf, Depth= 0.92"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

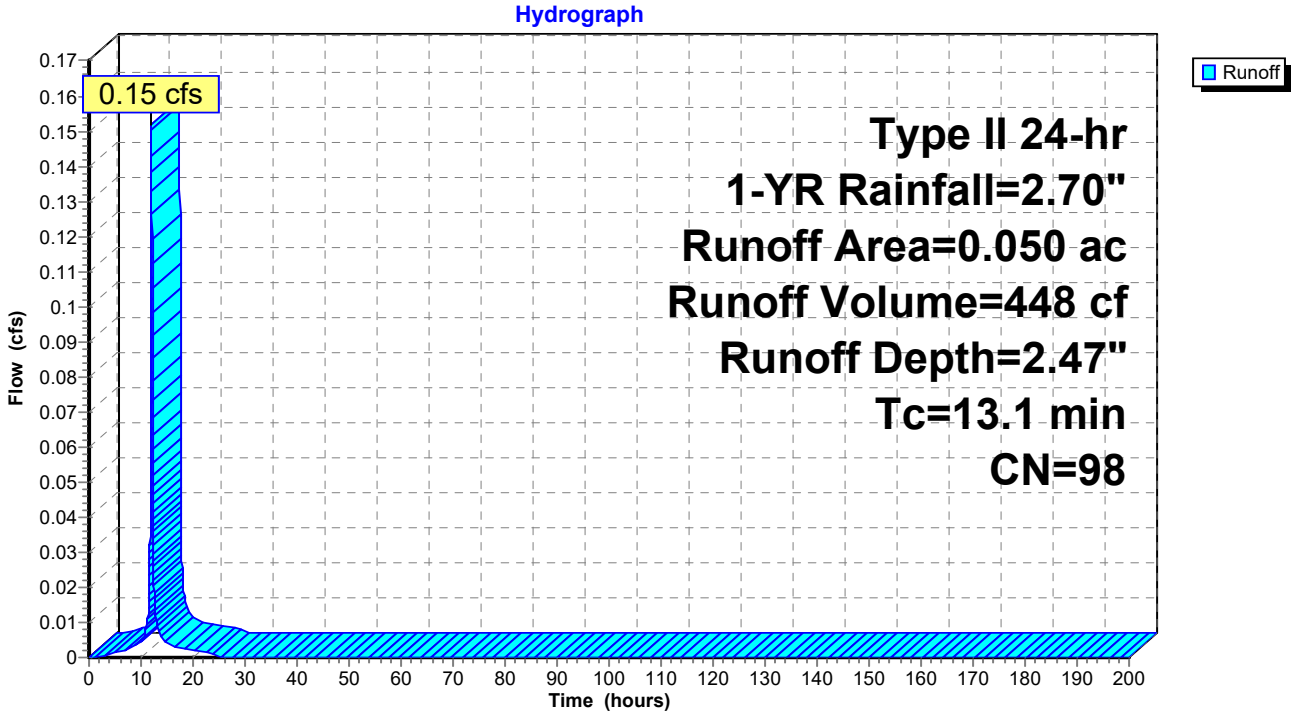
Runoff = 0.15 cfs @ 12.04 hrs, Volume= 448 cf, Depth= 2.47"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

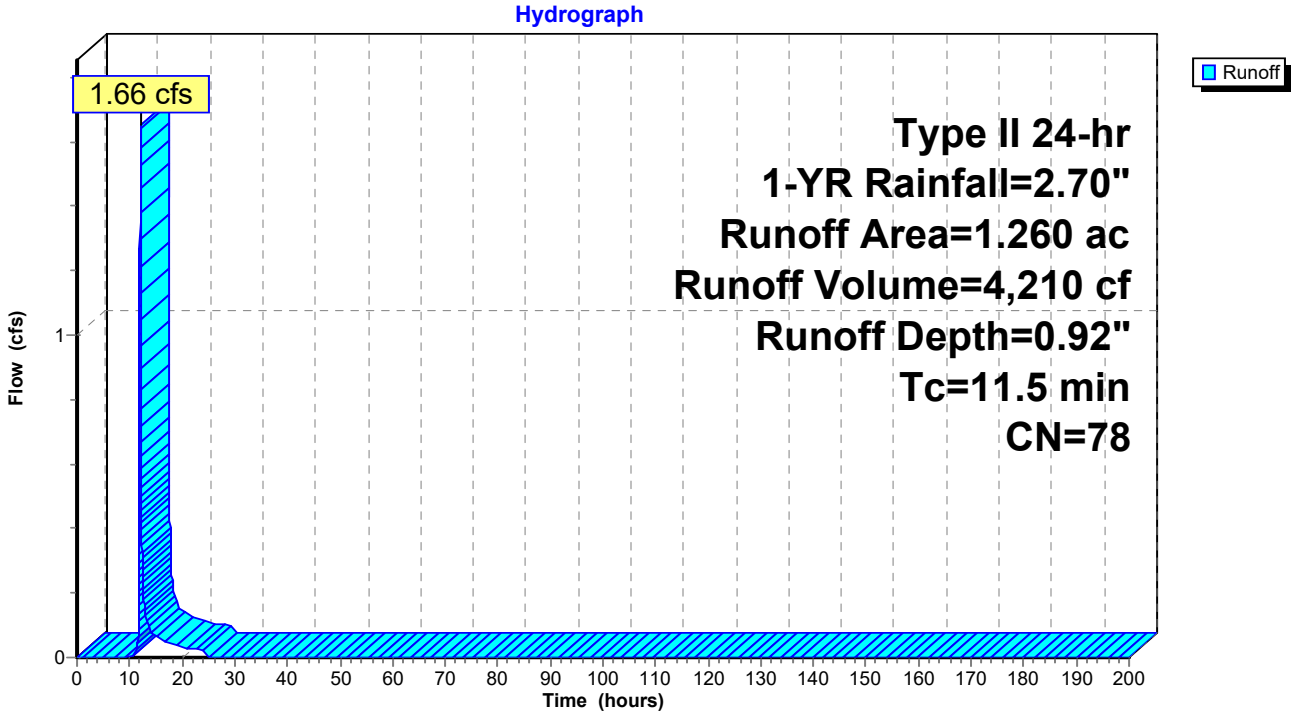
Runoff = 1.66 cfs @ 12.04 hrs, Volume= 4,210 cf, Depth= 0.92"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

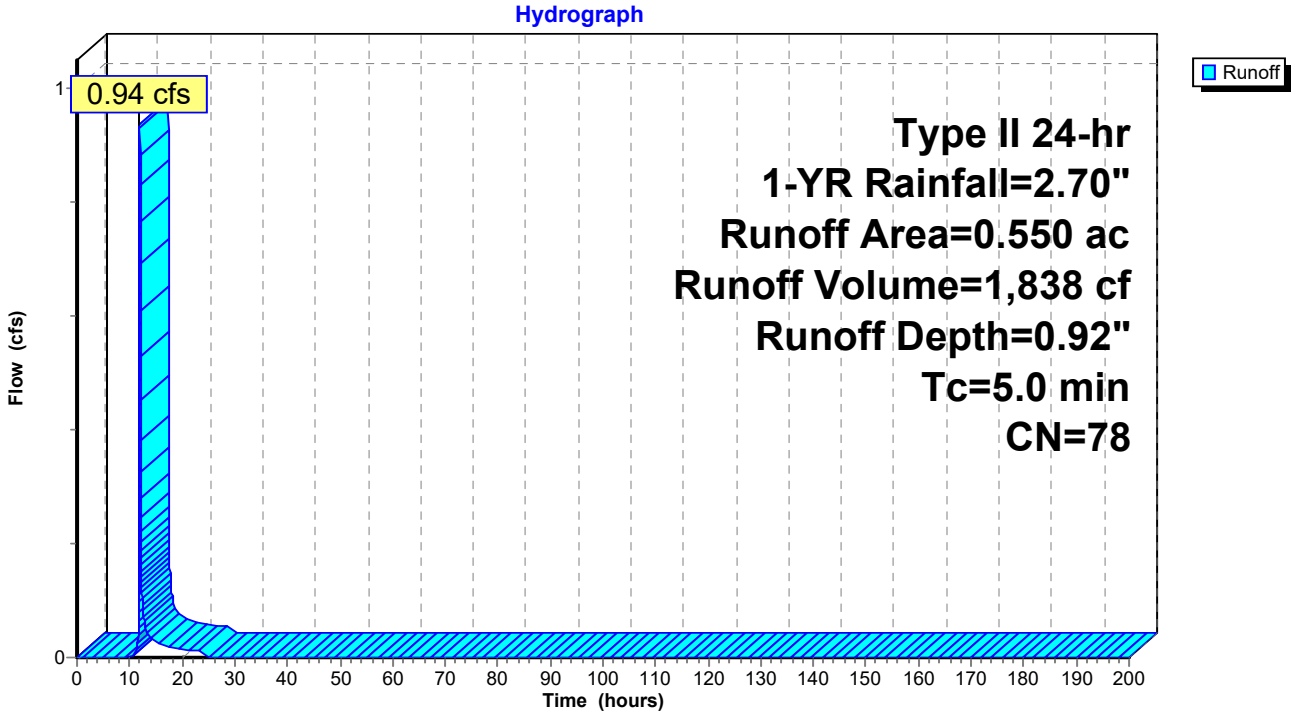
Runoff = 0.94 cfs @ 11.97 hrs, Volume= 1,838 cf, Depth= 0.92"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

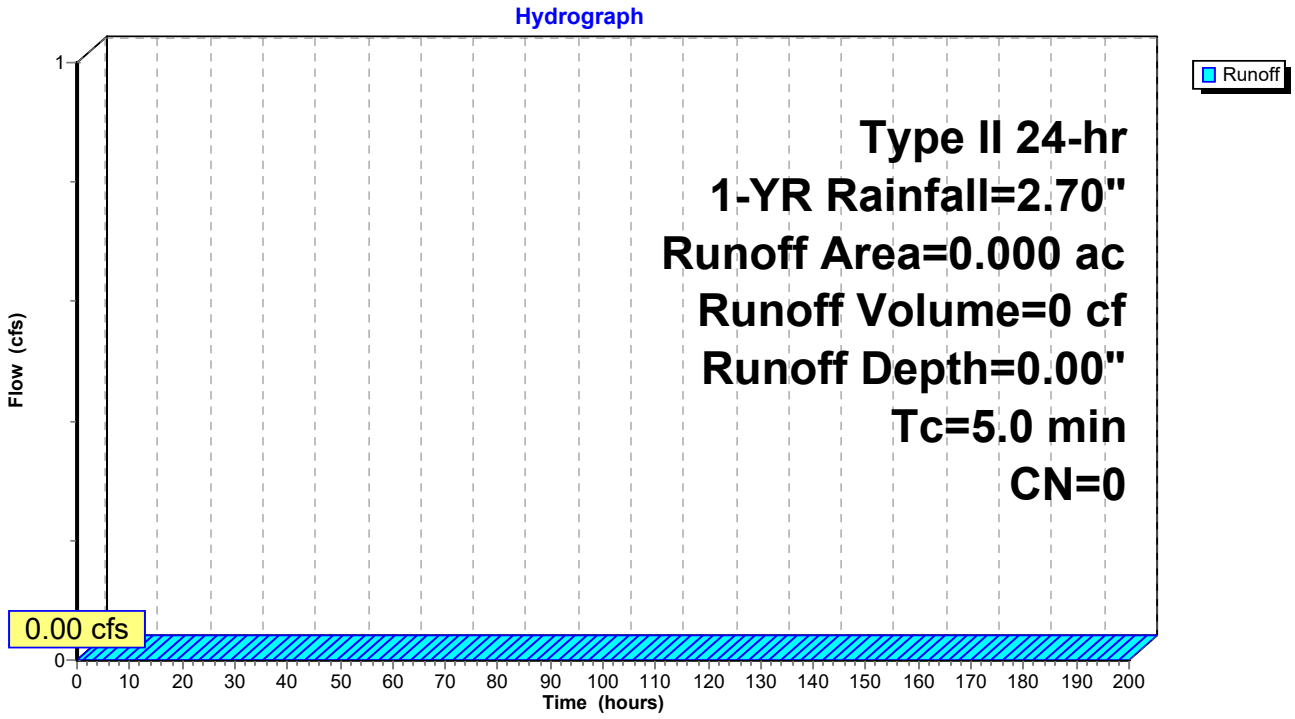
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

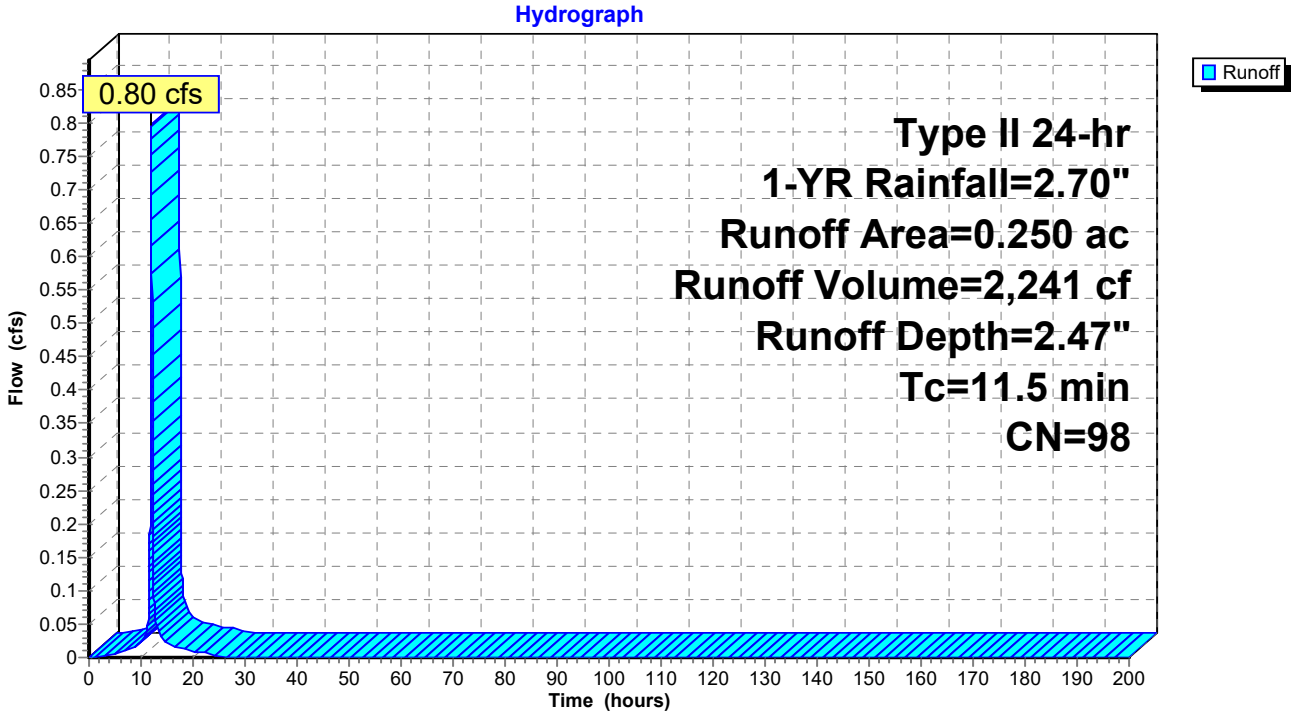
Runoff = 0.80 cfs @ 12.02 hrs, Volume= 2,241 cf, Depth= 2.47"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

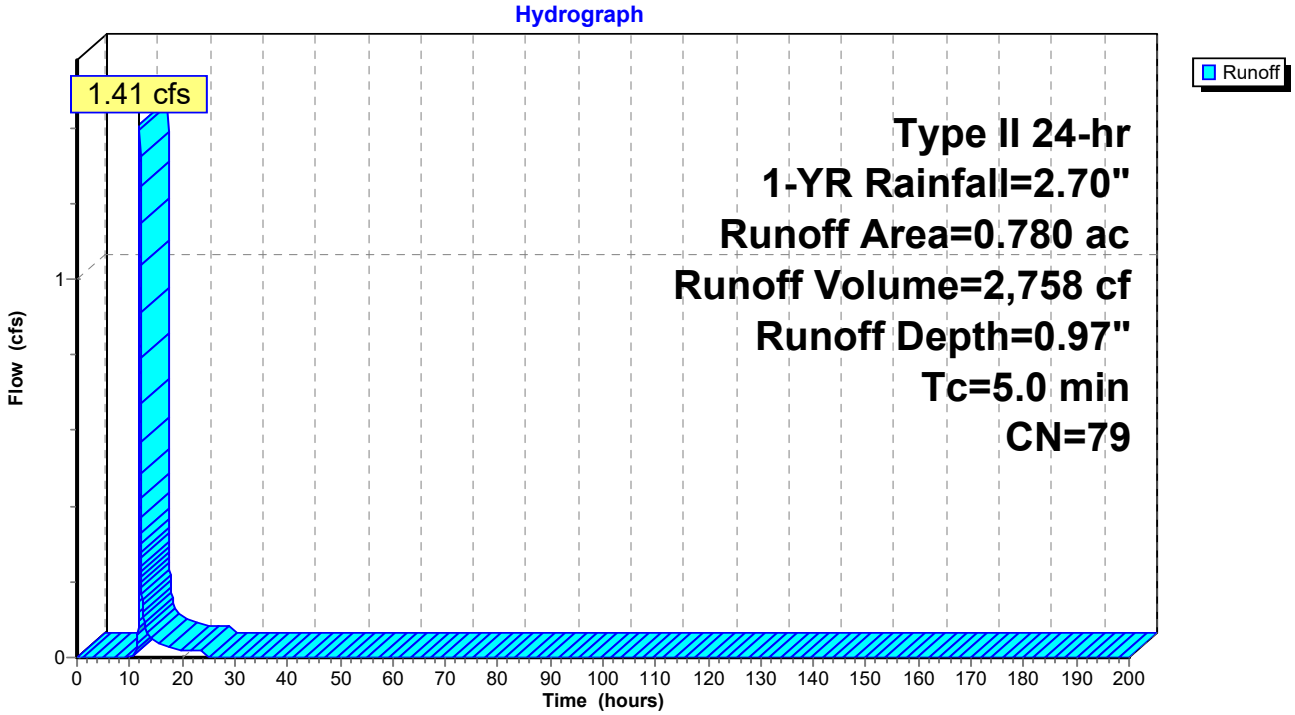
Runoff = 1.41 cfs @ 11.97 hrs, Volume= 2,758 cf, Depth= 0.97"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

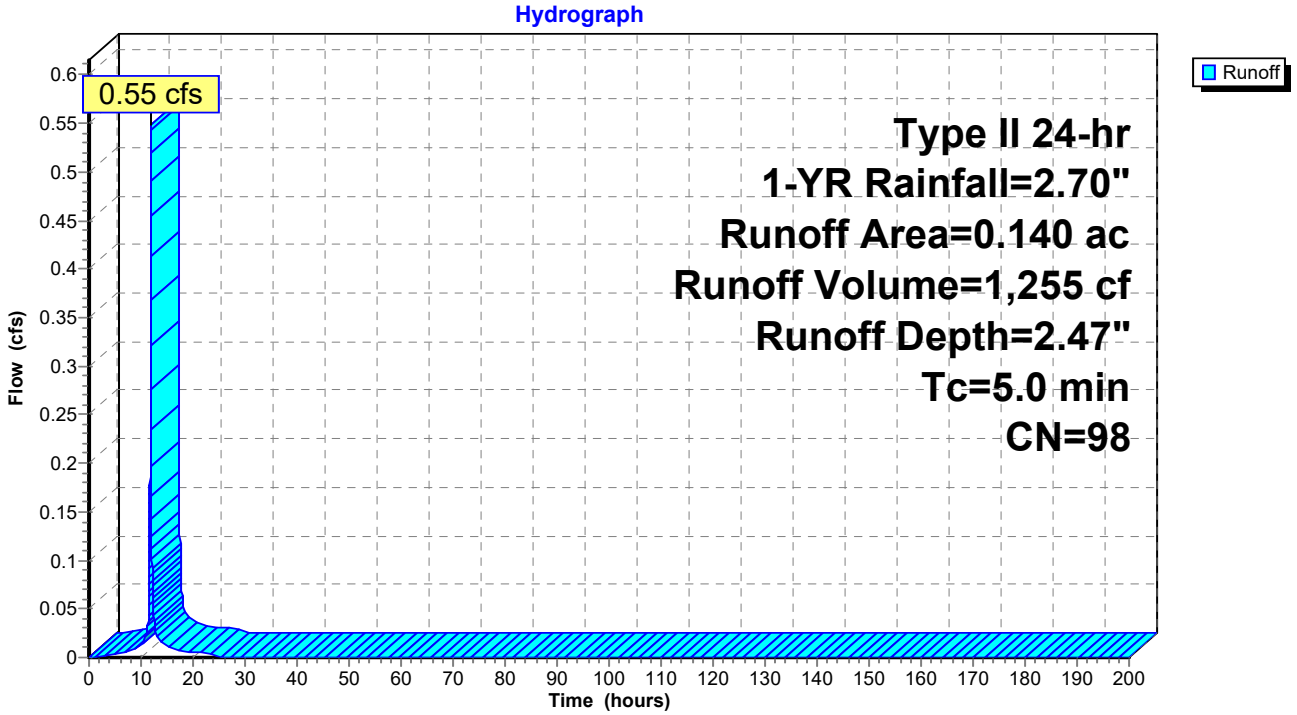
Runoff = 0.55 cfs @ 11.96 hrs, Volume= 1,255 cf, Depth= 2.47"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

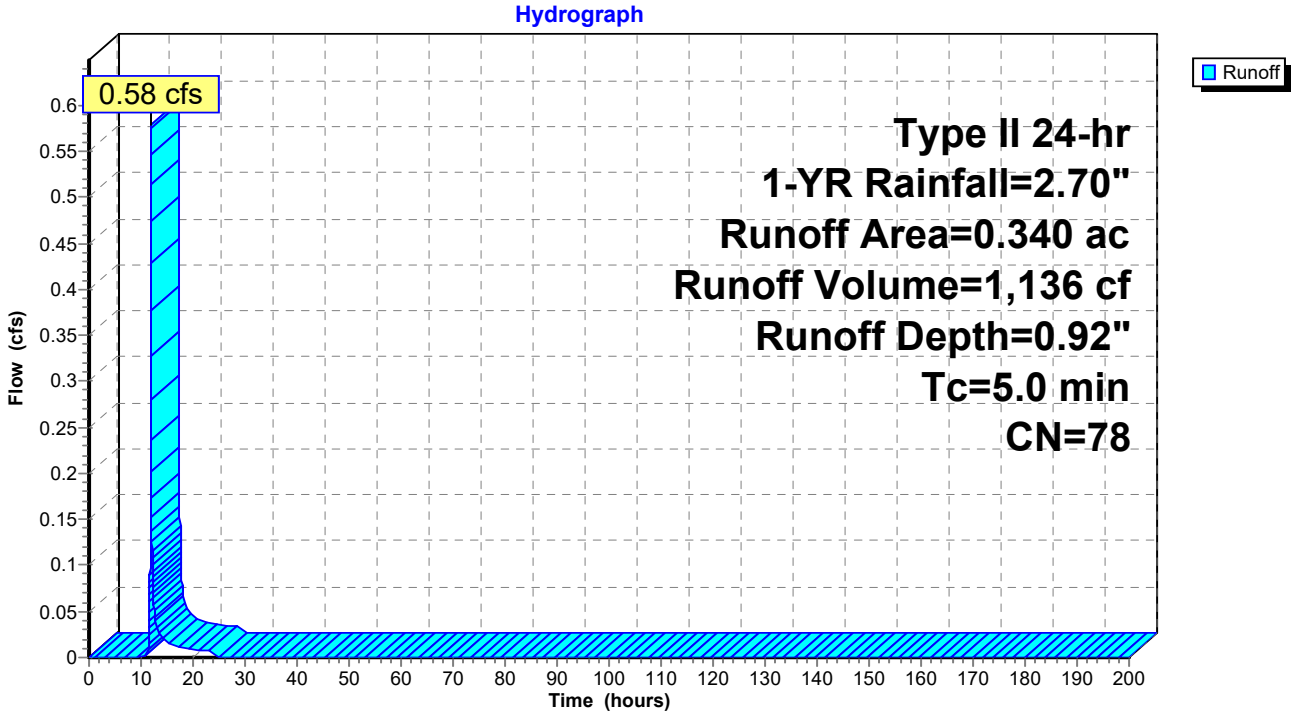
Runoff = 0.58 cfs @ 11.97 hrs, Volume= 1,136 cf, Depth= 0.92"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

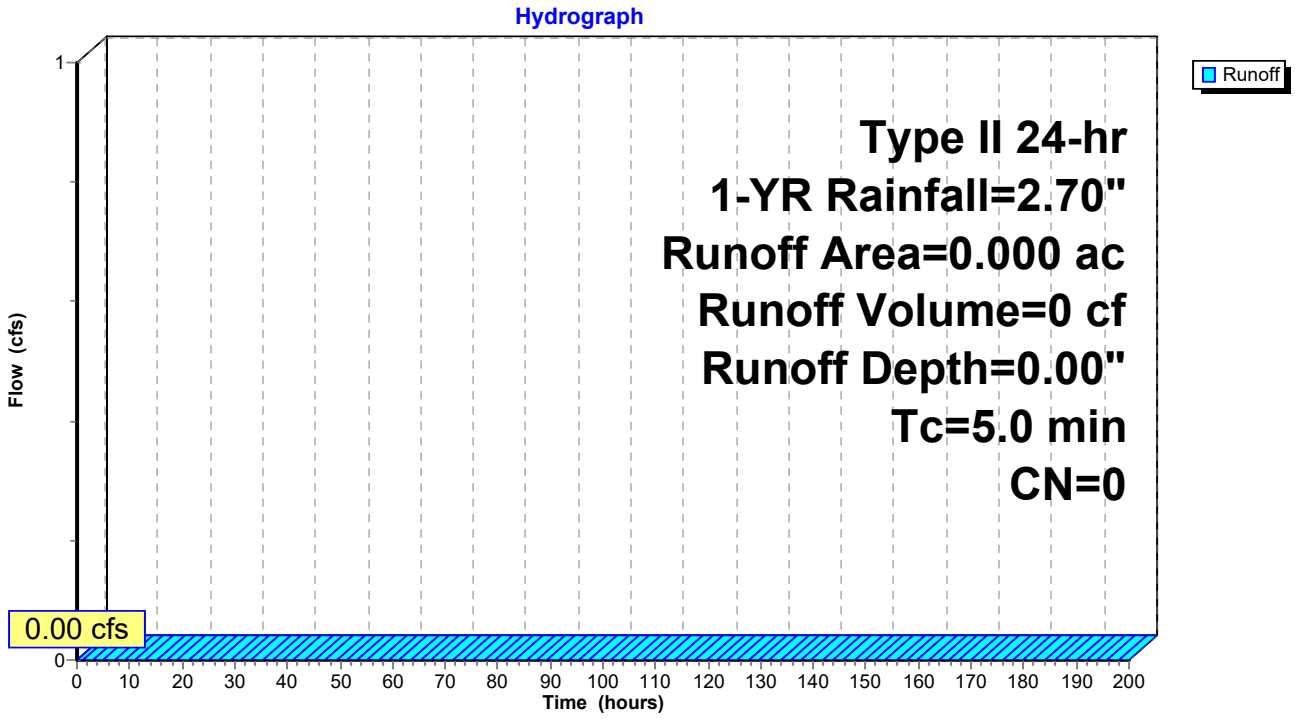
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

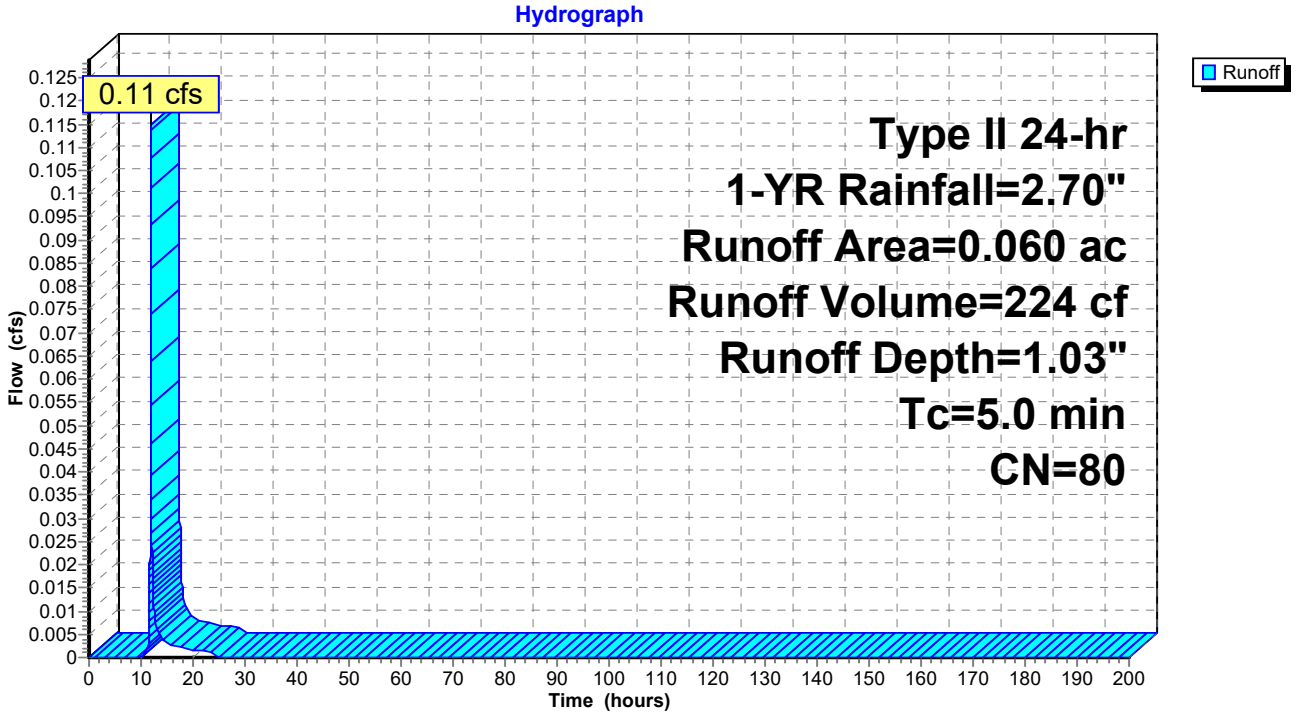
Runoff = 0.11 cfs @ 11.97 hrs, Volume= 224 cf, Depth= 1.03"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

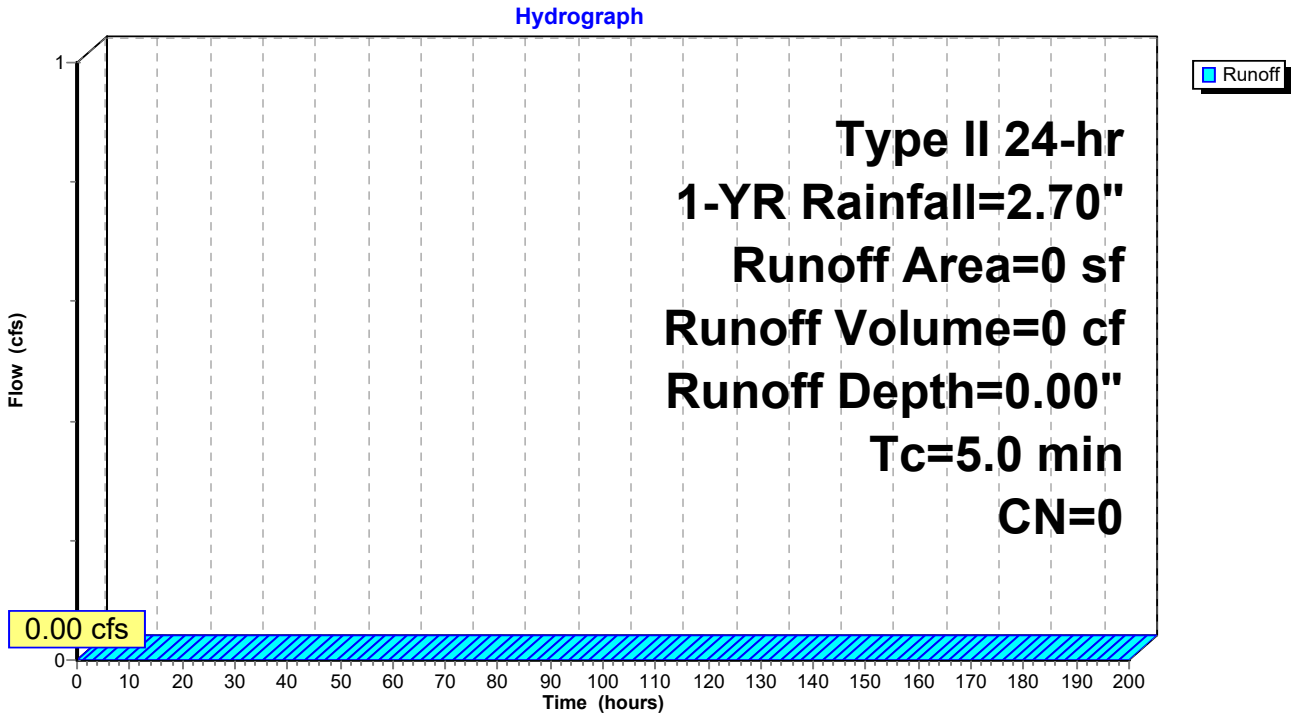
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

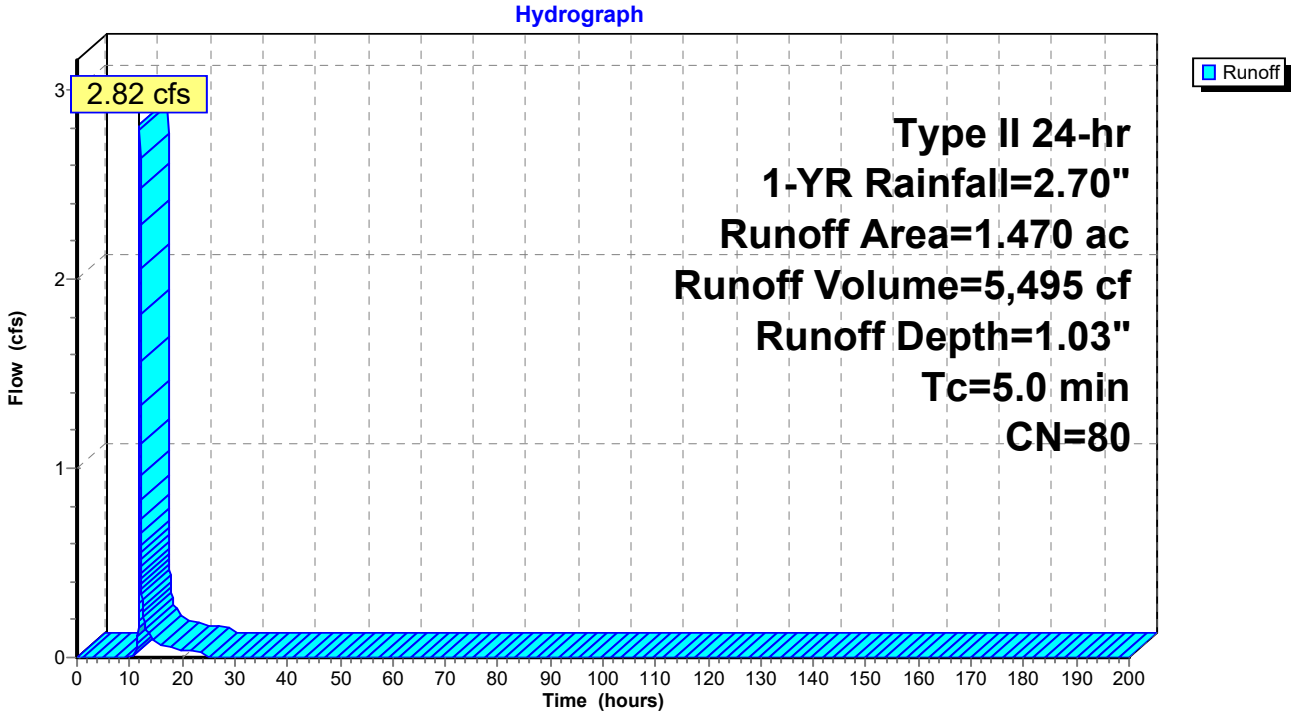
Runoff = 2.82 cfs @ 11.97 hrs, Volume= 5,495 cf, Depth= 1.03"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

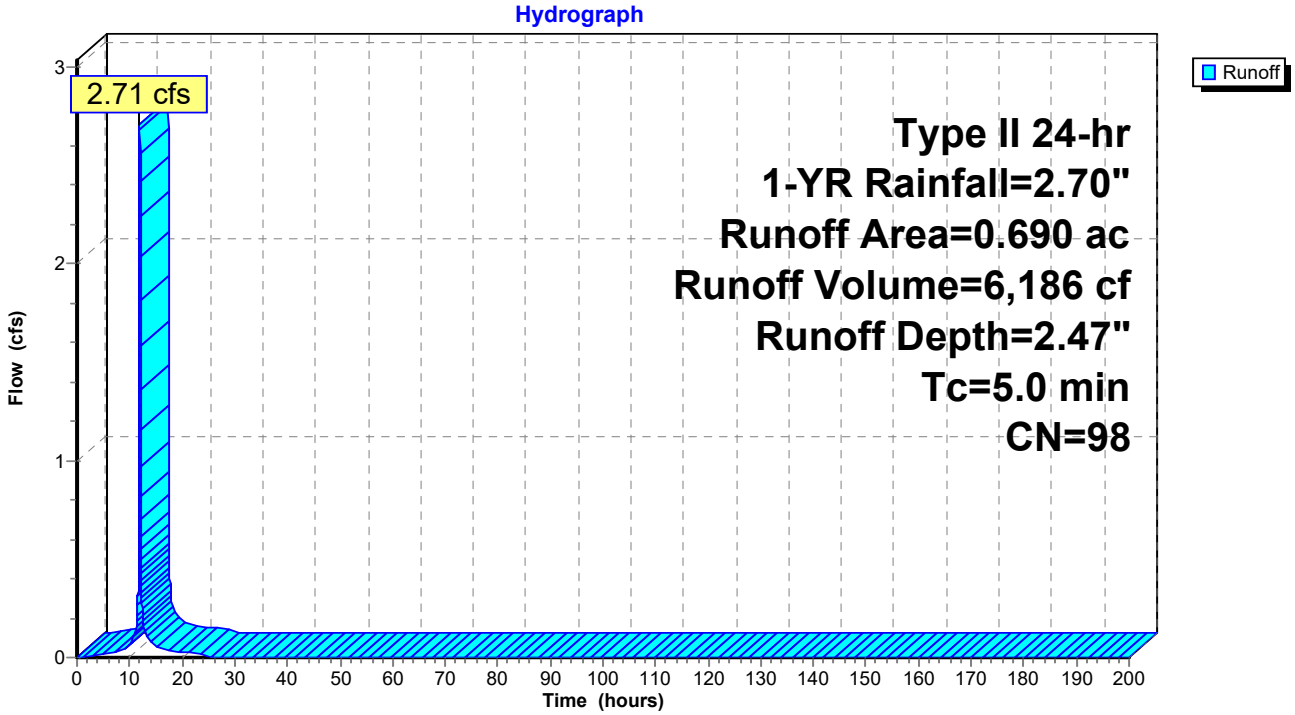
Runoff = 2.71 cfs @ 11.96 hrs, Volume= 6,186 cf, Depth= 2.47"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

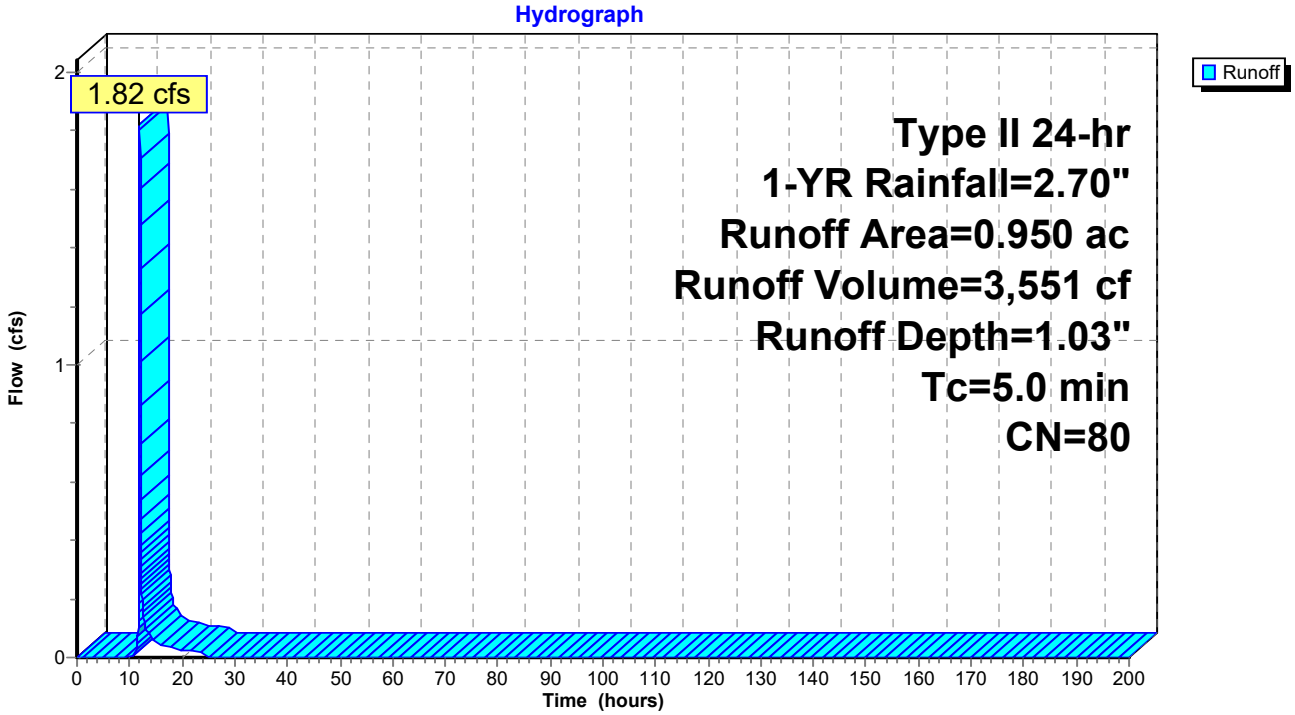
Runoff = 1.82 cfs @ 11.97 hrs, Volume= 3,551 cf, Depth= 1.03"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

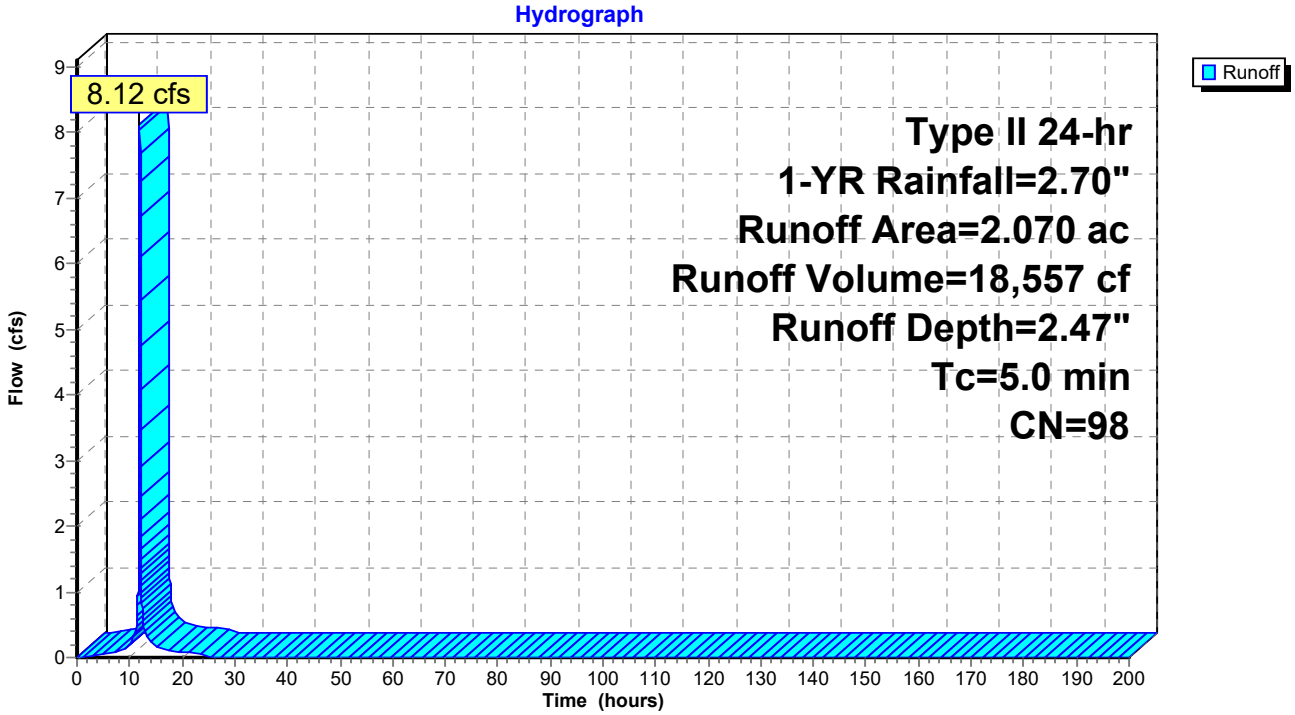
Runoff = 8.12 cfs @ 11.96 hrs, Volume= 18,557 cf, Depth= 2.47"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

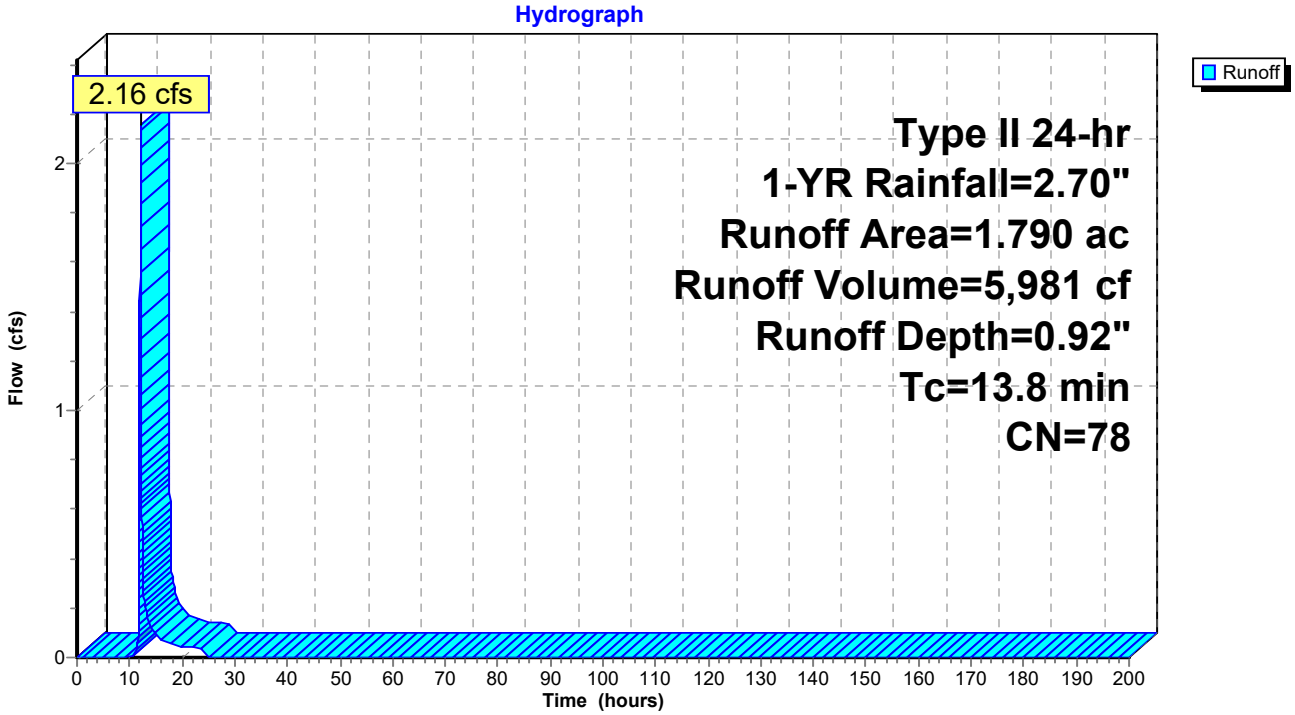
Runoff = 2.16 cfs @ 12.07 hrs, Volume= 5,981 cf, Depth= 0.92"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

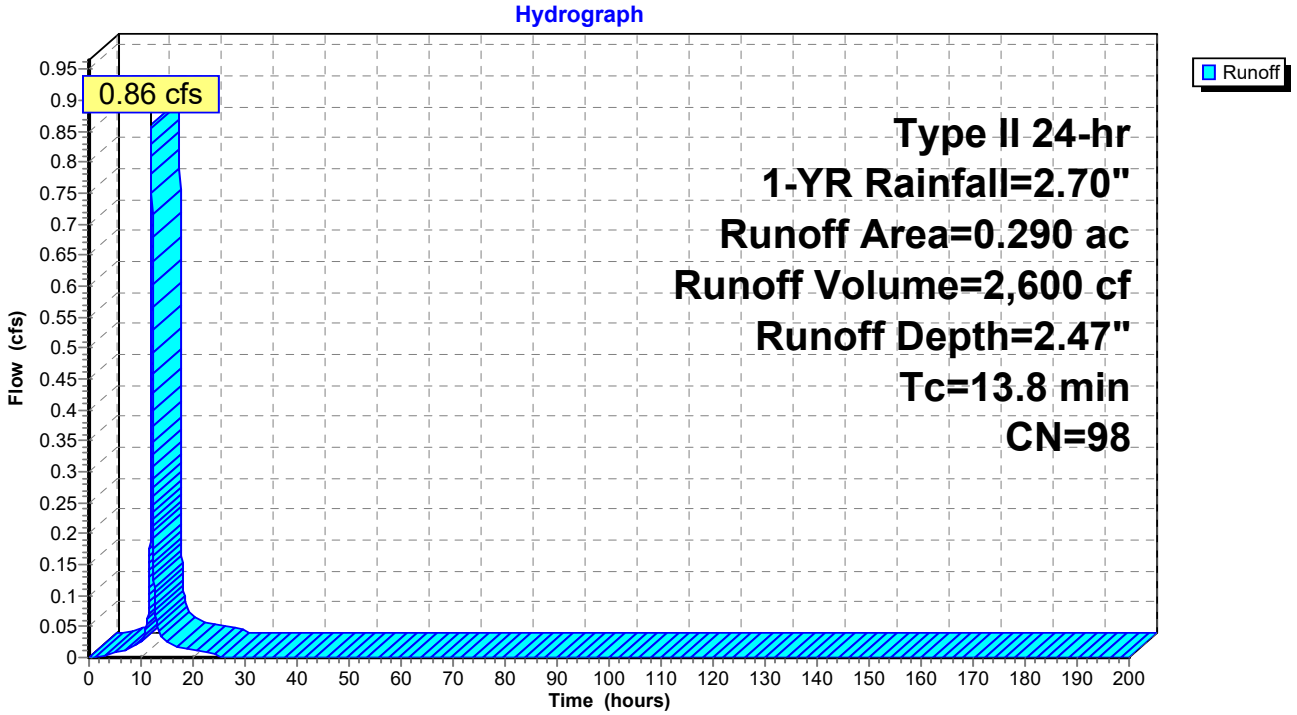
Runoff = 0.86 cfs @ 12.05 hrs, Volume= 2,600 cf, Depth= 2.47"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YR Rainfall=2.70"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 1.31" for 1-YR event
Inflow = 9.93 cfs @ 11.96 hrs, Volume= 24,637 cf
Outflow = 0.33 cfs @ 15.11 hrs, Volume= 22,065 cf, Atten= 97%, Lag= 189.2 min
Primary = 0.29 cfs @ 15.11 hrs, Volume= 8,278 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.04 cfs @ 15.11 hrs, Volume= 13,787 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 365.00' @ 15.11 hrs Surf.Area= 10,093 sf Storage= 16,420 cf

Plug-Flow detention time= 2,360.1 min calculated for 22,065 cf (90% of inflow)
Center-of-Mass det. time= 2,305.0 min (3,101.7 - 796.7)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

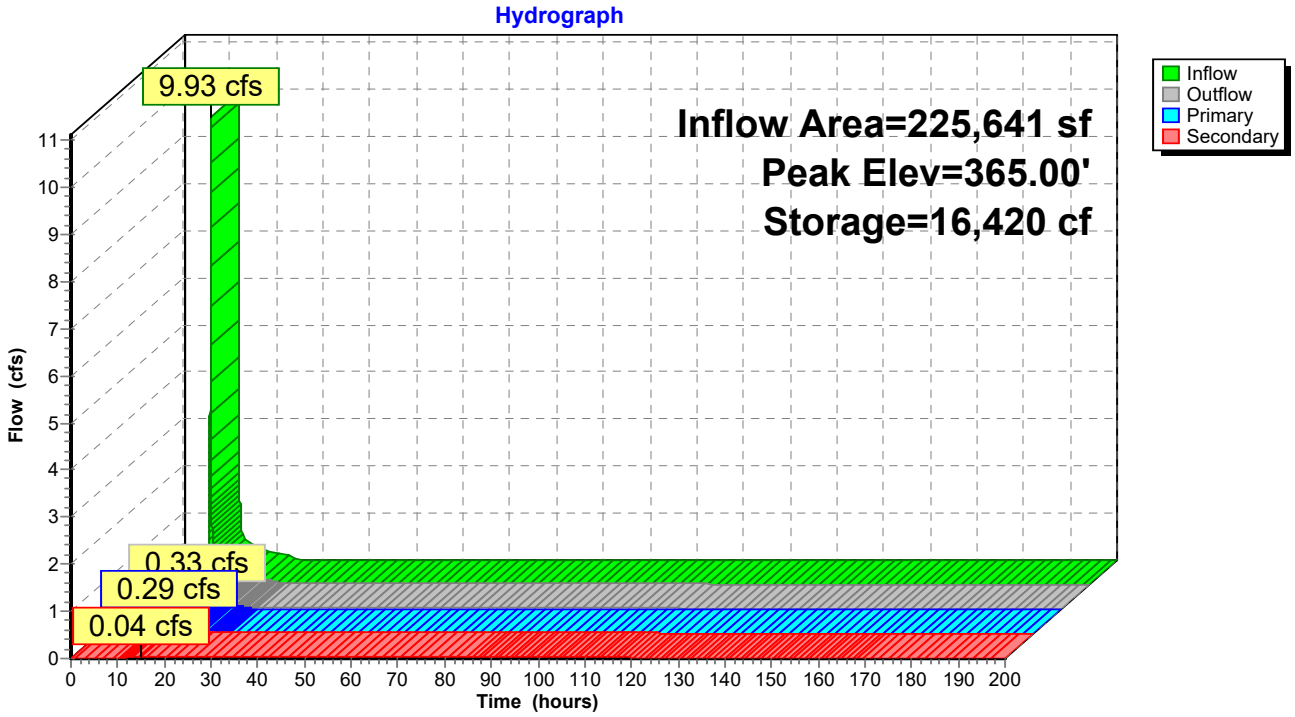
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.29 cfs @ 15.11 hrs HW=365.00' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.29 cfs of 12.75 cfs potential flow)
↑**4=Orifice** (Orifice Controls 0.29 cfs @ 1.59 fps)

Secondary OutFlow Max=0.04 cfs @ 15.11 hrs HW=365.00' TW=0.00' (Dynamic Tailwater)
↑**2=MRC Underdrain** (Passes 0.04 cfs of 0.71 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 8.28 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 1.49" for 1-YR event
Inflow = 5.51 cfs @ 11.96 hrs, Volume= 11,681 cf
Outflow = 0.15 cfs @ 14.45 hrs, Volume= 10,842 cf, Atten= 97%, Lag= 149.6 min
Primary = 0.12 cfs @ 14.45 hrs, Volume= 2,528 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.03 cfs @ 14.45 hrs, Volume= 8,313 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 365.71' @ 14.45 hrs Surf.Area= 5,844 sf Storage= 8,048 cf

Plug-Flow detention time= 1,748.5 min calculated for 10,841 cf (93% of inflow)
Center-of-Mass det. time= 1,708.8 min (2,507.6 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

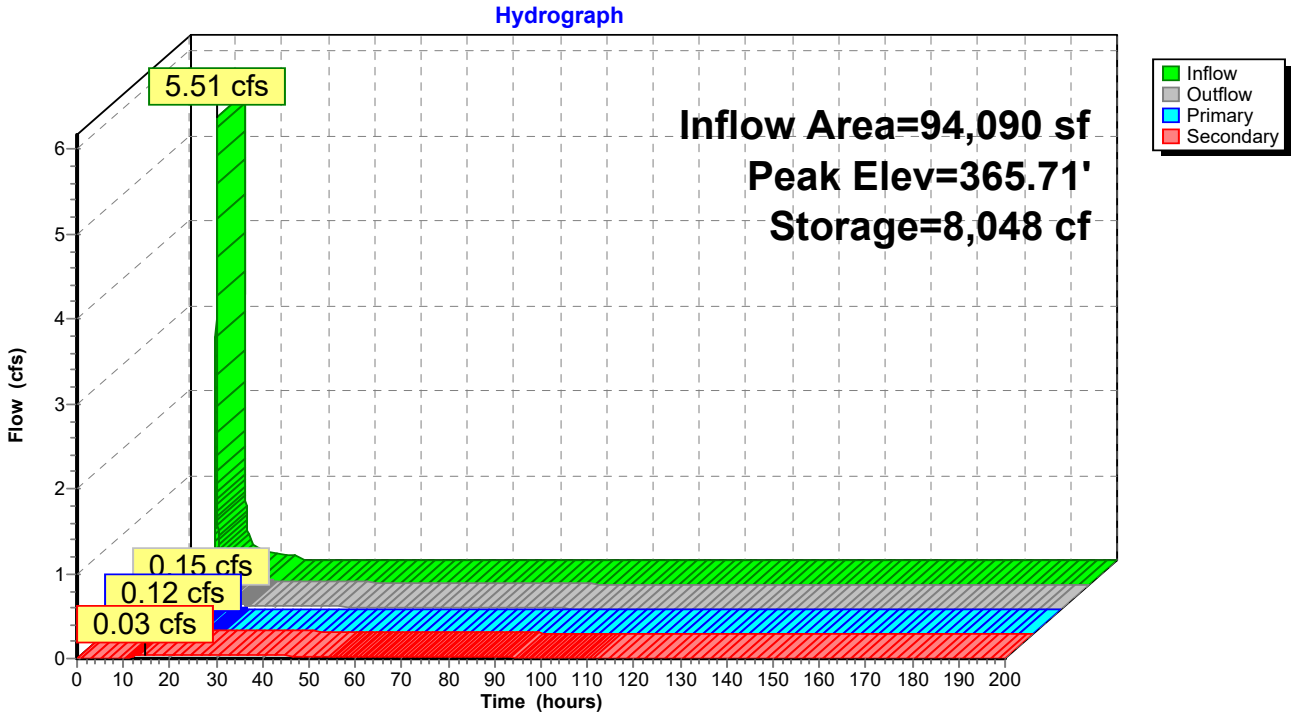
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 14.45 hrs HW=365.71' TW=364.99' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 2.14 cfs potential flow)
↑**4=Orifice** (Orifice Controls 0.12 cfs @ 1.07 fps)

Secondary OutFlow Max=0.03 cfs @ 14.45 hrs HW=365.71' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.03 cfs of 0.39 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.03 cfs @ 7.87 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

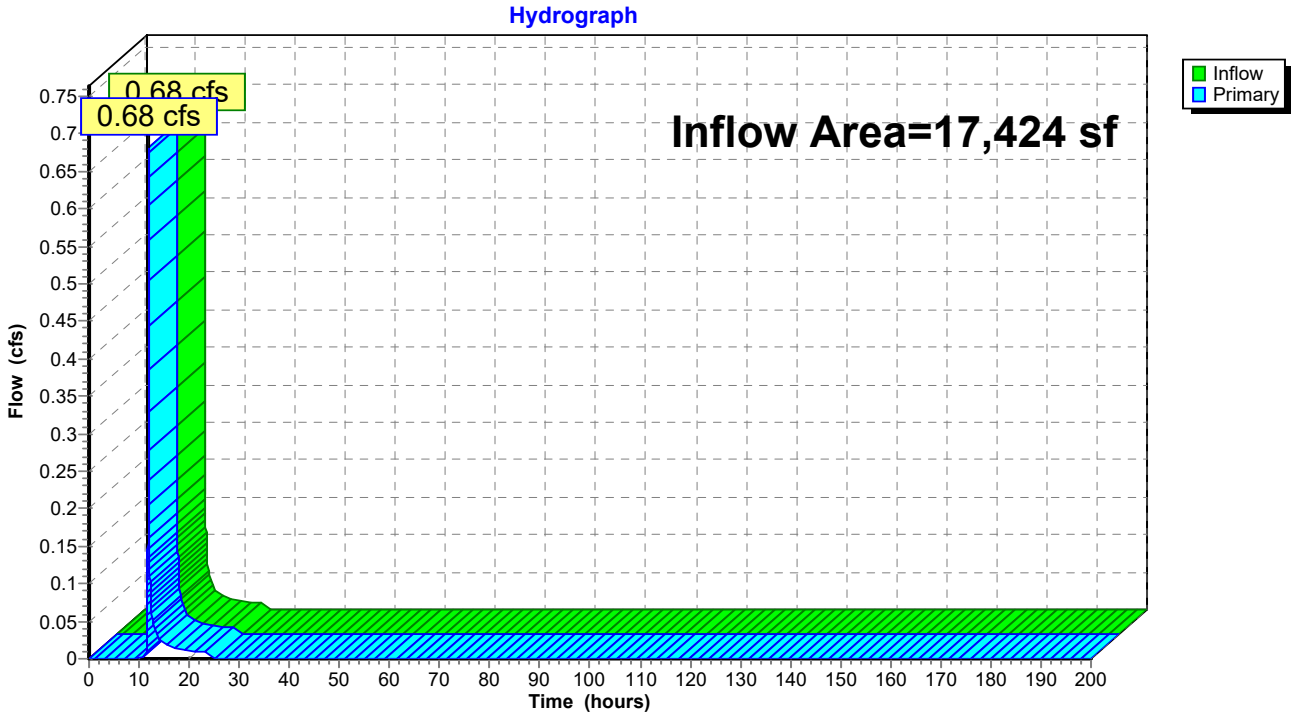
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 0.92" for 1-YR event
Inflow = 0.68 cfs @ 11.97 hrs, Volume= 1,336 cf
Primary = 0.68 cfs @ 11.97 hrs, Volume= 1,336 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

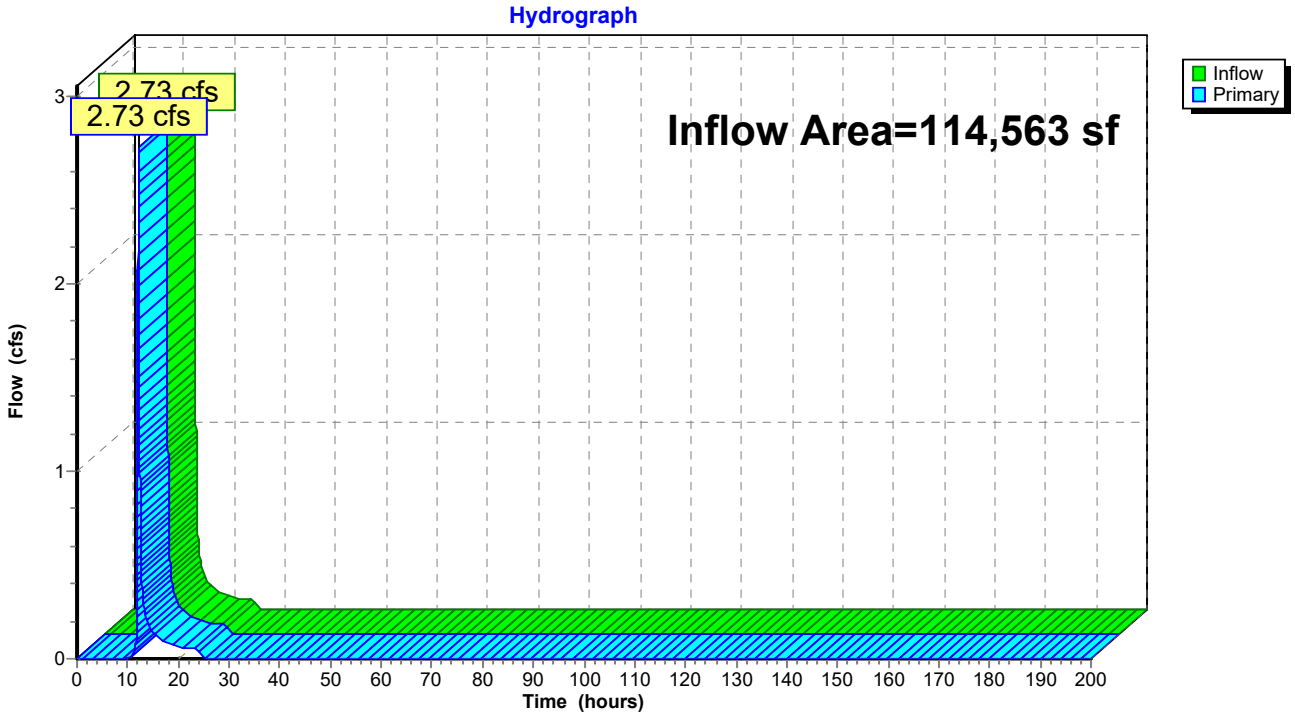


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 0.95" for 1-YR event
Inflow = 2.73 cfs @ 12.12 hrs, Volume= 9,068 cf
Primary = 2.73 cfs @ 12.12 hrs, Volume= 9,068 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

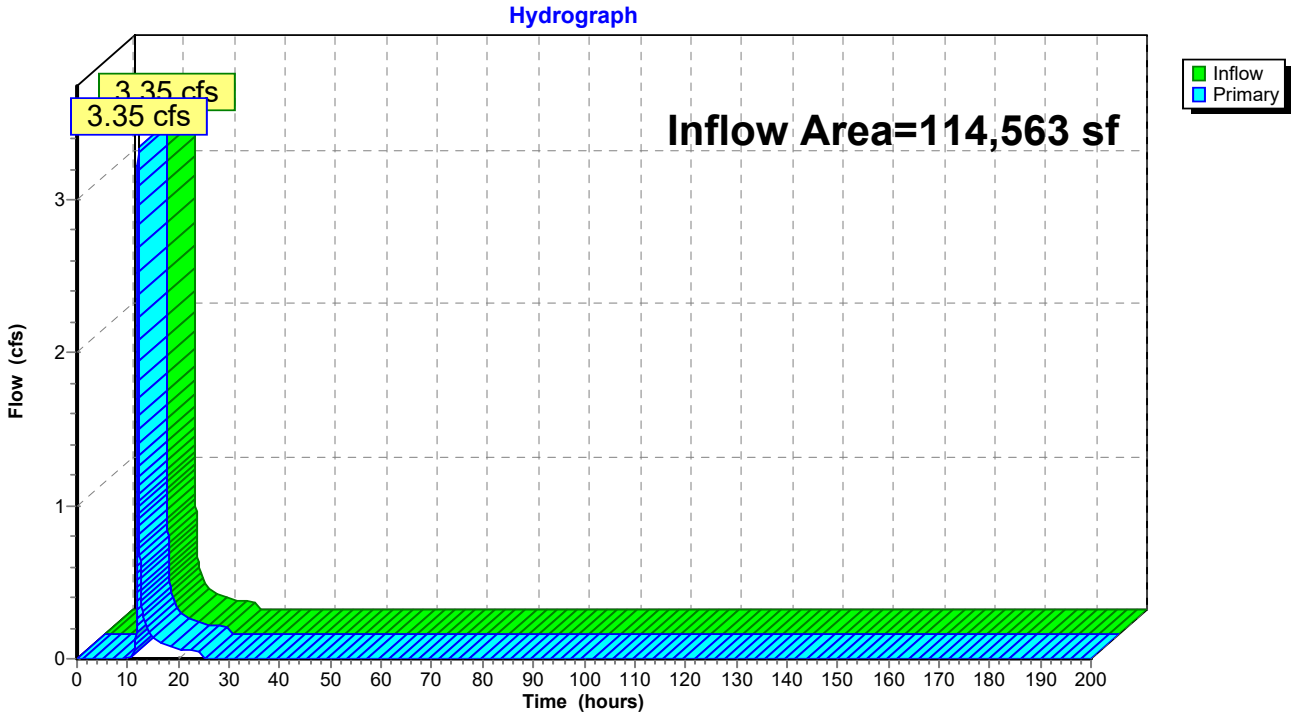


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 0.95" for 1-YR event
Inflow = 3.35 cfs @ 12.06 hrs, Volume= 9,068 cf
Primary = 3.35 cfs @ 12.06 hrs, Volume= 9,068 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

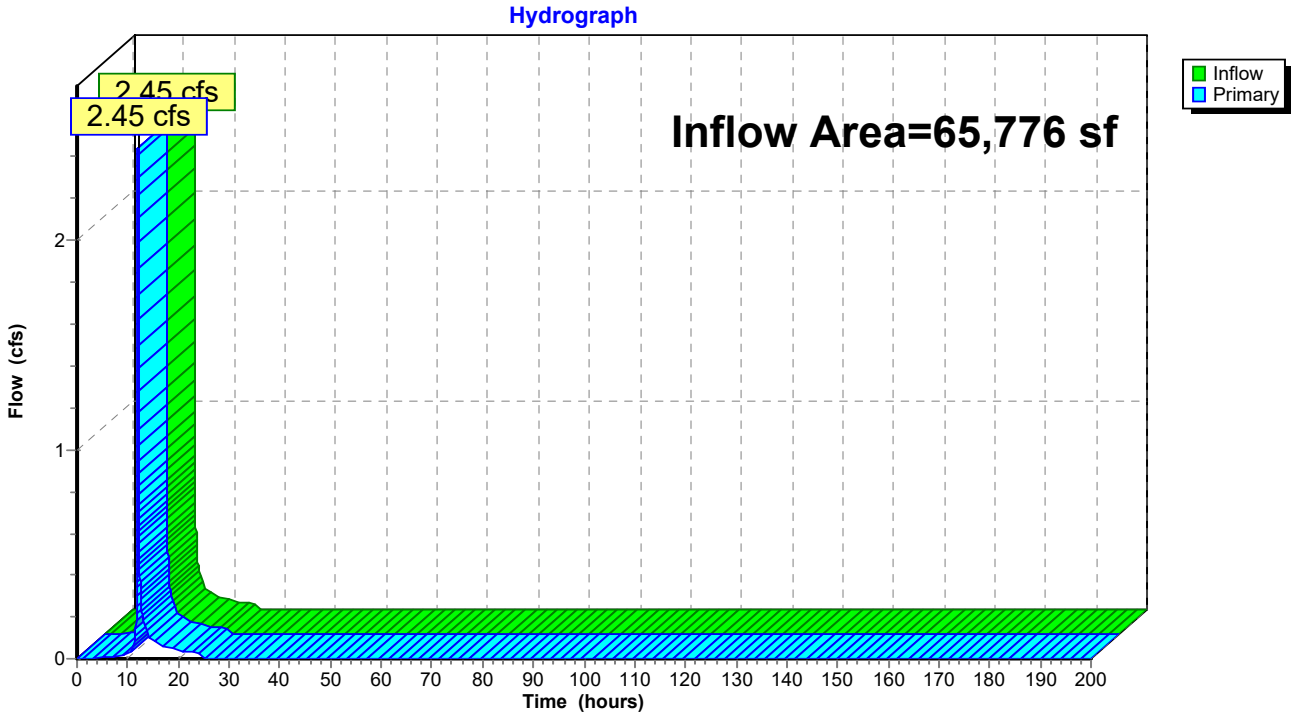


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 1.18" for 1-YR event
Inflow = 2.45 cfs @ 12.04 hrs, Volume= 6,451 cf
Primary = 2.45 cfs @ 12.04 hrs, Volume= 6,451 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

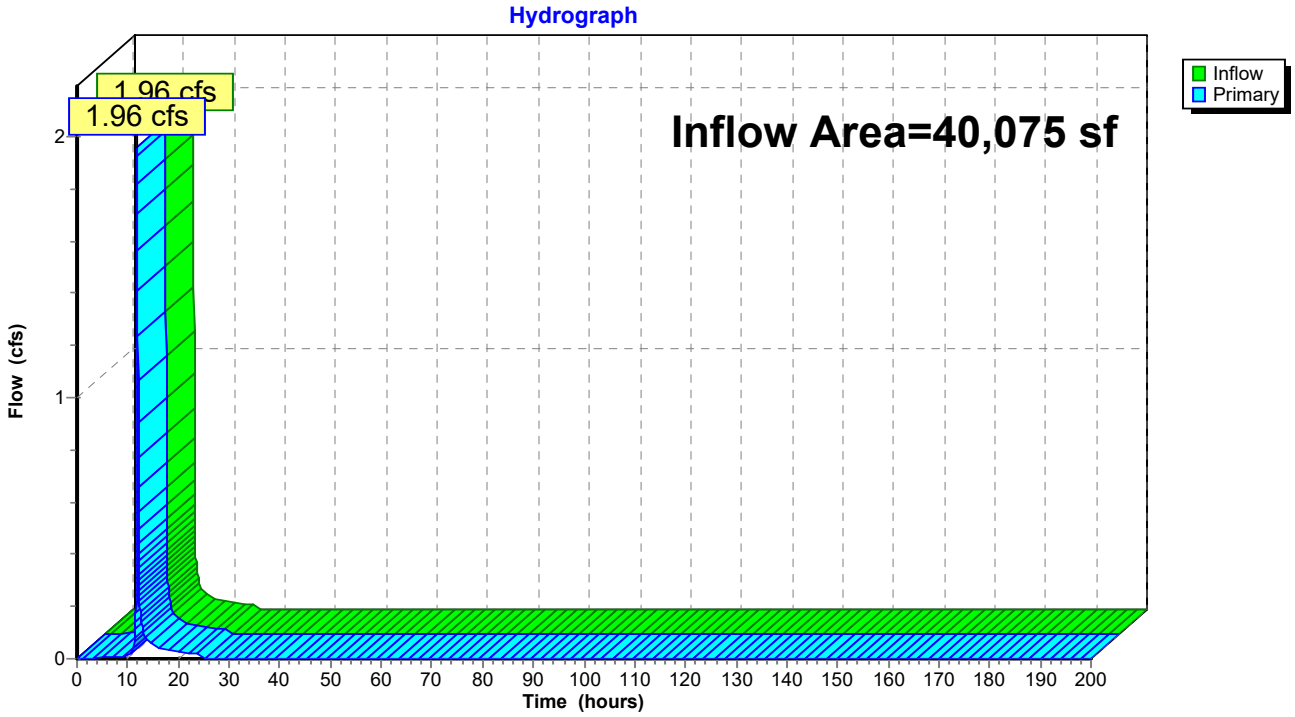


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 1.20" for 1-YR event
Inflow = 1.96 cfs @ 11.96 hrs, Volume= 4,013 cf
Primary = 1.96 cfs @ 11.96 hrs, Volume= 4,013 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

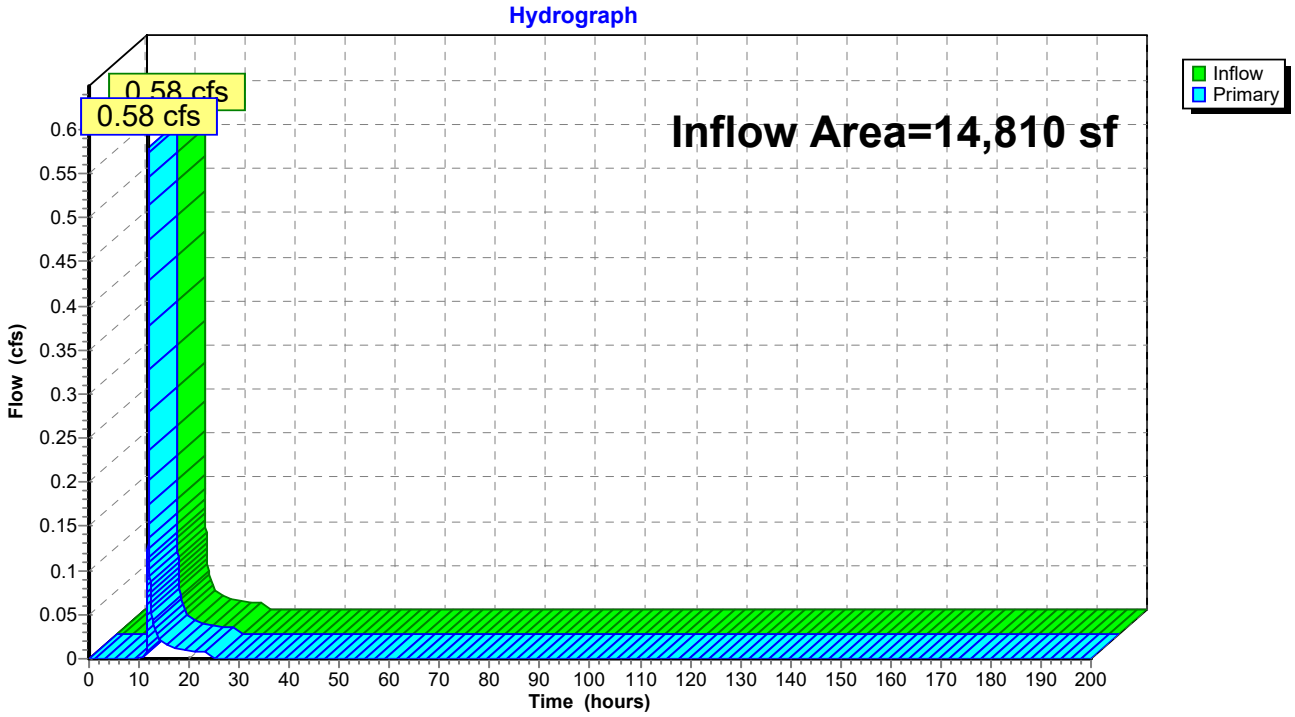


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 0.92" for 1-YR event
Inflow = 0.58 cfs @ 11.97 hrs, Volume= 1,136 cf
Primary = 0.58 cfs @ 11.97 hrs, Volume= 1,136 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

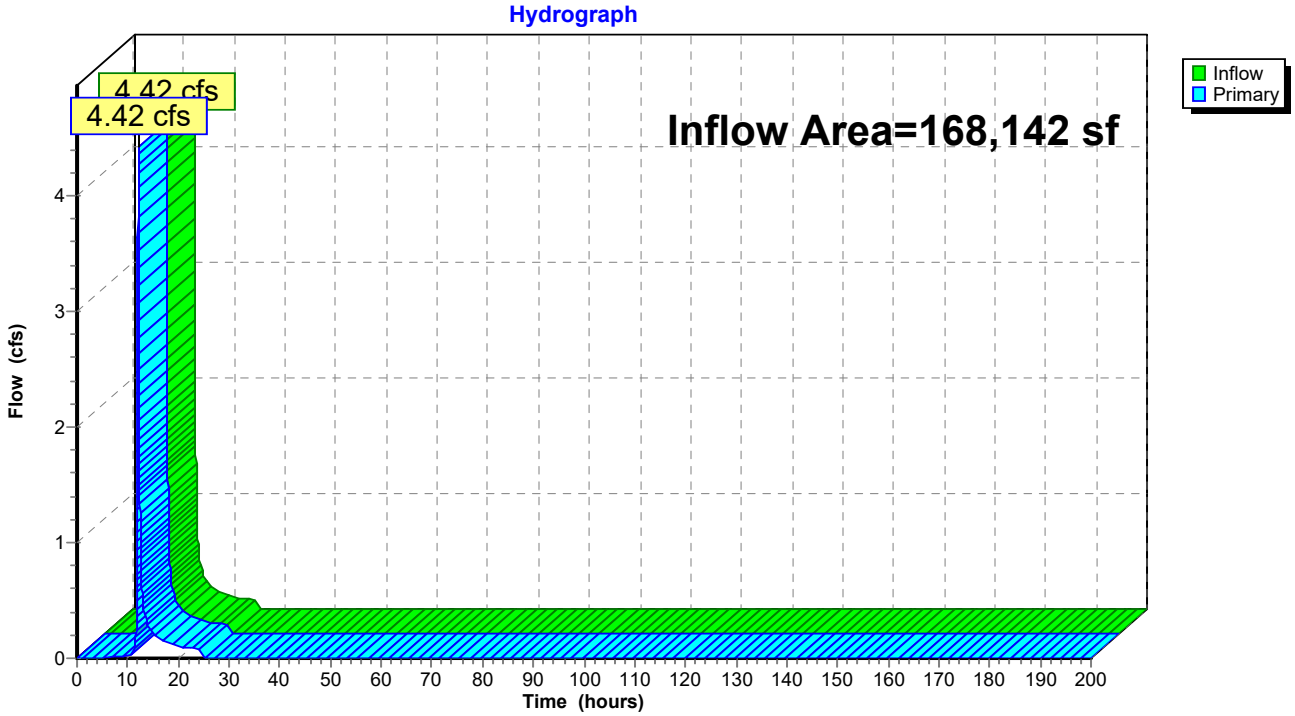


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 1.00" for 1-YR event
Inflow = 4.42 cfs @ 12.11 hrs, Volume= 14,022 cf
Primary = 4.42 cfs @ 12.11 hrs, Volume= 14,022 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

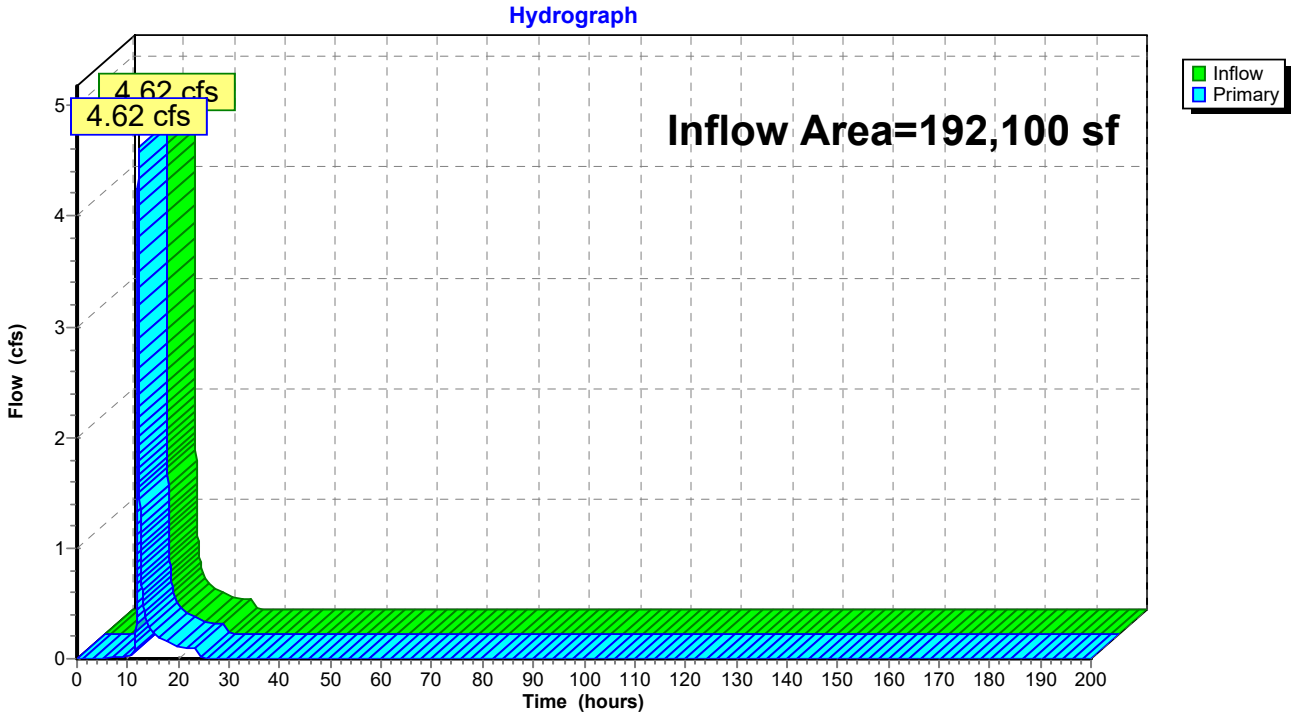


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 0.99" for 1-YR event
Inflow = 4.62 cfs @ 12.10 hrs, Volume= 15,859 cf
Primary = 4.62 cfs @ 12.10 hrs, Volume= 15,859 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

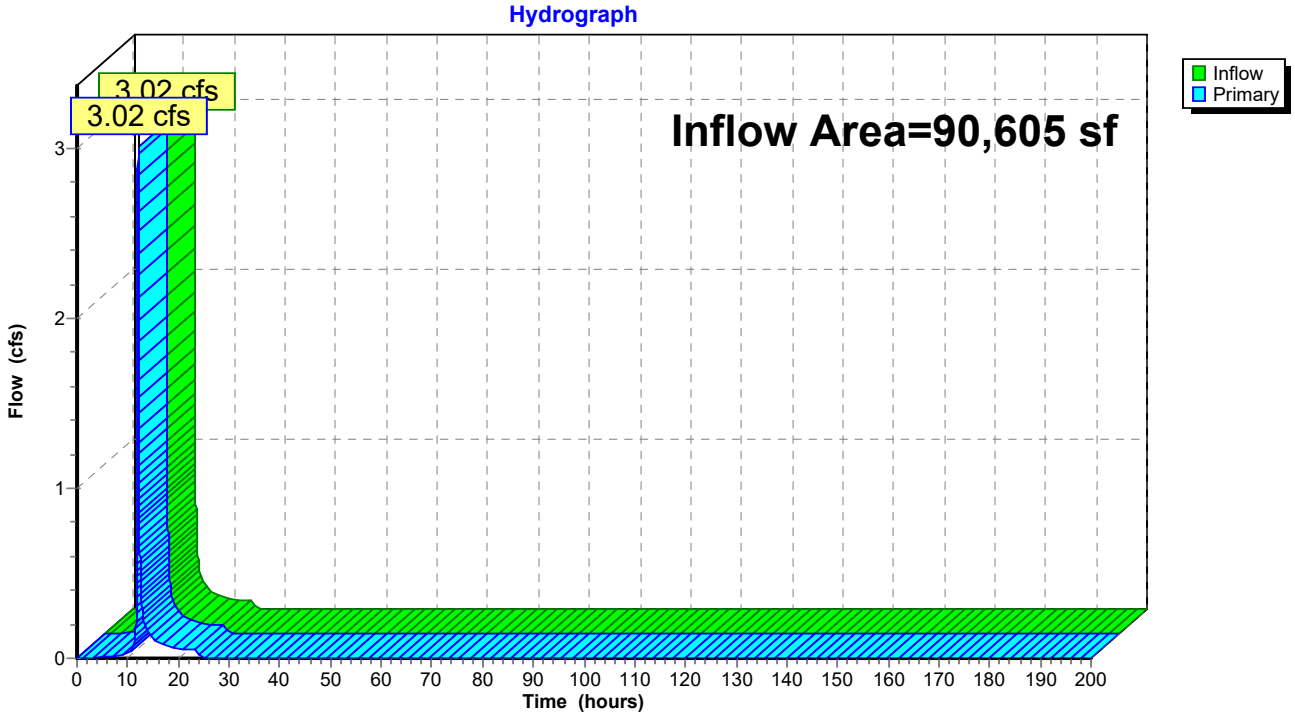


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 1.14" for 1-YR event
Inflow = 3.02 cfs @ 12.06 hrs, Volume= 8,581 cf
Primary = 3.02 cfs @ 12.06 hrs, Volume= 8,581 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

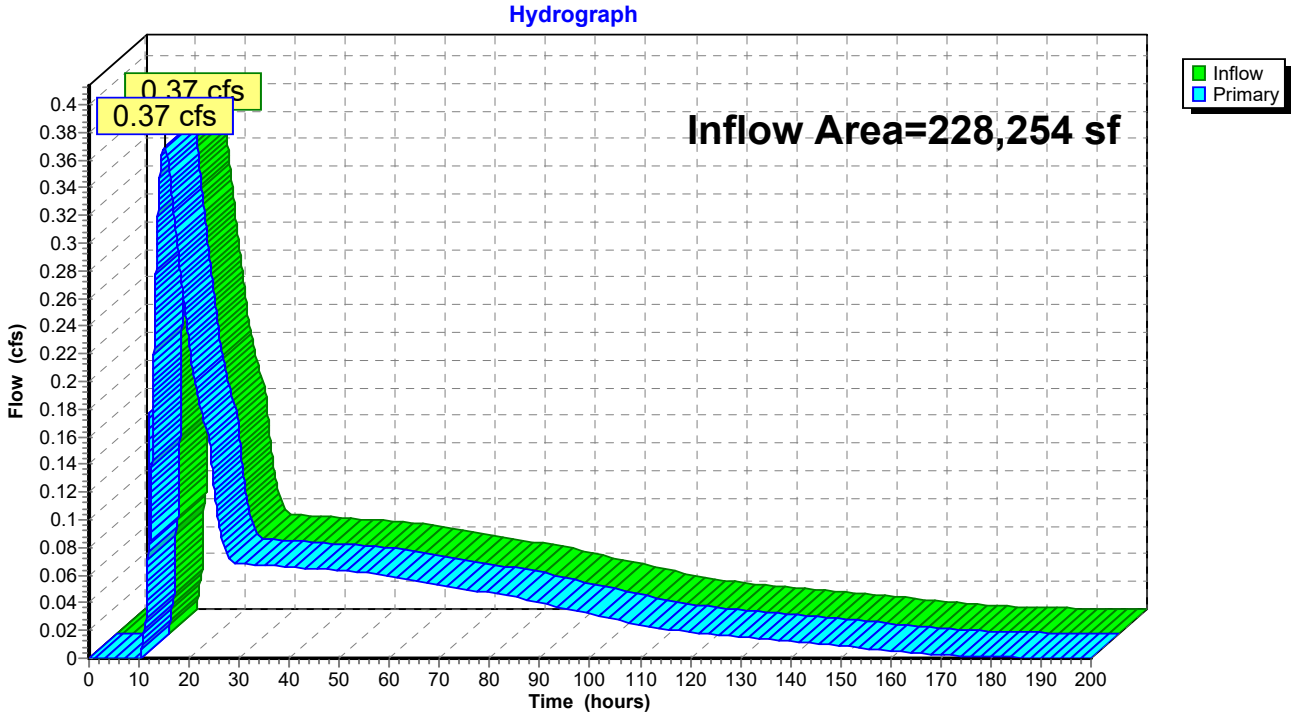


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 1.61" for 1-YR event
Inflow = 0.37 cfs @ 15.09 hrs, Volume= 30,603 cf
Primary = 0.37 cfs @ 15.09 hrs, Volume= 30,603 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

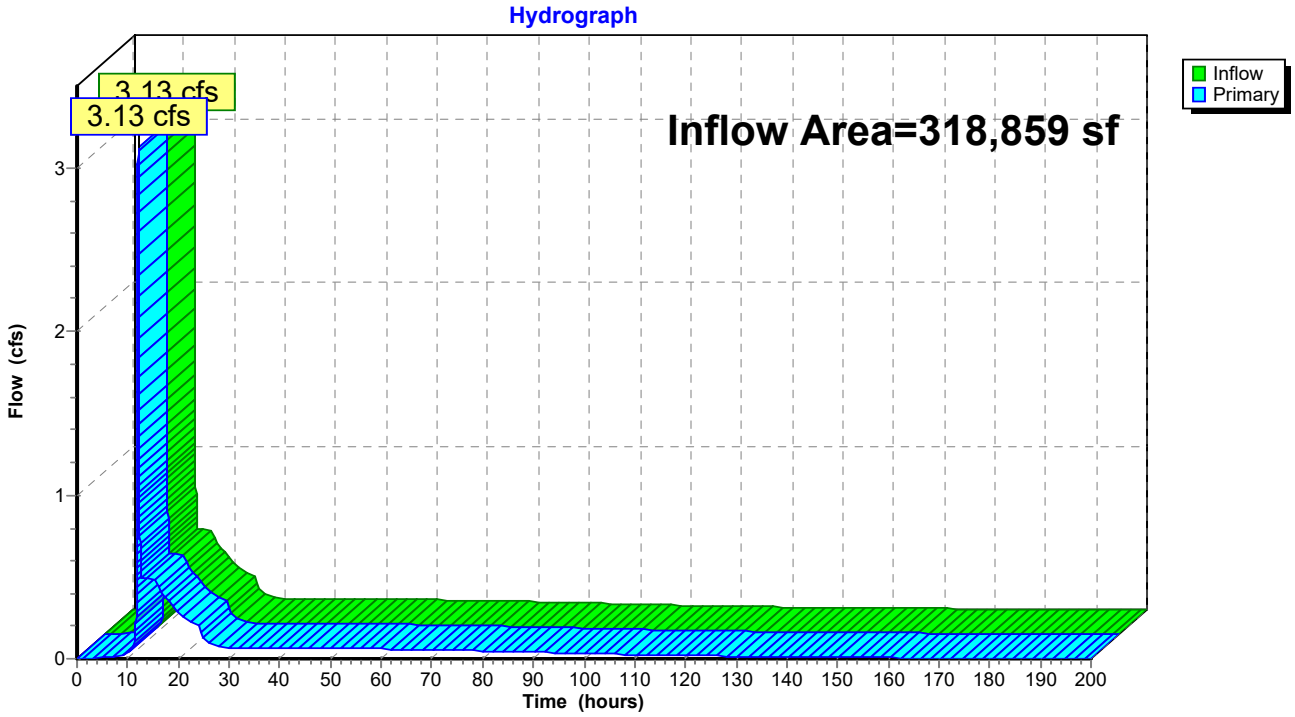


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 1.47" for 1-YR event
Inflow = 3.13 cfs @ 12.06 hrs, Volume= 39,184 cf
Primary = 3.13 cfs @ 12.06 hrs, Volume= 39,184 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=0.12"
Tc=17.5 min CN=78 Runoff=0.70 cfs 1,554 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=0.99"
Tc=17.5 min CN=98 Runoff=0.39 cfs 716 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=0.12"
Tc=5.0 min CN=78 Runoff=0.13 cfs 170 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=0.12"
Tc=19.1 min CN=78 Runoff=0.47 cfs 1,096 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=0.99"
Tc=19.1 min CN=98 Runoff=0.09 cfs 179 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=0.12"
Tc=13.1 min CN=78 Runoff=0.56 cfs 1,096 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=0.99"
Tc=13.1 min CN=98 Runoff=0.11 cfs 179 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=0.12"
Tc=11.5 min CN=78 Runoff=0.29 cfs 535 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=0.12"
Tc=5.0 min CN=78 Runoff=0.18 cfs 234 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=0.99"
Tc=11.5 min CN=98 Runoff=0.59 cfs 894 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=0.13"
Tc=5.0 min CN=79 Runoff=0.30 cfs 380 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=98 Runoff=0.40 cfs 501 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=0.12"
Tc=5.0 min CN=78 Runoff=0.11 cfs 144 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=0.15"
Tc=5.0 min CN=80 Runoff=0.03 cfs 33 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=0.15"
Tc=5.0 min CN=80 Runoff=0.67 cfs 817 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=98 Runoff=1.97 cfs 2,469 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=0.15"
Tc=5.0 min CN=80 Runoff=0.44 cfs 528 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=98 Runoff=5.91 cfs 7,406 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=0.12"
Tc=13.8 min CN=78 Runoff=0.38 cfs 760 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=0.99"
Tc=13.8 min CN=98 Runoff=0.64 cfs 1,038 cf

Pond 39P: Basin 1 (MRC) Peak Elev=364.02' Storage=7,830 cf Inflow=6.28 cfs 7,934 cf
Primary=0.00 cfs 0 cf Secondary=0.03 cfs 5,388 cf Outflow=0.03 cfs 5,388 cf

Pond 40P: Basin 2 (MRC) Peak Elev=364.42' Storage=3,202 cf Inflow=2.58 cfs 3,286 cf
Primary=0.00 cfs 0 cf Secondary=0.03 cfs 2,449 cf Outflow=0.03 cfs 2,449 cf

Link 6L: Pre B (Bypass) Inflow=0.13 cfs 170 cf
Primary=0.13 cfs 170 cf

Link 9L: Pre C (Bypass) Inflow=0.55 cfs 1,275 cf
Primary=0.55 cfs 1,275 cf

Link 12L: Pre D (Bypass) Inflow=0.65 cfs 1,275 cf
Primary=0.65 cfs 1,275 cf

Link 17L: Post D Bypass Inflow=0.82 cfs 1,430 cf
Primary=0.82 cfs 1,430 cf

Link 20L: Post C Bypass Inflow=0.68 cfs 881 cf
Primary=0.68 cfs 881 cf

Link 23L: Post B Bypass Inflow=0.11 cfs 144 cf
Primary=0.11 cfs 144 cf

Link 24L: Culvert - PRE Inflow=1.03 cfs 2,270 cf
Primary=1.03 cfs 2,270 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=1.11 cfs 2,503 cf
Primary=1.11 cfs 2,503 cf

Link 26L: Culvert - POST Inflow=0.94 cfs 1,798 cf
Primary=0.94 cfs 1,798 cf

Link 27L: Post POI A-1 Inflow=0.06 cfs 7,871 cf
Primary=0.06 cfs 7,871 cf

Link 30L: To CTP Ex. Basin- POST Inflow=1.00 cfs 9,669 cf
Primary=1.00 cfs 9,669 cf

Total Runoff Area = 878,170 sf Runoff Volume = 20,729 cf Average Runoff Depth = 0.28"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

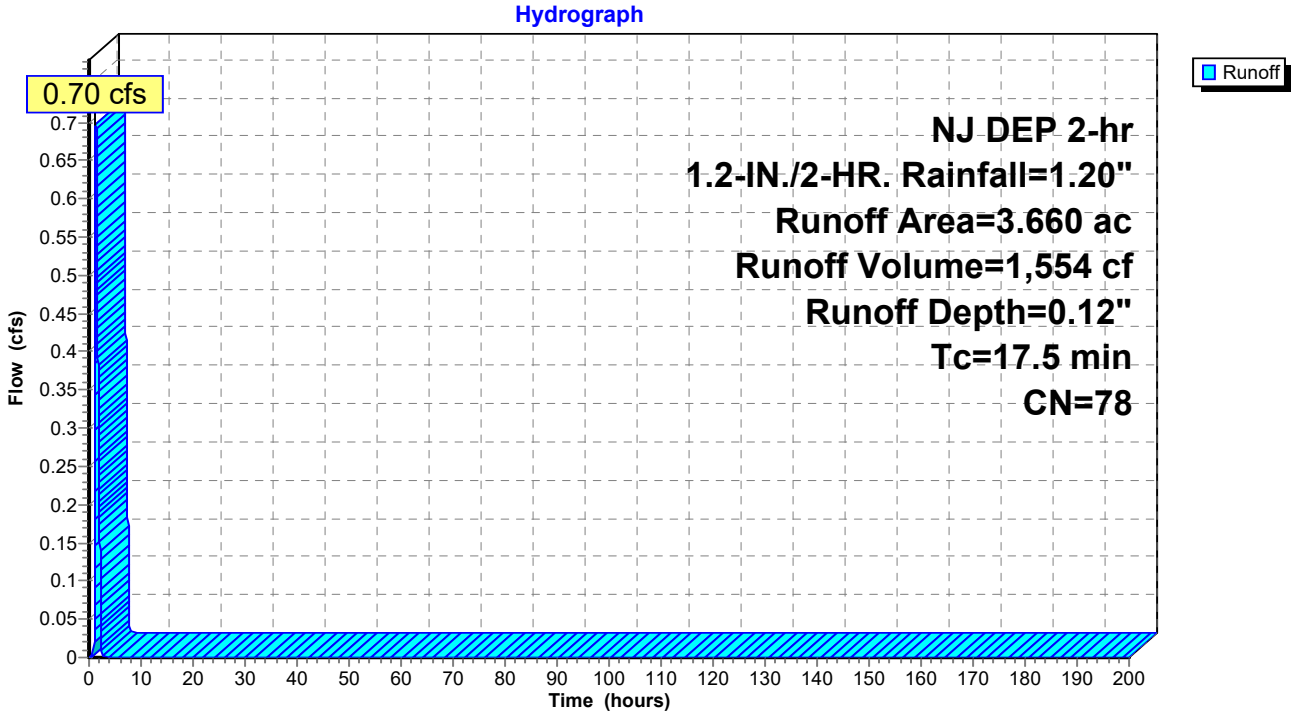
Runoff = 0.70 cfs @ 1.34 hrs, Volume= 1,554 cf, Depth= 0.12"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

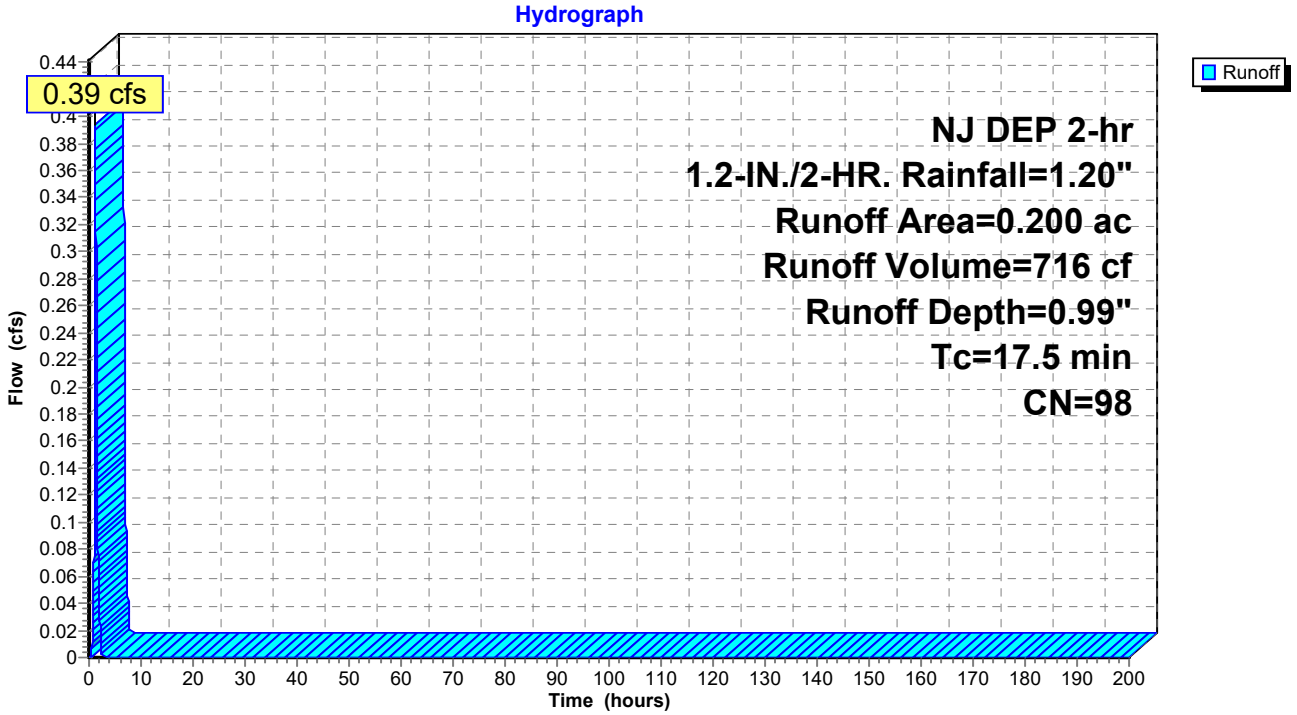
Runoff = 0.39 cfs @ 1.23 hrs, Volume= 716 cf, Depth= 0.99"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

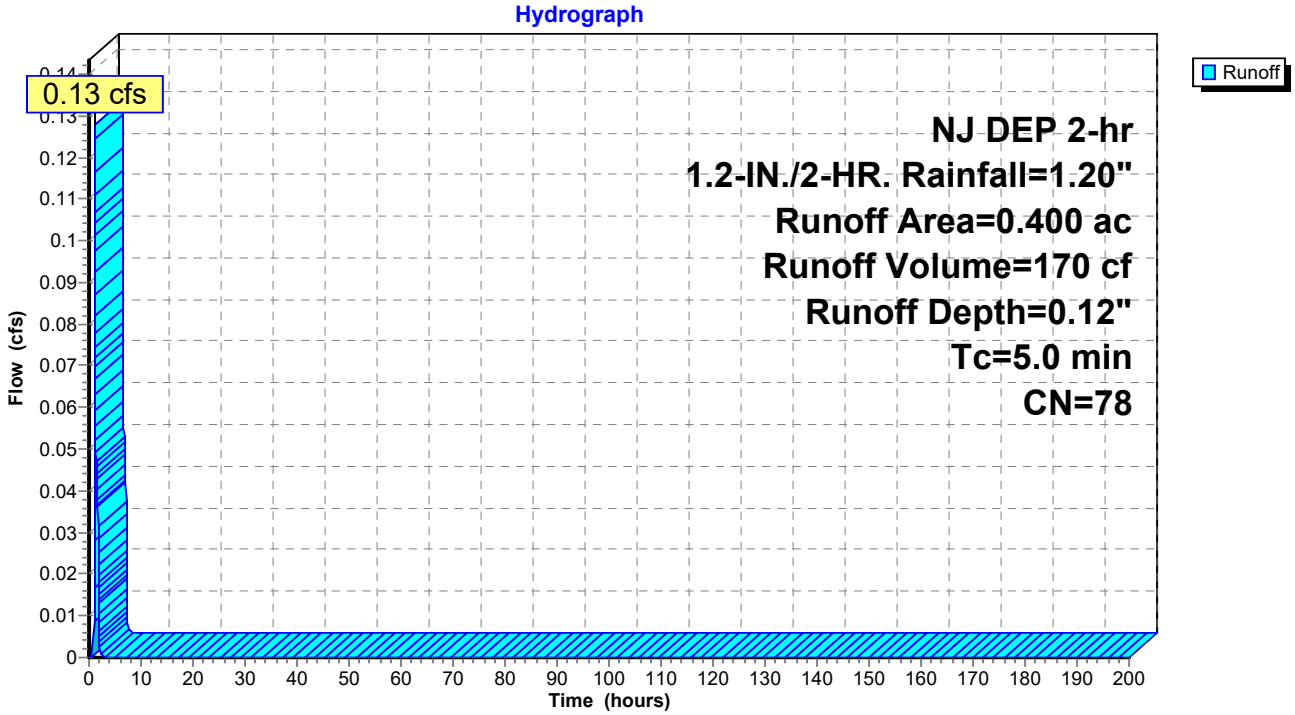
Runoff = 0.13 cfs @ 1.13 hrs, Volume= 170 cf, Depth= 0.12"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

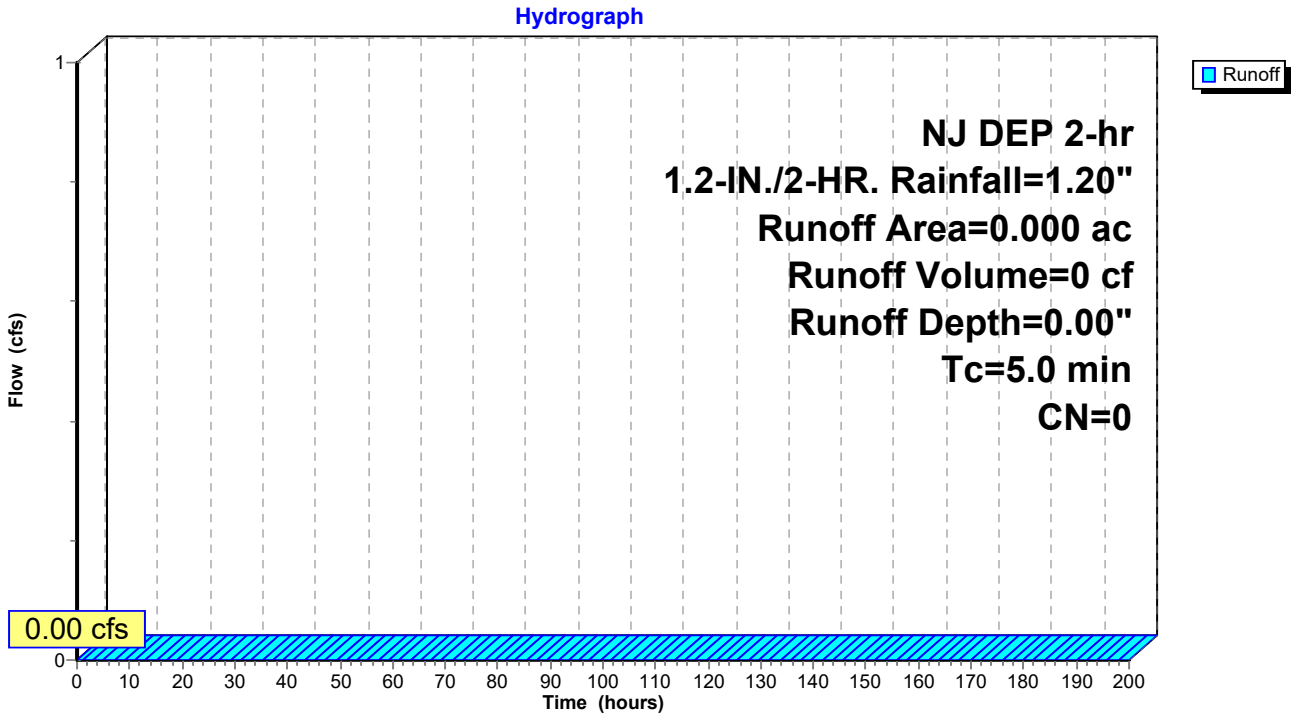
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

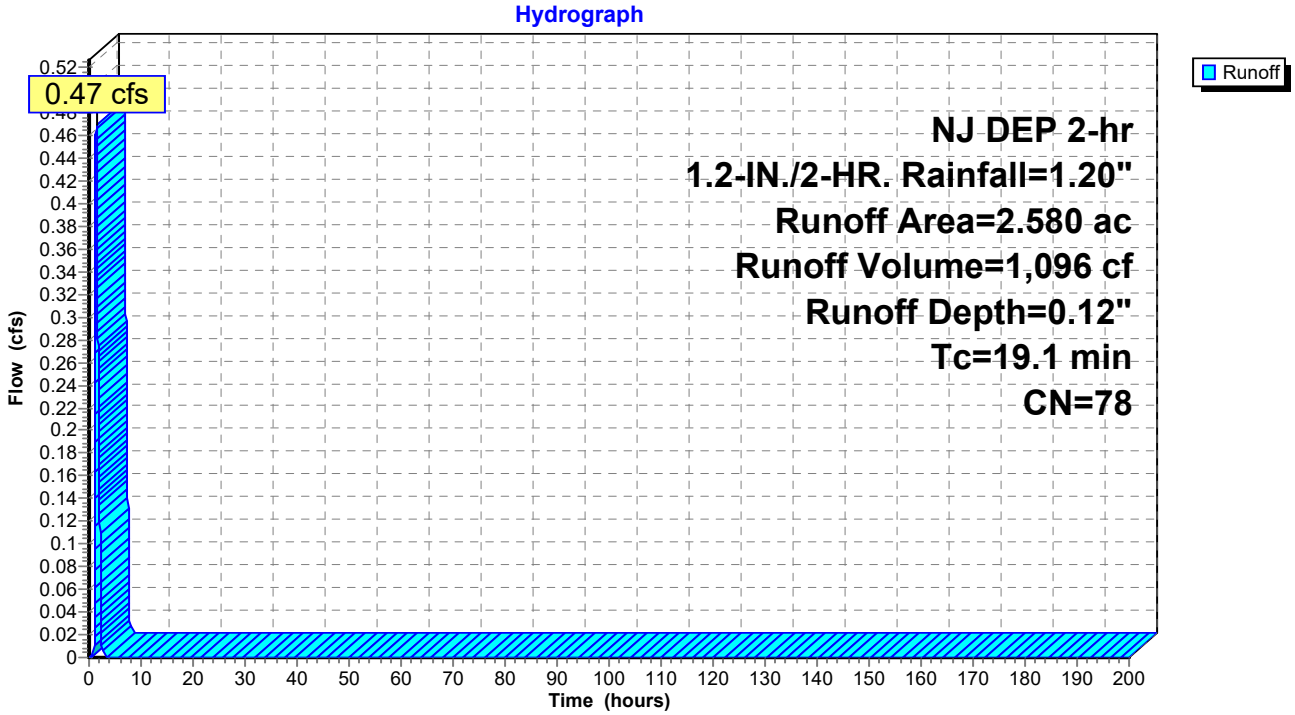
Runoff = 0.47 cfs @ 1.38 hrs, Volume= 1,096 cf, Depth= 0.12"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

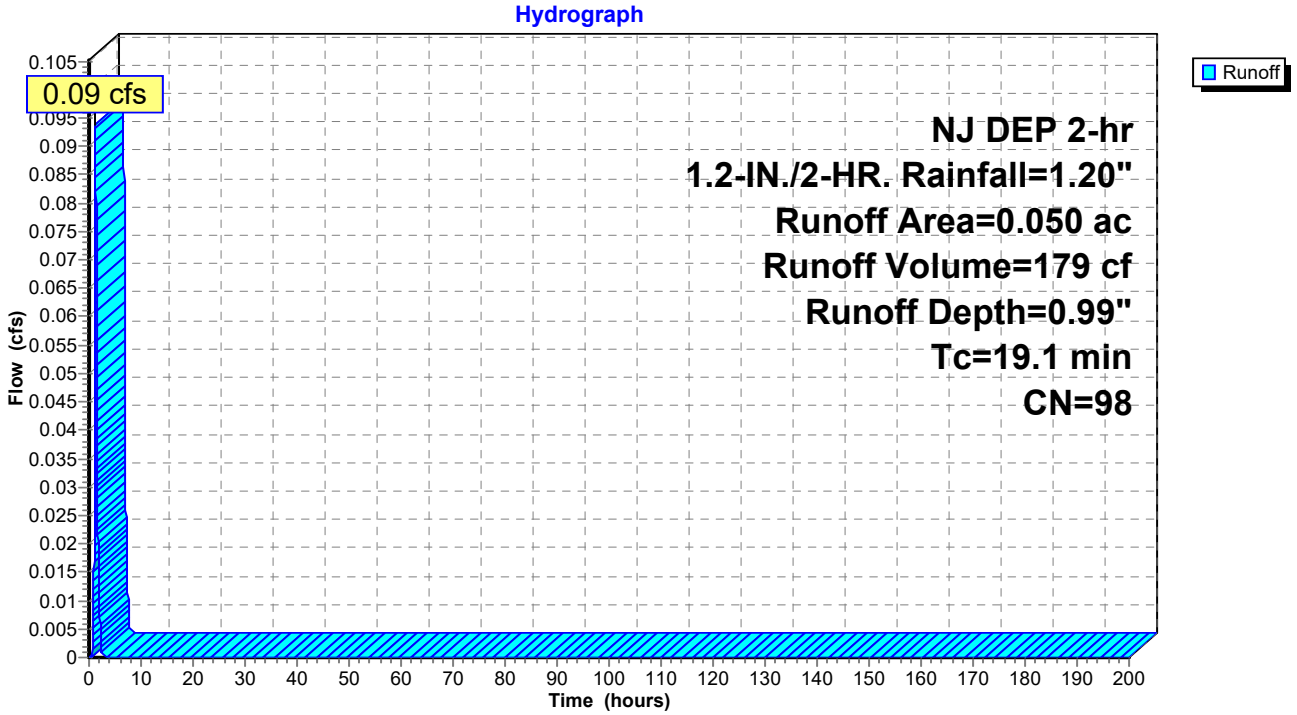
Runoff = 0.09 cfs @ 1.25 hrs, Volume= 179 cf, Depth= 0.99"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

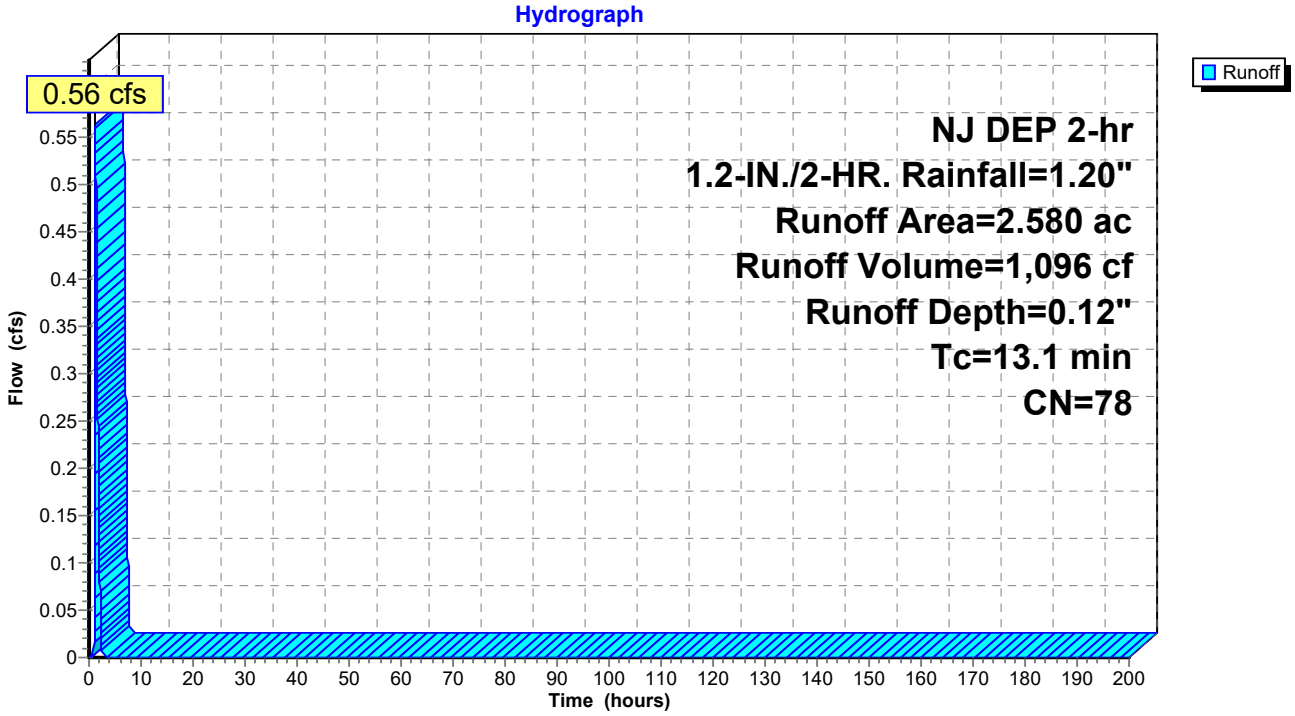
Runoff = 0.56 cfs @ 1.27 hrs, Volume= 1,096 cf, Depth= 0.12"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

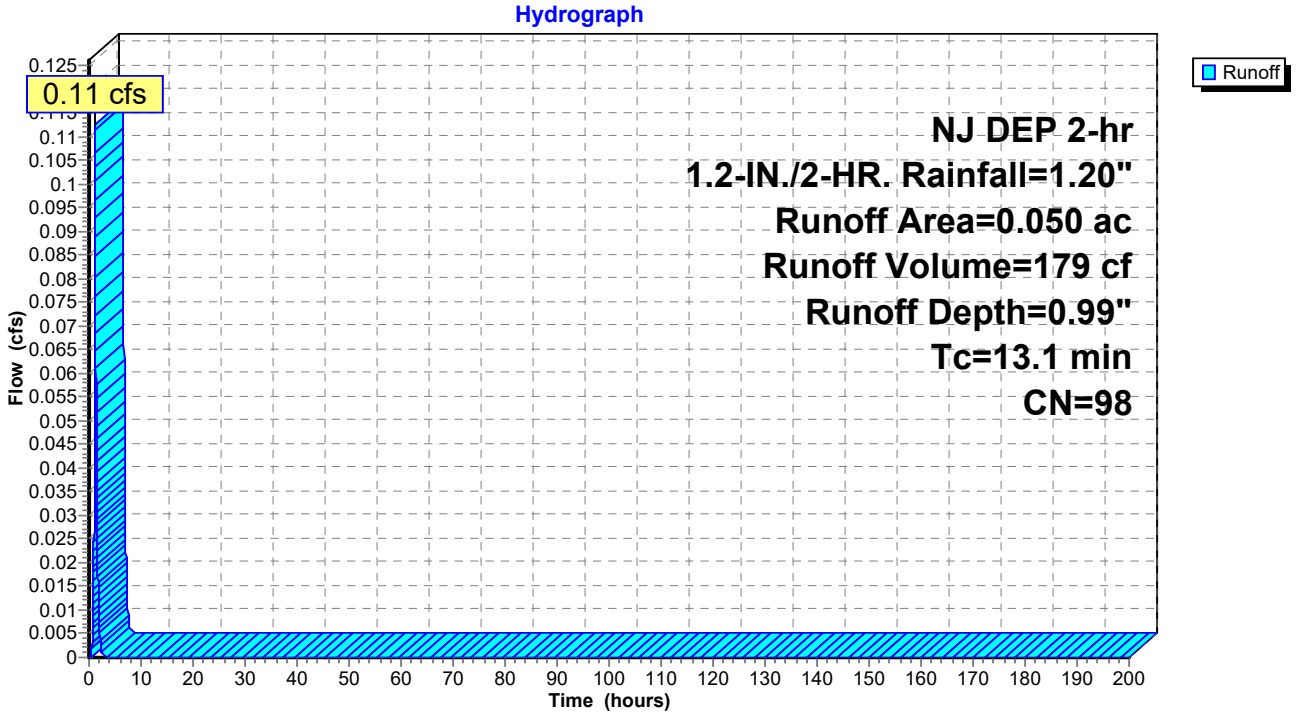
Runoff = 0.11 cfs @ 1.18 hrs, Volume= 179 cf, Depth= 0.99"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

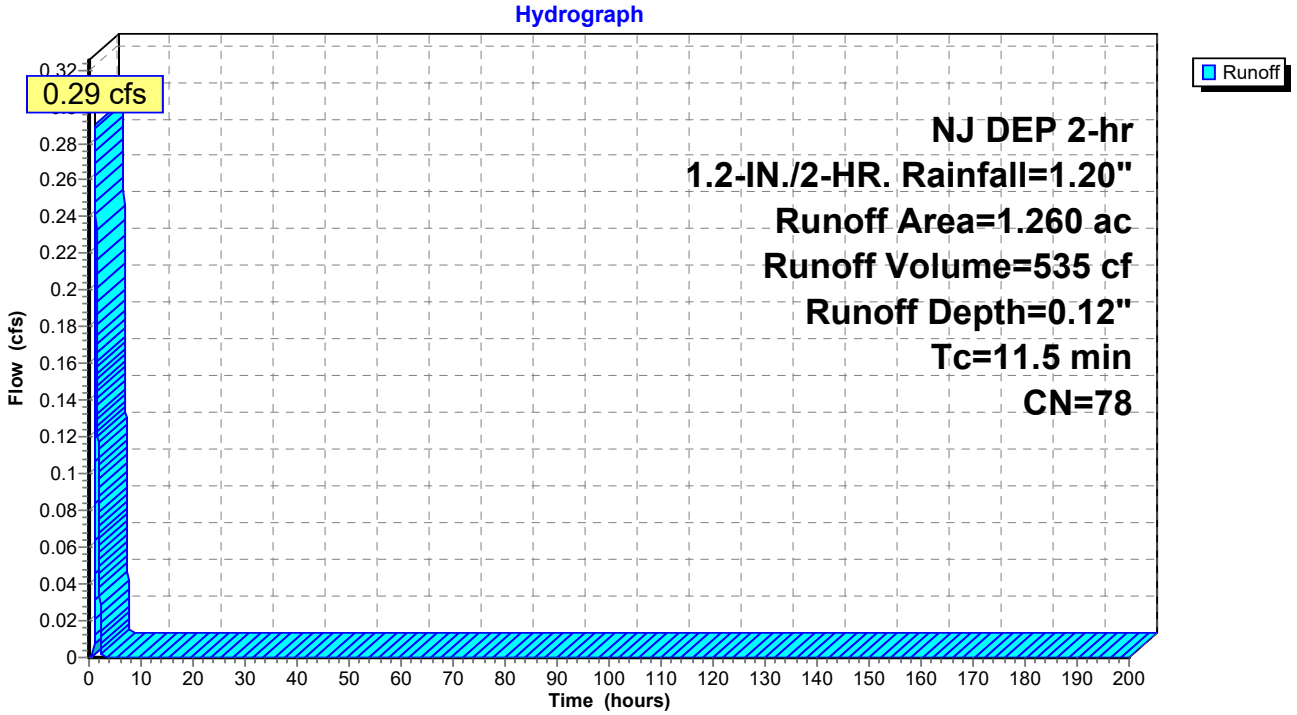
Runoff = 0.29 cfs @ 1.25 hrs, Volume= 535 cf, Depth= 0.12"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

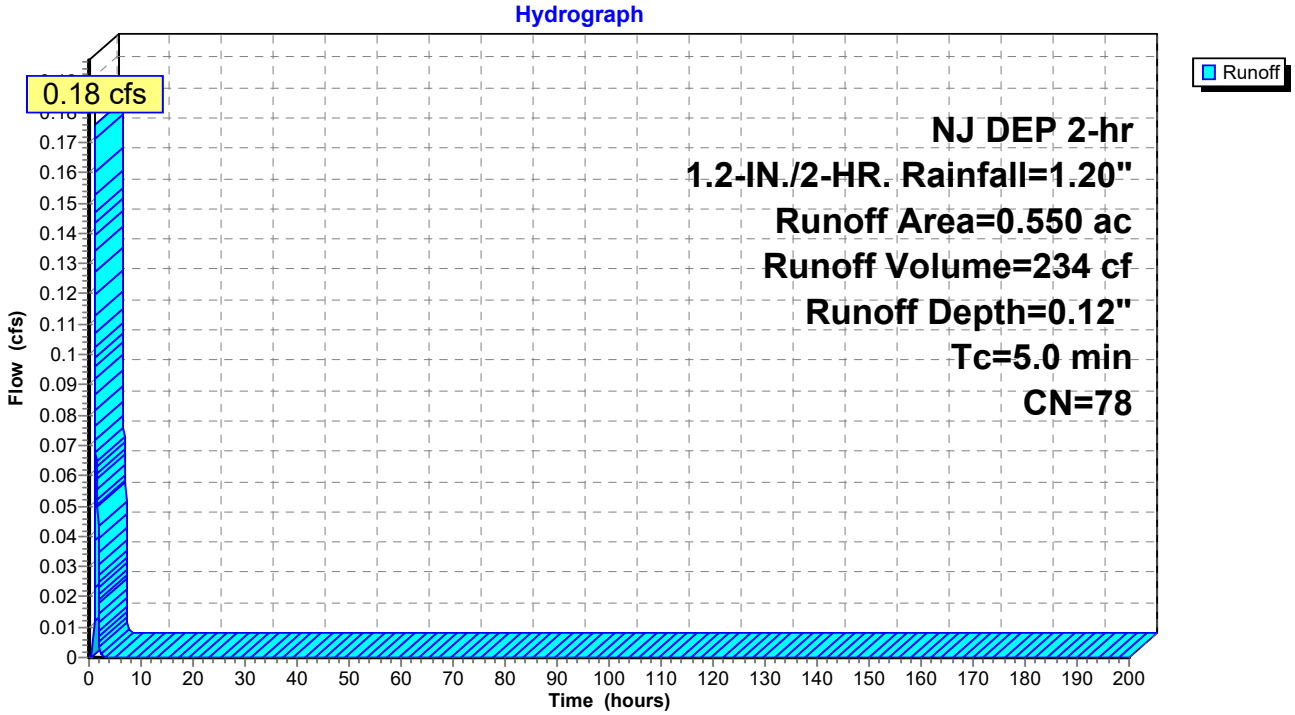
Runoff = 0.18 cfs @ 1.13 hrs, Volume= 234 cf, Depth= 0.12"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

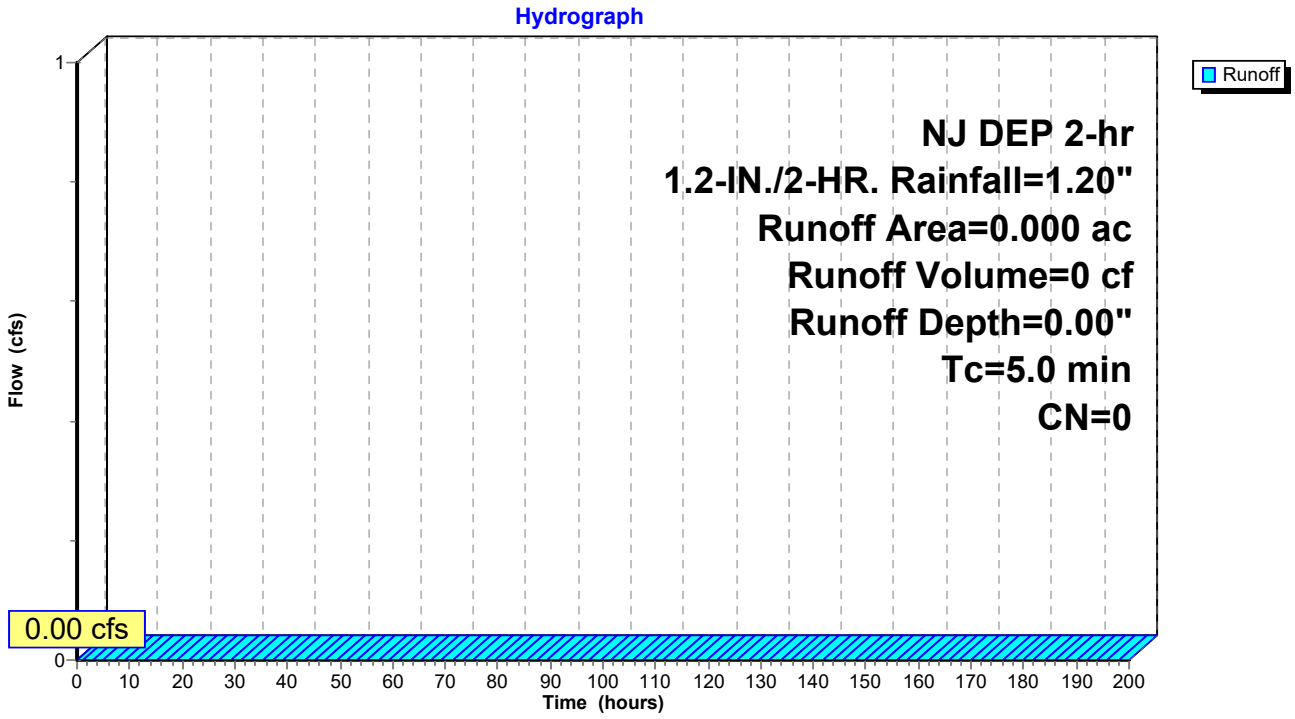
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

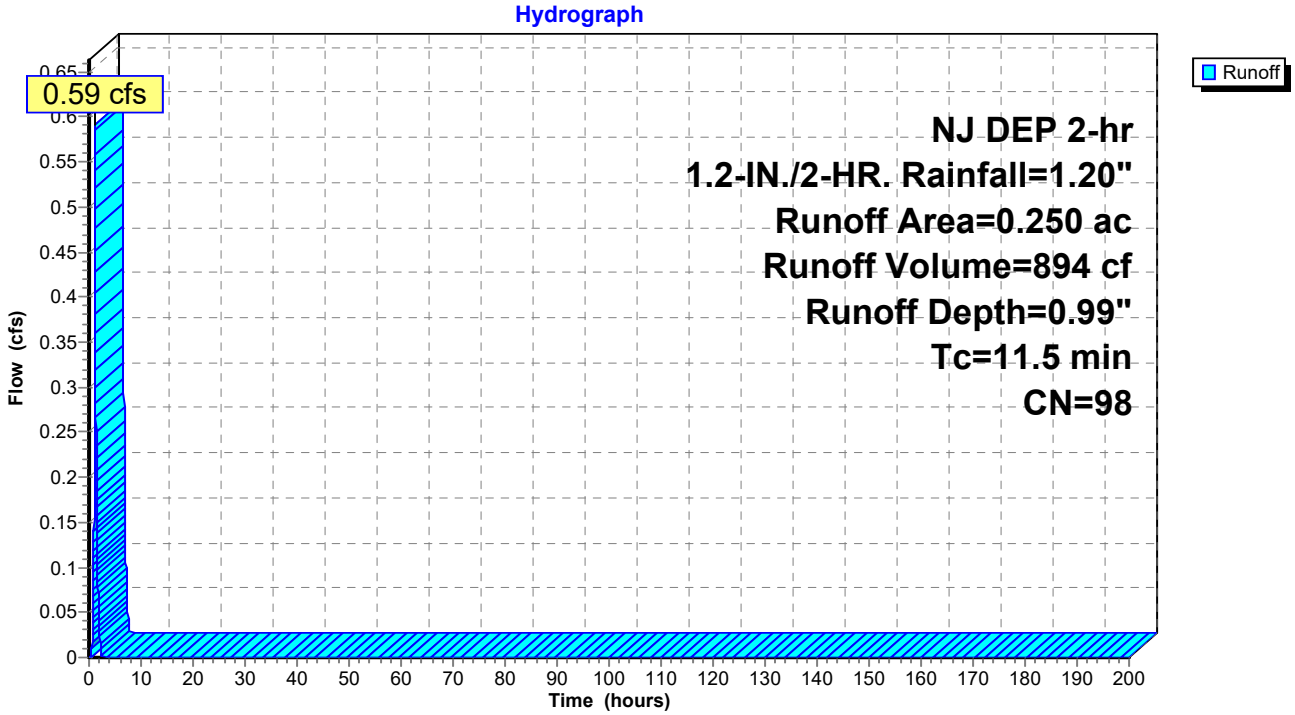
Runoff = 0.59 cfs @ 1.16 hrs, Volume= 894 cf, Depth= 0.99"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

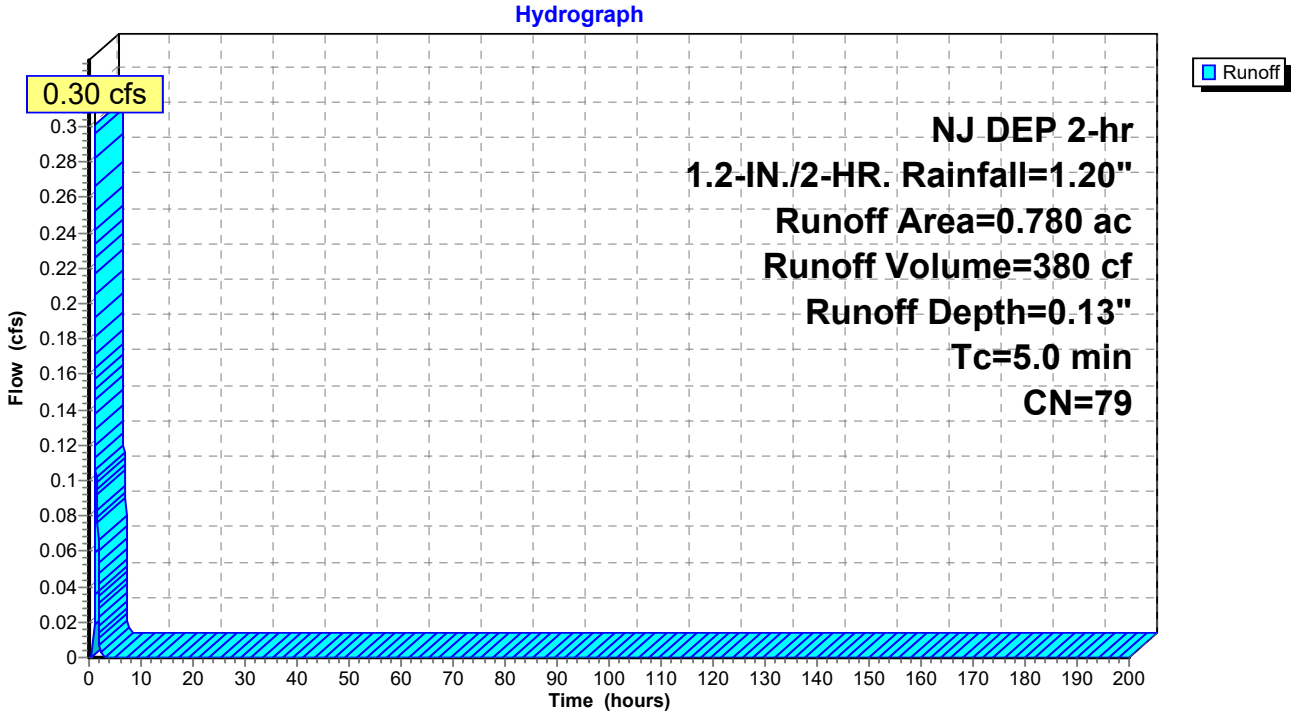
Runoff = 0.30 cfs @ 1.13 hrs, Volume= 380 cf, Depth= 0.13"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

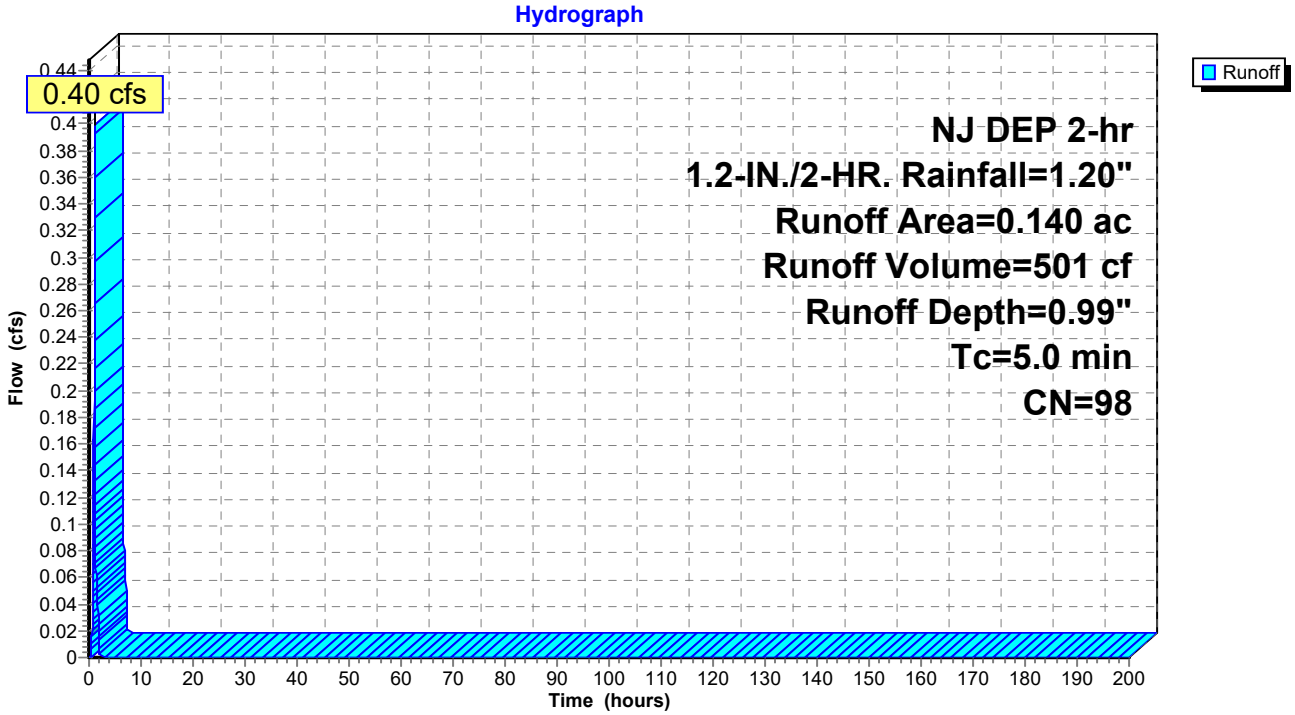
Runoff = 0.40 cfs @ 1.10 hrs, Volume= 501 cf, Depth= 0.99"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

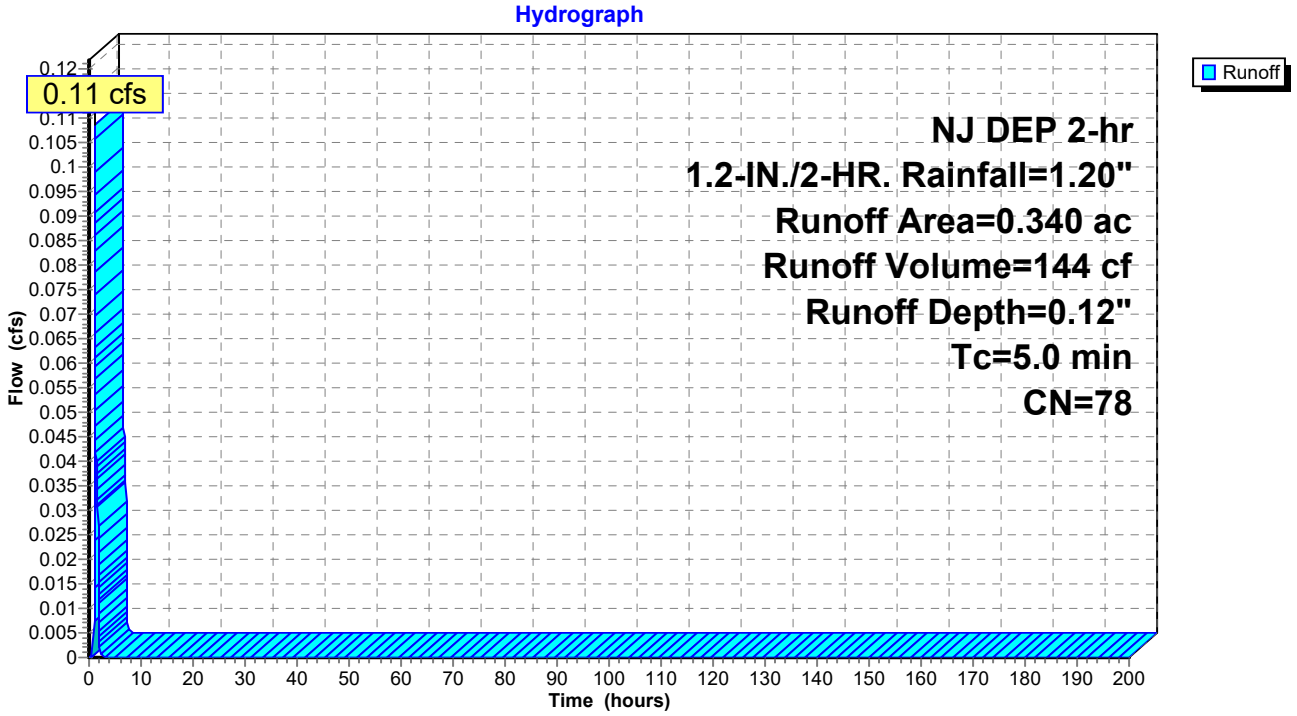
Runoff = 0.11 cfs @ 1.13 hrs, Volume= 144 cf, Depth= 0.12"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

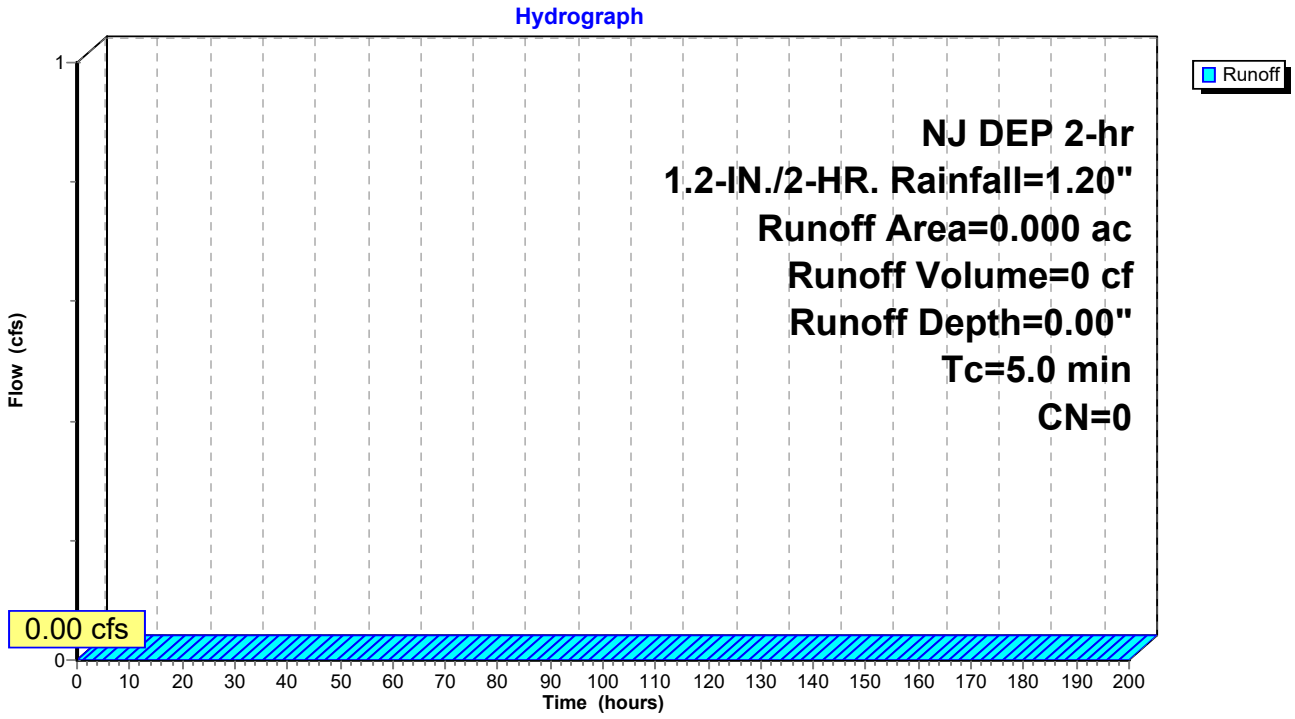
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

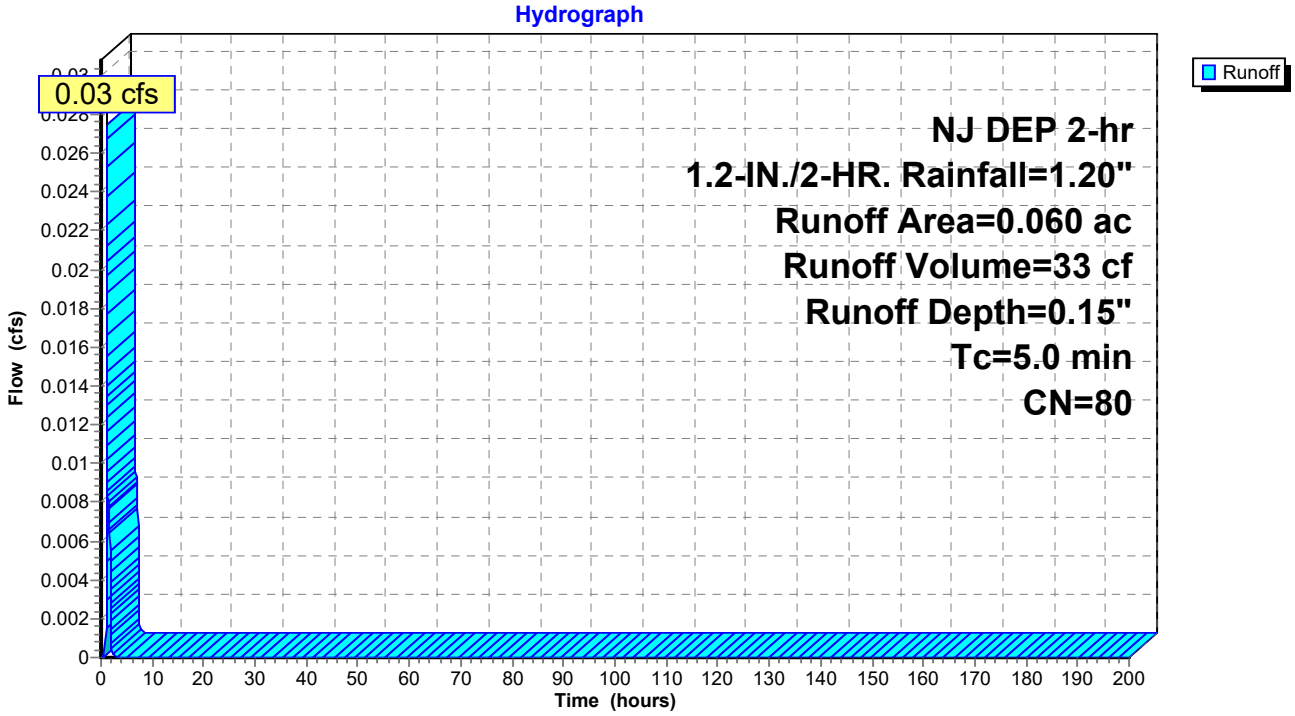
Runoff = 0.03 cfs @ 1.13 hrs, Volume= 33 cf, Depth= 0.15"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

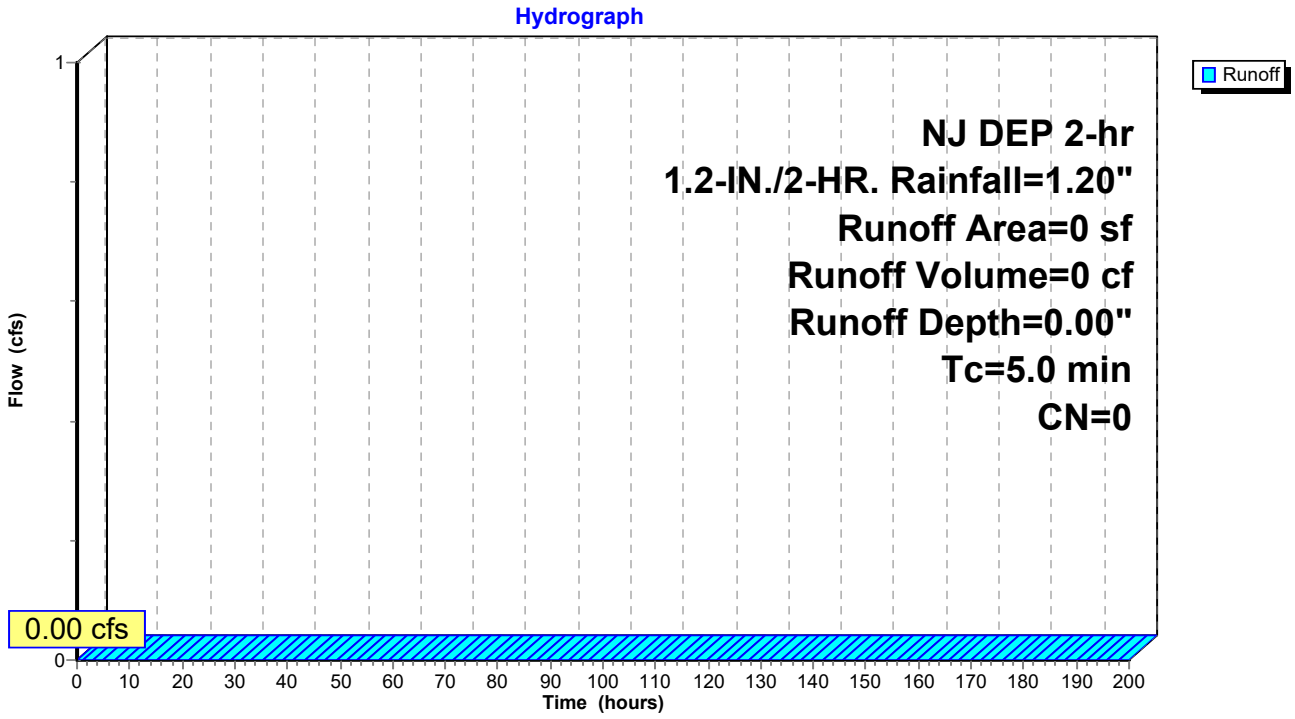
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

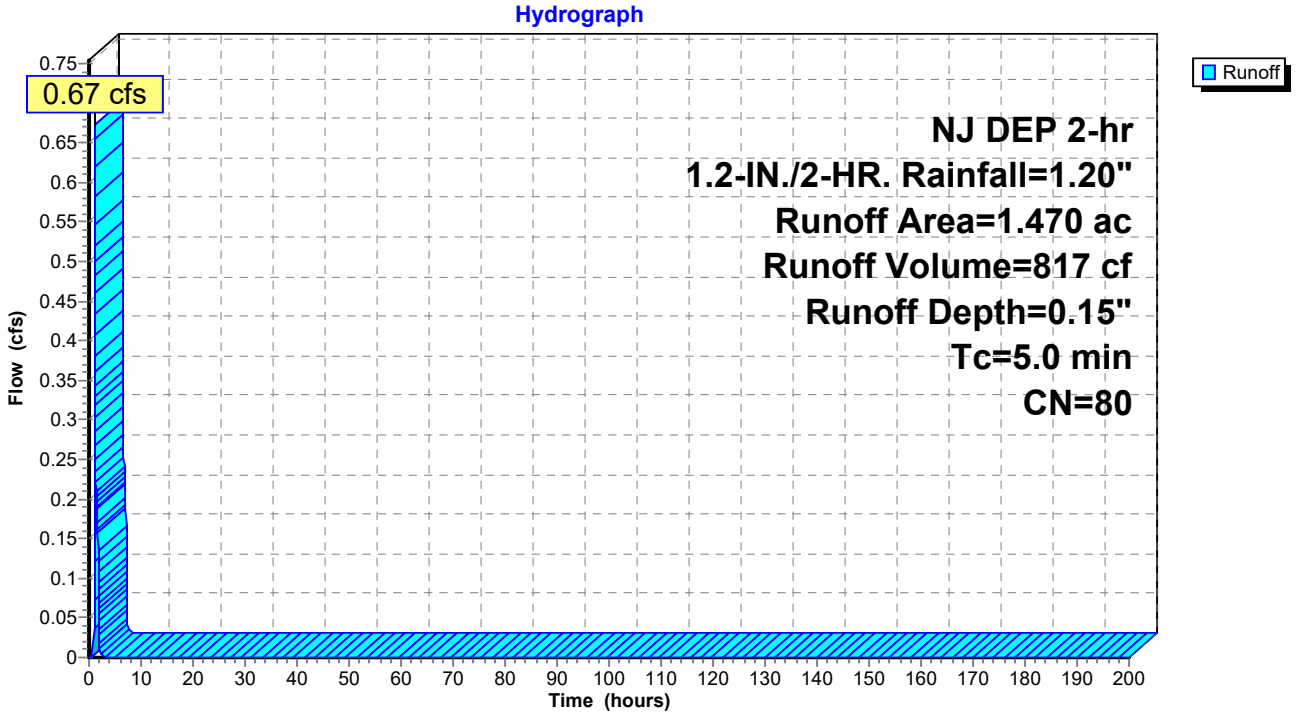
Runoff = 0.67 cfs @ 1.13 hrs, Volume= 817 cf, Depth= 0.15"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

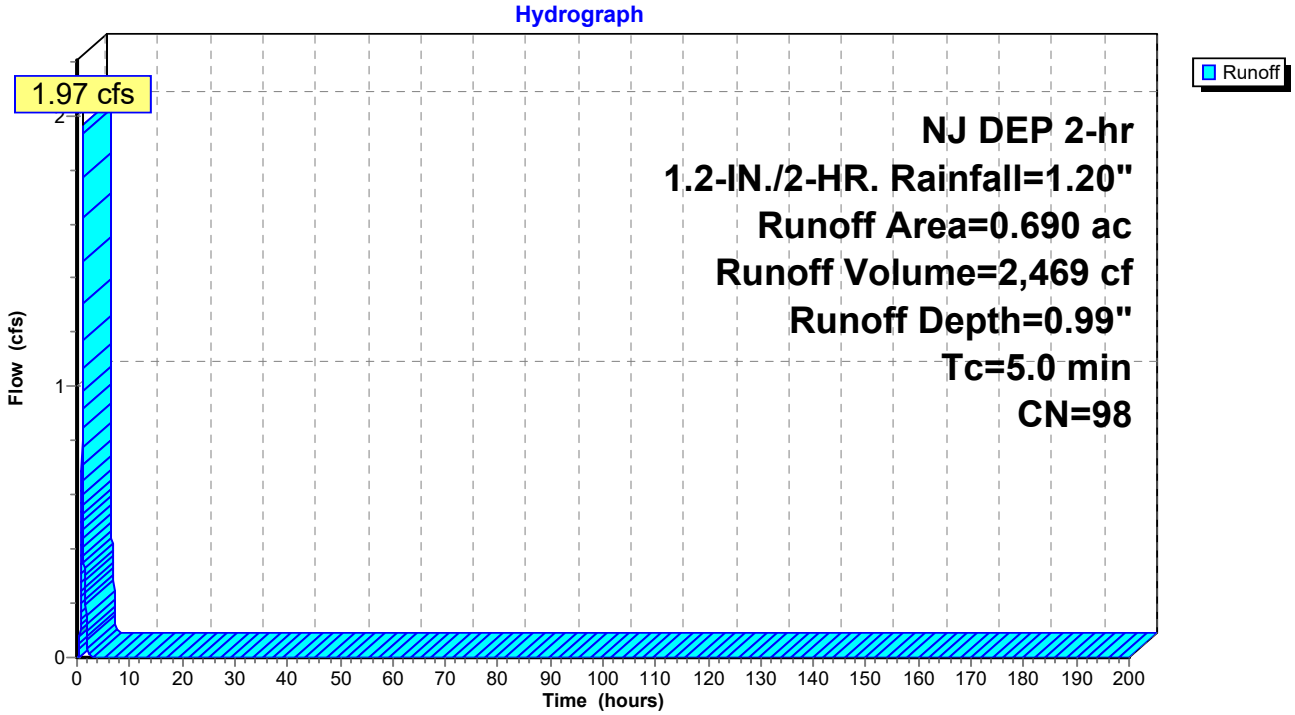
Runoff = 1.97 cfs @ 1.10 hrs, Volume= 2,469 cf, Depth= 0.99"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

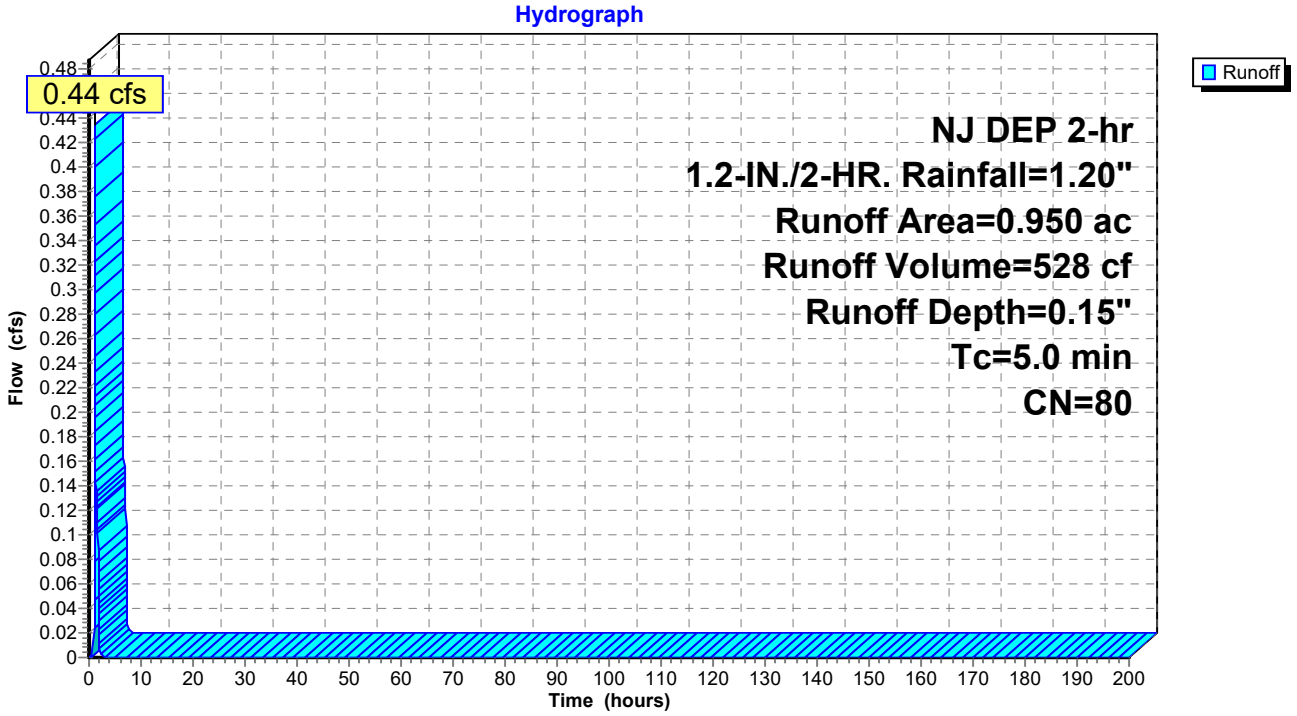
Runoff = 0.44 cfs @ 1.13 hrs, Volume= 528 cf, Depth= 0.15"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

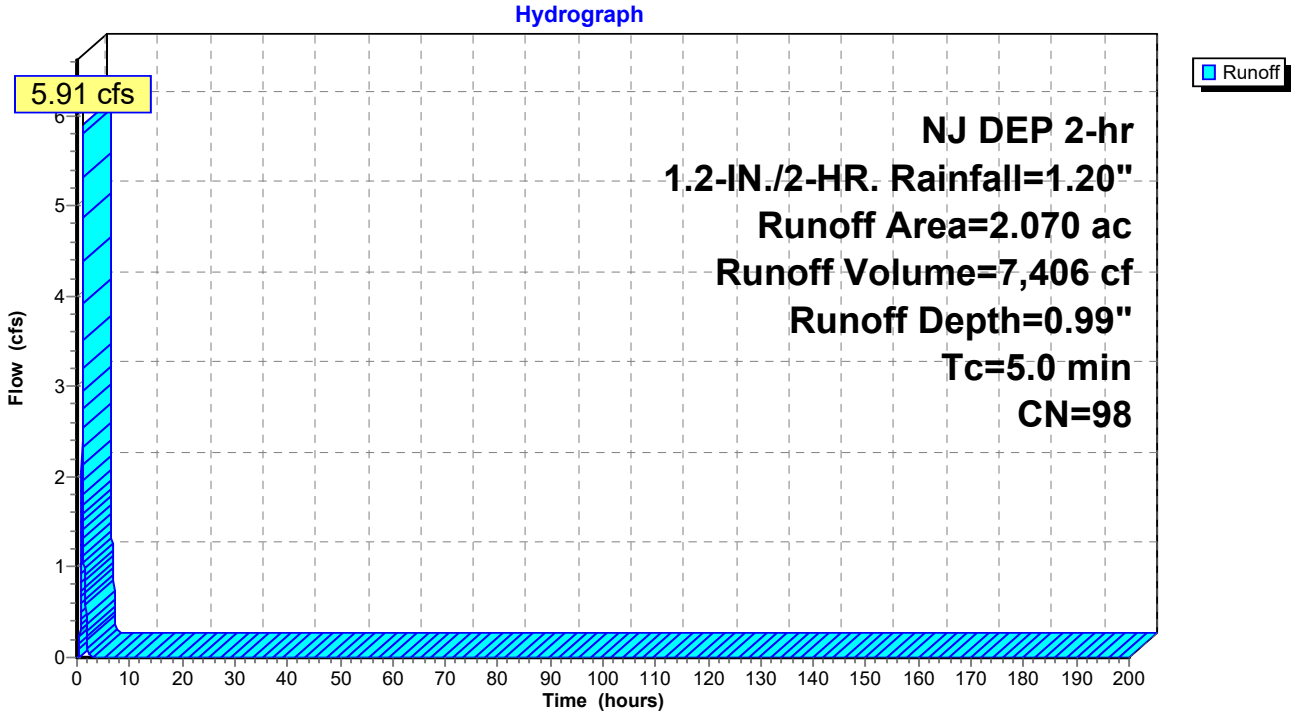
Runoff = 5.91 cfs @ 1.10 hrs, Volume= 7,406 cf, Depth= 0.99"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

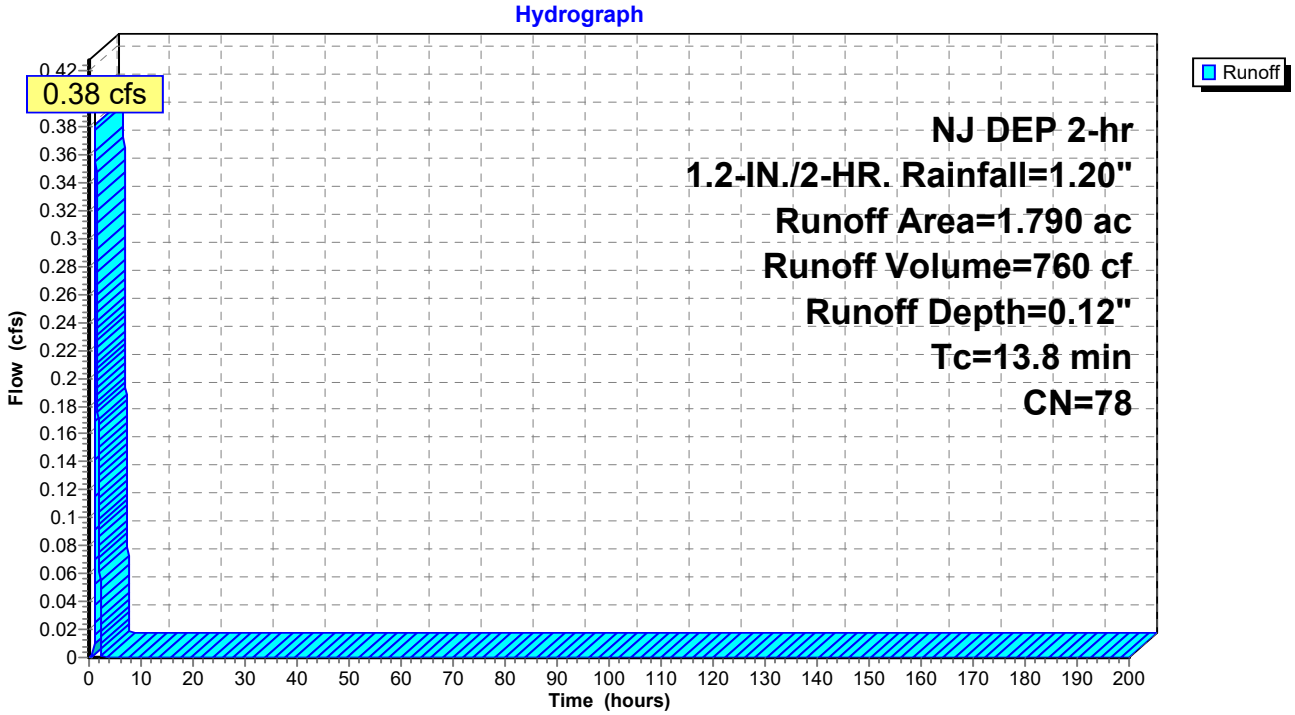
Runoff = 0.38 cfs @ 1.29 hrs, Volume= 760 cf, Depth= 0.12"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

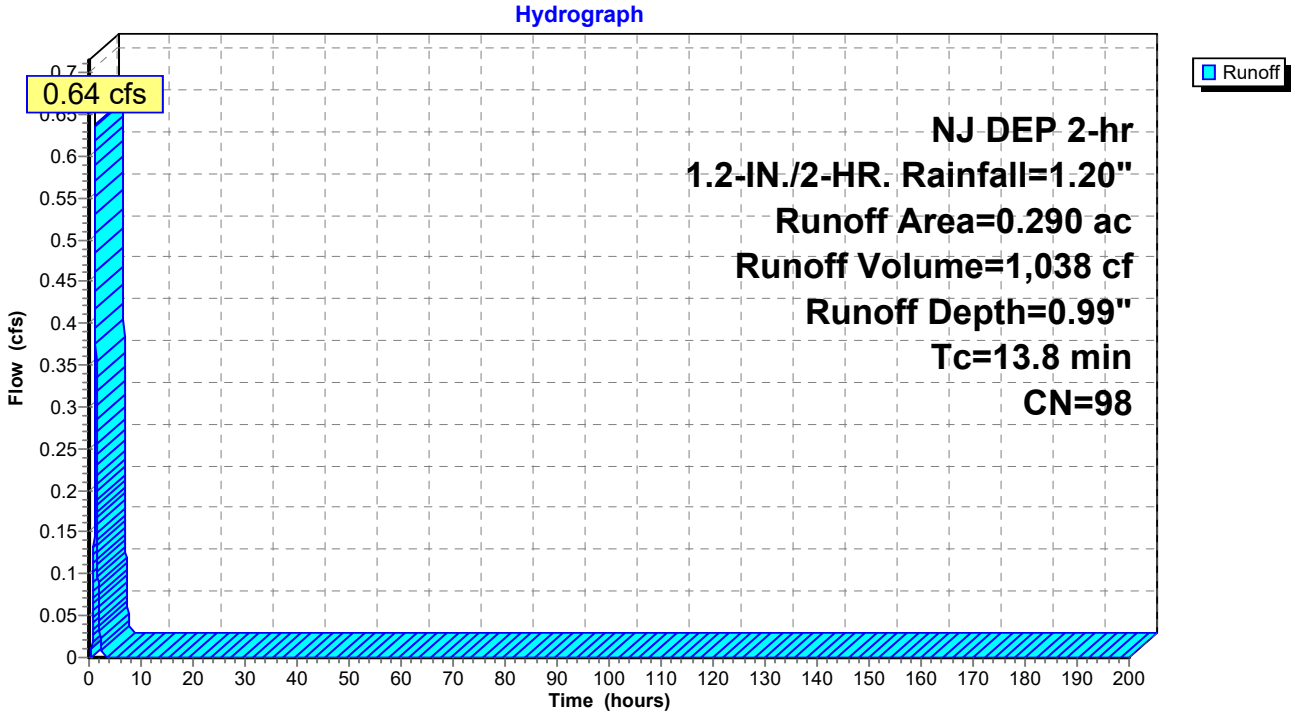
Runoff = 0.64 cfs @ 1.19 hrs, Volume= 1,038 cf, Depth= 0.99"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
NJ DEP 2-hr 1.2-IN./2-HR. Rainfall=1.20"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 0.42" for 1.2-IN./2-HR. event
Inflow = 6.28 cfs @ 1.10 hrs, Volume= 7,934 cf
Outflow = 0.03 cfs @ 2.12 hrs, Volume= 5,388 cf, Atten= 100%, Lag= 60.8 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.03 cfs @ 2.12 hrs, Volume= 5,388 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 364.02' @ 2.12 hrs Surf.Area= 8,479 sf Storage= 7,830 cf

Plug-Flow detention time= 2,004.1 min calculated for 5,388 cf (68% of inflow)
Center-of-Mass det. time= 1,995.2 min (2,065.5 - 70.3)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

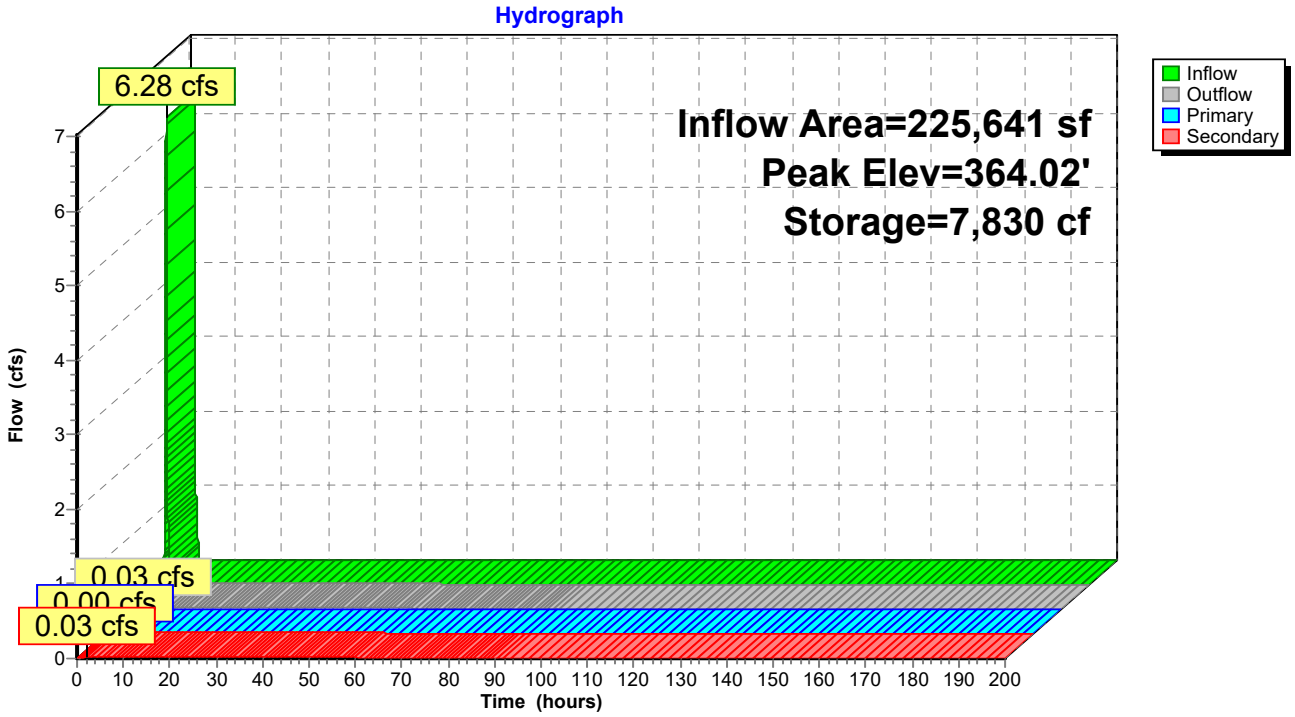
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=361.00' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)
↑**4=Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.03 cfs @ 2.12 hrs HW=364.02' TW=0.00' (Dynamic Tailwater)
↑**2=MRC Underdrain** (Passes 0.03 cfs of 0.57 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.03 cfs @ 6.78 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 0.42" for 1.2-IN./2-HR. event
Inflow = 2.58 cfs @ 1.11 hrs, Volume= 3,286 cf
Outflow = 0.03 cfs @ 2.10 hrs, Volume= 2,449 cf, Atten= 99%, Lag= 59.4 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.03 cfs @ 2.10 hrs, Volume= 2,449 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 364.42' @ 2.10 hrs Surf.Area= 5,550 sf Storage= 3,202 cf

Plug-Flow detention time= 1,126.9 min calculated for 2,449 cf (75% of inflow)
Center-of-Mass det. time= 1,119.2 min (1,191.9 - 72.7)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

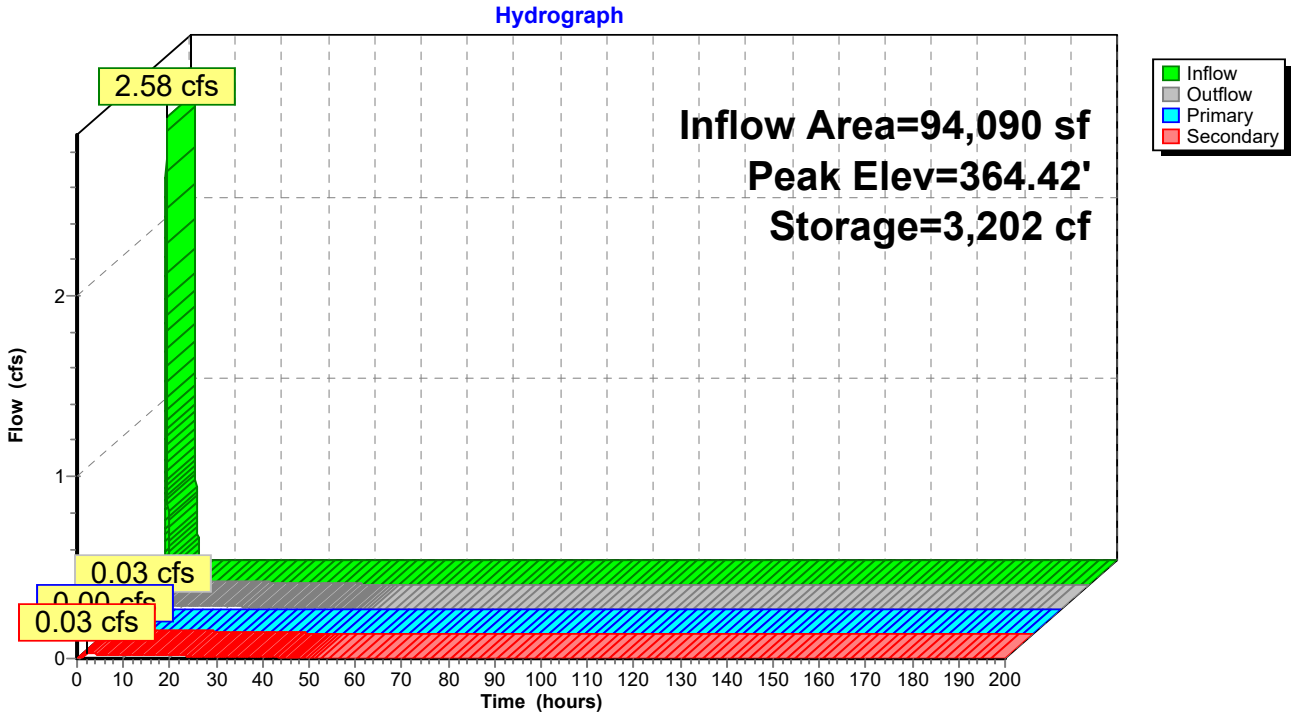
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=362.00' TW=361.00' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)
↑**4=Orifice** (Controls 0.00 cfs)

Secondary OutFlow Max=0.03 cfs @ 2.10 hrs HW=364.42' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.03 cfs of 0.31 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.03 cfs @ 5.67 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

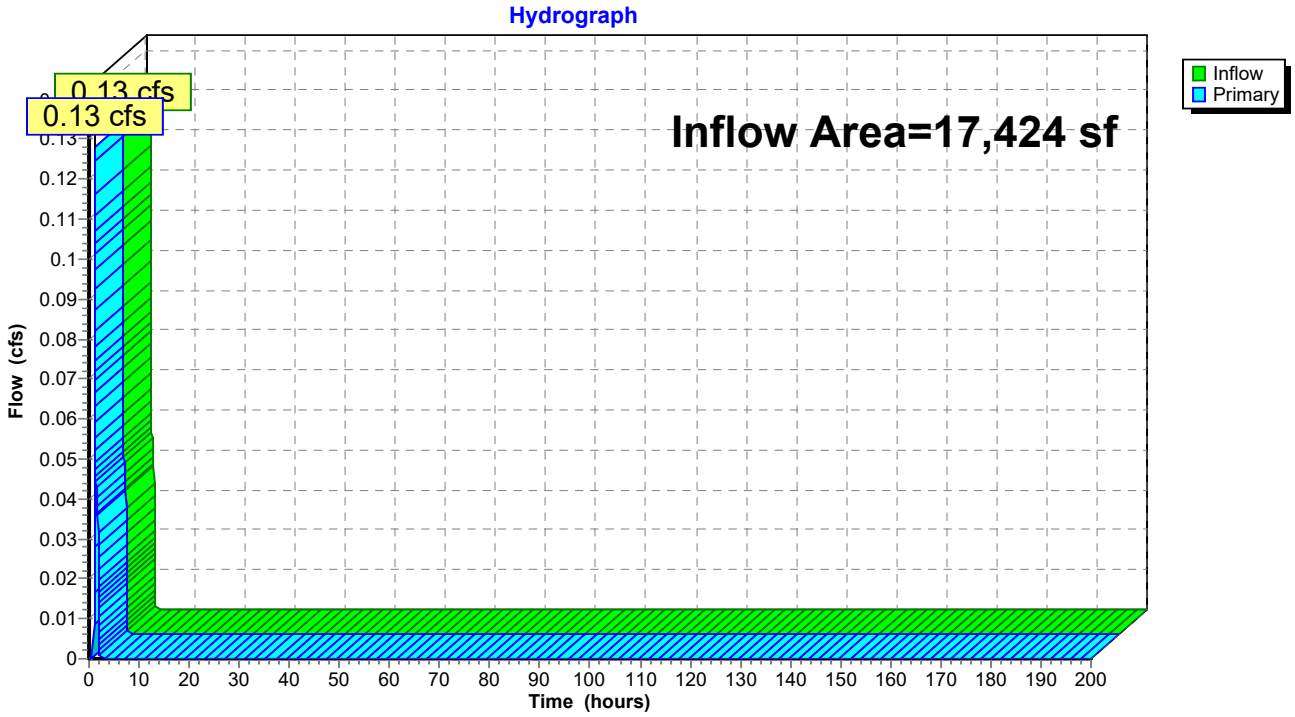
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 0.12" for 1.2-IN./2-HR. event
Inflow = 0.13 cfs @ 1.13 hrs, Volume= 170 cf
Primary = 0.13 cfs @ 1.13 hrs, Volume= 170 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

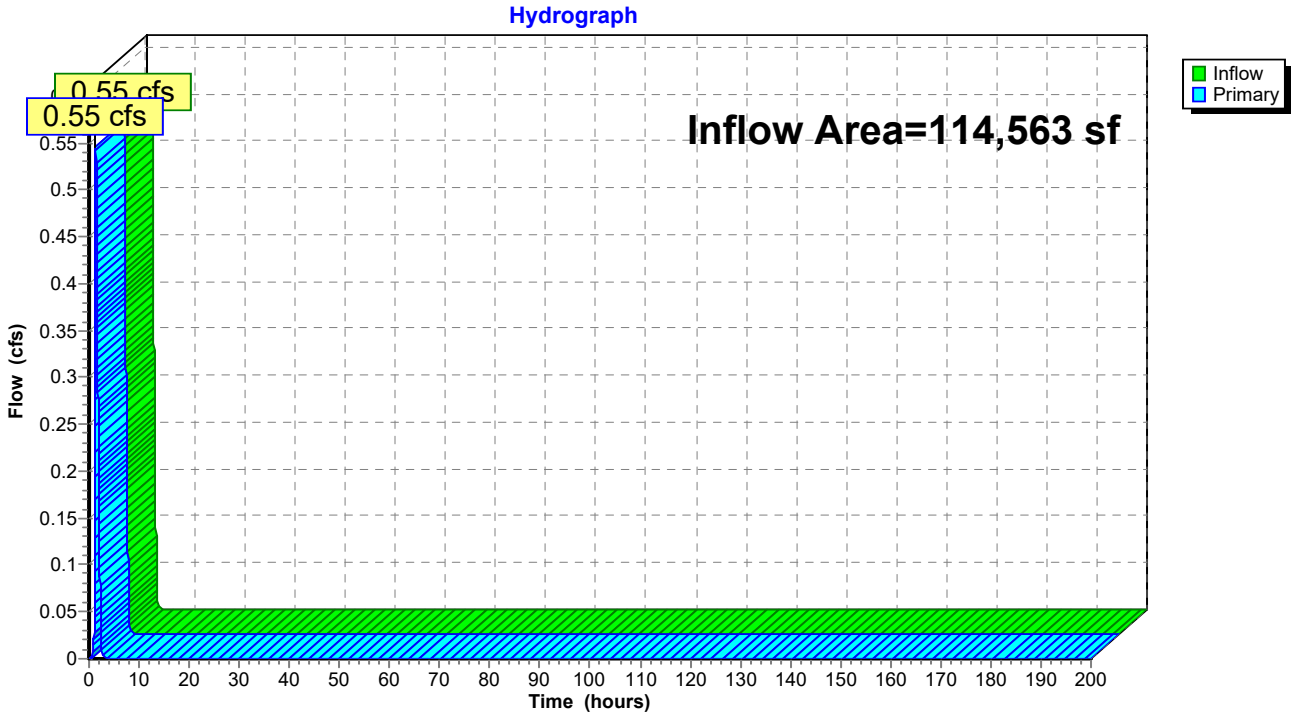


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 0.13" for 1.2-IN./2-HR. event
Inflow = 0.55 cfs @ 1.36 hrs, Volume= 1,275 cf
Primary = 0.55 cfs @ 1.36 hrs, Volume= 1,275 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

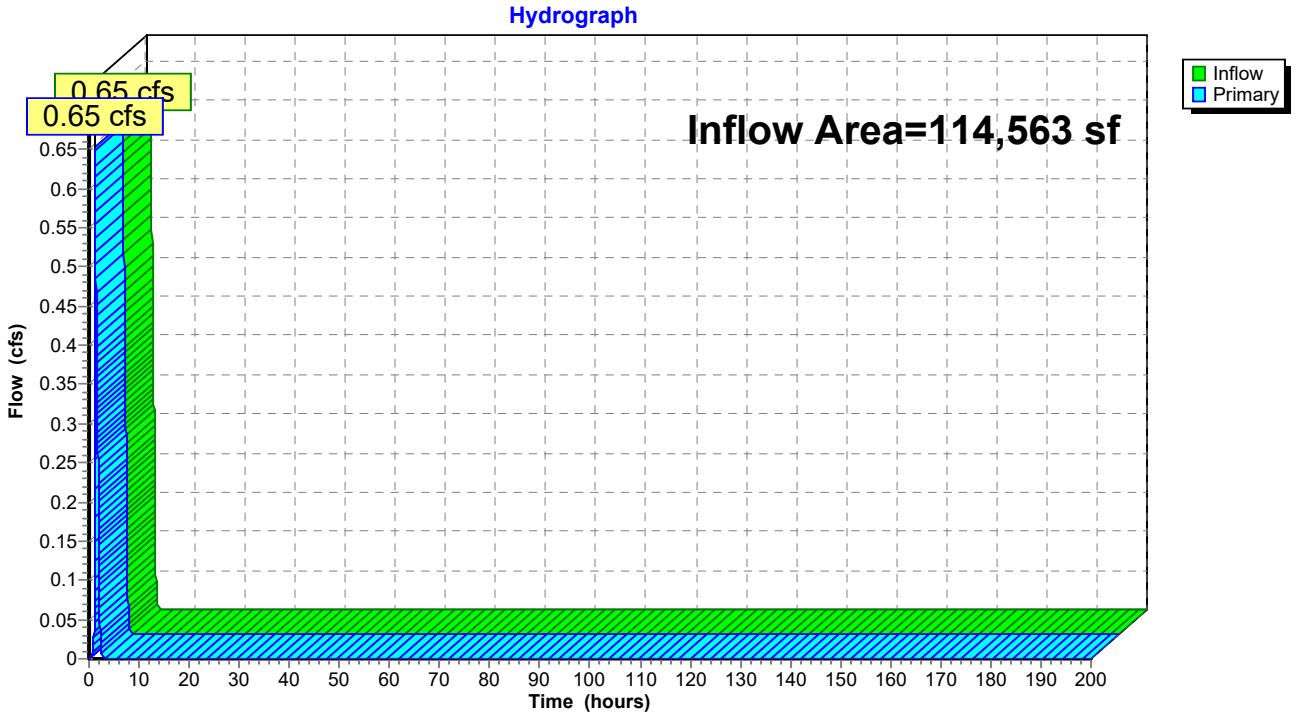


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 0.13" for 1.2-IN./2-HR. event
Inflow = 0.65 cfs @ 1.27 hrs, Volume= 1,275 cf
Primary = 0.65 cfs @ 1.27 hrs, Volume= 1,275 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

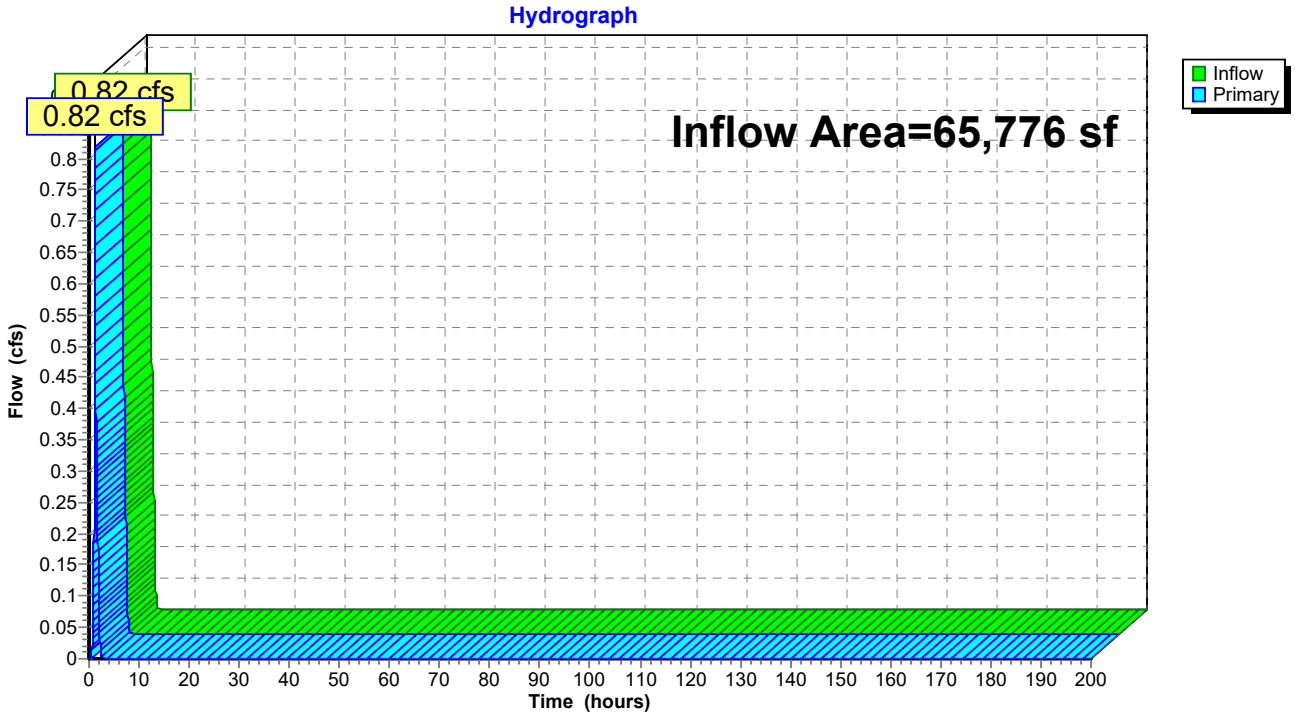


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 0.26" for 1.2-IN./2-HR. event
Inflow = 0.82 cfs @ 1.19 hrs, Volume= 1,430 cf
Primary = 0.82 cfs @ 1.19 hrs, Volume= 1,430 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

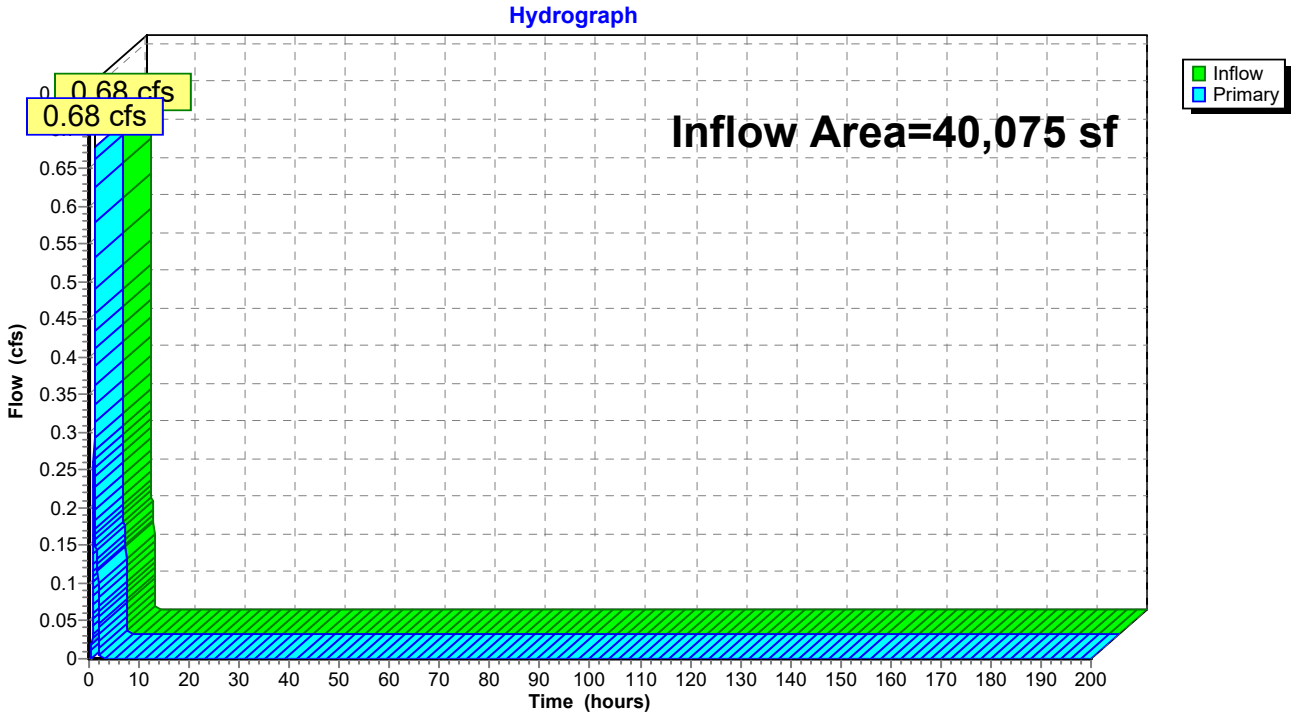


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 0.26" for 1.2-IN./2-HR. event
Inflow = 0.68 cfs @ 1.12 hrs, Volume= 881 cf
Primary = 0.68 cfs @ 1.12 hrs, Volume= 881 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

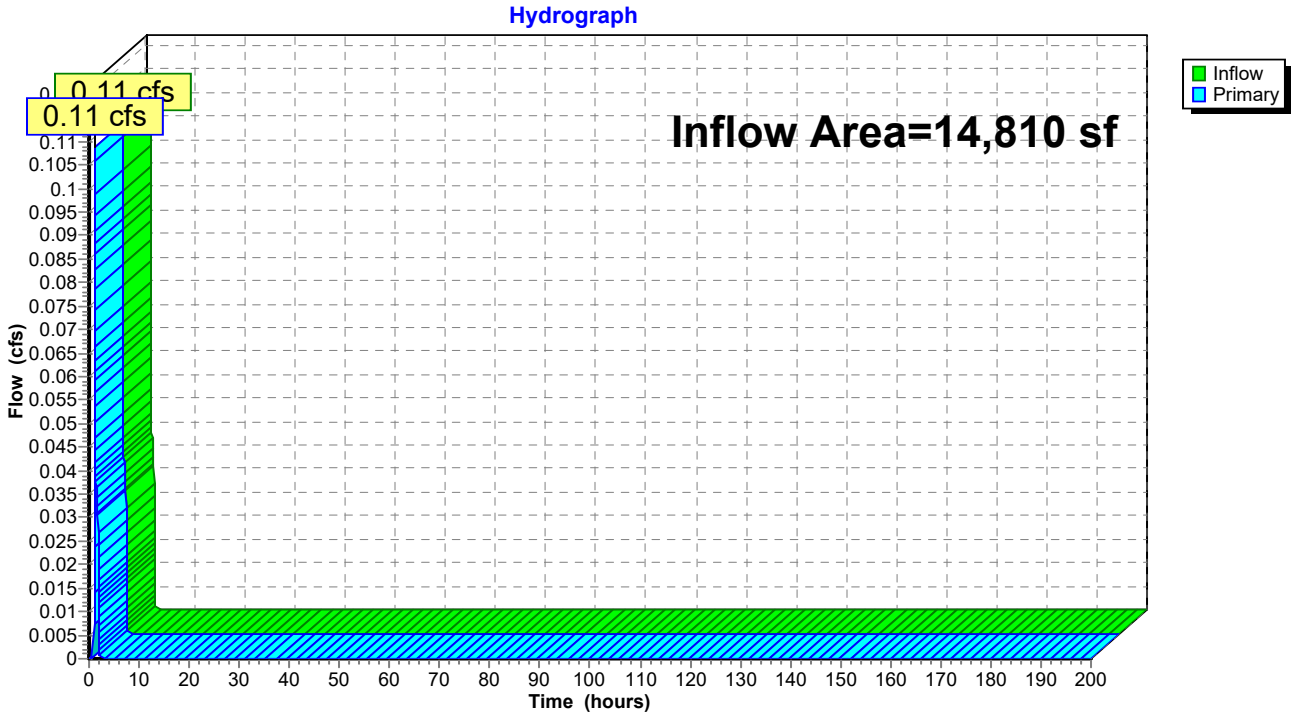


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 0.12" for 1.2-IN./2-HR. event
Inflow = 0.11 cfs @ 1.13 hrs, Volume= 144 cf
Primary = 0.11 cfs @ 1.13 hrs, Volume= 144 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

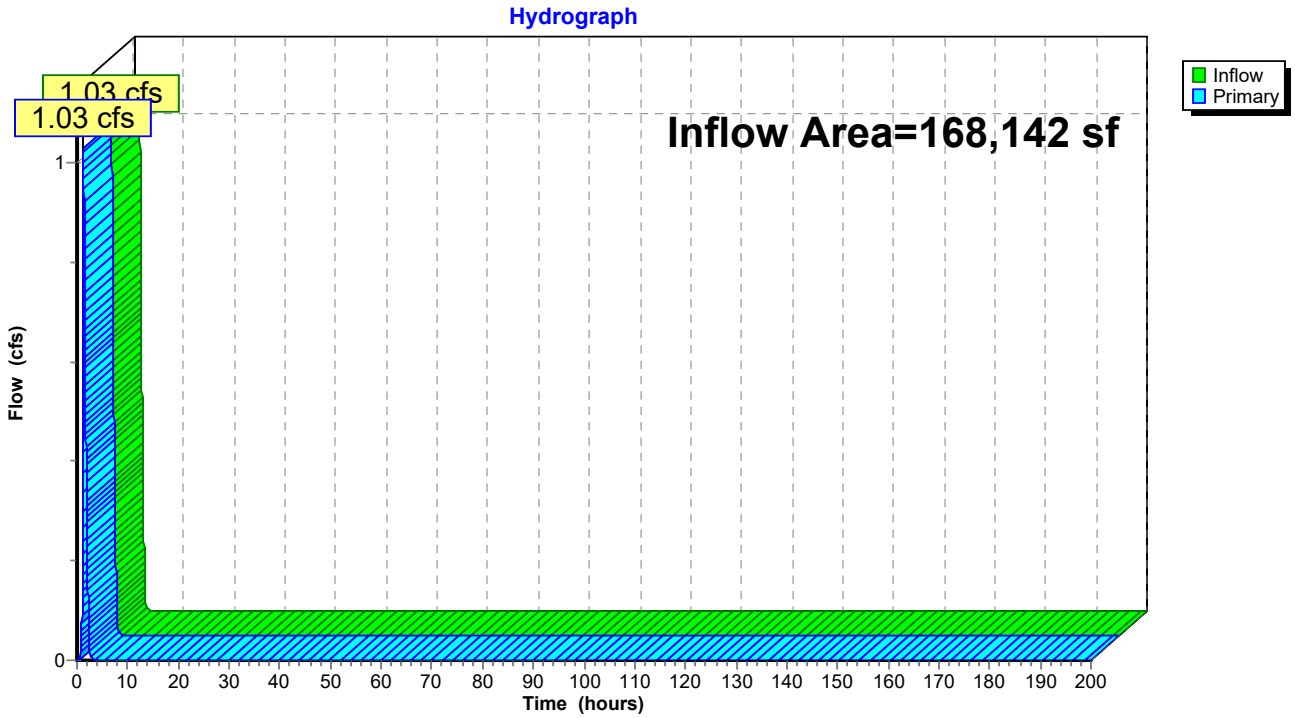


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 0.16" for 1.2-IN./2-HR. event
Inflow = 1.03 cfs @ 1.31 hrs, Volume= 2,270 cf
Primary = 1.03 cfs @ 1.31 hrs, Volume= 2,270 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

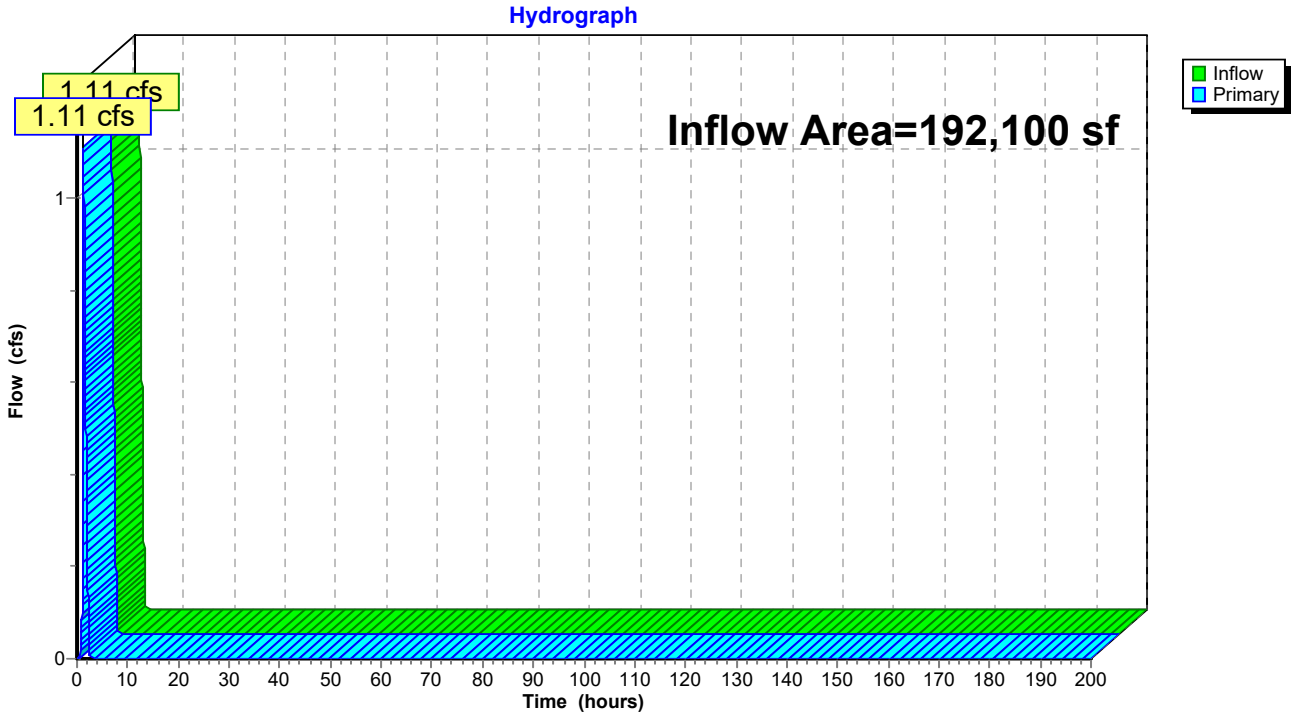


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 0.16" for 1.2-IN./2-HR. event
Inflow = 1.11 cfs @ 1.30 hrs, Volume= 2,503 cf
Primary = 1.11 cfs @ 1.30 hrs, Volume= 2,503 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

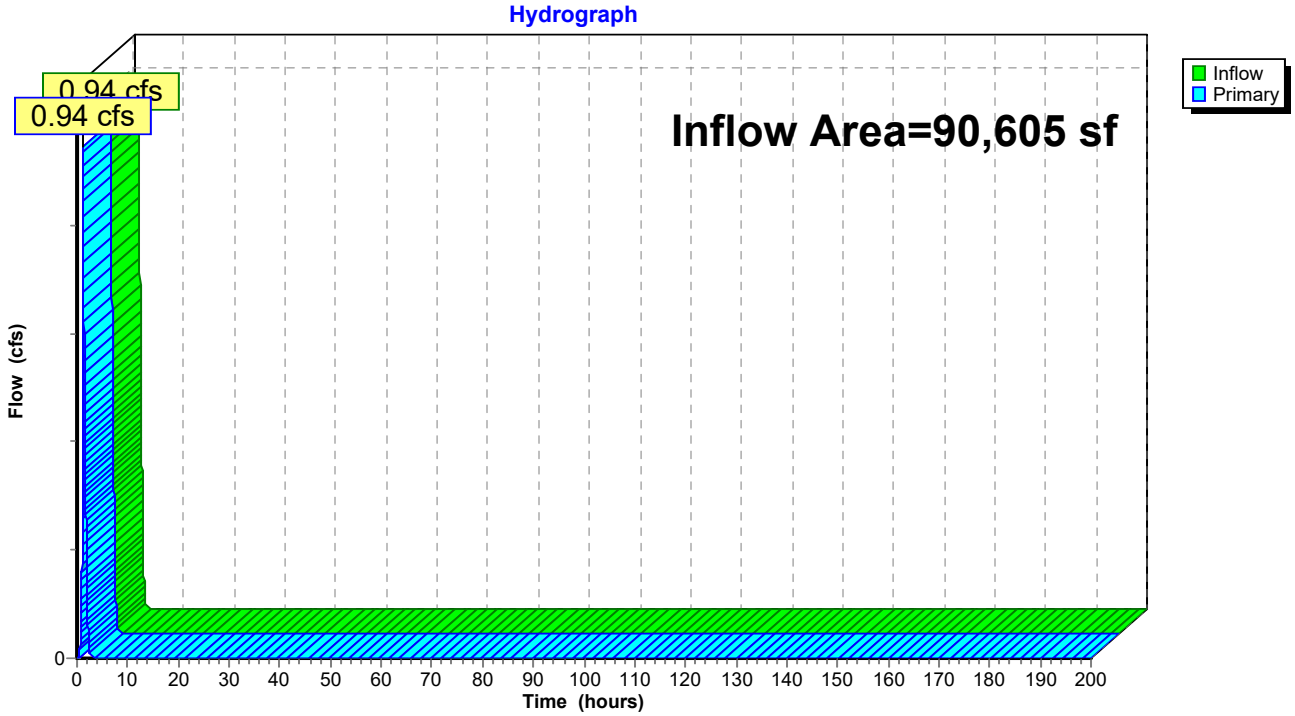


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 0.24" for 1.2-IN./2-HR. event
Inflow = 0.94 cfs @ 1.23 hrs, Volume= 1,798 cf
Primary = 0.94 cfs @ 1.23 hrs, Volume= 1,798 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

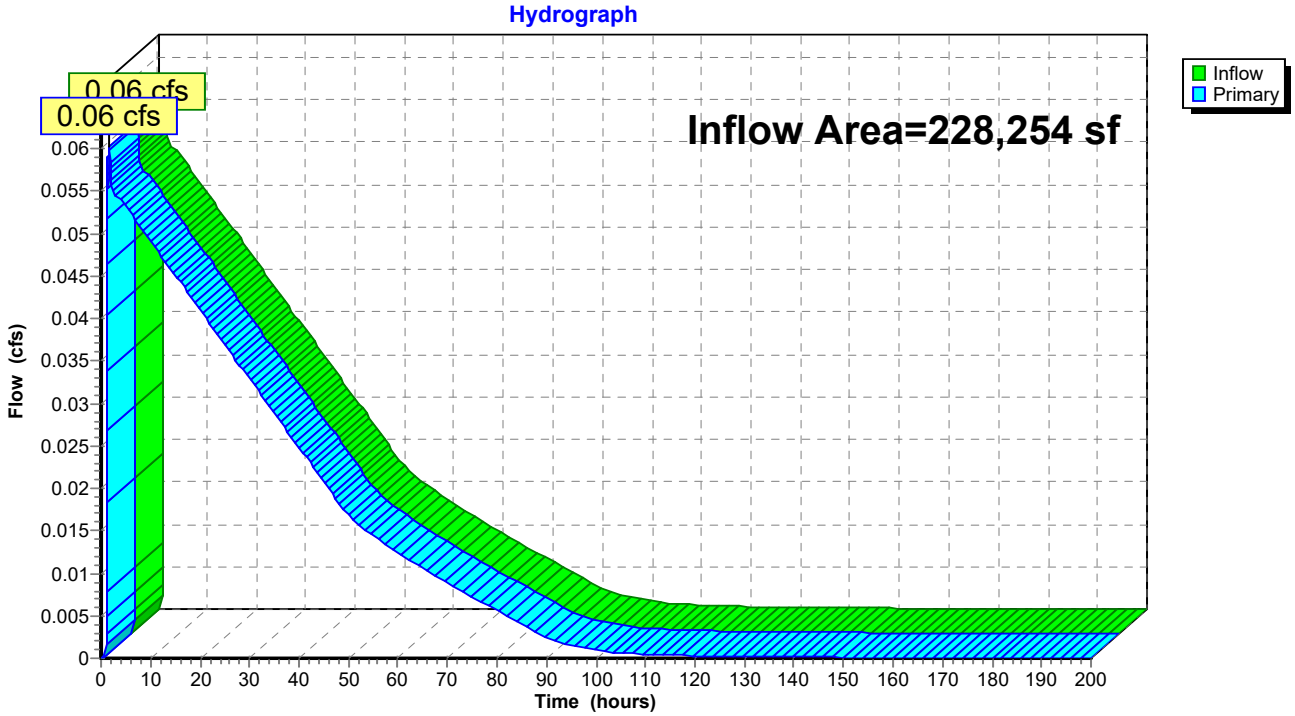


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 0.41" for 1.2-IN./2-HR. event
Inflow = 0.06 cfs @ 1.77 hrs, Volume= 7,871 cf
Primary = 0.06 cfs @ 1.77 hrs, Volume= 7,871 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

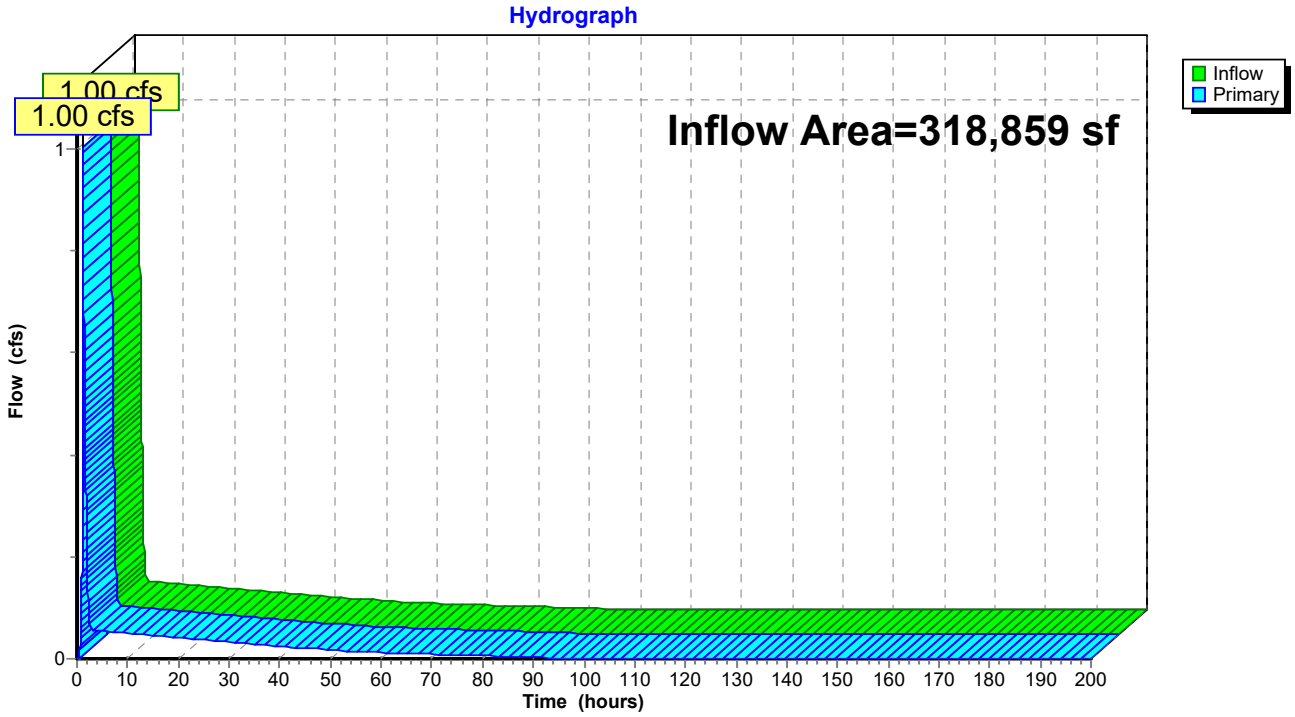


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 0.36" for 1.2-IN./2-HR. event
Inflow = 1.00 cfs @ 1.23 hrs, Volume= 9,669 cf
Primary = 1.00 cfs @ 1.23 hrs, Volume= 9,669 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=1.31"
Tc=17.5 min CN=78 Runoff=5.66 cfs 17,406 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=3.02"
Tc=17.5 min CN=98 Runoff=0.65 cfs 2,191 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=1.31"
Tc=5.0 min CN=78 Runoff=0.98 cfs 1,902 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=1.31"
Tc=19.1 min CN=78 Runoff=3.80 cfs 12,270 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=3.02"
Tc=19.1 min CN=98 Runoff=0.15 cfs 548 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=1.31"
Tc=13.1 min CN=78 Runoff=4.63 cfs 12,270 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=3.02"
Tc=13.1 min CN=98 Runoff=0.18 cfs 548 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=1.31"
Tc=11.5 min CN=78 Runoff=2.40 cfs 5,992 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=1.31"
Tc=5.0 min CN=78 Runoff=1.34 cfs 2,616 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=3.02"
Tc=11.5 min CN=98 Runoff=0.97 cfs 2,738 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=1.37"
Tc=5.0 min CN=79 Runoff=2.00 cfs 3,891 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=3.02"
Tc=5.0 min CN=98 Runoff=0.66 cfs 1,533 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=1.31"
Tc=5.0 min CN=78 Runoff=0.83 cfs 1,617 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=1.44"
Tc=5.0 min CN=80 Runoff=0.16 cfs 314 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=1.44"
Tc=5.0 min CN=80 Runoff=3.94 cfs 7,687 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=3.02"
Tc=5.0 min CN=98 Runoff=3.27 cfs 7,557 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=1.44"
Tc=5.0 min CN=80 Runoff=2.55 cfs 4,967 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=3.02"
Tc=5.0 min CN=98 Runoff=9.82 cfs 22,672 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=1.31"
Tc=13.8 min CN=78 Runoff=3.13 cfs 8,513 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=3.02"
Tc=13.8 min CN=98 Runoff=1.04 cfs 3,176 cf

Pond 39P: Basin 1 (MRC) Peak Elev=365.25' Storage=18,886 cf Inflow=12.36 cfs 33,631 cf
Primary=0.85 cfs 17,117 cf Secondary=0.04 cfs 13,942 cf Outflow=0.89 cfs 31,059 cf

Pond 40P: Basin 2 (MRC) Peak Elev=365.87' Storage=8,923 cf Inflow=7.20 cfs 15,244 cf
Primary=0.45 cfs 5,991 cf Secondary=0.04 cfs 8,414 cf Outflow=0.48 cfs 14,405 cf

Link 6L: Pre B (Bypass) Inflow=0.98 cfs 1,902 cf
Primary=0.98 cfs 1,902 cf

Link 9L: Pre C (Bypass) Inflow=3.95 cfs 12,817 cf
Primary=3.95 cfs 12,817 cf

Link 12L: Pre D (Bypass) Inflow=4.81 cfs 12,817 cf
Primary=4.81 cfs 12,817 cf

Link 17L: Post D Bypass Inflow=3.35 cfs 8,730 cf
Primary=3.35 cfs 8,730 cf

Link 20L: Post C Bypass Inflow=2.66 cfs 5,425 cf
Primary=2.66 cfs 5,425 cf

Link 23L: Post B Bypass Inflow=0.83 cfs 1,617 cf
Primary=0.83 cfs 1,617 cf

Link 24L: Culvert - PRE Inflow=6.30 cfs 19,597 cf
Primary=6.30 cfs 19,597 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=6.60 cfs 22,212 cf
Primary=6.60 cfs 22,212 cf

Link 26L: Culvert - POST Inflow=4.17 cfs 11,689 cf
Primary=4.17 cfs 11,689 cf

Link 27L: Post POI A-1 Inflow=0.93 cfs 39,787 cf
Primary=0.93 cfs 39,787 cf

Link 30L: To CTP Ex. Basin- POST Inflow=4.56 cfs 51,476 cf
Primary=4.56 cfs 51,476 cf

Total Runoff Area = 878,170 sf Runoff Volume = 120,408 cf Average Runoff Depth = 1.65"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

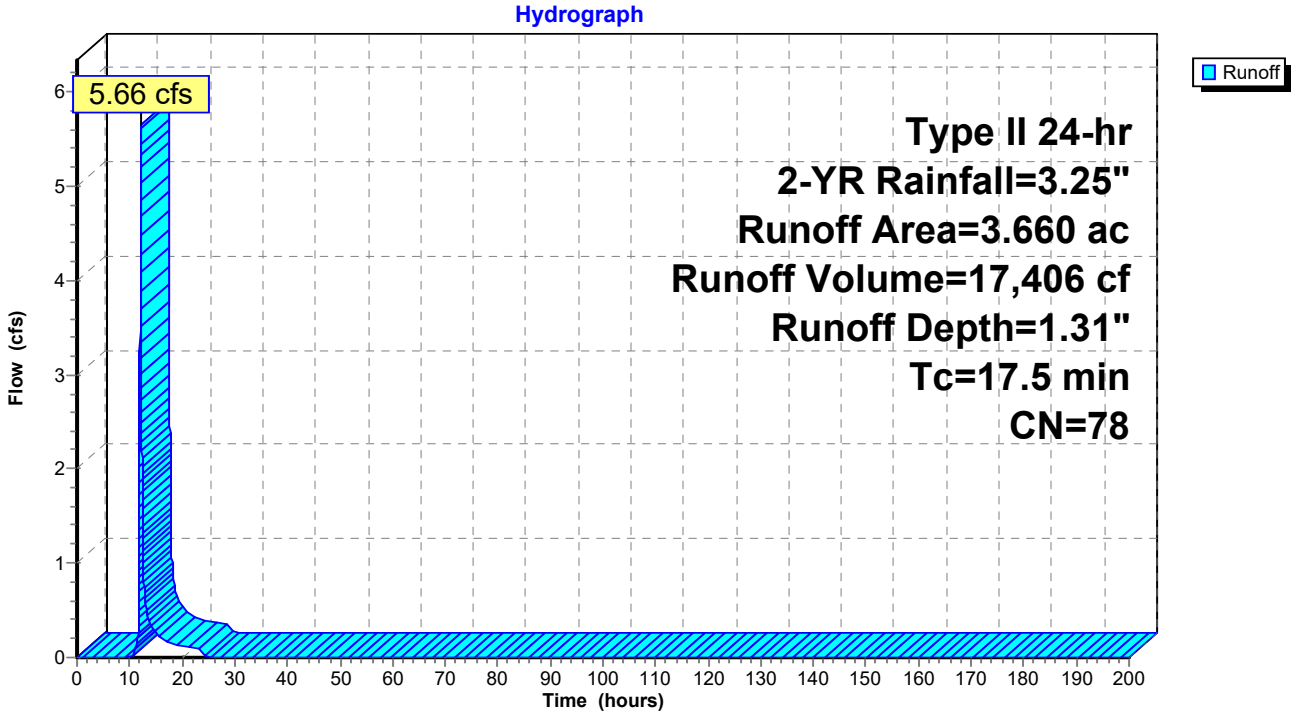
Runoff = 5.66 cfs @ 12.11 hrs, Volume= 17,406 cf, Depth= 1.31"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

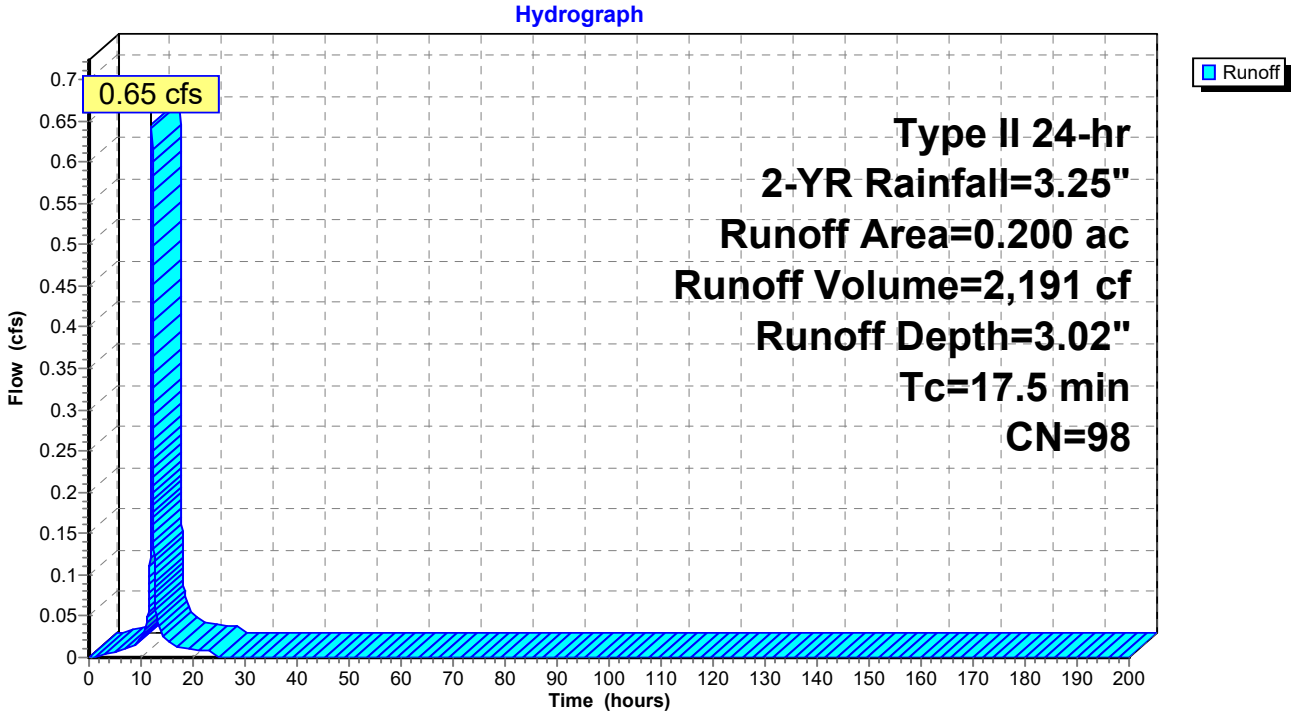
Runoff = 0.65 cfs @ 12.09 hrs, Volume= 2,191 cf, Depth= 3.02"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

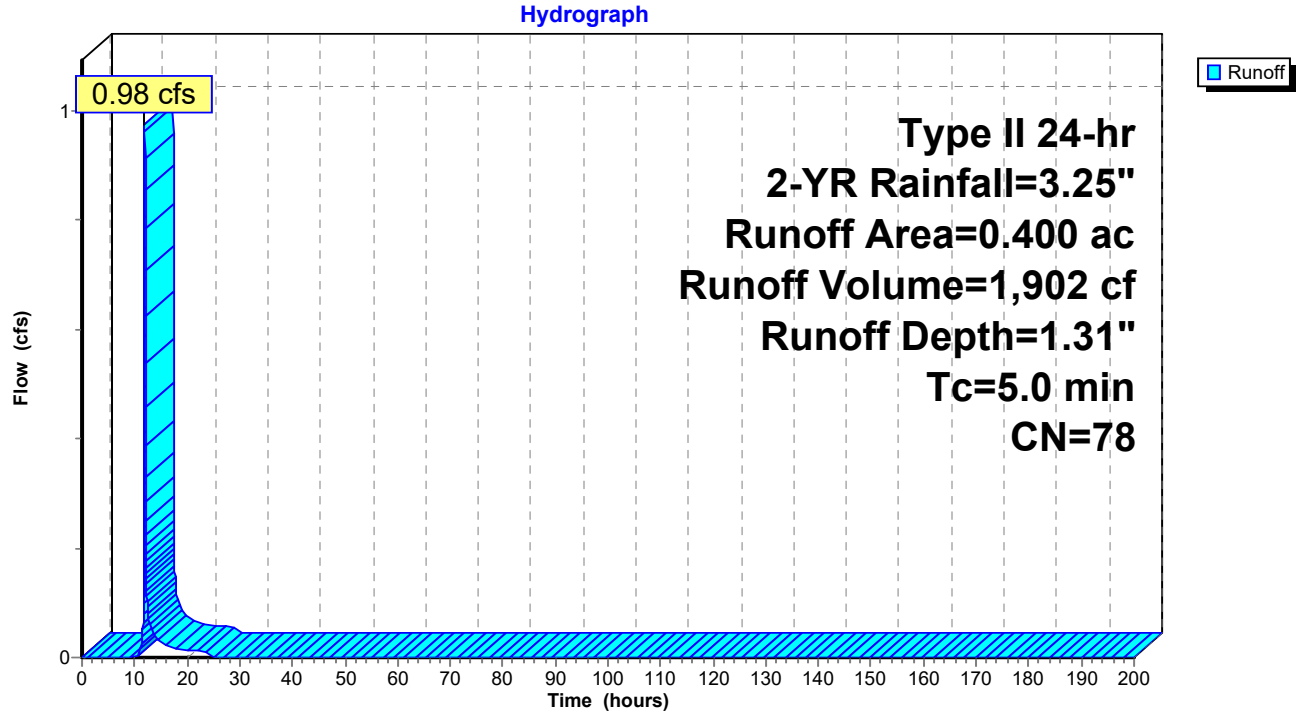
Runoff = 0.98 cfs @ 11.97 hrs, Volume= 1,902 cf, Depth= 1.31"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

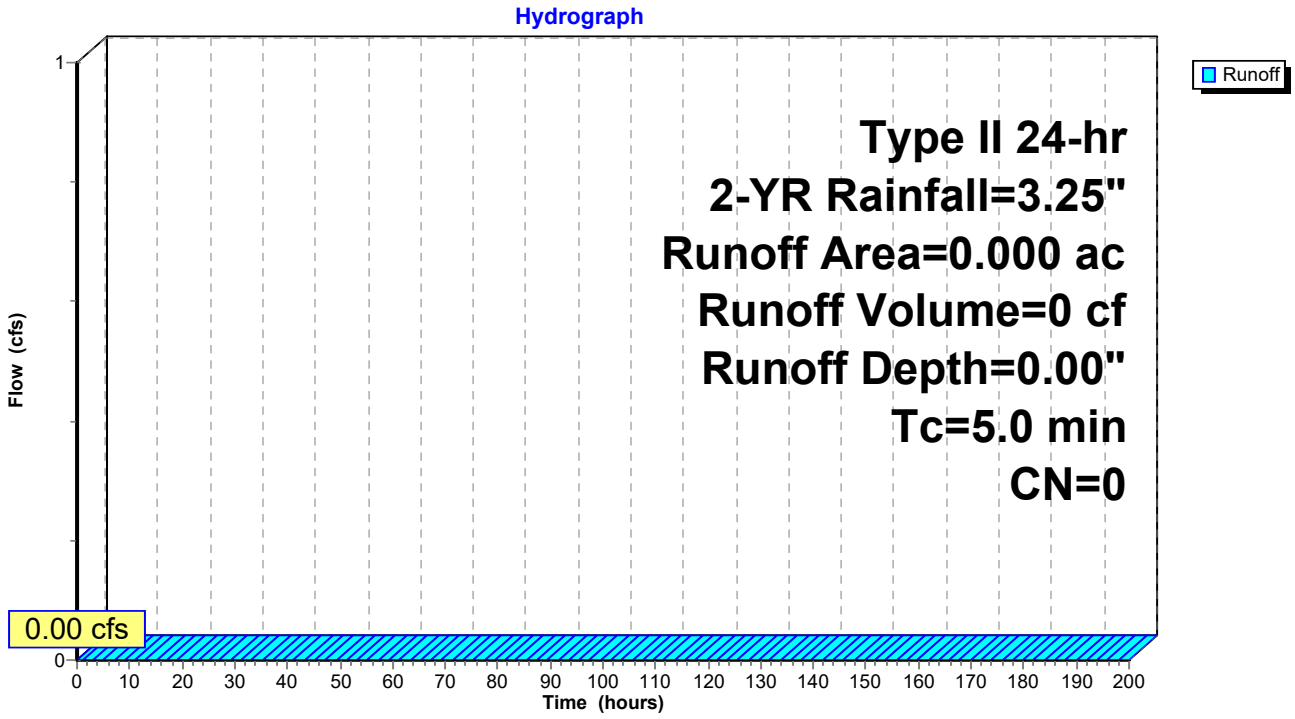
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

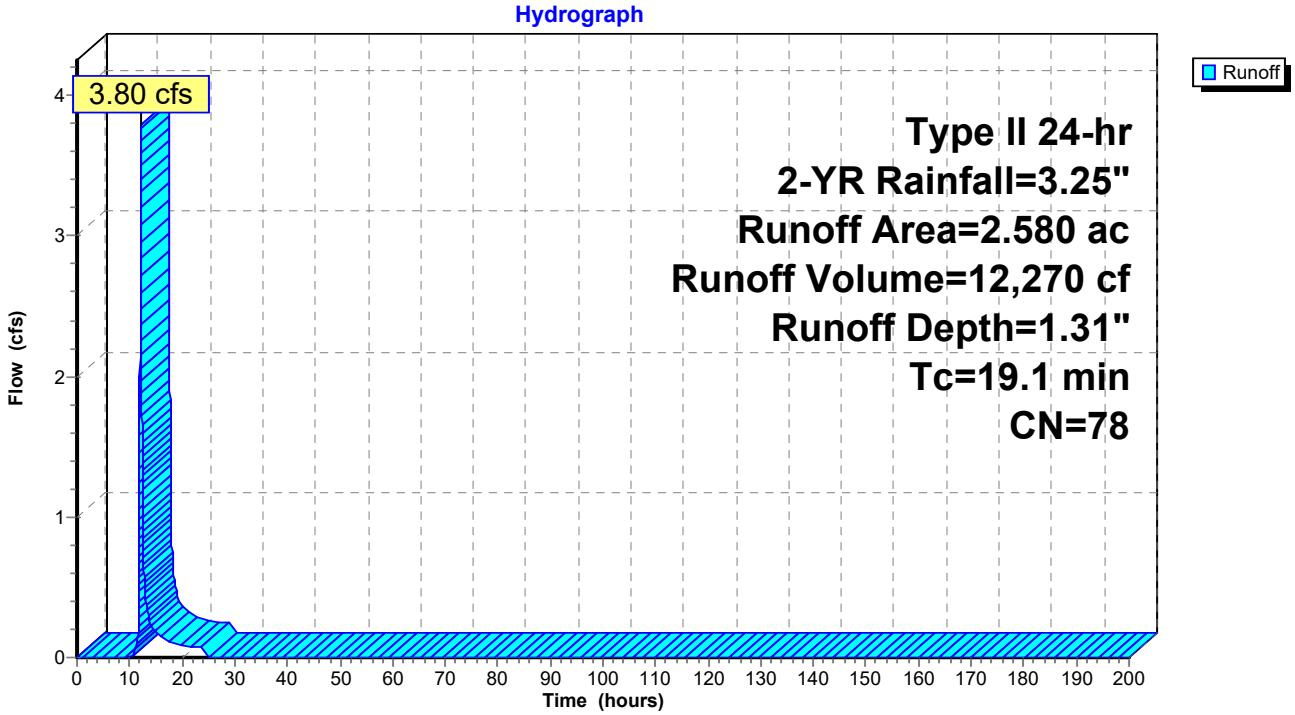
Runoff = 3.80 cfs @ 12.12 hrs, Volume= 12,270 cf, Depth= 1.31"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

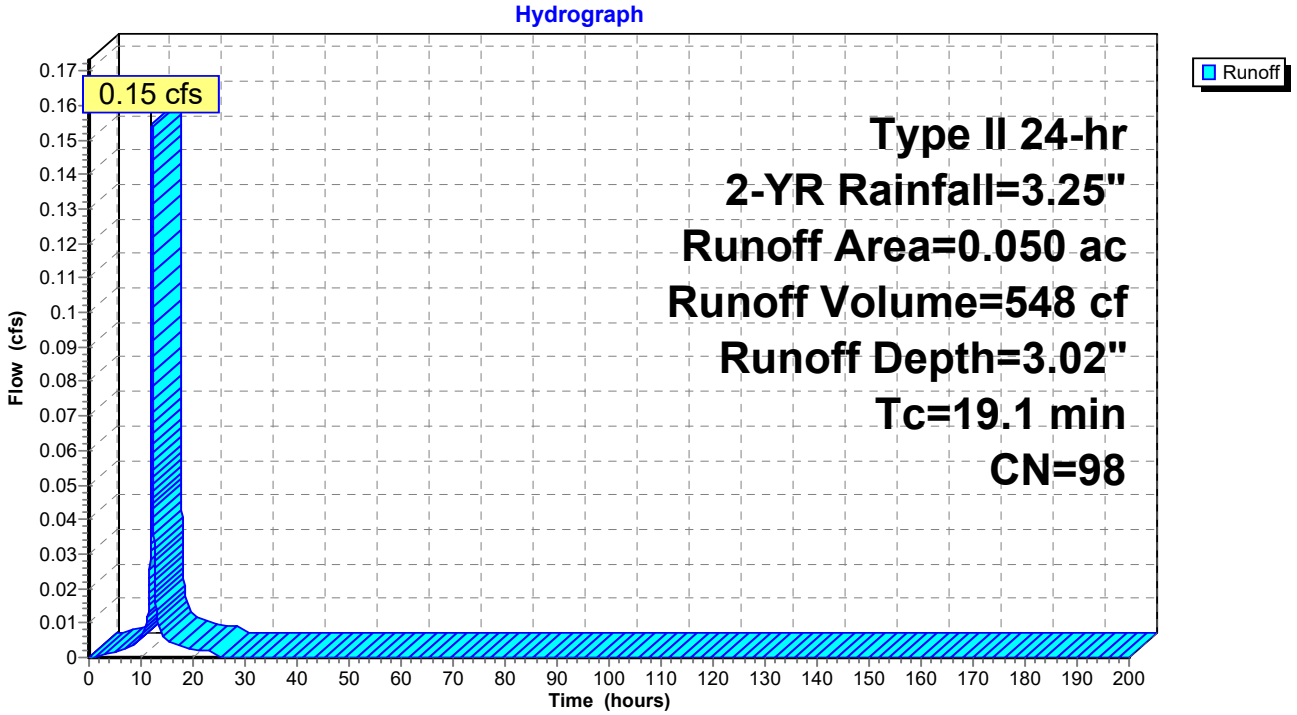
Runoff = 0.15 cfs @ 12.11 hrs, Volume= 548 cf, Depth= 3.02"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

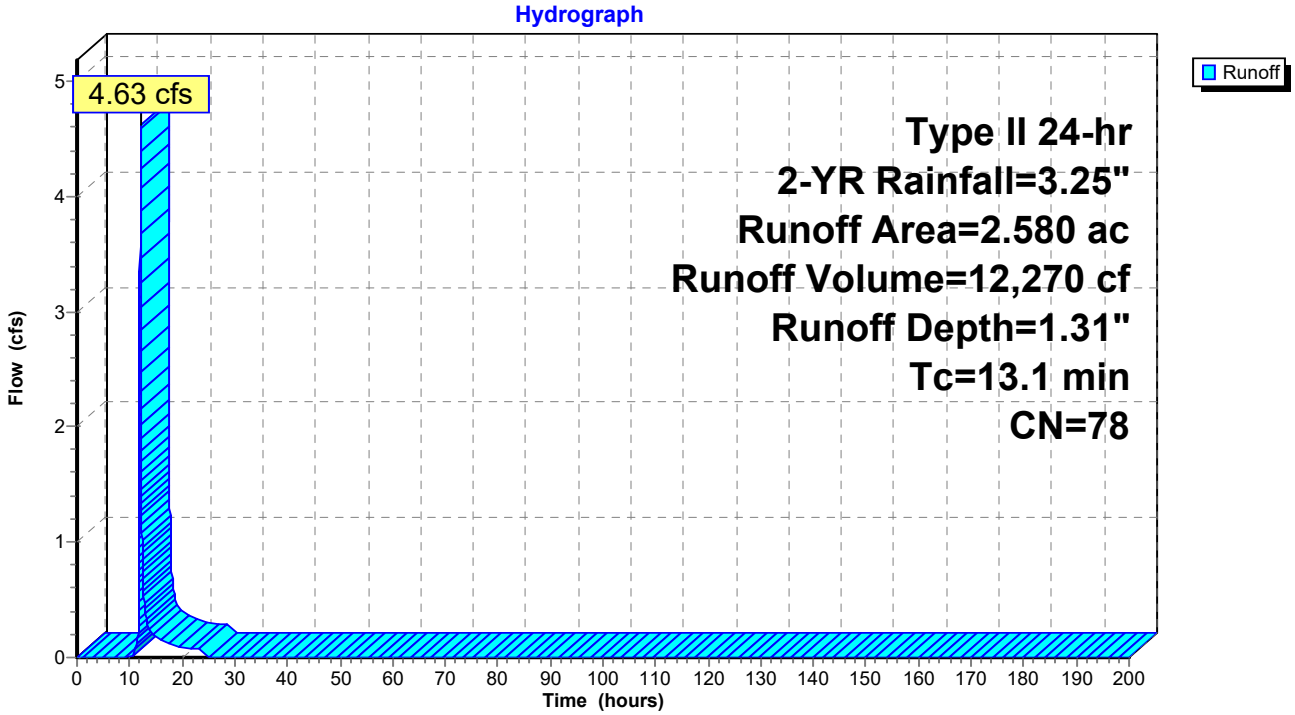
Runoff = 4.63 cfs @ 12.06 hrs, Volume= 12,270 cf, Depth= 1.31"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

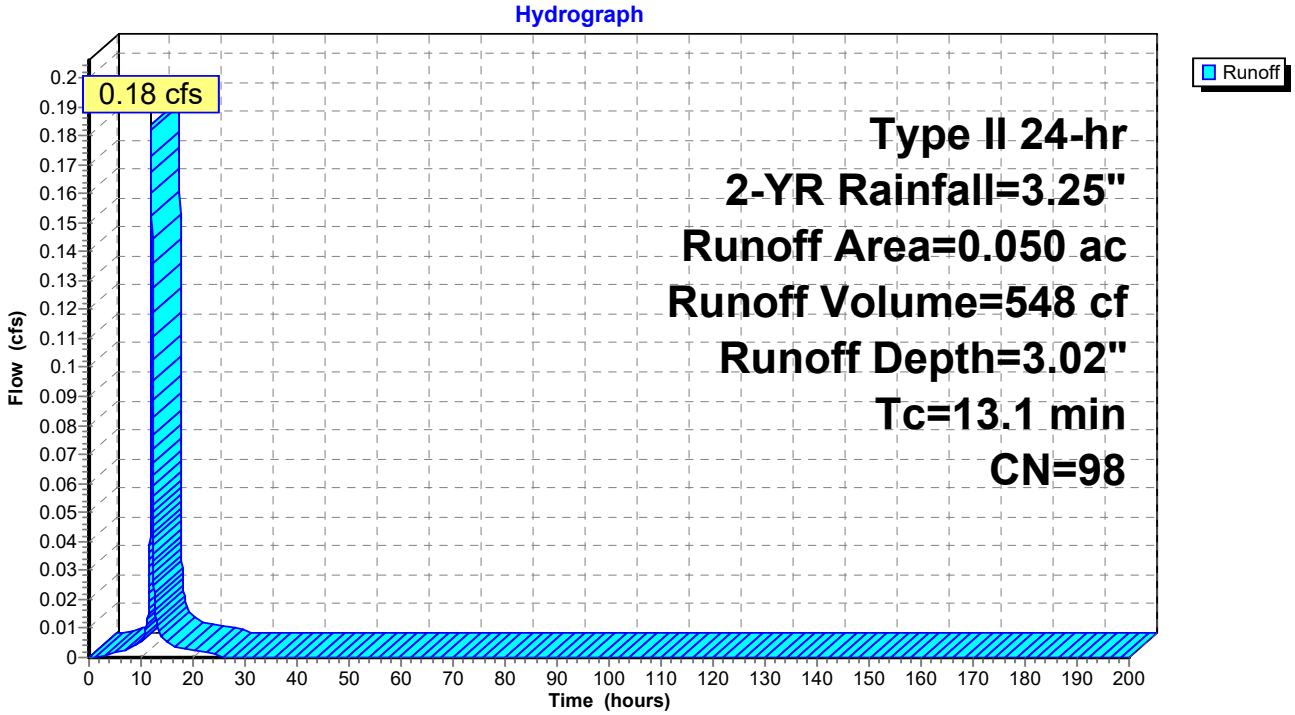
Runoff = 0.18 cfs @ 12.04 hrs, Volume= 548 cf, Depth= 3.02"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

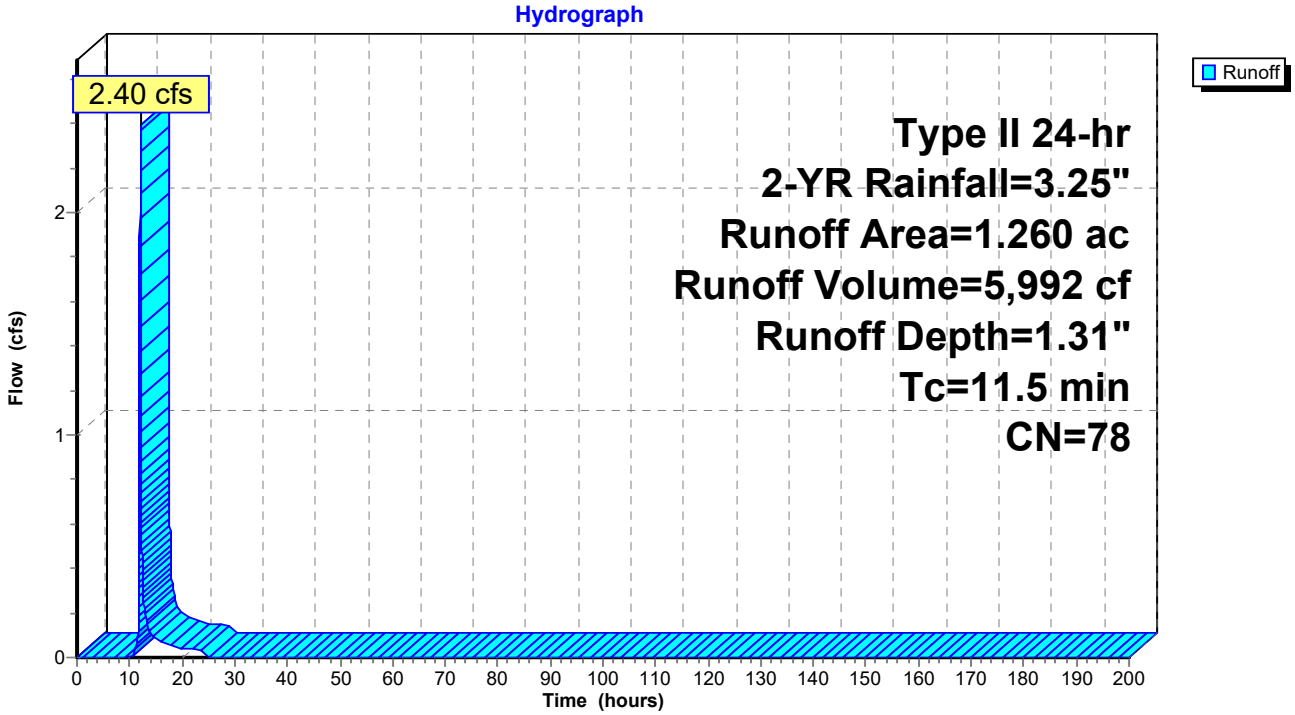
Runoff = 2.40 cfs @ 12.04 hrs, Volume= 5,992 cf, Depth= 1.31"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

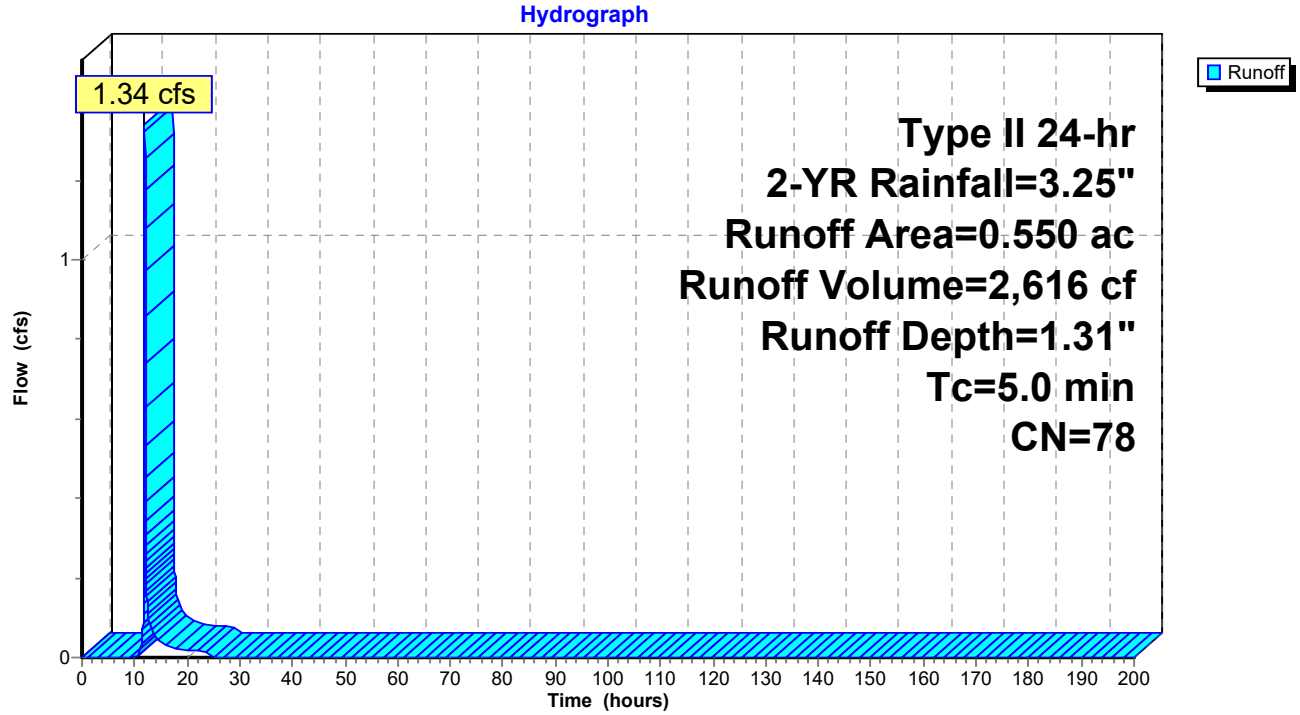
Runoff = 1.34 cfs @ 11.97 hrs, Volume= 2,616 cf, Depth= 1.31"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

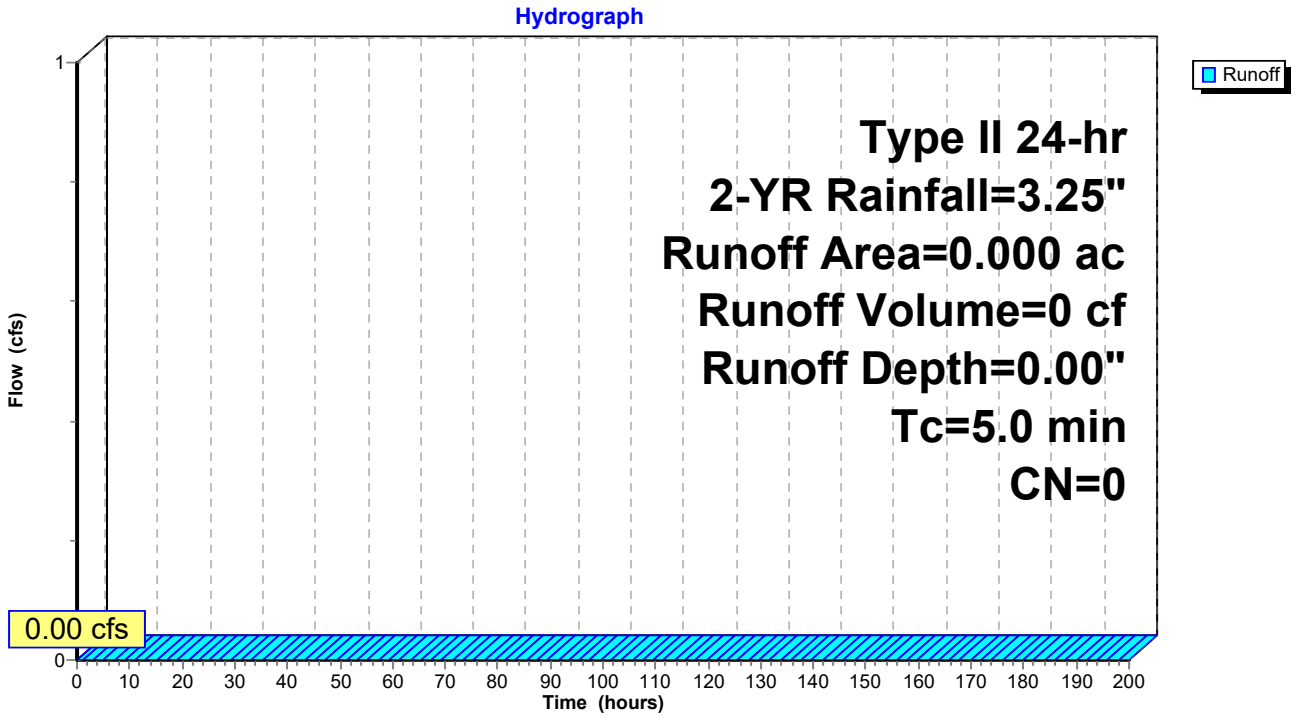
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

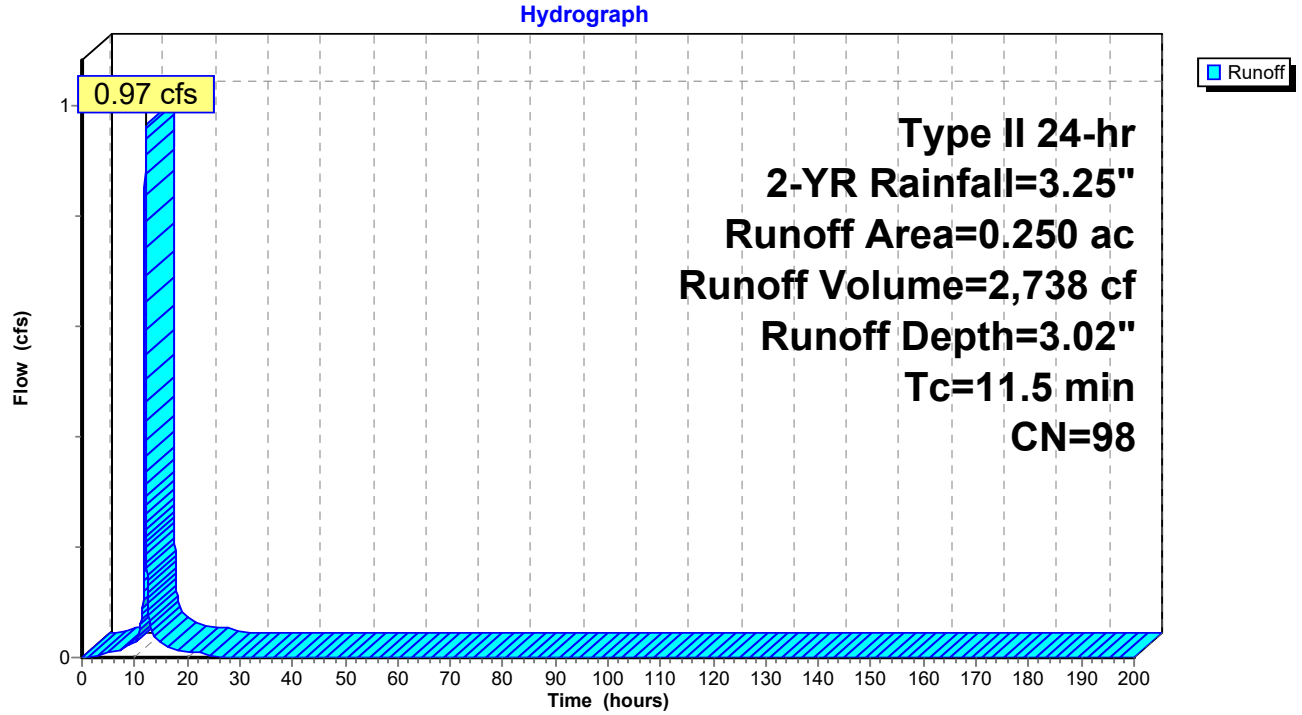
Runoff = 0.97 cfs @ 12.02 hrs, Volume= 2,738 cf, Depth= 3.02"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

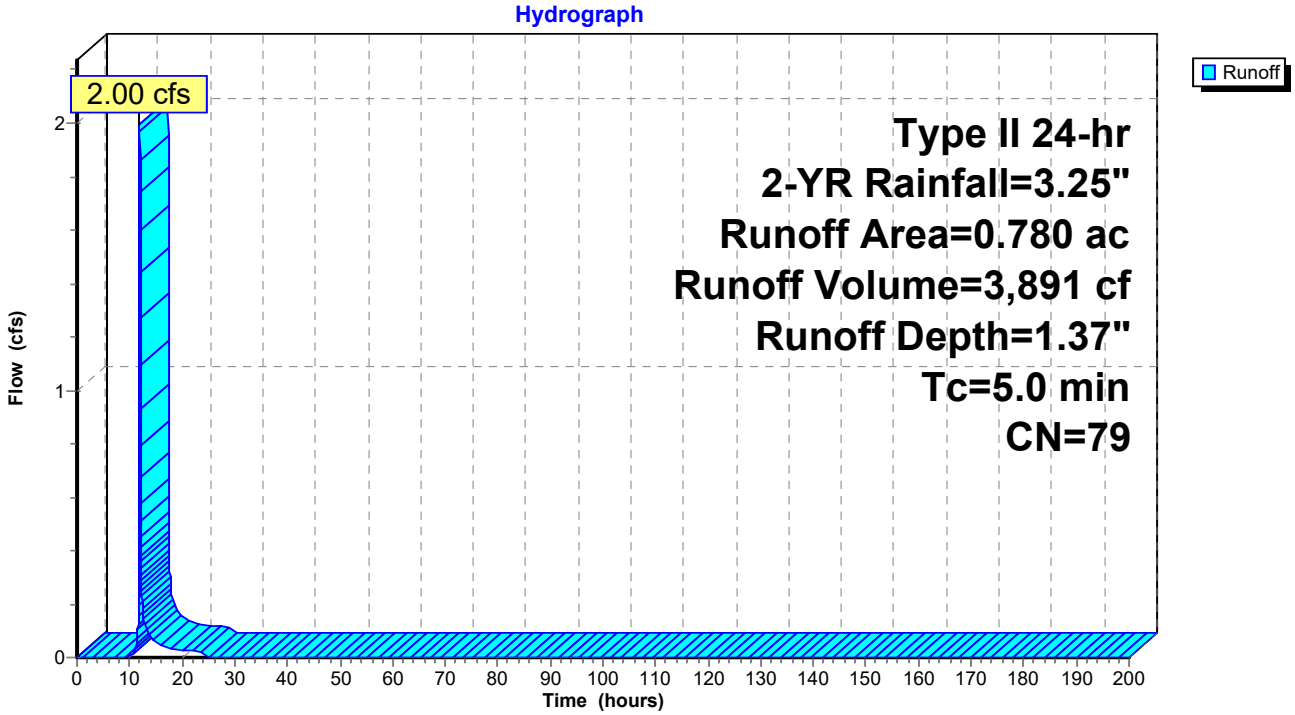
Runoff = 2.00 cfs @ 11.96 hrs, Volume= 3,891 cf, Depth= 1.37"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

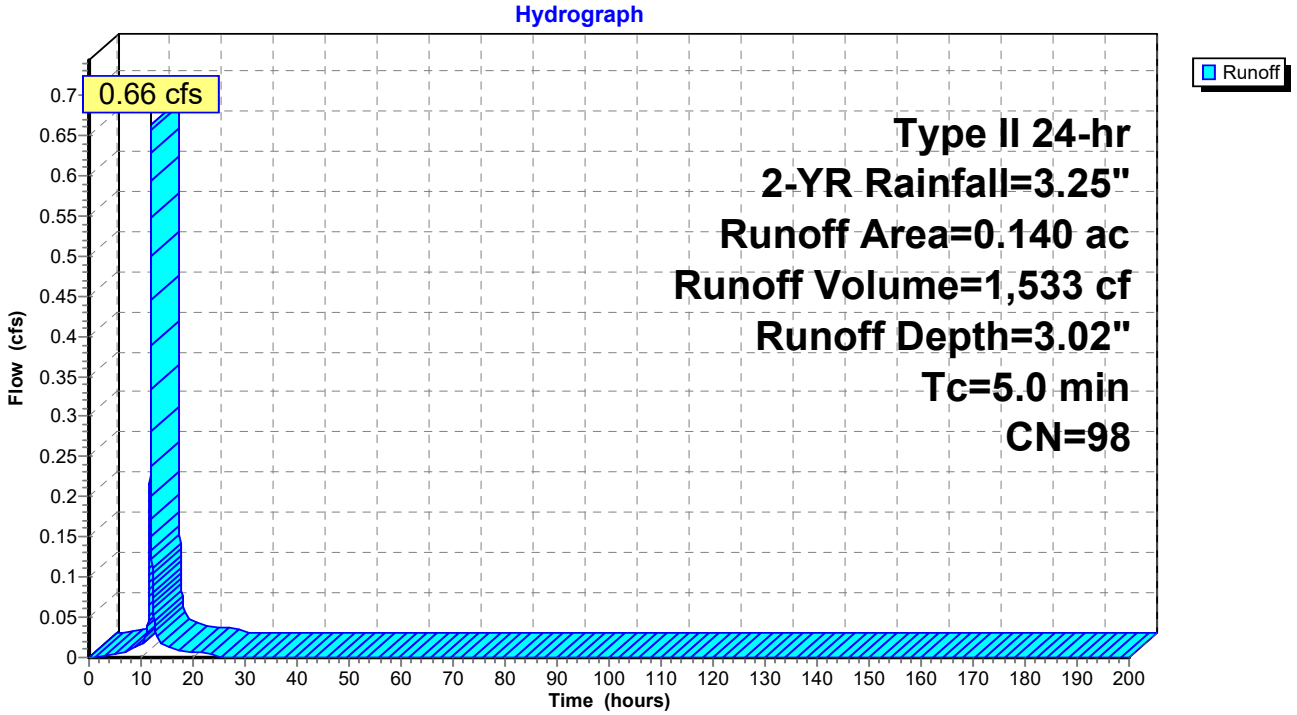
Runoff = 0.66 cfs @ 11.96 hrs, Volume= 1,533 cf, Depth= 3.02"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

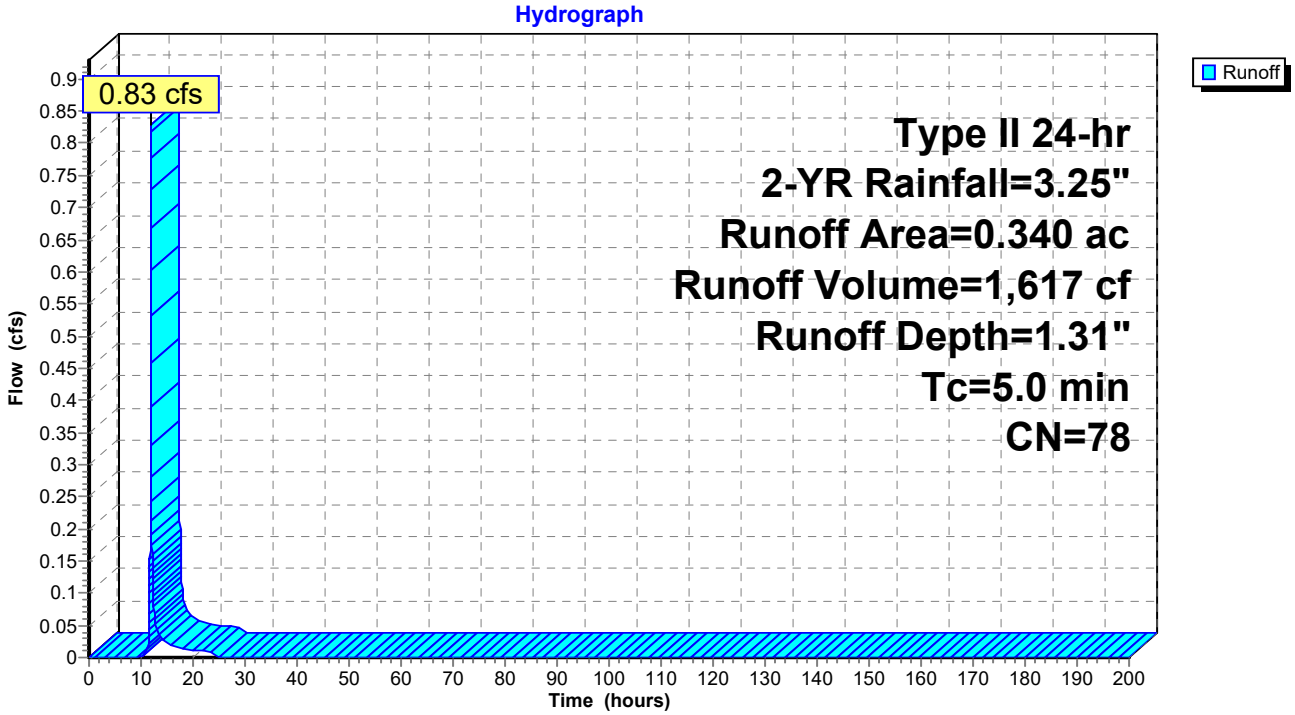
Runoff = 0.83 cfs @ 11.97 hrs, Volume= 1,617 cf, Depth= 1.31"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

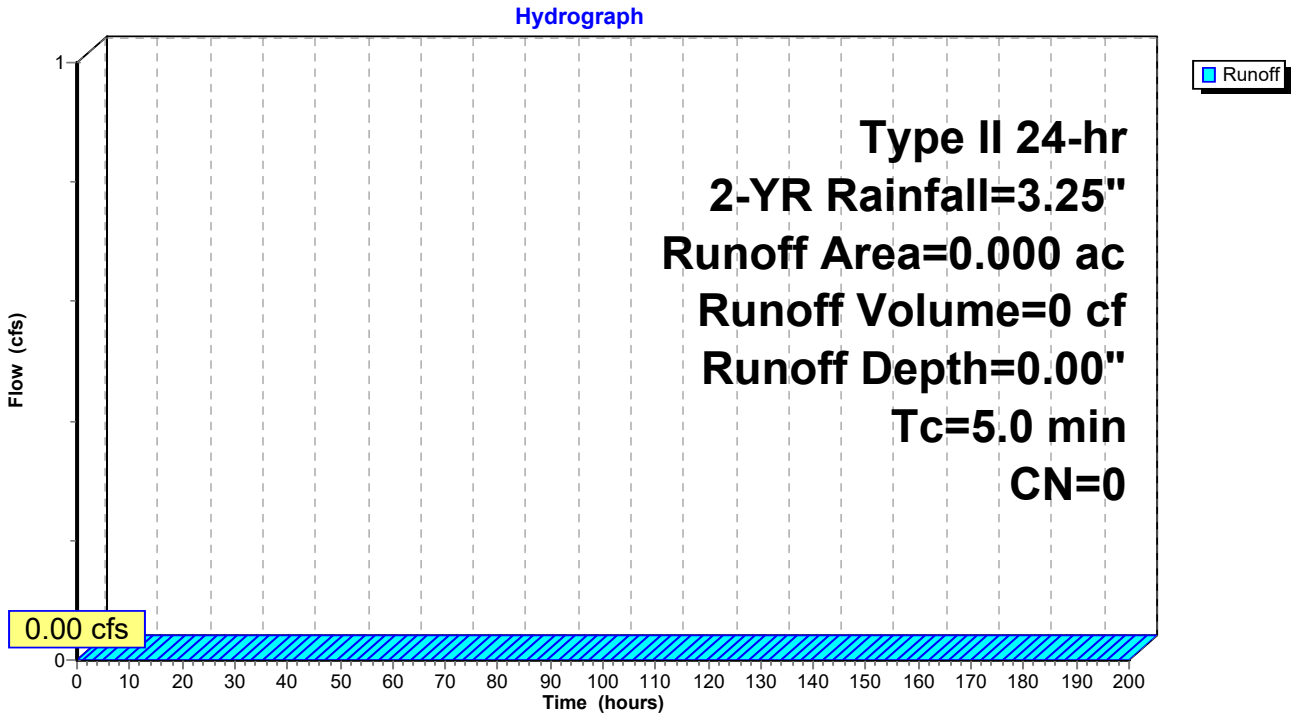
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

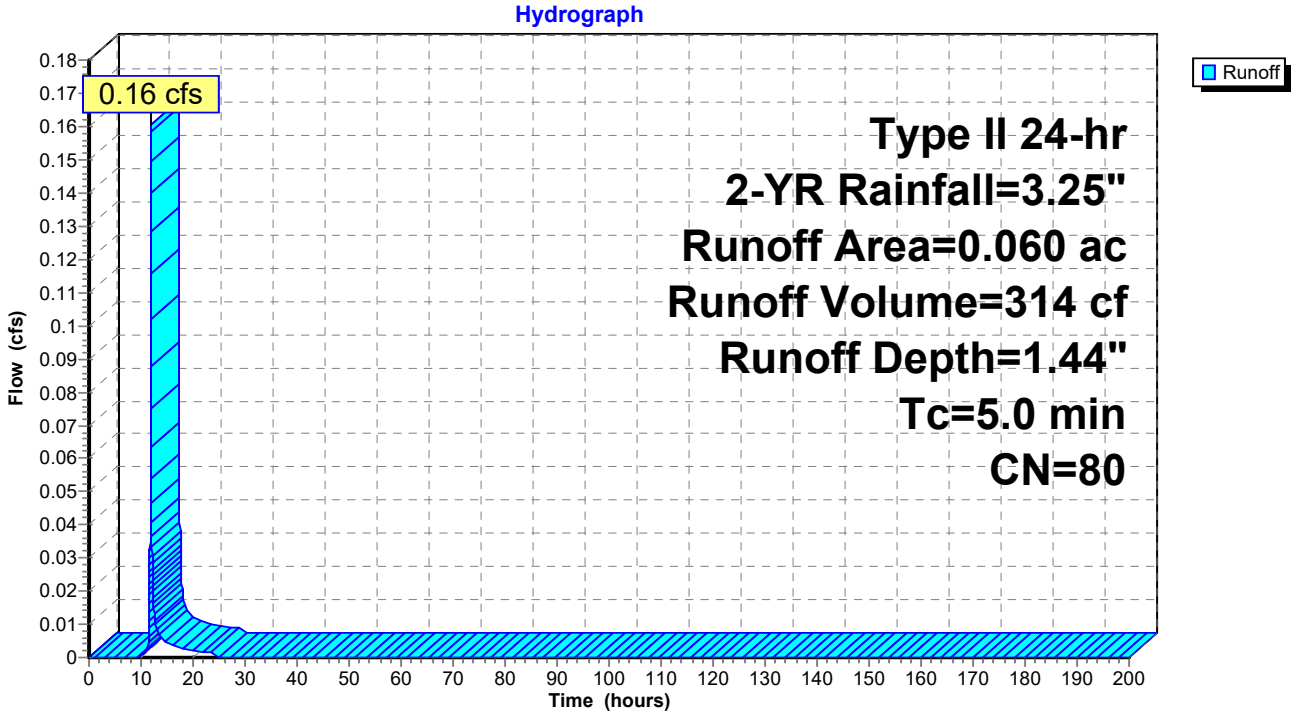
Runoff = 0.16 cfs @ 11.96 hrs, Volume= 314 cf, Depth= 1.44"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

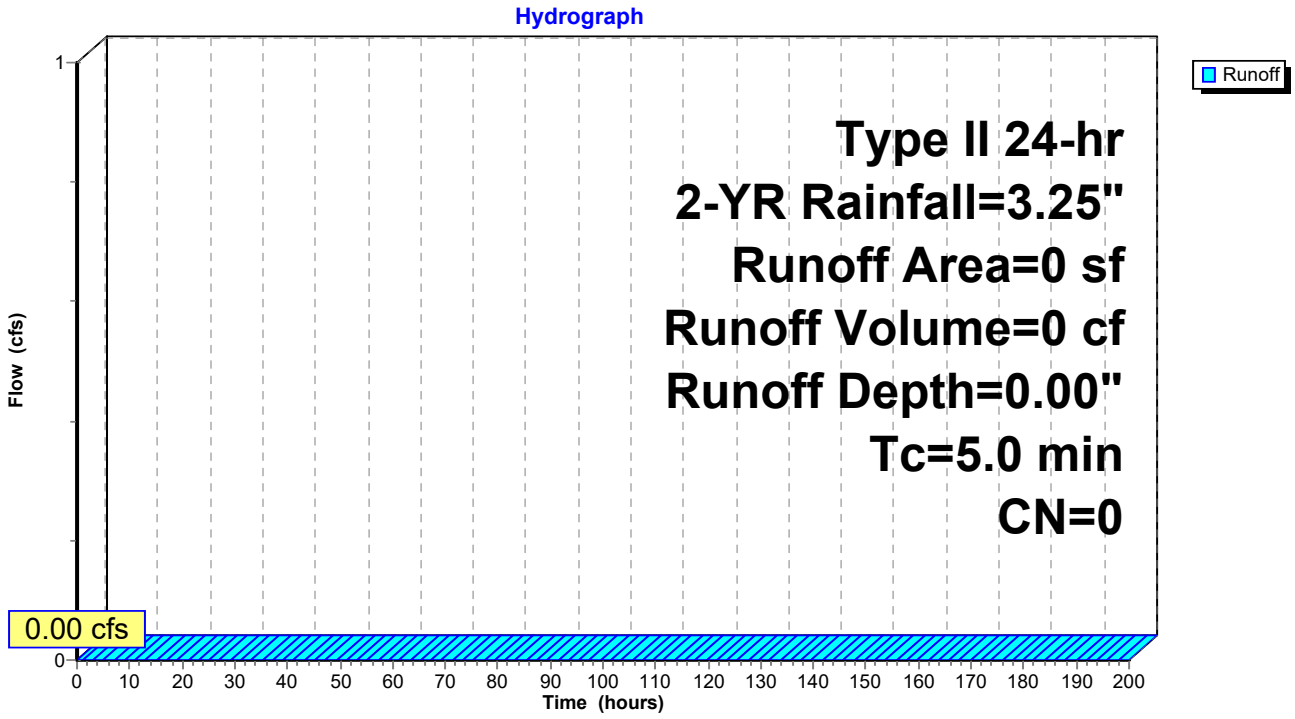
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

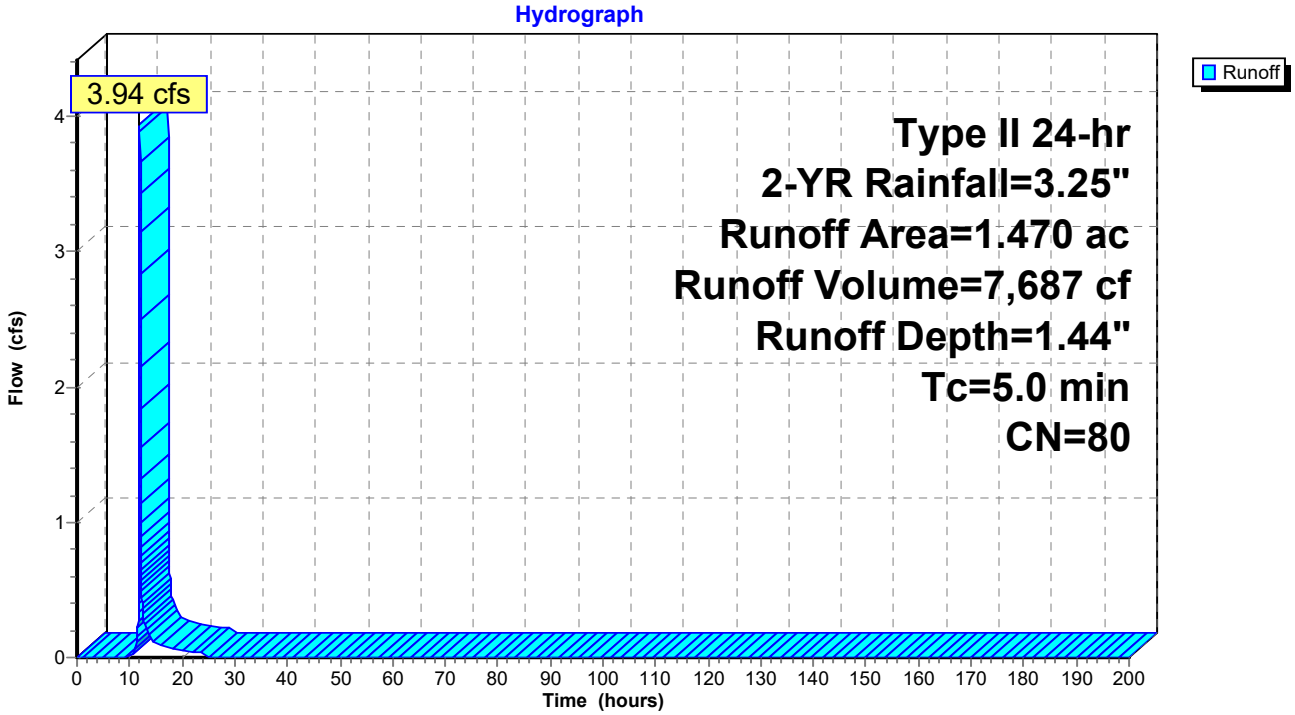
Runoff = 3.94 cfs @ 11.96 hrs, Volume= 7,687 cf, Depth= 1.44"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

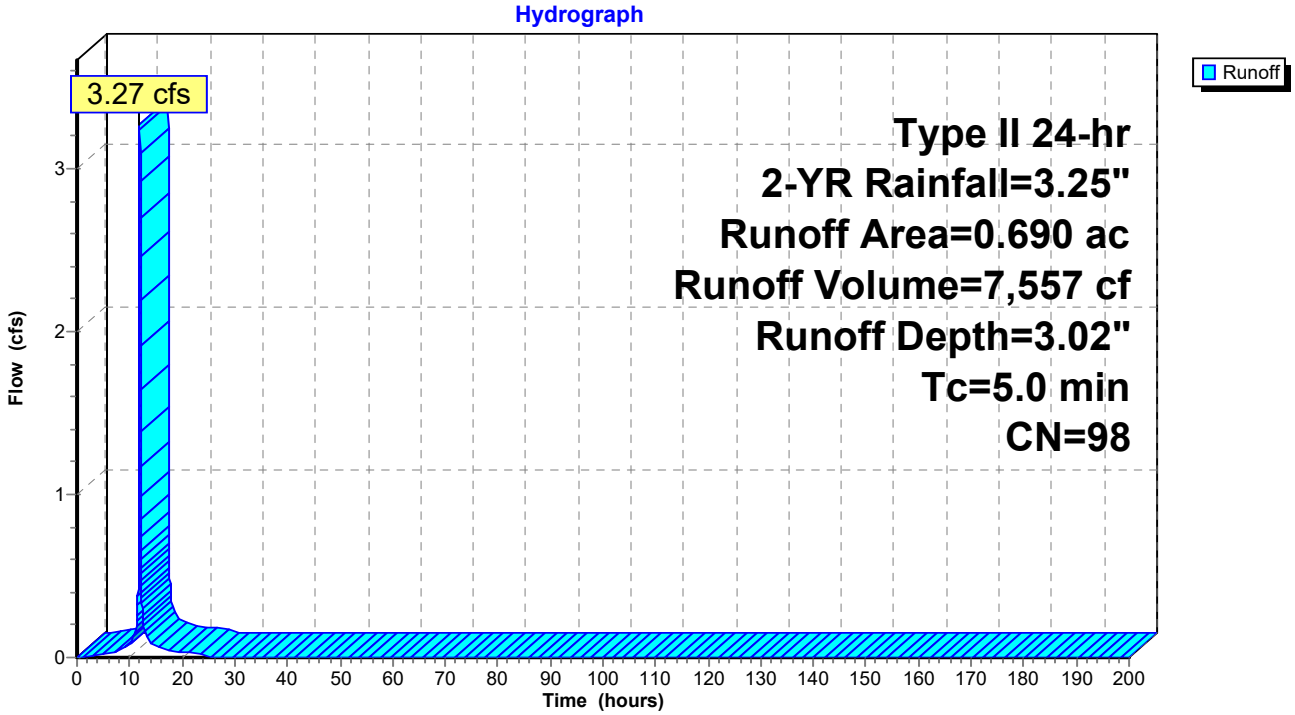
Runoff = 3.27 cfs @ 11.96 hrs, Volume= 7,557 cf, Depth= 3.02"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

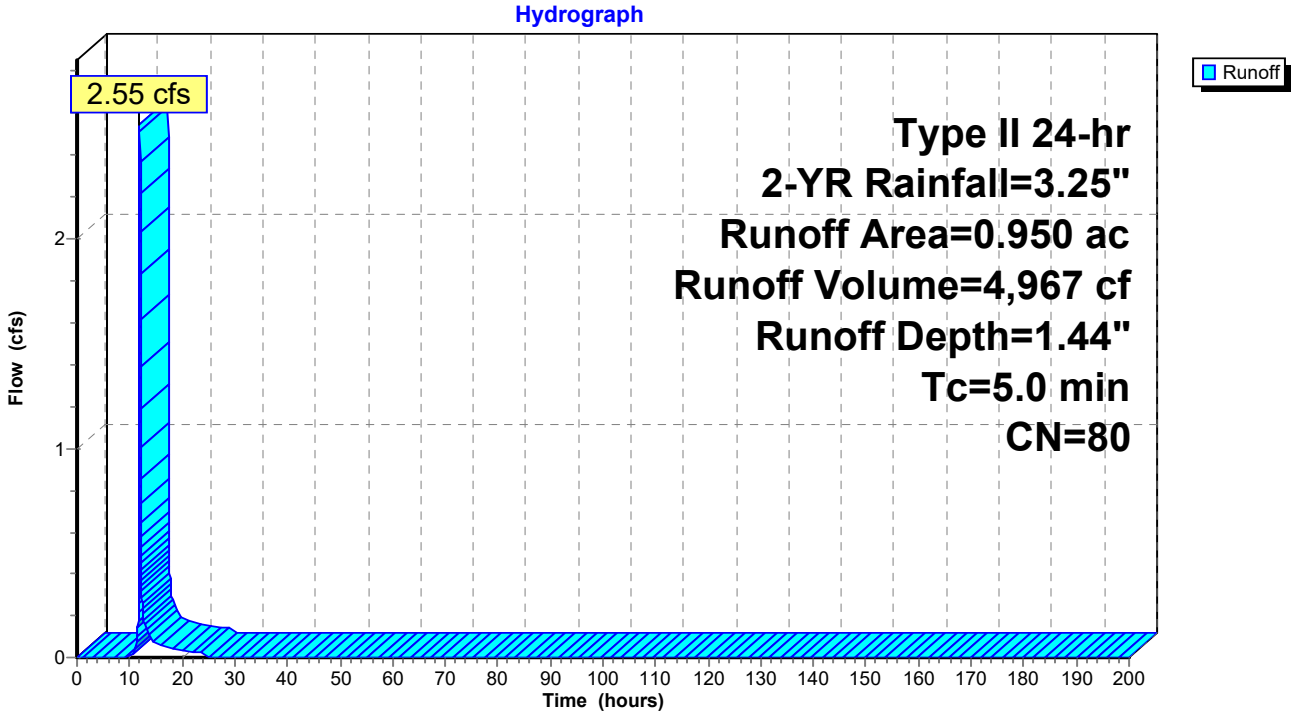
Runoff = 2.55 cfs @ 11.96 hrs, Volume= 4,967 cf, Depth= 1.44"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

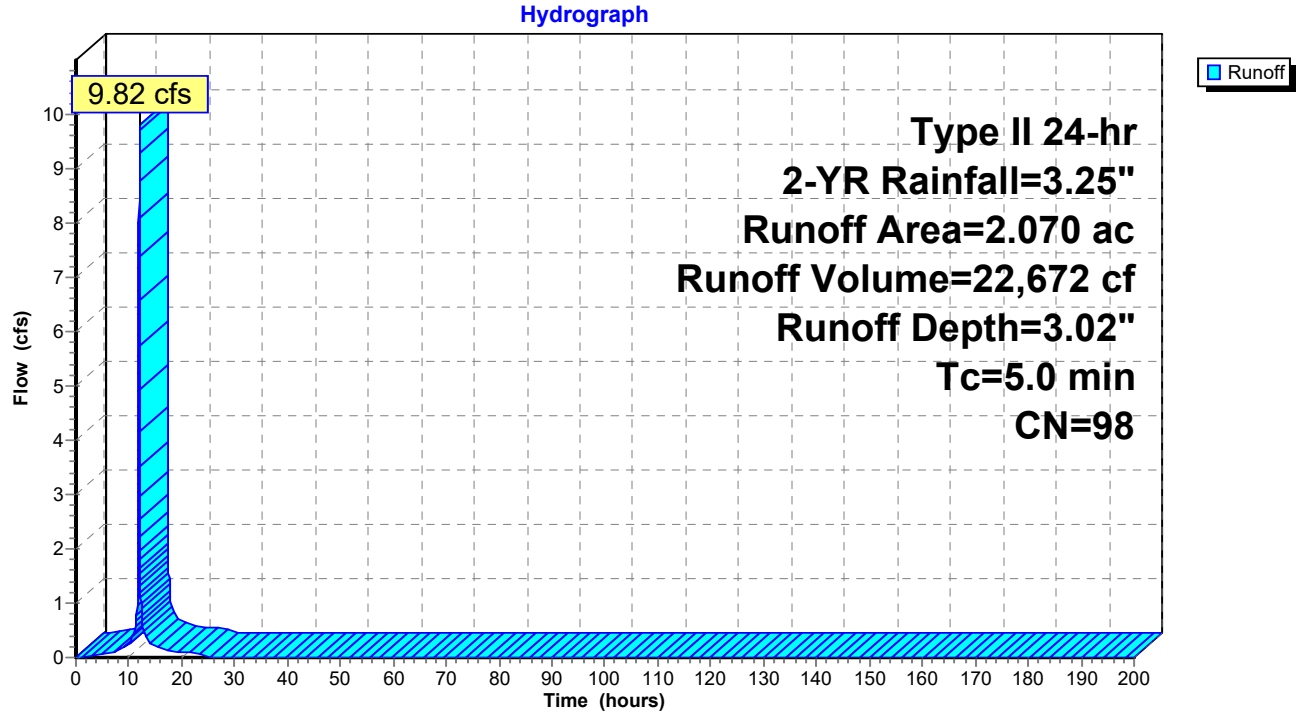
Runoff = 9.82 cfs @ 11.96 hrs, Volume= 22,672 cf, Depth= 3.02"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

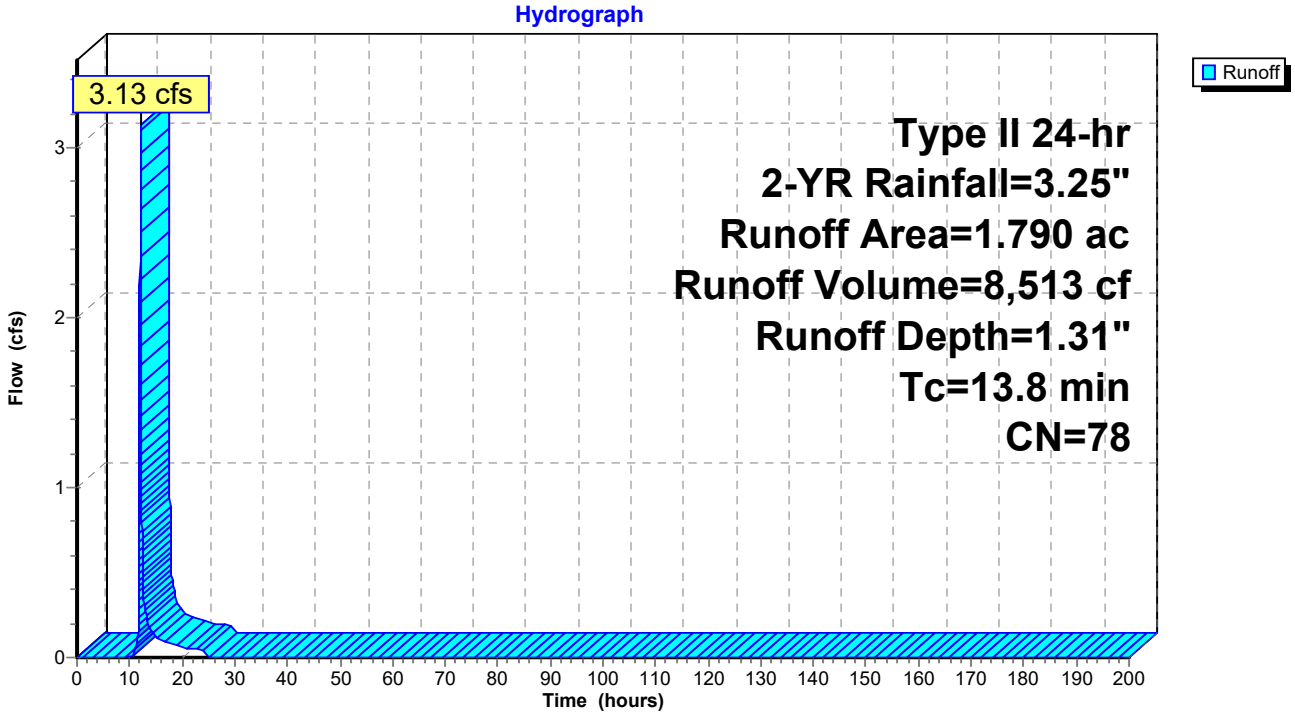
Runoff = 3.13 cfs @ 12.07 hrs, Volume= 8,513 cf, Depth= 1.31"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

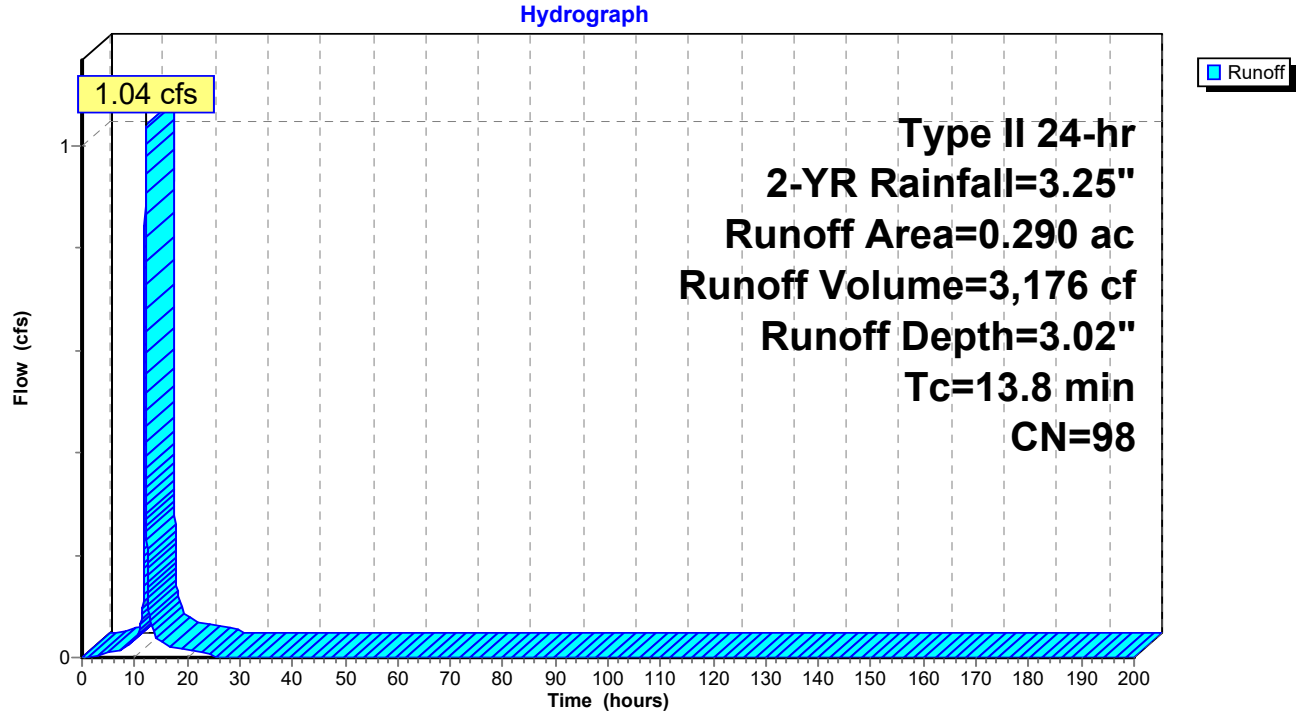
Runoff = 1.04 cfs @ 12.05 hrs, Volume= 3,176 cf, Depth= 3.02"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-YR Rainfall=3.25"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 1.79" for 2-YR event
Inflow = 12.36 cfs @ 11.96 hrs, Volume= 33,631 cf
Outflow = 0.89 cfs @ 13.23 hrs, Volume= 31,059 cf, Atten= 93%, Lag= 76.3 min
Primary = 0.85 cfs @ 13.23 hrs, Volume= 17,117 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.04 cfs @ 13.23 hrs, Volume= 13,942 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 365.25' @ 13.23 hrs Surf.Area= 10,532 sf Storage= 18,886 cf

Plug-Flow detention time= 1,725.9 min calculated for 31,057 cf (92% of inflow)
Center-of-Mass det. time= 1,683.8 min (2,480.8 - 797.0)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

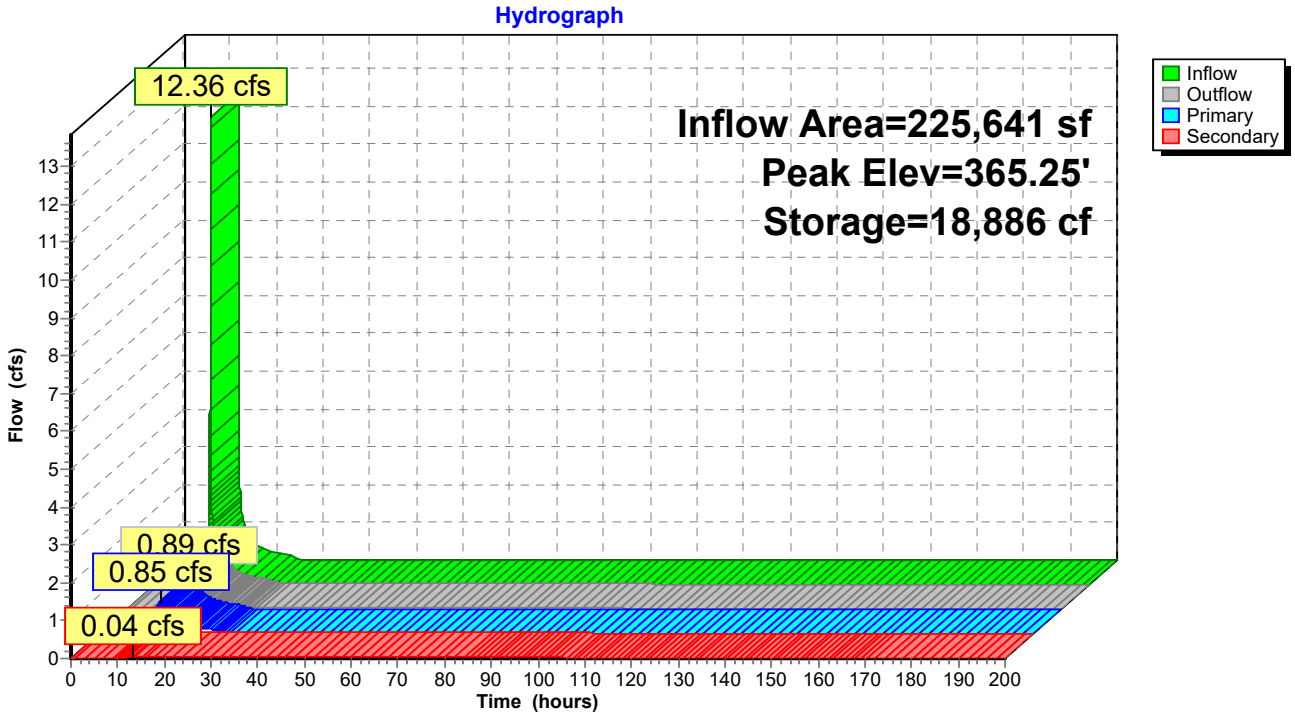
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.85 cfs @ 13.23 hrs HW=365.25' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.85 cfs of 13.45 cfs potential flow)
↑**4=Orifice** (Orifice Controls 0.85 cfs @ 2.27 fps)

Secondary OutFlow Max=0.04 cfs @ 13.23 hrs HW=365.25' TW=0.00' (Dynamic Tailwater)
↑**2=MRC Underdrain** (Passes 0.04 cfs of 0.74 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 8.63 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 1.94" for 2-YR event
Inflow = 7.20 cfs @ 11.96 hrs, Volume= 15,244 cf
Outflow = 0.48 cfs @ 12.60 hrs, Volume= 14,405 cf, Atten= 93%, Lag= 38.1 min
Primary = 0.45 cfs @ 12.60 hrs, Volume= 5,991 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.04 cfs @ 12.60 hrs, Volume= 8,414 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 365.87' @ 12.60 hrs Surf.Area= 5,909 sf Storage= 8,923 cf

Plug-Flow detention time= 1,349.8 min calculated for 14,405 cf (94% of inflow)
Center-of-Mass det. time= 1,317.9 min (2,112.8 - 794.9)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

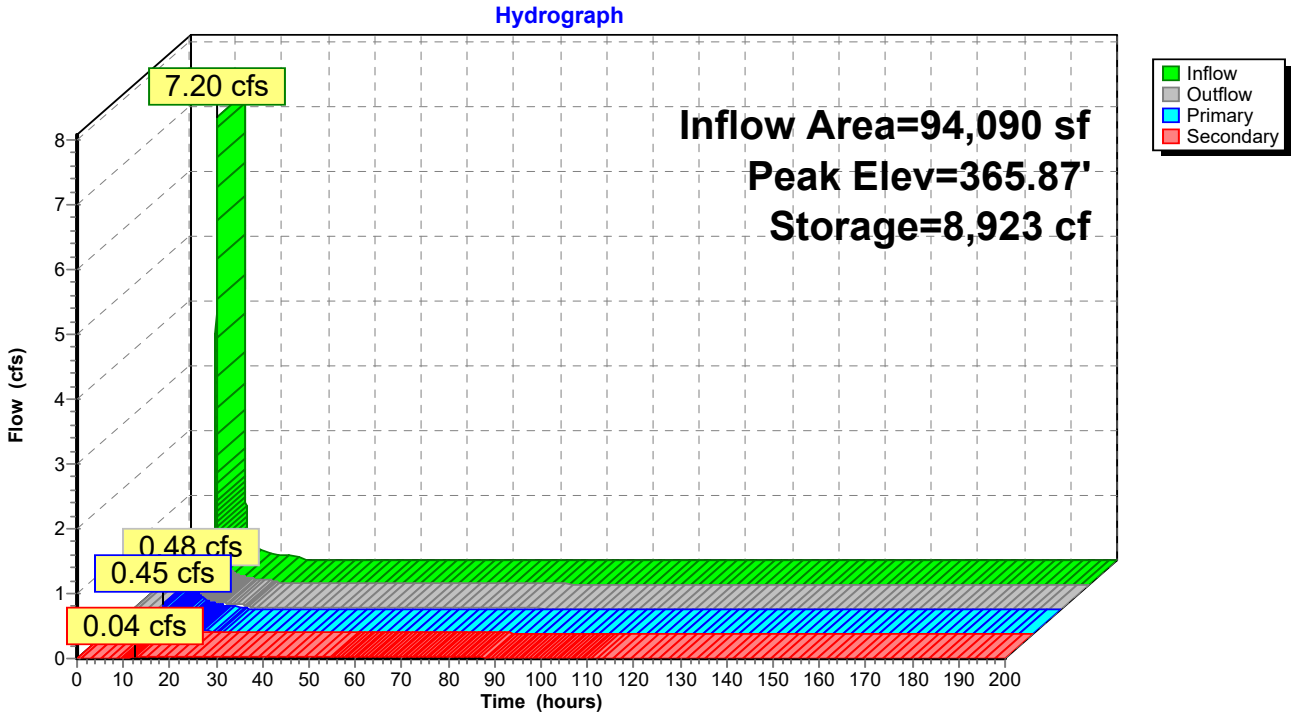
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.45 cfs @ 12.60 hrs HW=365.87' TW=365.20' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.45 cfs of 2.82 cfs potential flow)
↑**4=Orifice** (Orifice Controls 0.45 cfs @ 1.66 fps)

Secondary OutFlow Max=0.04 cfs @ 12.60 hrs HW=365.87' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.04 cfs of 0.40 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 8.10 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

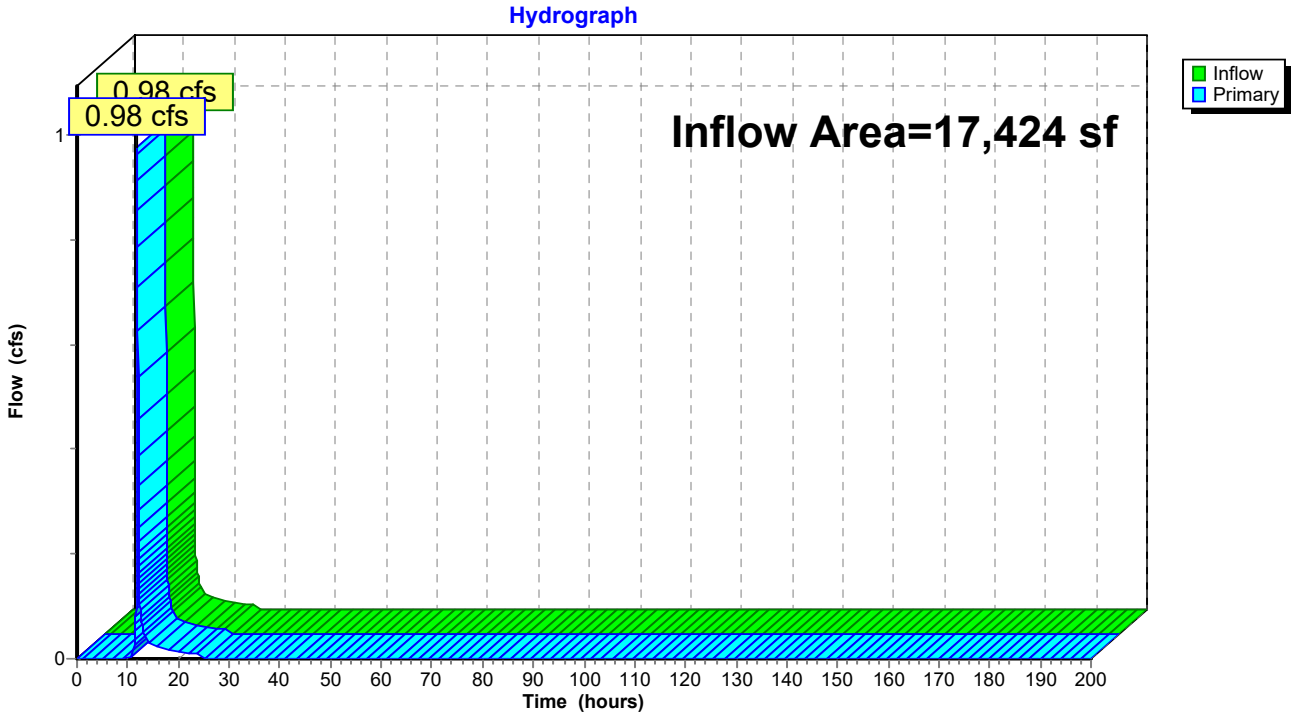
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 1.31" for 2-YR event
Inflow = 0.98 cfs @ 11.97 hrs, Volume= 1,902 cf
Primary = 0.98 cfs @ 11.97 hrs, Volume= 1,902 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

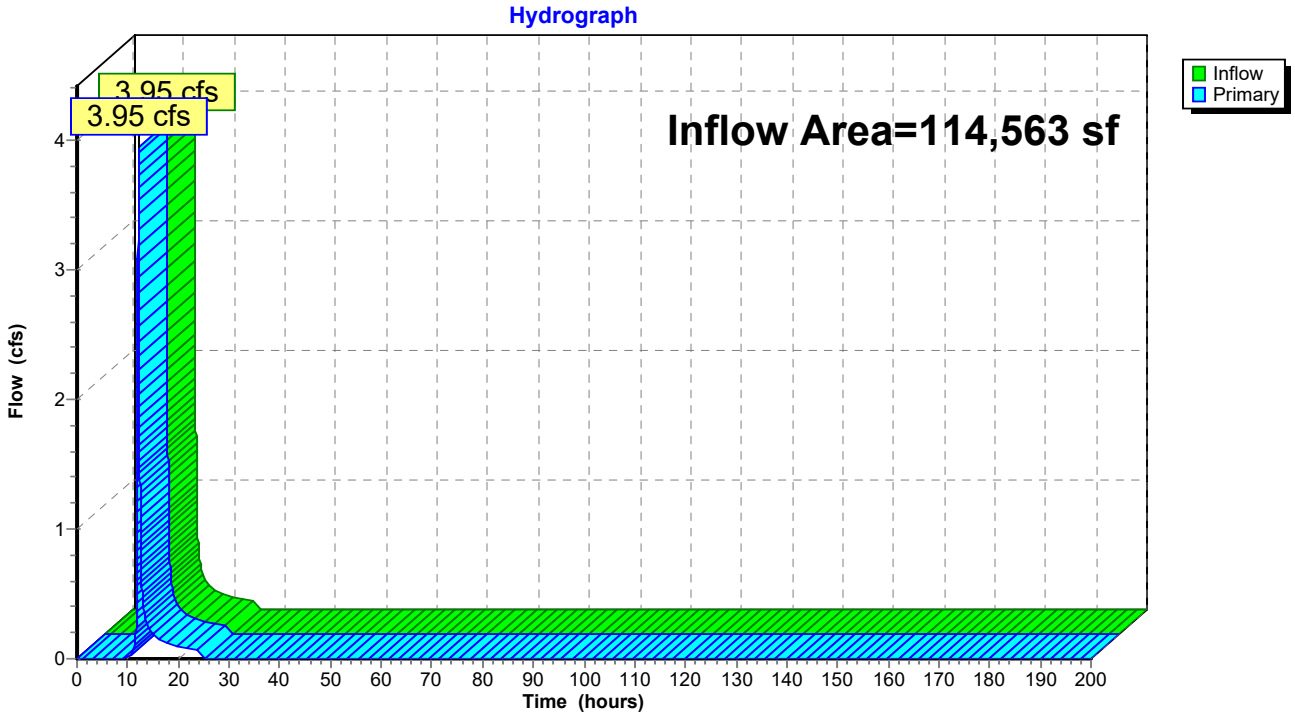


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 1.34" for 2-YR event
Inflow = 3.95 cfs @ 12.12 hrs, Volume= 12,817 cf
Primary = 3.95 cfs @ 12.12 hrs, Volume= 12,817 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

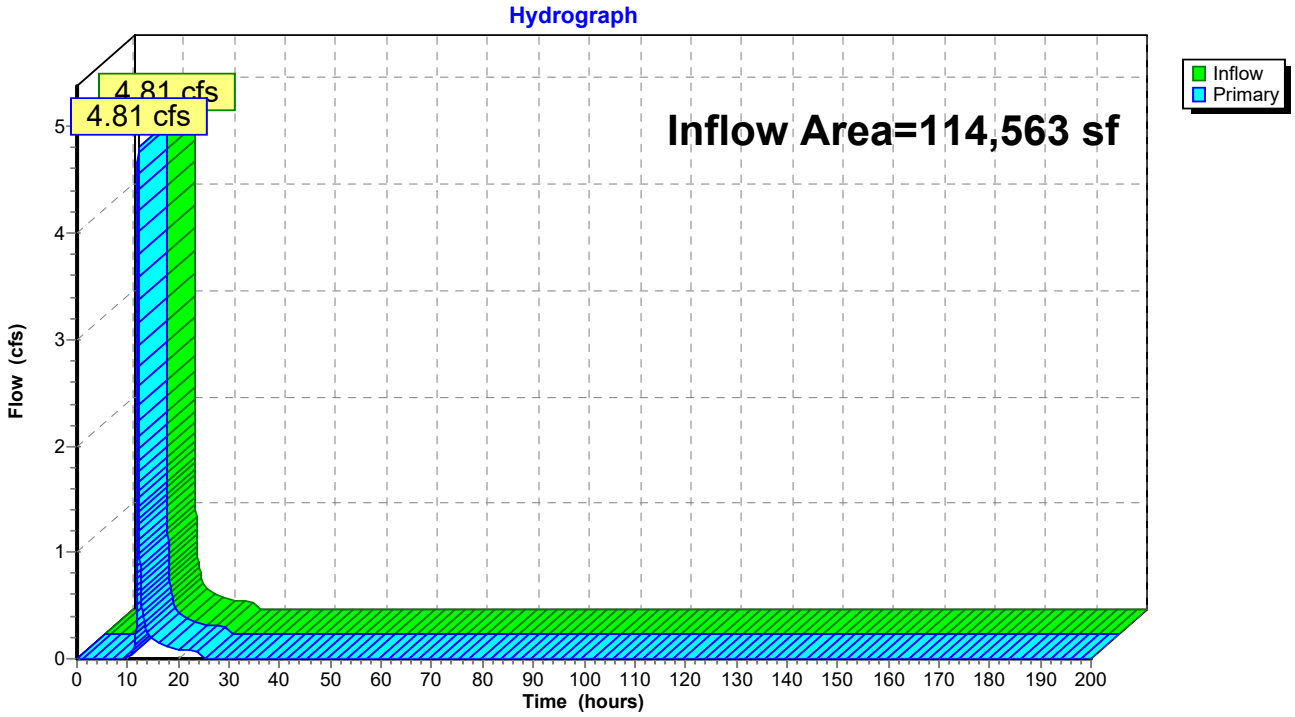


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 1.34" for 2-YR event
Inflow = 4.81 cfs @ 12.06 hrs, Volume= 12,817 cf
Primary = 4.81 cfs @ 12.06 hrs, Volume= 12,817 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

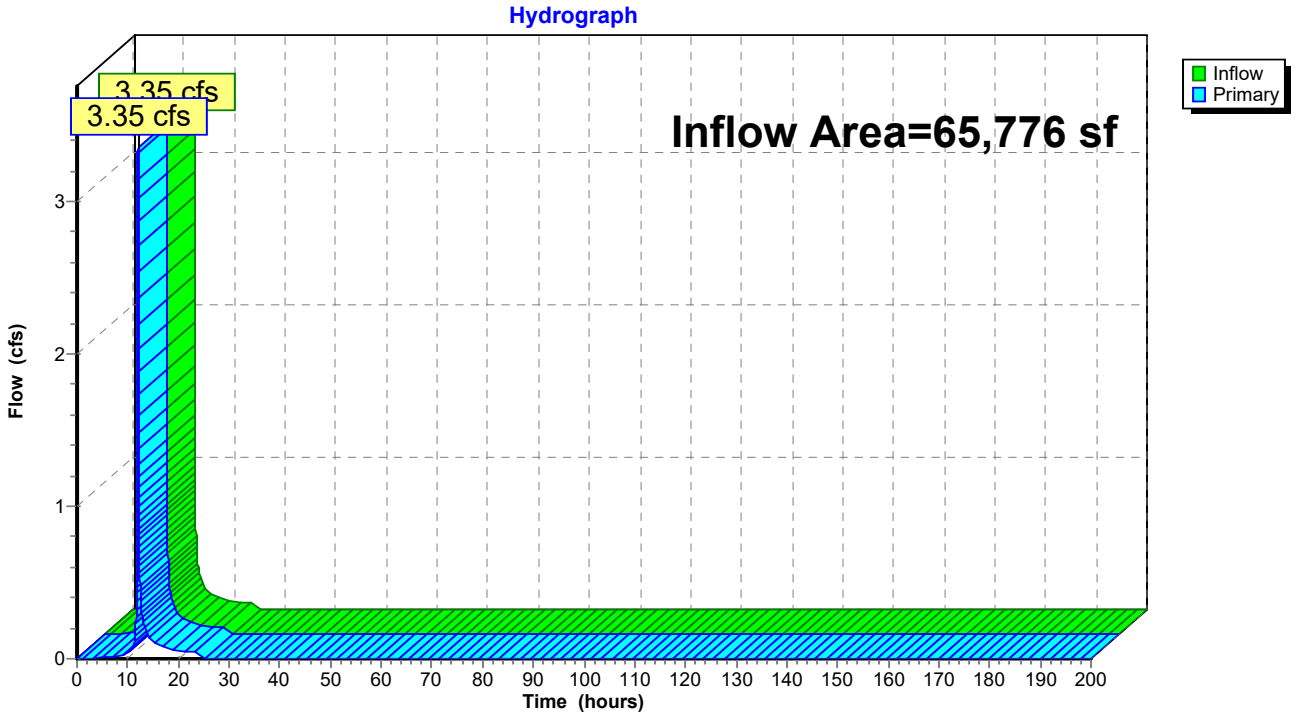


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 1.59" for 2-YR event
Inflow = 3.35 cfs @ 12.03 hrs, Volume= 8,730 cf
Primary = 3.35 cfs @ 12.03 hrs, Volume= 8,730 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

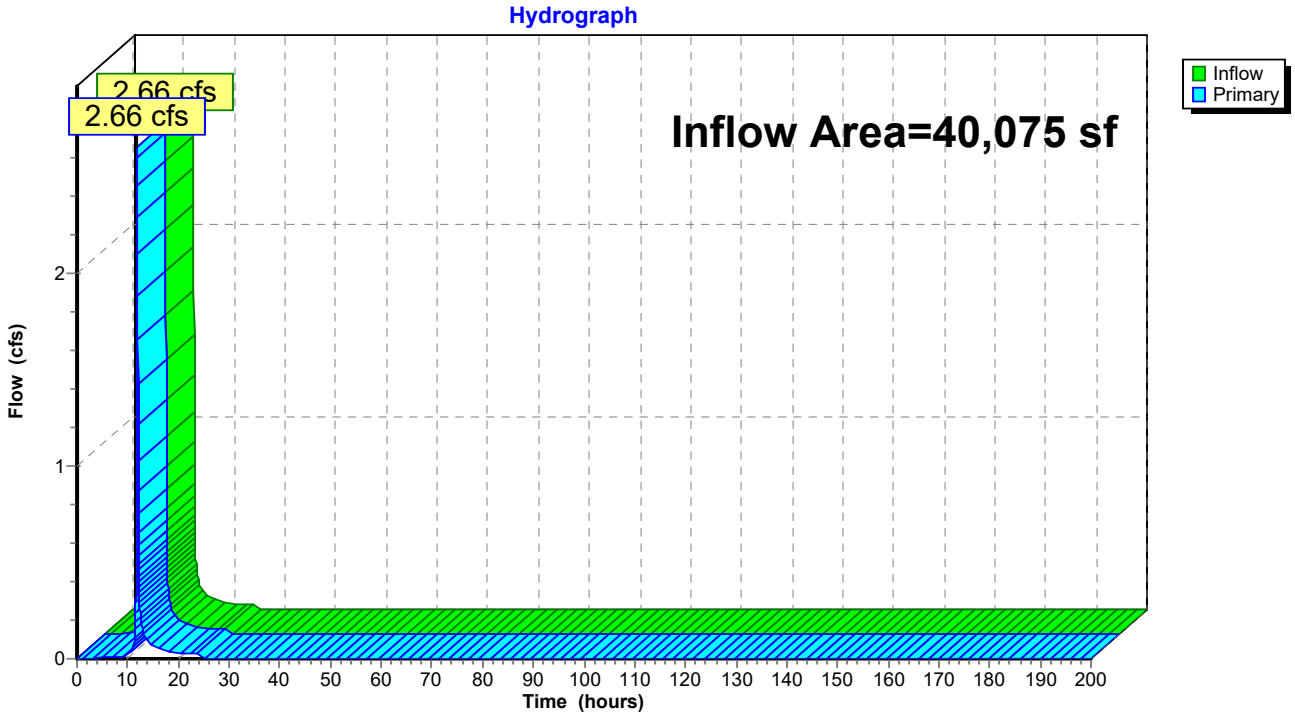


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 1.62" for 2-YR event
Inflow = 2.66 cfs @ 11.96 hrs, Volume= 5,425 cf
Primary = 2.66 cfs @ 11.96 hrs, Volume= 5,425 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

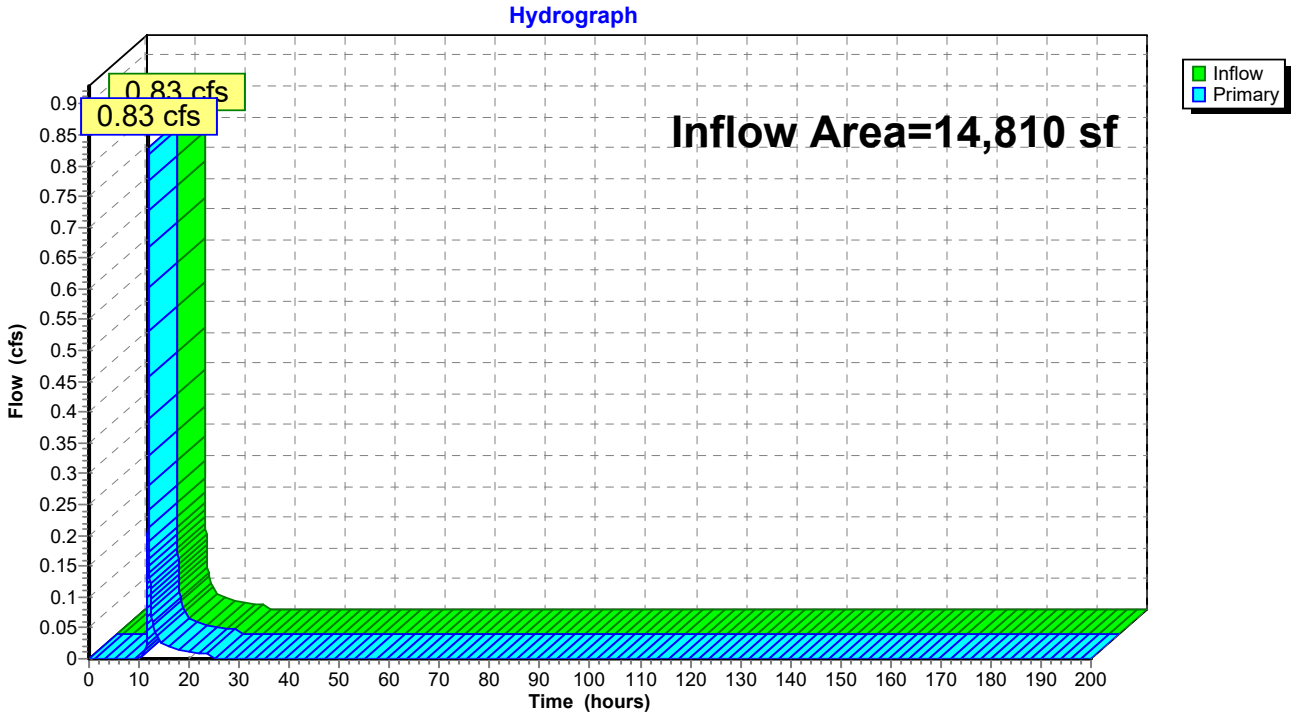


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 1.31" for 2-YR event
Inflow = 0.83 cfs @ 11.97 hrs, Volume= 1,617 cf
Primary = 0.83 cfs @ 11.97 hrs, Volume= 1,617 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

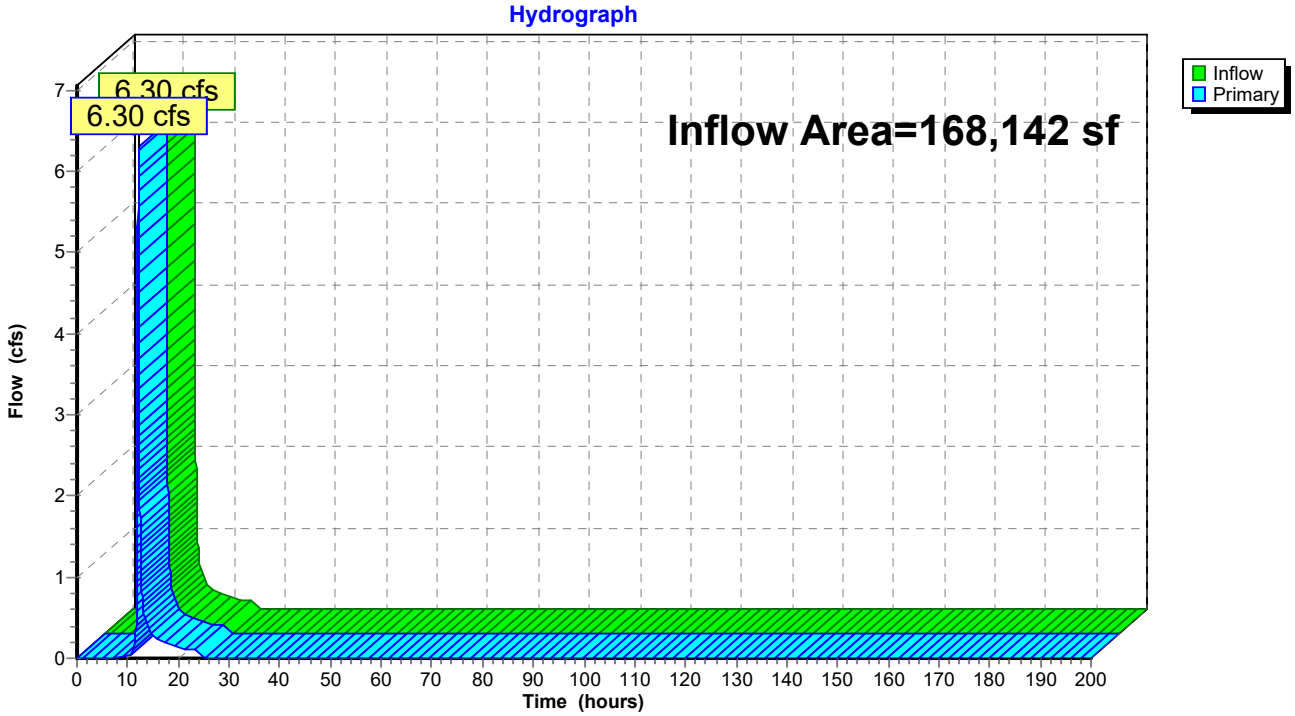


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 1.40" for 2-YR event
Inflow = 6.30 cfs @ 12.11 hrs, Volume= 19,597 cf
Primary = 6.30 cfs @ 12.11 hrs, Volume= 19,597 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

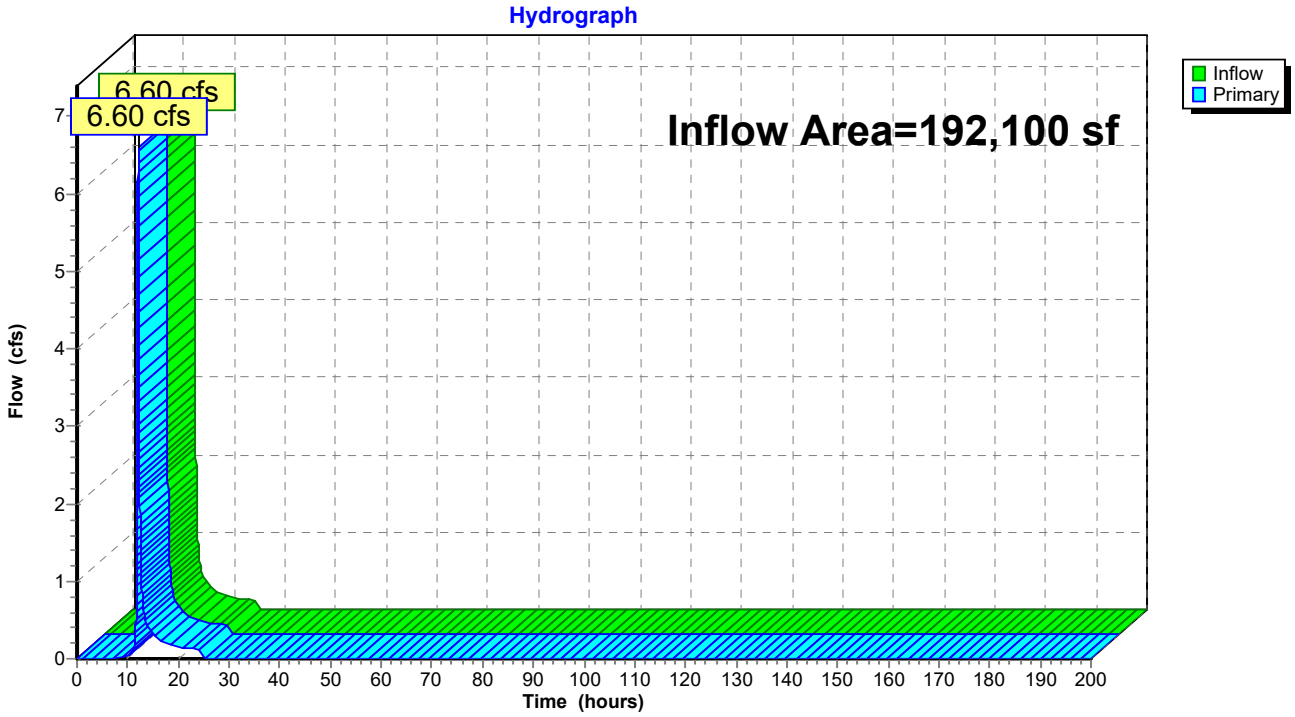


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 1.39" for 2-YR event
Inflow = 6.60 cfs @ 12.09 hrs, Volume= 22,212 cf
Primary = 6.60 cfs @ 12.09 hrs, Volume= 22,212 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

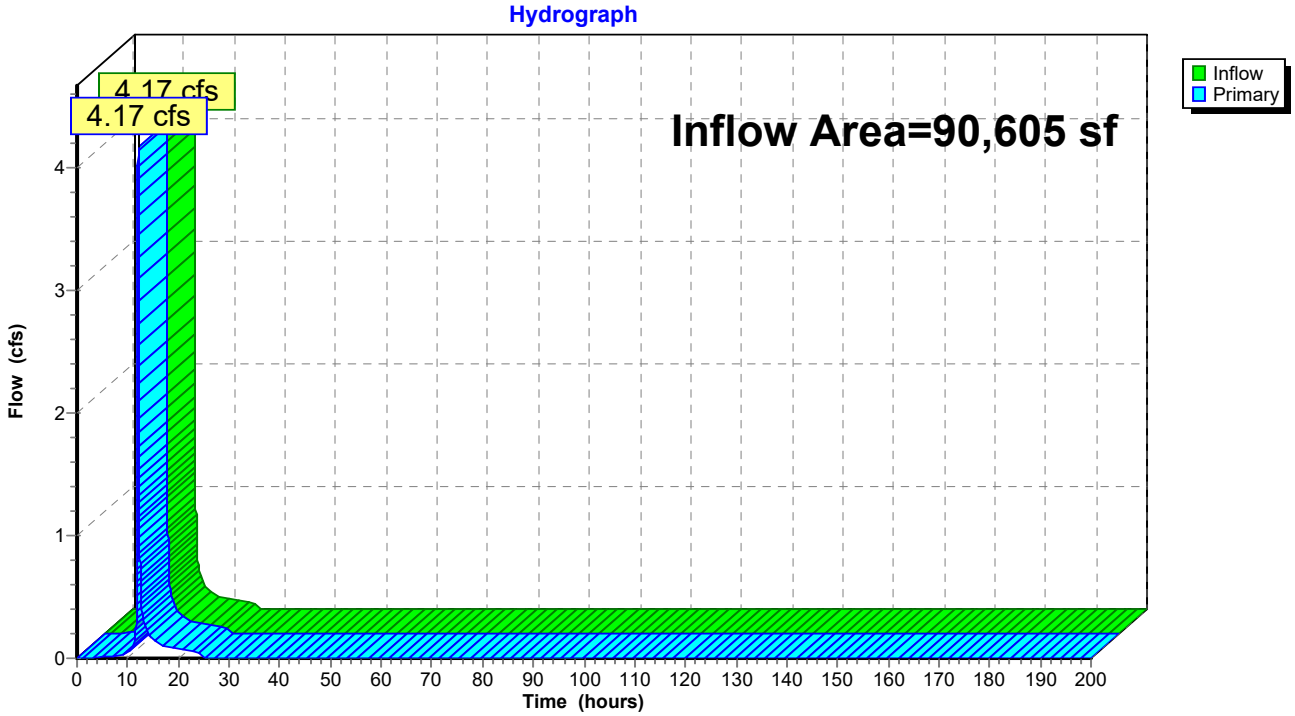


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 1.55" for 2-YR event
Inflow = 4.17 cfs @ 12.06 hrs, Volume= 11,689 cf
Primary = 4.17 cfs @ 12.06 hrs, Volume= 11,689 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

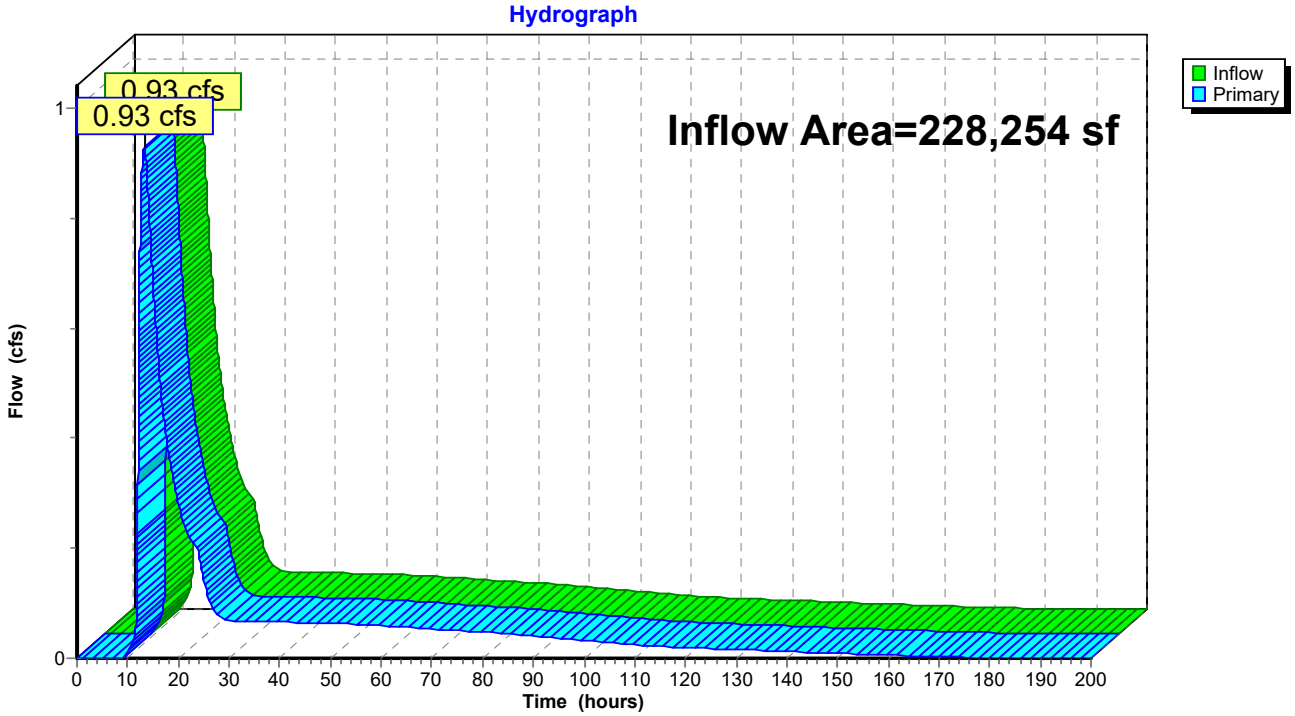


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 2.09" for 2-YR event
Inflow = 0.93 cfs @ 13.22 hrs, Volume= 39,787 cf
Primary = 0.93 cfs @ 13.22 hrs, Volume= 39,787 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

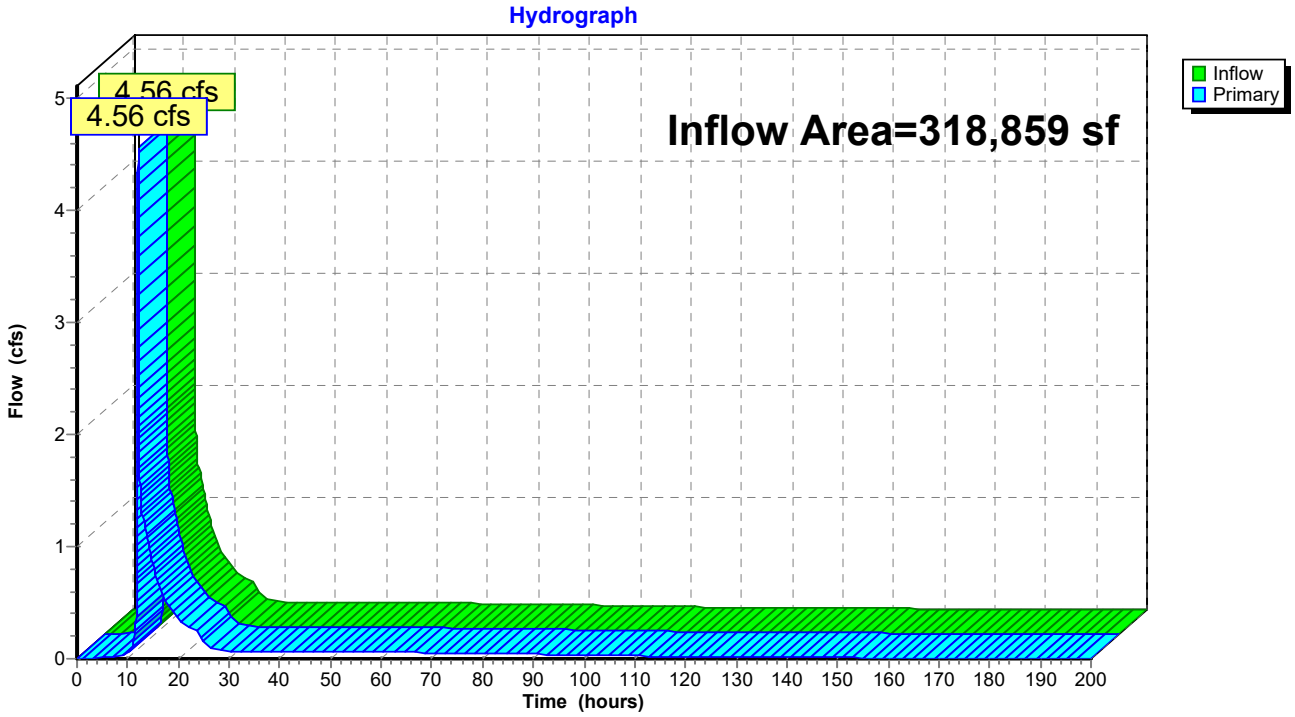


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 1.94" for 2-YR event
Inflow = 4.56 cfs @ 12.07 hrs, Volume= 51,476 cf
Primary = 4.56 cfs @ 12.07 hrs, Volume= 51,476 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=1.96"
Tc=17.5 min CN=78 Runoff=8.56 cfs 26,025 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=3.85"
Tc=17.5 min CN=98 Runoff=0.82 cfs 2,799 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=1.96"
Tc=5.0 min CN=78 Runoff=1.46 cfs 2,844 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=1.96"
Tc=19.1 min CN=78 Runoff=5.76 cfs 18,346 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=3.85"
Tc=19.1 min CN=98 Runoff=0.20 cfs 700 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=1.96"
Tc=13.1 min CN=78 Runoff=6.98 cfs 18,346 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=3.85"
Tc=13.1 min CN=98 Runoff=0.23 cfs 700 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=1.96"
Tc=11.5 min CN=78 Runoff=3.60 cfs 8,960 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=1.96"
Tc=5.0 min CN=78 Runoff=2.00 cfs 3,911 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=3.85"
Tc=11.5 min CN=98 Runoff=1.22 cfs 3,498 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=2.04"
Tc=5.0 min CN=79 Runoff=2.95 cfs 5,767 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=3.85"
Tc=5.0 min CN=98 Runoff=0.84 cfs 1,959 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=1.96"
Tc=5.0 min CN=78 Runoff=1.24 cfs 2,418 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=2.12"
Tc=5.0 min CN=80 Runoff=0.23 cfs 461 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=2.12"
Tc=5.0 min CN=80 Runoff=5.75 cfs 11,293 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=3.85"
Tc=5.0 min CN=98 Runoff=4.14 cfs 9,655 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=2.12"
Tc=5.0 min CN=80 Runoff=3.72 cfs 7,298 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=3.85"
Tc=5.0 min CN=98 Runoff=12.41 cfs 28,966 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=1.96"
Tc=13.8 min CN=78 Runoff=4.73 cfs 12,728 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=3.85"
Tc=13.8 min CN=98 Runoff=1.32 cfs 4,058 cf

Pond 39P: Basin 1 (MRC) Peak Elev=365.78' Storage=24,476 cf Inflow=16.40 cfs 47,822 cf
Primary=1.59 cfs 31,092 cf Secondary=0.04 cfs 14,157 cf Outflow=1.63 cfs 45,249 cf

Pond 40P: Basin 2 (MRC) Peak Elev=366.28' Storage=11,275 cf Inflow=9.88 cfs 20,948 cf
Primary=1.14 cfs 11,558 cf Secondary=0.04 cfs 8,551 cf Outflow=1.18 cfs 20,109 cf

Link 6L: Pre B (Bypass) Inflow=1.46 cfs 2,844 cf
Primary=1.46 cfs 2,844 cf

Link 9L: Pre C (Bypass) Inflow=5.95 cfs 19,046 cf
Primary=5.95 cfs 19,046 cf

Link 12L: Pre D (Bypass) Inflow=7.21 cfs 19,046 cf
Primary=7.21 cfs 19,046 cf

Link 17L: Post D Bypass Inflow=4.82 cfs 12,458 cf
Primary=4.82 cfs 12,458 cf

Link 20L: Post C Bypass Inflow=3.78 cfs 7,726 cf
Primary=3.78 cfs 7,726 cf

Link 23L: Post B Bypass Inflow=1.24 cfs 2,418 cf
Primary=1.24 cfs 2,418 cf

Link 24L: Culvert - PRE Inflow=9.37 cfs 28,824 cf
Primary=9.37 cfs 28,824 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=9.84 cfs 32,735 cf
Primary=9.84 cfs 32,735 cf

Link 26L: Culvert - POST
Inflow=6.04 cfs 16,786 cf
Primary=6.04 cfs 16,786 cf

Link 27L: Post POI A-1
Inflow=1.68 cfs 54,261 cf
Primary=1.68 cfs 54,261 cf

Link 30L: To CTP Ex. Basin- POST
Inflow=7.45 cfs 71,048 cf
Primary=7.45 cfs 71,048 cf

Total Runoff Area = 878,170 sf Runoff Volume = 170,731 cf Average Runoff Depth = 2.33"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

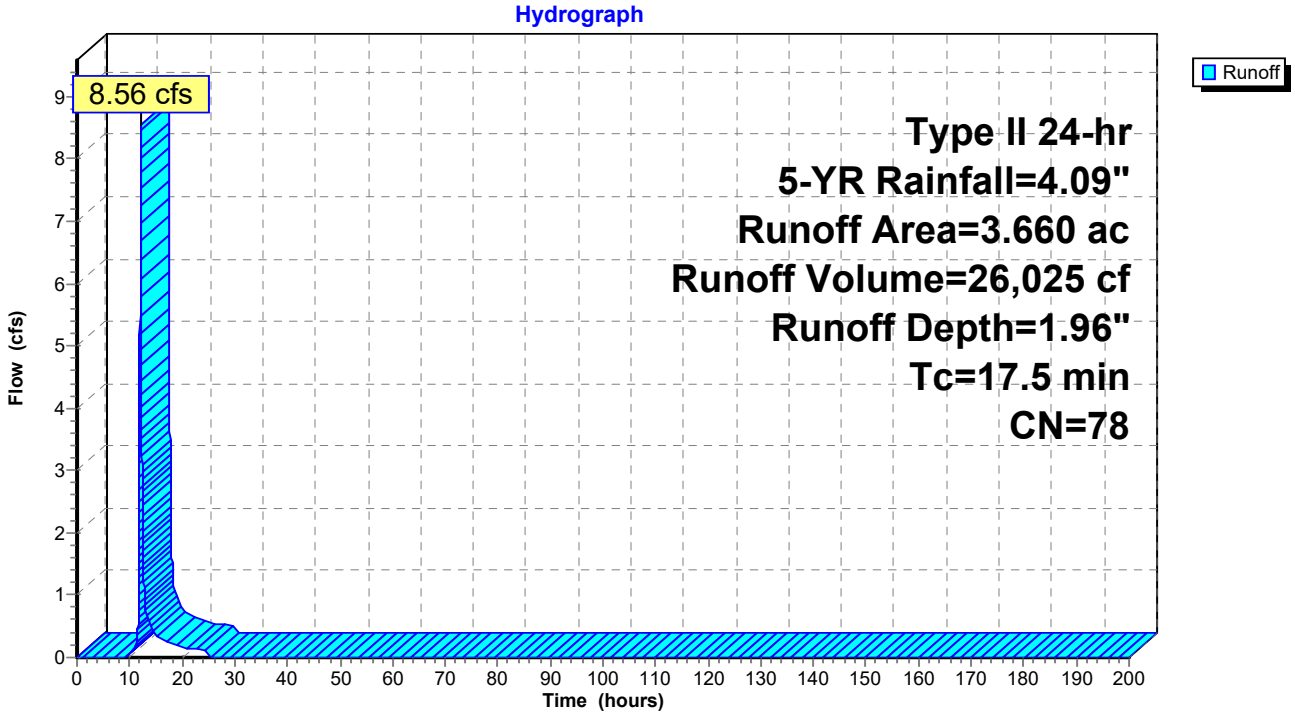
Runoff = 8.56 cfs @ 12.10 hrs, Volume= 26,025 cf, Depth= 1.96"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

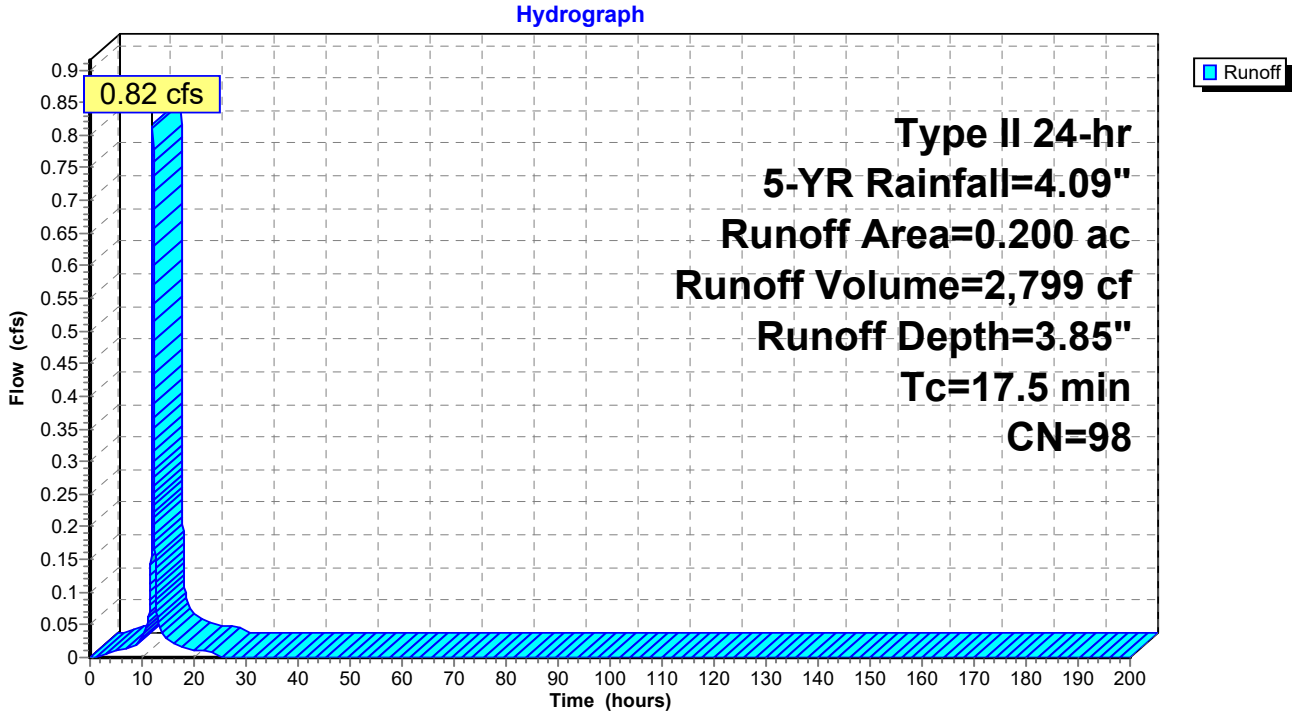
Runoff = 0.82 cfs @ 12.09 hrs, Volume= 2,799 cf, Depth= 3.85"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

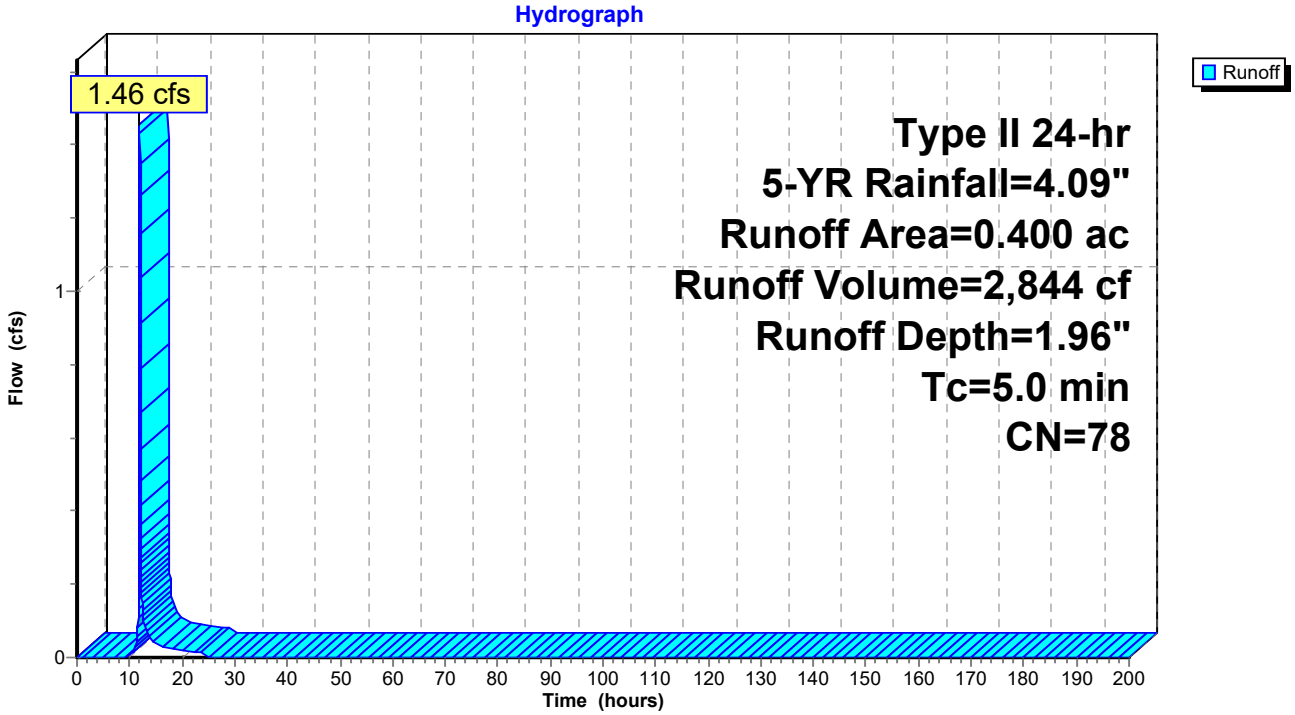
Runoff = 1.46 cfs @ 11.96 hrs, Volume= 2,844 cf, Depth= 1.96"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

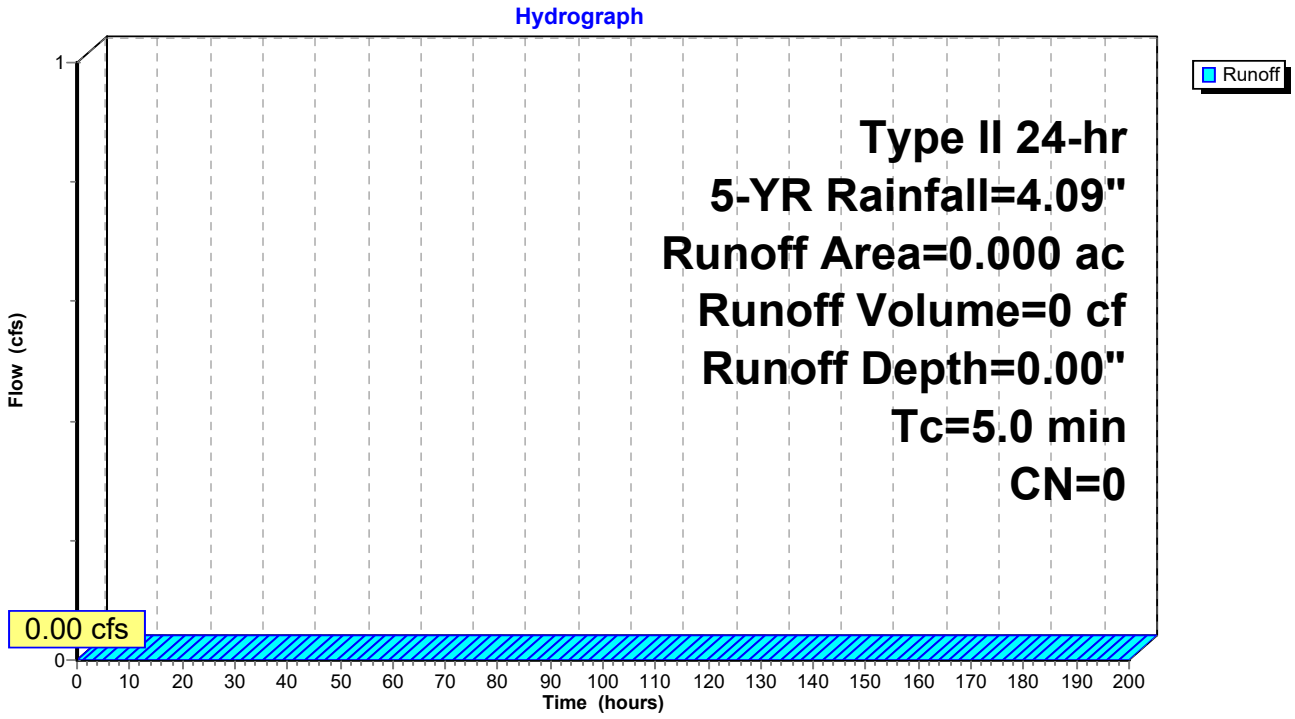
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

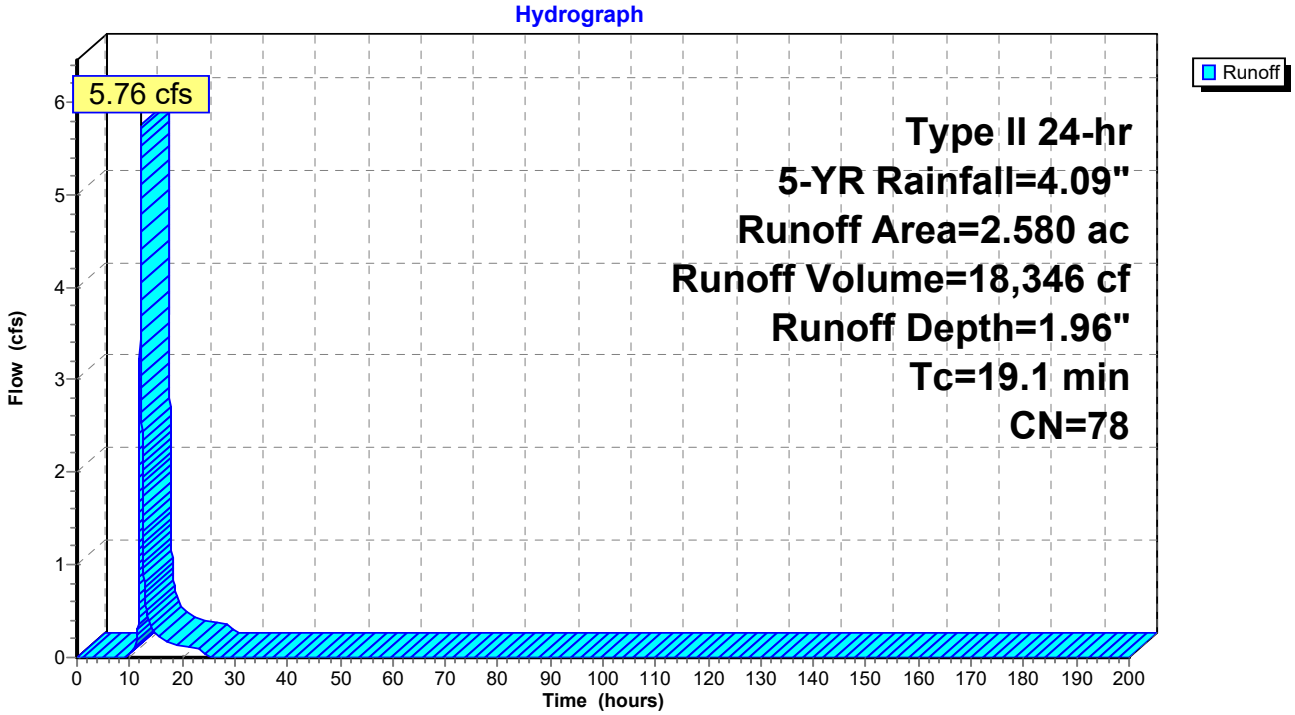
Runoff = 5.76 cfs @ 12.12 hrs, Volume= 18,346 cf, Depth= 1.96"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

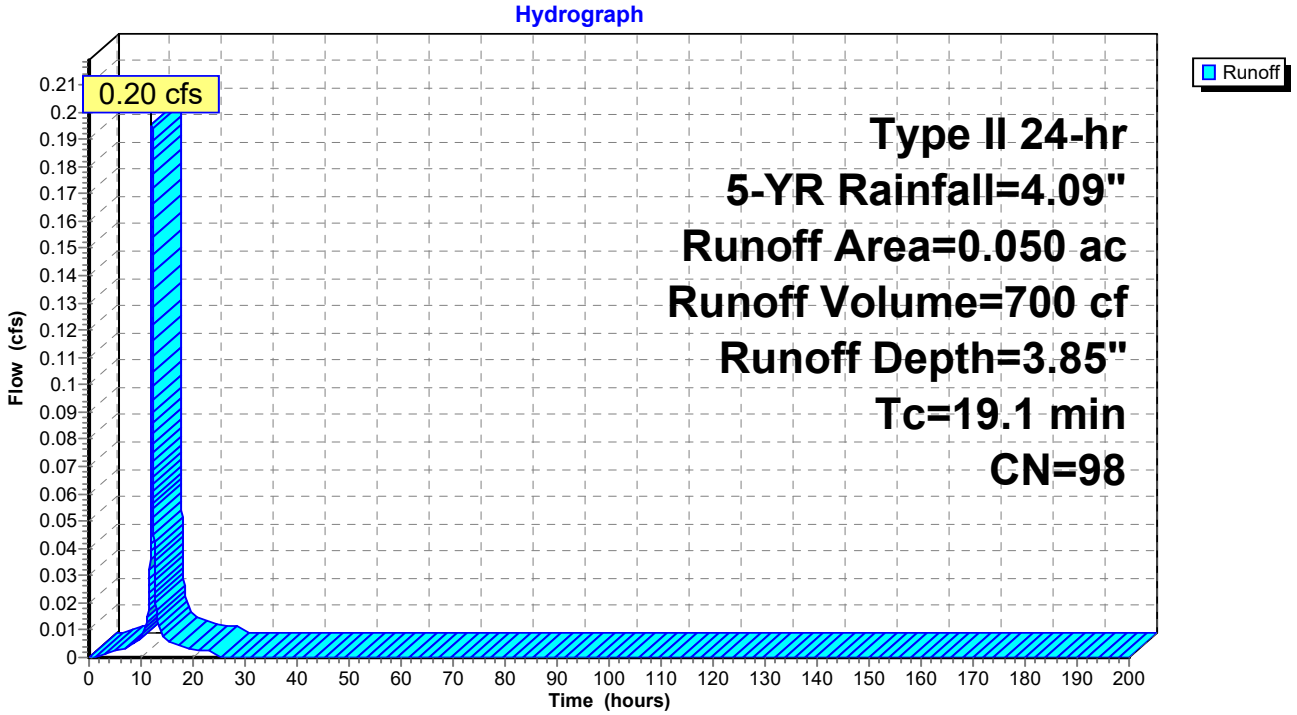
Runoff = 0.20 cfs @ 12.11 hrs, Volume= 700 cf, Depth= 3.85"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

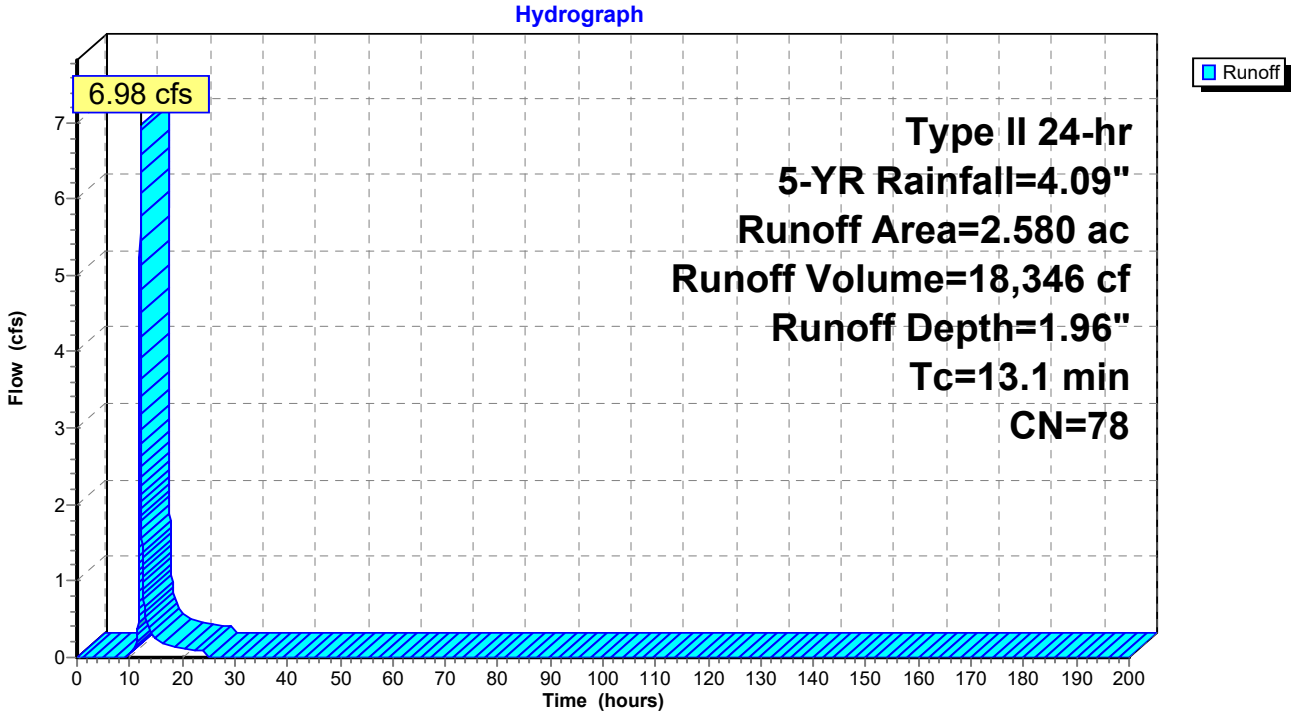
Runoff = 6.98 cfs @ 12.05 hrs, Volume= 18,346 cf, Depth= 1.96"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

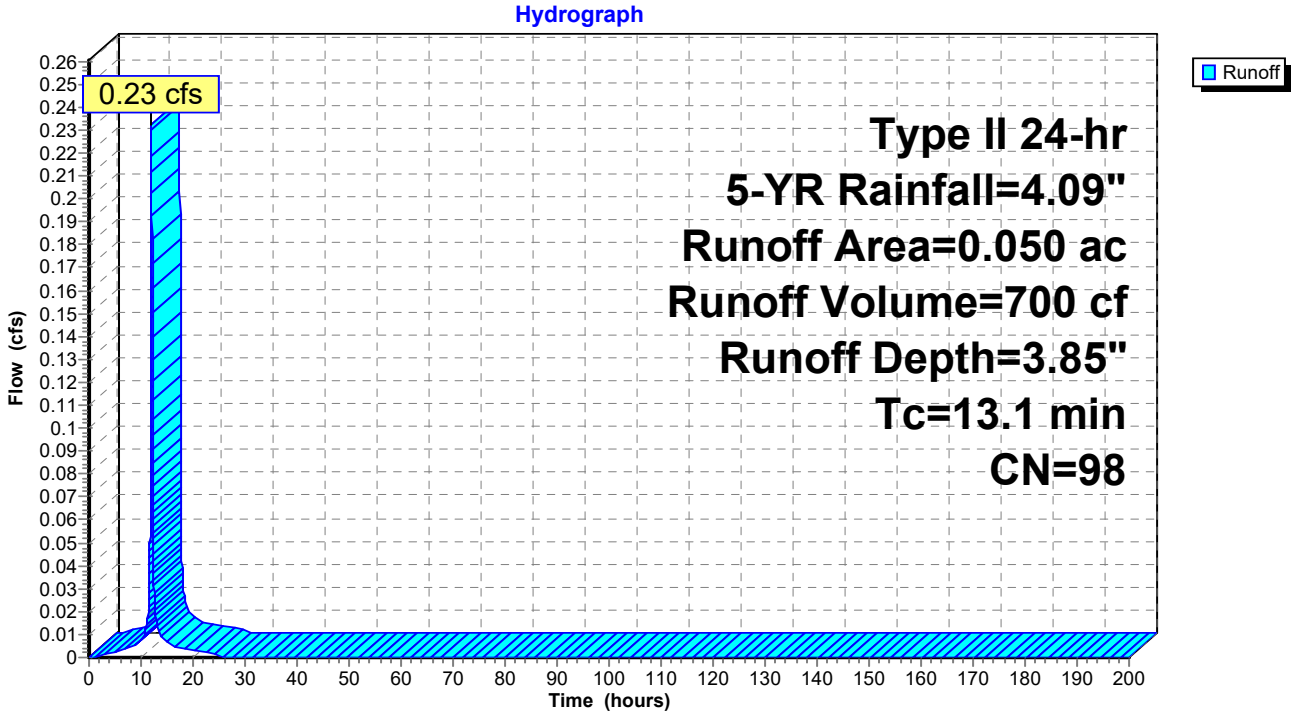
Runoff = 0.23 cfs @ 12.04 hrs, Volume= 700 cf, Depth= 3.85"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

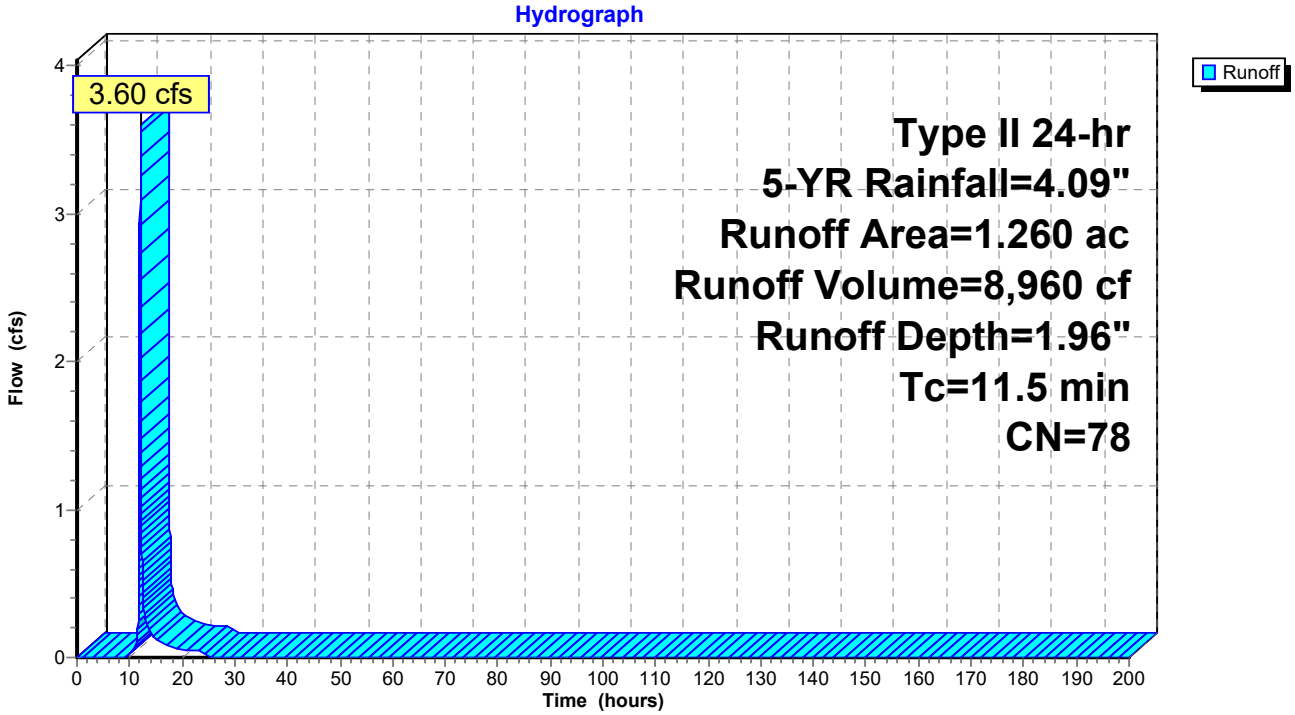
Runoff = 3.60 cfs @ 12.04 hrs, Volume= 8,960 cf, Depth= 1.96"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

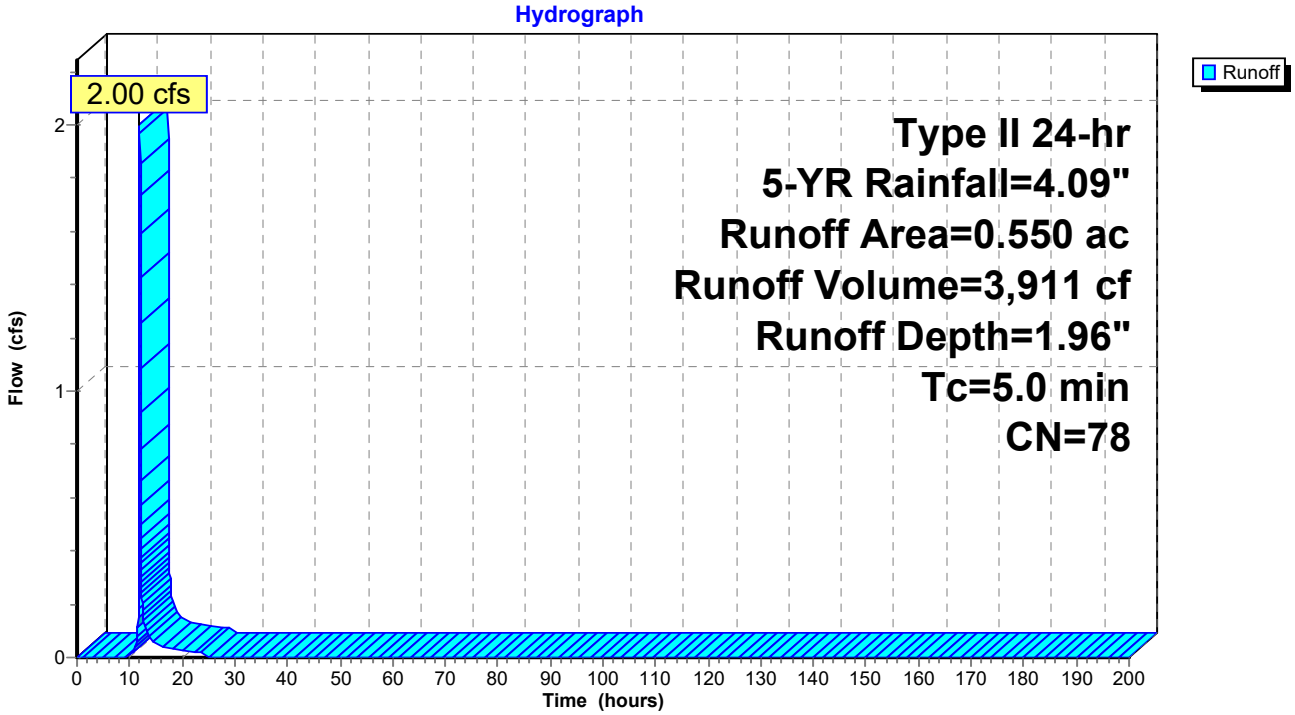
Runoff = 2.00 cfs @ 11.96 hrs, Volume= 3,911 cf, Depth= 1.96"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

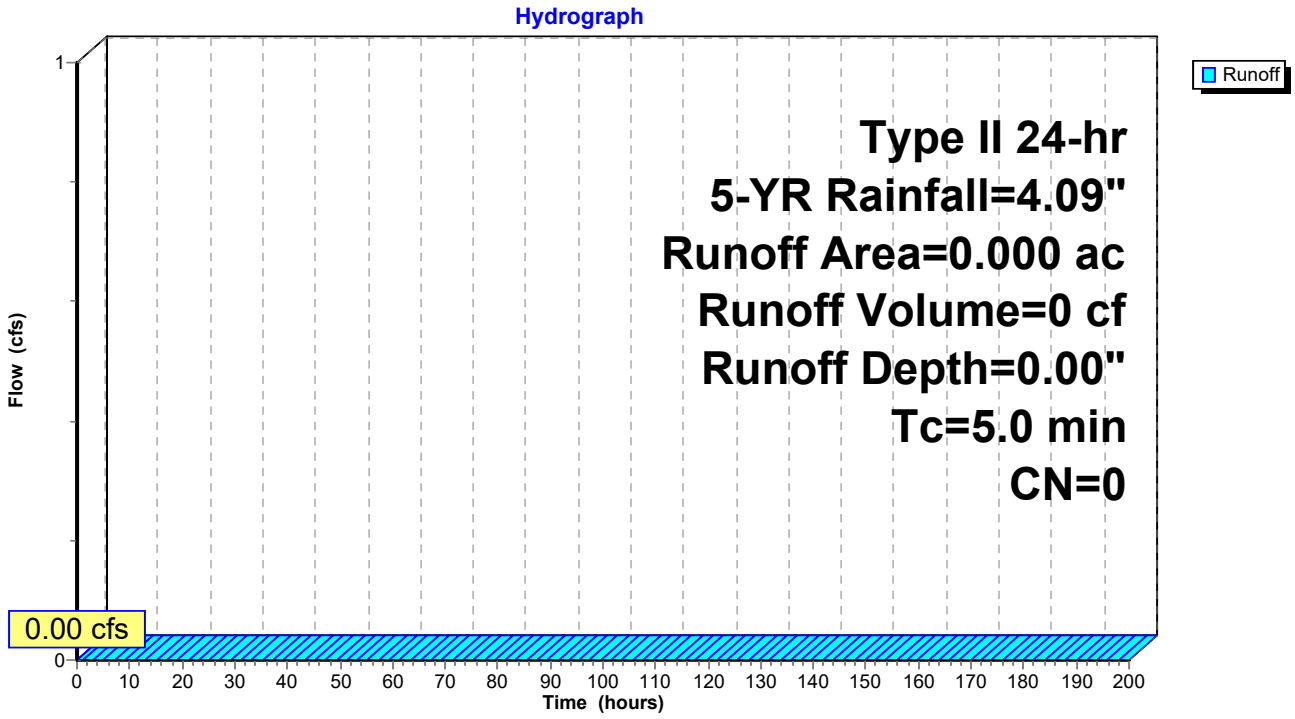
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

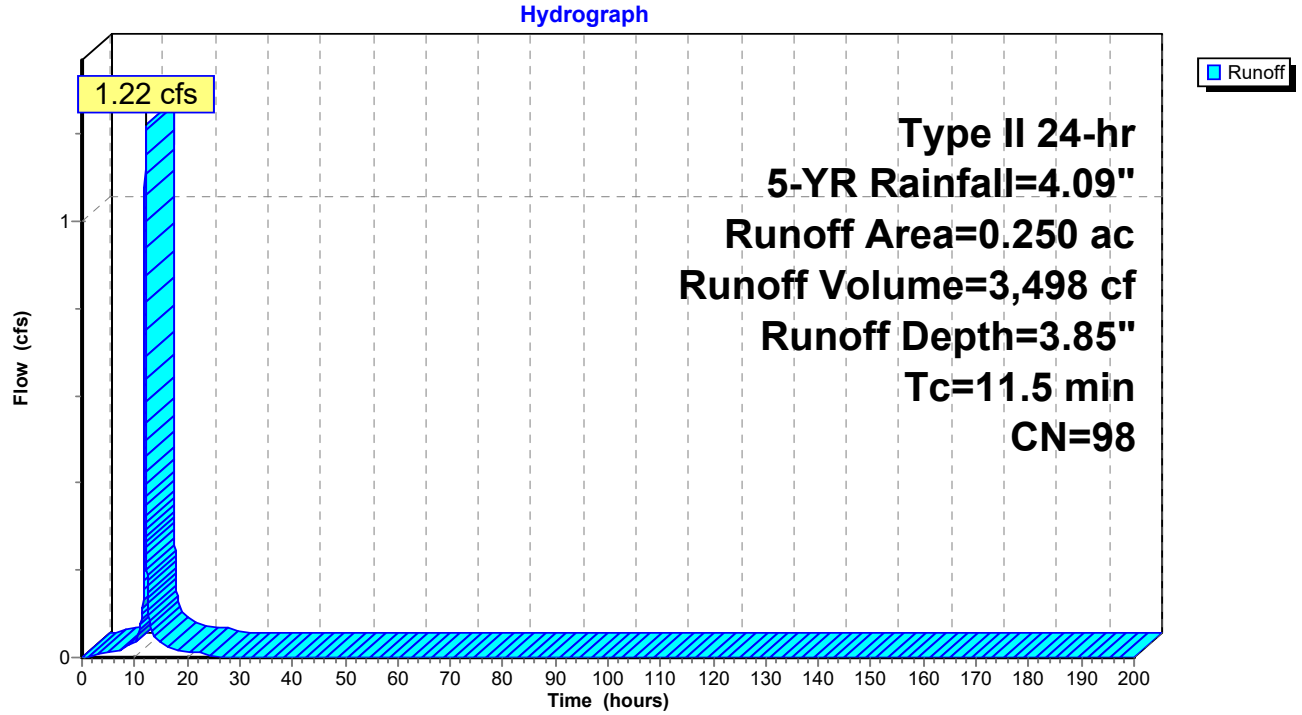
Runoff = 1.22 cfs @ 12.02 hrs, Volume= 3,498 cf, Depth= 3.85"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

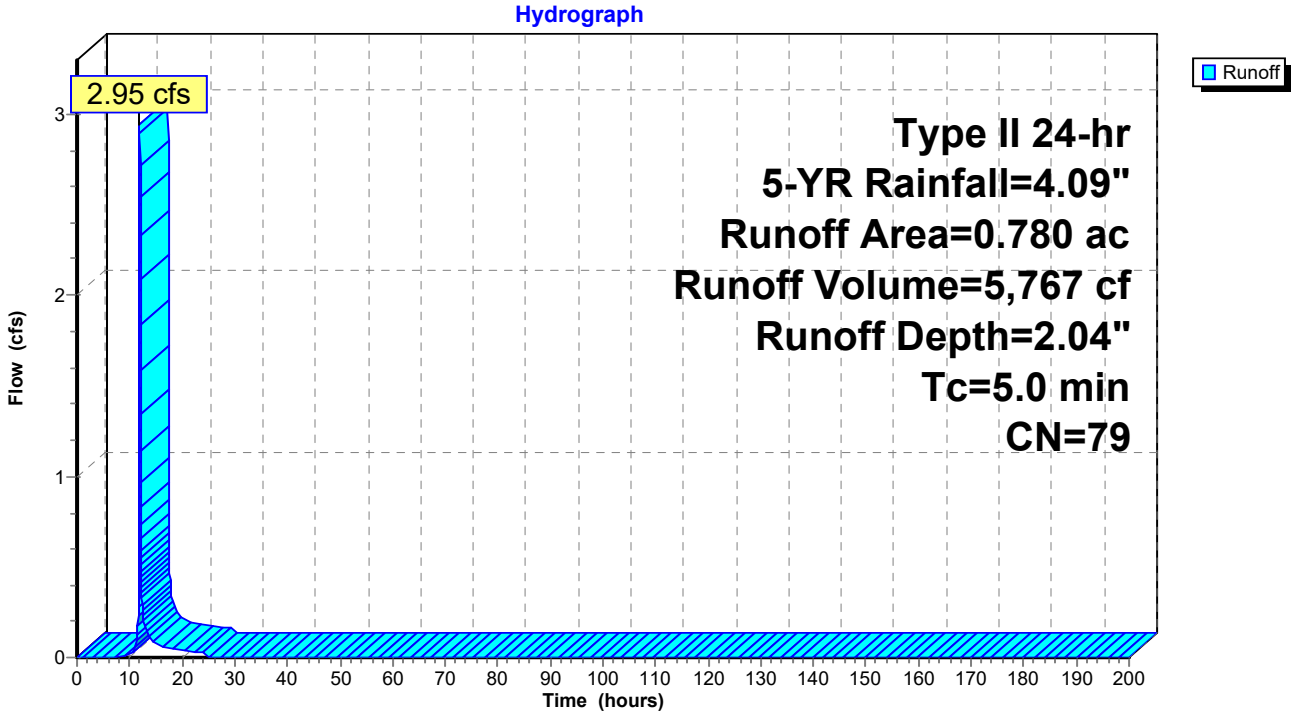
Runoff = 2.95 cfs @ 11.96 hrs, Volume= 5,767 cf, Depth= 2.04"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

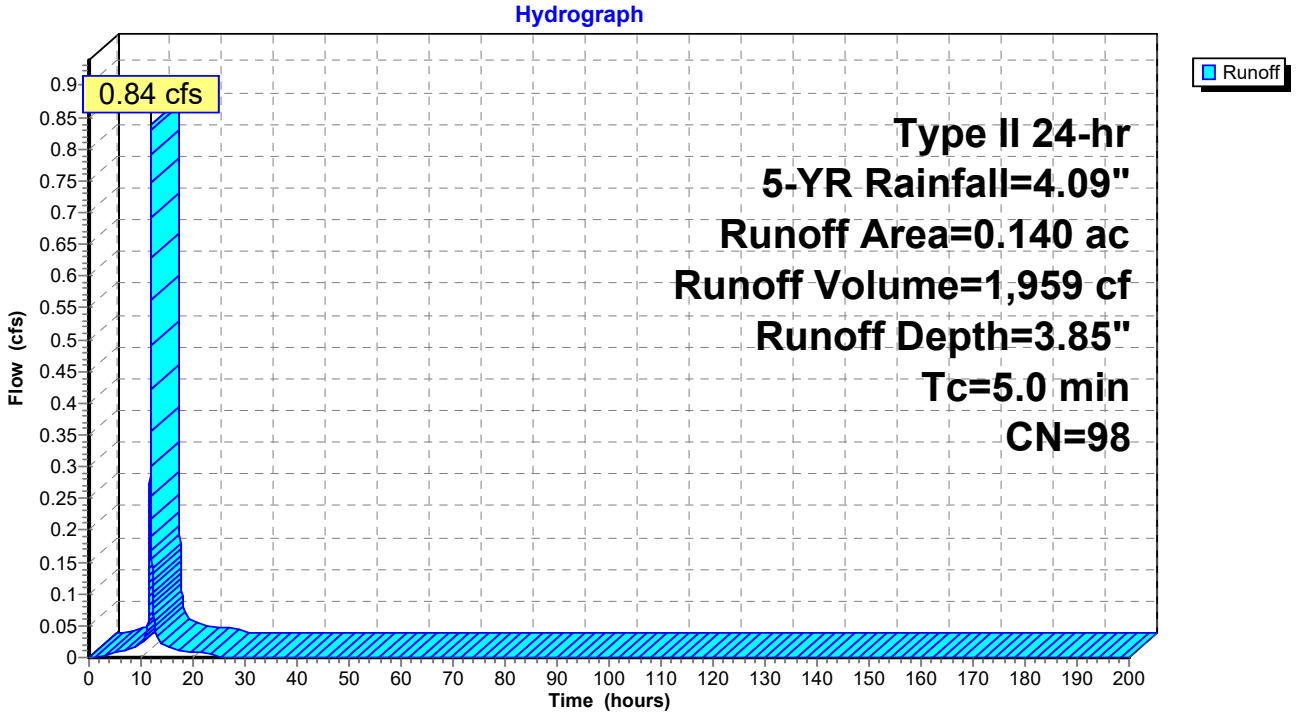
Runoff = 0.84 cfs @ 11.96 hrs, Volume= 1,959 cf, Depth= 3.85"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

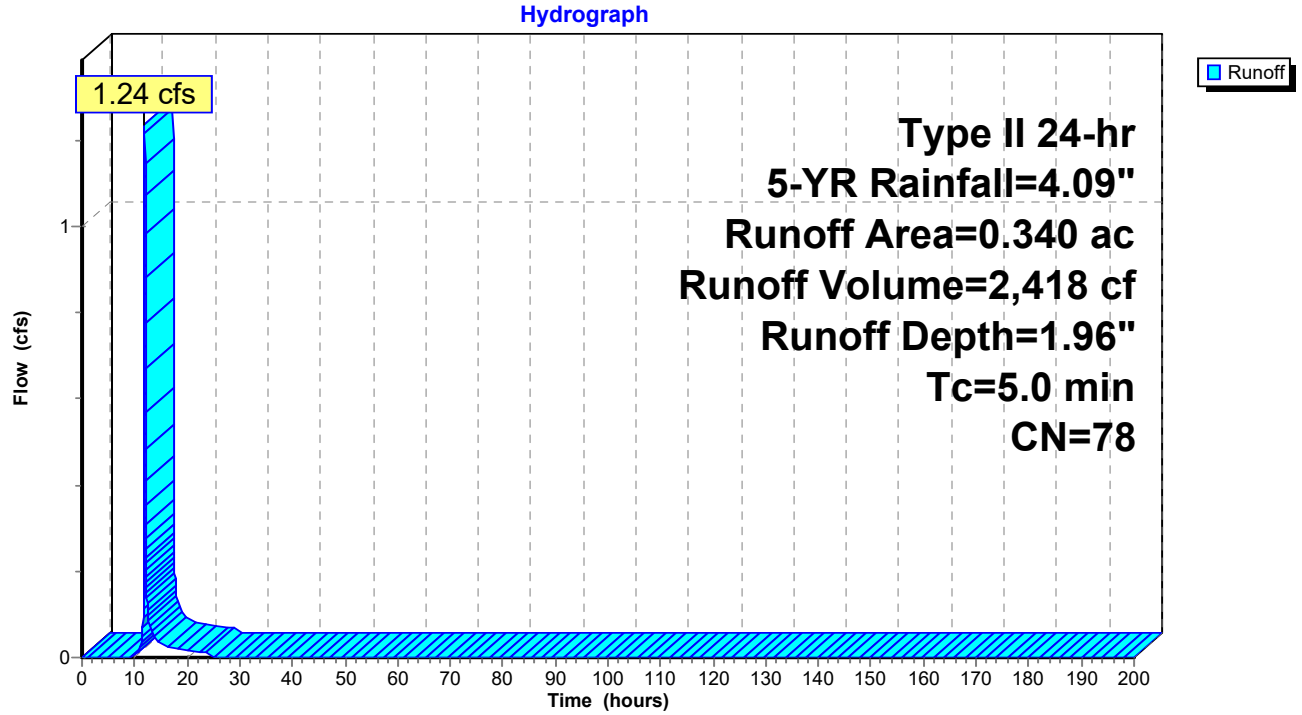
Runoff = 1.24 cfs @ 11.96 hrs, Volume= 2,418 cf, Depth= 1.96"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

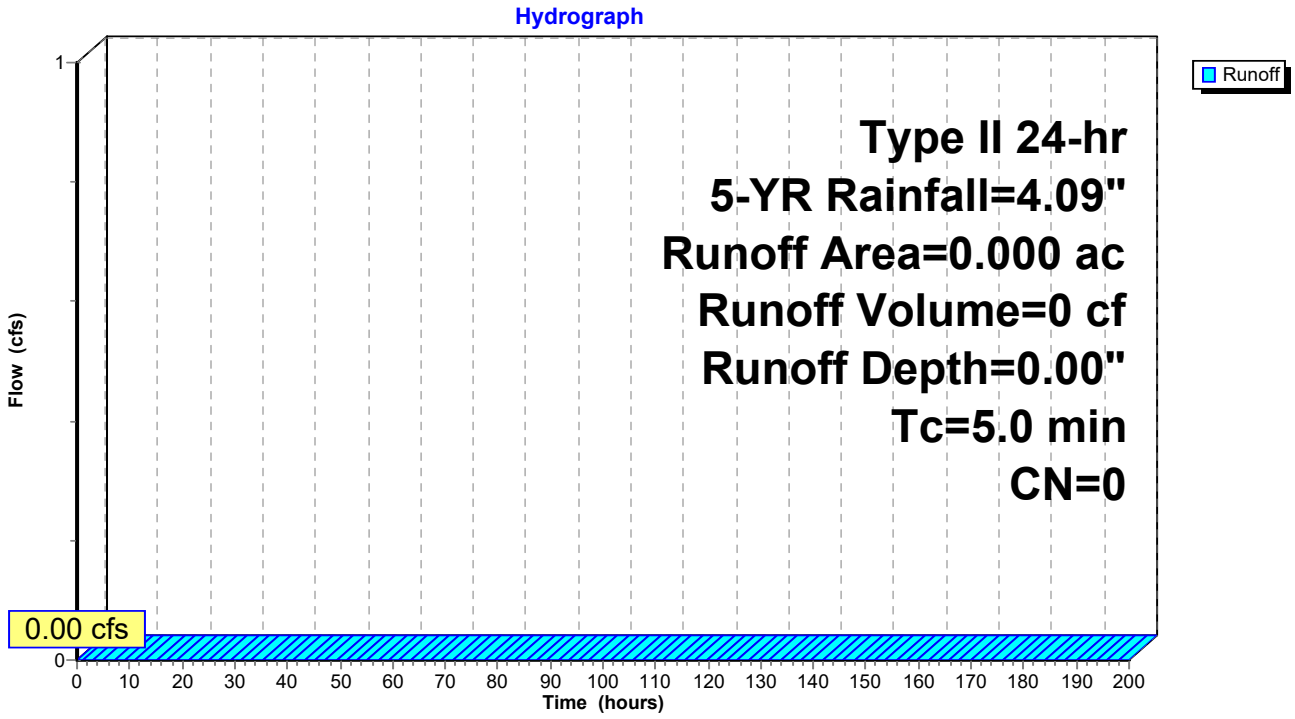
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

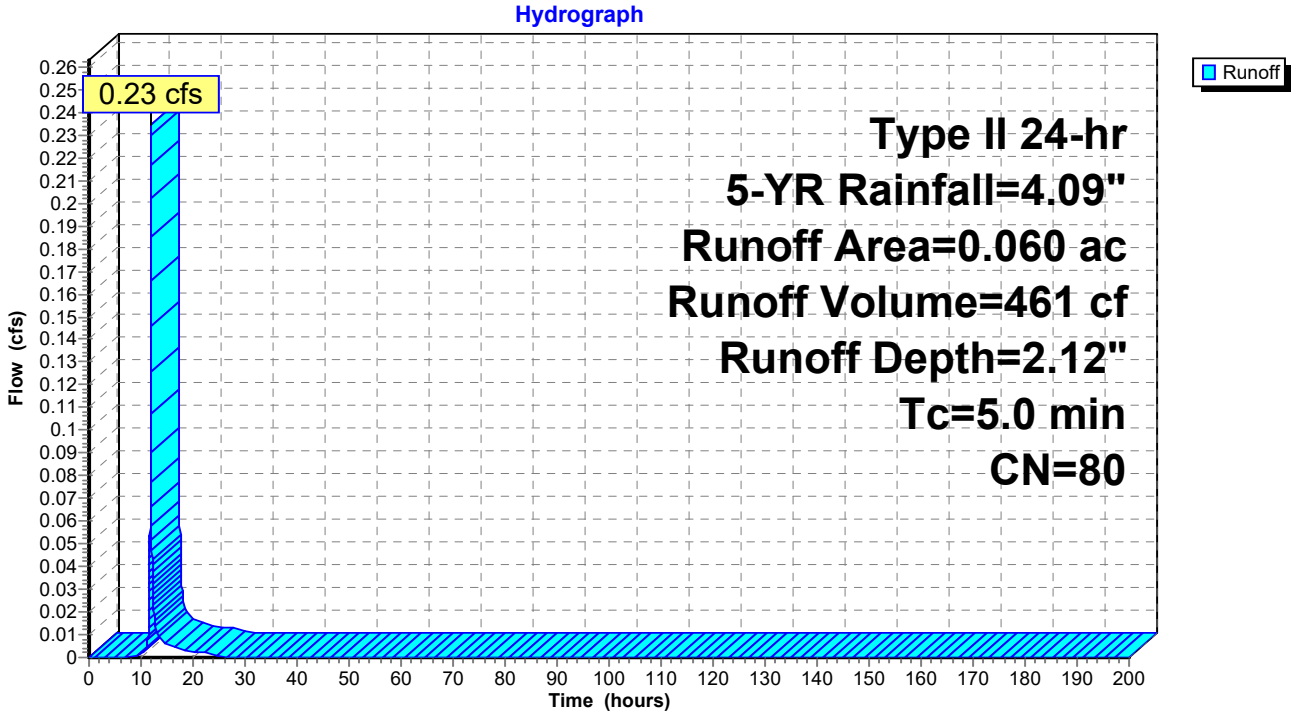
Runoff = 0.23 cfs @ 11.96 hrs, Volume= 461 cf, Depth= 2.12"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

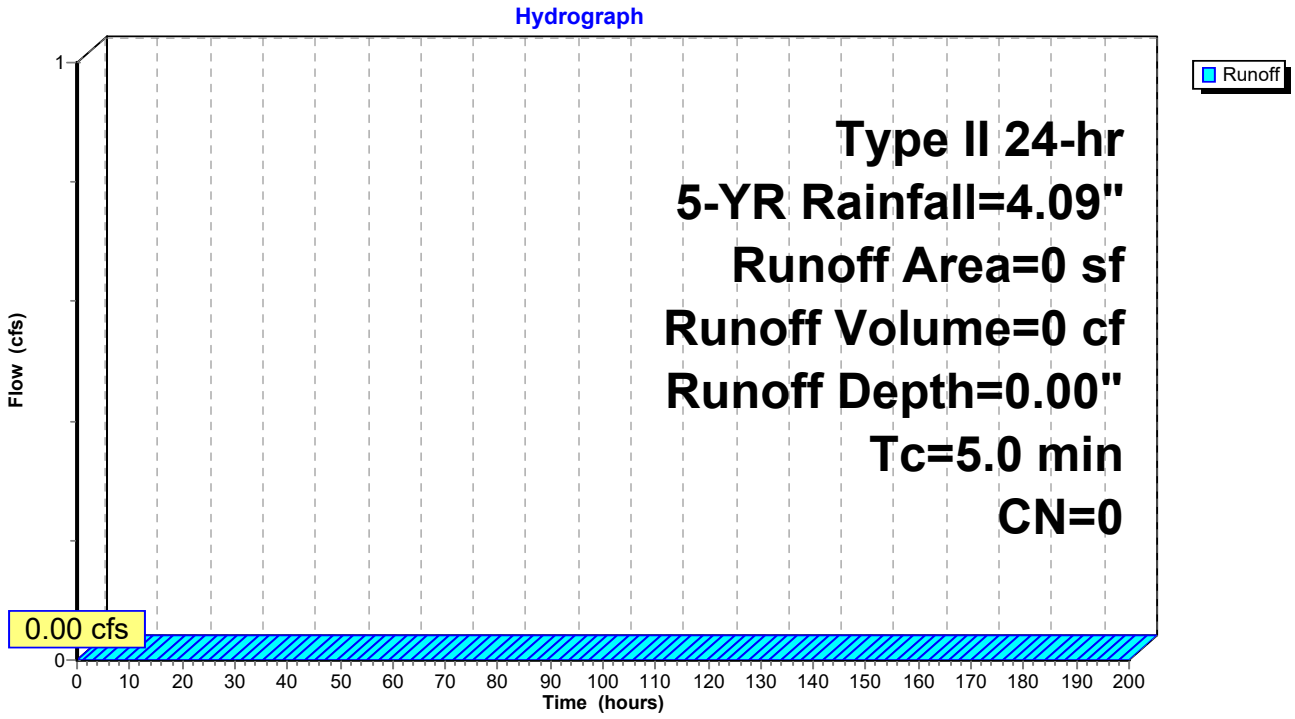
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

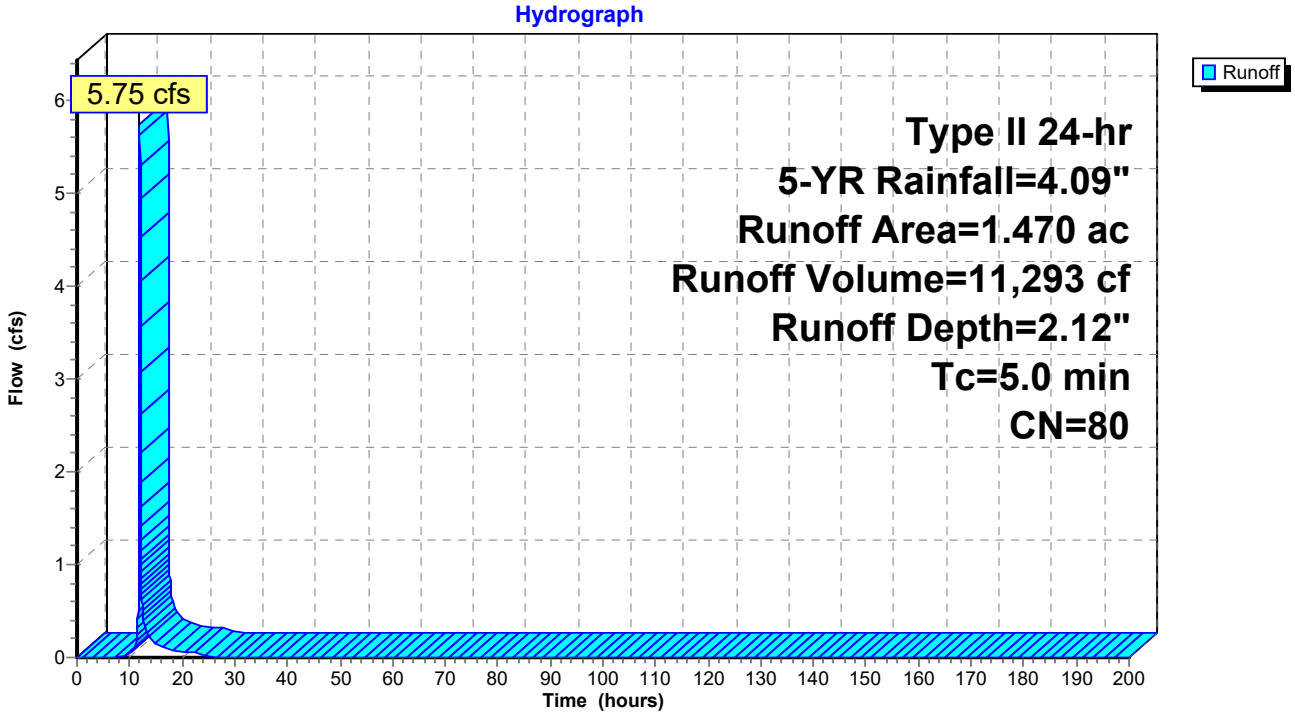
Runoff = 5.75 cfs @ 11.96 hrs, Volume= 11,293 cf, Depth= 2.12"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

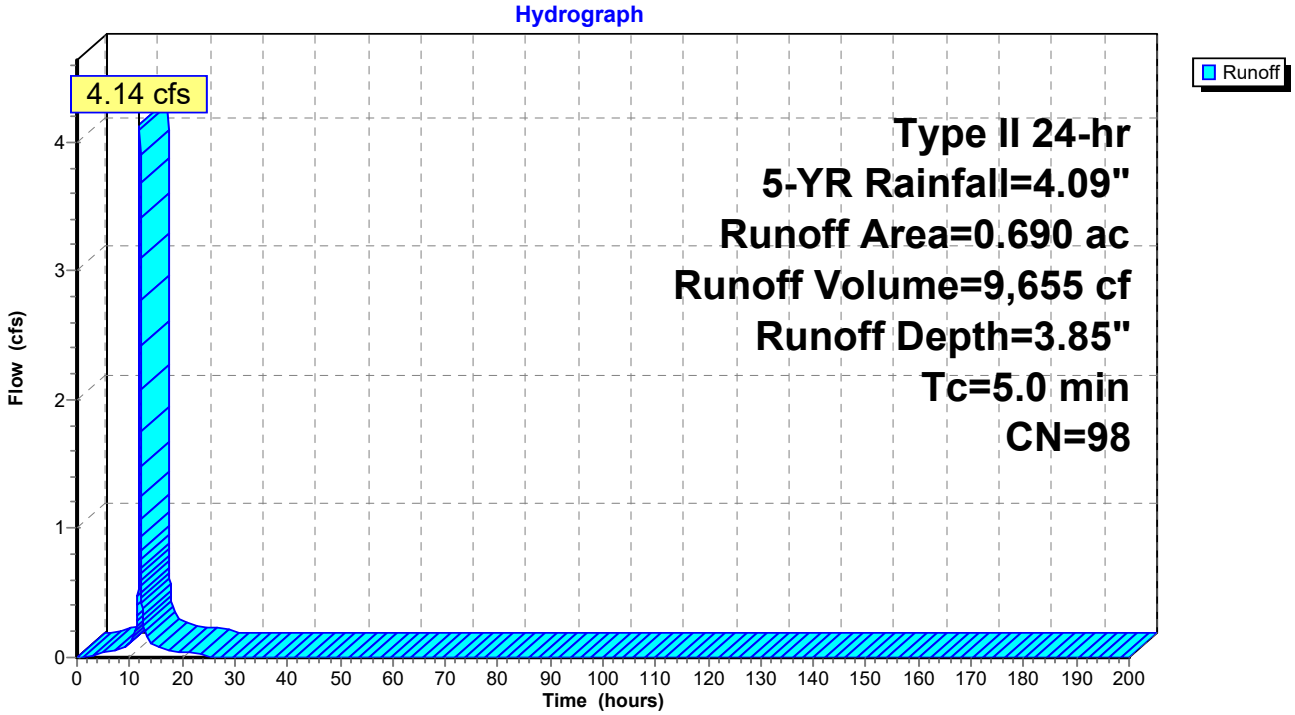
Runoff = 4.14 cfs @ 11.96 hrs, Volume= 9,655 cf, Depth= 3.85"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

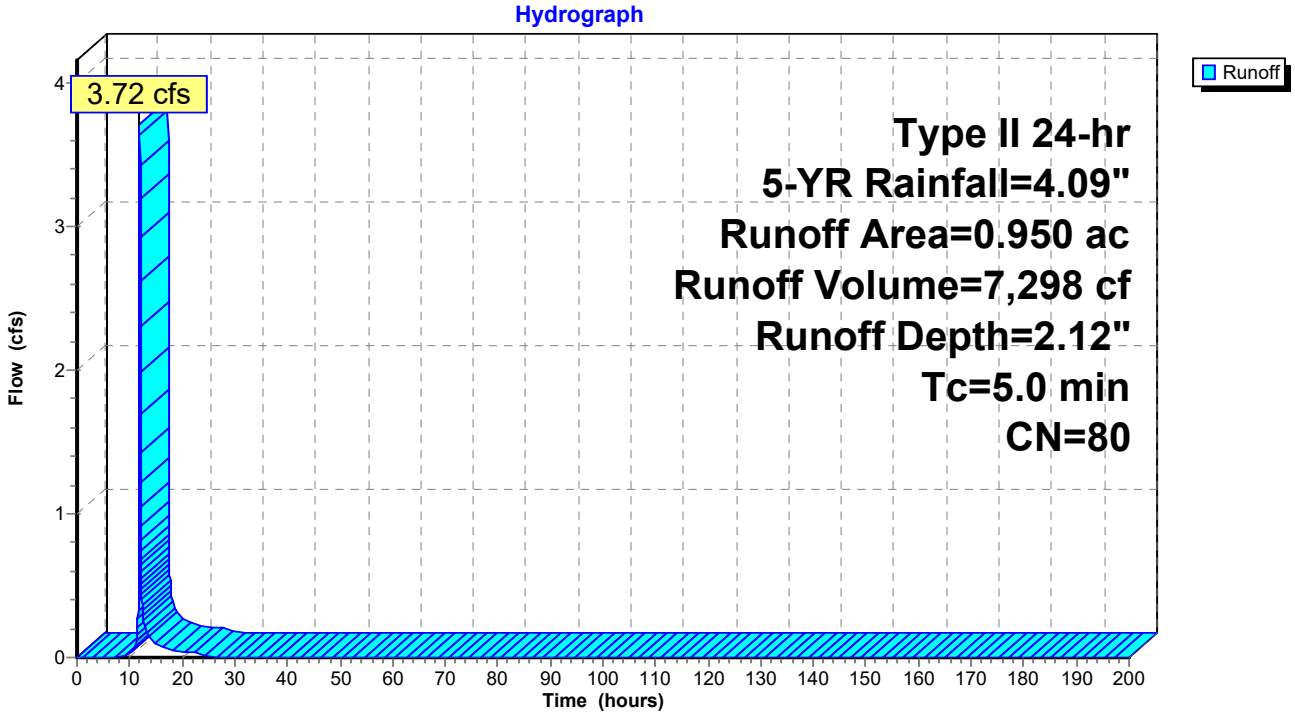
Runoff = 3.72 cfs @ 11.96 hrs, Volume= 7,298 cf, Depth= 2.12"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

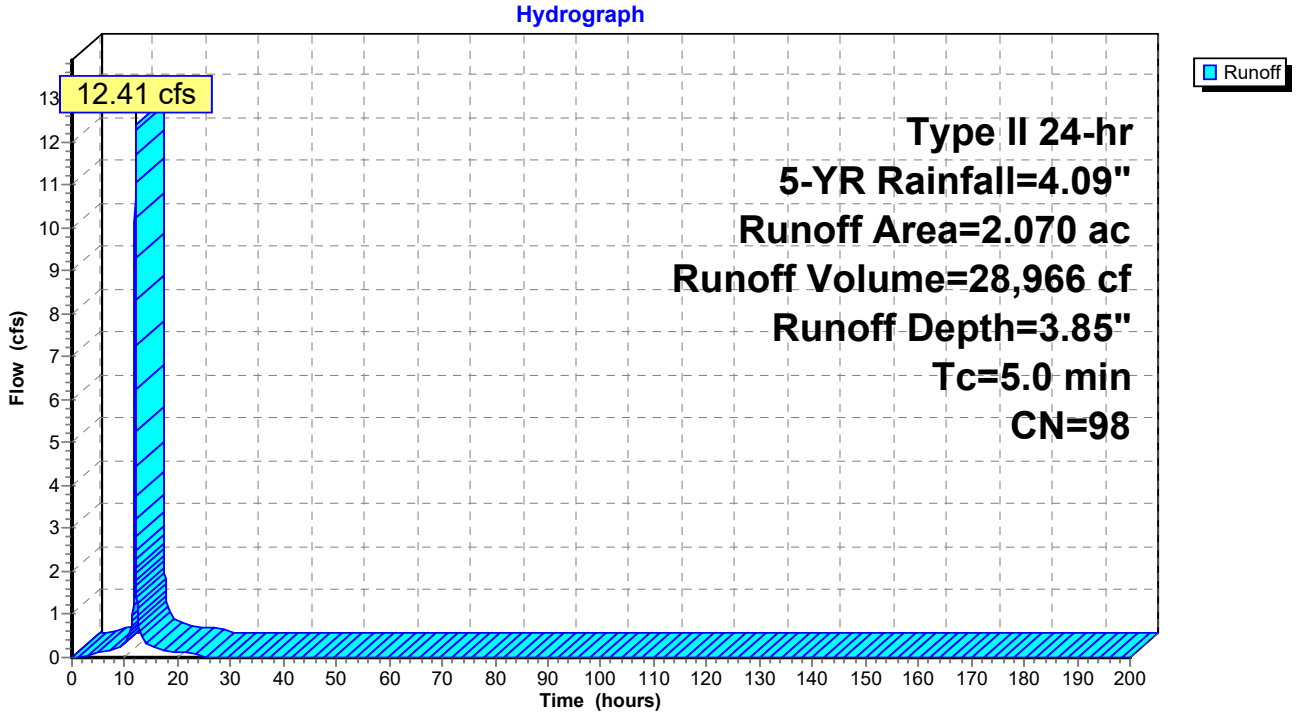
Runoff = 12.41 cfs @ 11.96 hrs, Volume= 28,966 cf, Depth= 3.85"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

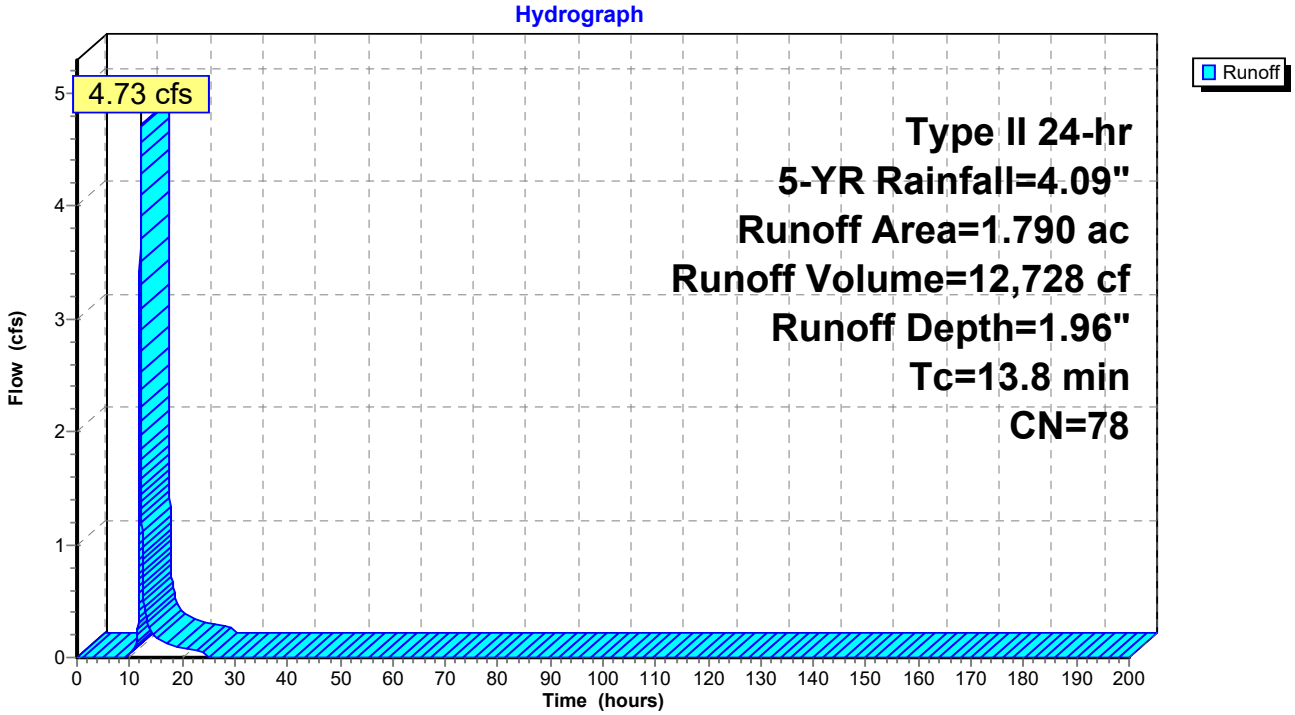
Runoff = 4.73 cfs @ 12.06 hrs, Volume= 12,728 cf, Depth= 1.96"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

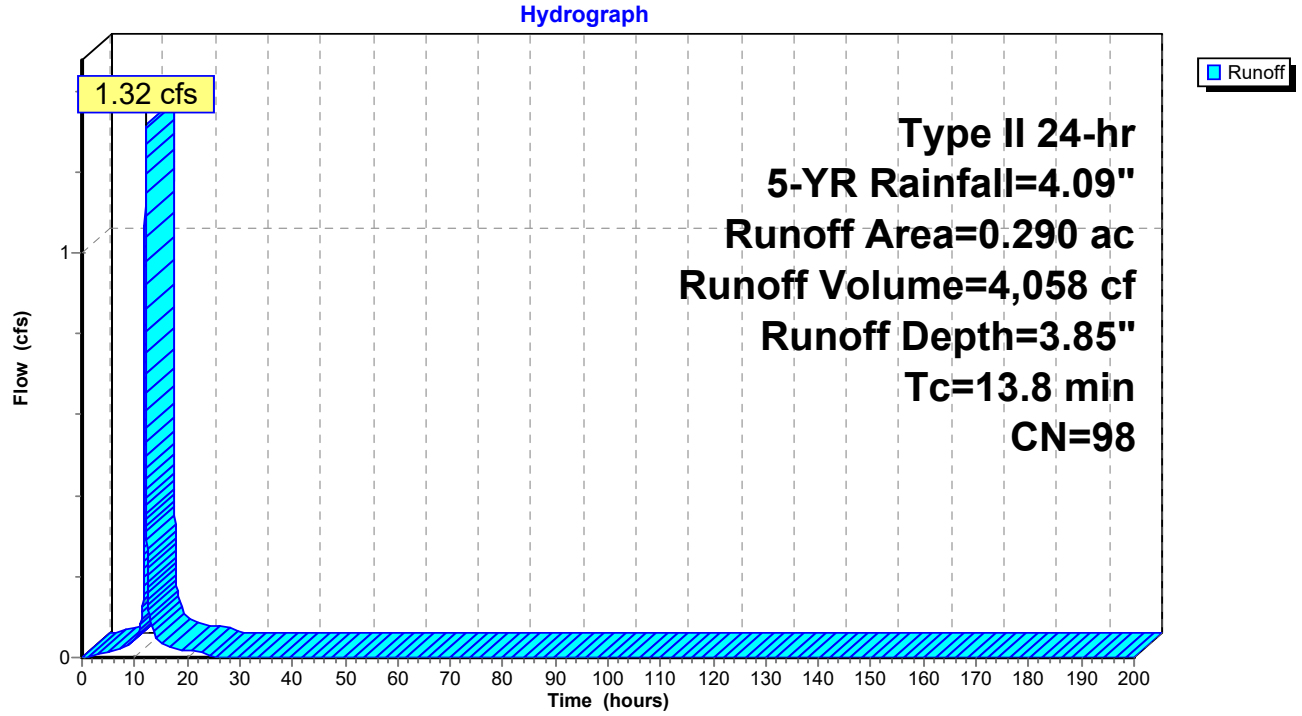
Runoff = 1.32 cfs @ 12.05 hrs, Volume= 4,058 cf, Depth= 3.85"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 5-YR Rainfall=4.09"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 2.54" for 5-YR event
Inflow = 16.40 cfs @ 11.96 hrs, Volume= 47,822 cf
Outflow = 1.63 cfs @ 12.99 hrs, Volume= 45,249 cf, Atten= 90%, Lag= 61.9 min
Primary = 1.59 cfs @ 12.99 hrs, Volume= 31,092 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.04 cfs @ 12.99 hrs, Volume= 14,157 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 365.78' @ 12.99 hrs Surf.Area= 11,496 sf Storage= 24,476 cf

Plug-Flow detention time= 1,235.9 min calculated for 45,249 cf (95% of inflow)
Center-of-Mass det. time= 1,204.5 min (1,999.7 - 795.2)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

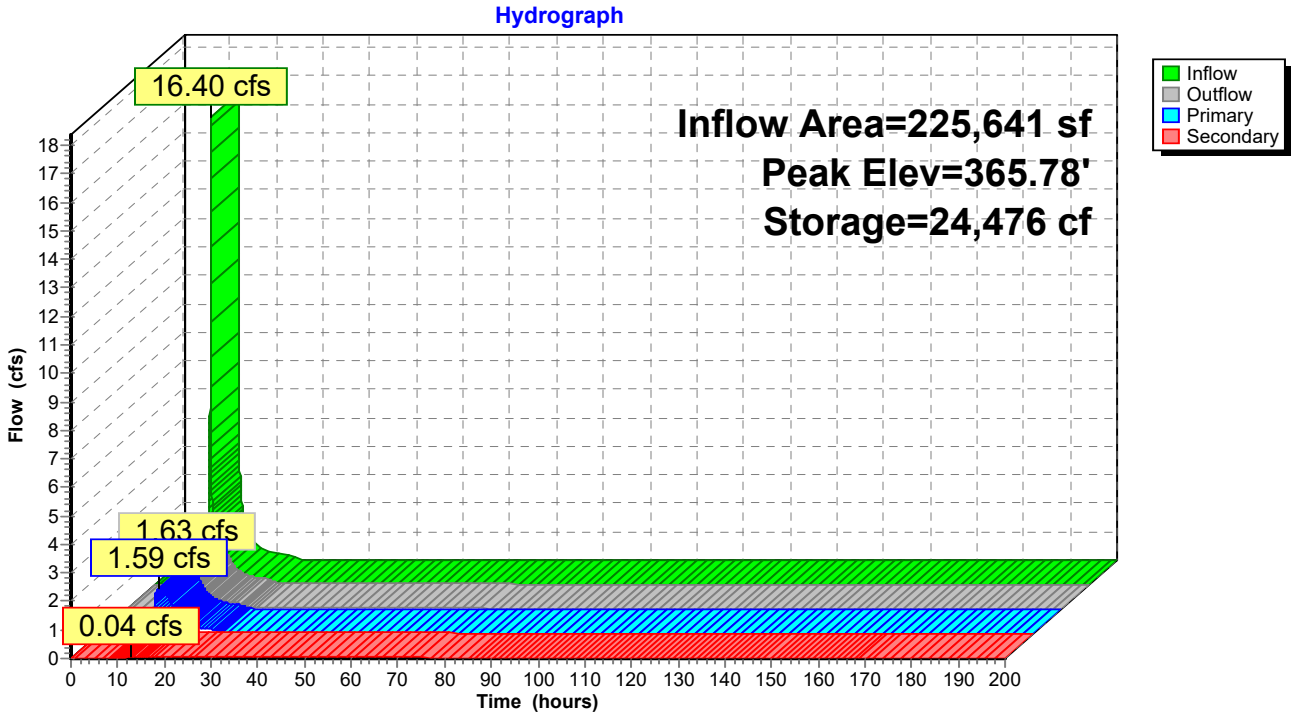
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.59 cfs @ 12.99 hrs HW=365.78' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.59 cfs of 14.81 cfs potential flow)
↑**4=Orifice** (Orifice Controls 1.59 cfs @ 4.24 fps)

Secondary OutFlow Max=0.04 cfs @ 12.99 hrs HW=365.78' TW=0.00' (Dynamic Tailwater)
↑**2=MRC Underdrain** (Passes 0.04 cfs of 0.80 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 9.32 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 2.67" for 5-YR event
Inflow = 9.88 cfs @ 11.96 hrs, Volume= 20,948 cf
Outflow = 1.18 cfs @ 12.22 hrs, Volume= 20,109 cf, Atten= 88%, Lag= 15.5 min
Primary = 1.14 cfs @ 12.22 hrs, Volume= 11,558 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.04 cfs @ 12.25 hrs, Volume= 8,551 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 366.28' @ 12.25 hrs Surf.Area= 6,083 sf Storage= 11,275 cf

Plug-Flow detention time= 997.8 min calculated for 20,109 cf (96% of inflow)
Center-of-Mass det. time= 973.7 min (1,763.5 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

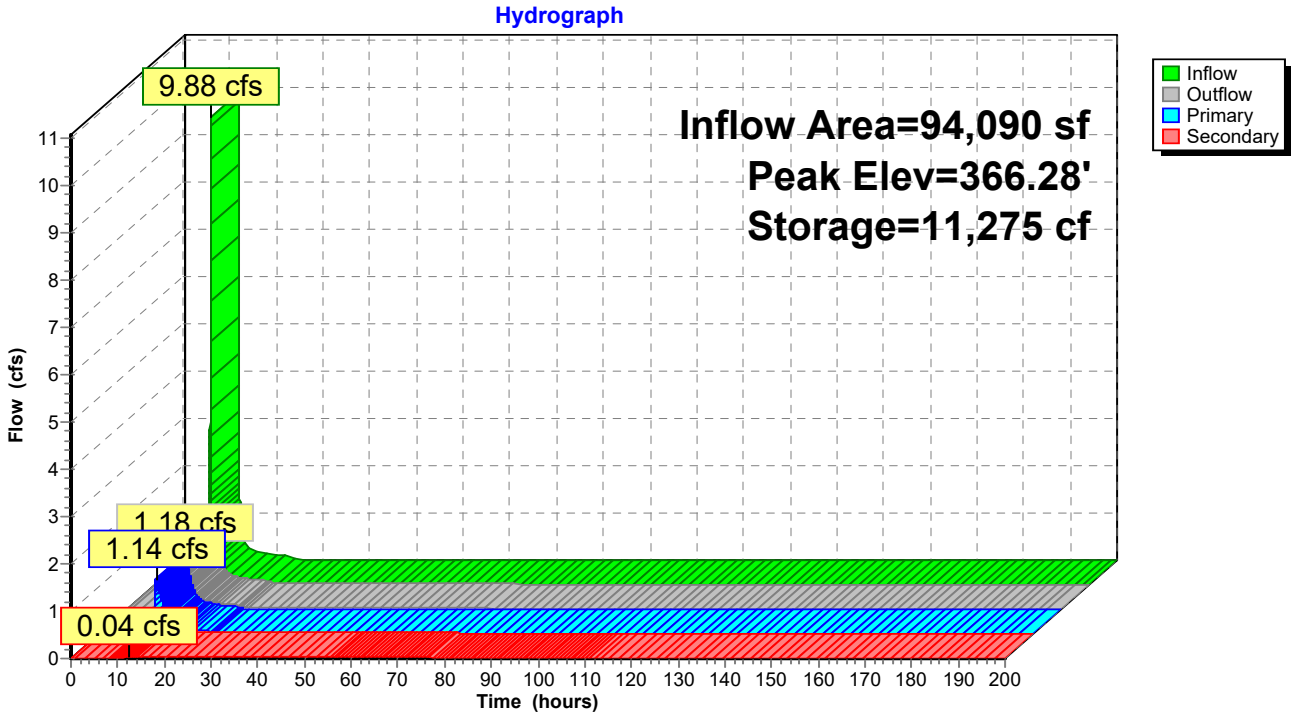
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.14 cfs @ 12.22 hrs HW=366.28' TW=365.63' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.14 cfs of 4.86 cfs potential flow)
↑**4=Orifice** (Orifice Controls 1.14 cfs @ 3.43 fps)

Secondary OutFlow Max=0.04 cfs @ 12.25 hrs HW=366.28' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.04 cfs of 0.42 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 8.67 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

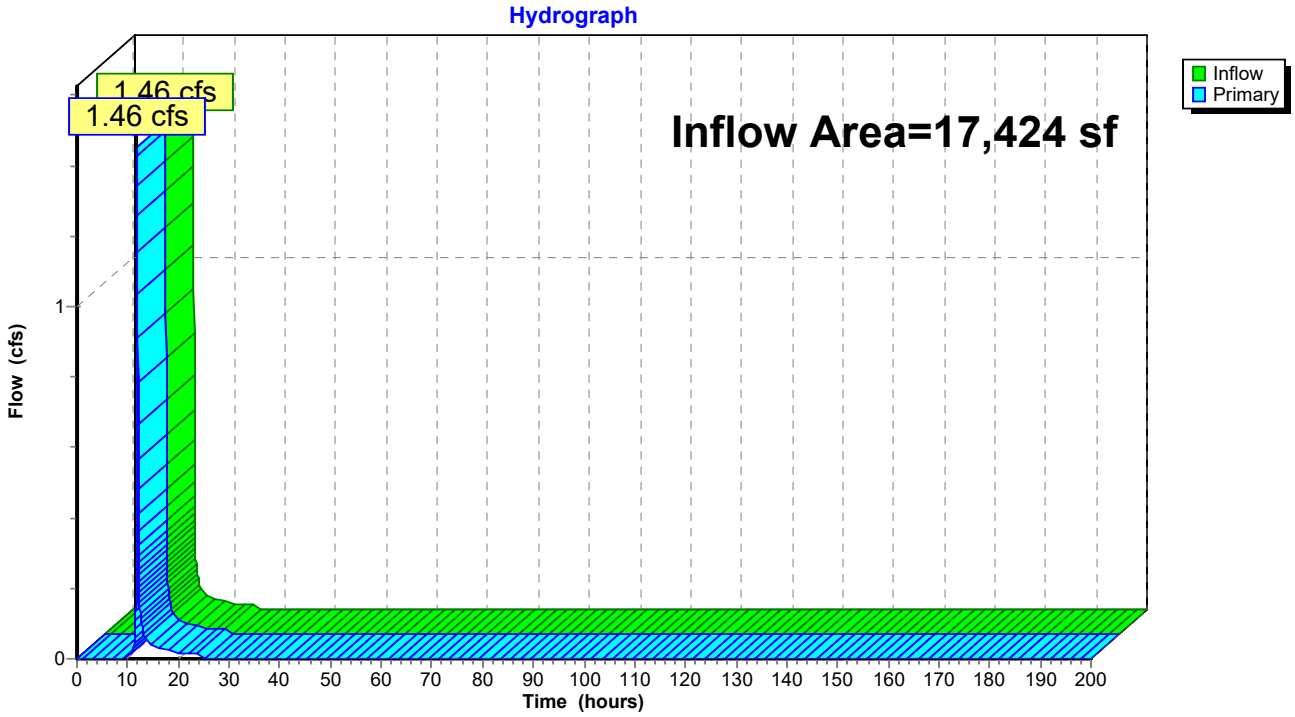
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 1.96" for 5-YR event
Inflow = 1.46 cfs @ 11.96 hrs, Volume= 2,844 cf
Primary = 1.46 cfs @ 11.96 hrs, Volume= 2,844 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

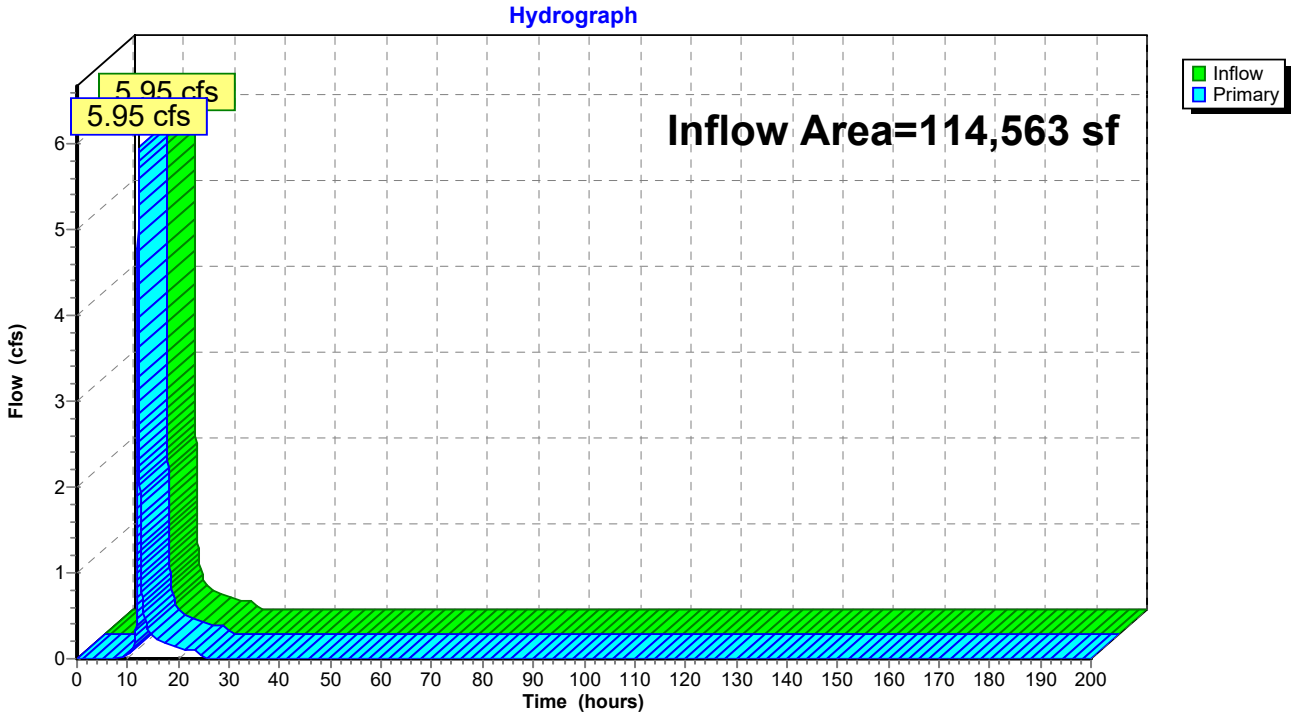


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 1.99" for 5-YR event
Inflow = 5.95 cfs @ 12.12 hrs, Volume= 19,046 cf
Primary = 5.95 cfs @ 12.12 hrs, Volume= 19,046 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

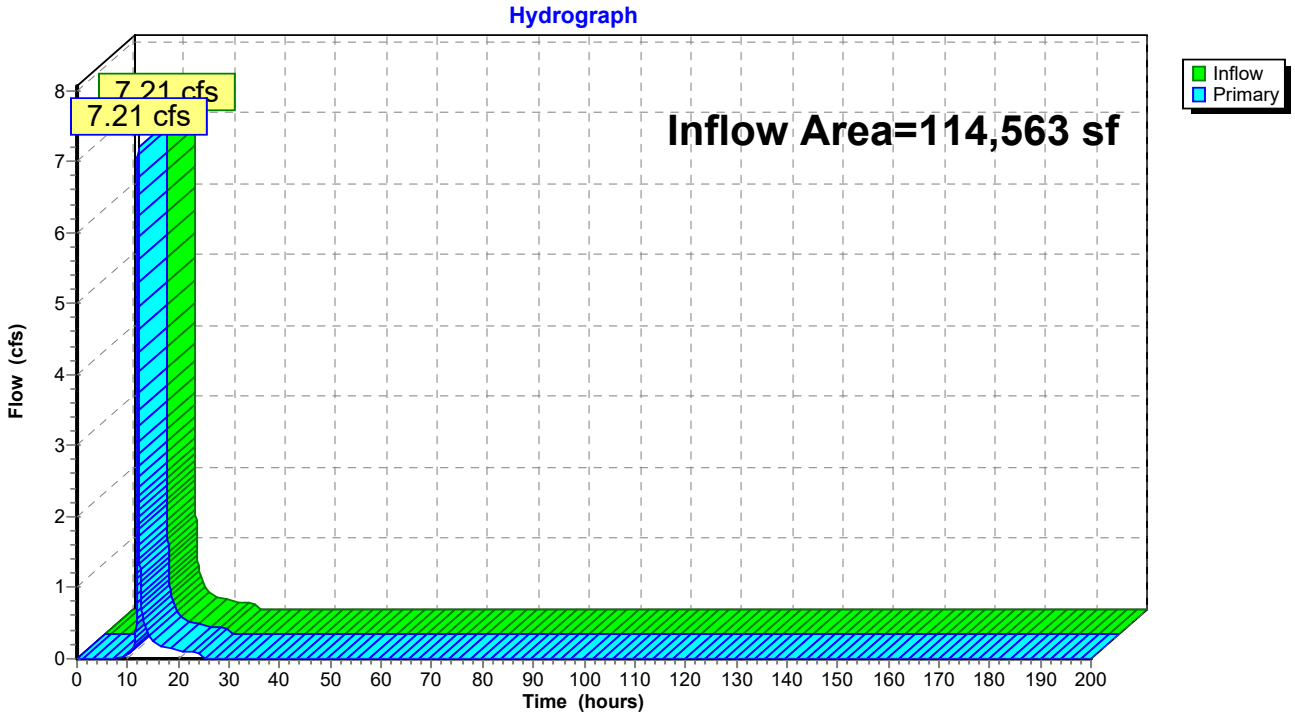


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 1.99" for 5-YR event
Inflow = 7.21 cfs @ 12.05 hrs, Volume= 19,046 cf
Primary = 7.21 cfs @ 12.05 hrs, Volume= 19,046 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

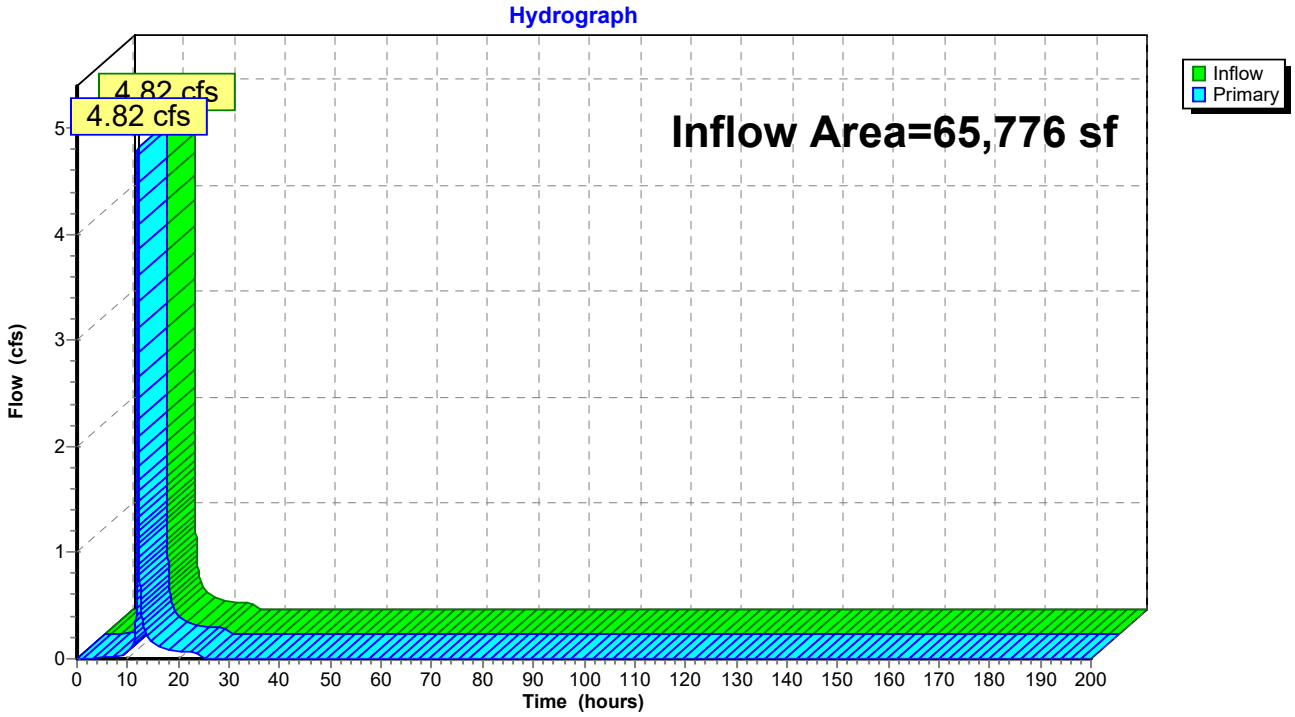


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 2.27" for 5-YR event
Inflow = 4.82 cfs @ 12.03 hrs, Volume= 12,458 cf
Primary = 4.82 cfs @ 12.03 hrs, Volume= 12,458 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

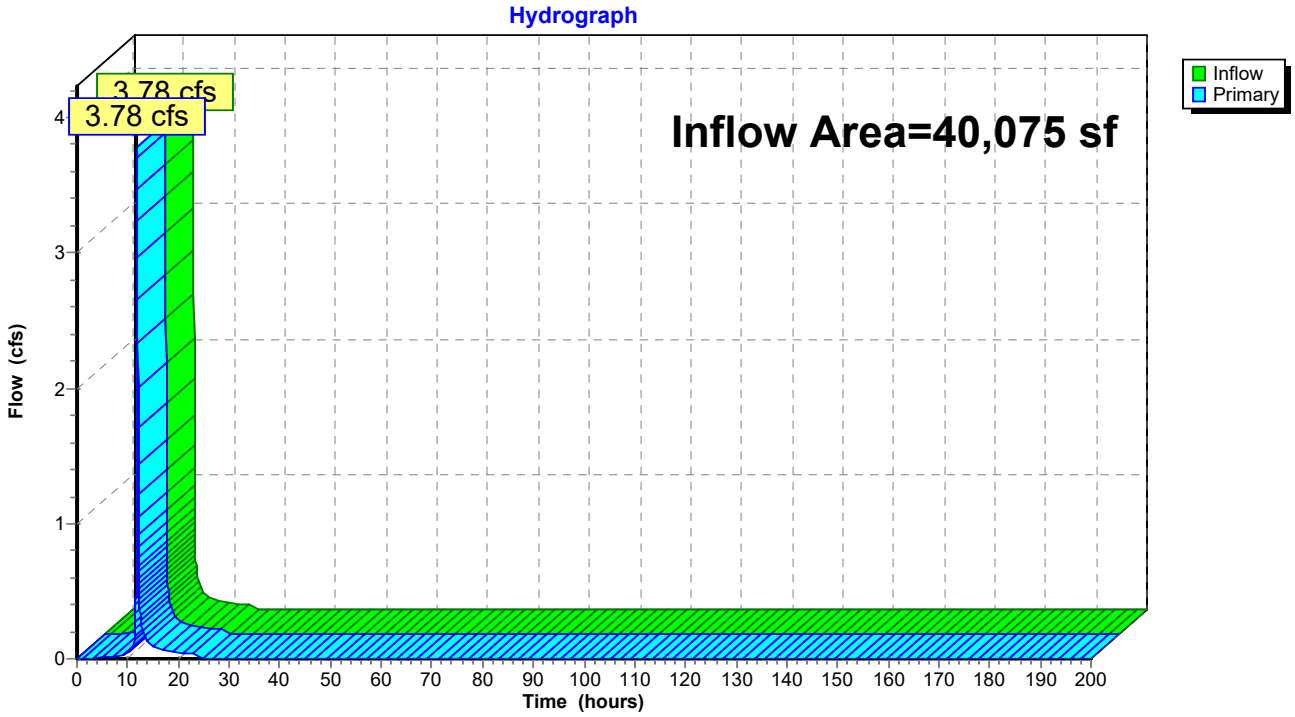


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 2.31" for 5-YR event
Inflow = 3.78 cfs @ 11.96 hrs, Volume= 7,726 cf
Primary = 3.78 cfs @ 11.96 hrs, Volume= 7,726 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

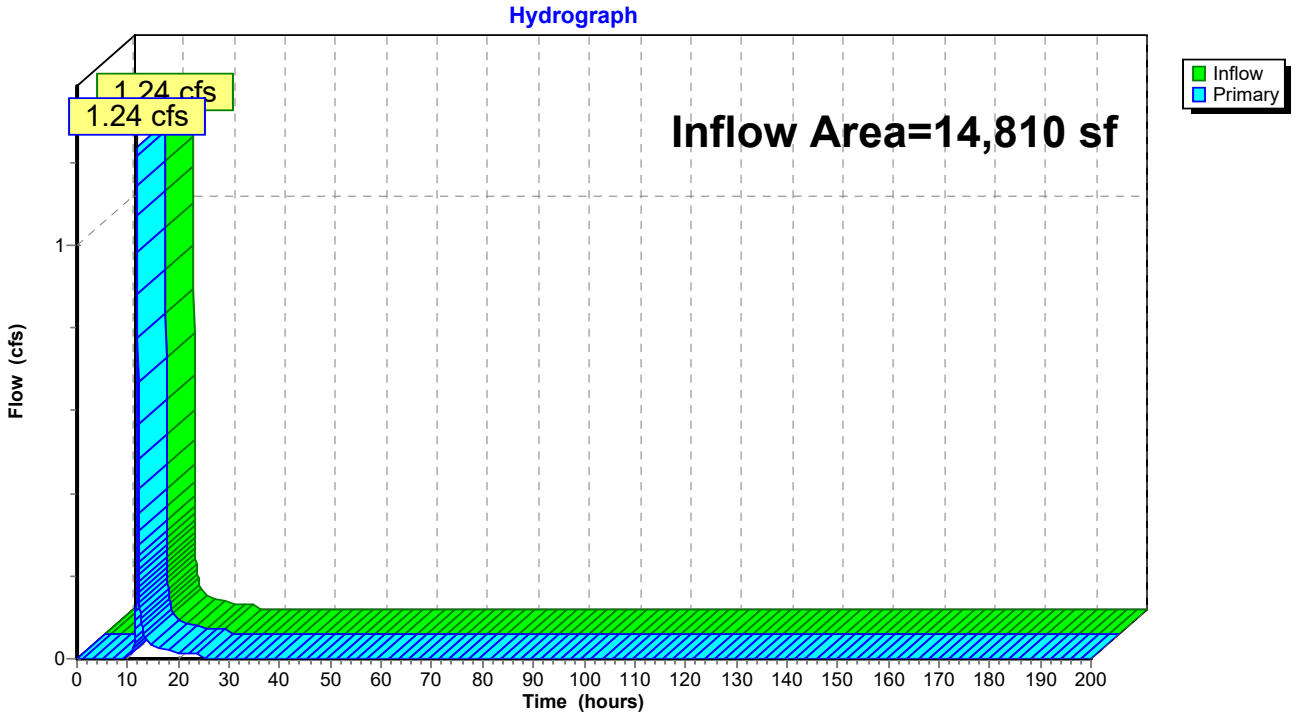


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 1.96" for 5-YR event
Inflow = 1.24 cfs @ 11.96 hrs, Volume= 2,418 cf
Primary = 1.24 cfs @ 11.96 hrs, Volume= 2,418 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

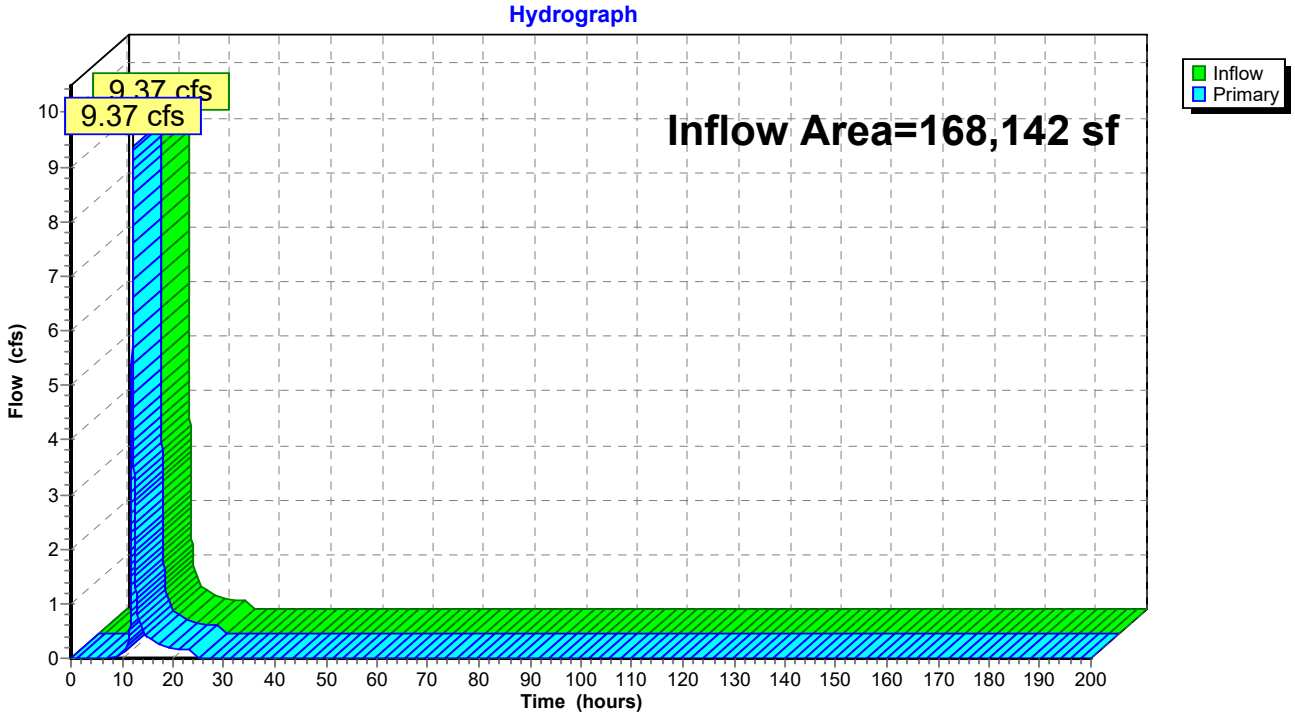


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 2.06" for 5-YR event
Inflow = 9.37 cfs @ 12.10 hrs, Volume= 28,824 cf
Primary = 9.37 cfs @ 12.10 hrs, Volume= 28,824 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

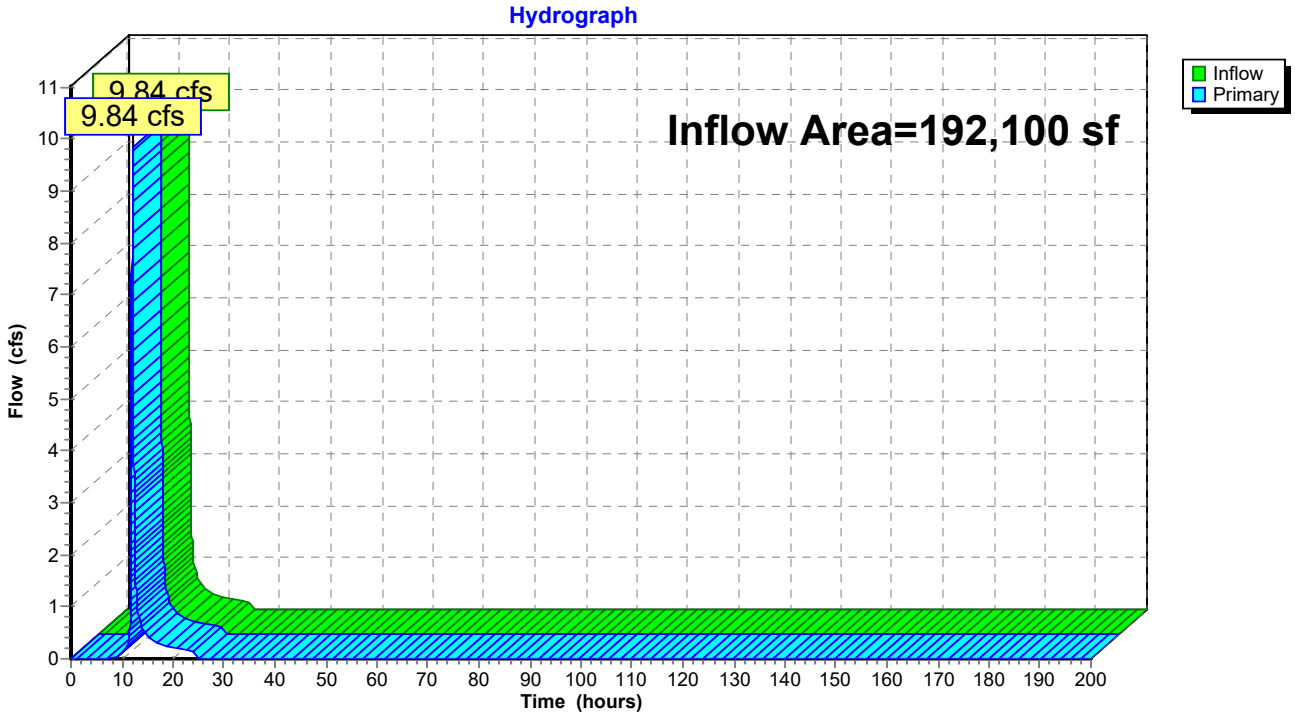


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 2.04" for 5-YR event
Inflow = 9.84 cfs @ 12.09 hrs, Volume= 32,735 cf
Primary = 9.84 cfs @ 12.09 hrs, Volume= 32,735 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

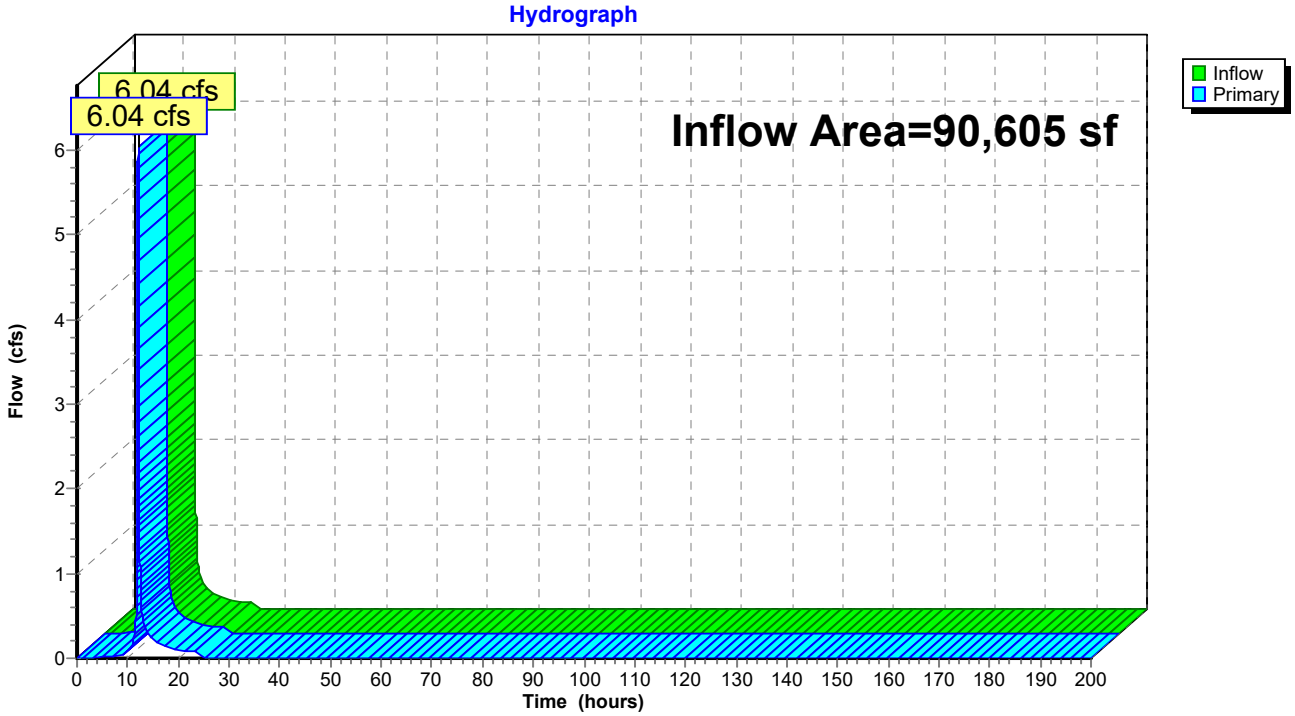


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 2.22" for 5-YR event
Inflow = 6.04 cfs @ 12.06 hrs, Volume= 16,786 cf
Primary = 6.04 cfs @ 12.06 hrs, Volume= 16,786 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

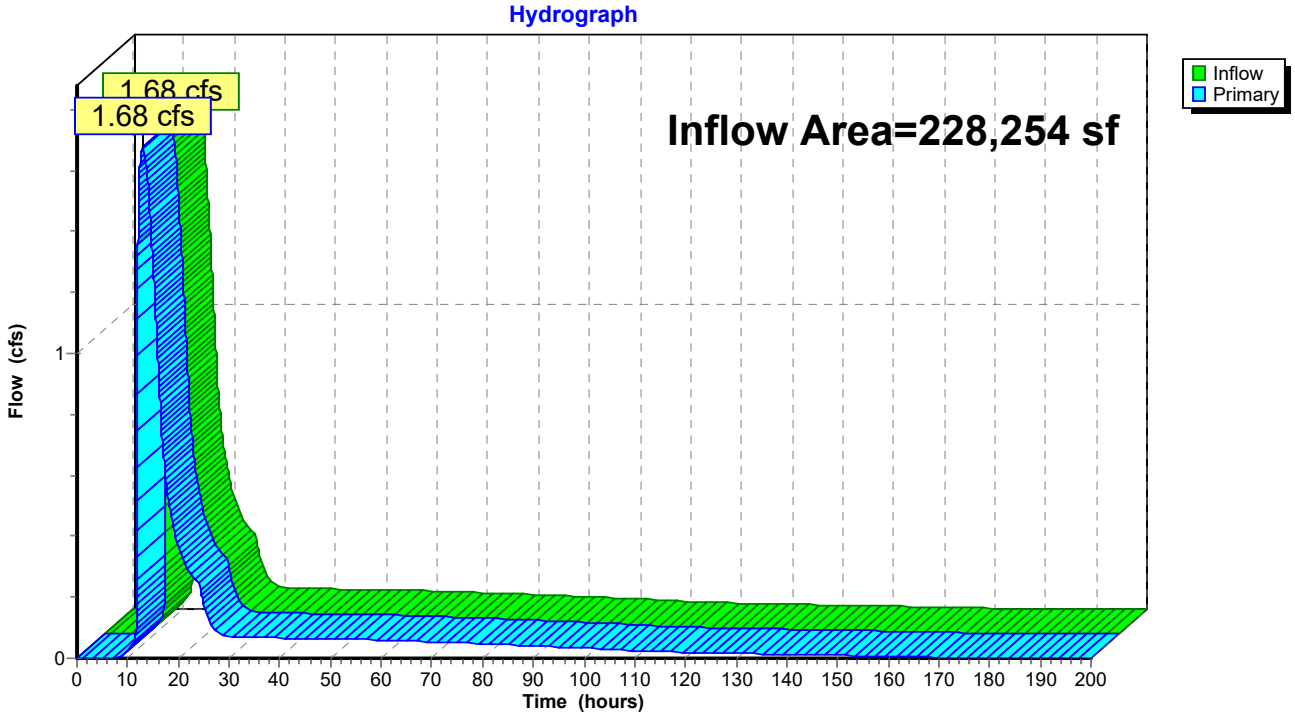


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 2.85" for 5-YR event
Inflow = 1.68 cfs @ 12.96 hrs, Volume= 54,261 cf
Primary = 1.68 cfs @ 12.96 hrs, Volume= 54,261 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

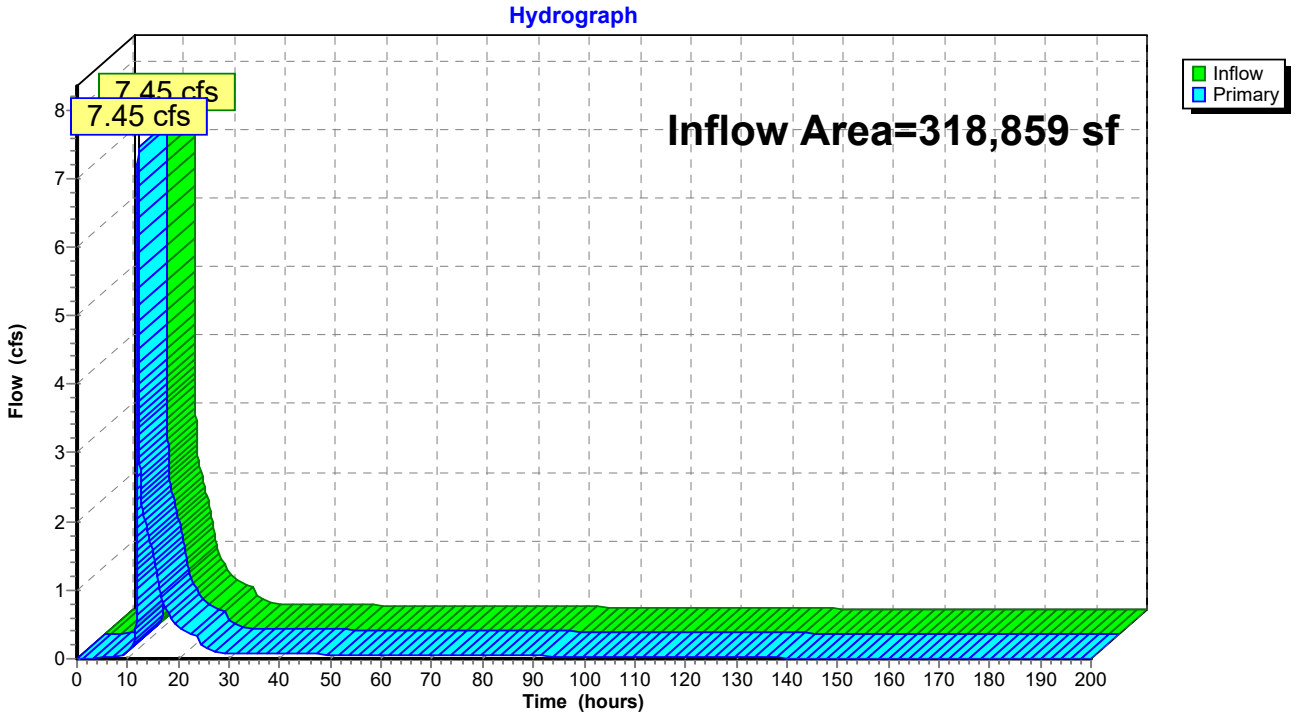


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 2.67" for 5-YR event
Inflow = 7.45 cfs @ 12.06 hrs, Volume= 71,048 cf
Primary = 7.45 cfs @ 12.06 hrs, Volume= 71,048 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=2.53"
Tc=17.5 min CN=78 Runoff=11.07 cfs 33,560 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=4.54"
Tc=17.5 min CN=98 Runoff=0.96 cfs 3,299 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=2.53"
Tc=5.0 min CN=78 Runoff=1.87 cfs 3,668 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=2.53"
Tc=19.1 min CN=78 Runoff=7.45 cfs 23,657 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=4.54"
Tc=19.1 min CN=98 Runoff=0.23 cfs 825 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=2.53"
Tc=13.1 min CN=78 Runoff=9.00 cfs 23,657 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=4.54"
Tc=13.1 min CN=98 Runoff=0.27 cfs 825 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=2.53"
Tc=11.5 min CN=78 Runoff=4.65 cfs 11,553 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=2.53"
Tc=5.0 min CN=78 Runoff=2.57 cfs 5,043 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=4.54"
Tc=11.5 min CN=98 Runoff=1.43 cfs 4,123 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=2.61"
Tc=5.0 min CN=79 Runoff=3.75 cfs 7,399 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=98 Runoff=0.98 cfs 2,309 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=2.53"
Tc=5.0 min CN=78 Runoff=1.59 cfs 3,118 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=2.70"
Tc=5.0 min CN=80 Runoff=0.30 cfs 588 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=2.70"
Tc=5.0 min CN=80 Runoff=7.29 cfs 14,417 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=98 Runoff=4.84 cfs 11,380 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=2.70"
Tc=5.0 min CN=80 Runoff=4.71 cfs 9,317 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=98 Runoff=14.53 cfs 34,141 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=2.53"
Tc=13.8 min CN=78 Runoff=6.10 cfs 16,413 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=4.54"
Tc=13.8 min CN=98 Runoff=1.54 cfs 4,783 cf

Pond 39P: Basin 1 (MRC) Peak Elev=366.18' Storage=28,928 cf Inflow=20.23 cfs 59,742 cf
Primary=1.96 cfs 42,842 cf Secondary=0.04 cfs 14,327 cf Outflow=2.00 cfs 57,169 cf

Pond 40P: Basin 2 (MRC) Peak Elev=366.72' Storage=13,875 cf Inflow=12.12 cfs 25,797 cf
Primary=1.41 cfs 16,284 cf Secondary=0.04 cfs 8,674 cf Outflow=1.45 cfs 24,958 cf

Link 6L: Pre B (Bypass) Inflow=1.87 cfs 3,668 cf
Primary=1.87 cfs 3,668 cf

Link 9L: Pre C (Bypass) Inflow=7.68 cfs 24,481 cf
Primary=7.68 cfs 24,481 cf

Link 12L: Pre D (Bypass) Inflow=9.27 cfs 24,481 cf
Primary=9.27 cfs 24,481 cf

Link 17L: Post D Bypass Inflow=6.07 cfs 15,677 cf
Primary=6.07 cfs 15,677 cf

Link 20L: Post C Bypass Inflow=4.73 cfs 9,708 cf
Primary=4.73 cfs 9,708 cf

Link 23L: Post B Bypass Inflow=1.59 cfs 3,118 cf
Primary=1.59 cfs 3,118 cf

Link 24L: Culvert - PRE Inflow=12.02 cfs 36,858 cf
Primary=12.02 cfs 36,858 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=12.63 cfs 41,901 cf
Primary=12.63 cfs 41,901 cf

Link 26L: Culvert - POST Inflow=7.64 cfs 21,196 cf
Primary=7.64 cfs 21,196 cf

Link 27L: Post POI A-1 Inflow=2.06 cfs 66,432 cf
Primary=2.06 cfs 66,432 cf

Link 30L: To CTP Ex. Basin- POST Inflow=9.53 cfs 87,628 cf
Primary=9.53 cfs 87,628 cf

Total Runoff Area = 878,170 sf Runoff Volume = 214,074 cf Average Runoff Depth = 2.93"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

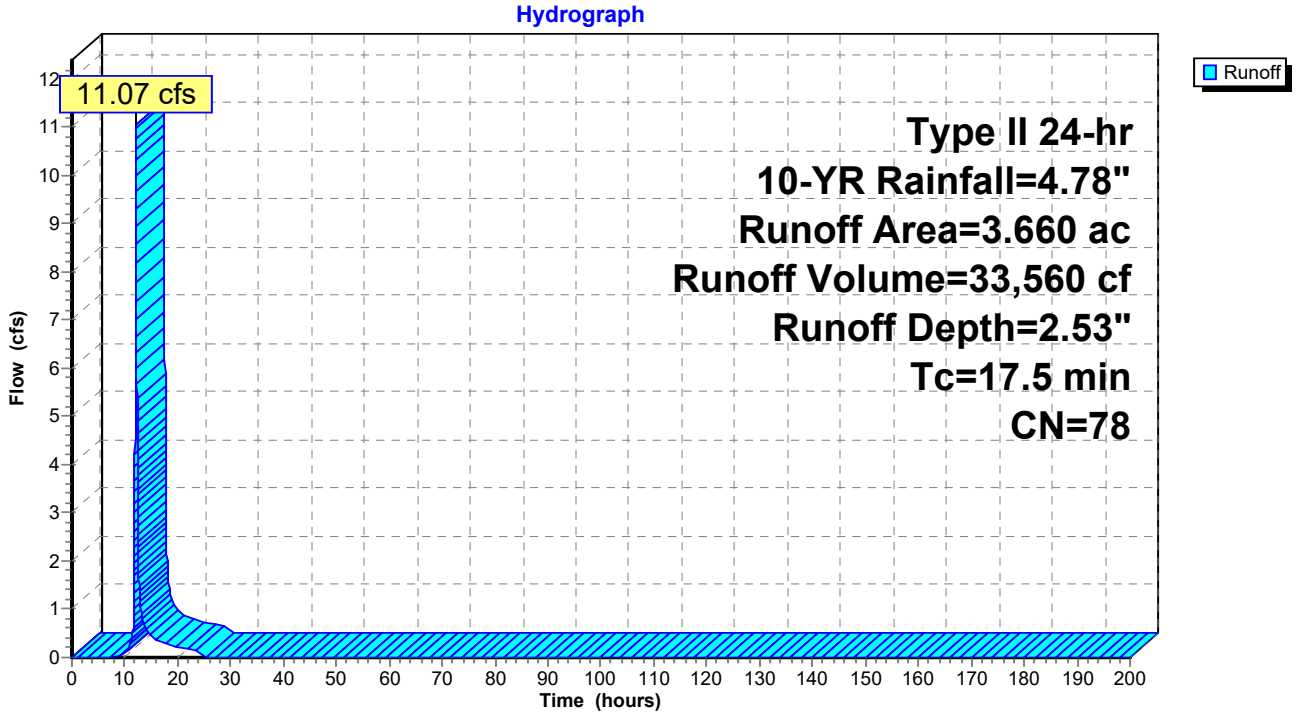
Runoff = 11.07 cfs @ 12.10 hrs, Volume= 33,560 cf, Depth= 2.53"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

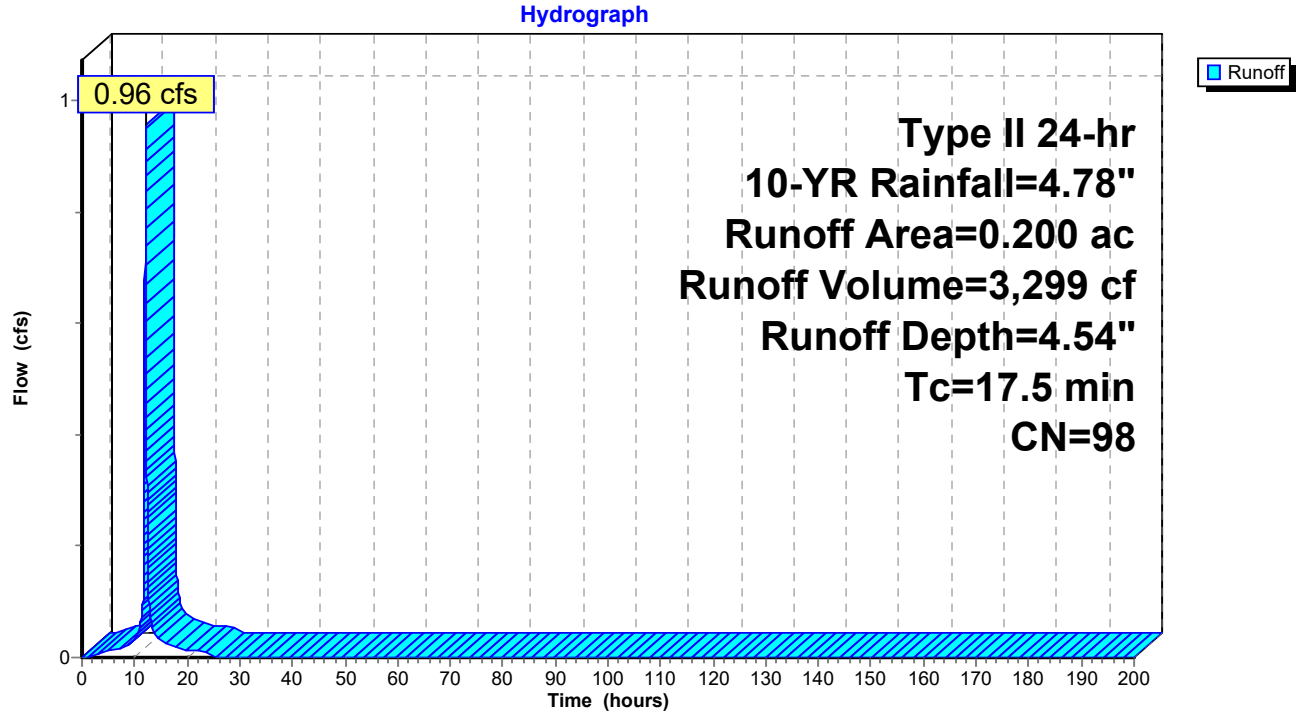
Runoff = 0.96 cfs @ 12.09 hrs, Volume= 3,299 cf, Depth= 4.54"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

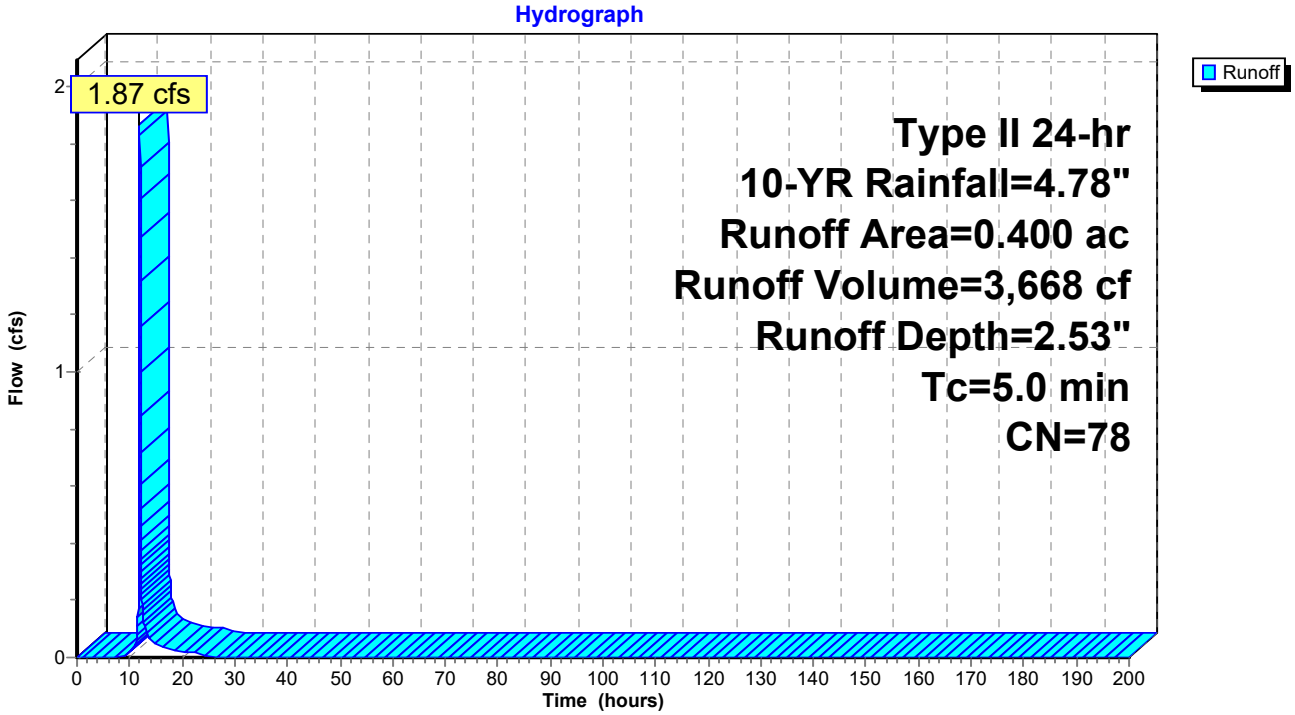
Runoff = 1.87 cfs @ 11.96 hrs, Volume= 3,668 cf, Depth= 2.53"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

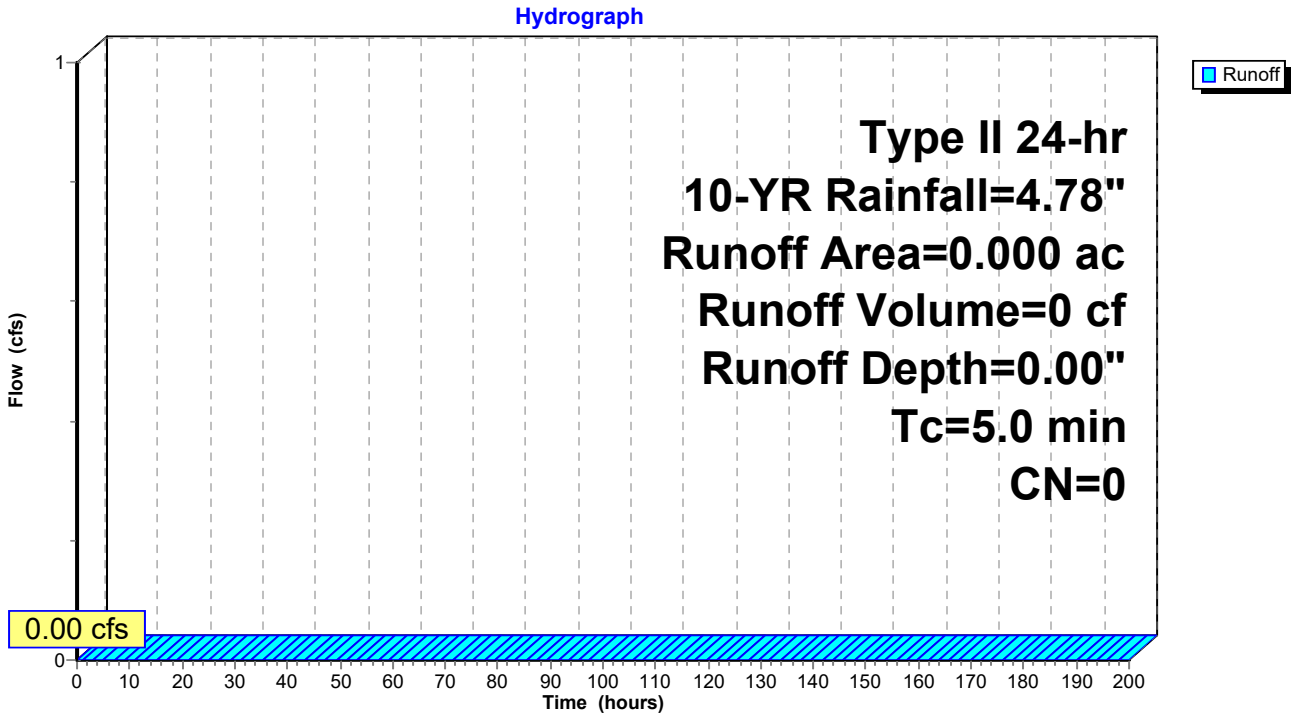
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

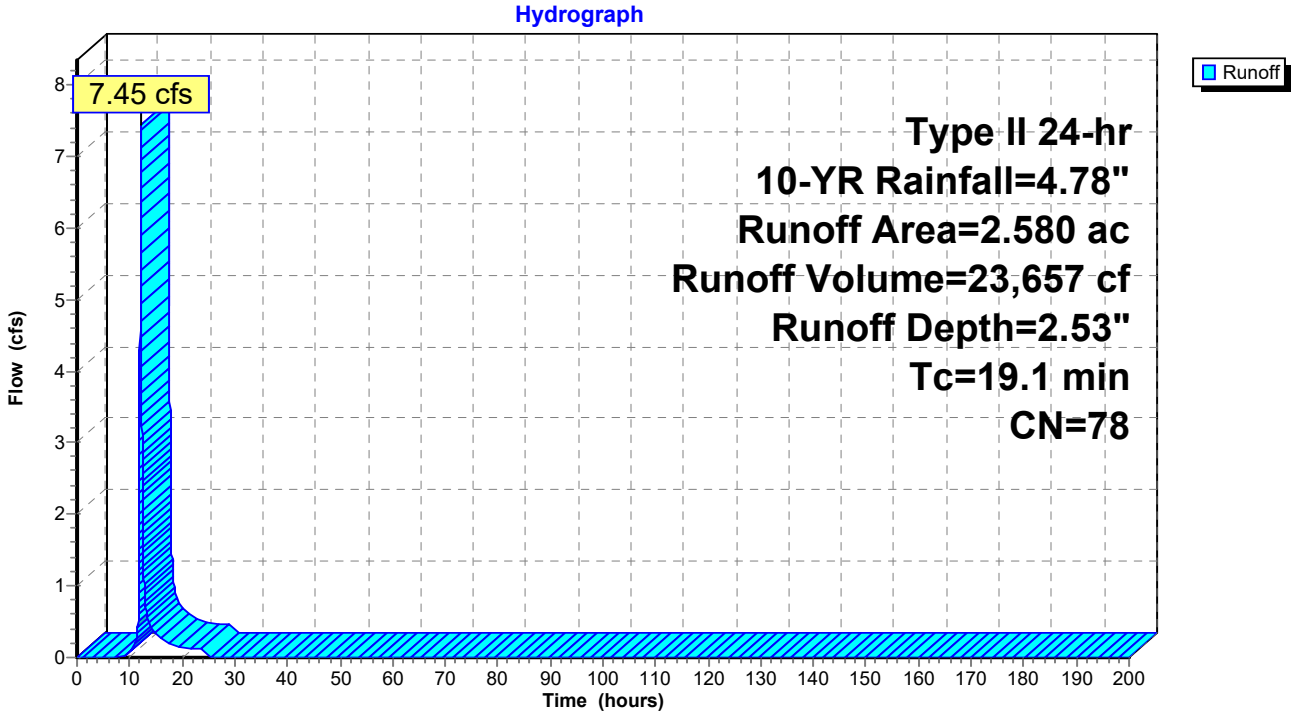
Runoff = 7.45 cfs @ 12.12 hrs, Volume= 23,657 cf, Depth= 2.53"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

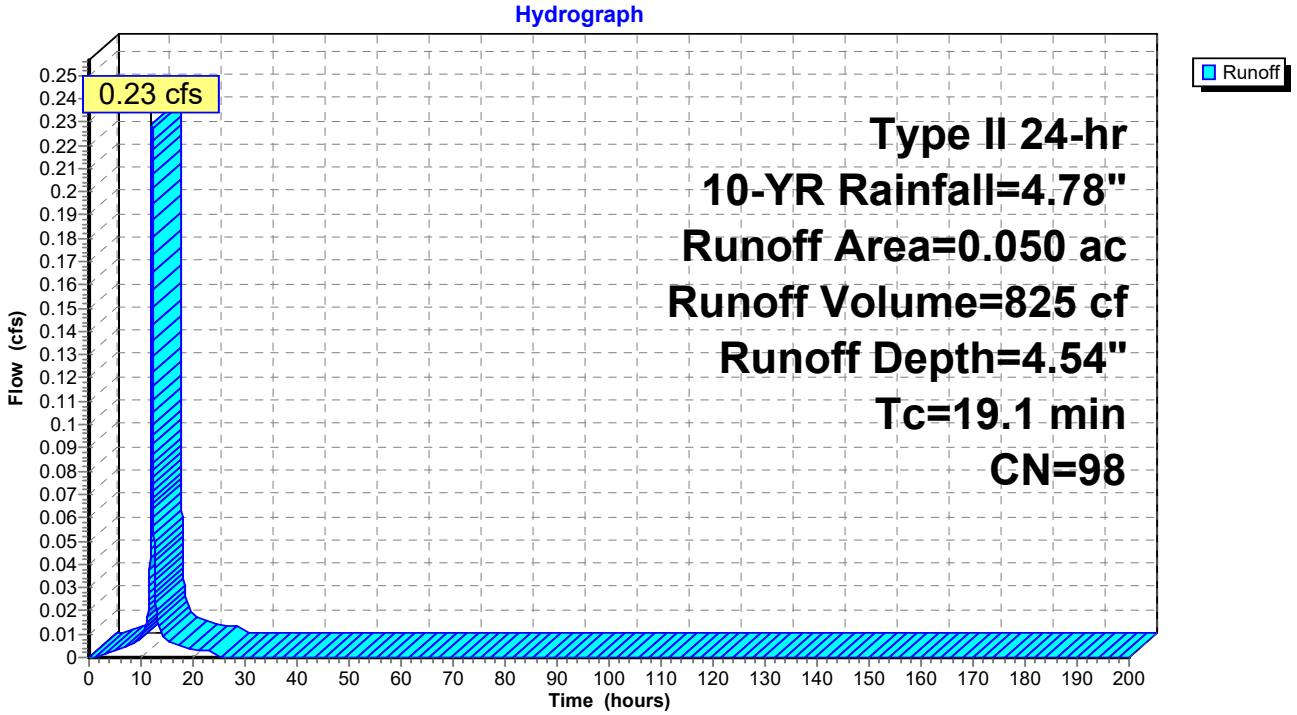
Runoff = 0.23 cfs @ 12.11 hrs, Volume= 825 cf, Depth= 4.54"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

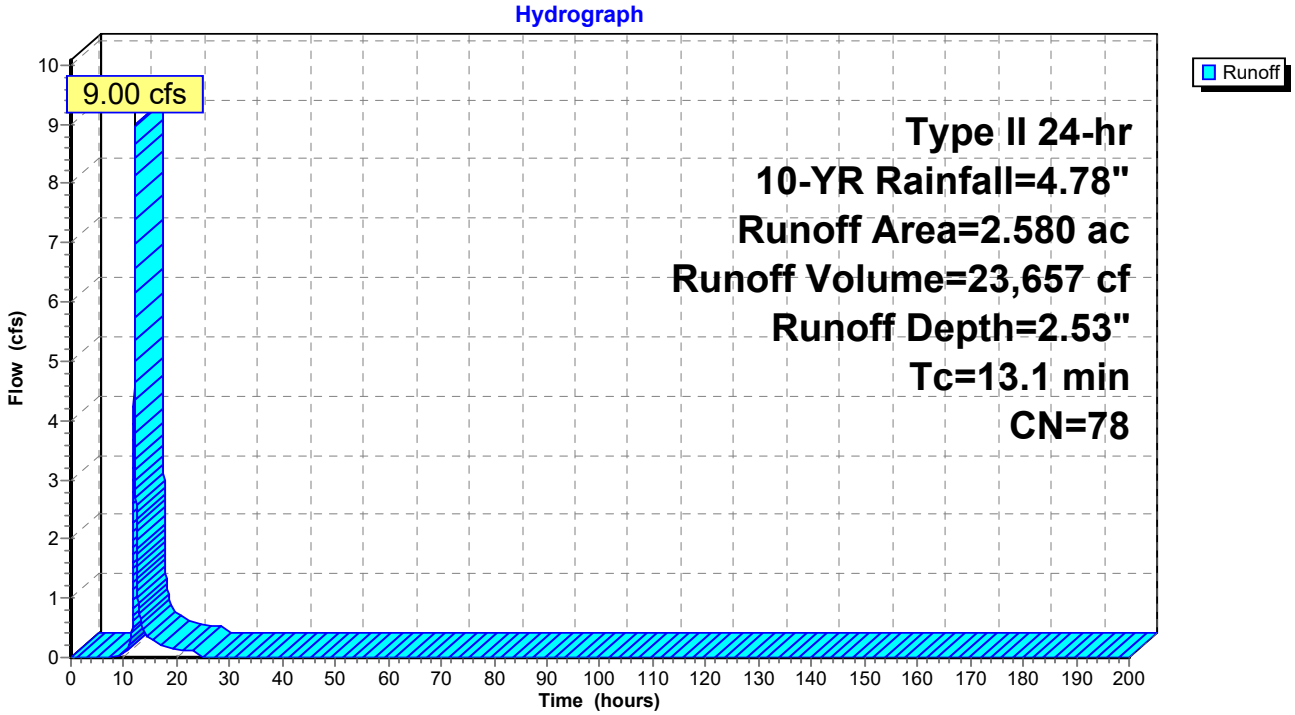
Runoff = 9.00 cfs @ 12.05 hrs, Volume= 23,657 cf, Depth= 2.53"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

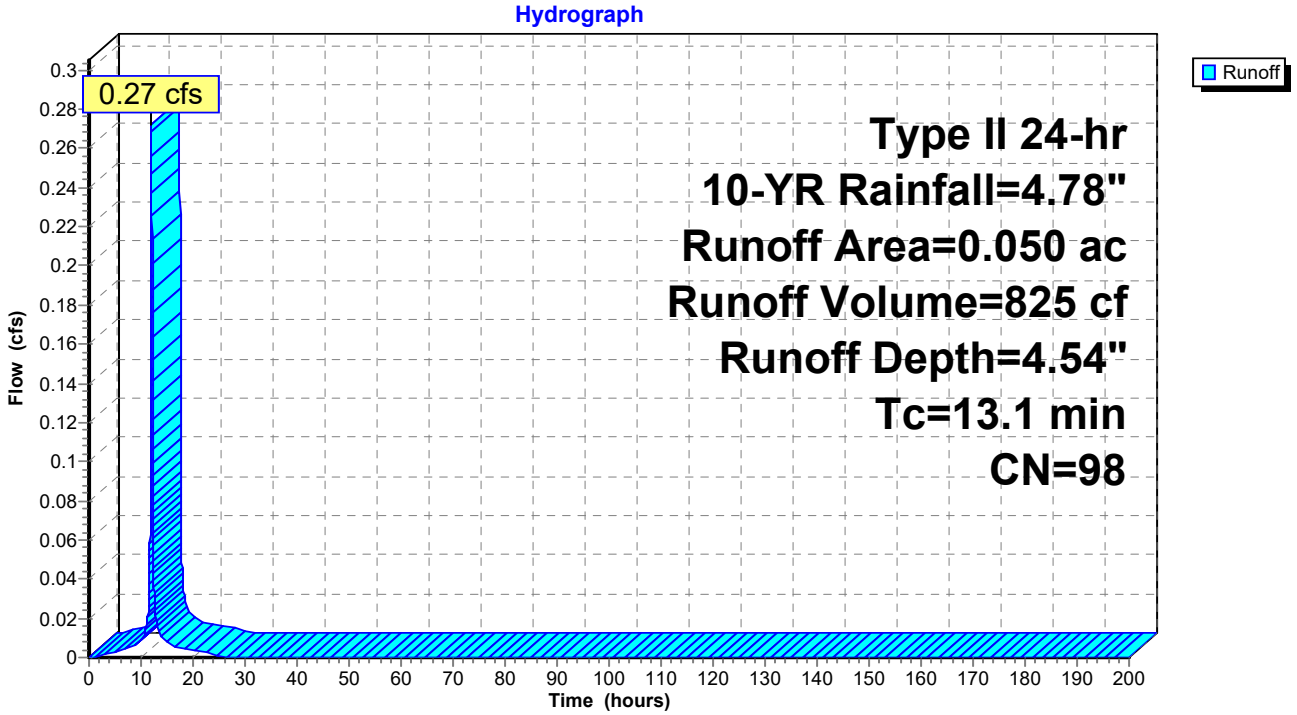
Runoff = 0.27 cfs @ 12.04 hrs, Volume= 825 cf, Depth= 4.54"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

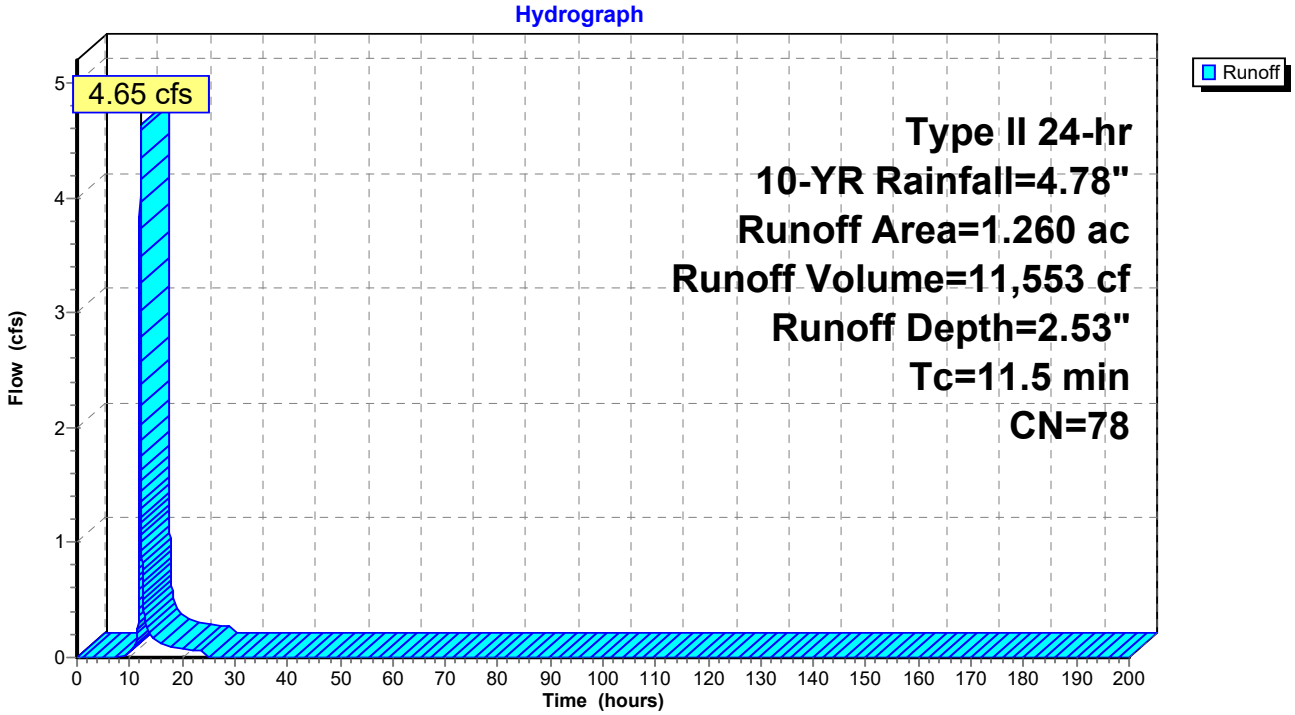
Runoff = 4.65 cfs @ 12.03 hrs, Volume= 11,553 cf, Depth= 2.53"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

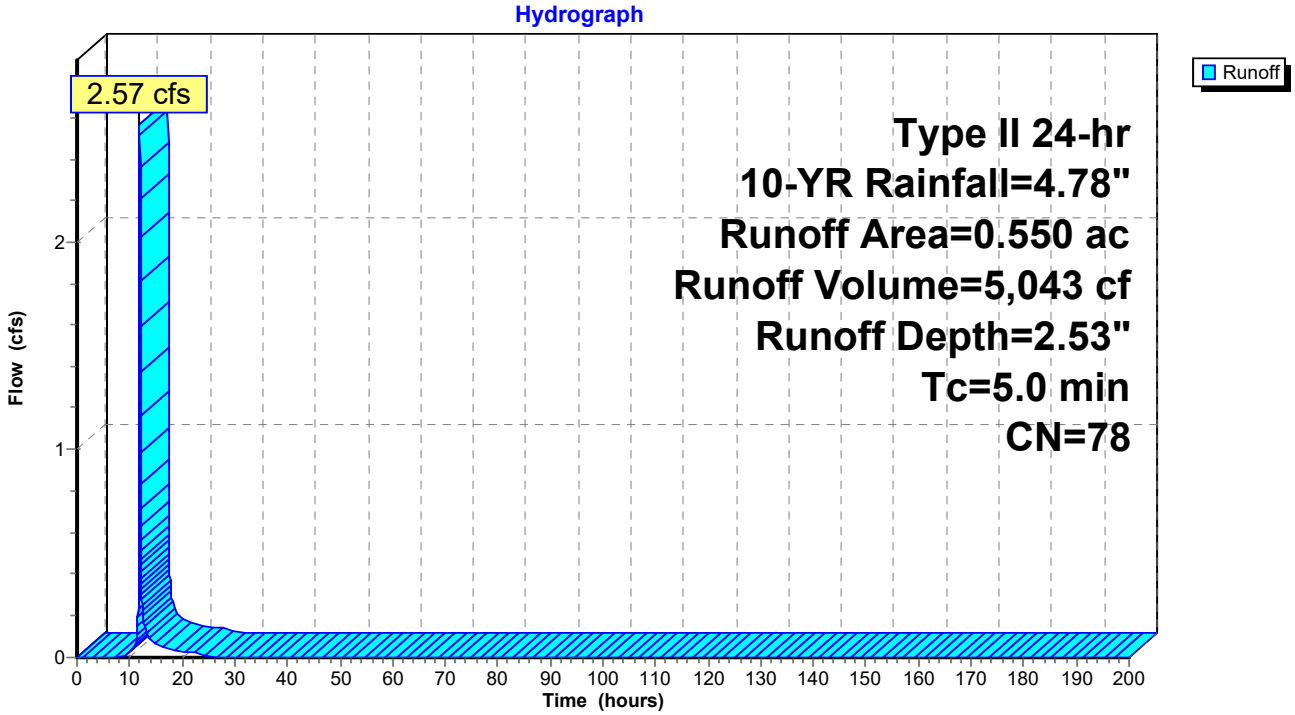
Runoff = 2.57 cfs @ 11.96 hrs, Volume= 5,043 cf, Depth= 2.53"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

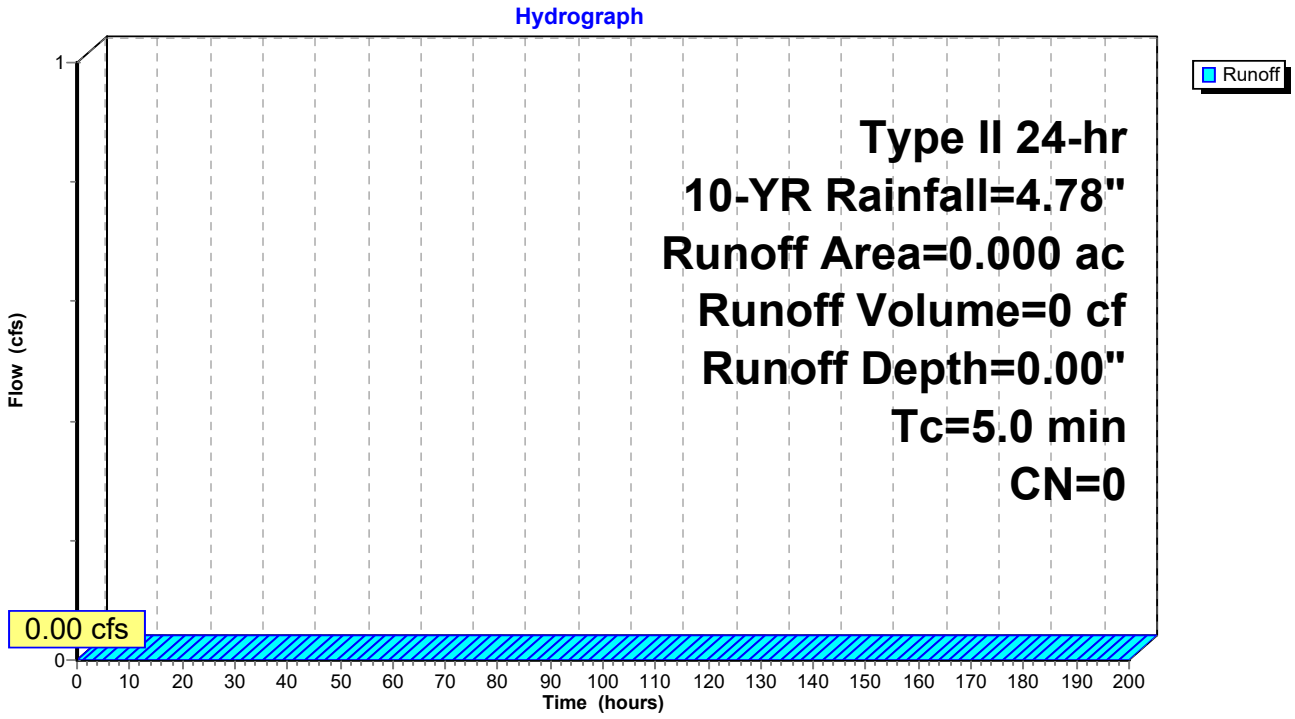
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

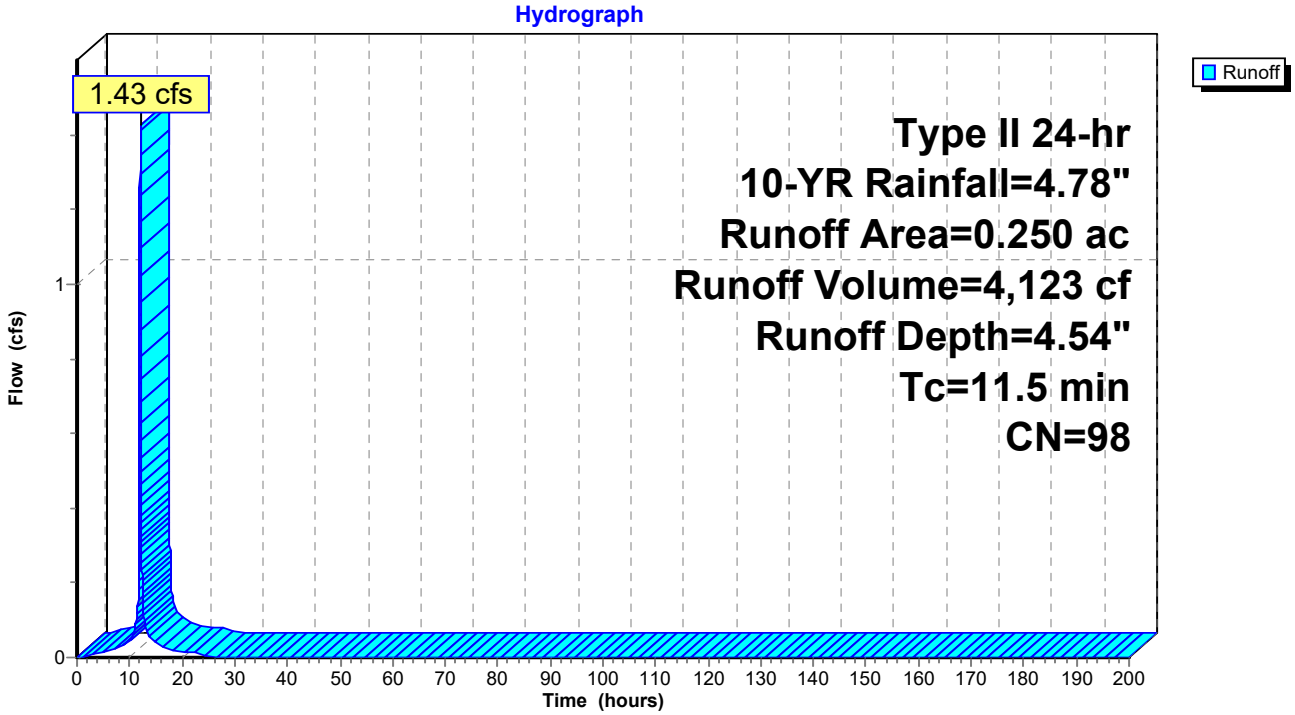
Runoff = 1.43 cfs @ 12.02 hrs, Volume= 4,123 cf, Depth= 4.54"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

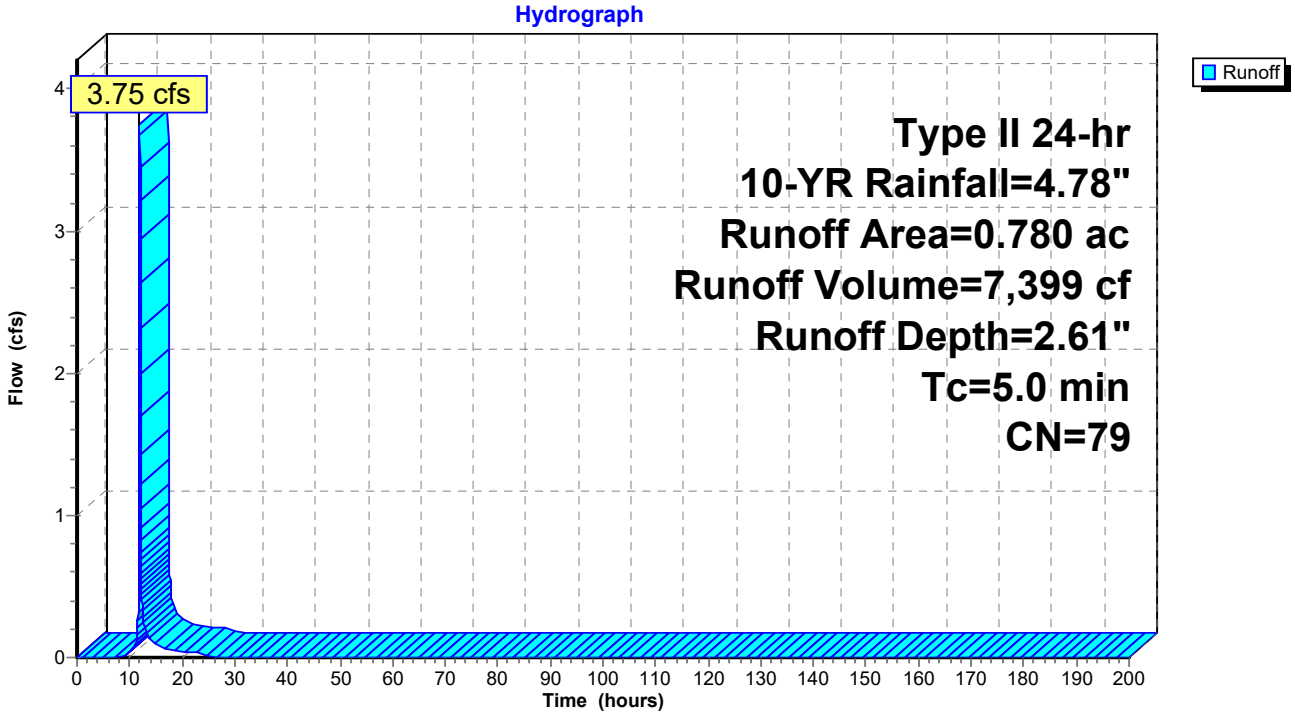
Runoff = 3.75 cfs @ 11.96 hrs, Volume= 7,399 cf, Depth= 2.61"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

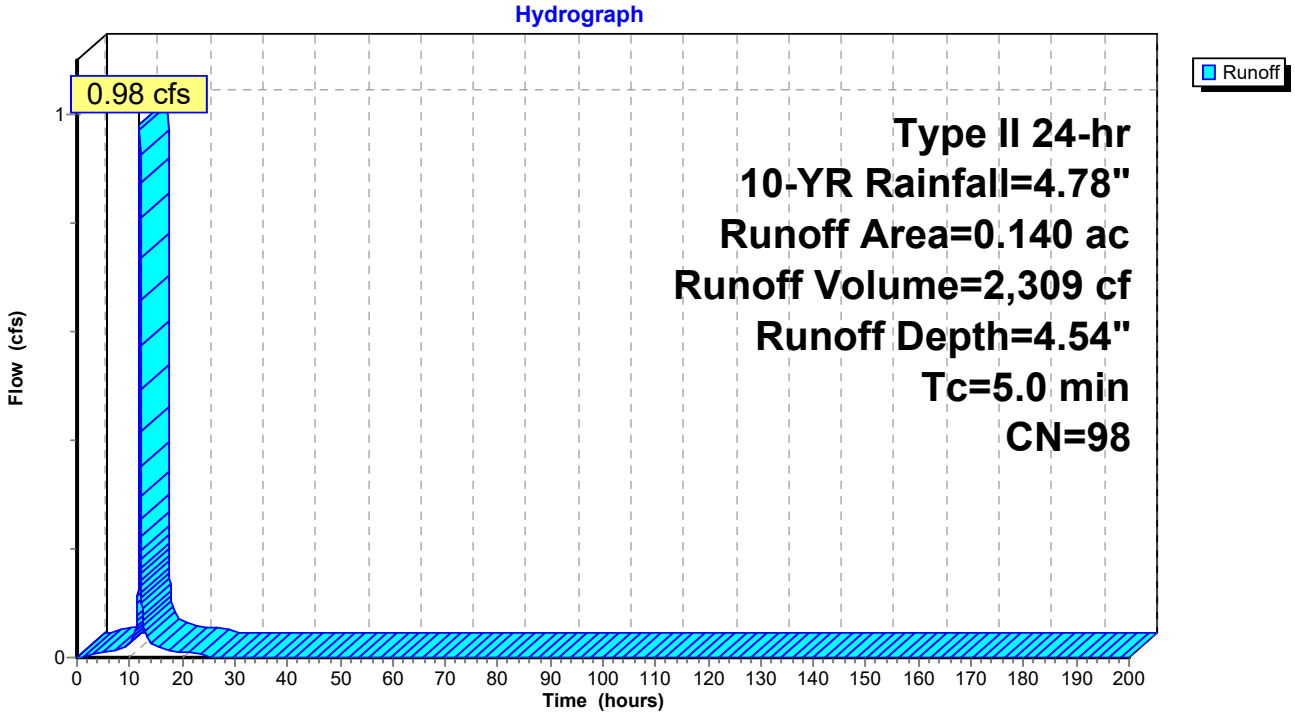
Runoff = 0.98 cfs @ 11.96 hrs, Volume= 2,309 cf, Depth= 4.54"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

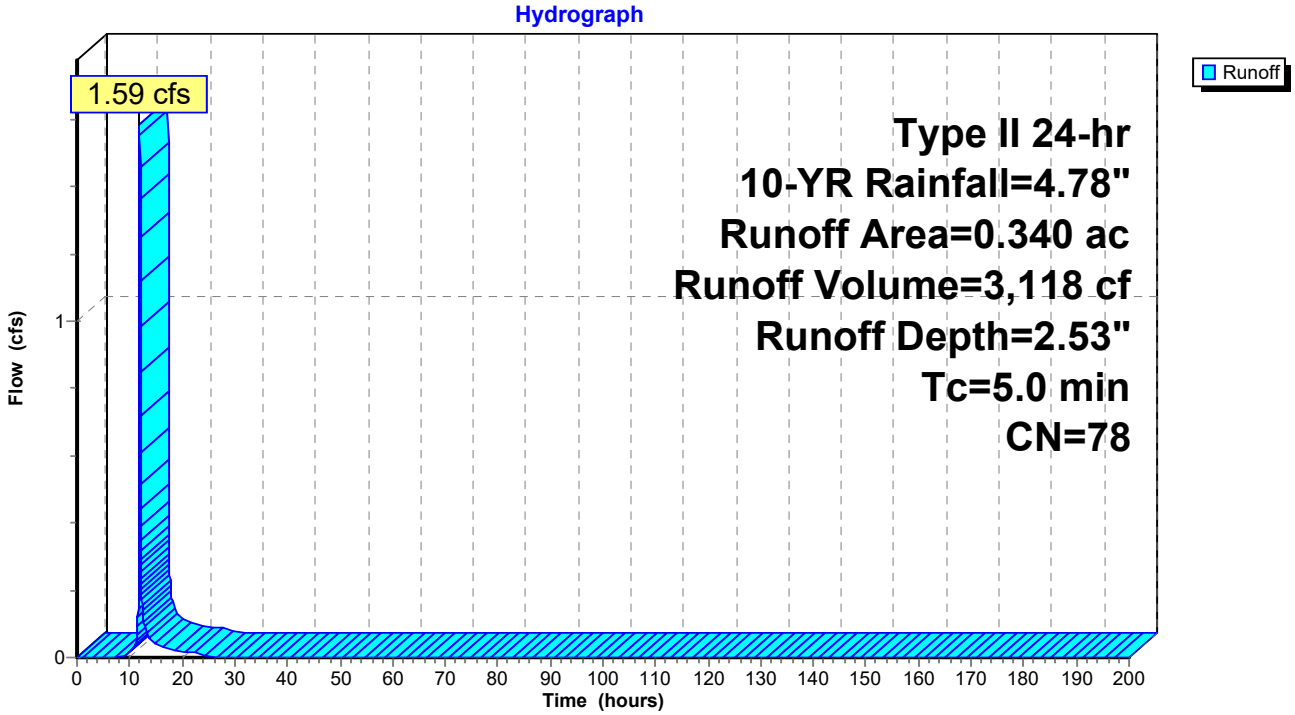
Runoff = 1.59 cfs @ 11.96 hrs, Volume= 3,118 cf, Depth= 2.53"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

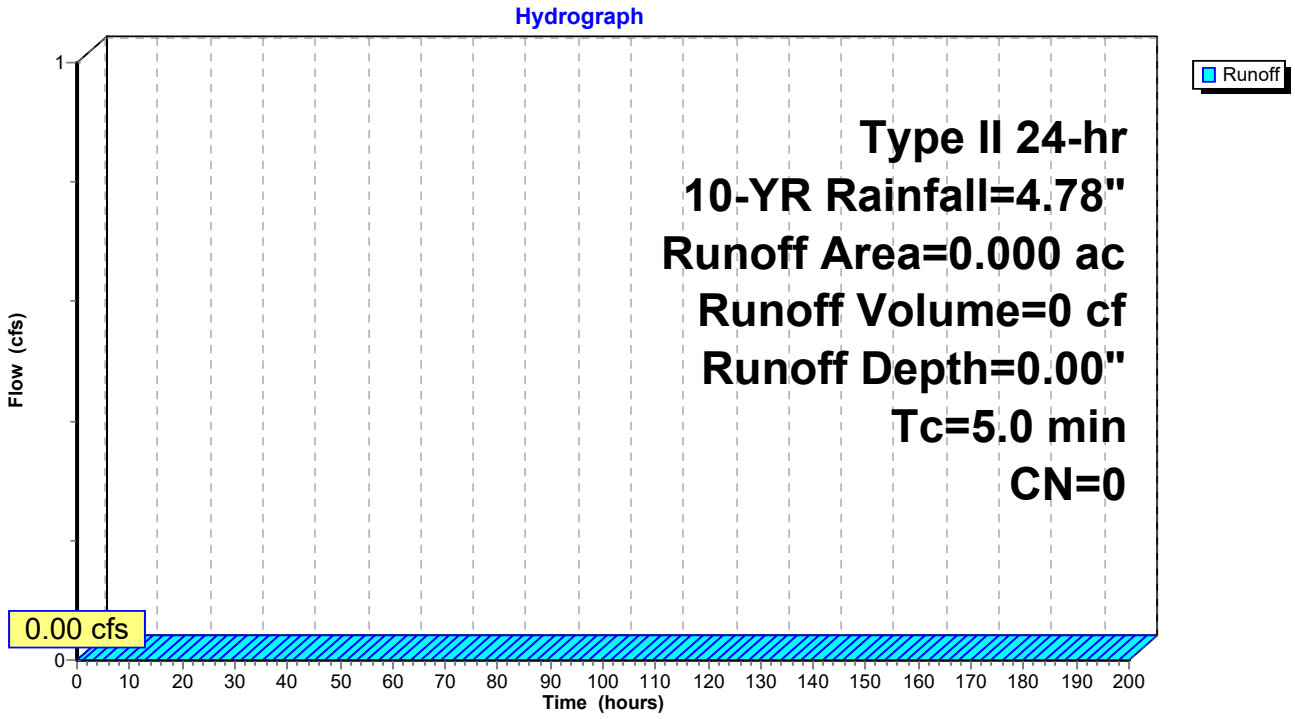
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

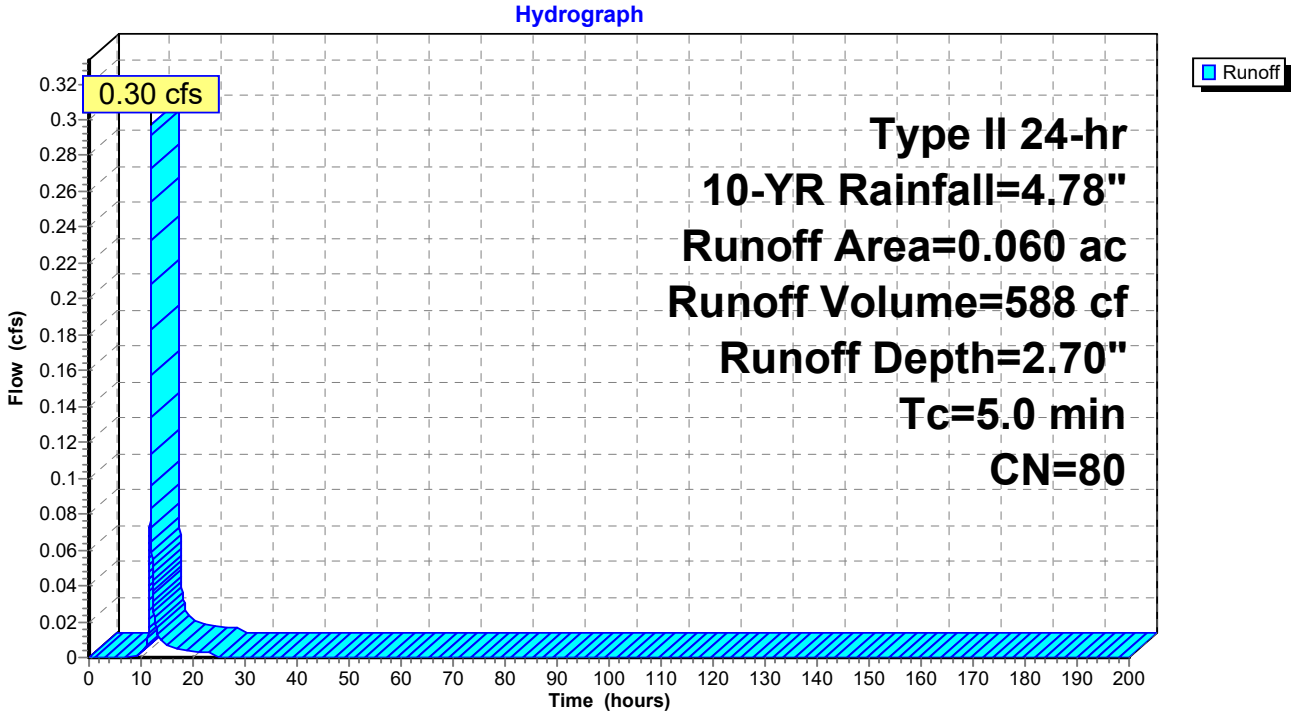
Runoff = 0.30 cfs @ 11.96 hrs, Volume= 588 cf, Depth= 2.70"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

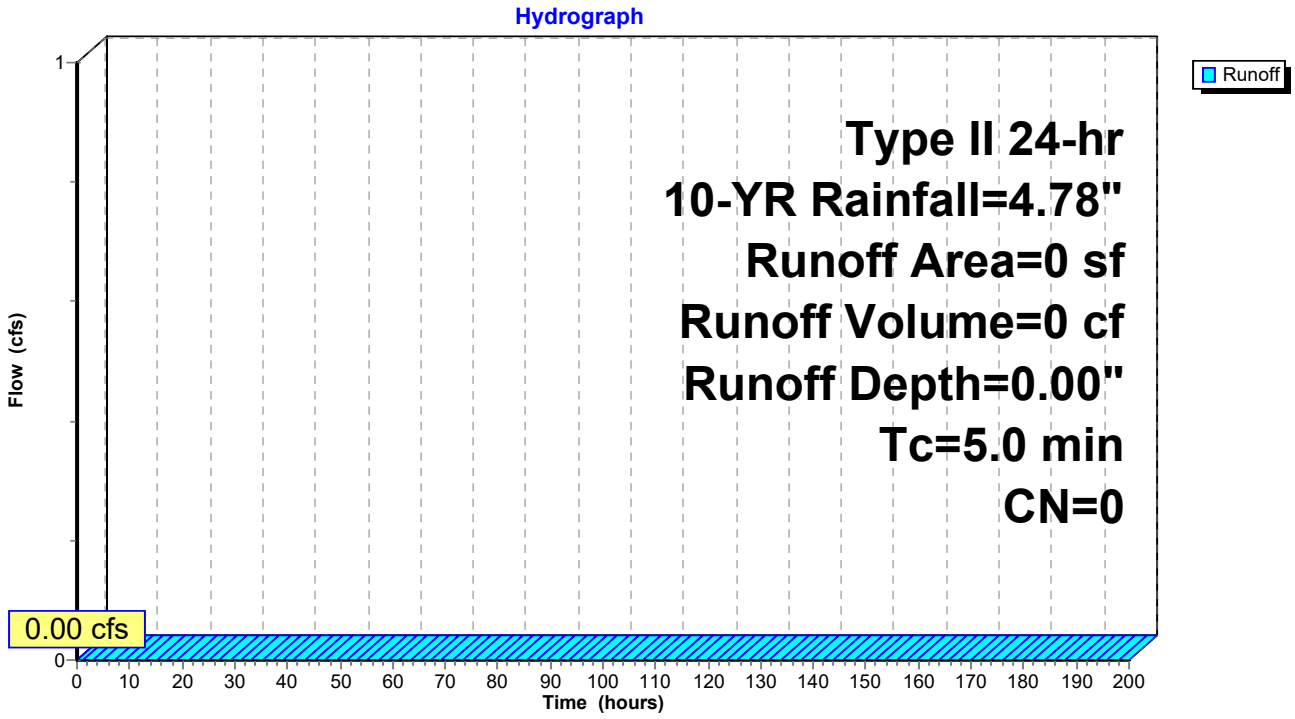
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

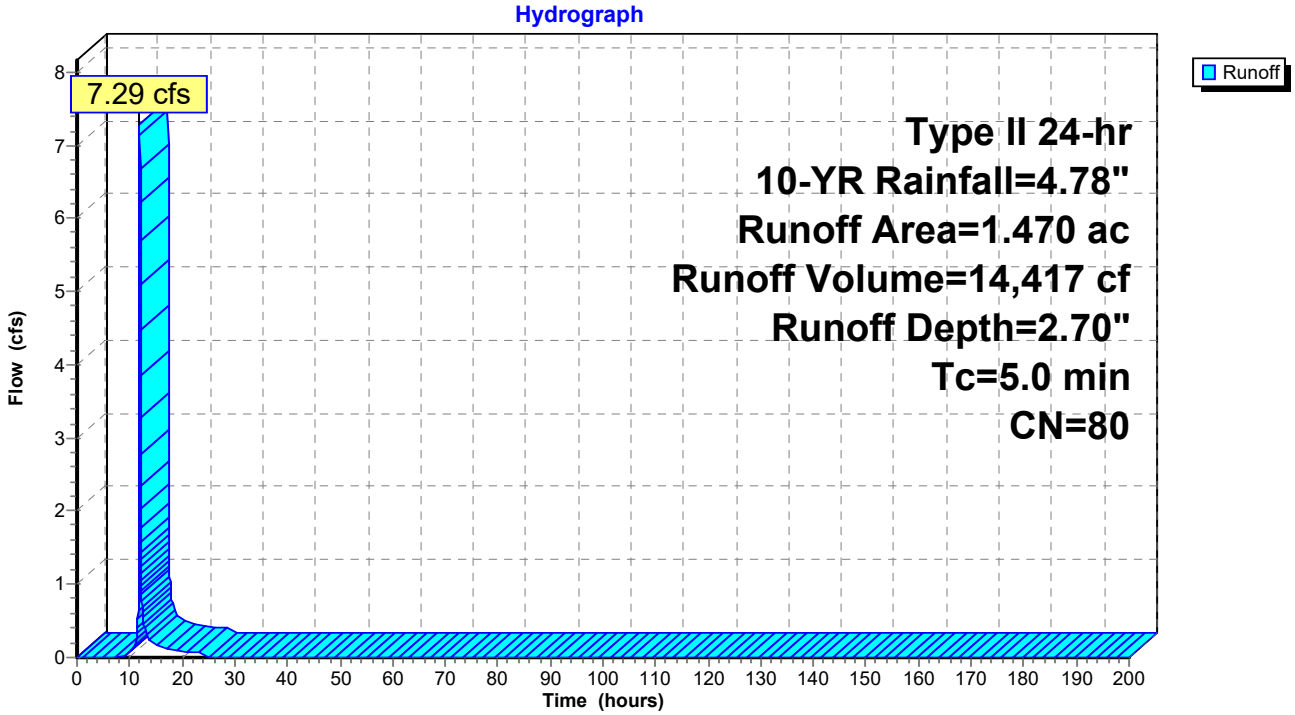
Runoff = 7.29 cfs @ 11.96 hrs, Volume= 14,417 cf, Depth= 2.70"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

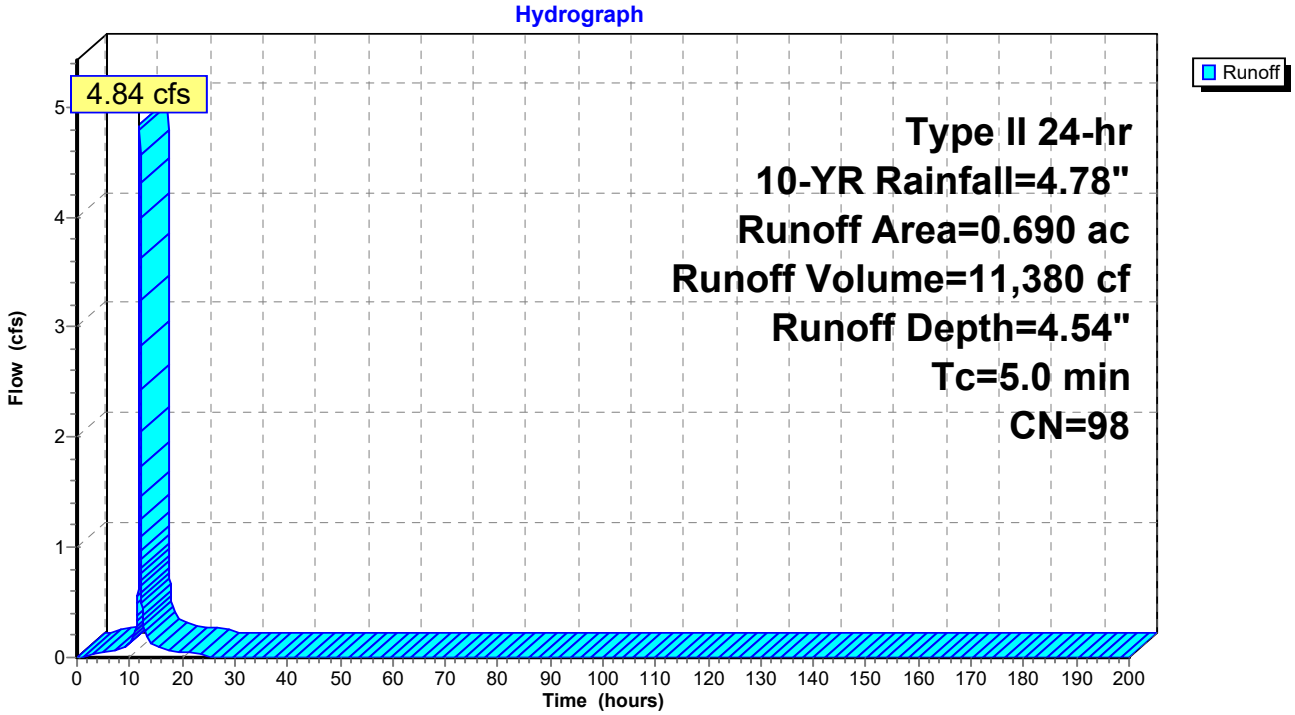
Runoff = 4.84 cfs @ 11.96 hrs, Volume= 11,380 cf, Depth= 4.54"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

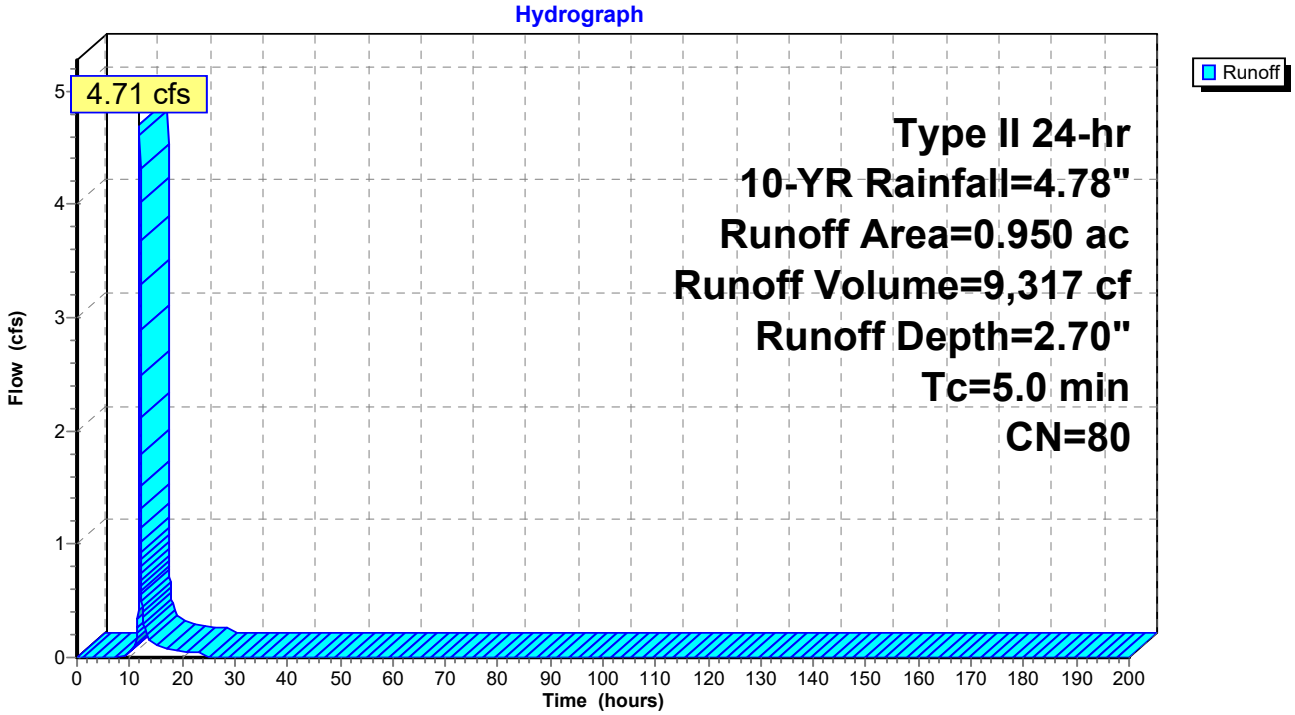
Runoff = 4.71 cfs @ 11.96 hrs, Volume= 9,317 cf, Depth= 2.70"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

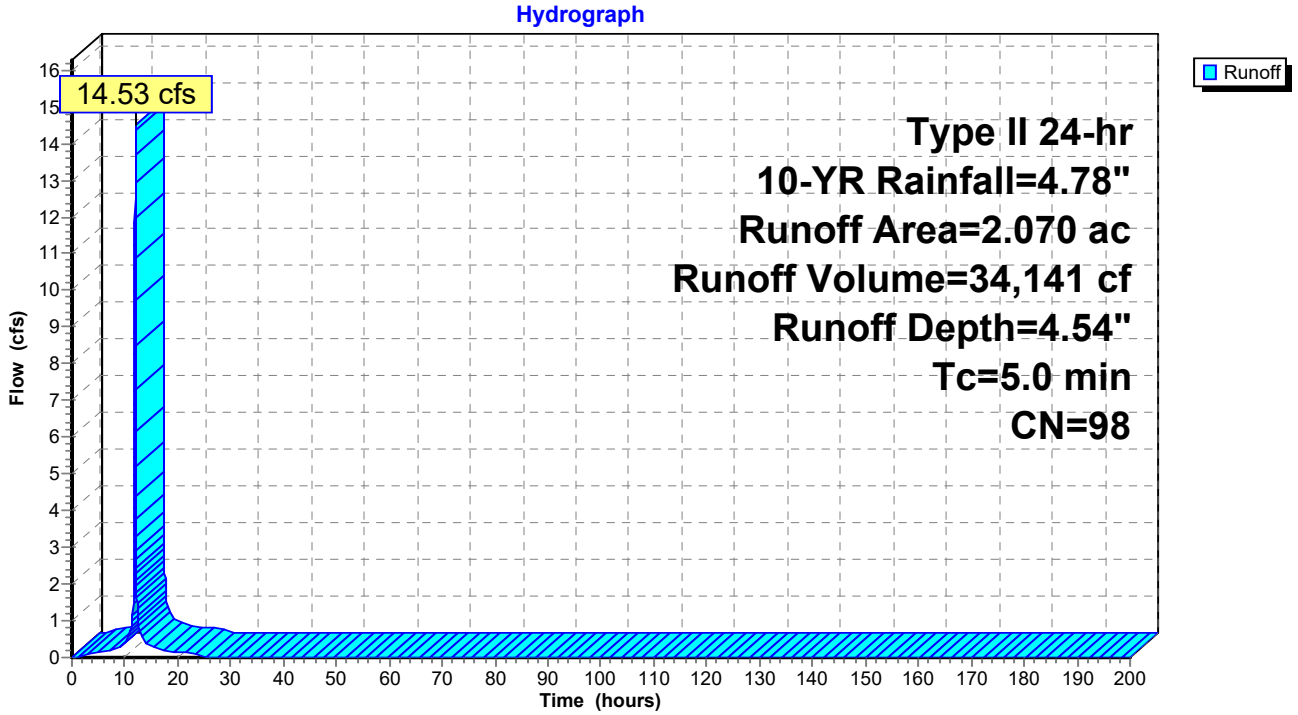
Runoff = 14.53 cfs @ 11.96 hrs, Volume= 34,141 cf, Depth= 4.54"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

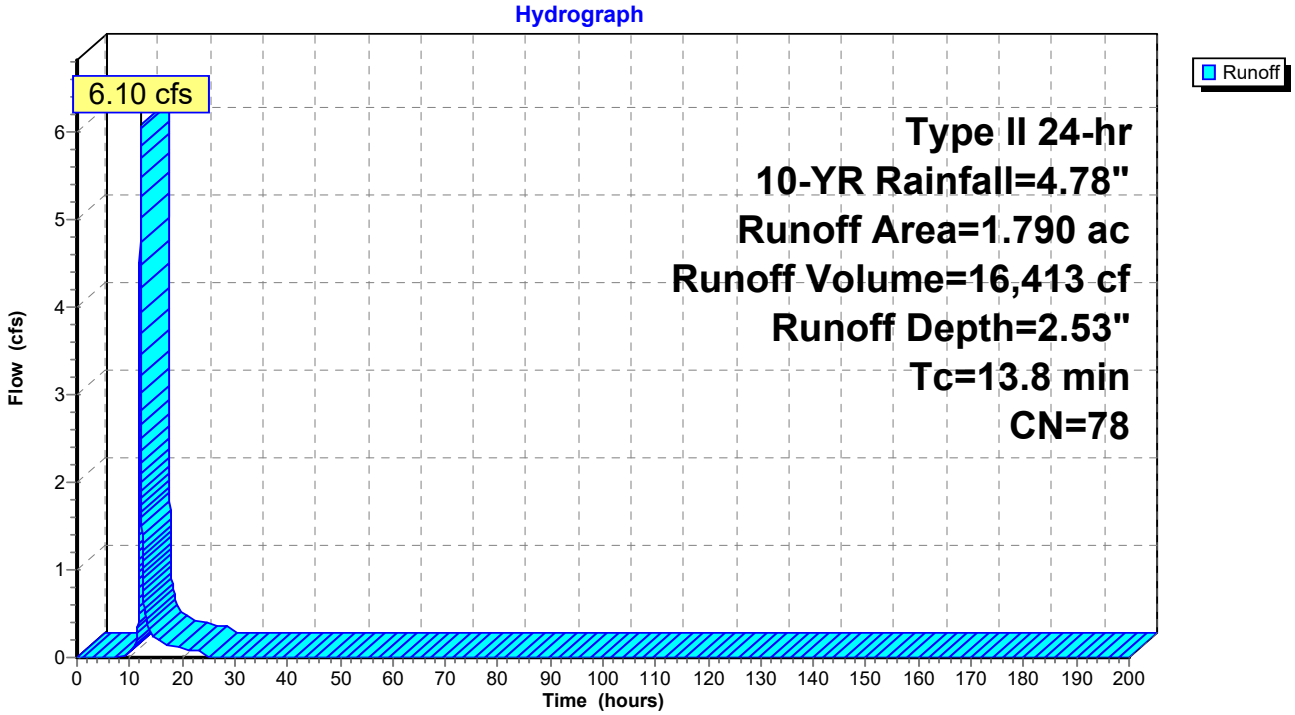
Runoff = 6.10 cfs @ 12.06 hrs, Volume= 16,413 cf, Depth= 2.53"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

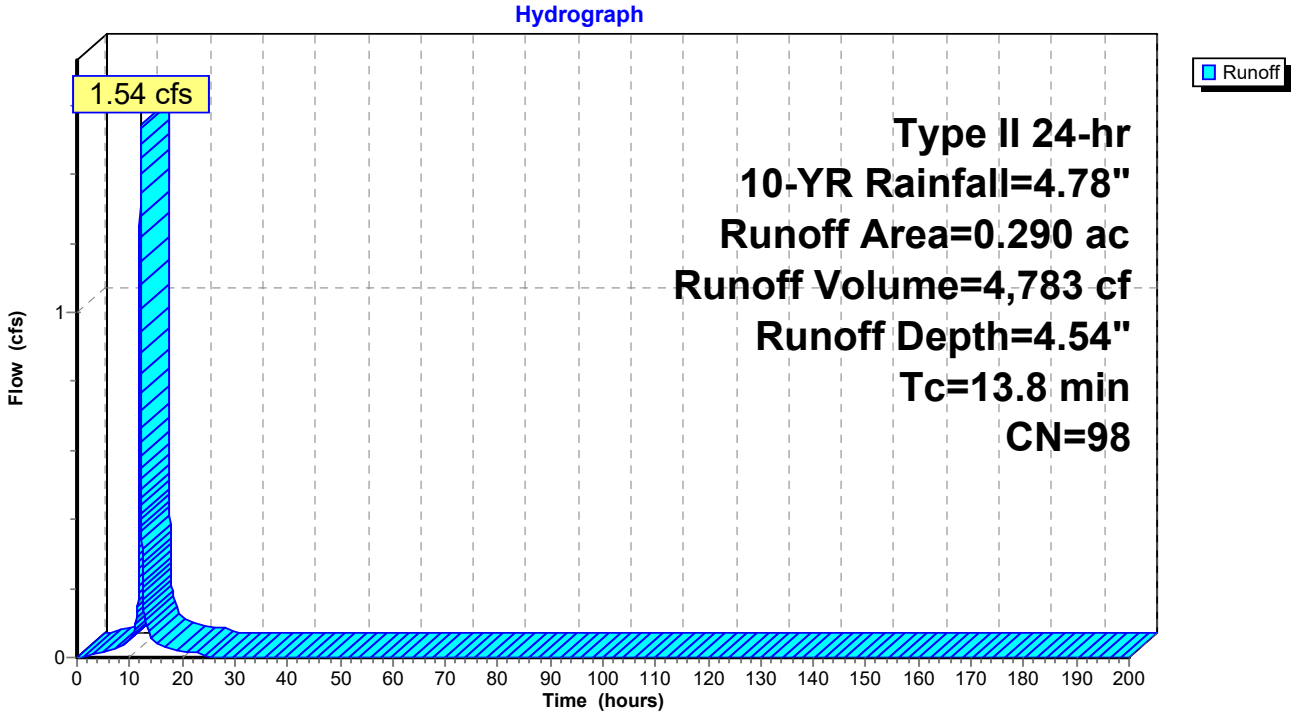
Runoff = 1.54 cfs @ 12.05 hrs, Volume= 4,783 cf, Depth= 4.54"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-YR Rainfall=4.78"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 3.18" for 10-YR event
Inflow = 20.23 cfs @ 11.96 hrs, Volume= 59,742 cf
Outflow = 2.00 cfs @ 12.90 hrs, Volume= 57,169 cf, Atten= 90%, Lag= 56.5 min
Primary = 1.96 cfs @ 12.90 hrs, Volume= 42,842 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.04 cfs @ 12.90 hrs, Volume= 14,327 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 366.18' @ 12.90 hrs Surf.Area= 12,081 sf Storage= 28,928 cf

Plug-Flow detention time= 1,015.6 min calculated for 57,167 cf (96% of inflow)
Center-of-Mass det. time= 990.4 min (1,788.9 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

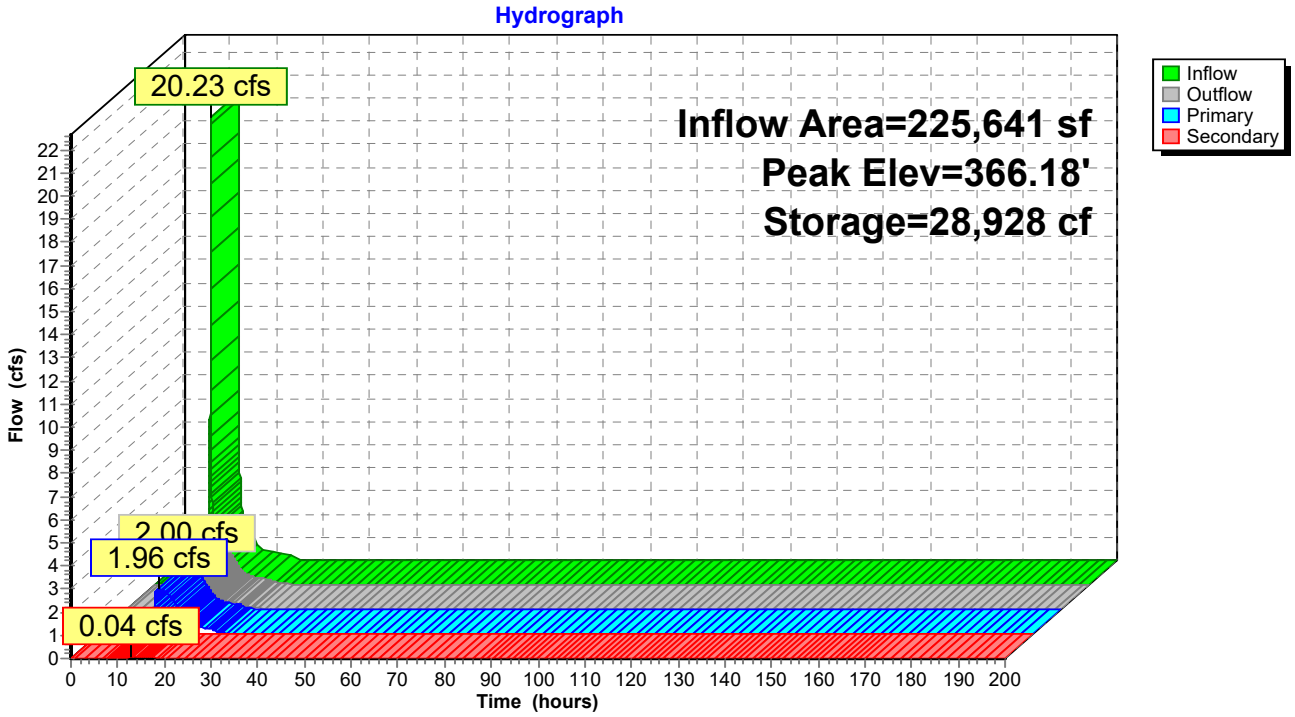
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.96 cfs @ 12.90 hrs HW=366.18' TW=0.00' (Dynamic Tailwater)
↑└**1=Culvert** (Passes 1.96 cfs of 15.67 cfs potential flow)
↑└**4=Orifice** (Orifice Controls 1.96 cfs @ 5.22 fps)

Secondary OutFlow Max=0.04 cfs @ 12.90 hrs HW=366.18' TW=0.00' (Dynamic Tailwater)
↑└**2=MRC Underdrain** (Passes 0.04 cfs of 0.84 cfs potential flow)
↑└**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 9.80 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 3.29" for 10-YR event
Inflow = 12.12 cfs @ 11.96 hrs, Volume= 25,797 cf
Outflow = 1.45 cfs @ 12.05 hrs, Volume= 24,958 cf, Atten= 88%, Lag= 5.7 min
Primary = 1.41 cfs @ 12.05 hrs, Volume= 16,284 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.04 cfs @ 12.30 hrs, Volume= 8,674 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 366.72' @ 12.30 hrs Surf.Area= 6,271 sf Storage= 13,875 cf

Plug-Flow detention time= 834.7 min calculated for 24,958 cf (97% of inflow)
Center-of-Mass det. time= 814.7 min (1,600.9 - 786.2)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

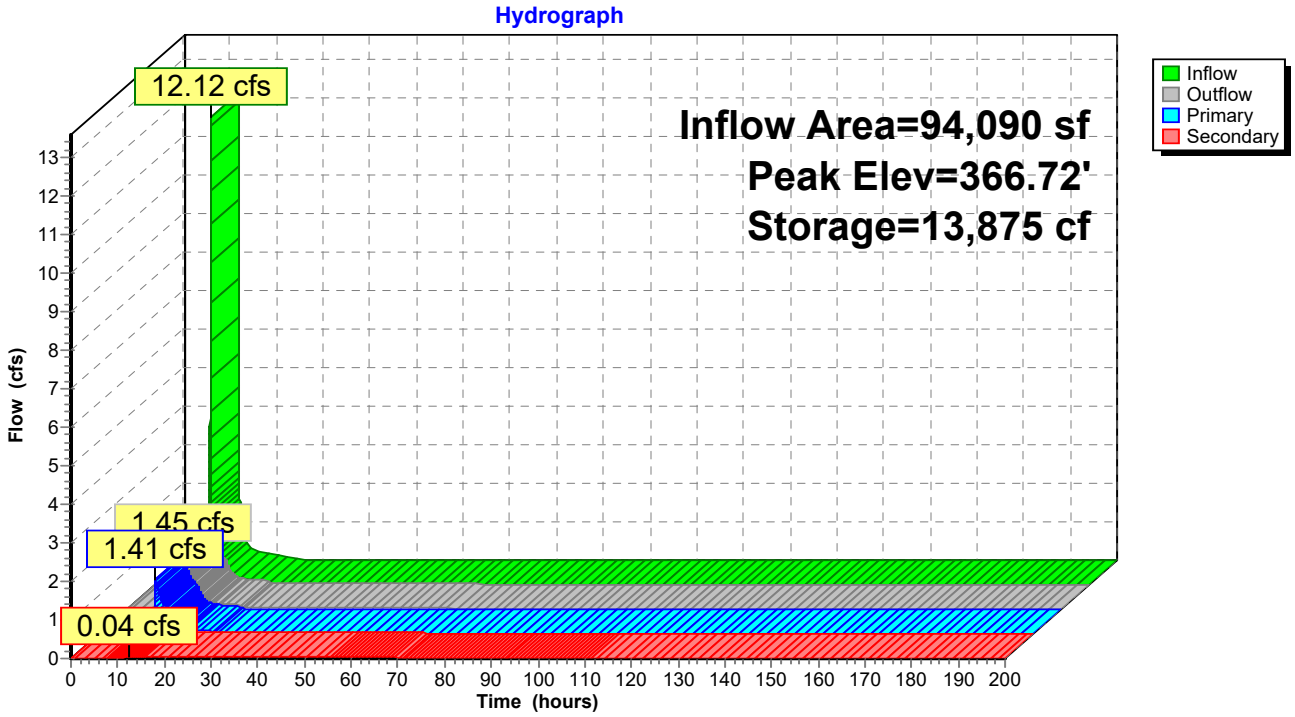
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.39 cfs @ 12.05 hrs HW=366.63' TW=365.88' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.39 cfs of 6.84 cfs potential flow)
↑**4=Orifice** (Orifice Controls 1.39 cfs @ 4.16 fps)

Secondary OutFlow Max=0.04 cfs @ 12.30 hrs HW=366.72' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.04 cfs of 0.45 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 9.25 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

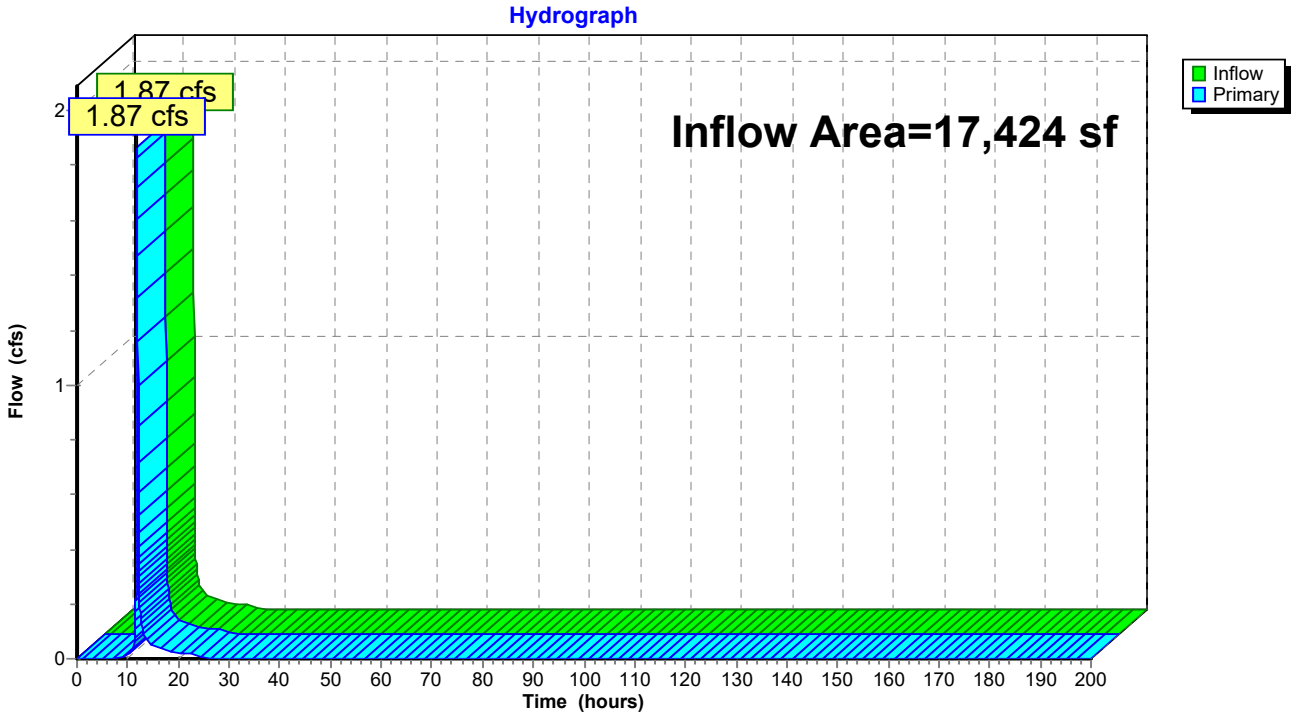
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 2.53" for 10-YR event
Inflow = 1.87 cfs @ 11.96 hrs, Volume= 3,668 cf
Primary = 1.87 cfs @ 11.96 hrs, Volume= 3,668 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

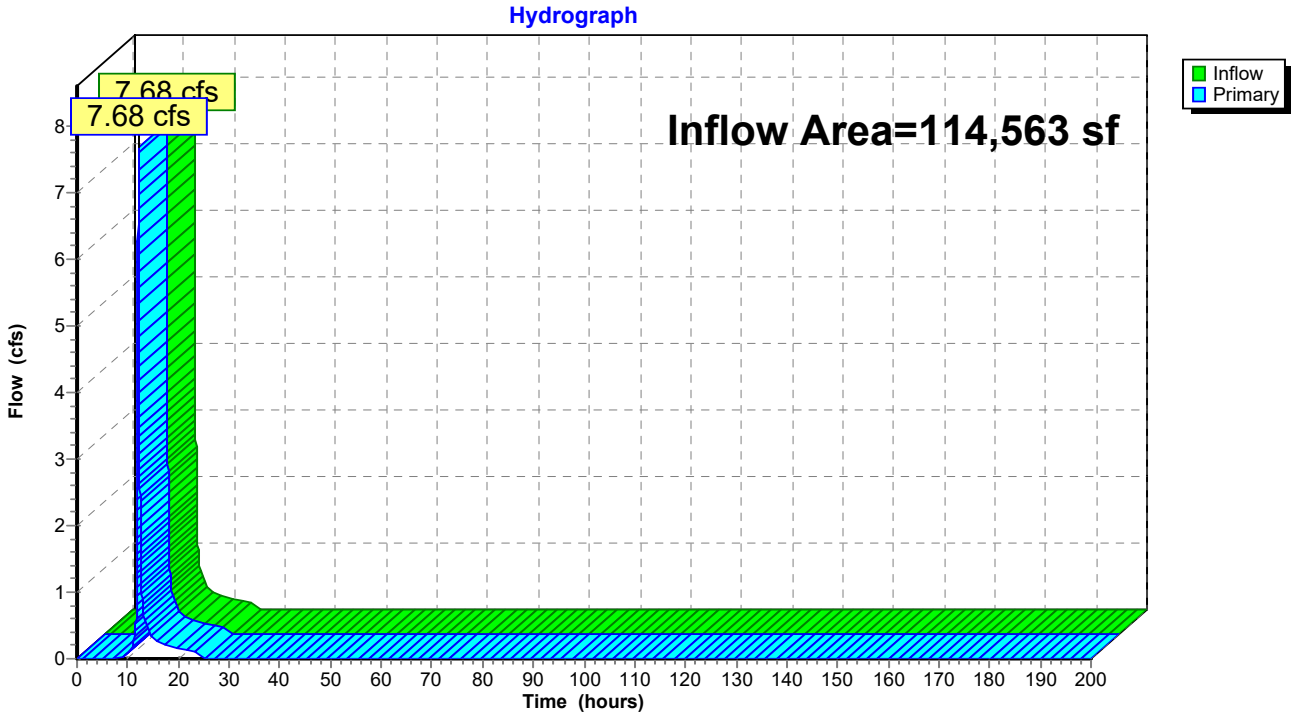


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 2.56" for 10-YR event
Inflow = 7.68 cfs @ 12.12 hrs, Volume= 24,481 cf
Primary = 7.68 cfs @ 12.12 hrs, Volume= 24,481 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

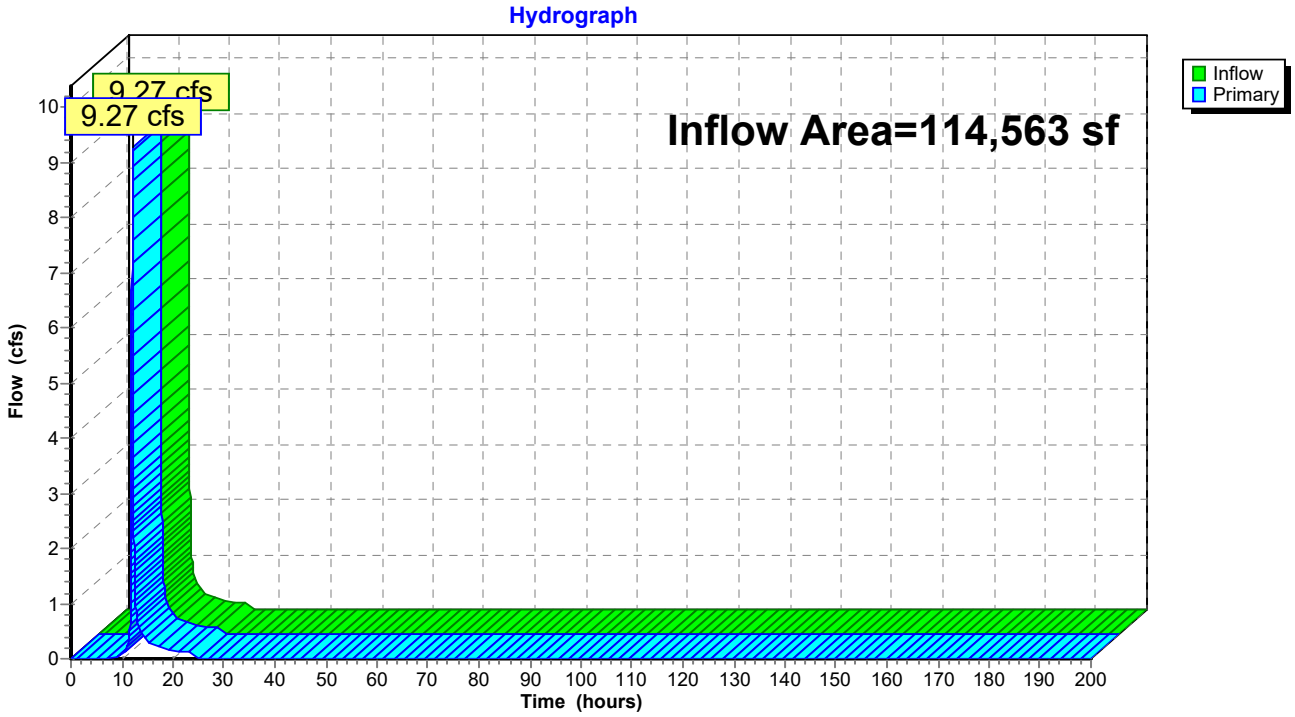


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 2.56" for 10-YR event
Inflow = 9.27 cfs @ 12.05 hrs, Volume= 24,481 cf
Primary = 9.27 cfs @ 12.05 hrs, Volume= 24,481 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

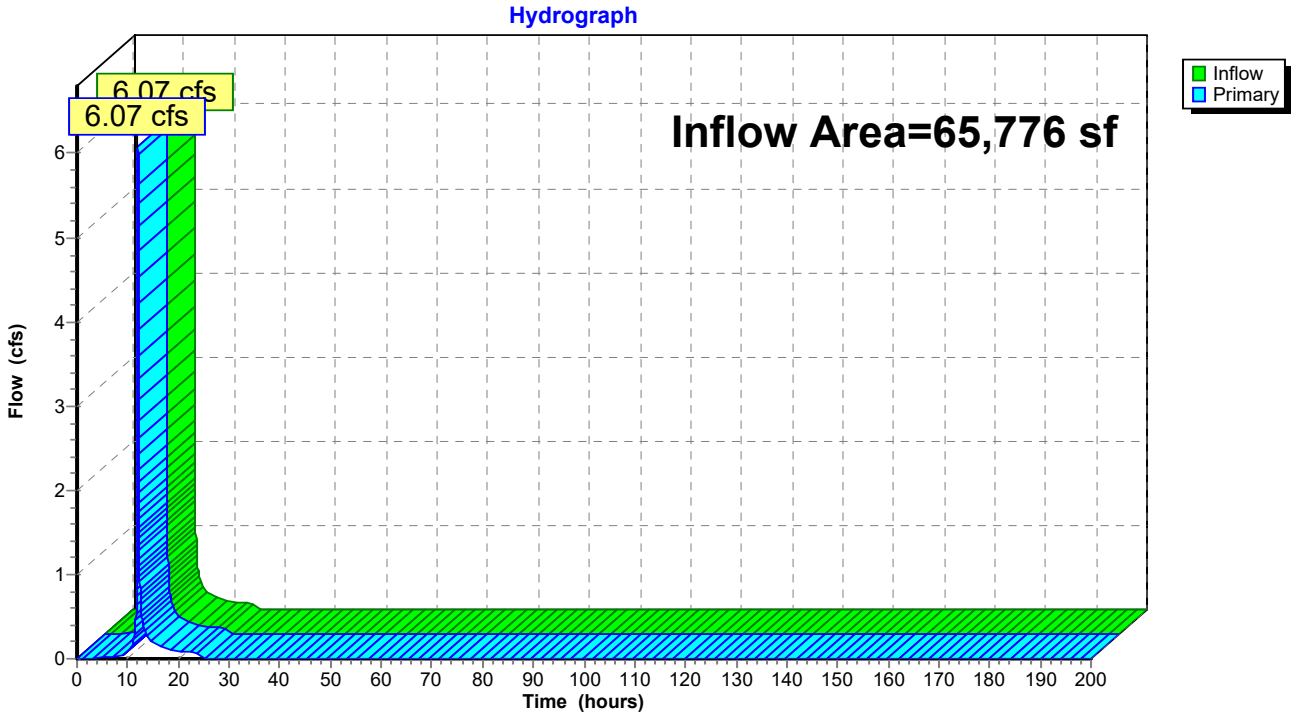


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 2.86" for 10-YR event
Inflow = 6.07 cfs @ 12.03 hrs, Volume= 15,677 cf
Primary = 6.07 cfs @ 12.03 hrs, Volume= 15,677 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

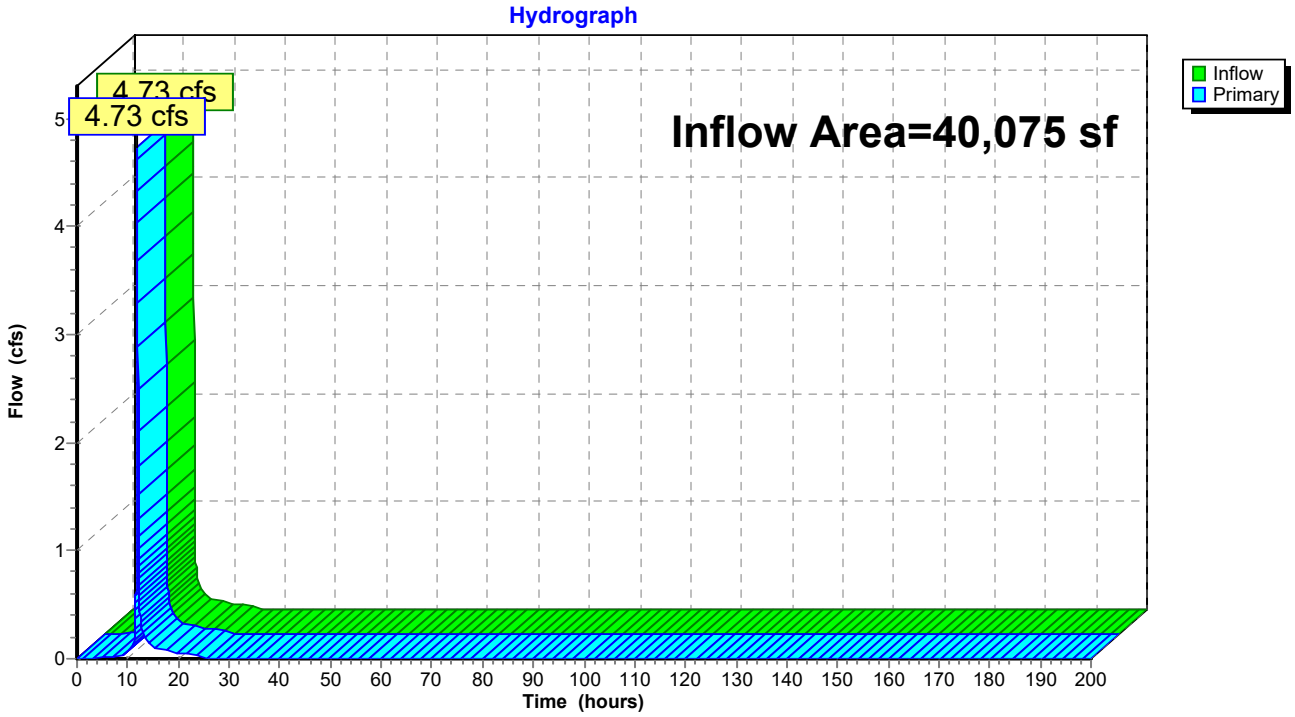


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 2.91" for 10-YR event
Inflow = 4.73 cfs @ 11.96 hrs, Volume= 9,708 cf
Primary = 4.73 cfs @ 11.96 hrs, Volume= 9,708 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

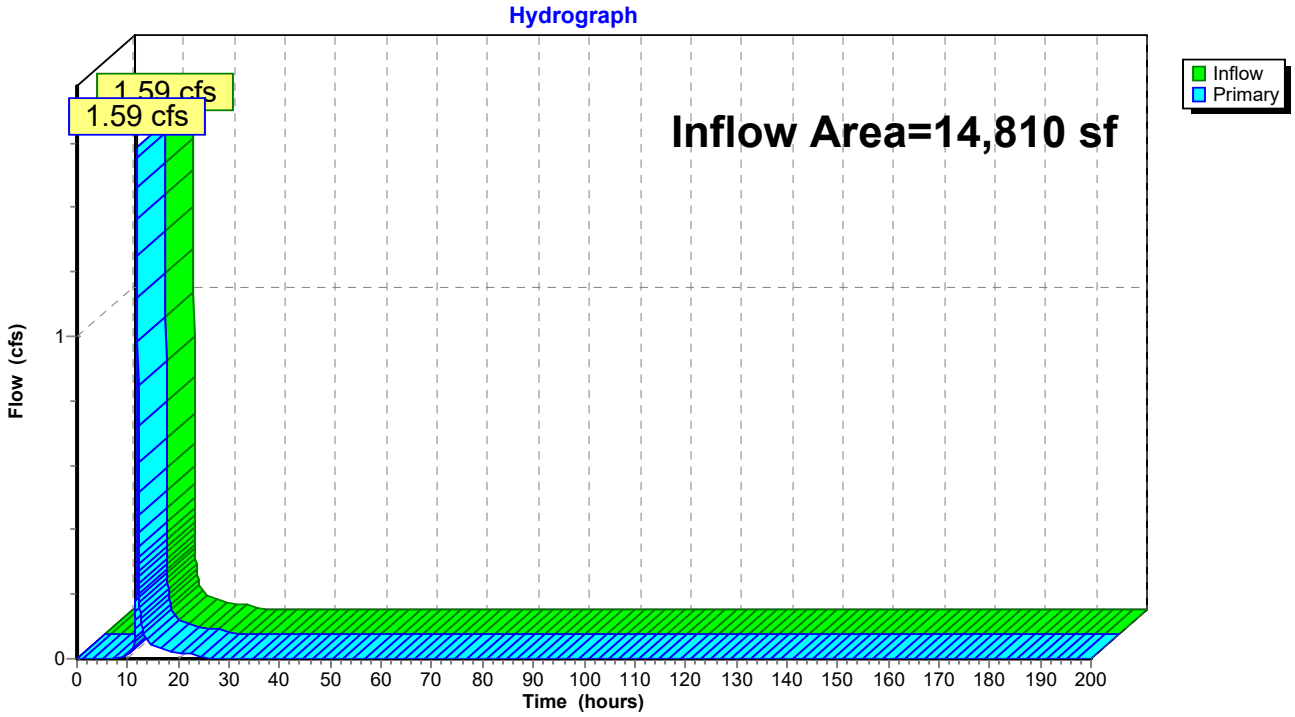


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 2.53" for 10-YR event
Inflow = 1.59 cfs @ 11.96 hrs, Volume= 3,118 cf
Primary = 1.59 cfs @ 11.96 hrs, Volume= 3,118 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

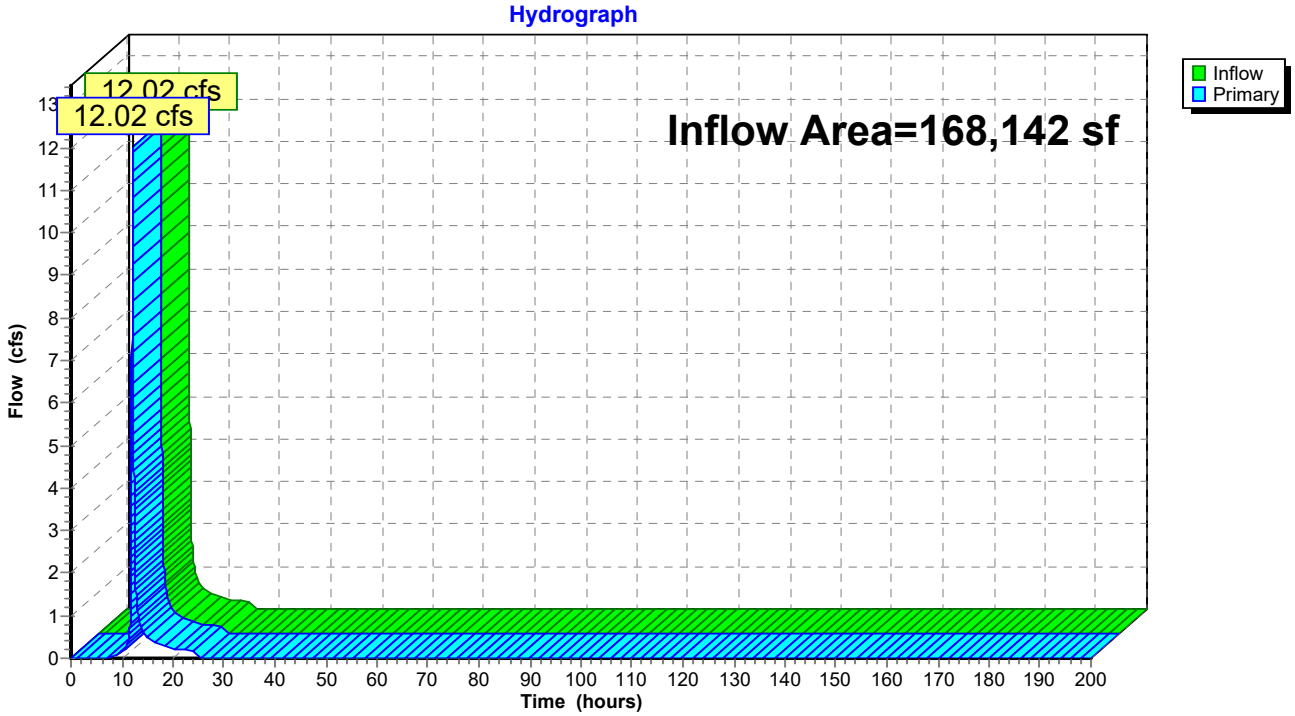


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 2.63" for 10-YR event
Inflow = 12.02 cfs @ 12.10 hrs, Volume= 36,858 cf
Primary = 12.02 cfs @ 12.10 hrs, Volume= 36,858 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

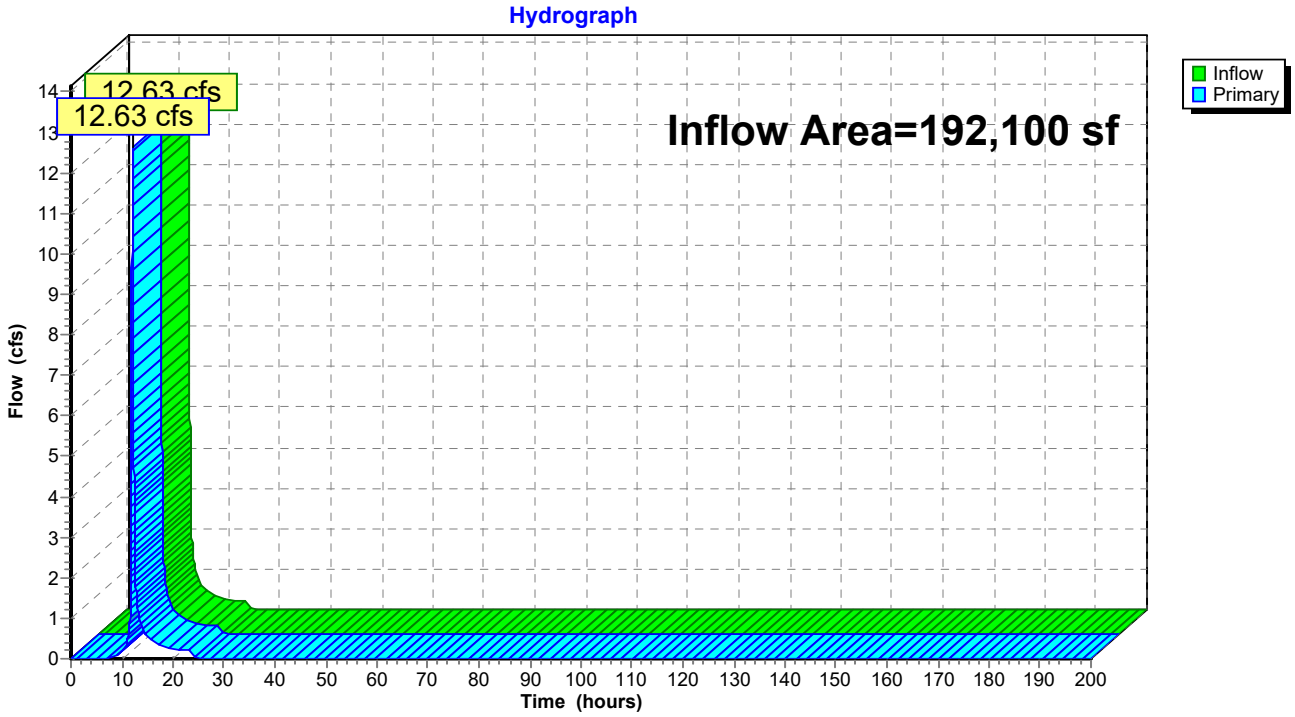


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 2.62" for 10-YR event
Inflow = 12.63 cfs @ 12.08 hrs, Volume= 41,901 cf
Primary = 12.63 cfs @ 12.08 hrs, Volume= 41,901 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

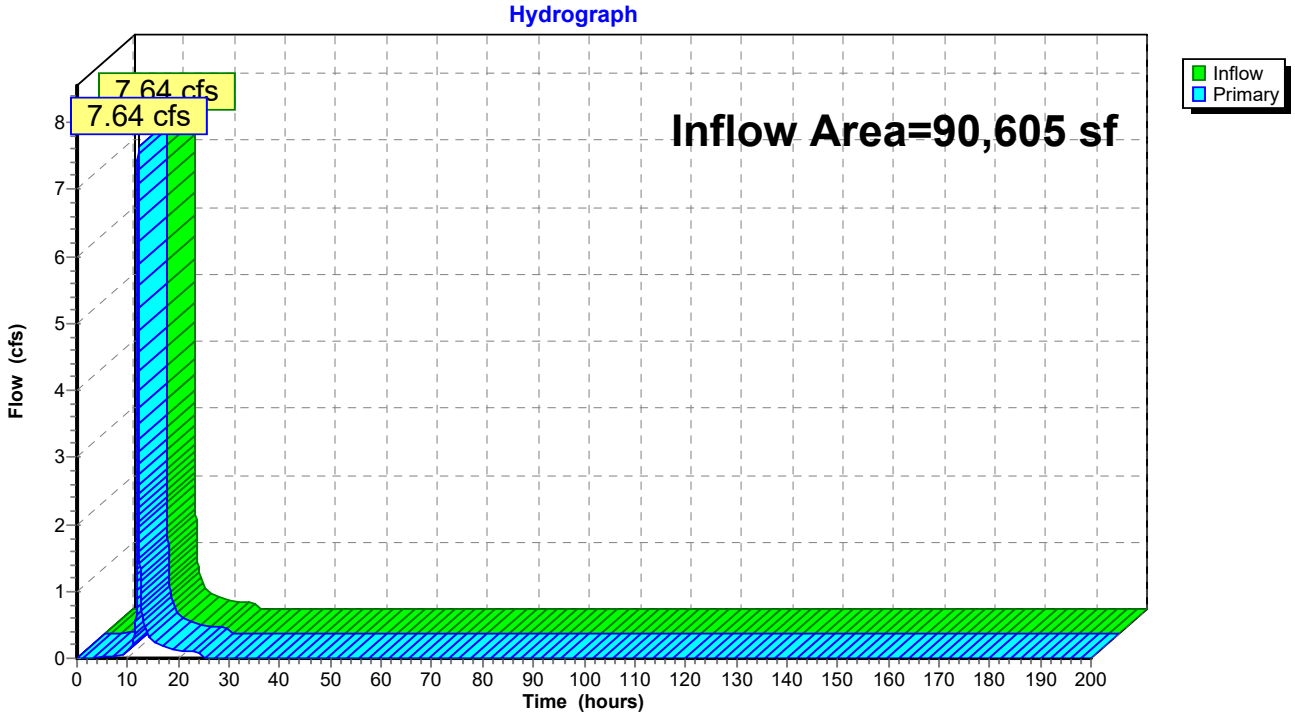


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 2.81" for 10-YR event
Inflow = 7.64 cfs @ 12.06 hrs, Volume= 21,196 cf
Primary = 7.64 cfs @ 12.06 hrs, Volume= 21,196 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

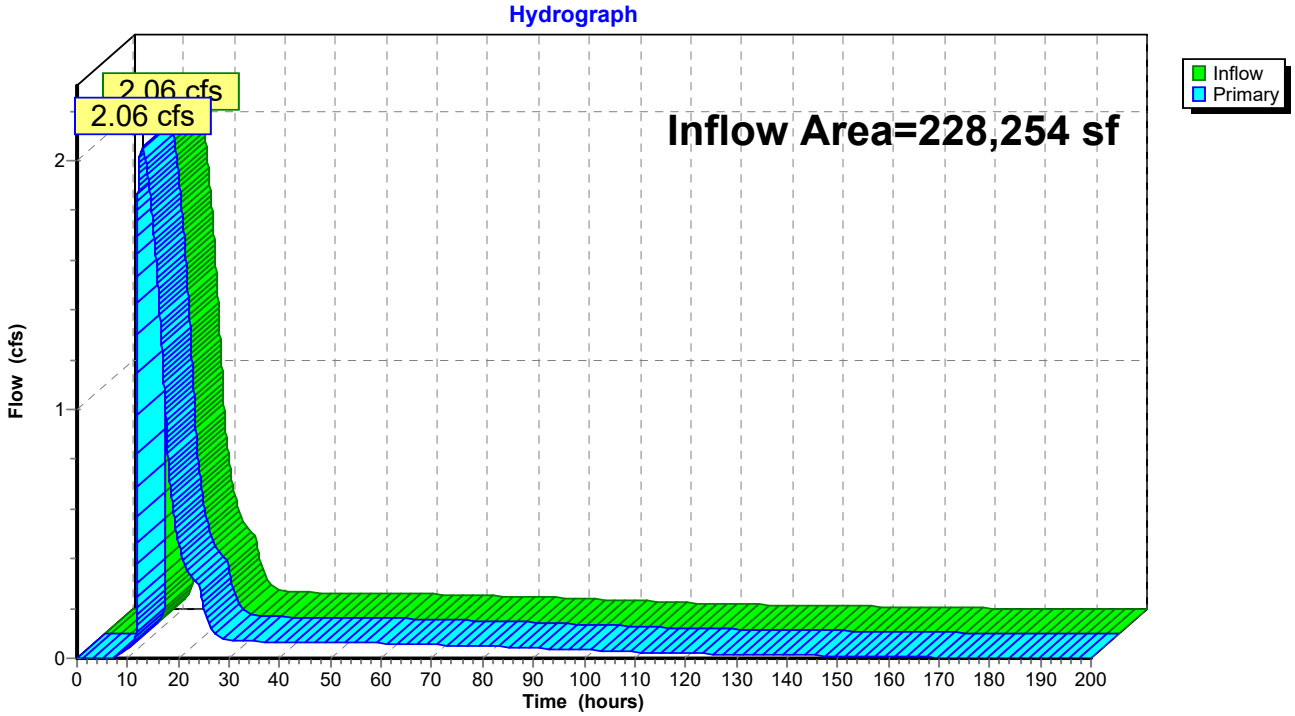


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 3.49" for 10-YR event
Inflow = 2.06 cfs @ 12.85 hrs, Volume= 66,432 cf
Primary = 2.06 cfs @ 12.85 hrs, Volume= 66,432 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

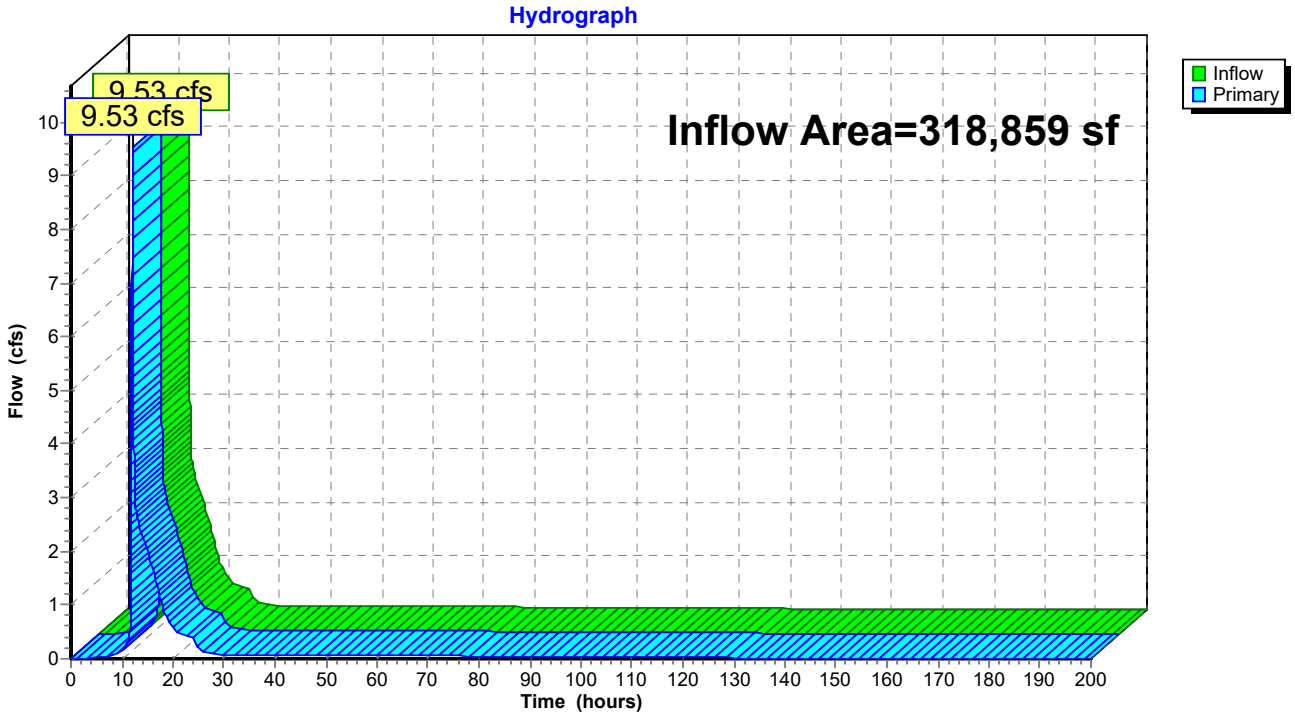


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 3.30" for 10-YR event
Inflow = 9.53 cfs @ 12.06 hrs, Volume= 87,628 cf
Primary = 9.53 cfs @ 12.06 hrs, Volume= 87,628 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=3.39"
Tc=17.5 min CN=78 Runoff=14.85 cfs 45,093 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=5.55"
Tc=17.5 min CN=98 Runoff=1.16 cfs 4,031 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=3.39"
Tc=5.0 min CN=78 Runoff=2.48 cfs 4,928 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=3.39"
Tc=19.1 min CN=78 Runoff=10.01 cfs 31,787 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=5.55"
Tc=19.1 min CN=98 Runoff=0.28 cfs 1,008 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=3.39"
Tc=13.1 min CN=78 Runoff=12.05 cfs 31,787 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=5.55"
Tc=13.1 min CN=98 Runoff=0.33 cfs 1,008 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=3.39"
Tc=11.5 min CN=78 Runoff=6.21 cfs 15,524 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=3.39"
Tc=5.0 min CN=78 Runoff=3.41 cfs 6,776 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=5.55"
Tc=11.5 min CN=98 Runoff=1.74 cfs 5,039 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=3.49"
Tc=5.0 min CN=79 Runoff=4.96 cfs 9,889 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=5.55"
Tc=5.0 min CN=98 Runoff=1.19 cfs 2,822 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=3.39"
Tc=5.0 min CN=78 Runoff=2.11 cfs 4,189 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=80 Runoff=0.39 cfs 782 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=80 Runoff=9.58 cfs 19,169 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=5.55"
Tc=5.0 min CN=98 Runoff=5.88 cfs 13,906 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=3.59"
Tc=5.0 min CN=80 Runoff=6.19 cfs 12,388 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=5.55"
Tc=5.0 min CN=98 Runoff=17.63 cfs 41,719 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=3.39"
Tc=13.8 min CN=78 Runoff=8.17 cfs 22,054 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=5.55"
Tc=13.8 min CN=98 Runoff=1.87 cfs 5,845 cf

Pond 39P: Basin 1 (MRC) Peak Elev=366.75' Storage=35,651 cf Inflow=25.27 cfs 77,478 cf
Primary=2.39 cfs 60,339 cf Secondary=0.05 cfs 14,565 cf Outflow=2.43 cfs 74,905 cf

Pond 40P: Basin 2 (MRC) Peak Elev=367.42' Storage=18,147 cf Inflow=15.45 cfs 33,075 cf
Primary=1.50 cfs 23,371 cf Secondary=0.04 cfs 8,866 cf Outflow=1.54 cfs 32,236 cf

Link 6L: Pre B (Bypass) Inflow=2.48 cfs 4,928 cf
Primary=2.48 cfs 4,928 cf

Link 9L: Pre C (Bypass) Inflow=10.29 cfs 32,794 cf
Primary=10.29 cfs 32,794 cf

Link 12L: Pre D (Bypass) Inflow=12.38 cfs 32,794 cf
Primary=12.38 cfs 32,794 cf

Link 17L: Post D Bypass Inflow=7.94 cfs 20,562 cf
Primary=7.94 cfs 20,562 cf

Link 20L: Post C Bypass Inflow=6.15 cfs 12,711 cf
Primary=6.15 cfs 12,711 cf

Link 23L: Post B Bypass Inflow=2.11 cfs 4,189 cf
Primary=2.11 cfs 4,189 cf

Link 24L: Culvert - PRE Inflow=16.01 cfs 49,124 cf
Primary=16.01 cfs 49,124 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=16.84 cfs 55,900 cf
Primary=16.84 cfs 55,900 cf

Link 26L: Culvert - POST
Inflow=10.04 cfs 27,898 cf
Primary=10.04 cfs 27,898 cf

Link 27L: Post POI A-1
Inflow=2.50 cfs 84,552 cf
Primary=2.50 cfs 84,552 cf

Link 30L: To CTP Ex. Basin- POST
Inflow=12.45 cfs 112,451 cf
Primary=12.45 cfs 112,451 cf

Total Runoff Area = 878,170 sf Runoff Volume = 279,742 cf Average Runoff Depth = 3.82"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

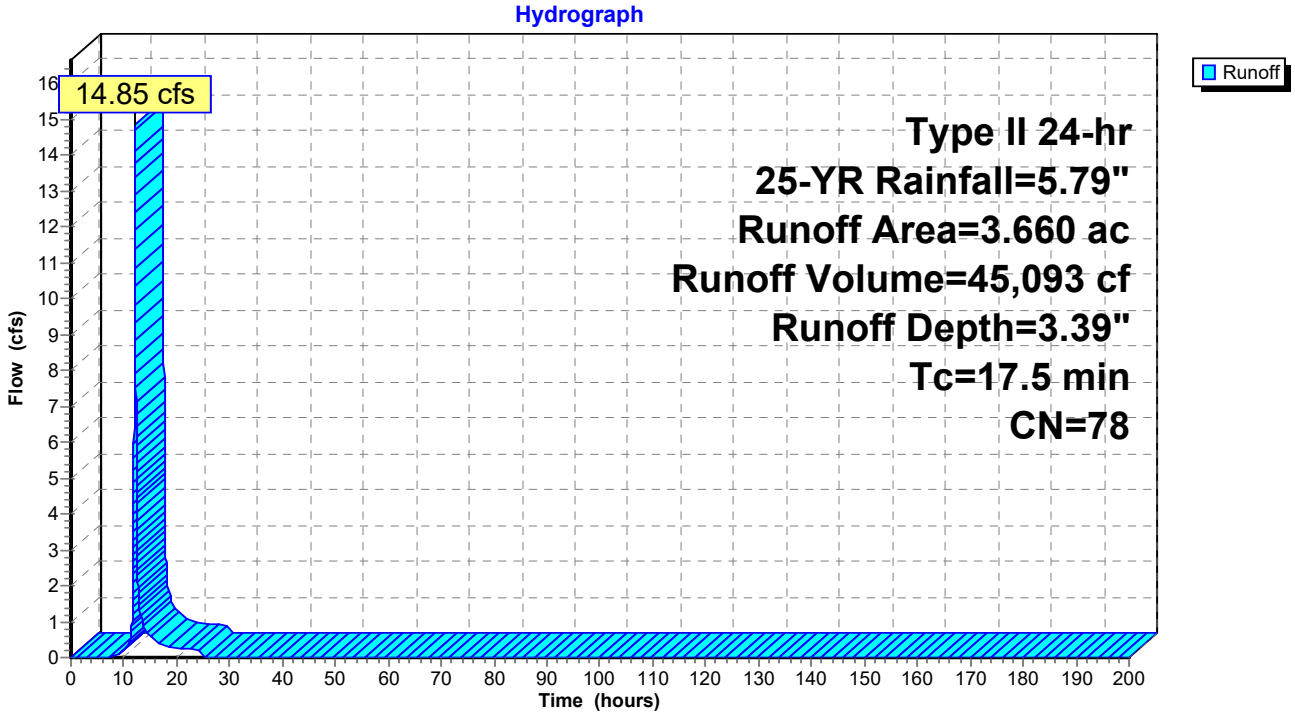
Runoff = 14.85 cfs @ 12.10 hrs, Volume= 45,093 cf, Depth= 3.39"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

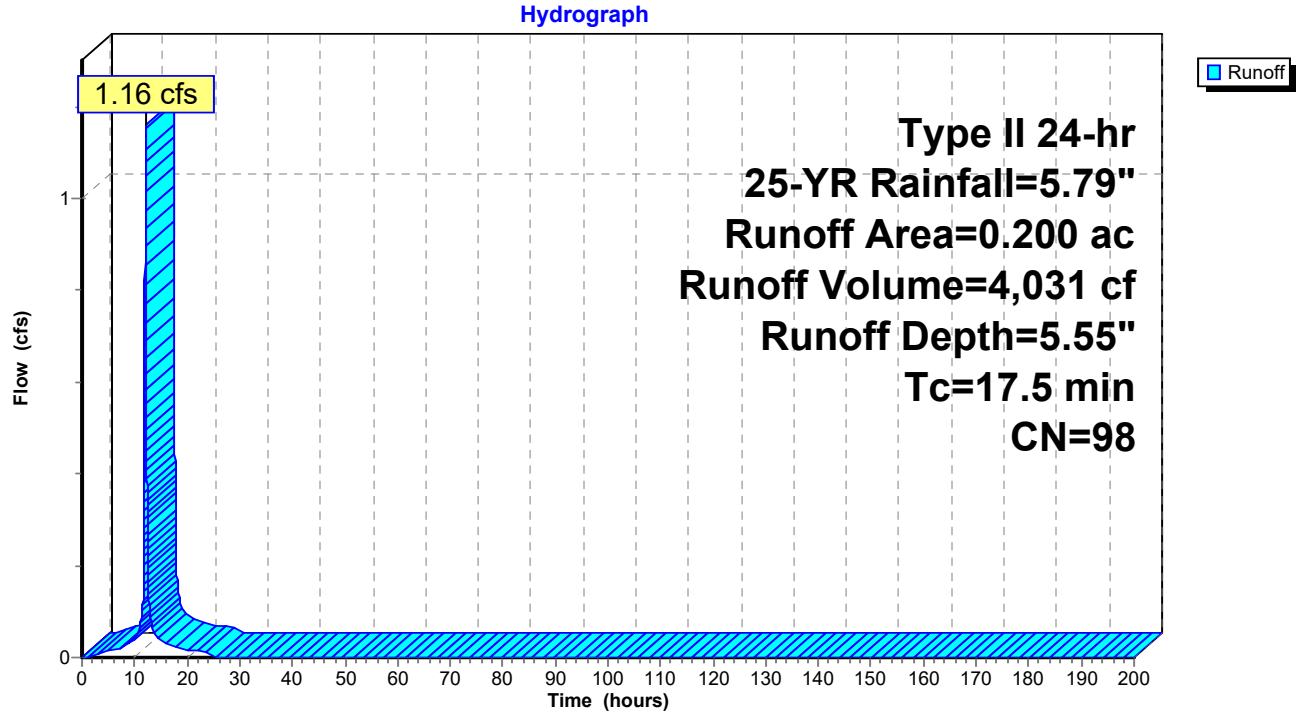
Runoff = 1.16 cfs @ 12.09 hrs, Volume= 4,031 cf, Depth= 5.55"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

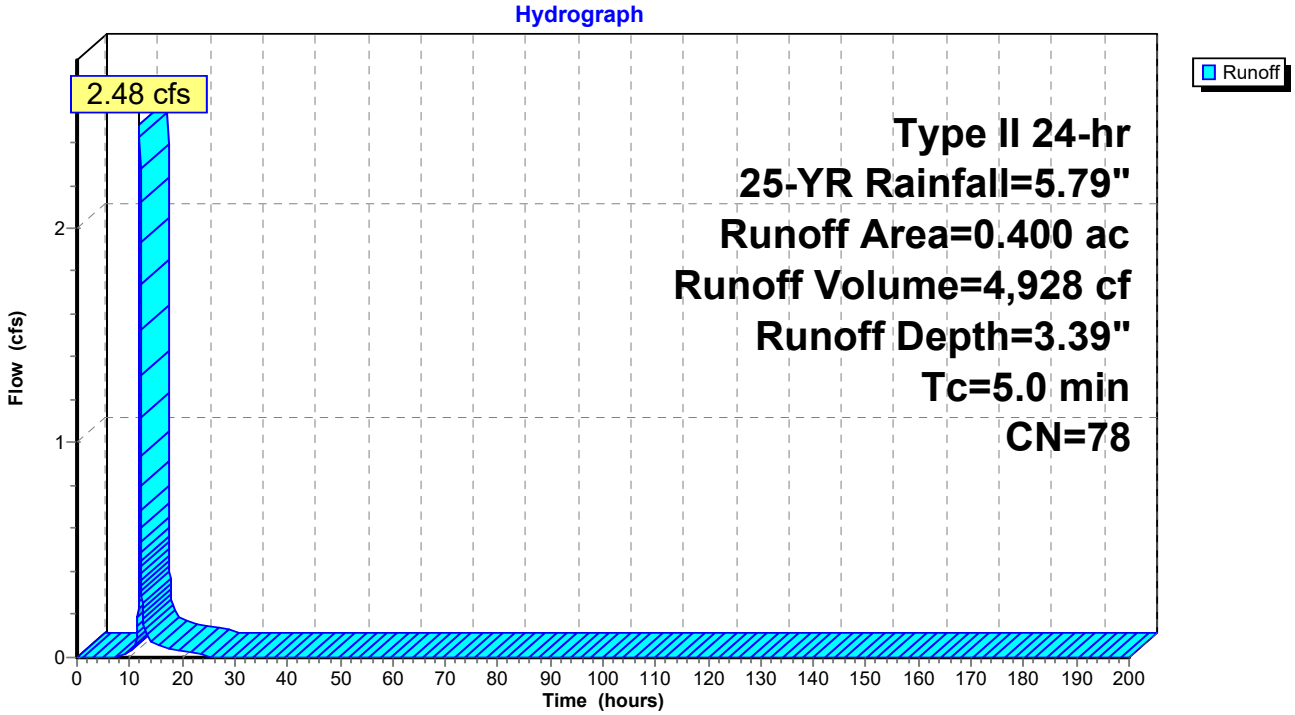
Runoff = 2.48 cfs @ 11.96 hrs, Volume= 4,928 cf, Depth= 3.39"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

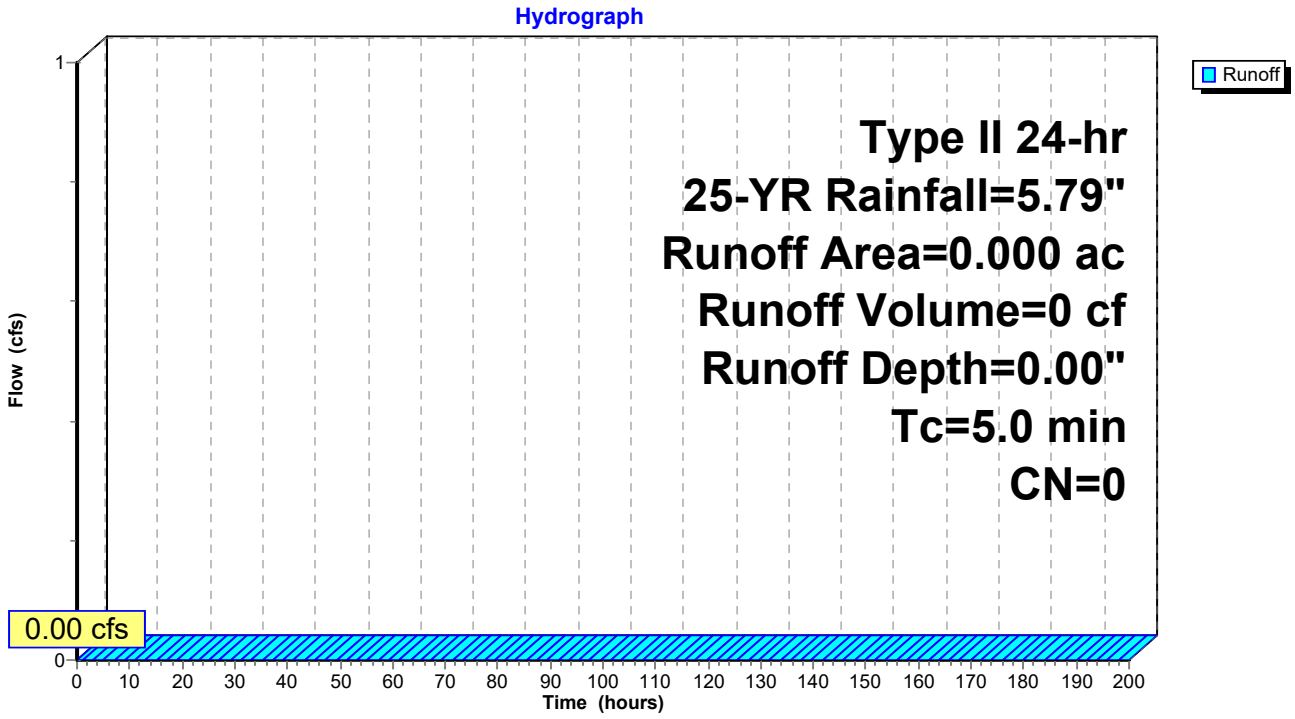
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

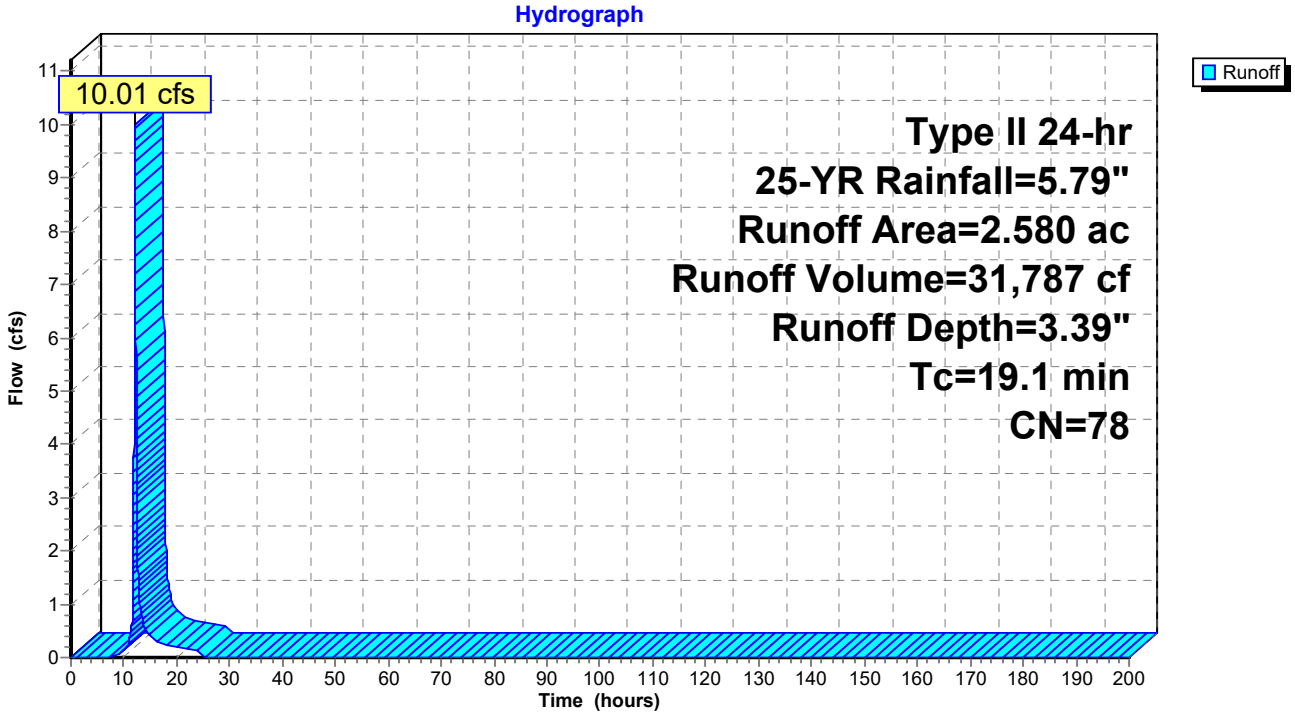
Runoff = 10.01 cfs @ 12.12 hrs, Volume= 31,787 cf, Depth= 3.39"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

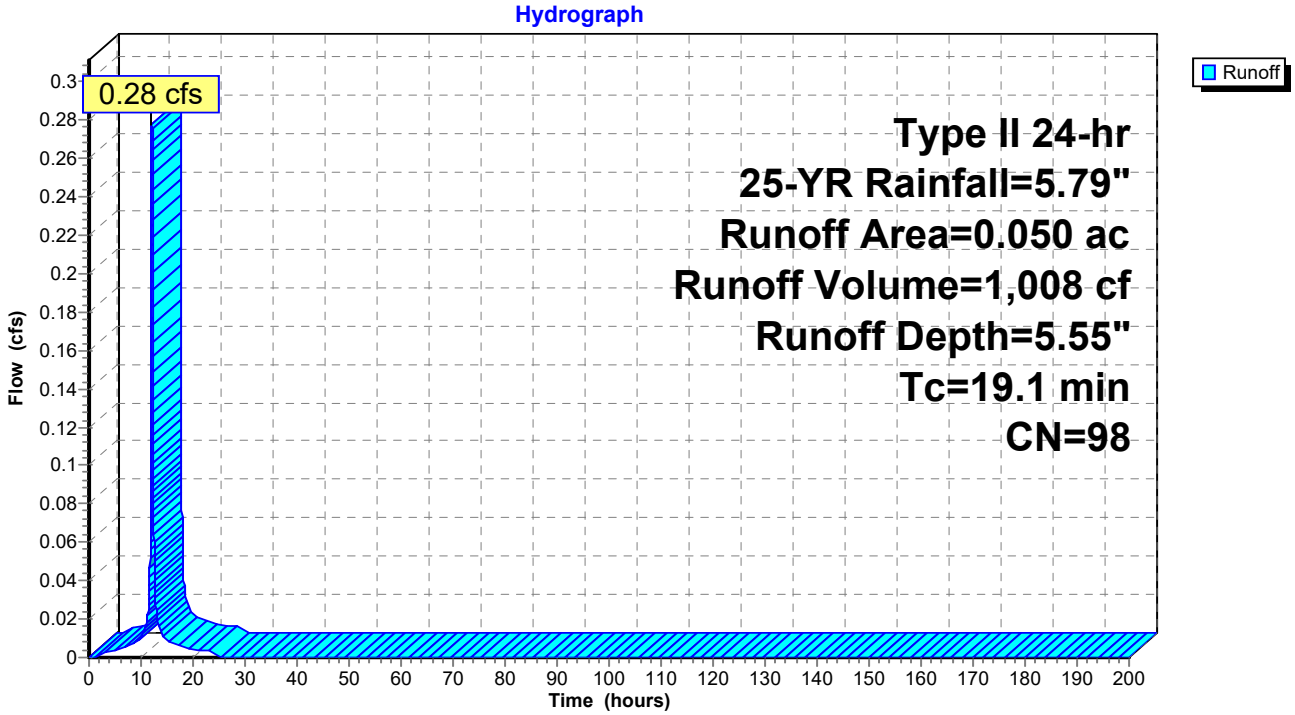
Runoff = 0.28 cfs @ 12.11 hrs, Volume= 1,008 cf, Depth= 5.55"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

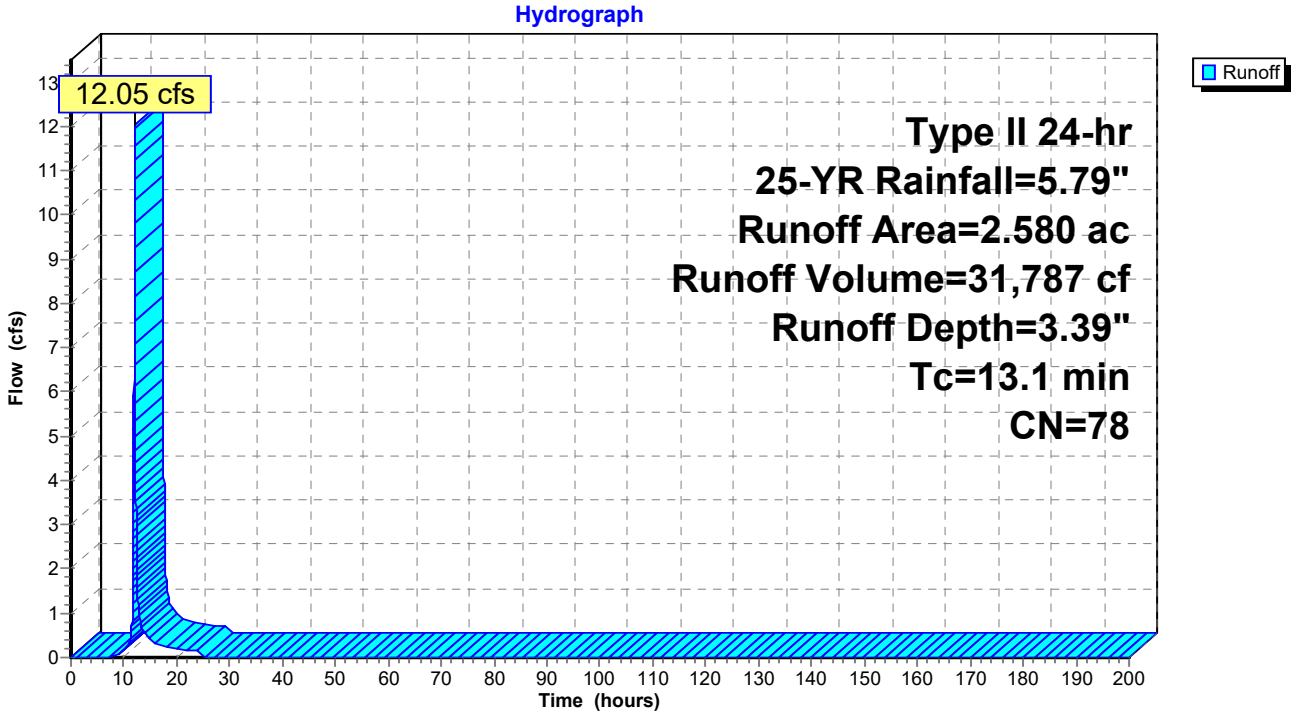
Runoff = 12.05 cfs @ 12.05 hrs, Volume= 31,787 cf, Depth= 3.39"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

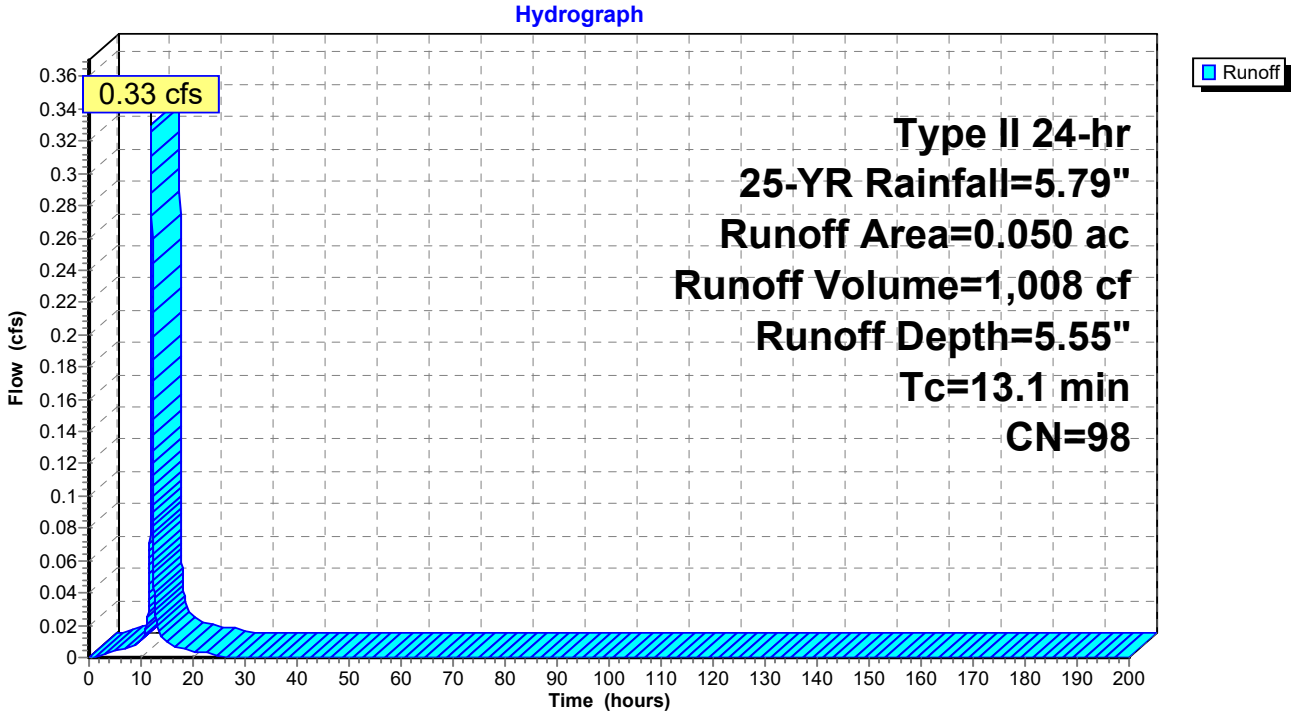
Runoff = 0.33 cfs @ 12.04 hrs, Volume= 1,008 cf, Depth= 5.55"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

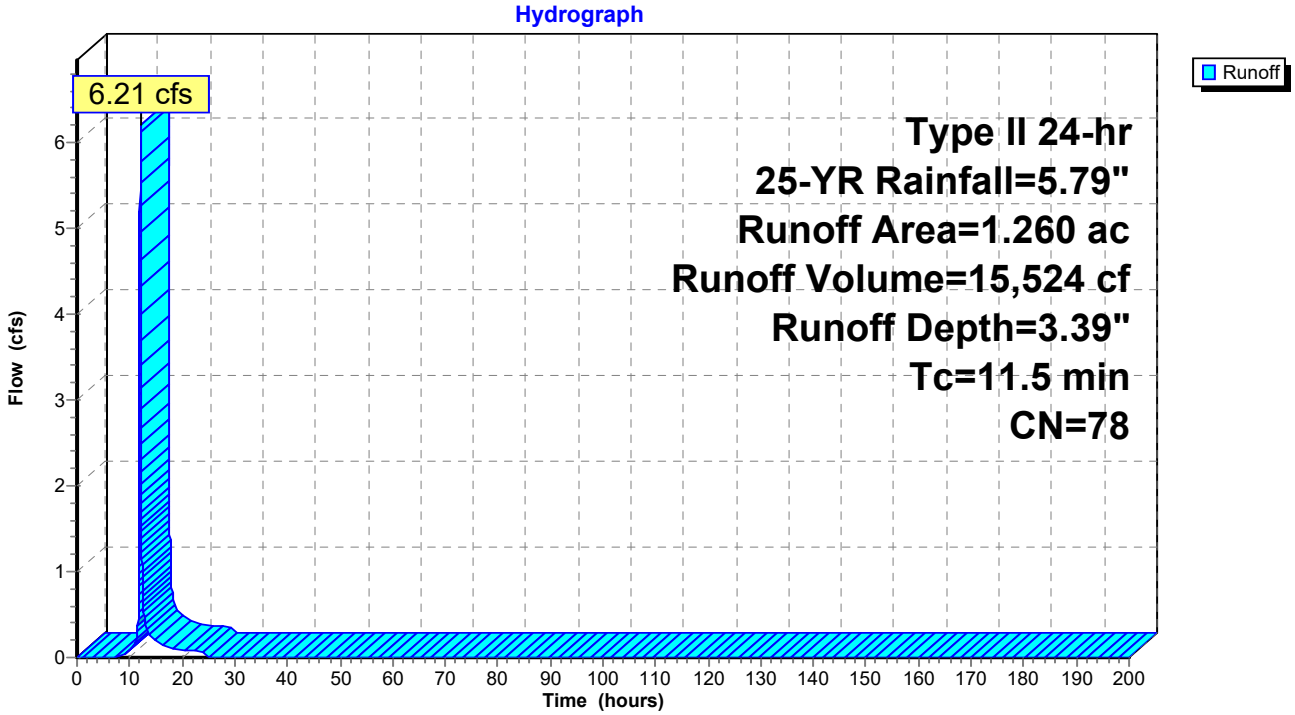
Runoff = 6.21 cfs @ 12.03 hrs, Volume= 15,524 cf, Depth= 3.39"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

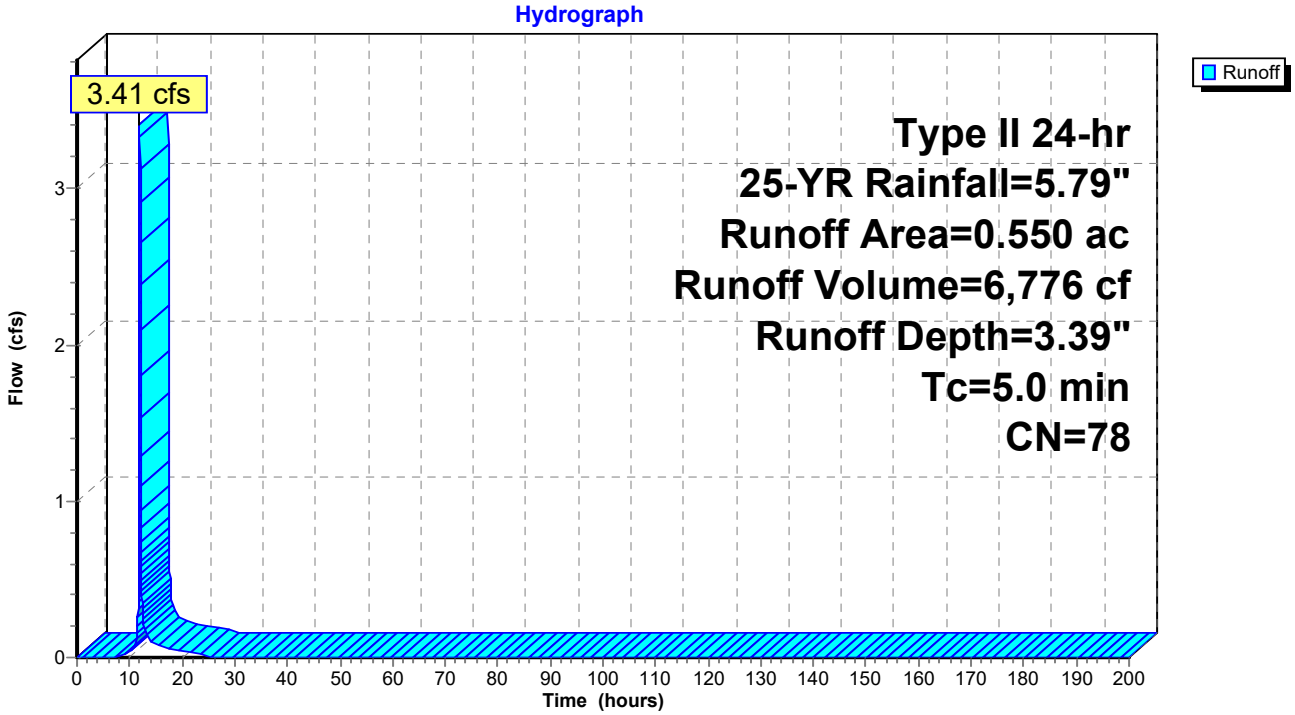
Runoff = 3.41 cfs @ 11.96 hrs, Volume= 6,776 cf, Depth= 3.39"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

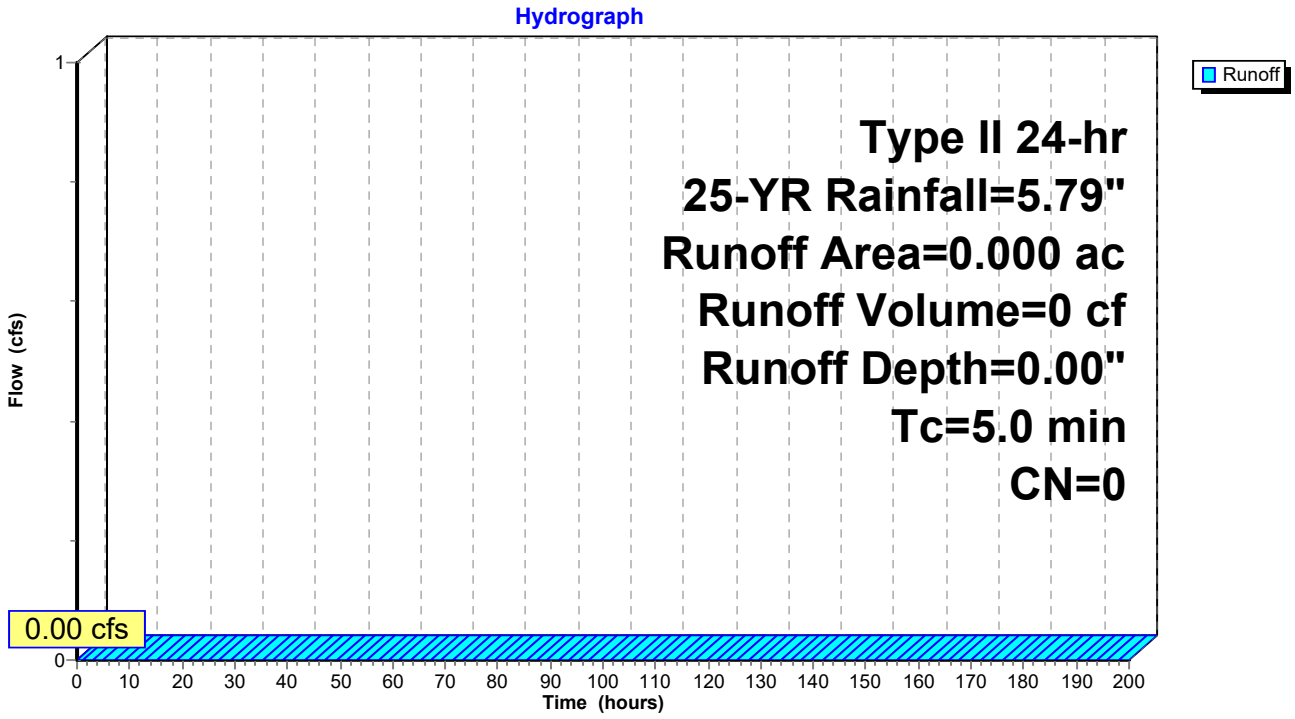
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

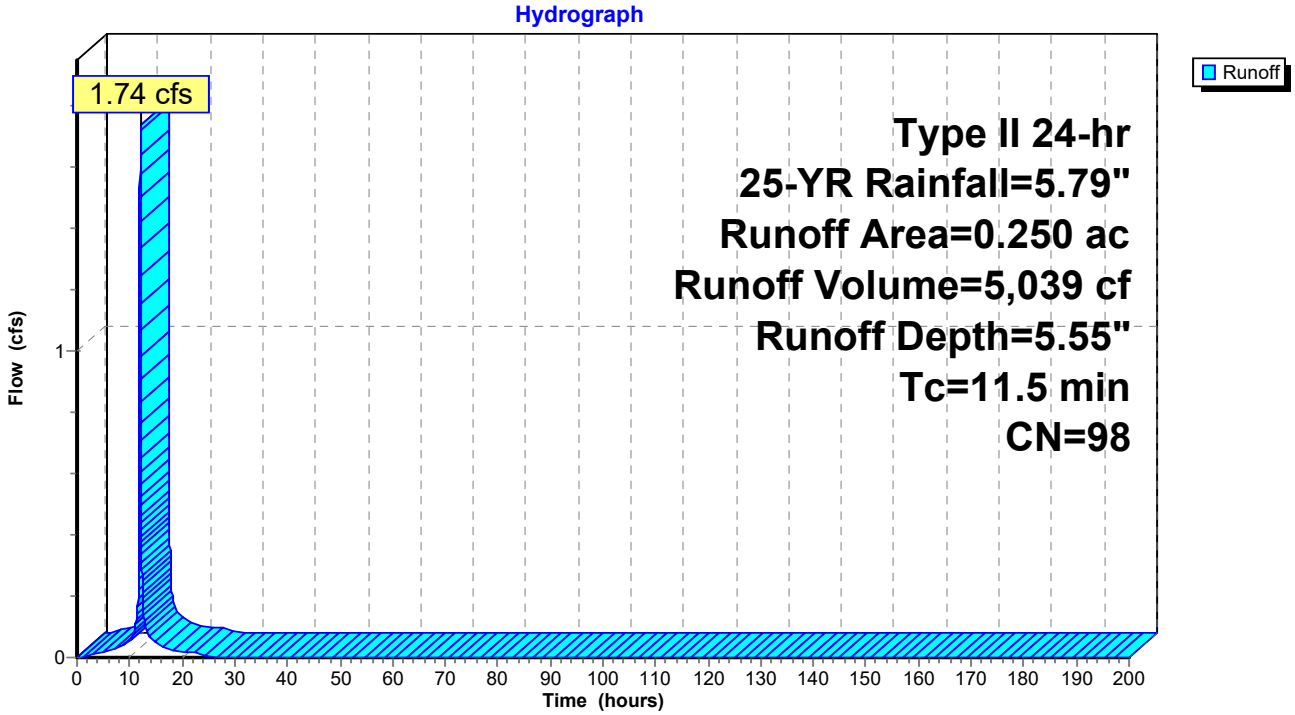
Runoff = 1.74 cfs @ 12.02 hrs, Volume= 5,039 cf, Depth= 5.55"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

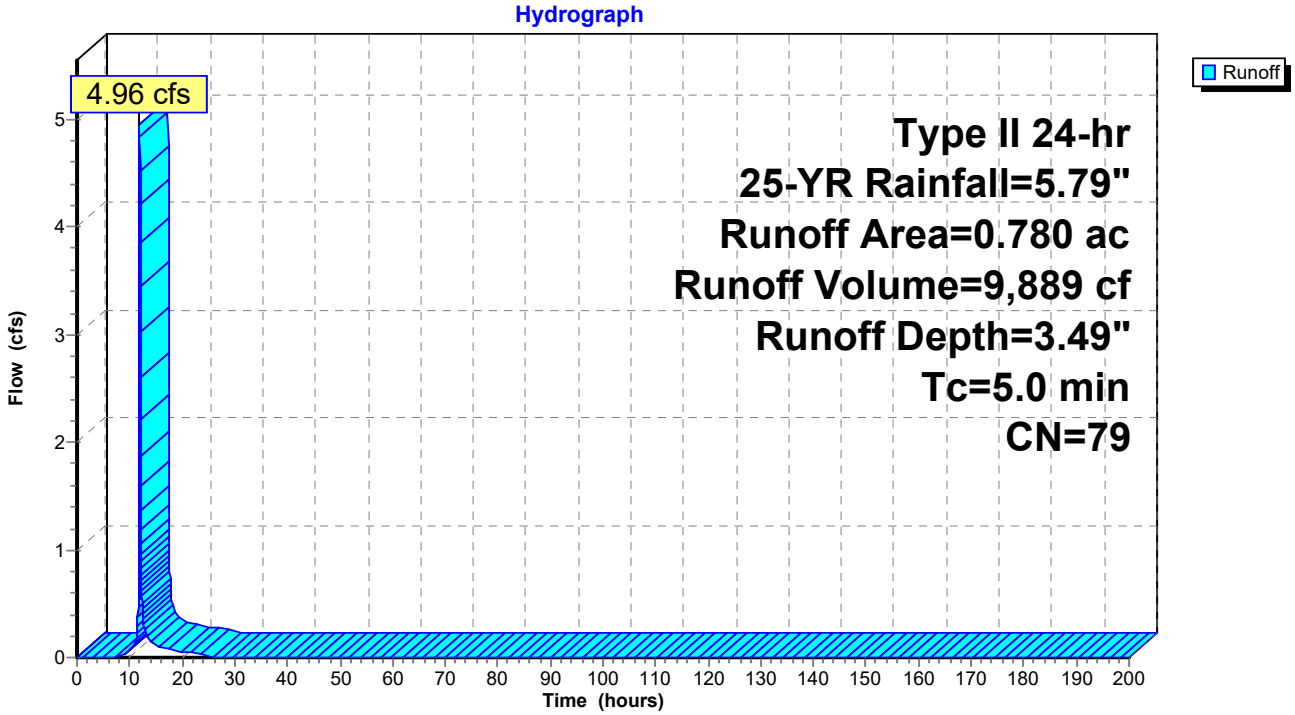
Runoff = 4.96 cfs @ 11.96 hrs, Volume= 9,889 cf, Depth= 3.49"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

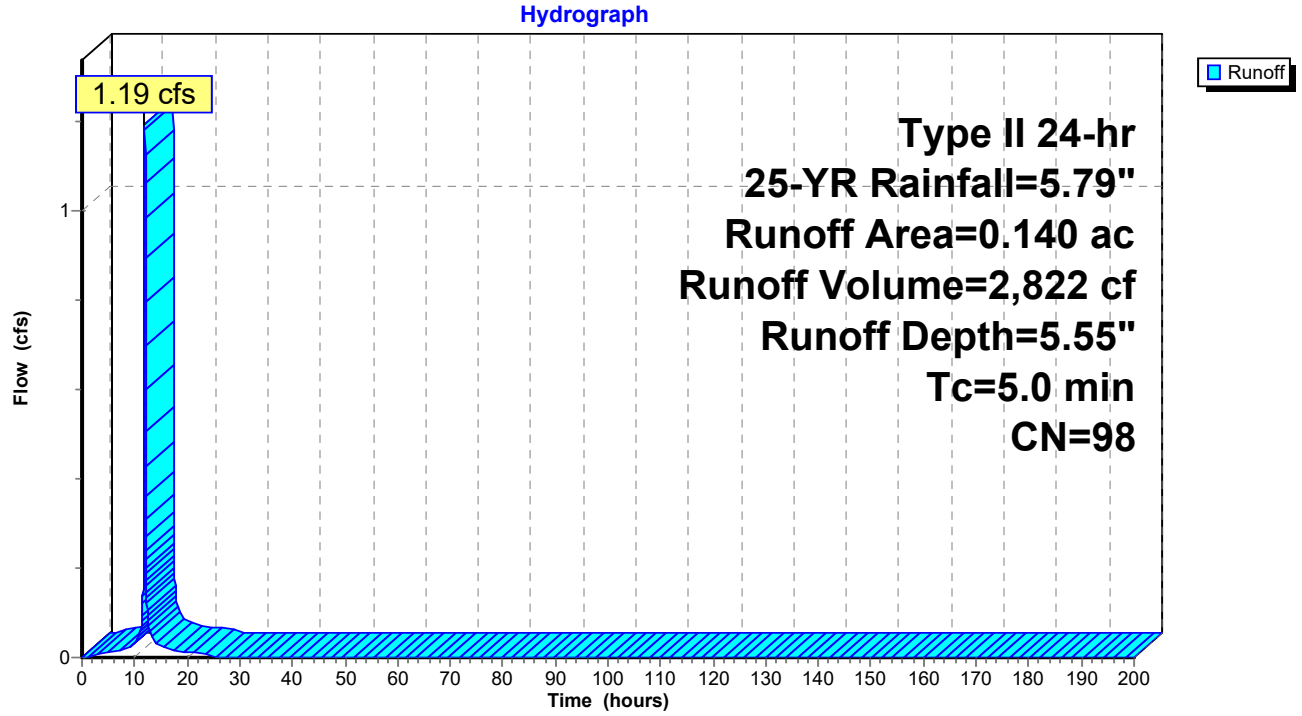
Runoff = 1.19 cfs @ 11.96 hrs, Volume= 2,822 cf, Depth= 5.55"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

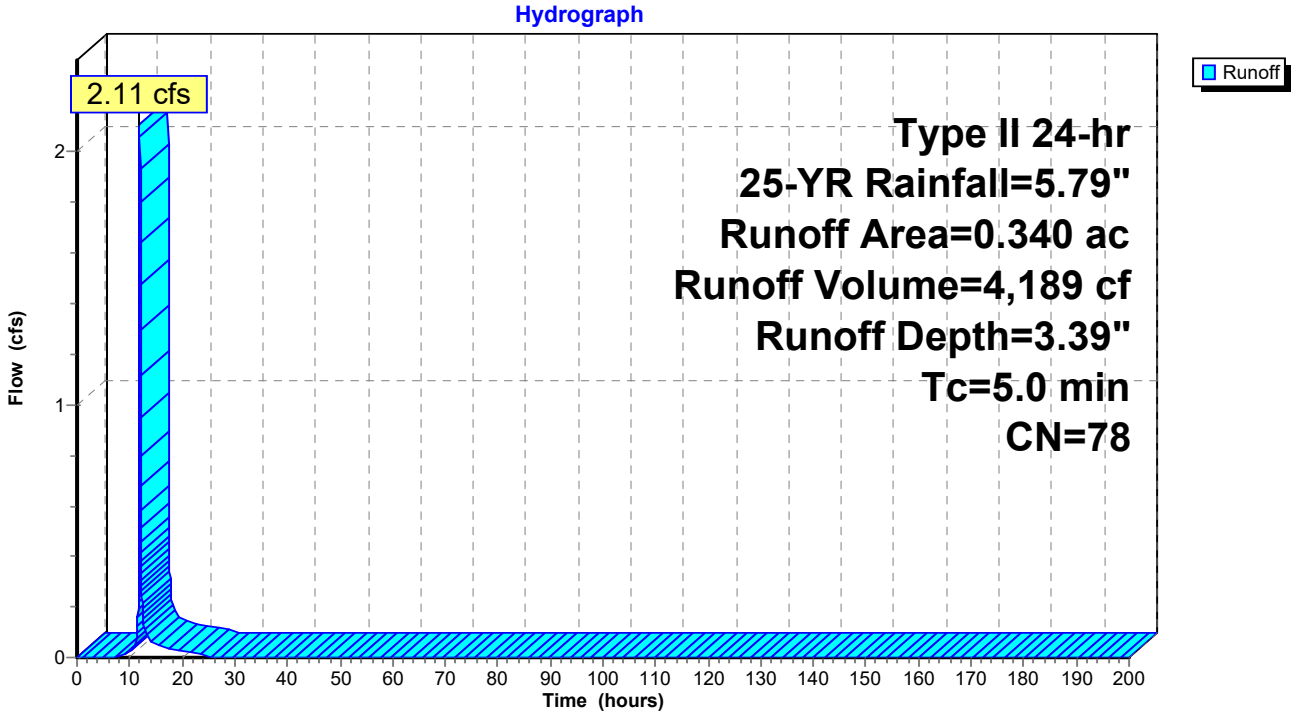
Runoff = 2.11 cfs @ 11.96 hrs, Volume= 4,189 cf, Depth= 3.39"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

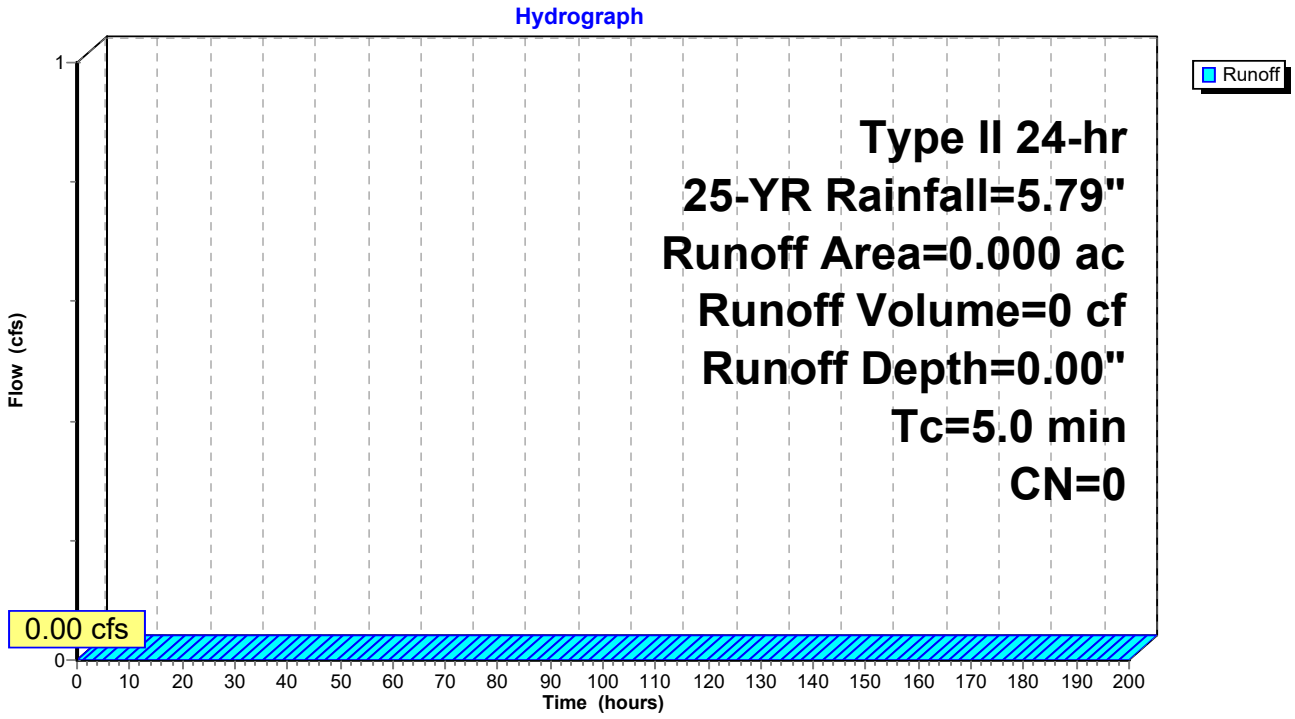
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

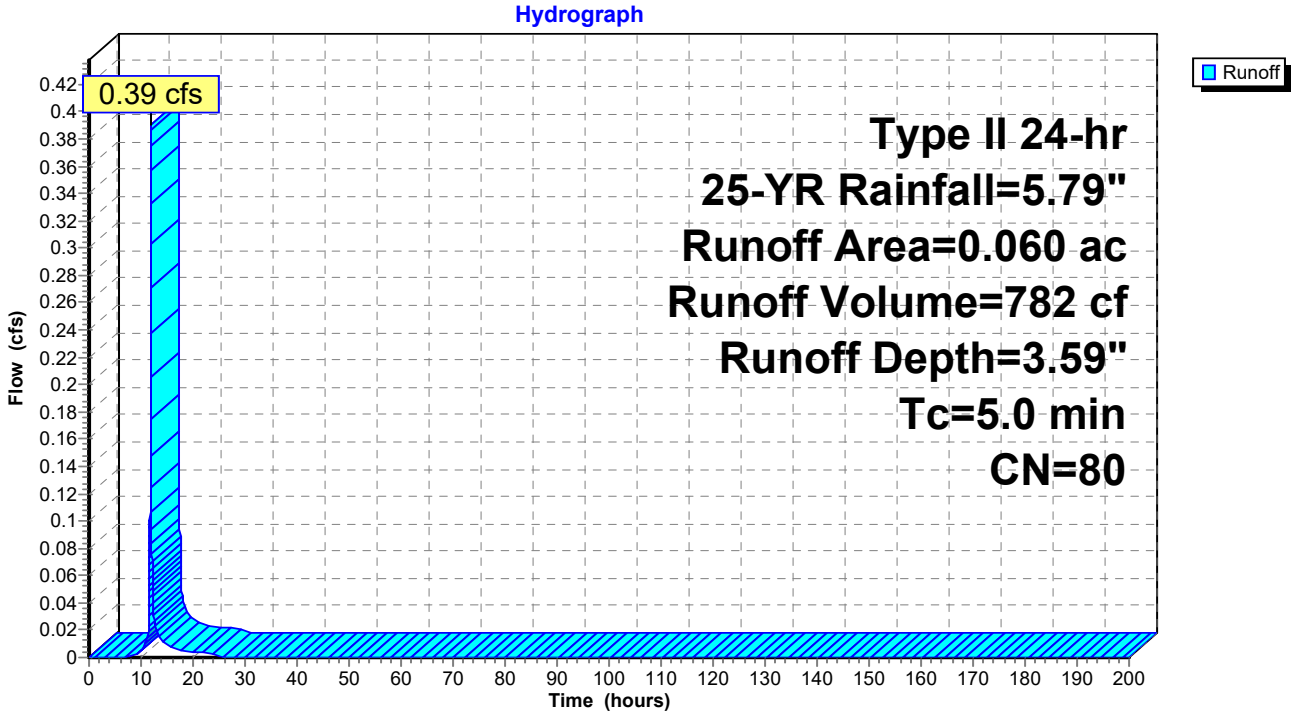
Runoff = 0.39 cfs @ 11.96 hrs, Volume= 782 cf, Depth= 3.59"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

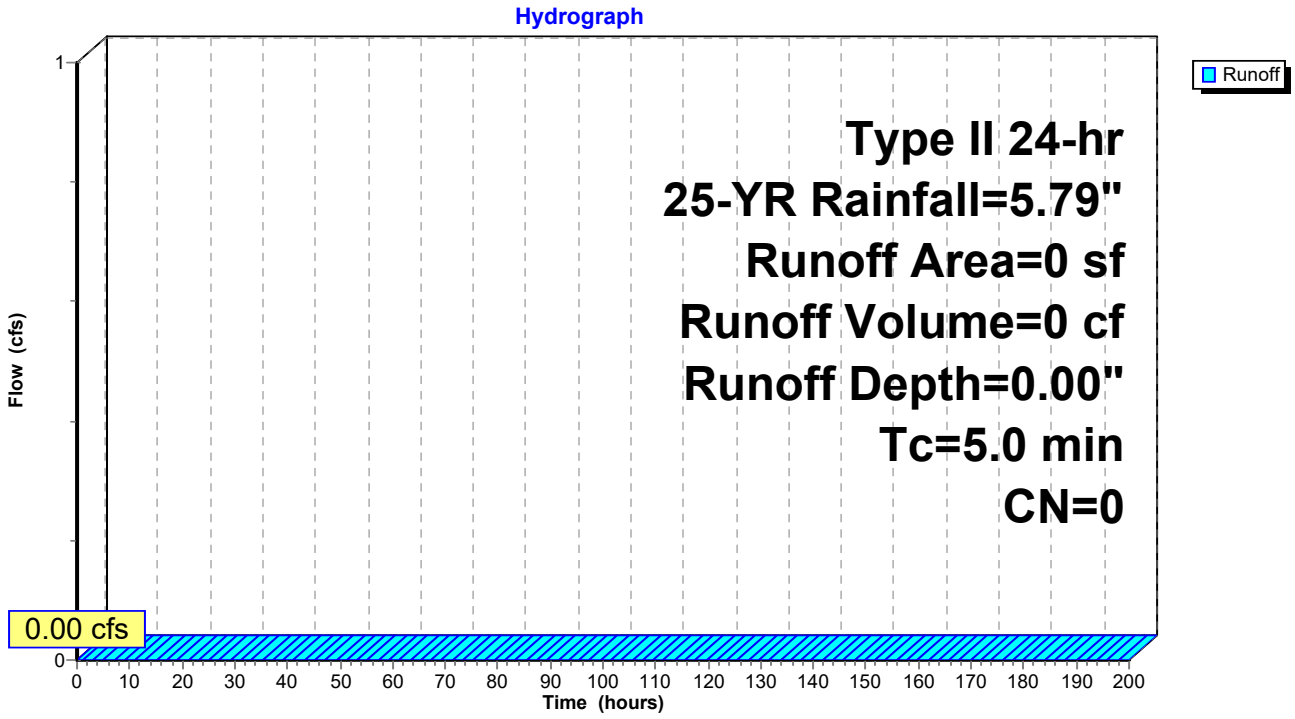
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

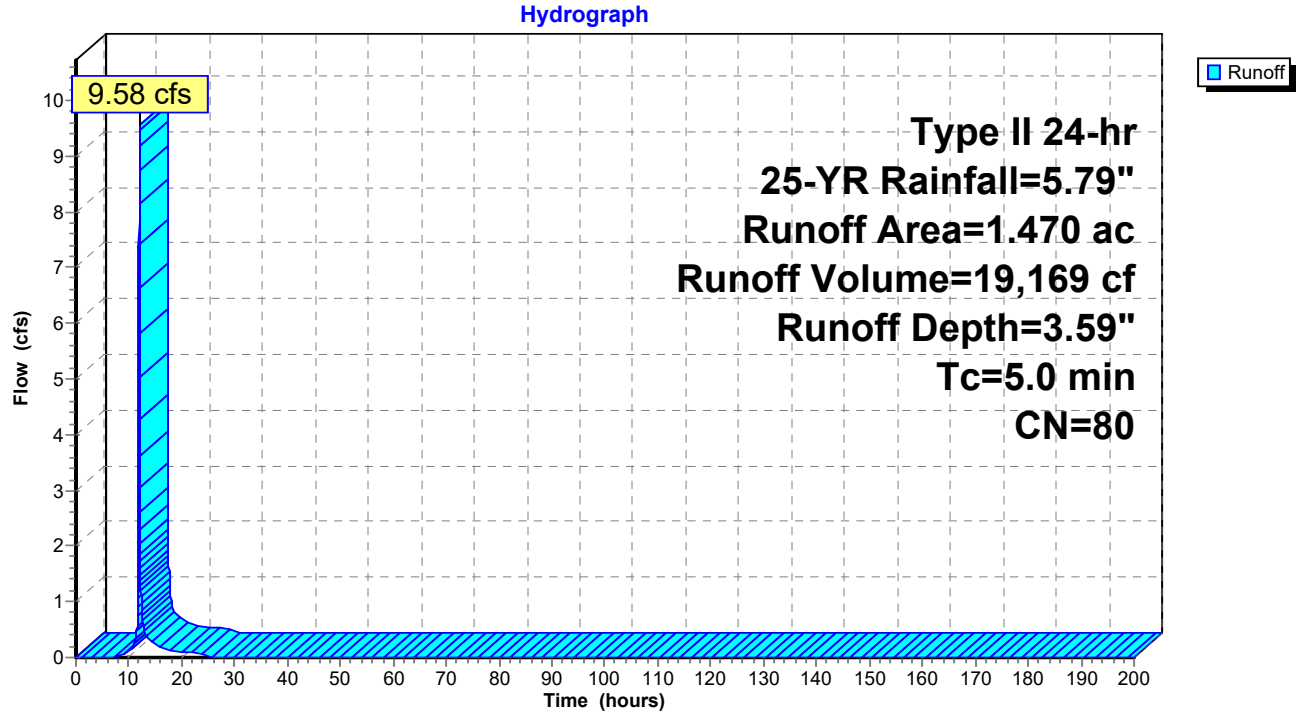
Runoff = 9.58 cfs @ 11.96 hrs, Volume= 19,169 cf, Depth= 3.59"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

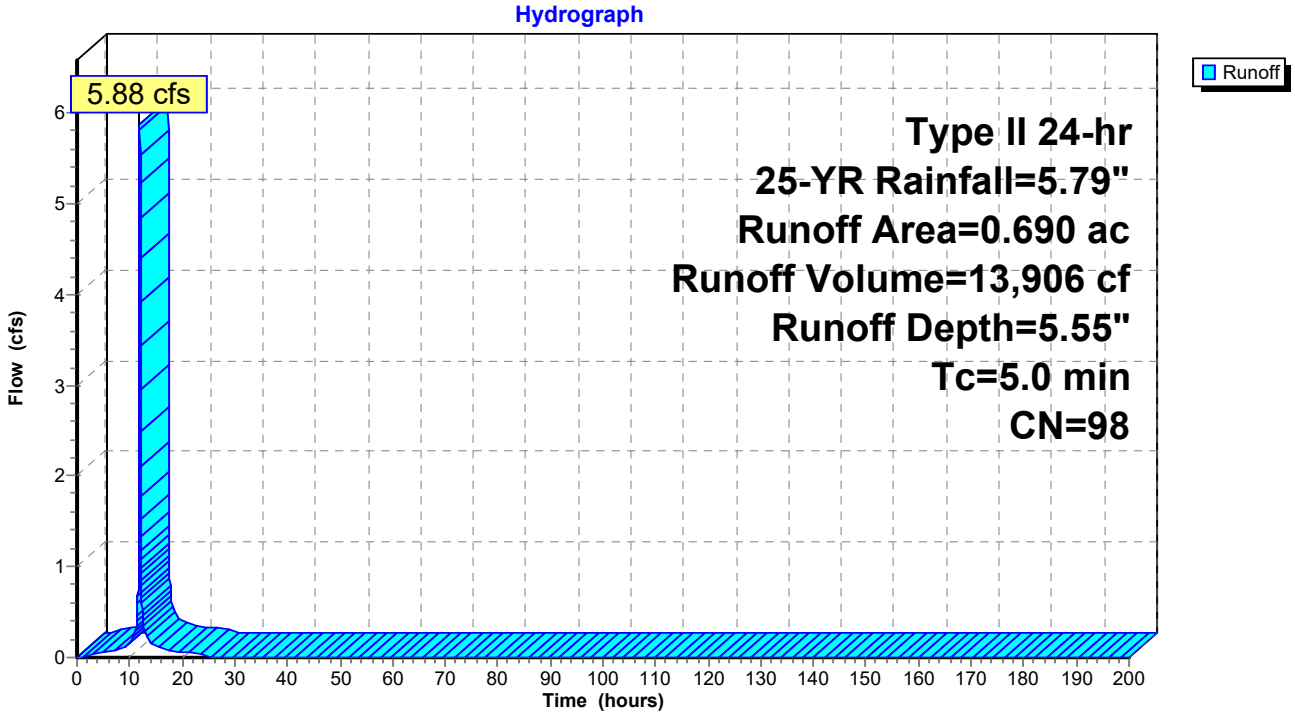
Runoff = 5.88 cfs @ 11.96 hrs, Volume= 13,906 cf, Depth= 5.55"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

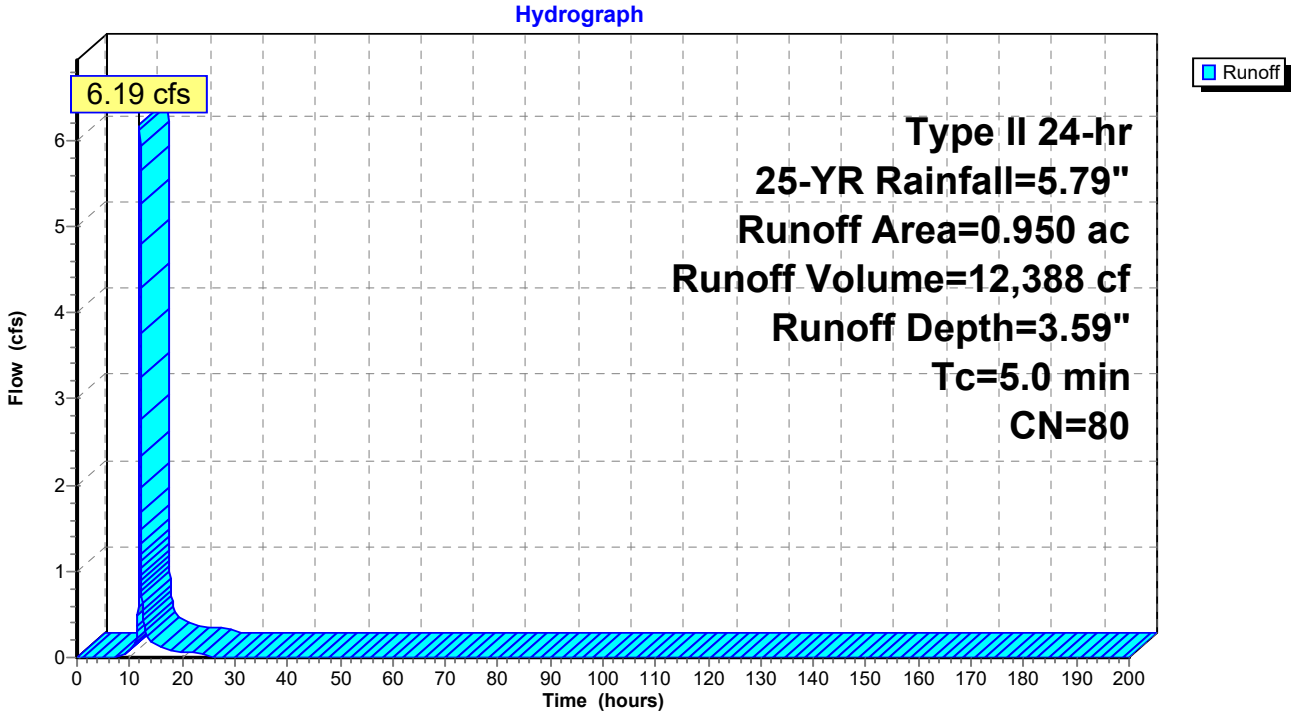
Runoff = 6.19 cfs @ 11.96 hrs, Volume= 12,388 cf, Depth= 3.59"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

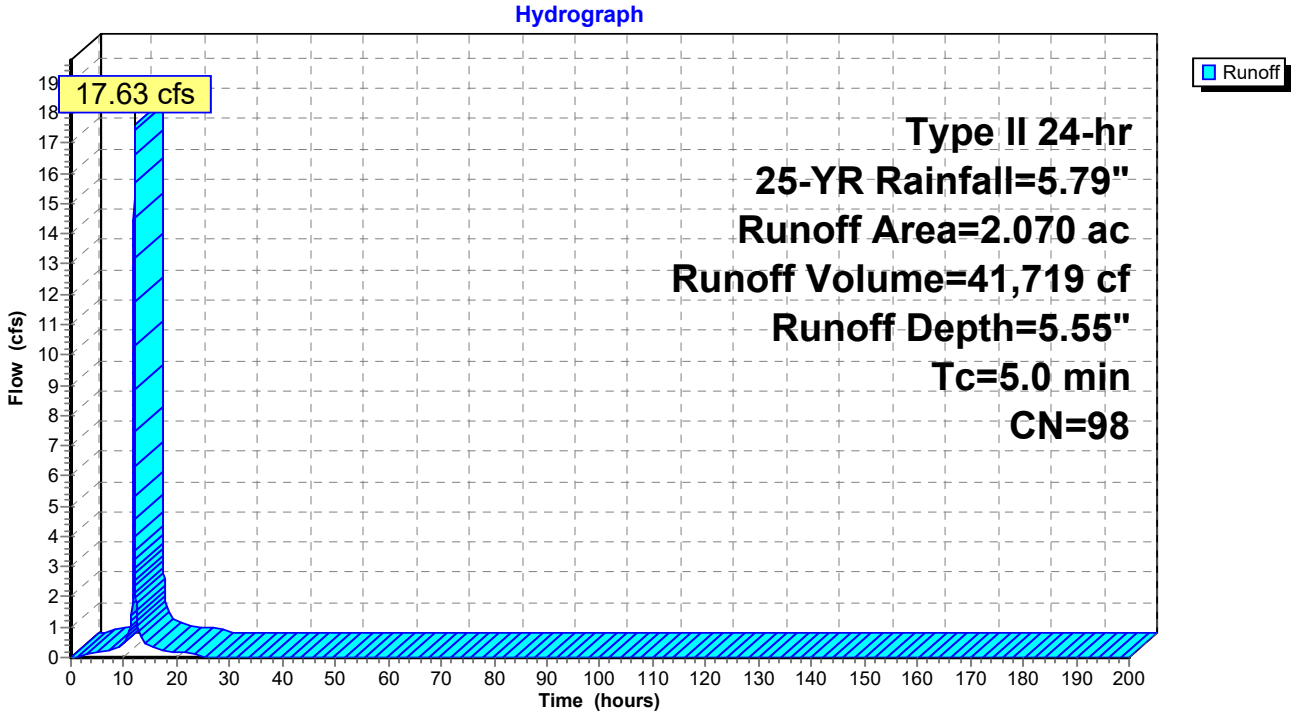
Runoff = 17.63 cfs @ 11.96 hrs, Volume= 41,719 cf, Depth= 5.55"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

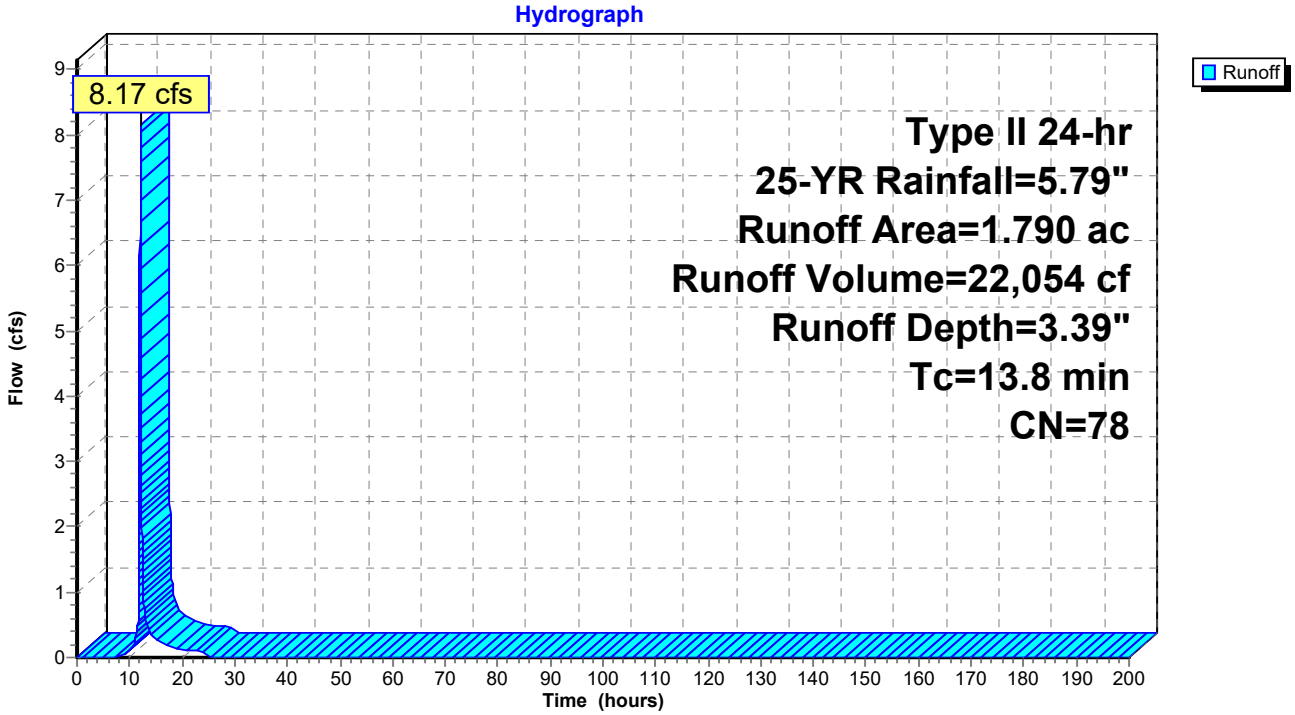
Runoff = 8.17 cfs @ 12.06 hrs, Volume= 22,054 cf, Depth= 3.39"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

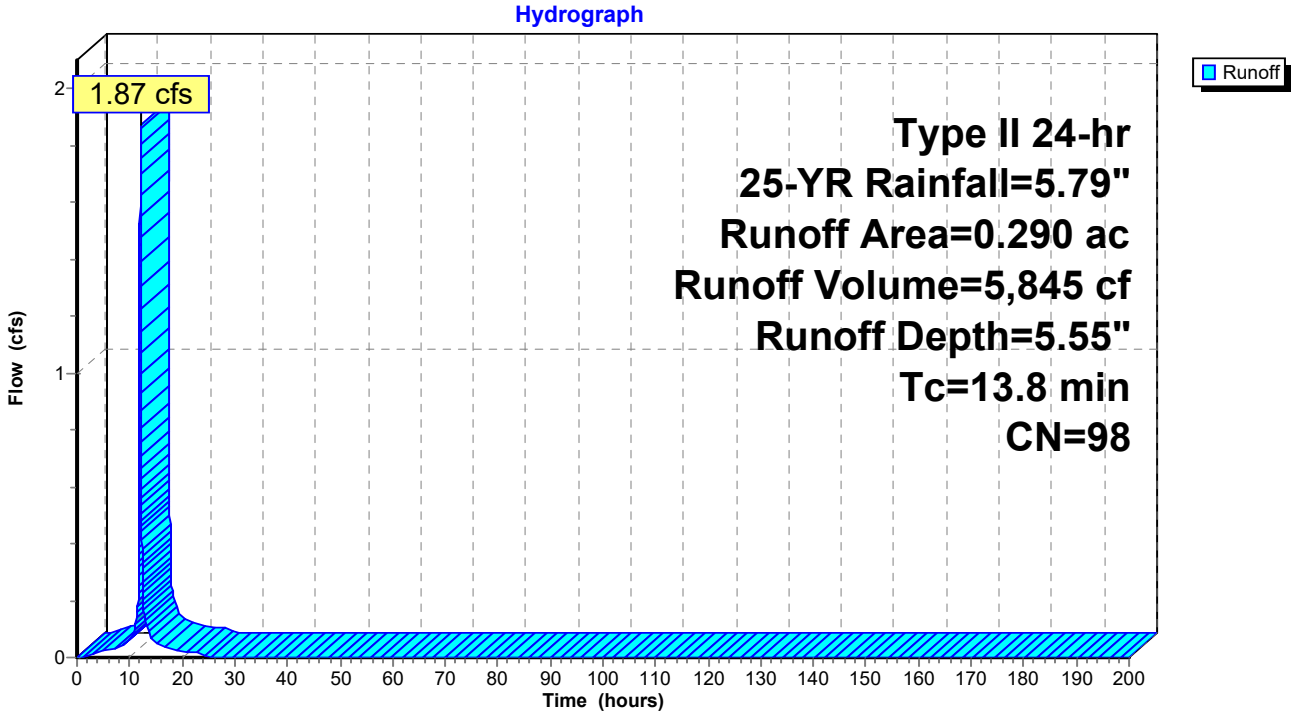
Runoff = 1.87 cfs @ 12.05 hrs, Volume= 5,845 cf, Depth= 5.55"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-YR Rainfall=5.79"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 4.12" for 25-YR event
Inflow = 25.27 cfs @ 11.96 hrs, Volume= 77,478 cf
Outflow = 2.43 cfs @ 12.87 hrs, Volume= 74,905 cf, Atten= 90%, Lag= 54.5 min
Primary = 2.39 cfs @ 12.87 hrs, Volume= 60,339 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.05 cfs @ 12.87 hrs, Volume= 14,565 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 366.75' @ 12.87 hrs Surf.Area= 12,668 sf Storage= 35,651 cf

Plug-Flow detention time= 822.4 min calculated for 74,901 cf (97% of inflow)
Center-of-Mass det. time= 802.9 min (1,609.4 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

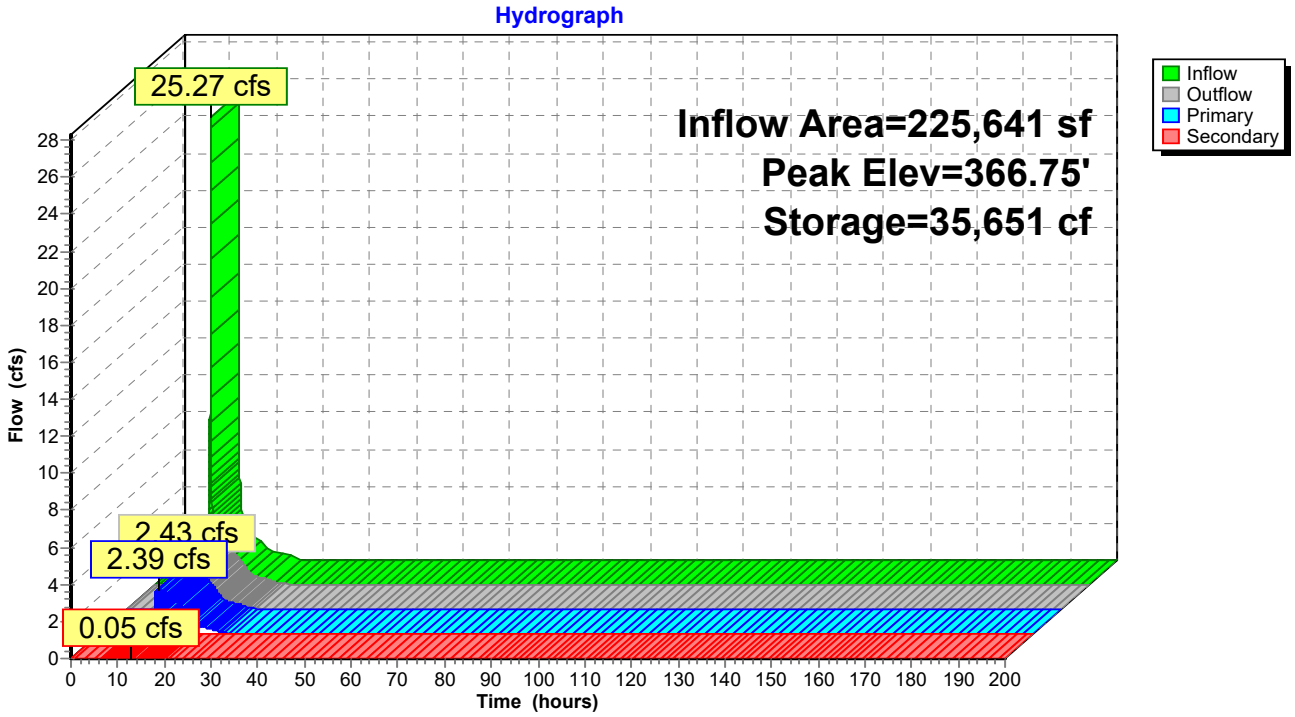
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.39 cfs @ 12.87 hrs HW=366.75' TW=0.00' (Dynamic Tailwater)
↑└**1=Culvert** (Passes 2.39 cfs of 16.85 cfs potential flow)
↑└**4=Orifice** (Orifice Controls 2.39 cfs @ 6.37 fps)

Secondary OutFlow Max=0.05 cfs @ 12.87 hrs HW=366.75' TW=0.00' (Dynamic Tailwater)
↑└**2=MRC Underdrain** (Passes 0.05 cfs of 0.90 cfs potential flow)
↑└**3=MRC Underdrain** (Orifice Controls 0.05 cfs @ 10.45 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 4.22" for 25-YR event
Inflow = 15.45 cfs @ 11.96 hrs, Volume= 33,075 cf
Outflow = 1.54 cfs @ 12.01 hrs, Volume= 32,236 cf, Atten= 90%, Lag= 3.3 min
Primary = 1.50 cfs @ 12.01 hrs, Volume= 23,371 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.04 cfs @ 12.40 hrs, Volume= 8,866 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 367.42' @ 12.40 hrs Surf.Area= 6,575 sf Storage= 18,147 cf

Plug-Flow detention time= 693.4 min calculated for 32,234 cf (97% of inflow)
Center-of-Mass det. time= 678.0 min (1,459.7 - 781.8)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

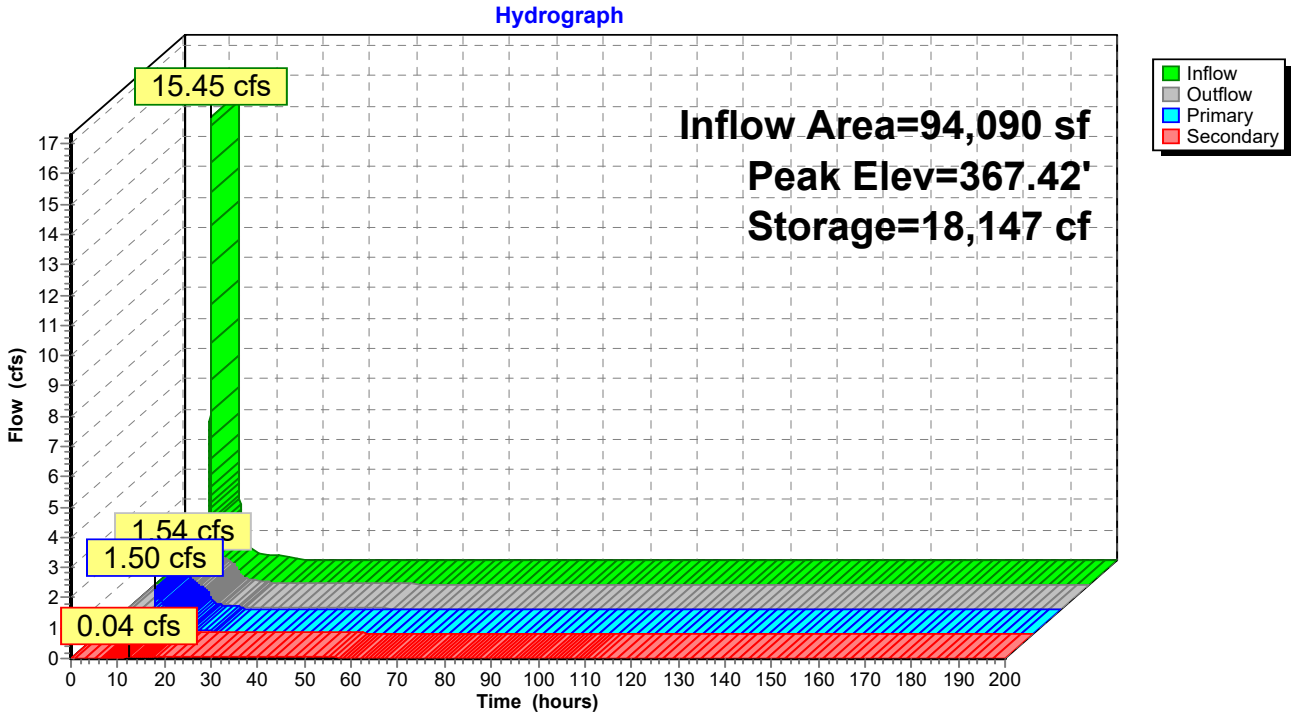
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.45 cfs @ 12.01 hrs HW=367.09' TW=366.27' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.45 cfs of 7.69 cfs potential flow)
↑**4=Orifice** (Orifice Controls 1.45 cfs @ 4.35 fps)

Secondary OutFlow Max=0.04 cfs @ 12.40 hrs HW=367.42' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.04 cfs of 0.48 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.04 cfs @ 10.08 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

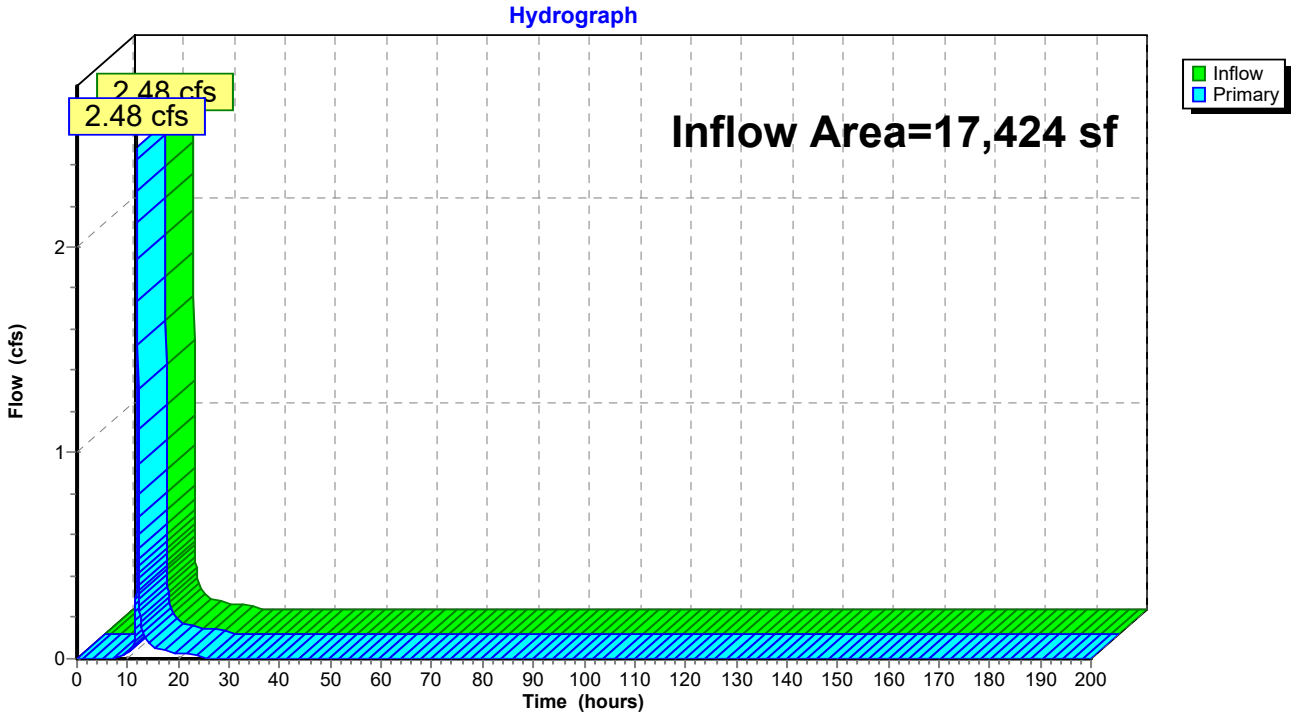
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 3.39" for 25-YR event
Inflow = 2.48 cfs @ 11.96 hrs, Volume= 4,928 cf
Primary = 2.48 cfs @ 11.96 hrs, Volume= 4,928 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

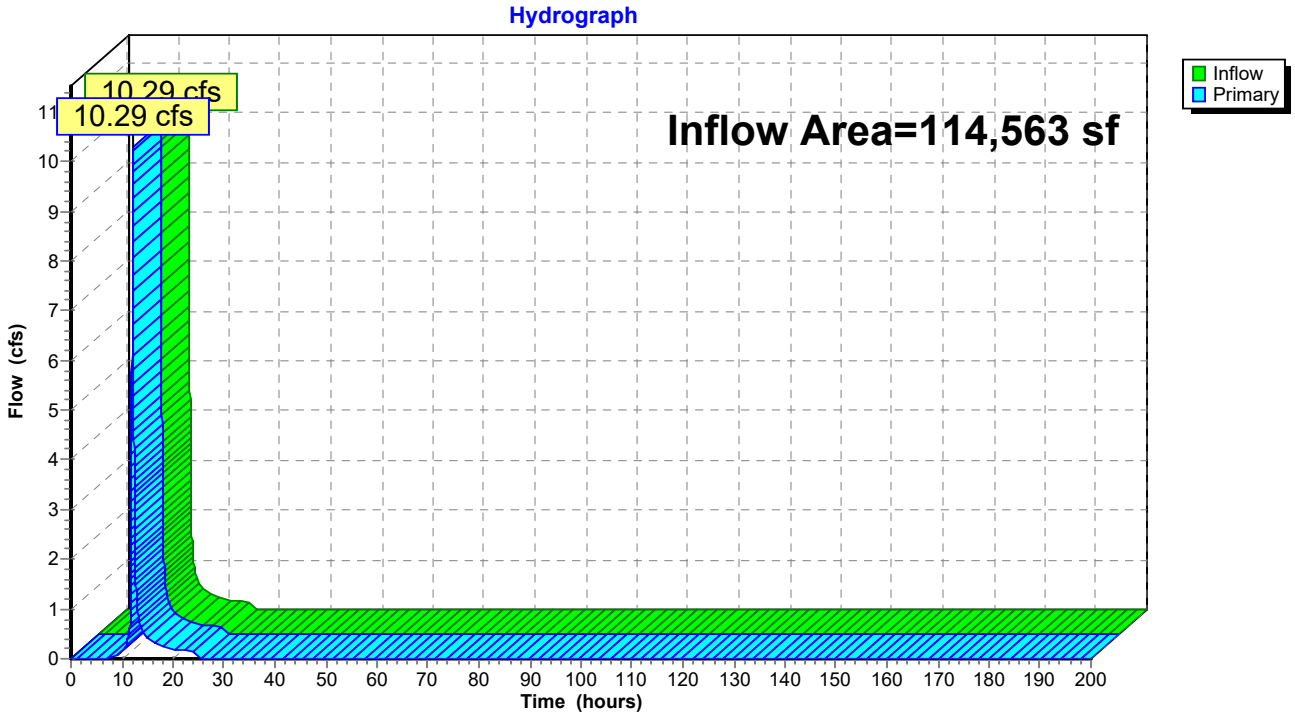


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 3.44" for 25-YR event
Inflow = 10.29 cfs @ 12.12 hrs, Volume= 32,794 cf
Primary = 10.29 cfs @ 12.12 hrs, Volume= 32,794 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

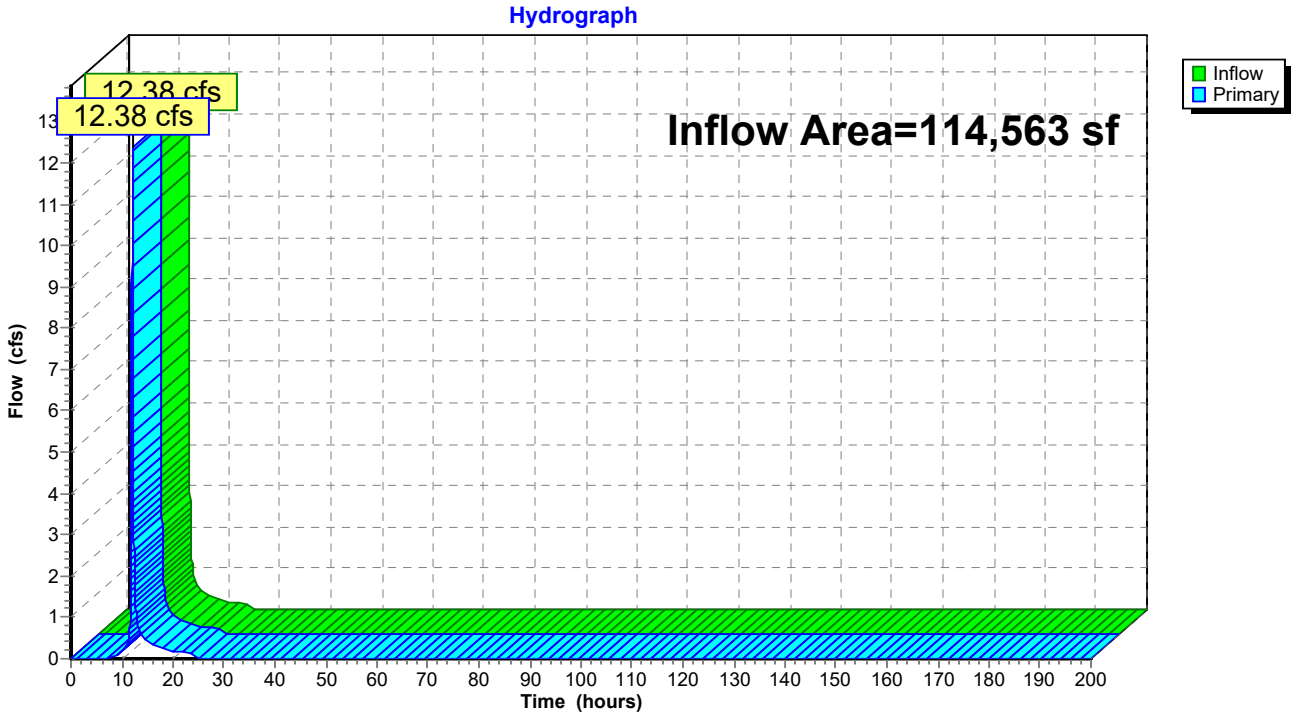


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 3.44" for 25-YR event
Inflow = 12.38 cfs @ 12.05 hrs, Volume= 32,794 cf
Primary = 12.38 cfs @ 12.05 hrs, Volume= 32,794 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

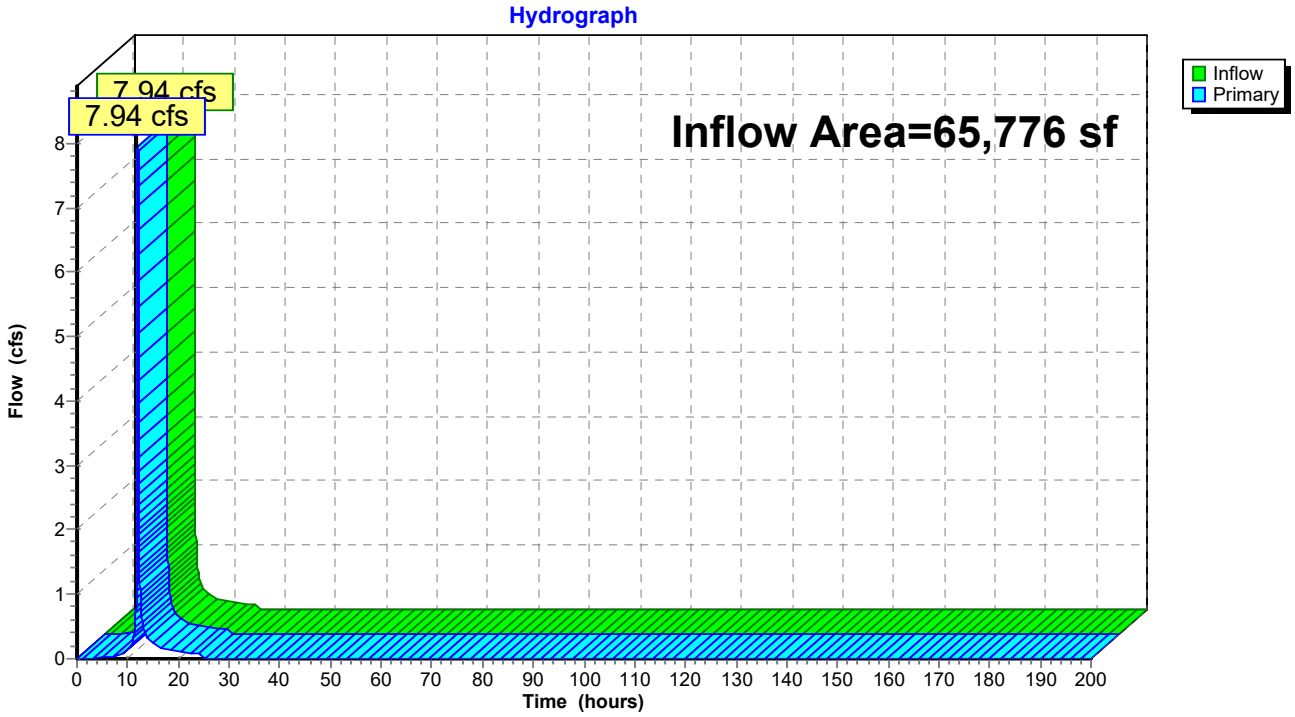


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 3.75" for 25-YR event
Inflow = 7.94 cfs @ 12.03 hrs, Volume= 20,562 cf
Primary = 7.94 cfs @ 12.03 hrs, Volume= 20,562 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

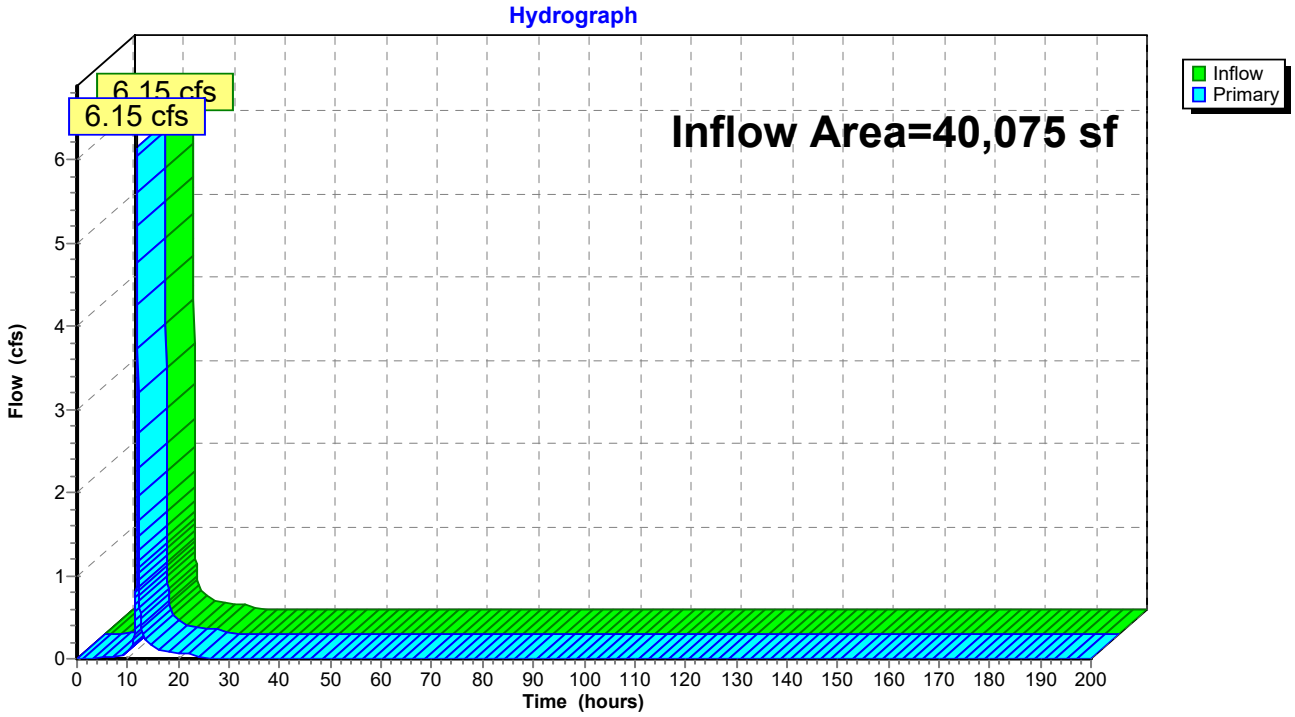


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 3.81" for 25-YR event
Inflow = 6.15 cfs @ 11.96 hrs, Volume= 12,711 cf
Primary = 6.15 cfs @ 11.96 hrs, Volume= 12,711 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

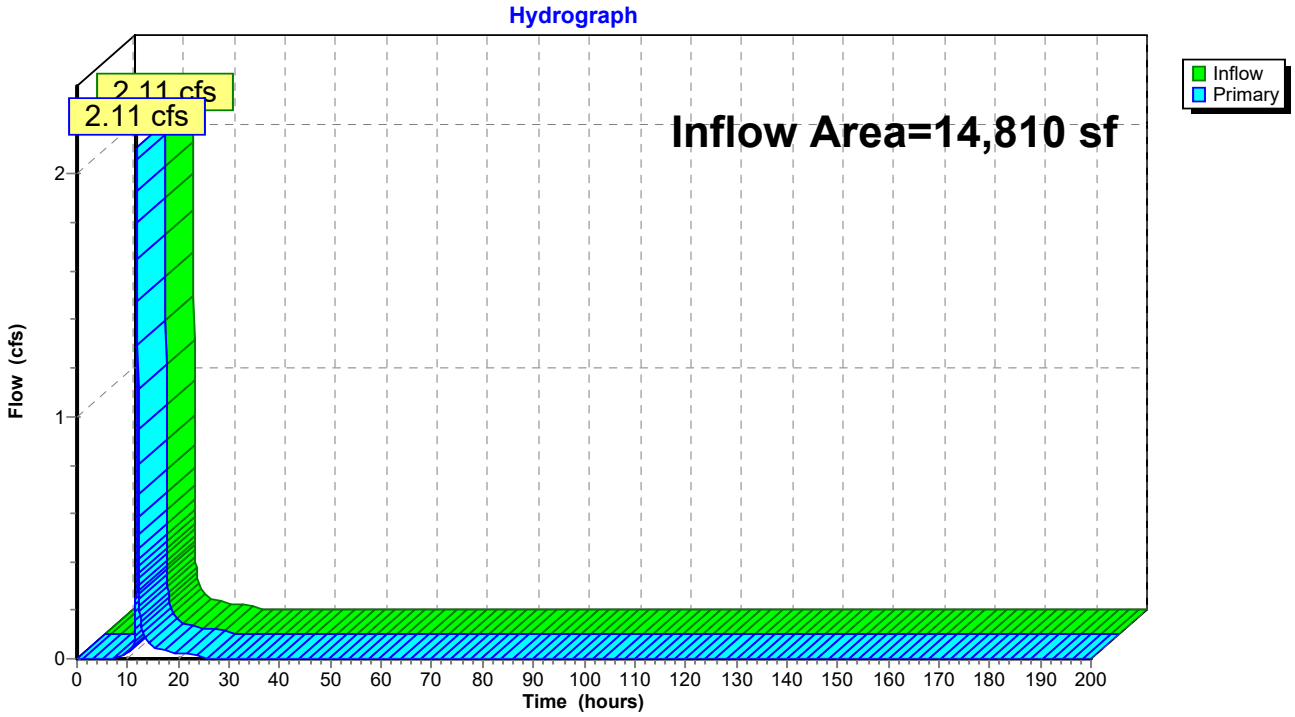


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 3.39" for 25-YR event
Inflow = 2.11 cfs @ 11.96 hrs, Volume= 4,189 cf
Primary = 2.11 cfs @ 11.96 hrs, Volume= 4,189 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

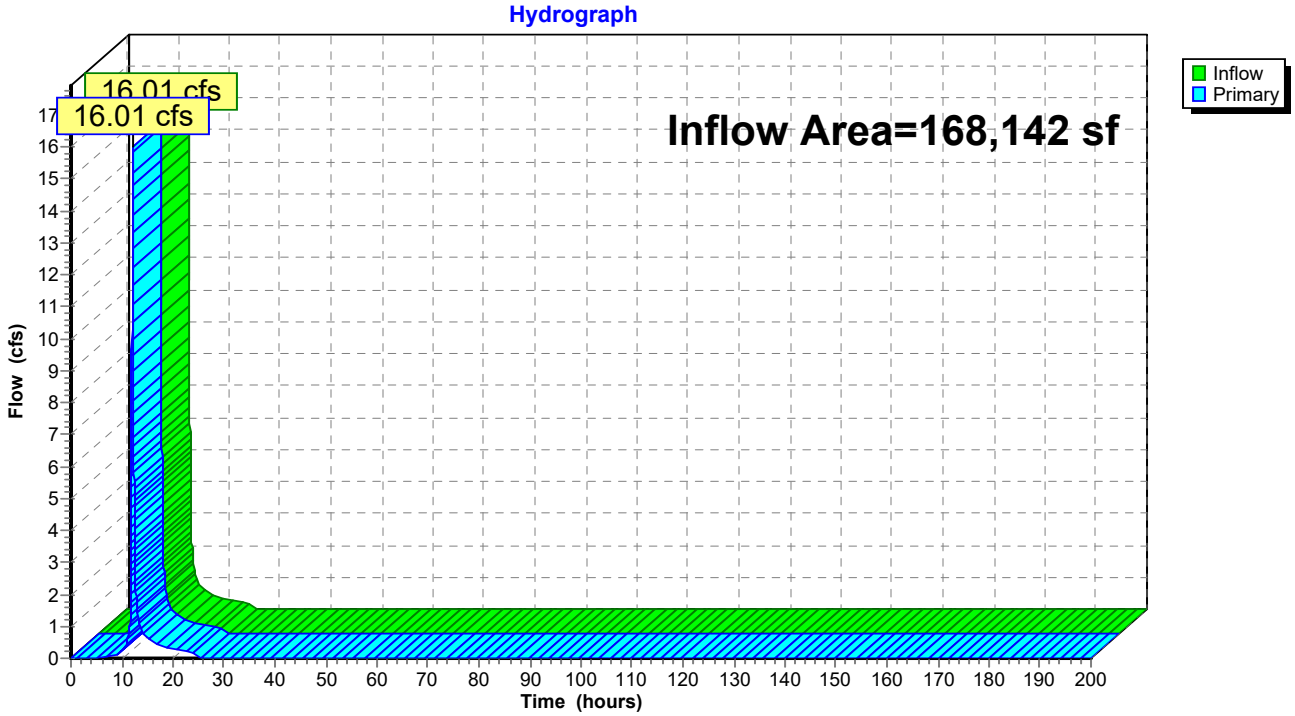


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 3.51" for 25-YR event
Inflow = 16.01 cfs @ 12.10 hrs, Volume= 49,124 cf
Primary = 16.01 cfs @ 12.10 hrs, Volume= 49,124 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

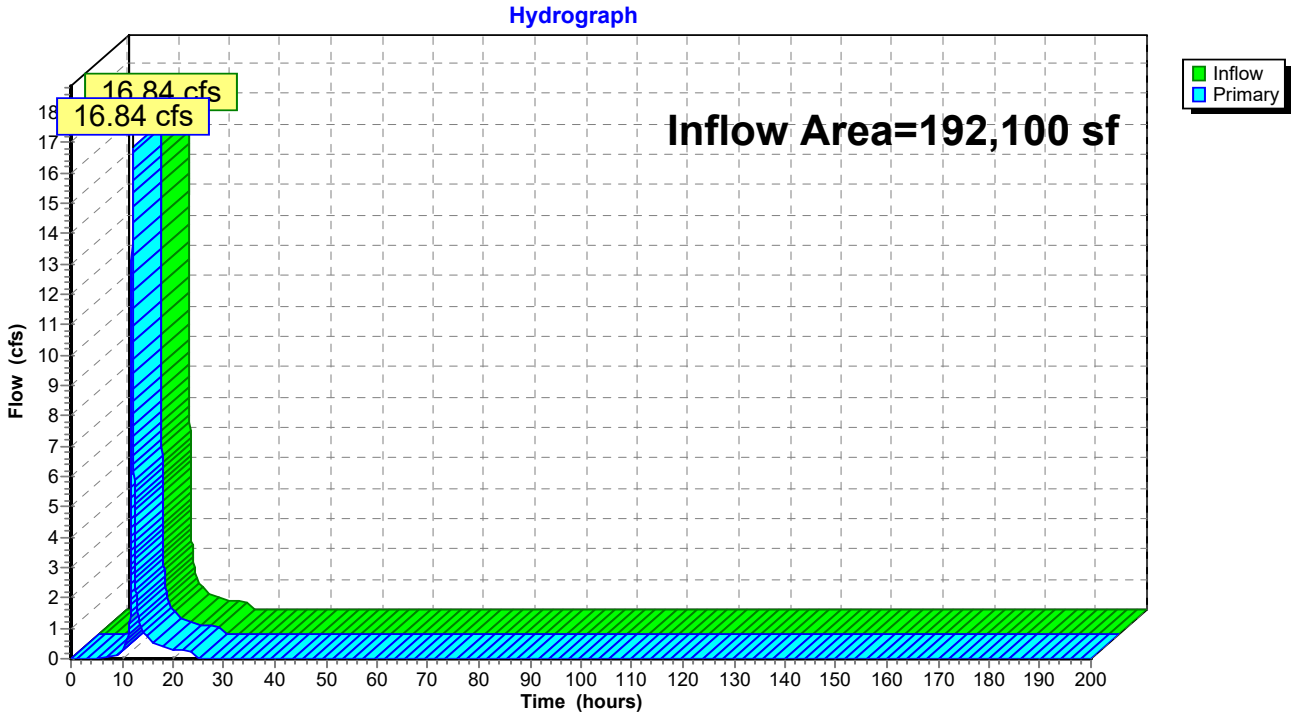


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 3.49" for 25-YR event
Inflow = 16.84 cfs @ 12.08 hrs, Volume= 55,900 cf
Primary = 16.84 cfs @ 12.08 hrs, Volume= 55,900 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

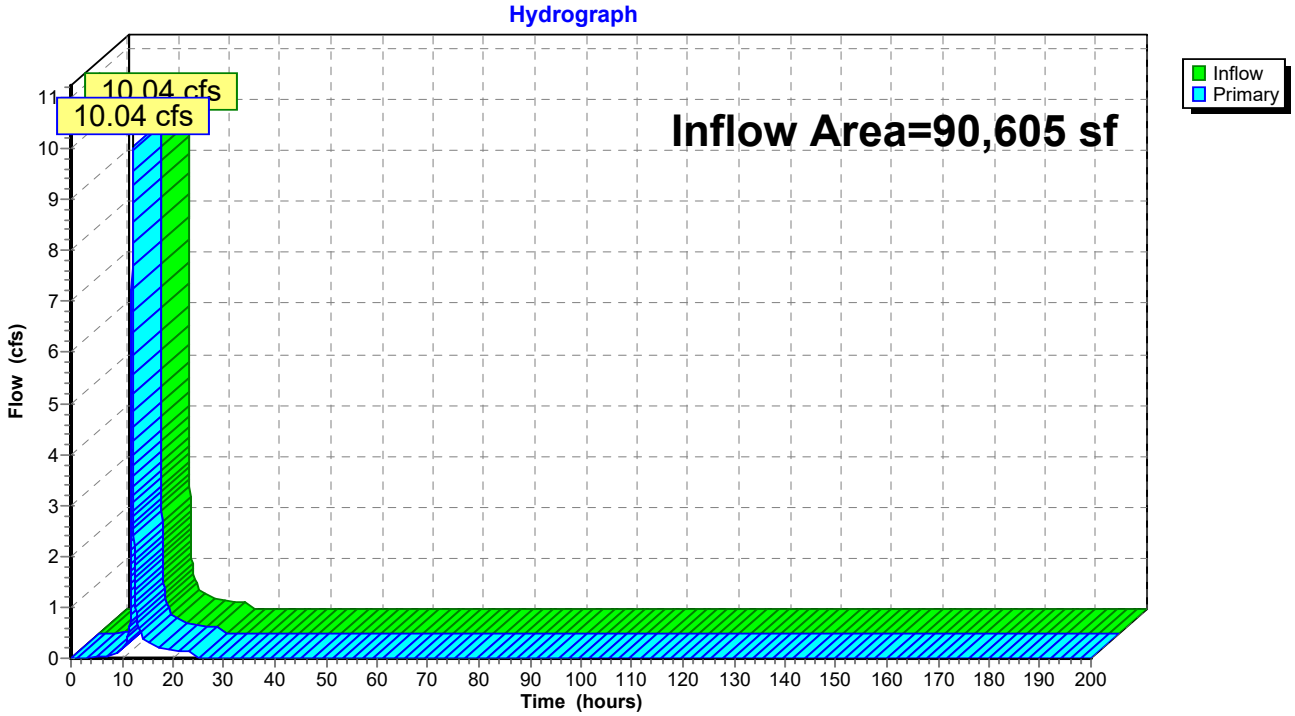


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 3.69" for 25-YR event
Inflow = 10.04 cfs @ 12.06 hrs, Volume= 27,898 cf
Primary = 10.04 cfs @ 12.06 hrs, Volume= 27,898 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

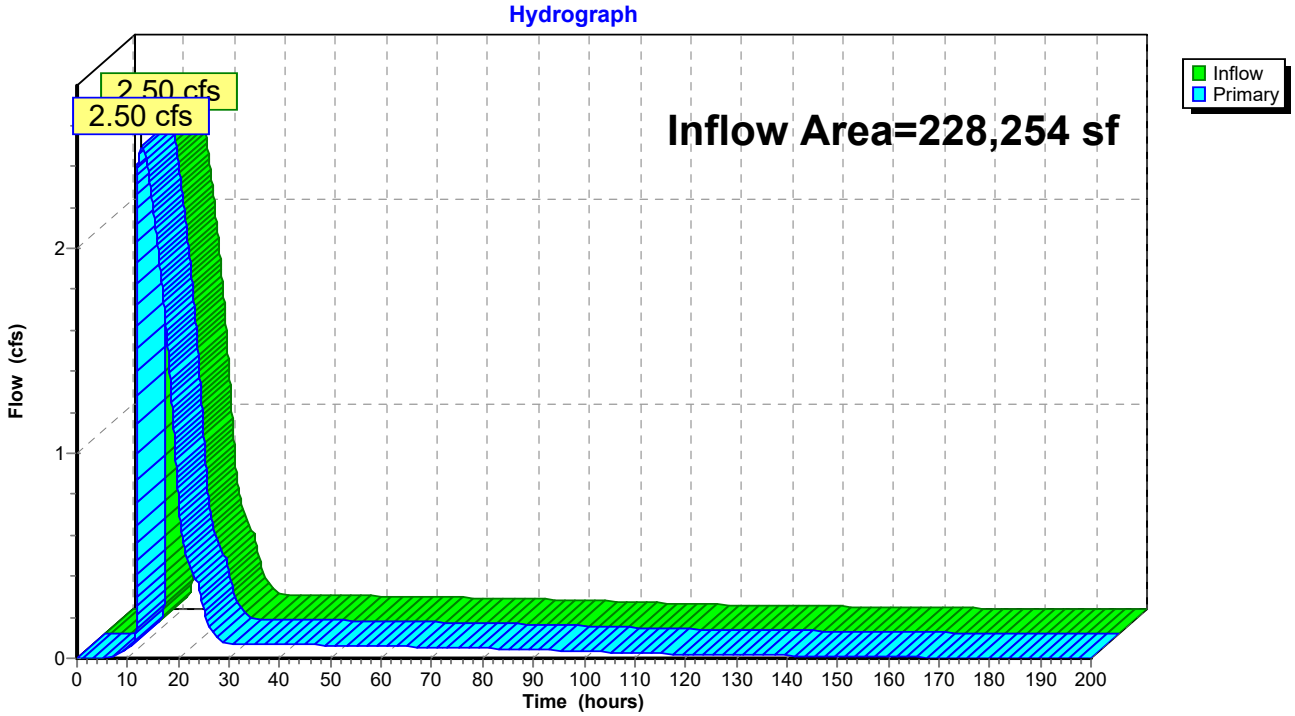


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 4.45" for 25-YR event
Inflow = 2.50 cfs @ 12.80 hrs, Volume= 84,552 cf
Primary = 2.50 cfs @ 12.80 hrs, Volume= 84,552 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

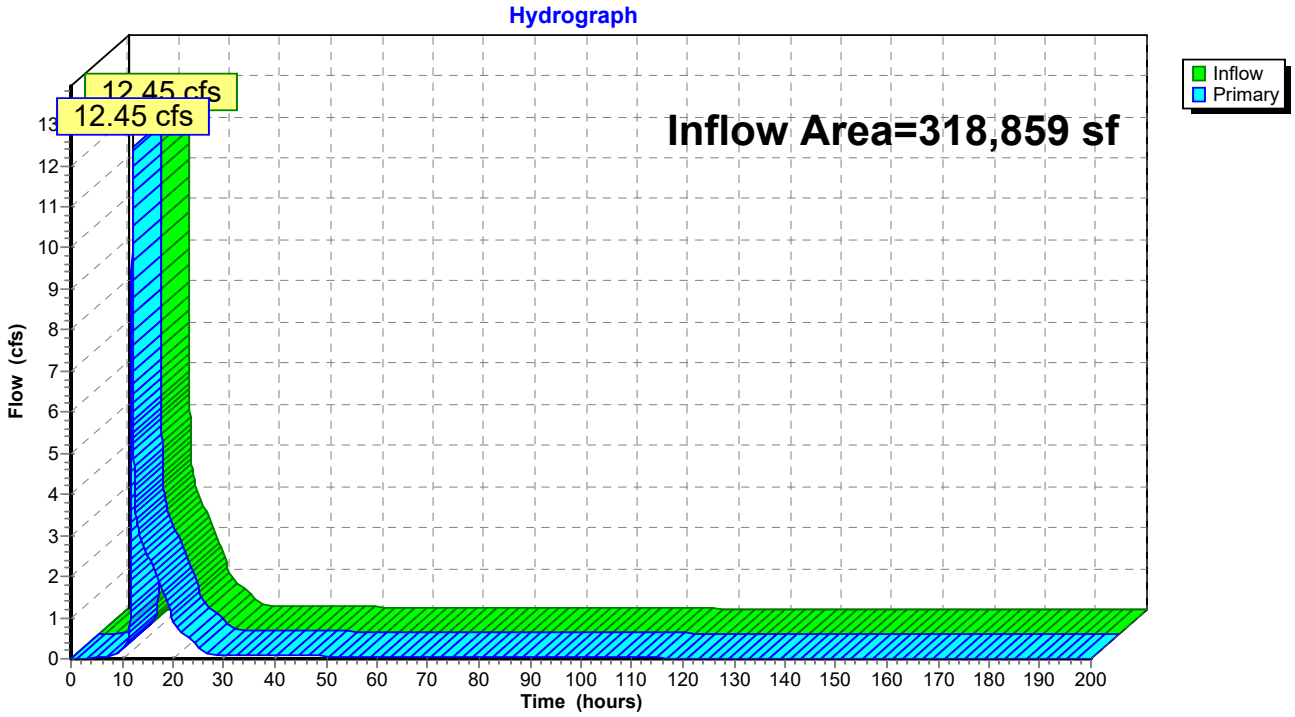


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 4.23" for 25-YR event
Inflow = 12.45 cfs @ 12.05 hrs, Volume= 112,451 cf
Primary = 12.45 cfs @ 12.05 hrs, Volume= 112,451 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=4.15"
Tc=17.5 min CN=78 Runoff=18.10 cfs 55,131 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=6.40"
Tc=17.5 min CN=98 Runoff=1.33 cfs 4,647 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=4.15"
Tc=5.0 min CN=78 Runoff=3.01 cfs 6,025 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=4.15"
Tc=19.1 min CN=78 Runoff=12.20 cfs 38,863 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=6.40"
Tc=19.1 min CN=98 Runoff=0.32 cfs 1,162 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=4.15"
Tc=13.1 min CN=78 Runoff=14.66 cfs 38,863 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=6.40"
Tc=13.1 min CN=98 Runoff=0.38 cfs 1,162 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=4.15"
Tc=11.5 min CN=78 Runoff=7.55 cfs 18,979 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=4.15"
Tc=5.0 min CN=78 Runoff=4.13 cfs 8,285 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=6.40"
Tc=11.5 min CN=98 Runoff=1.99 cfs 5,809 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=4.26"
Tc=5.0 min CN=79 Runoff=5.99 cfs 12,051 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=6.40"
Tc=5.0 min CN=98 Runoff=1.37 cfs 3,253 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=4.15"
Tc=5.0 min CN=78 Runoff=2.56 cfs 5,121 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=80 Runoff=0.47 cfs 950 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=80 Runoff=11.52 cfs 23,283 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=6.40"
Tc=5.0 min CN=98 Runoff=6.75 cfs 16,033 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=4.36"
Tc=5.0 min CN=80 Runoff=7.44 cfs 15,047 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=6.40"
Tc=5.0 min CN=98 Runoff=20.24 cfs 48,099 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=4.15"
Tc=13.8 min CN=78 Runoff=9.94 cfs 26,963 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=6.40"
Tc=13.8 min CN=98 Runoff=2.15 cfs 6,739 cf

Pond 39P: Basin 1 (MRC) Peak Elev=367.23' Storage=41,507 cf Inflow=29.20 cfs 92,594 cf
Primary=2.69 cfs 75,261 cf Secondary=0.05 cfs 14,760 cf Outflow=2.74 cfs 90,021 cf

Pond 40P: Basin 2 (MRC) Peak Elev=368.01' Storage=21,887 cf Inflow=18.26 cfs 39,317 cf
Primary=1.56 cfs 29,448 cf Secondary=0.05 cfs 9,030 cf Outflow=1.61 cfs 38,477 cf

Link 6L: Pre B (Bypass) Inflow=3.01 cfs 6,025 cf
Primary=3.01 cfs 6,025 cf

Link 9L: Pre C (Bypass) Inflow=12.52 cfs 40,024 cf
Primary=12.52 cfs 40,024 cf

Link 12L: Pre D (Bypass) Inflow=15.04 cfs 40,024 cf
Primary=15.04 cfs 40,024 cf

Link 17L: Post D Bypass Inflow=9.54 cfs 24,789 cf
Primary=9.54 cfs 24,789 cf

Link 20L: Post C Bypass Inflow=7.36 cfs 15,304 cf
Primary=7.36 cfs 15,304 cf

Link 23L: Post B Bypass Inflow=2.56 cfs 5,121 cf
Primary=2.56 cfs 5,121 cf

Link 24L: Culvert - PRE Inflow=19.43 cfs 59,778 cf
Primary=19.43 cfs 59,778 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=20.45 cfs 68,063 cf
Primary=20.45 cfs 68,063 cf

Link 26L: Culvert - POST
Inflow=12.09 cfs 33,701 cf
Primary=12.09 cfs 33,701 cf

Link 27L: Post POI A-1
Inflow=2.82 cfs 100,001 cf
Primary=2.82 cfs 100,001 cf

Link 30L: To CTP Ex. Basin- POST
Inflow=14.85 cfs 133,702 cf
Primary=14.85 cfs 133,702 cf

Total Runoff Area = 878,170 sf Runoff Volume = 336,466 cf Average Runoff Depth = 4.60"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

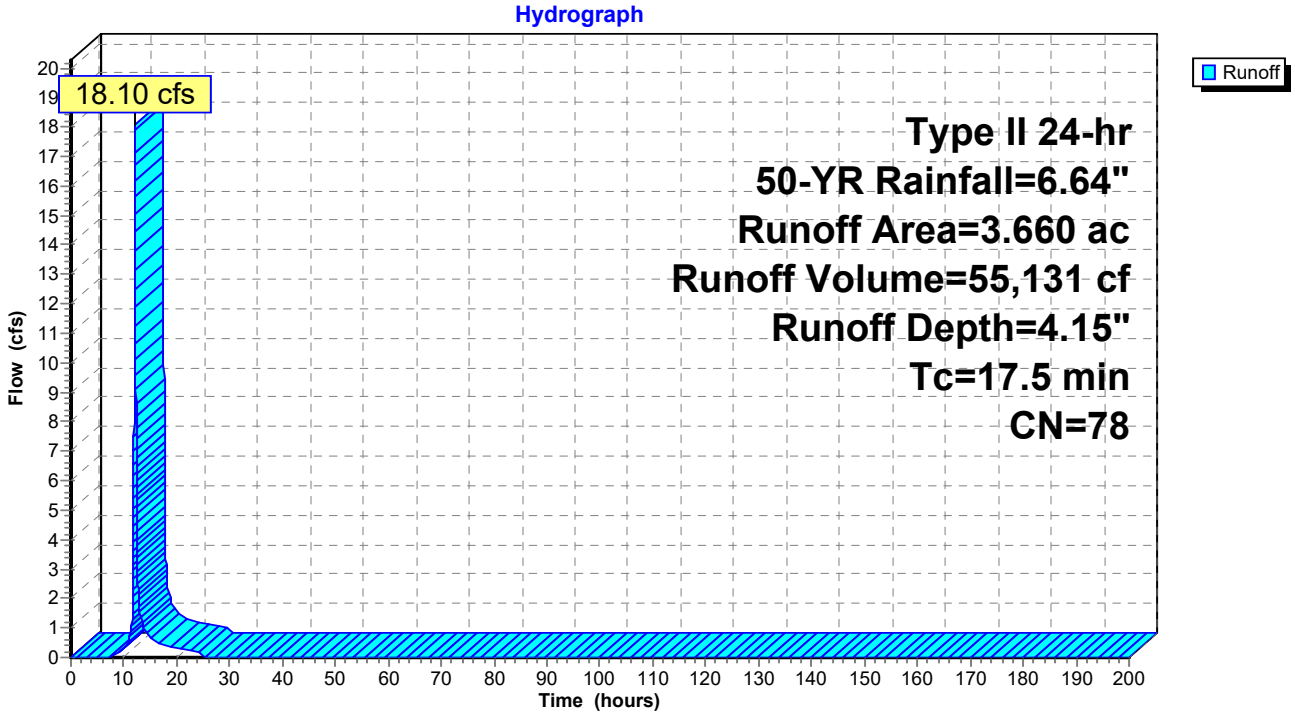
Runoff = 18.10 cfs @ 12.10 hrs, Volume= 55,131 cf, Depth= 4.15"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

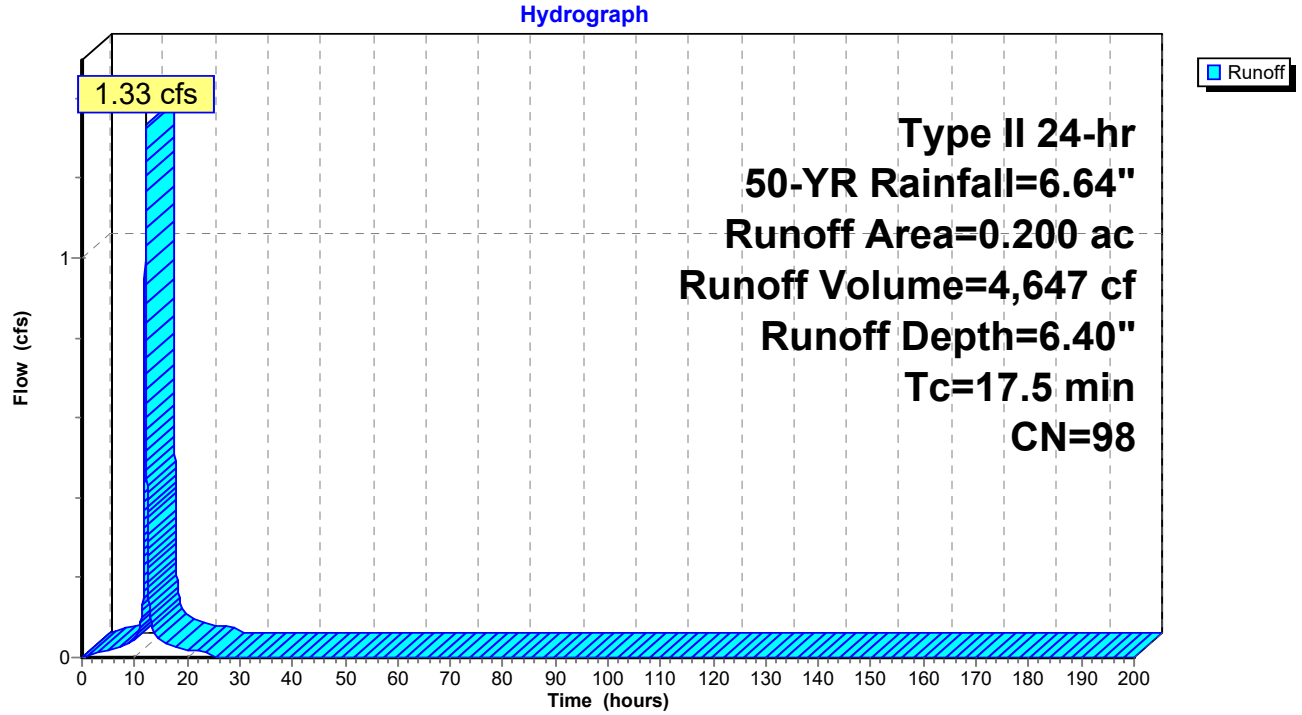
Runoff = 1.33 cfs @ 12.09 hrs, Volume= 4,647 cf, Depth= 6.40"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

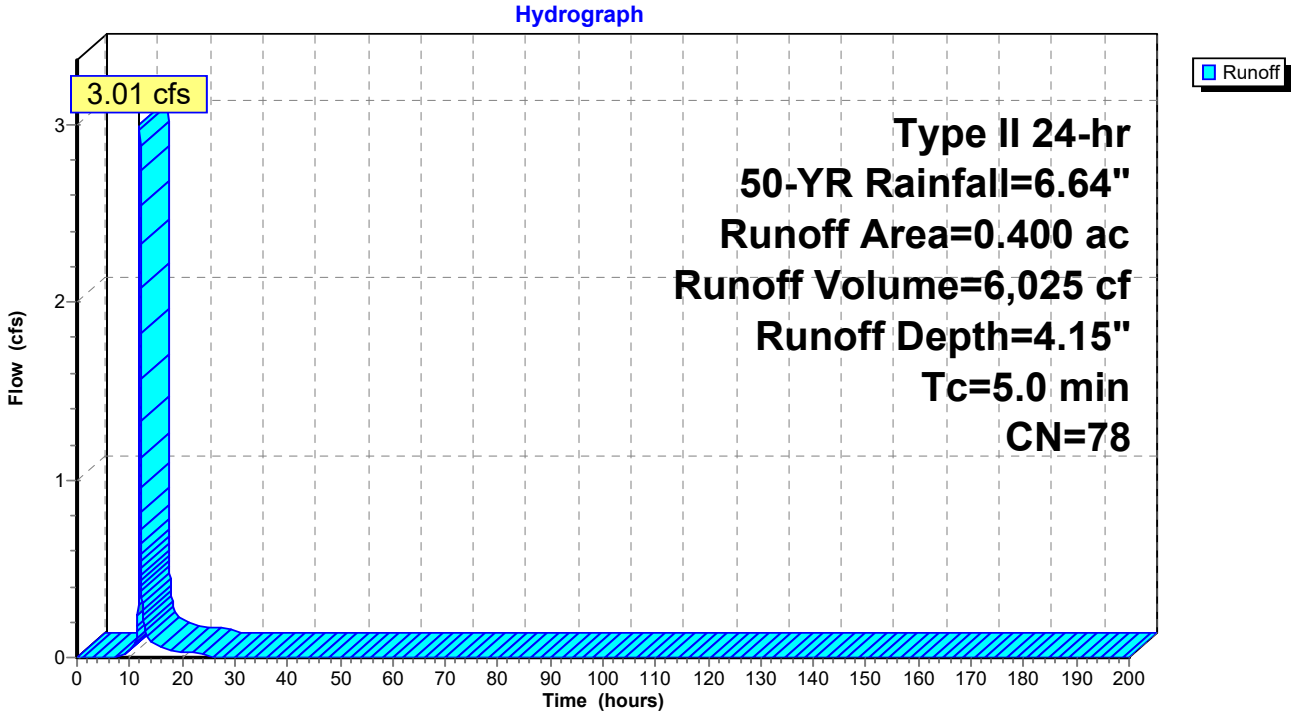
Runoff = 3.01 cfs @ 11.96 hrs, Volume= 6,025 cf, Depth= 4.15"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

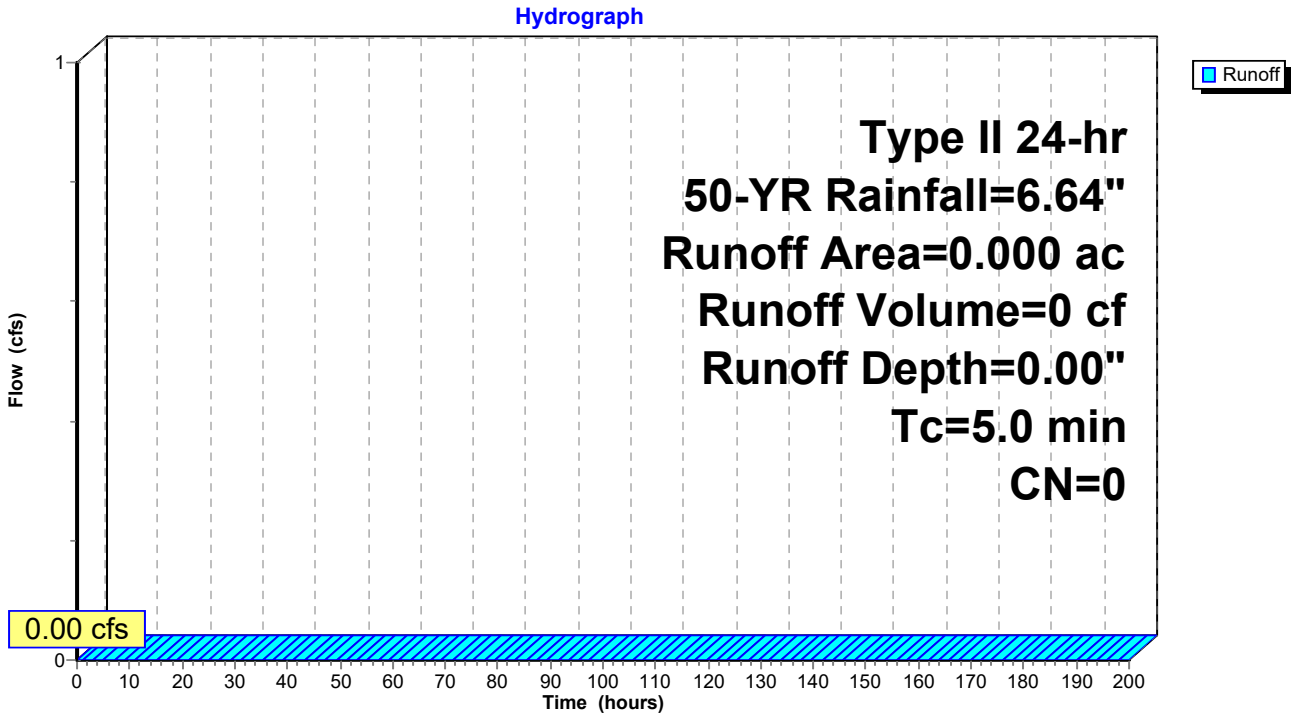
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

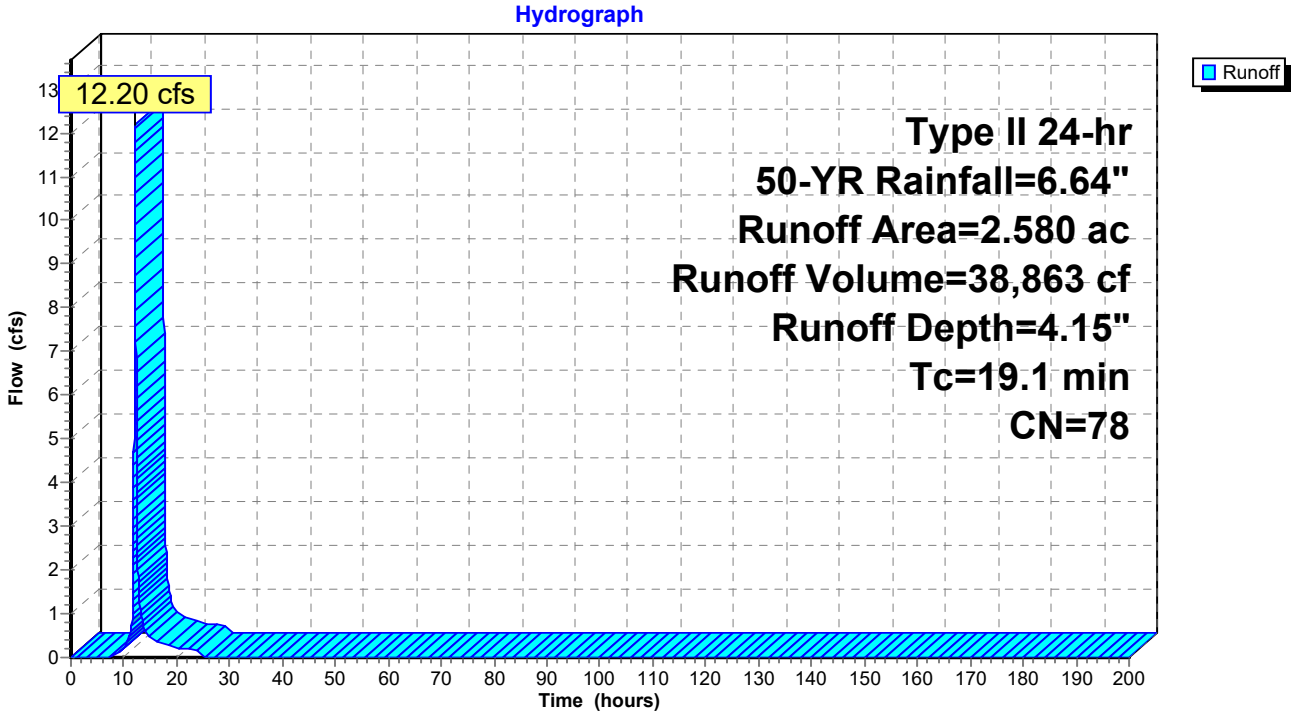
Runoff = 12.20 cfs @ 12.12 hrs, Volume= 38,863 cf, Depth= 4.15"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

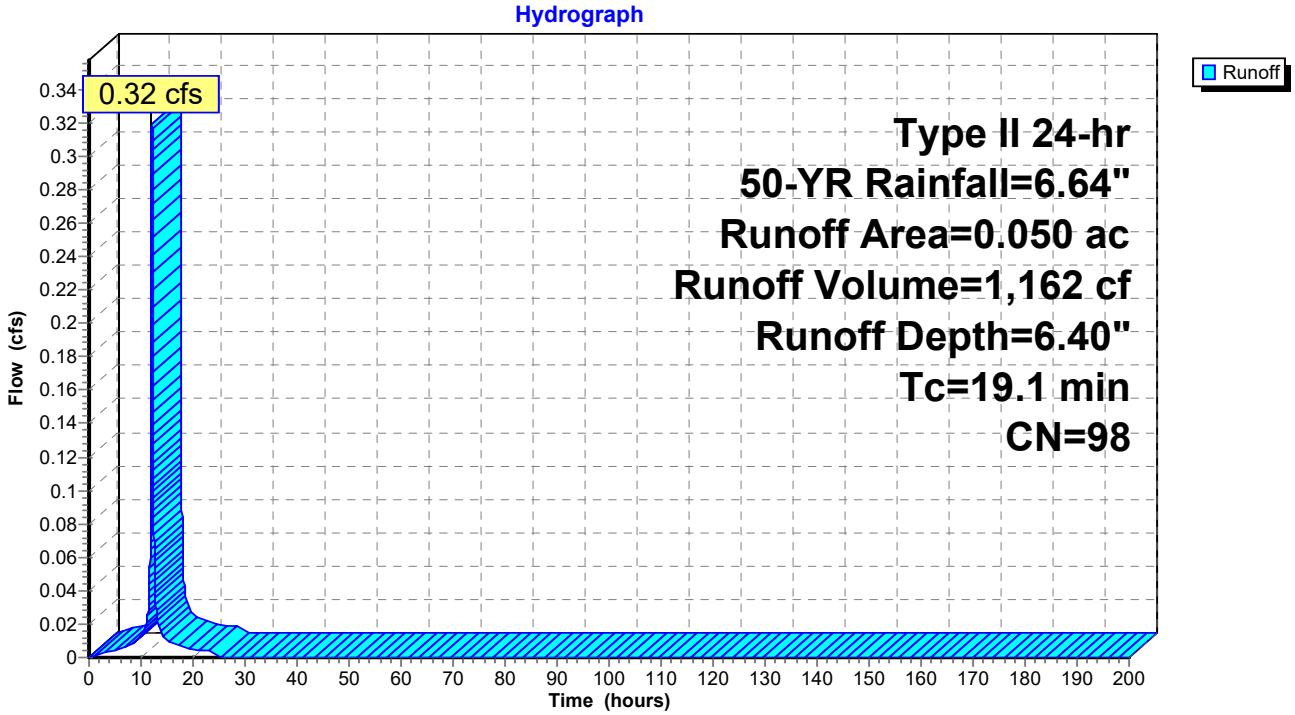
Runoff = 0.32 cfs @ 12.11 hrs, Volume= 1,162 cf, Depth= 6.40"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

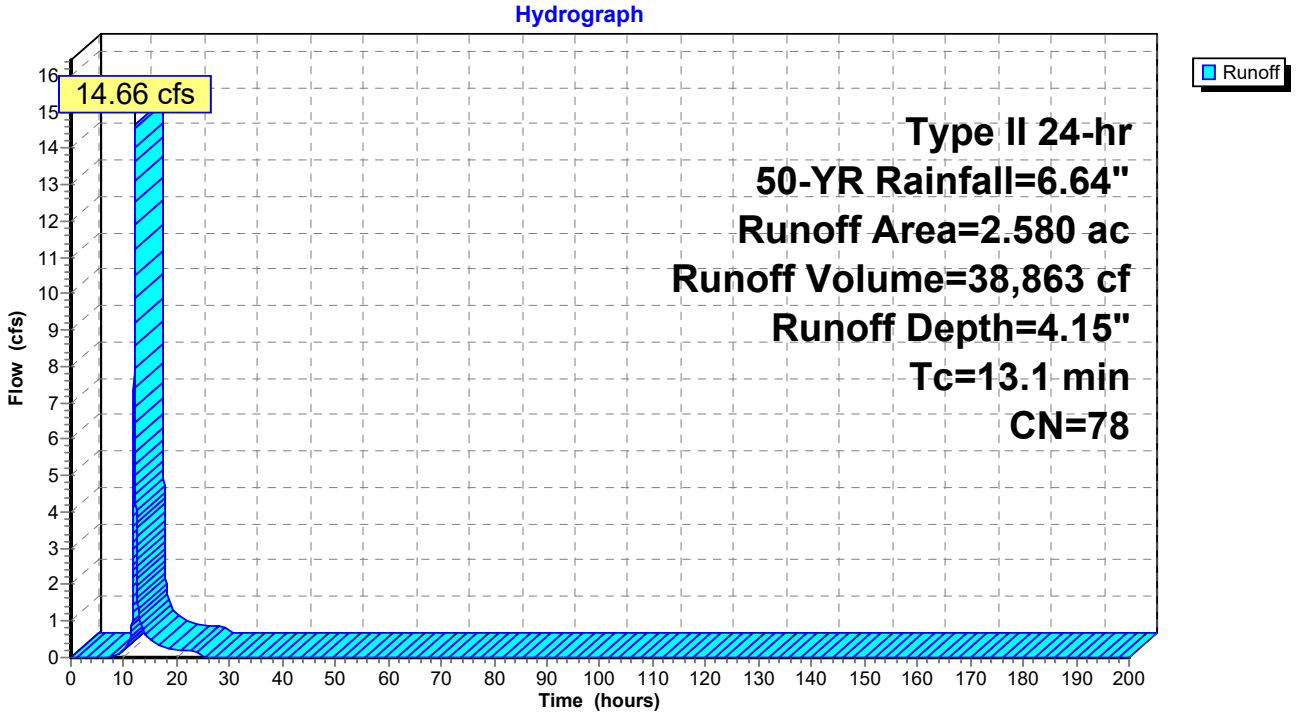
Runoff = 14.66 cfs @ 12.05 hrs, Volume= 38,863 cf, Depth= 4.15"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

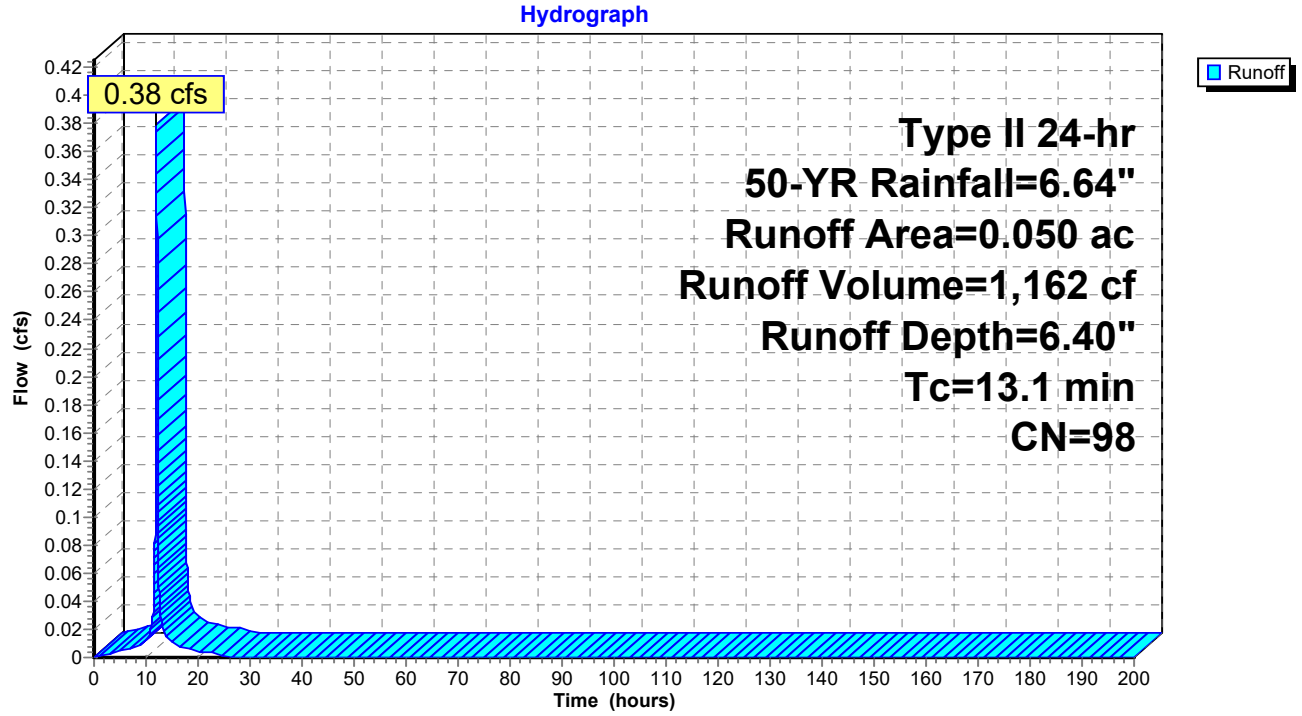
Runoff = 0.38 cfs @ 12.04 hrs, Volume= 1,162 cf, Depth= 6.40"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

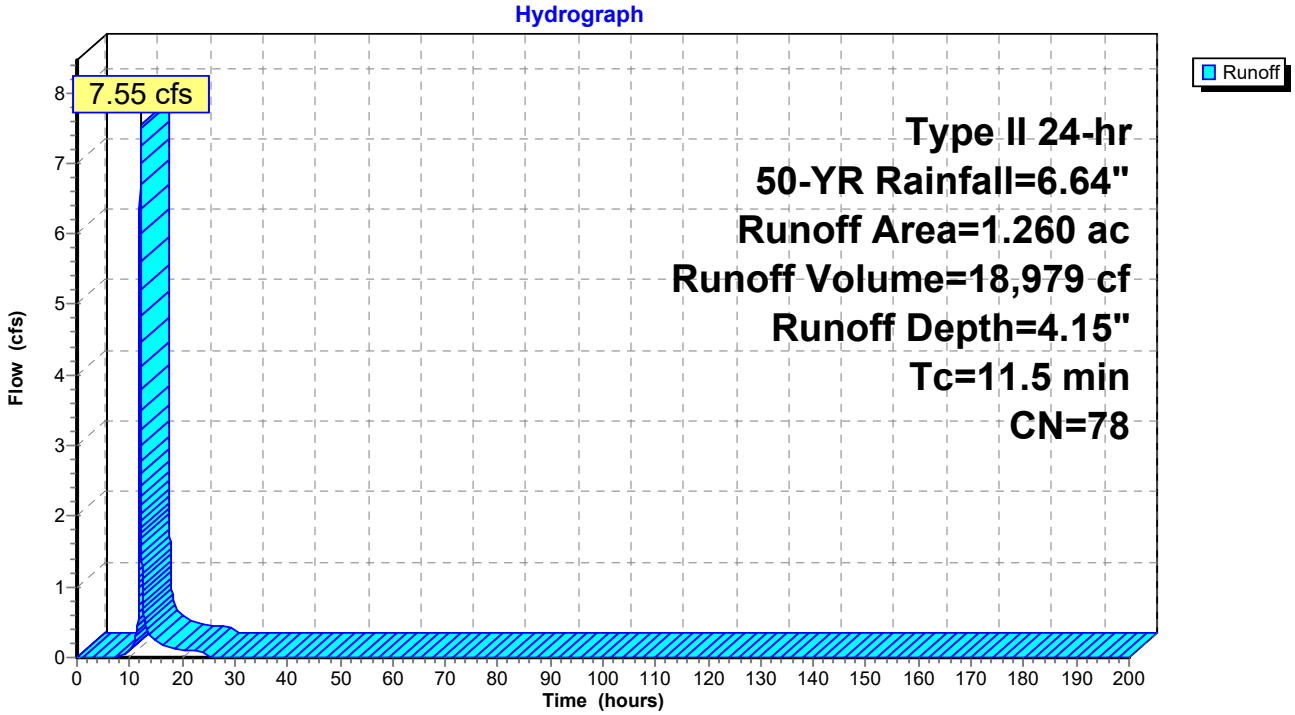
Runoff = 7.55 cfs @ 12.03 hrs, Volume= 18,979 cf, Depth= 4.15"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

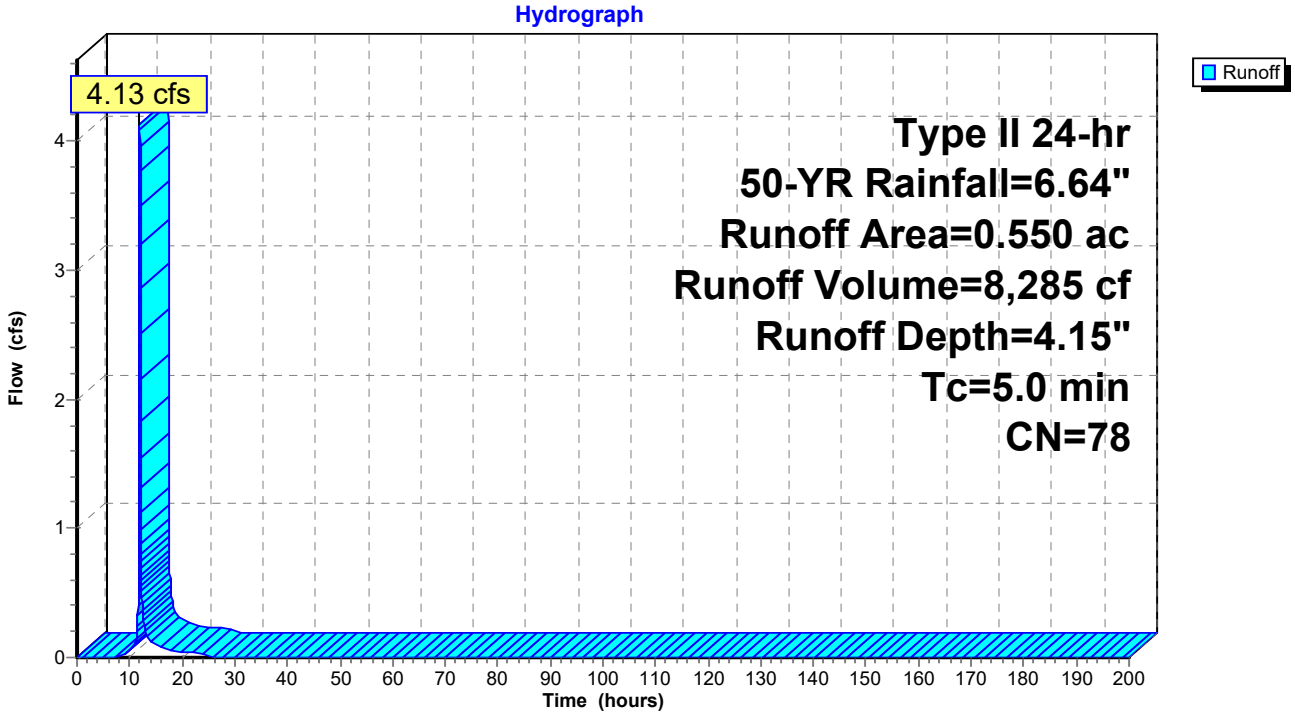
Runoff = 4.13 cfs @ 11.96 hrs, Volume= 8,285 cf, Depth= 4.15"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

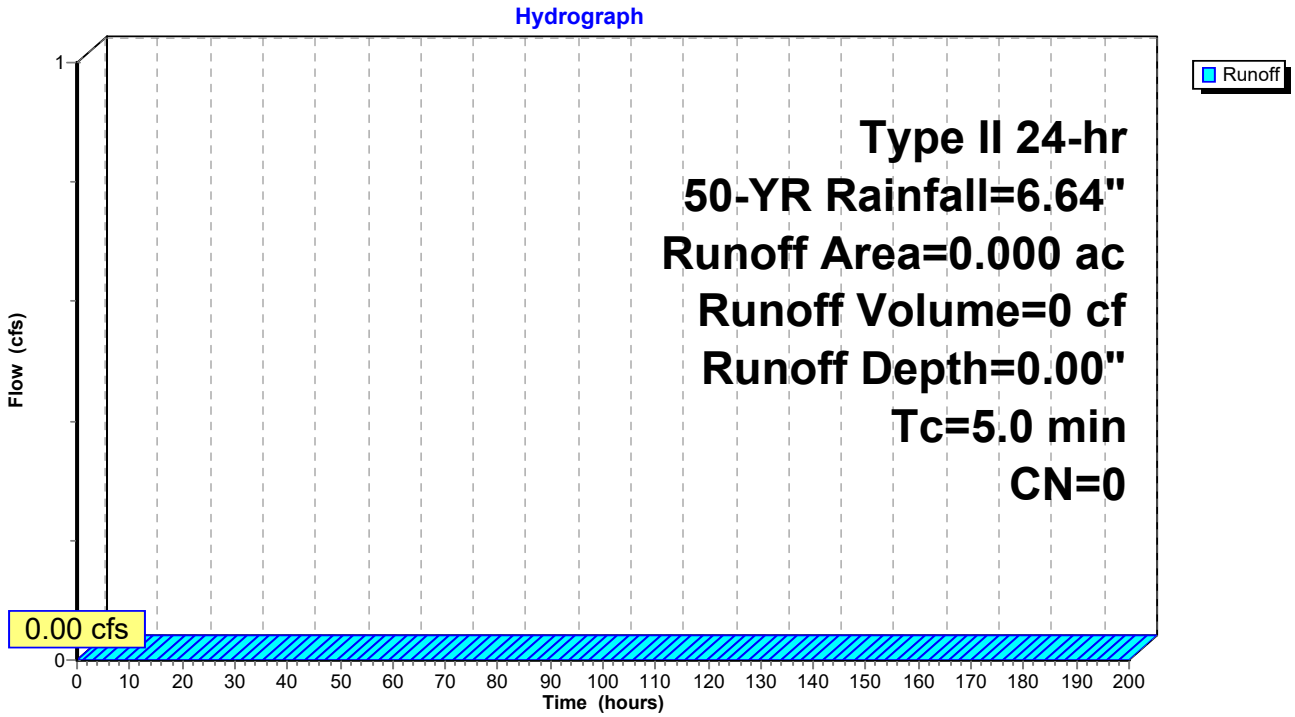
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

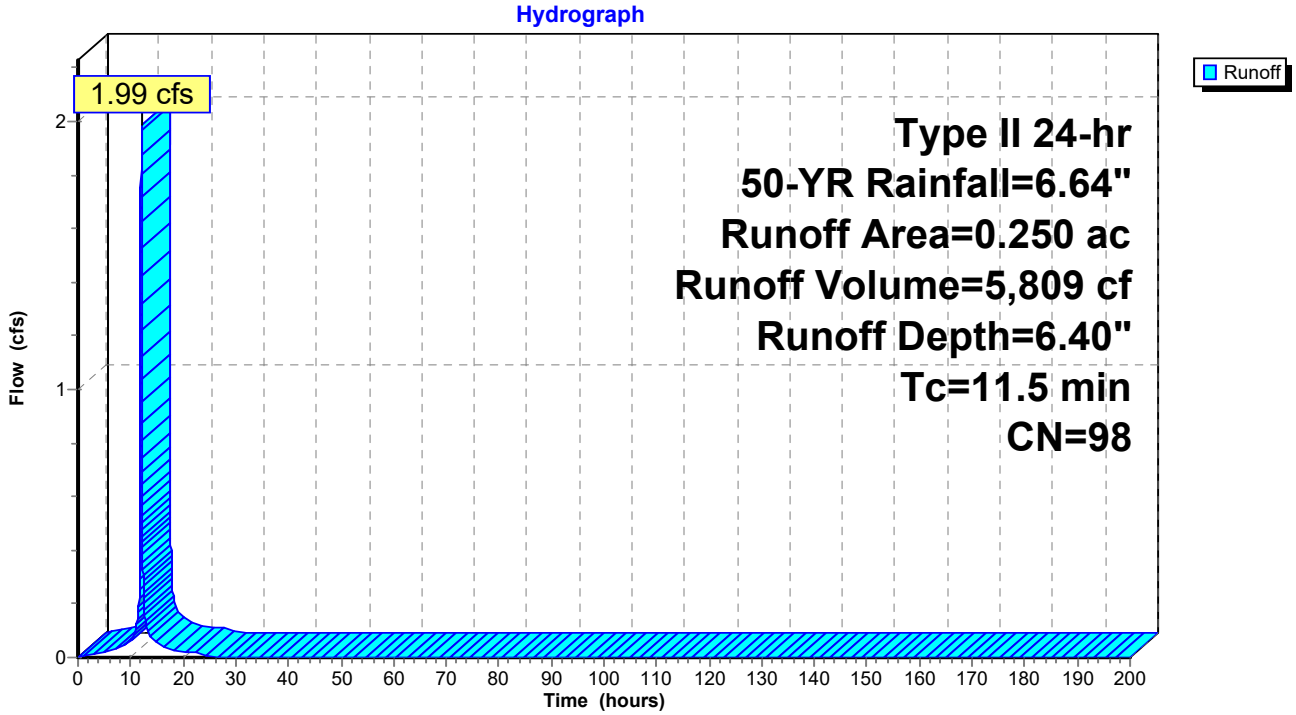
Runoff = 1.99 cfs @ 12.02 hrs, Volume= 5,809 cf, Depth= 6.40"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

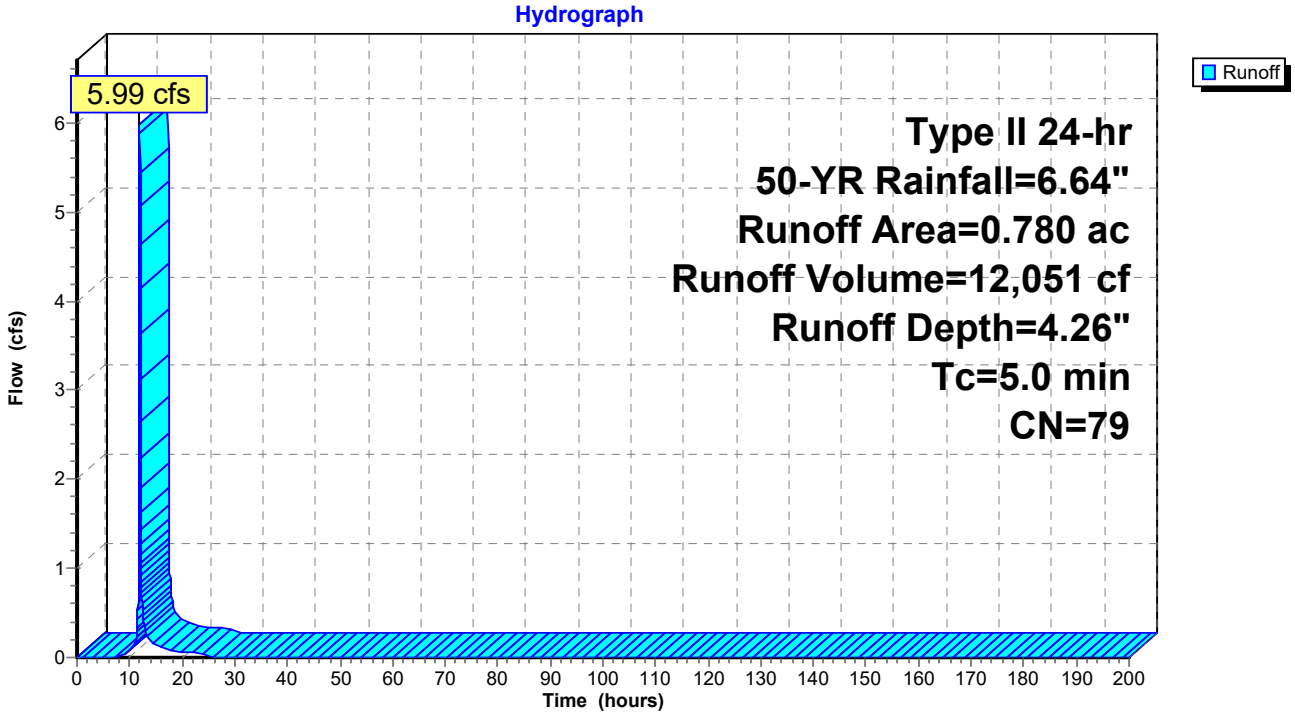
Runoff = 5.99 cfs @ 11.96 hrs, Volume= 12,051 cf, Depth= 4.26"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

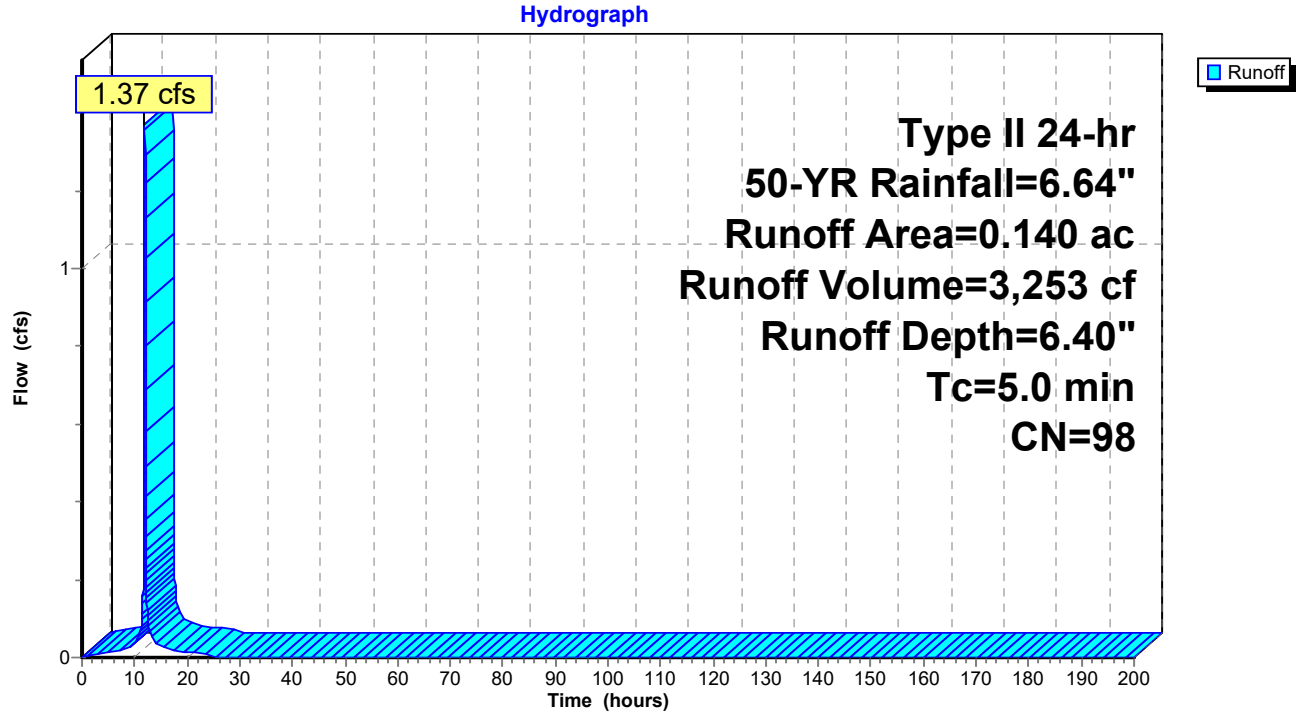
Runoff = 1.37 cfs @ 11.96 hrs, Volume= 3,253 cf, Depth= 6.40"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

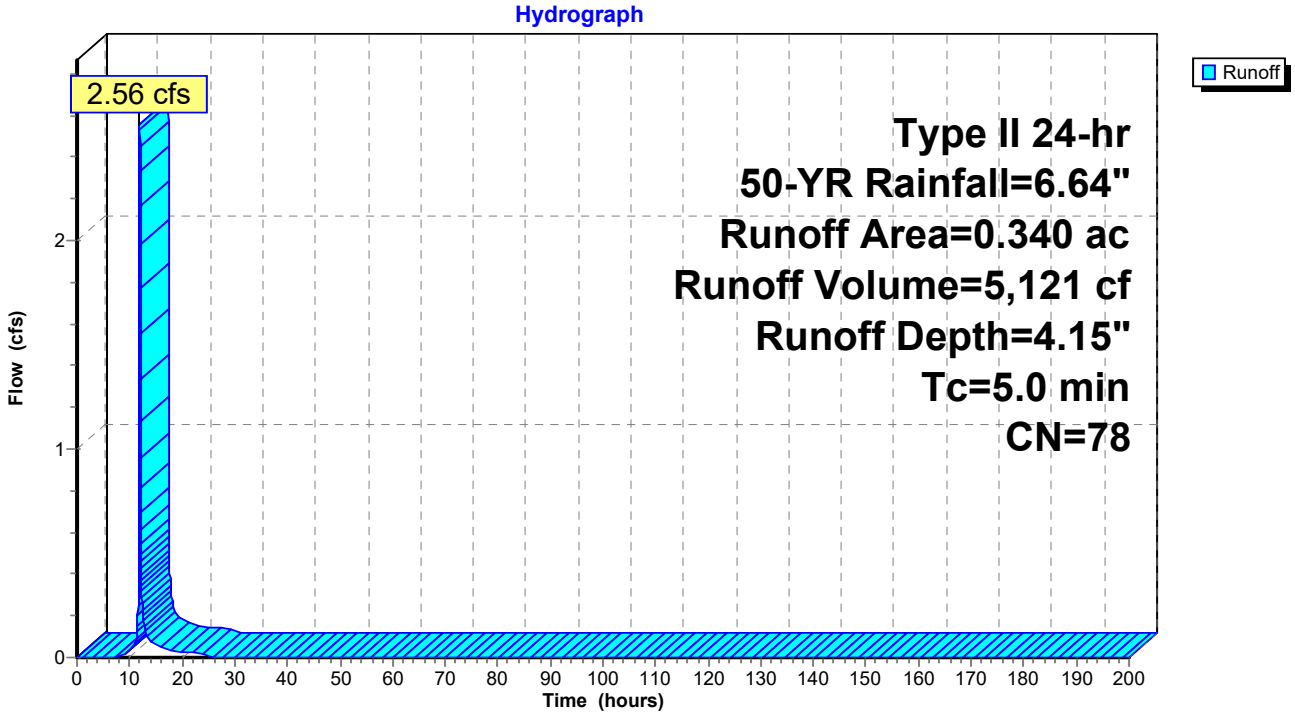
Runoff = 2.56 cfs @ 11.96 hrs, Volume= 5,121 cf, Depth= 4.15"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

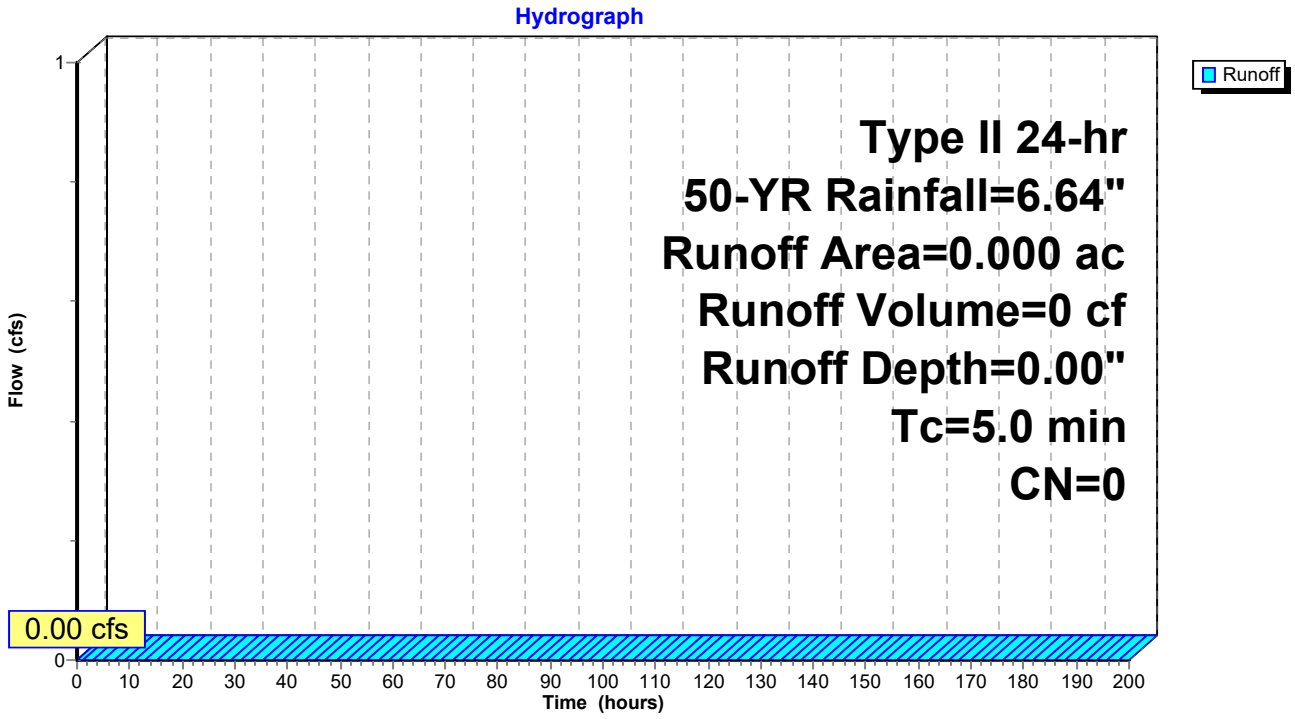
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

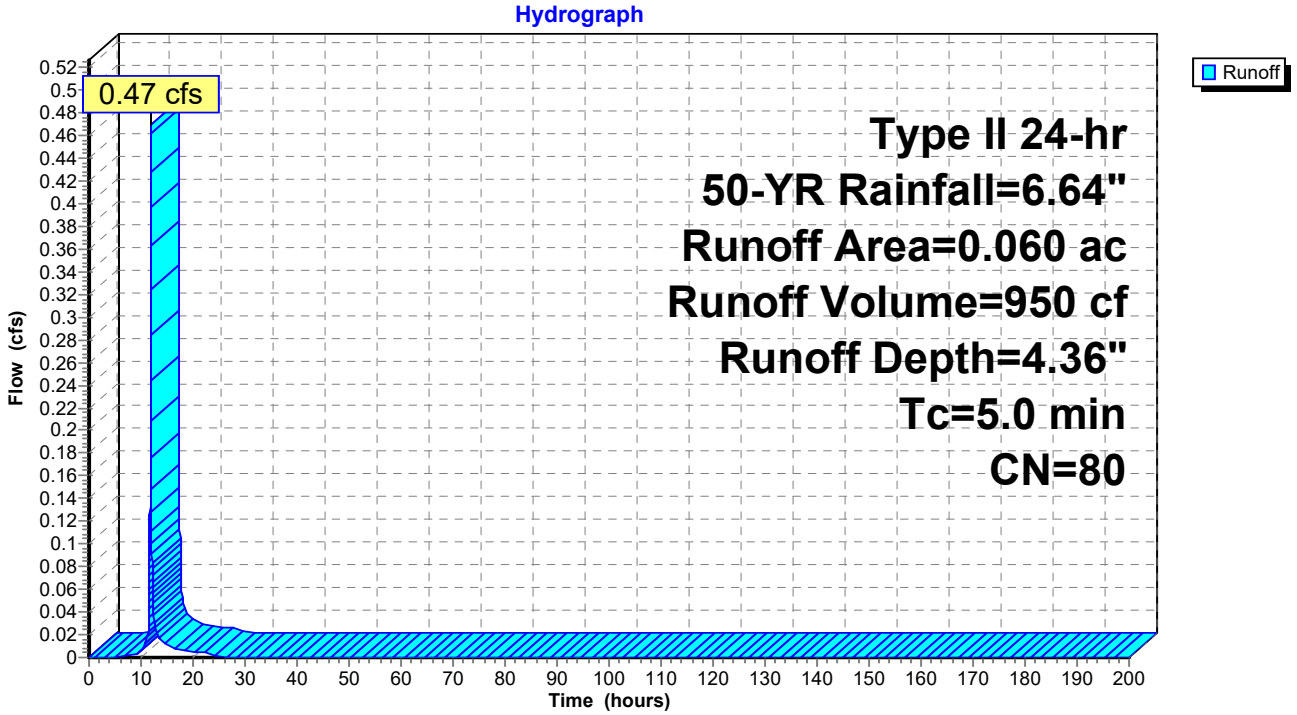
Runoff = 0.47 cfs @ 11.96 hrs, Volume= 950 cf, Depth= 4.36"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

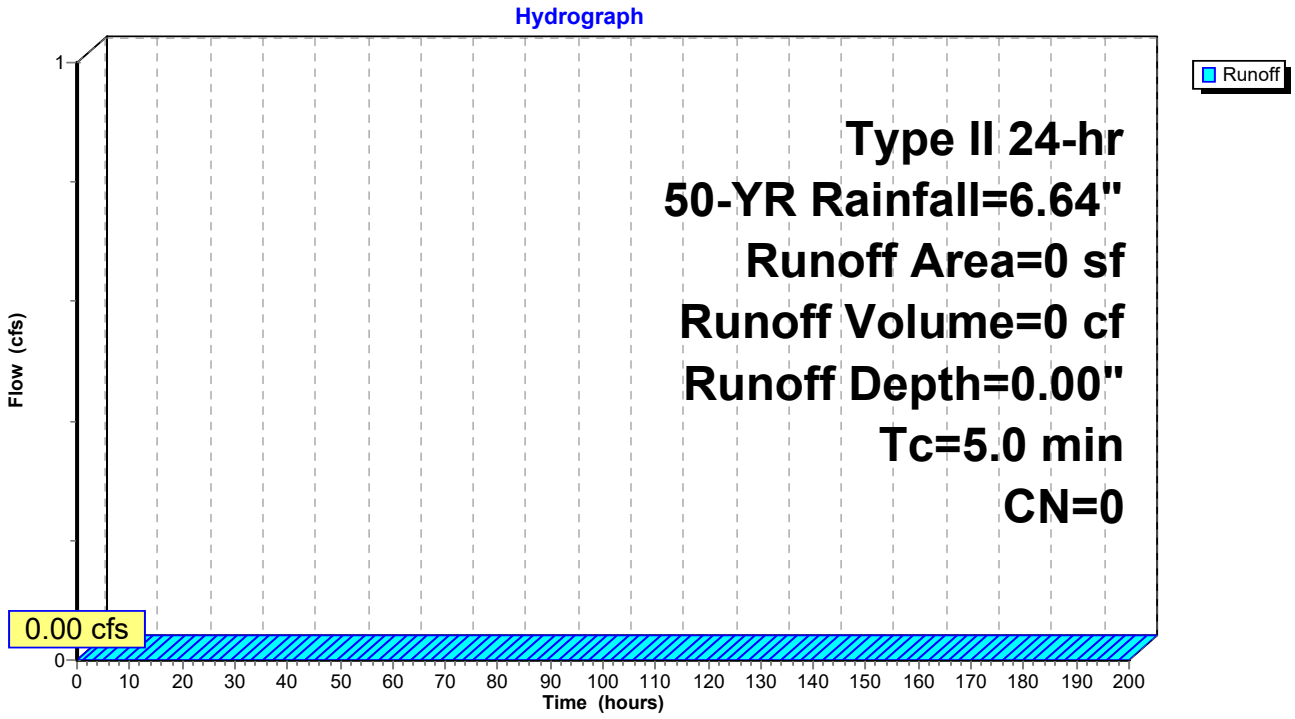
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

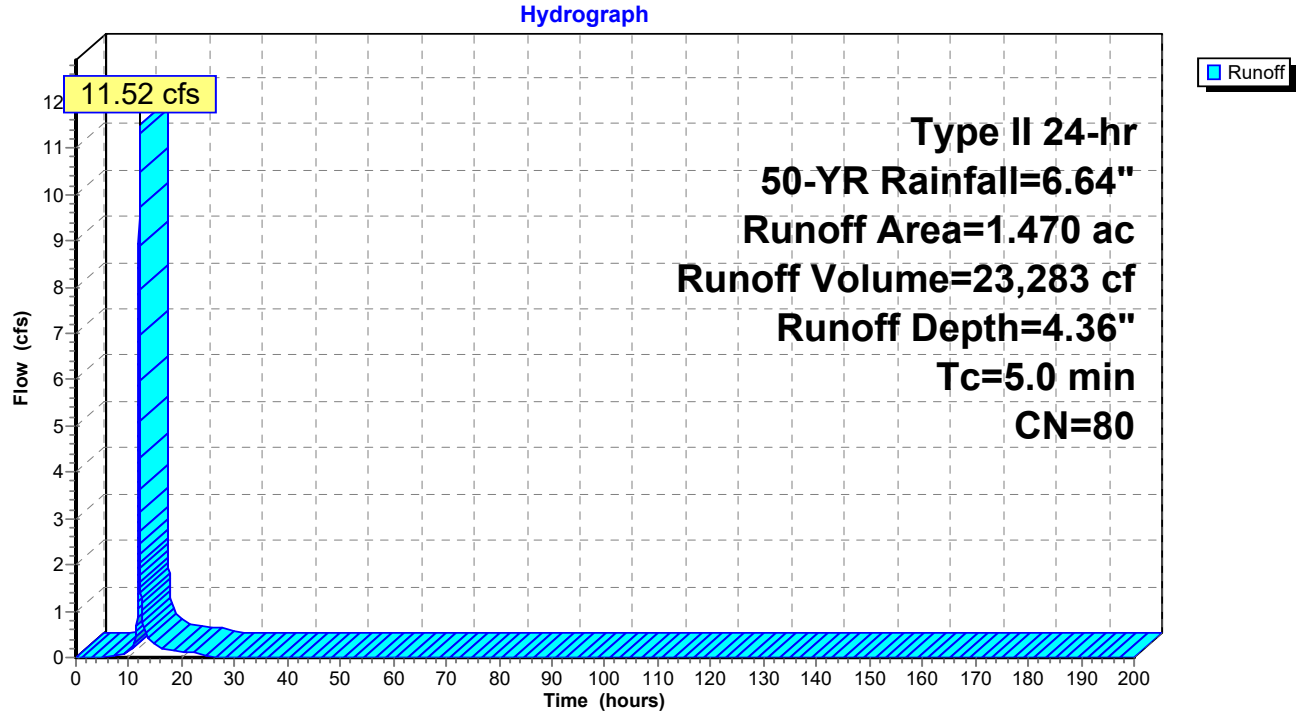
Runoff = 11.52 cfs @ 11.96 hrs, Volume= 23,283 cf, Depth= 4.36"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

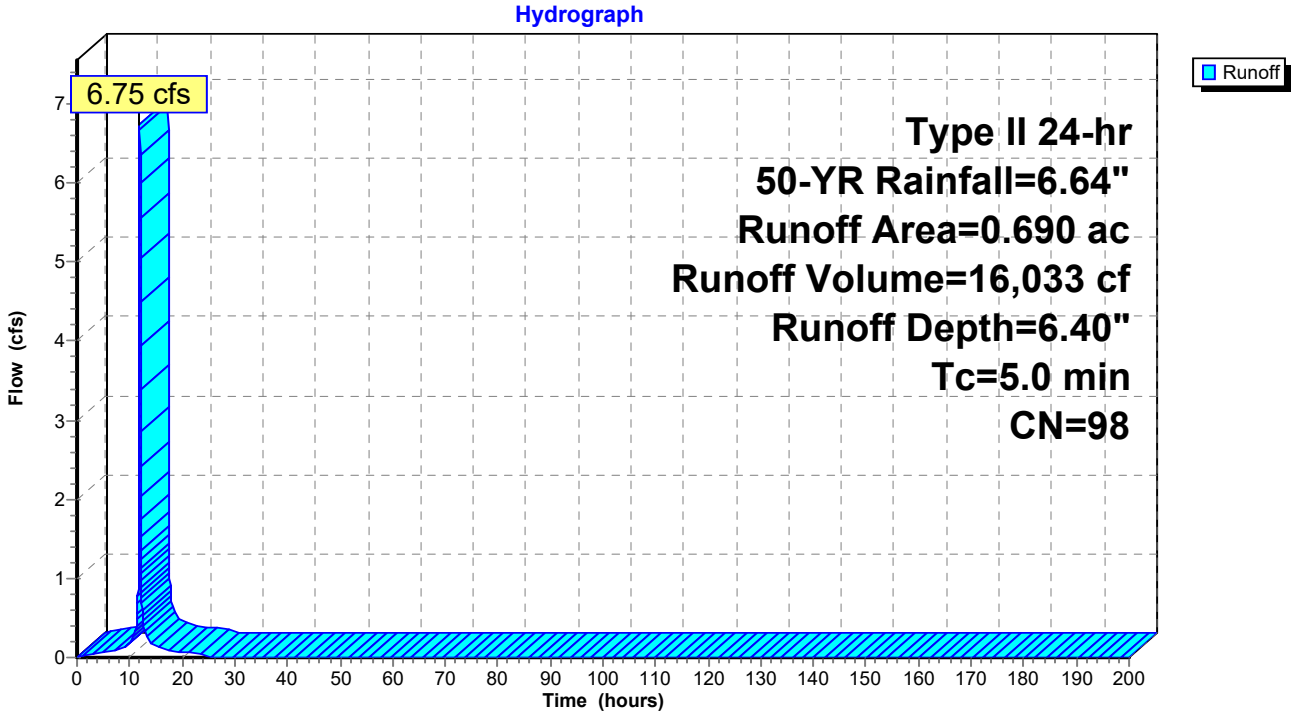
Runoff = 6.75 cfs @ 11.96 hrs, Volume= 16,033 cf, Depth= 6.40"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

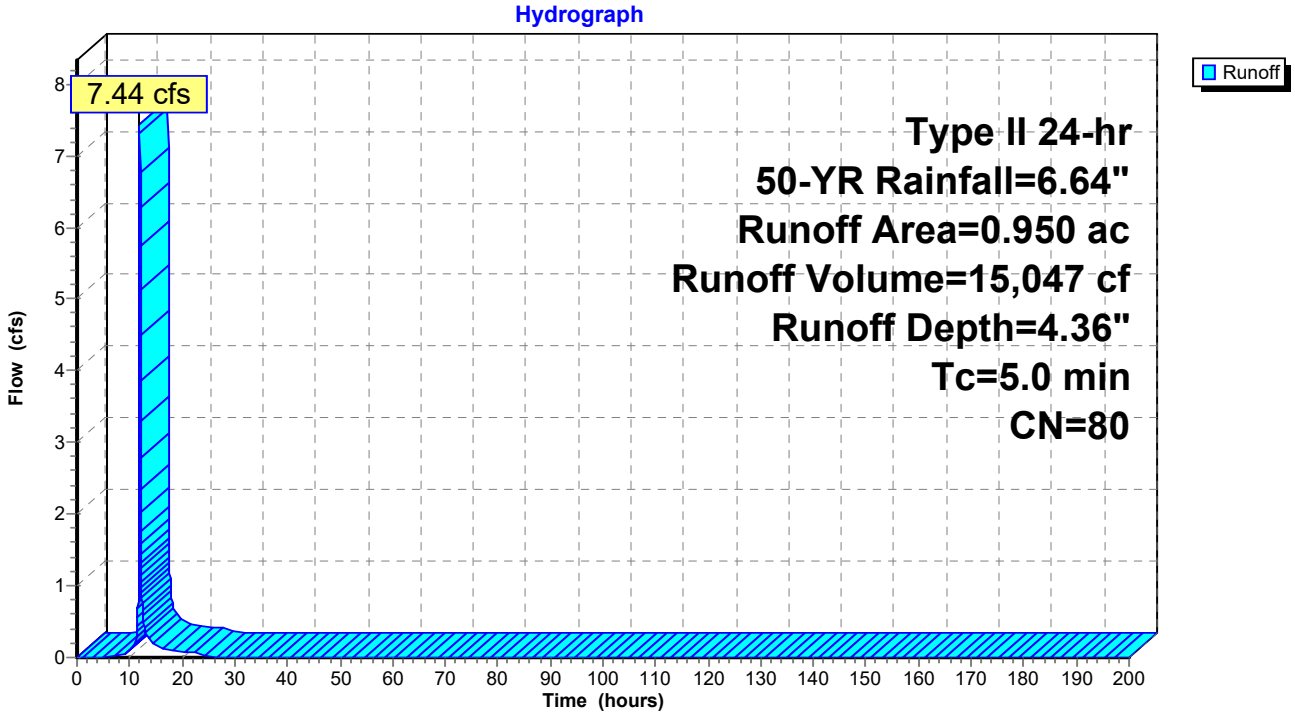
Runoff = 7.44 cfs @ 11.96 hrs, Volume= 15,047 cf, Depth= 4.36"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

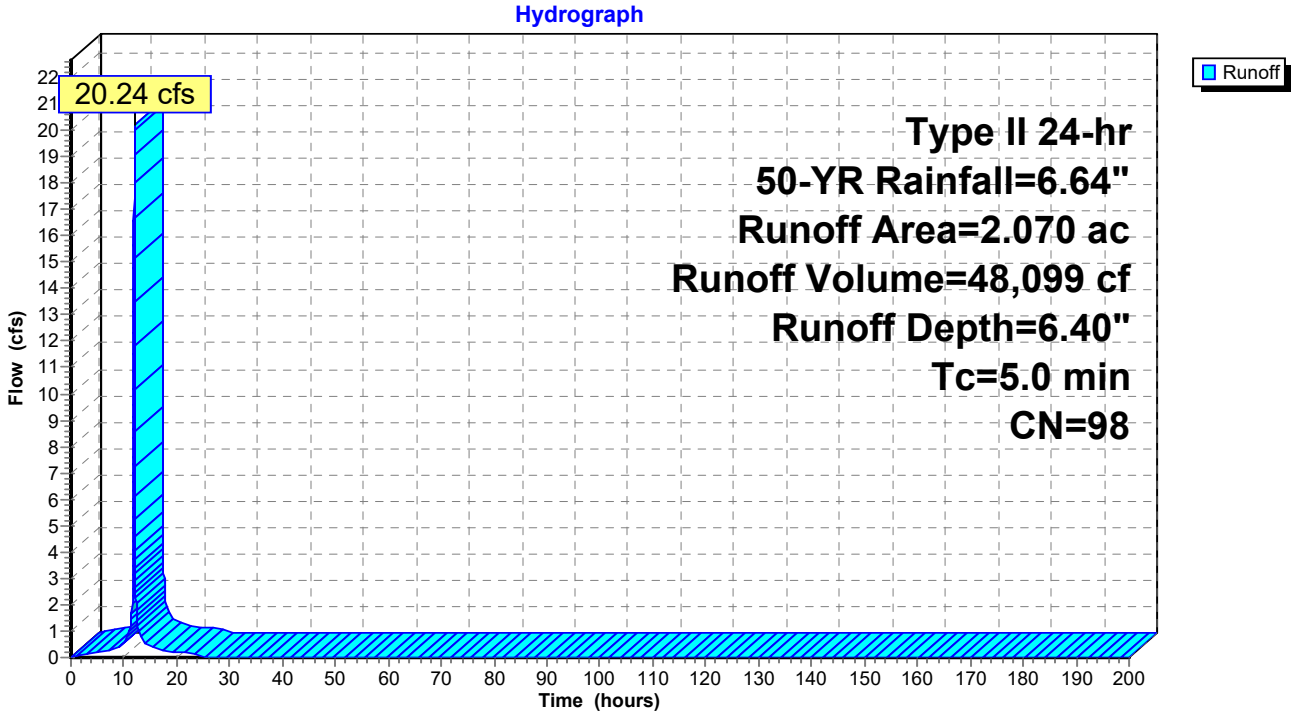
Runoff = 20.24 cfs @ 11.96 hrs, Volume= 48,099 cf, Depth= 6.40"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

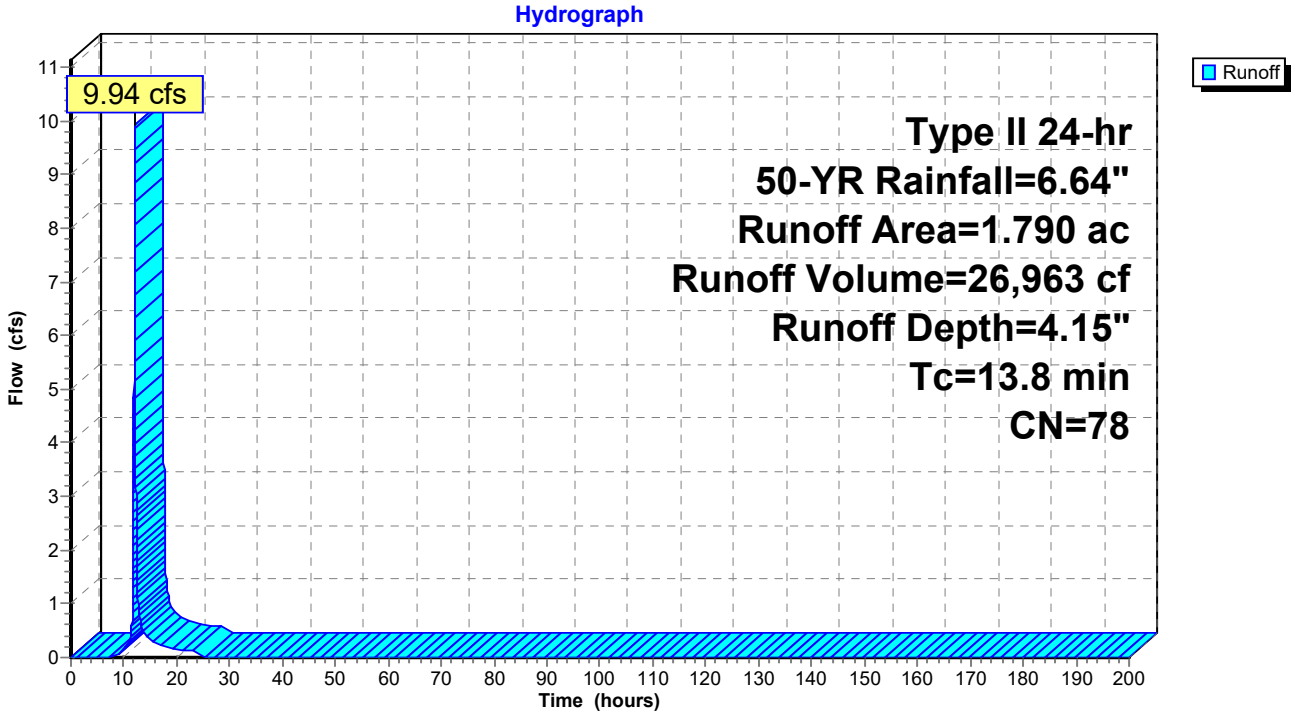
Runoff = 9.94 cfs @ 12.06 hrs, Volume= 26,963 cf, Depth= 4.15"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

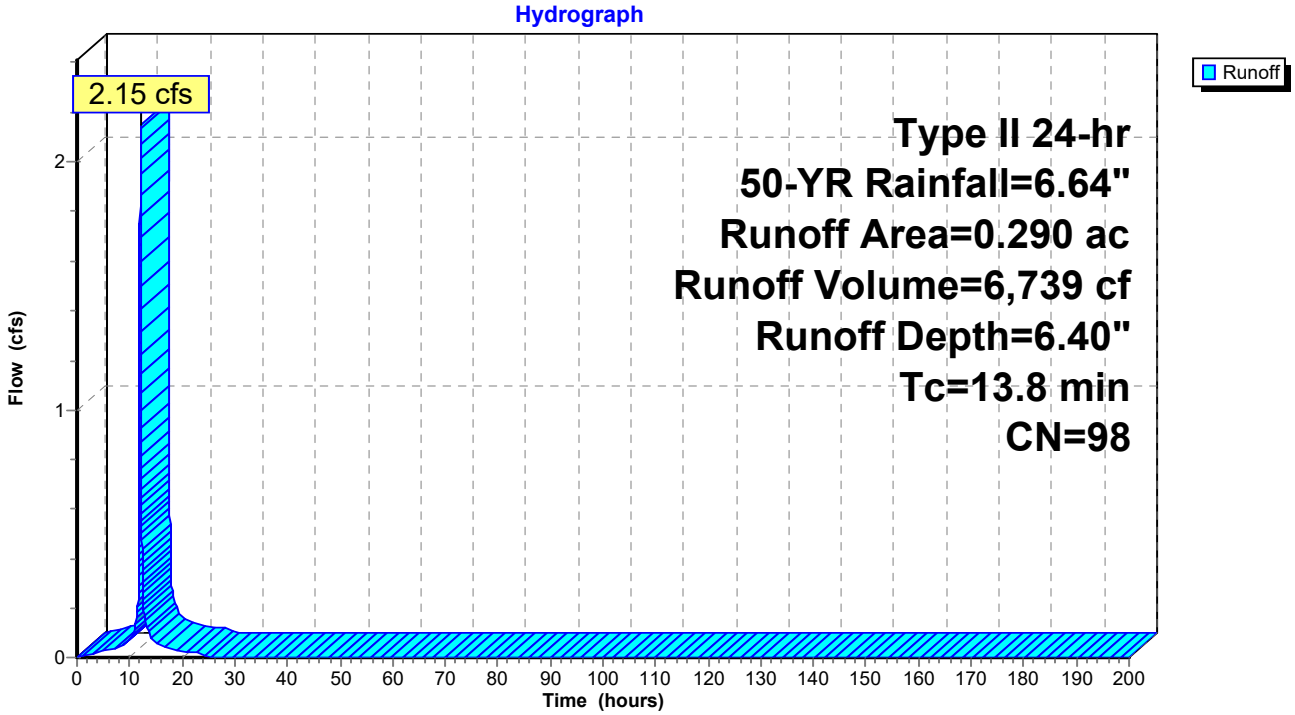
Runoff = 2.15 cfs @ 12.05 hrs, Volume= 6,739 cf, Depth= 6.40"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-YR Rainfall=6.64"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 4.92" for 50-YR event
Inflow = 29.20 cfs @ 11.96 hrs, Volume= 92,594 cf
Outflow = 2.74 cfs @ 12.87 hrs, Volume= 90,021 cf, Atten= 91%, Lag= 54.9 min
Primary = 2.69 cfs @ 12.87 hrs, Volume= 75,261 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.05 cfs @ 12.87 hrs, Volume= 14,760 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 367.23' @ 12.87 hrs Surf.Area= 13,169 sf Storage= 41,507 cf

Plug-Flow detention time= 721.8 min calculated for 90,016 cf (97% of inflow)
Center-of-Mass det. time= 705.5 min (1,519.1 - 813.6)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

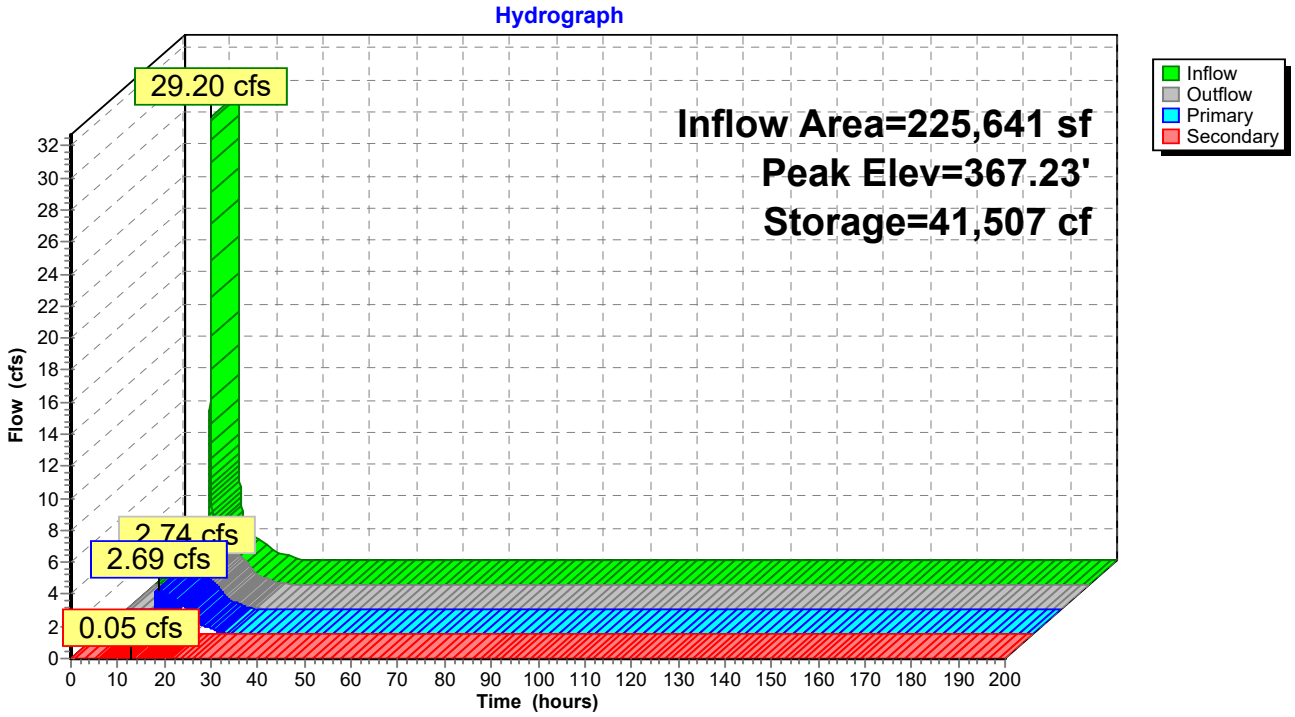
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.69 cfs @ 12.87 hrs HW=367.23' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 2.69 cfs of 17.77 cfs potential flow)
↑—**4=Orifice** (Orifice Controls 2.69 cfs @ 7.18 fps)

Secondary OutFlow Max=0.05 cfs @ 12.87 hrs HW=367.23' TW=0.00' (Dynamic Tailwater)
↑—**2=MRC Underdrain** (Passes 0.05 cfs of 0.95 cfs potential flow)
↑—**3=MRC Underdrain** (Orifice Controls 0.05 cfs @ 10.97 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 5.01" for 50-YR event
Inflow = 18.26 cfs @ 11.96 hrs, Volume= 39,317 cf
Outflow = 1.61 cfs @ 12.03 hrs, Volume= 38,477 cf, Atten= 91%, Lag= 4.2 min
Primary = 1.56 cfs @ 12.03 hrs, Volume= 29,448 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.05 cfs @ 12.46 hrs, Volume= 9,030 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 368.01' @ 12.46 hrs Surf.Area= 6,837 sf Storage= 21,887 cf

Plug-Flow detention time= 622.4 min calculated for 38,475 cf (98% of inflow)
Center-of-Mass det. time= 609.3 min (1,387.9 - 778.5)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

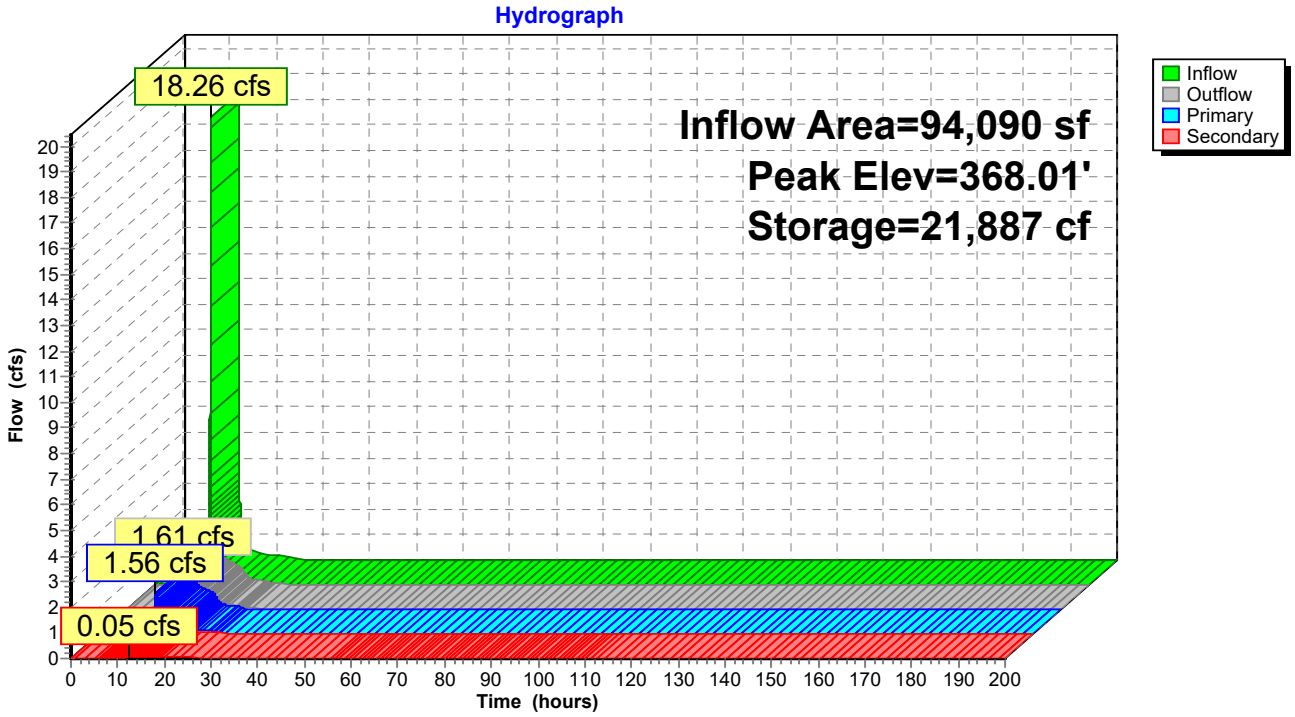
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.52 cfs @ 12.03 hrs HW=367.68' TW=366.78' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.52 cfs of 8.06 cfs potential flow)
↑**4=Orifice** (Orifice Controls 1.52 cfs @ 4.56 fps)

Secondary OutFlow Max=0.05 cfs @ 12.46 hrs HW=368.01' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.05 cfs of 0.51 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.05 cfs @ 10.74 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

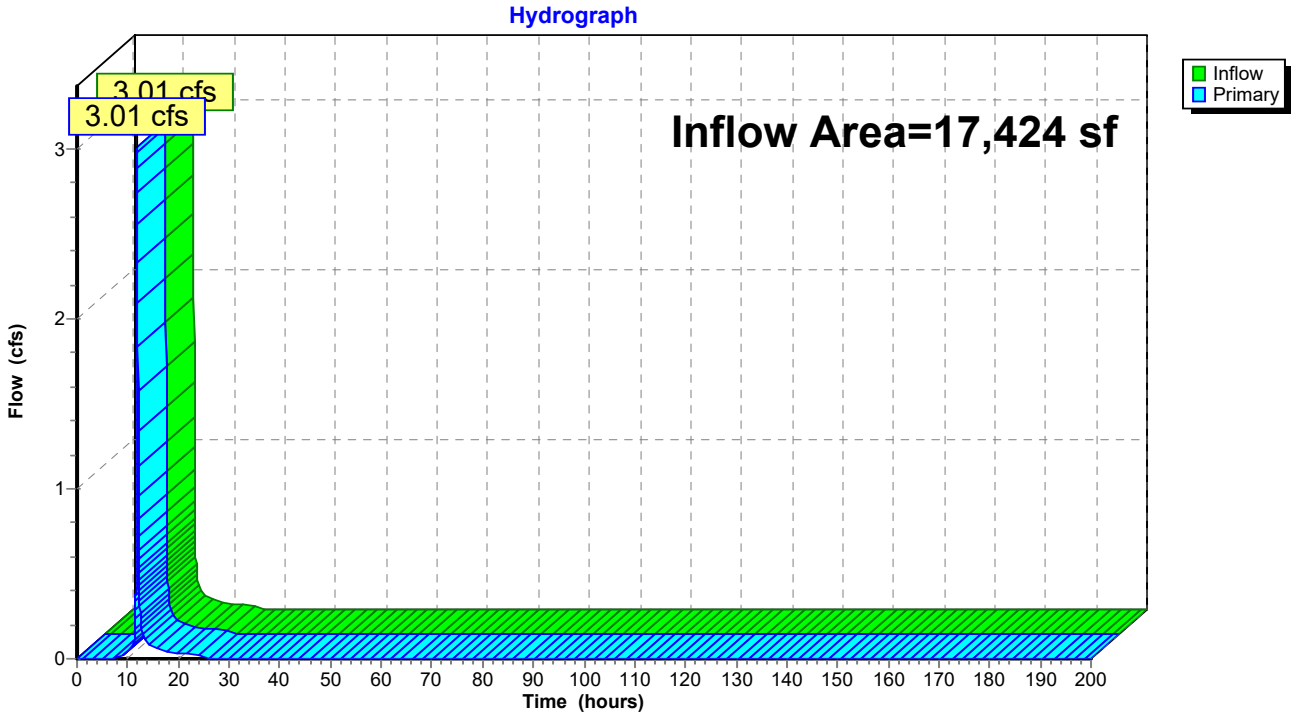
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 4.15" for 50-YR event
Inflow = 3.01 cfs @ 11.96 hrs, Volume= 6,025 cf
Primary = 3.01 cfs @ 11.96 hrs, Volume= 6,025 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

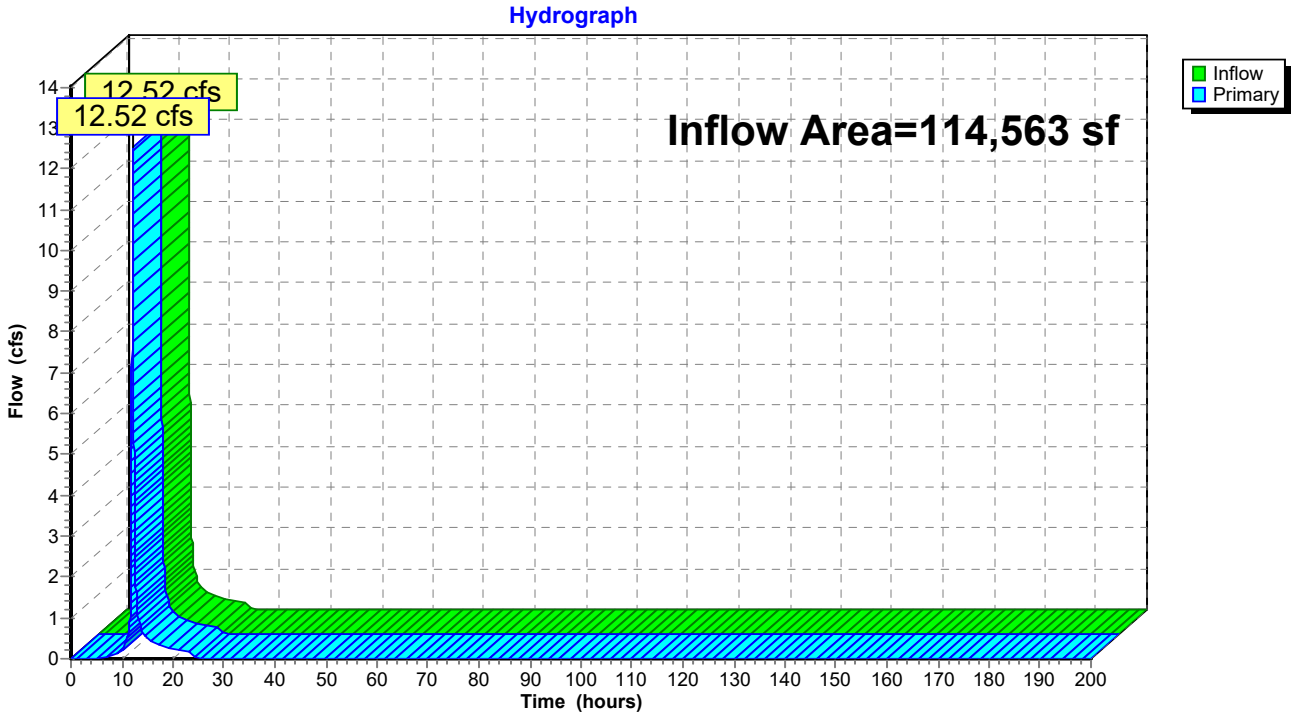


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 4.19" for 50-YR event
Inflow = 12.52 cfs @ 12.12 hrs, Volume= 40,024 cf
Primary = 12.52 cfs @ 12.12 hrs, Volume= 40,024 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

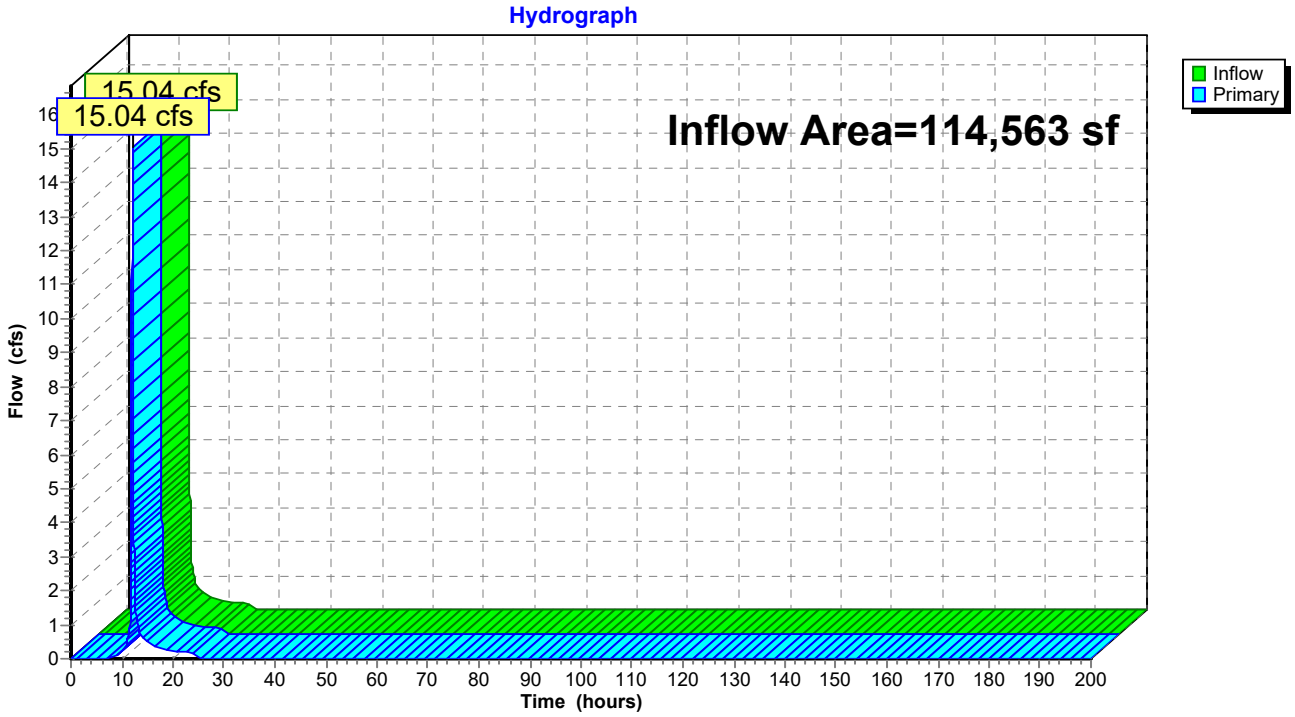


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 4.19" for 50-YR event
Inflow = 15.04 cfs @ 12.05 hrs, Volume= 40,024 cf
Primary = 15.04 cfs @ 12.05 hrs, Volume= 40,024 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

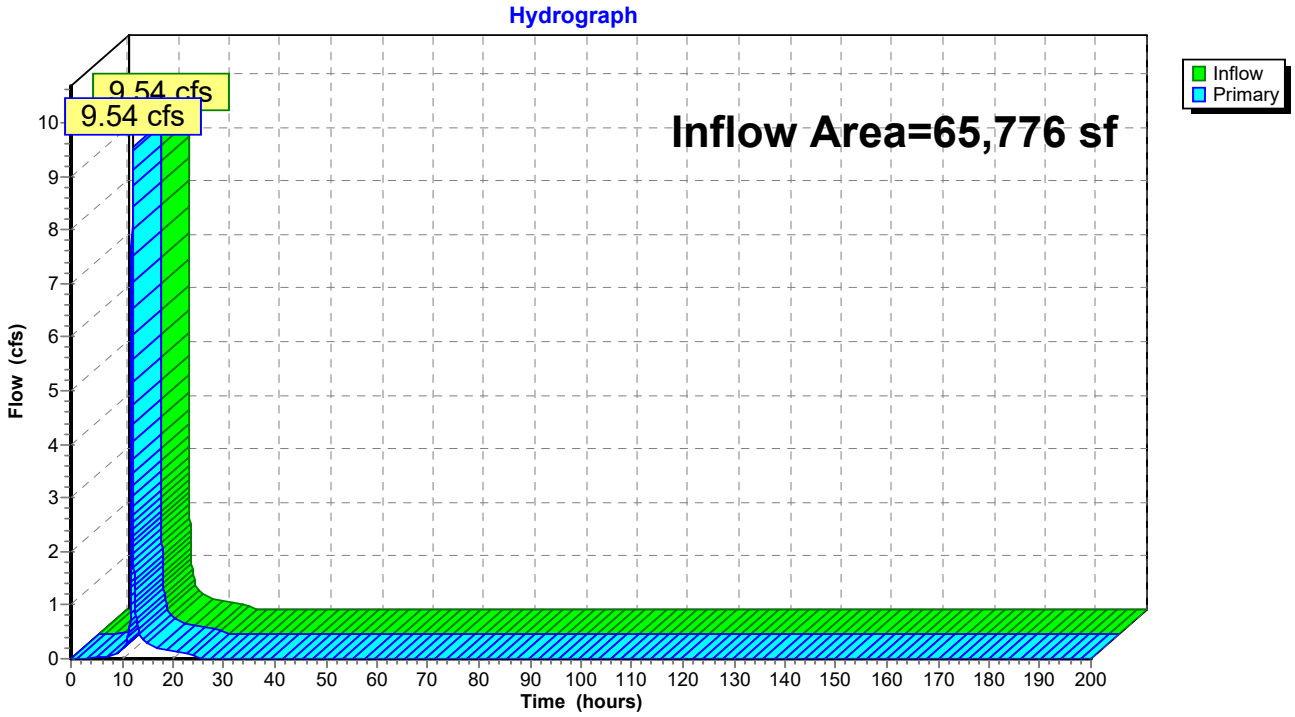


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 4.52" for 50-YR event
Inflow = 9.54 cfs @ 12.03 hrs, Volume= 24,789 cf
Primary = 9.54 cfs @ 12.03 hrs, Volume= 24,789 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

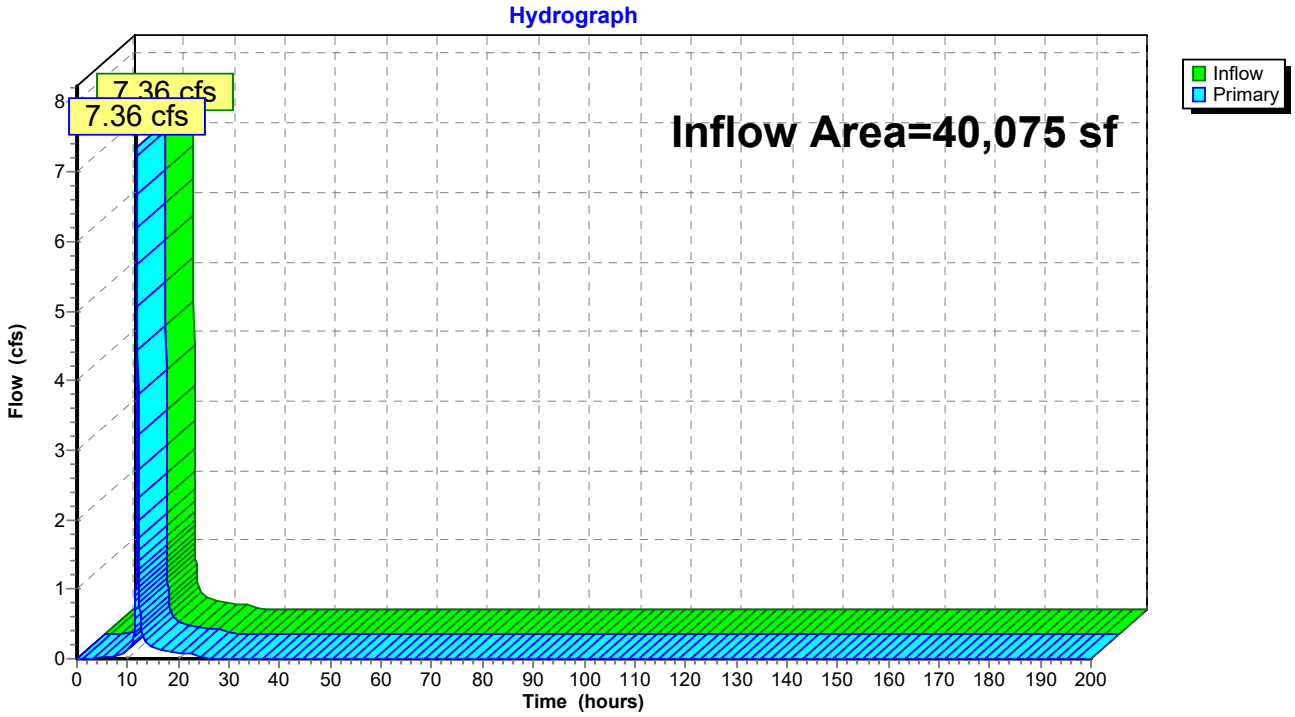


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 4.58" for 50-YR event
Inflow = 7.36 cfs @ 11.96 hrs, Volume= 15,304 cf
Primary = 7.36 cfs @ 11.96 hrs, Volume= 15,304 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

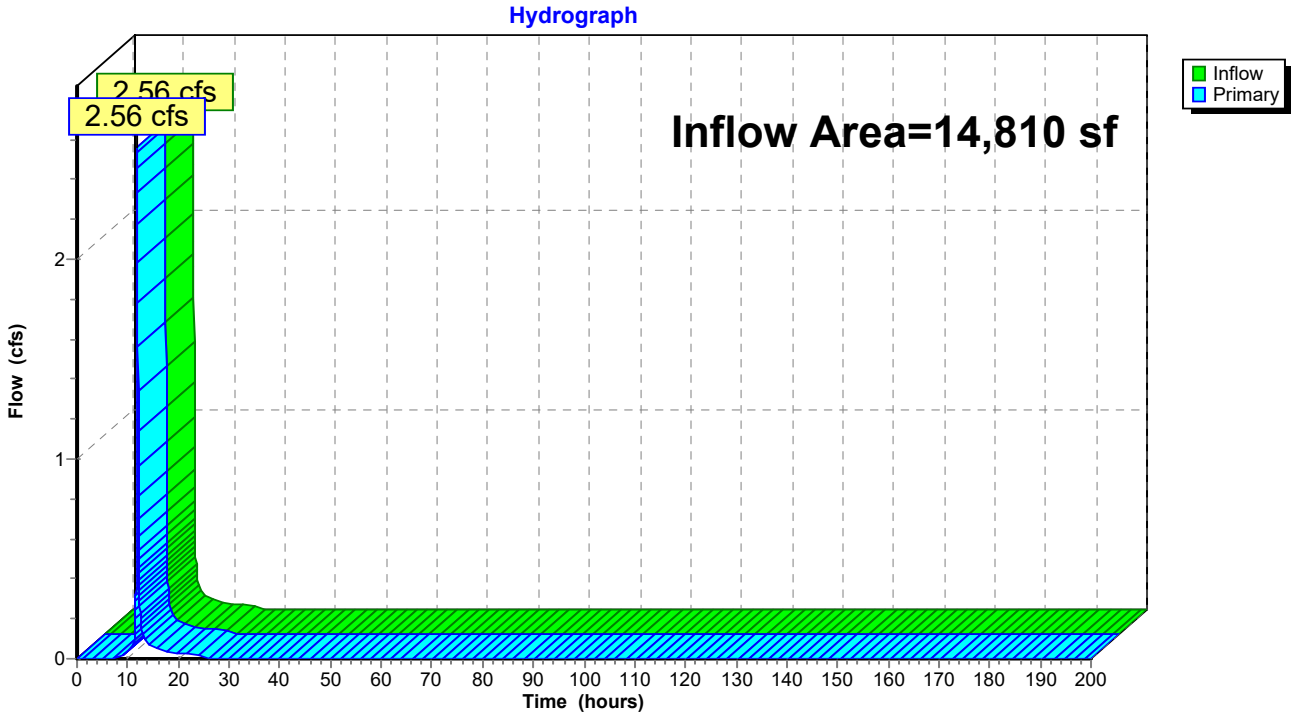


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 4.15" for 50-YR event
Inflow = 2.56 cfs @ 11.96 hrs, Volume= 5,121 cf
Primary = 2.56 cfs @ 11.96 hrs, Volume= 5,121 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

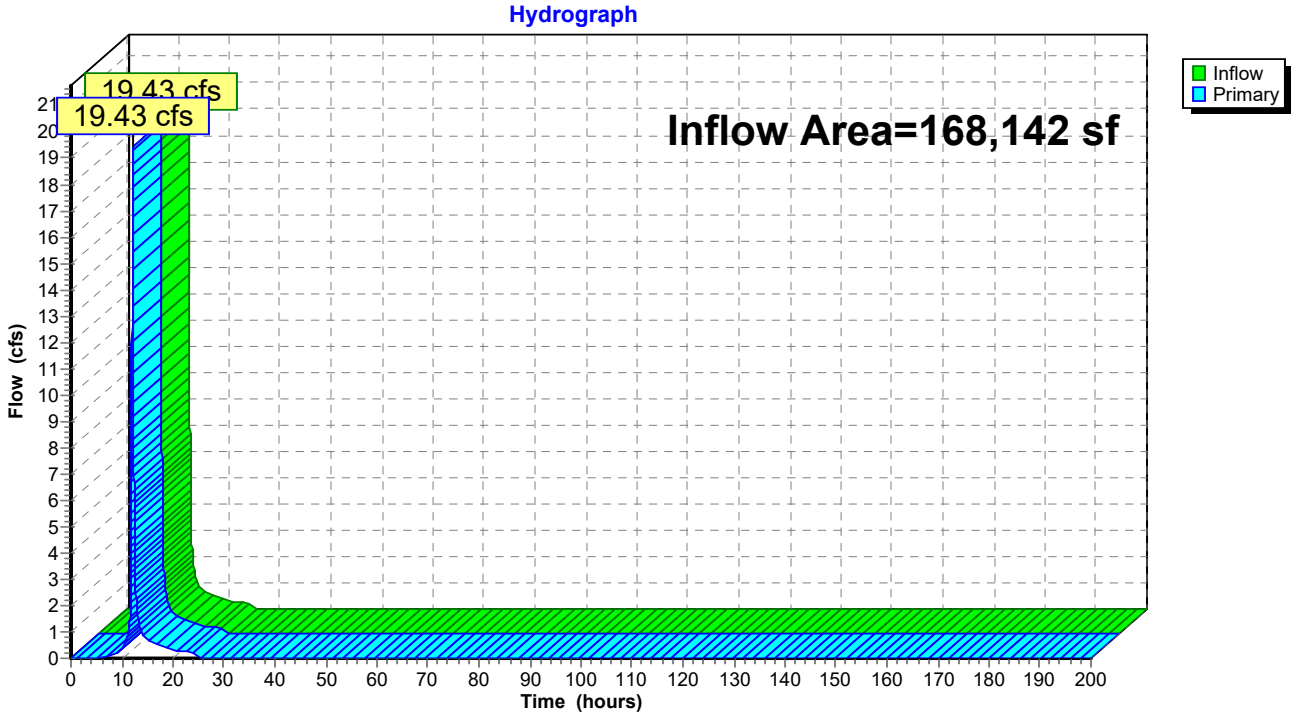


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 4.27" for 50-YR event
Inflow = 19.43 cfs @ 12.10 hrs, Volume= 59,778 cf
Primary = 19.43 cfs @ 12.10 hrs, Volume= 59,778 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

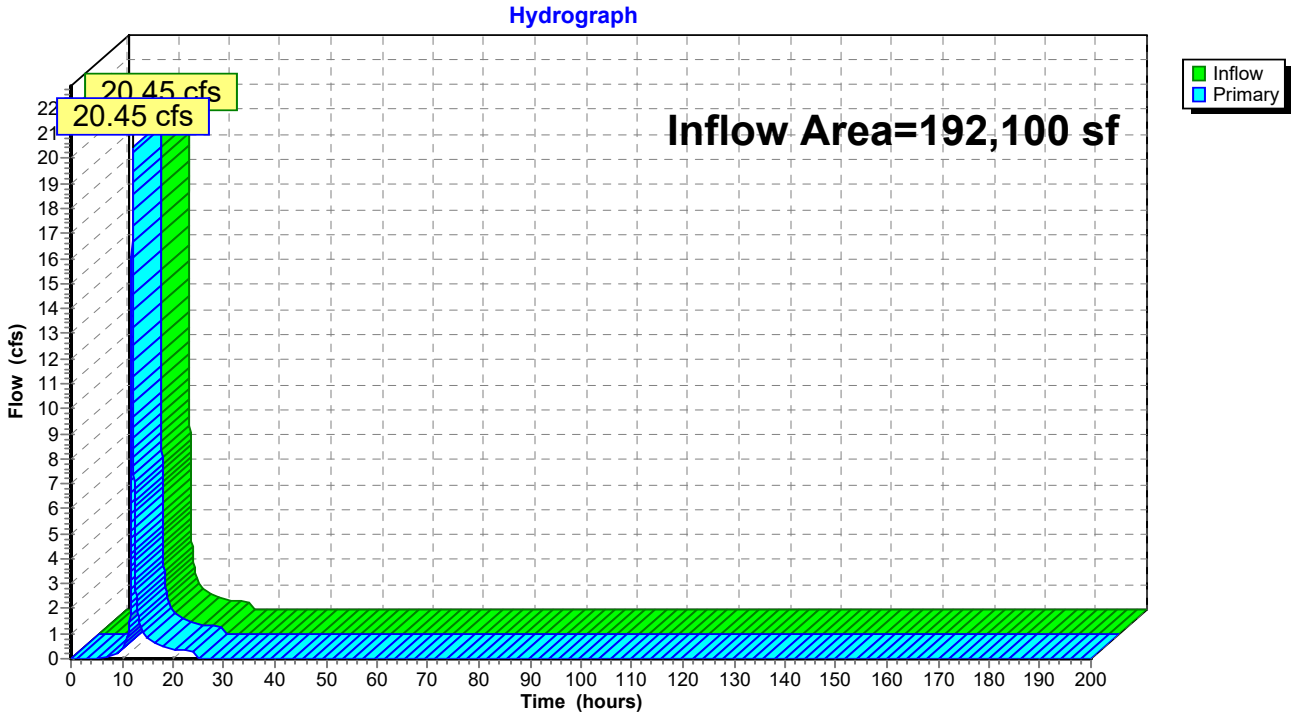


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 4.25" for 50-YR event
Inflow = 20.45 cfs @ 12.08 hrs, Volume= 68,063 cf
Primary = 20.45 cfs @ 12.08 hrs, Volume= 68,063 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

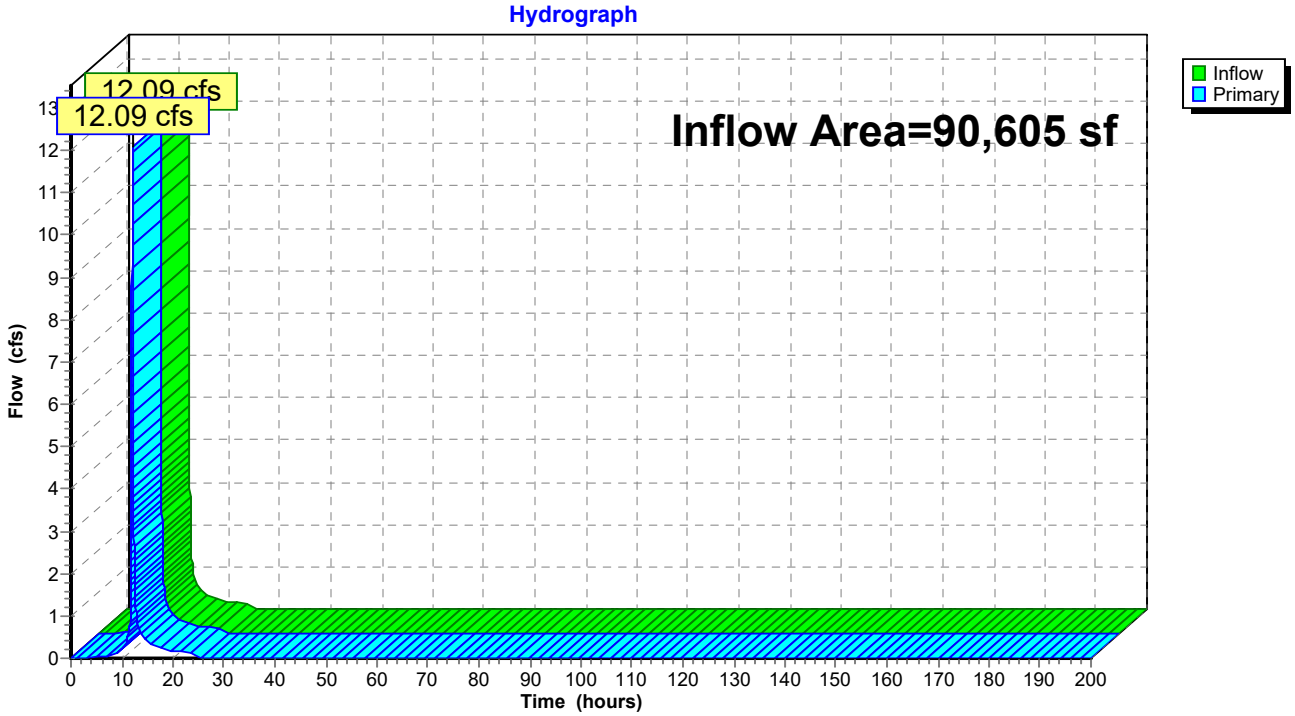


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 4.46" for 50-YR event
Inflow = 12.09 cfs @ 12.05 hrs, Volume= 33,701 cf
Primary = 12.09 cfs @ 12.05 hrs, Volume= 33,701 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

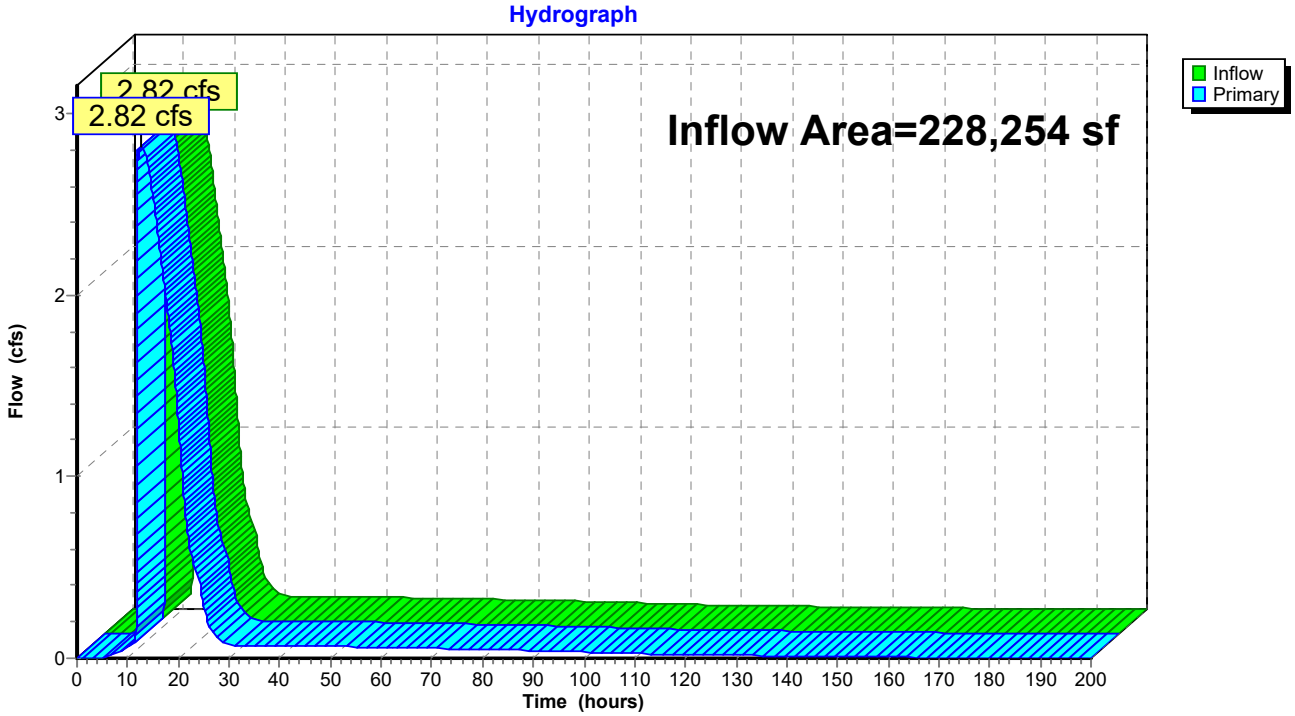


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth > 5.26" for 50-YR event
Inflow = 2.82 cfs @ 12.79 hrs, Volume= 100,001 cf
Primary = 2.82 cfs @ 12.79 hrs, Volume= 100,001 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

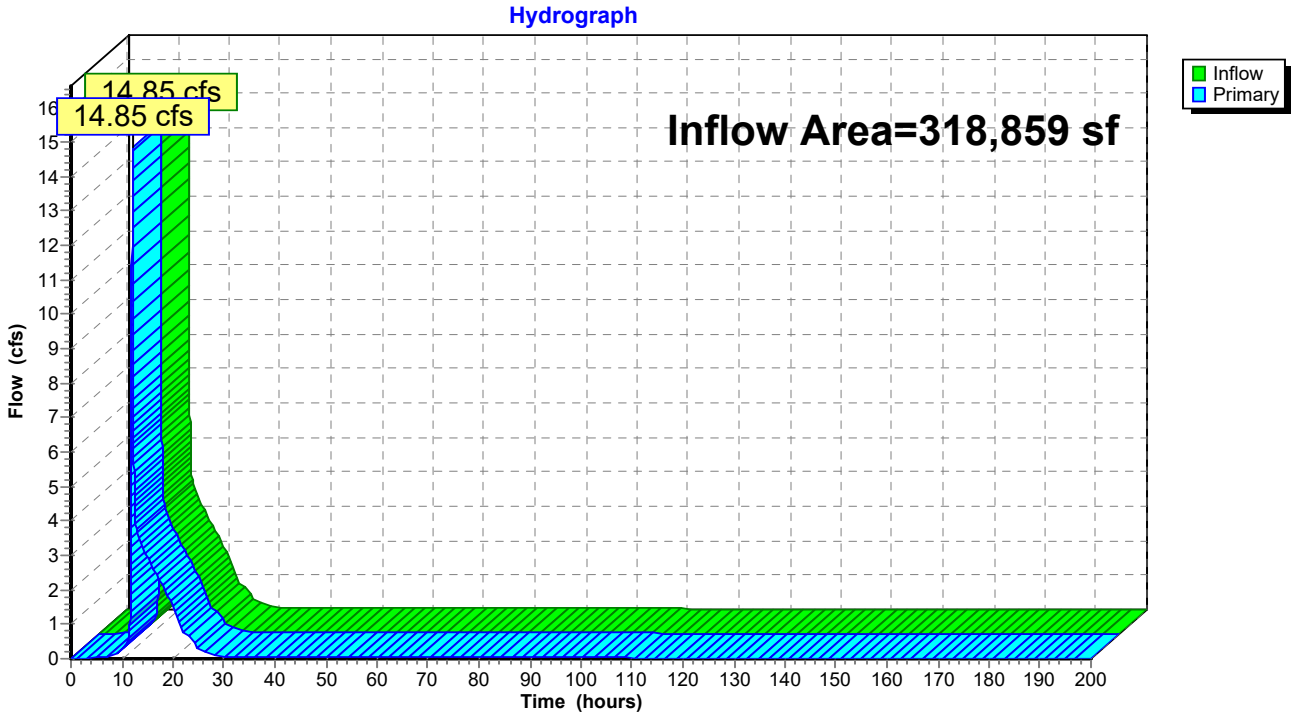


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 5.03" for 50-YR event
Inflow = 14.85 cfs @ 12.05 hrs, Volume= 133,702 cf
Primary = 14.85 cfs @ 12.05 hrs, Volume= 133,702 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Time span=0.00-200.00 hrs, dt=0.01 hrs, 20001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre A [Culvert] (Pervious) Runoff Area=3.660 ac 0.00% Impervious Runoff Depth=4.98"
Tc=17.5 min CN=78 Runoff=21.61 cfs 66,118 cf

Subcatchment 2S: Pre A [Culvert] (Imp.) Runoff Area=0.200 ac 100.00% Impervious Runoff Depth=7.31"
Tc=17.5 min CN=98 Runoff=1.52 cfs 5,307 cf

Subcatchment 4S: Pre B (Pervious) Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=4.98"
Tc=5.0 min CN=78 Runoff=3.57 cfs 7,226 cf

Subcatchment 5S: Pre B (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 7S: Pre C (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=4.98"
Tc=19.1 min CN=78 Runoff=14.57 cfs 46,608 cf

Subcatchment 8S: Pre C (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=7.31"
Tc=19.1 min CN=98 Runoff=0.36 cfs 1,327 cf

Subcatchment 10S: Pre D (Pervious) Runoff Area=2.580 ac 0.00% Impervious Runoff Depth=4.98"
Tc=13.1 min CN=78 Runoff=17.48 cfs 46,608 cf

Subcatchment 11S: Pre D (Imp.) Runoff Area=0.050 ac 100.00% Impervious Runoff Depth=7.31"
Tc=13.1 min CN=98 Runoff=0.43 cfs 1,327 cf

Subcatchment 13S: Post D Bypass Runoff Area=1.260 ac 0.00% Impervious Runoff Depth=4.98"
Tc=11.5 min CN=78 Runoff=9.00 cfs 22,762 cf

Subcatchment 14S: Pre A-1 CTP Basin Runoff Area=0.550 ac 0.00% Impervious Runoff Depth=4.98"
Tc=5.0 min CN=78 Runoff=4.91 cfs 9,936 cf

Subcatchment 15S: Pre A-1 CTP Basin (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 16S: Post D Bypass (Imp.) Runoff Area=0.250 ac 100.00% Impervious Runoff Depth=7.31"
Tc=11.5 min CN=98 Runoff=2.27 cfs 6,634 cf

Subcatchment 18S: Post C Bypass Runoff Area=0.780 ac 0.00% Impervious Runoff Depth=5.09"
Tc=5.0 min CN=79 Runoff=7.09 cfs 14,413 cf

Subcatchment 19S: Post C Bypass (Imp.) Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=7.31"
Tc=5.0 min CN=98 Runoff=1.56 cfs 3,715 cf

Subcatchment 21S: Post B Bypass Runoff Area=0.340 ac 0.00% Impervious Runoff Depth=4.98"
Tc=5.0 min CN=78 Runoff=3.04 cfs 6,142 cf

Subcatchment 22S: Post B Bypass (Imp.) Runoff Area=0.000 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 28S: Post A-1 Bypass Runoff Area=0.060 ac 0.00% Impervious Runoff Depth=5.20"
Tc=5.0 min CN=80 Runoff=0.56 cfs 1,134 cf

Subcatchment 29S: Post A-1 Bypass (Imp.) Runoff Area=0 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=0 Runoff=0.00 cfs 0 cf

Subcatchment 33S: To Basin 2 (Pervious) Runoff Area=1.470 ac 0.00% Impervious Runoff Depth=5.20"
Tc=5.0 min CN=80 Runoff=13.60 cfs 27,771 cf

Subcatchment 34S: To Basin 2 (Imp.) Runoff Area=0.690 ac 100.00% Impervious Runoff Depth=7.31"
Tc=5.0 min CN=98 Runoff=7.67 cfs 18,311 cf

Subcatchment 35S: To Basin 1 (Pervious) Runoff Area=0.950 ac 0.00% Impervious Runoff Depth=5.20"
Tc=5.0 min CN=80 Runoff=8.79 cfs 17,948 cf

Subcatchment 36S: To Basin 1 (Imp.) Runoff Area=2.070 ac 100.00% Impervious Runoff Depth=7.31"
Tc=5.0 min CN=98 Runoff=23.02 cfs 54,932 cf

Subcatchment 37S: Post A Bypass Runoff Area=1.790 ac 0.00% Impervious Runoff Depth=4.98"
Tc=13.8 min CN=78 Runoff=11.85 cfs 32,337 cf

Subcatchment 38S: Post A Bypass (Imp.) Runoff Area=0.290 ac 100.00% Impervious Runoff Depth=7.31"
Tc=13.8 min CN=98 Runoff=2.45 cfs 7,696 cf

Pond 39P: Basin 1 (MRC) Peak Elev=367.73' Storage=47,858 cf Inflow=33.39 cfs 108,916 cf
Primary=2.98 cfs 91,374 cf Secondary=0.05 cfs 14,968 cf Outflow=3.03 cfs 106,342 cf

Pond 40P: Basin 2 (MRC) Peak Elev=368.62' Storage=25,962 cf Inflow=21.27 cfs 46,082 cf
Primary=1.64 cfs 36,036 cf Secondary=0.05 cfs 9,206 cf Outflow=1.69 cfs 45,243 cf

Link 6L: Pre B (Bypass) Inflow=3.57 cfs 7,226 cf
Primary=3.57 cfs 7,226 cf

Link 9L: Pre C (Bypass) Inflow=14.94 cfs 47,935 cf
Primary=14.94 cfs 47,935 cf

Link 12L: Pre D (Bypass) Inflow=17.91 cfs 47,935 cf
Primary=17.91 cfs 47,935 cf

Link 17L: Post D Bypass Inflow=11.27 cfs 29,396 cf
Primary=11.27 cfs 29,396 cf

Link 20L: Post C Bypass Inflow=8.65 cfs 18,128 cf
Primary=8.65 cfs 18,128 cf

Link 23L: Post B Bypass Inflow=3.04 cfs 6,142 cf
Primary=3.04 cfs 6,142 cf

Link 24L: Culvert - PRE Inflow=23.13 cfs 71,426 cf
Primary=23.13 cfs 71,426 cf

Link 25L: To CTP Ex. Basin - PRE Inflow=24.35 cfs 81,362 cf
Primary=24.35 cfs 81,362 cf

Link 26L: Culvert - POST Inflow=14.30 cfs 40,032 cf
Primary=14.30 cfs 40,032 cf

Link 27L: Post POI A-1 Inflow=3.16 cfs 116,682 cf
Primary=3.16 cfs 116,682 cf

Link 30L: To CTP Ex. Basin- POST Inflow=17.40 cfs 156,714 cf
Primary=17.40 cfs 156,714 cf

Total Runoff Area = 878,170 sf Runoff Volume = 398,251 cf Average Runoff Depth = 5.44"
81.45% Pervious = 715,255 sf 18.55% Impervious = 162,914 sf

Summary for Subcatchment 1S: Pre A [Culvert] (Pervious)

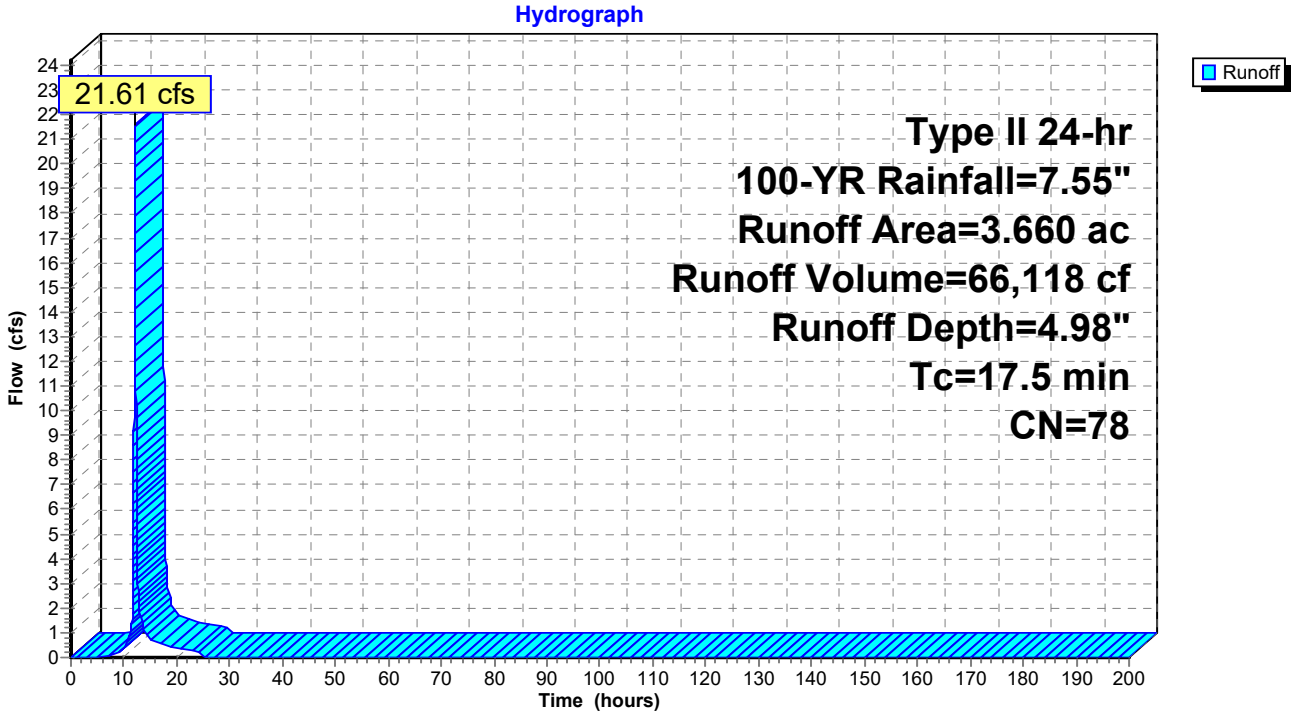
Runoff = 21.61 cfs @ 12.09 hrs, Volume= 66,118 cf, Depth= 4.98"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	3.660	78	
	3.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 1S: Pre A [Culvert] (Pervious)



Summary for Subcatchment 2S: Pre A [Culvert] (Imp.)

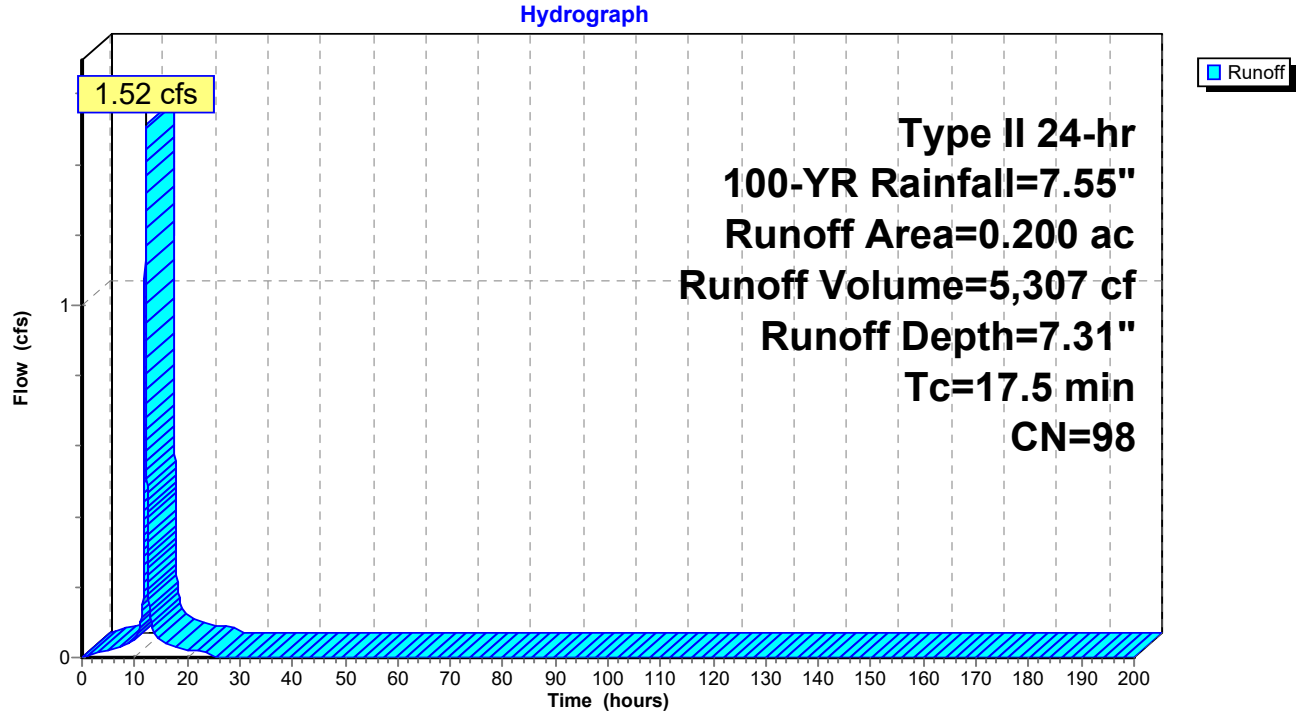
Runoff = 1.52 cfs @ 12.09 hrs, Volume= 5,307 cf, Depth= 7.31"
Routed to Link 24L : Culvert - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.200	98	
	0.200		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5					**Direct Entry, Direct**

Subcatchment 2S: Pre A [Culvert] (Imp.)



Summary for Subcatchment 4S: Pre B (Pervious)

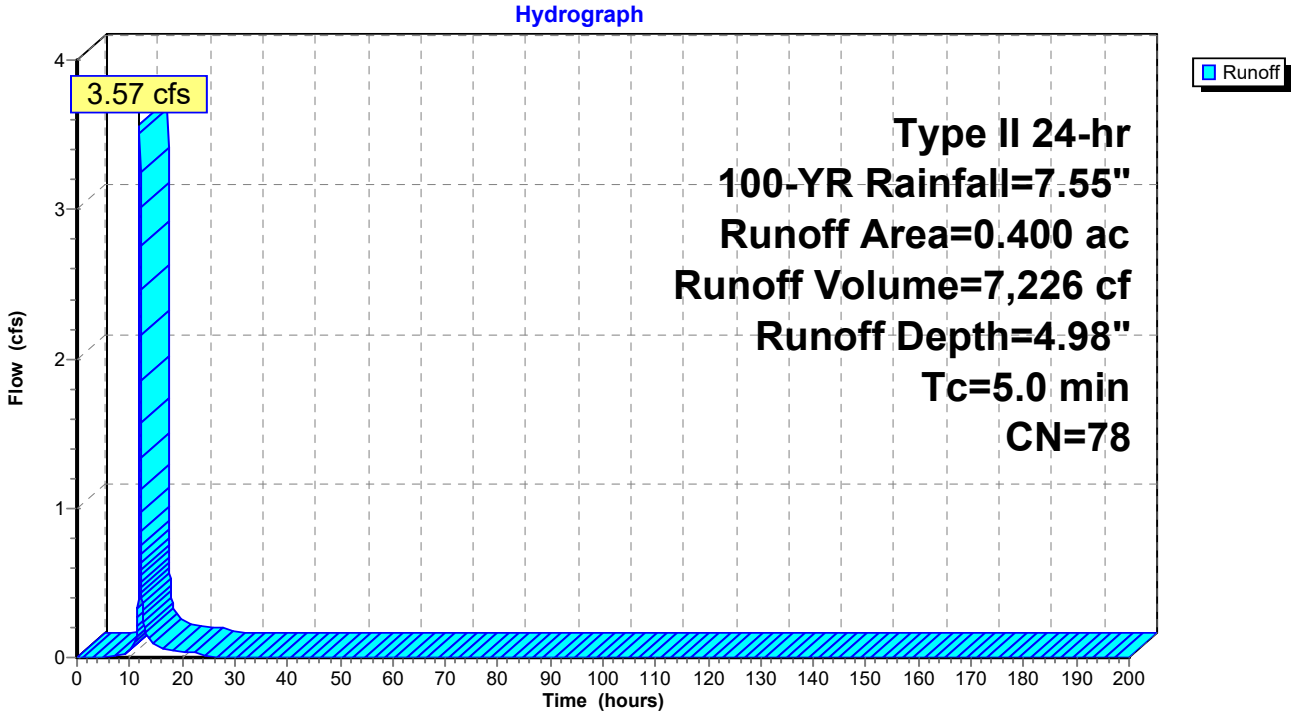
Runoff = 3.57 cfs @ 11.96 hrs, Volume= 7,226 cf, Depth= 4.98"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.400	78	
	0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 4S: Pre B (Pervious)



Summary for Subcatchment 5S: Pre B (Imp.)

[40] Hint: Not Described (Area=0)

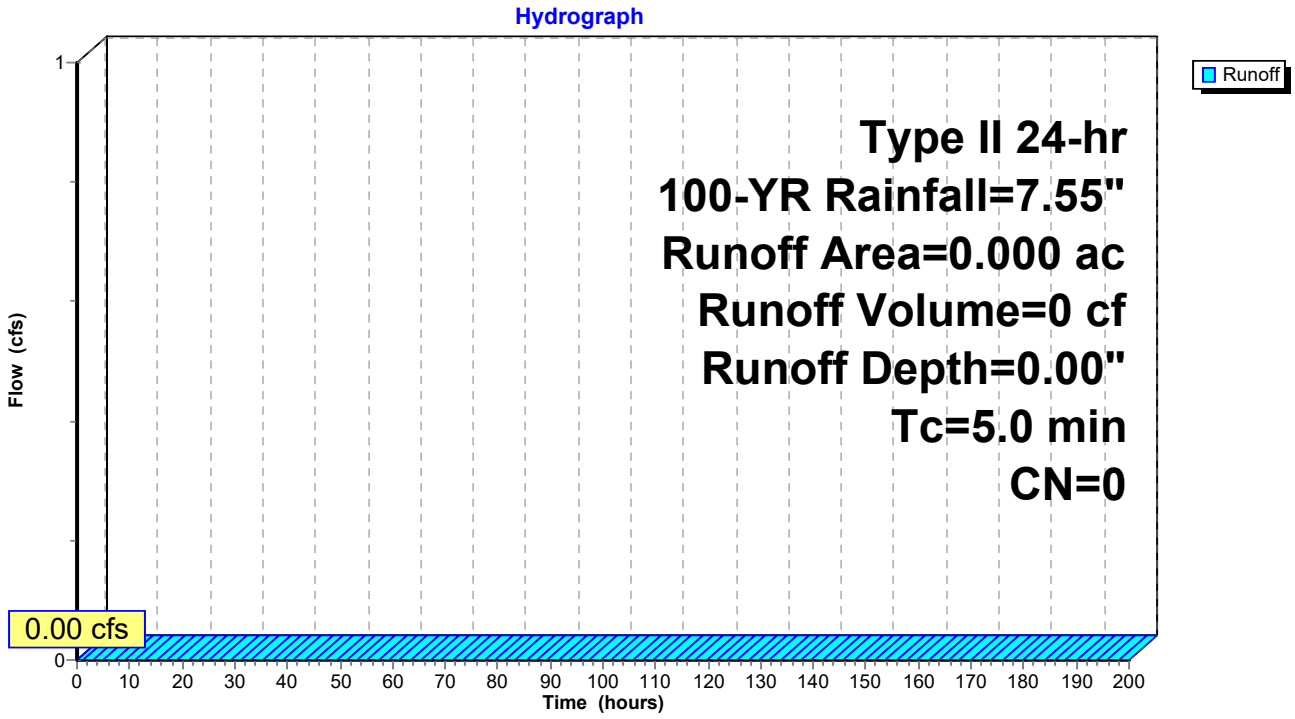
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 6L : Pre B (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 5S: Pre B (Imp.)



Summary for Subcatchment 7S: Pre C (Pervious)

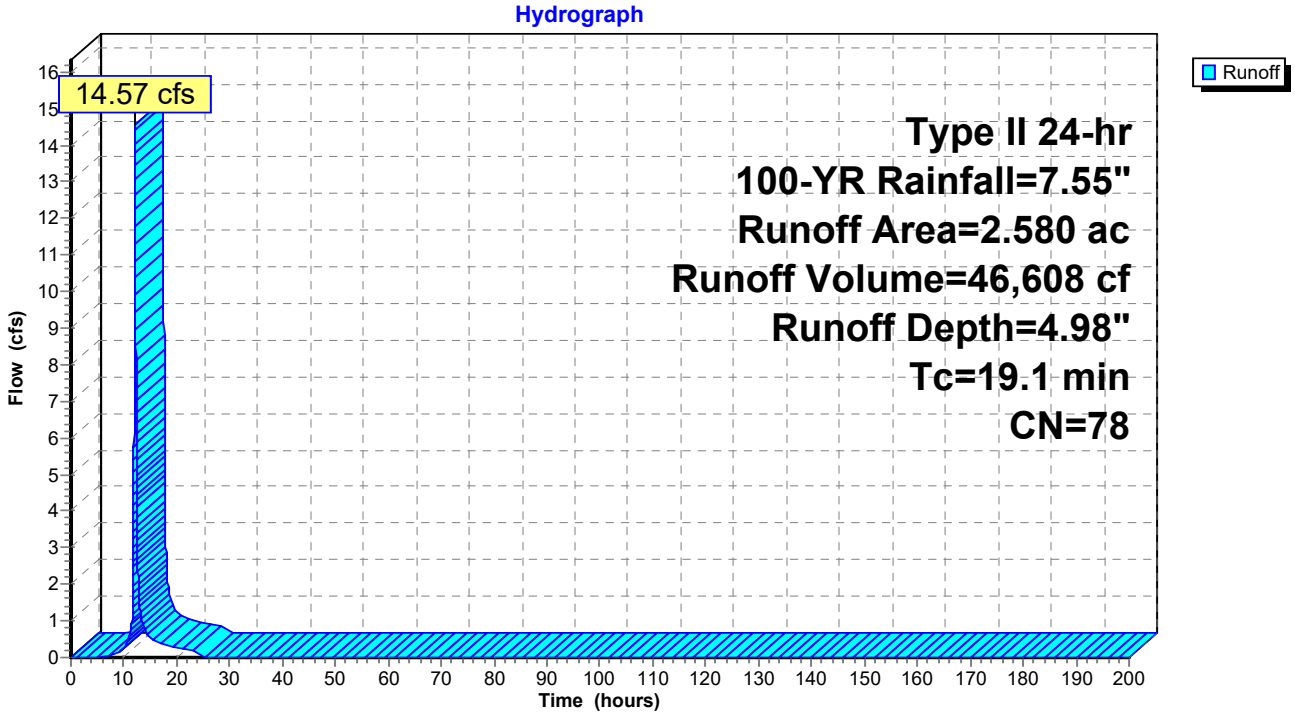
Runoff = 14.57 cfs @ 12.12 hrs, Volume= 46,608 cf, Depth= 4.98"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 7S: Pre C (Pervious)



Summary for Subcatchment 8S: Pre C (Imp.)

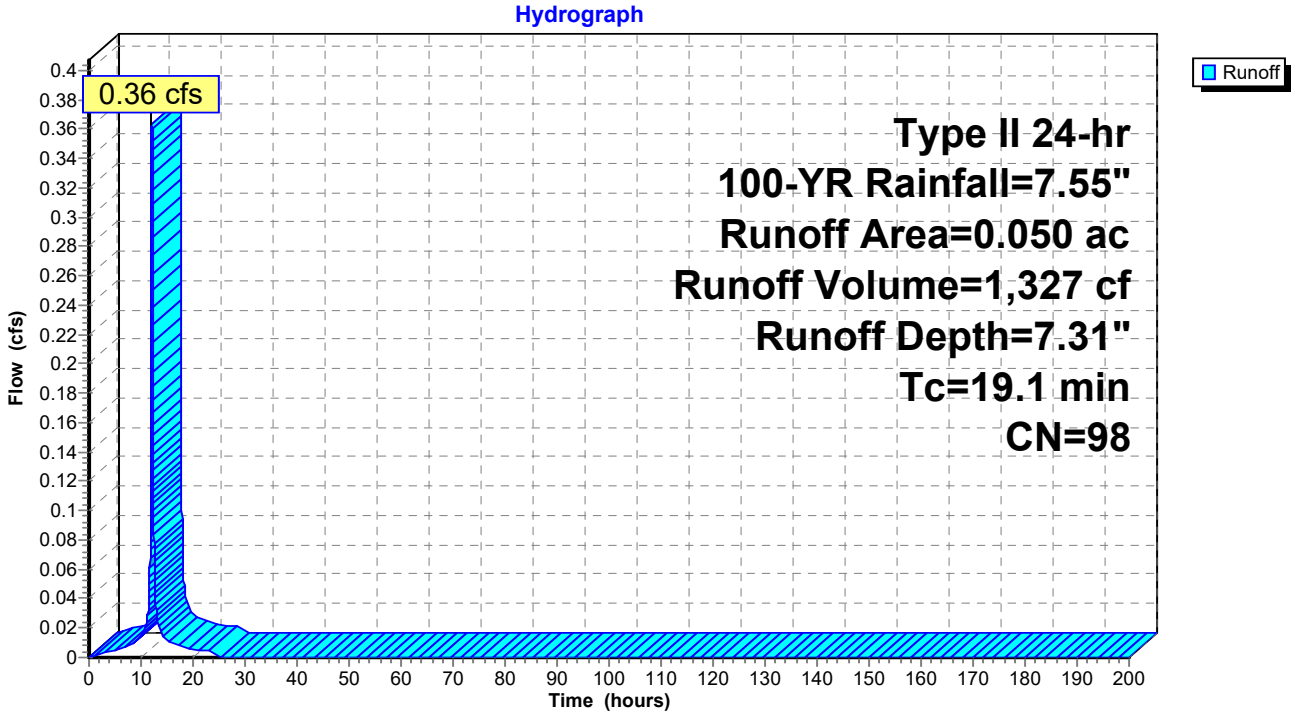
Runoff = 0.36 cfs @ 12.11 hrs, Volume= 1,327 cf, Depth= 7.31"
Routed to Link 9L : Pre C (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1					**Direct Entry, Direct**

Subcatchment 8S: Pre C (Imp.)



Summary for Subcatchment 10S: Pre D (Pervious)

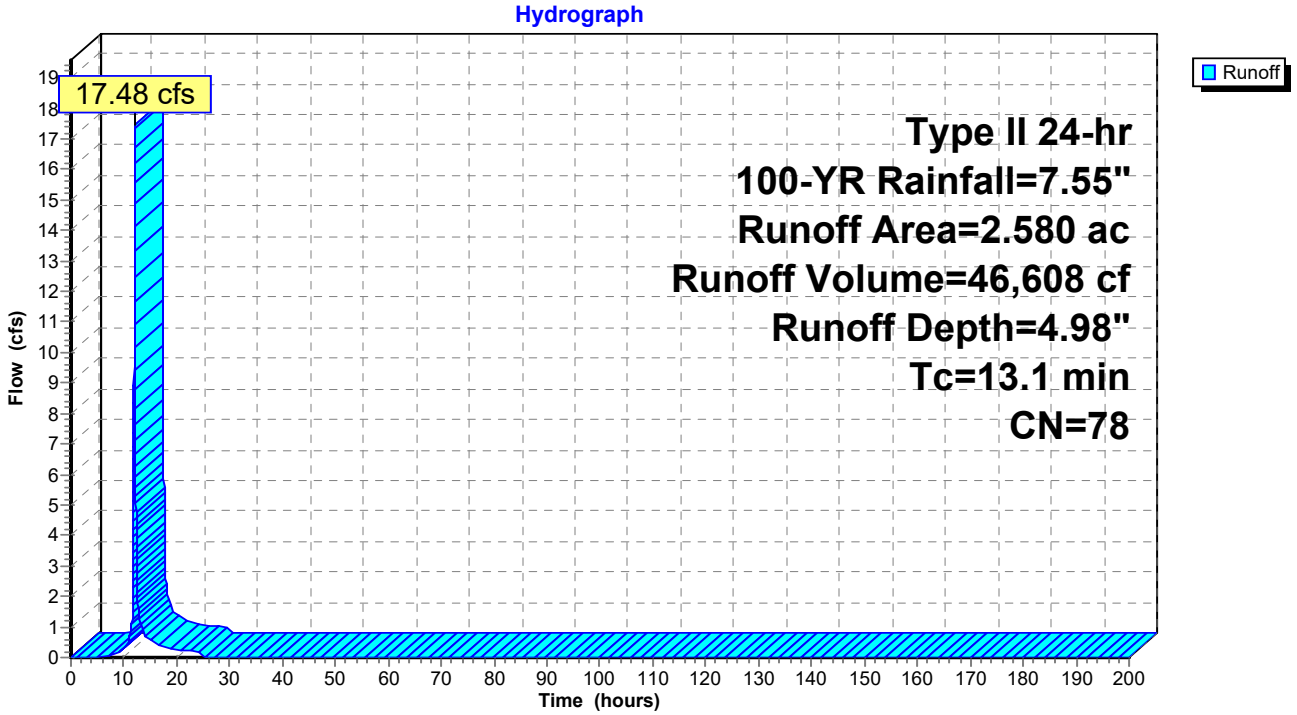
Runoff = 17.48 cfs @ 12.05 hrs, Volume= 46,608 cf, Depth= 4.98"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	2.580	78	
	2.580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 10S: Pre D (Pervious)



Summary for Subcatchment 11S: Pre D (Imp.)

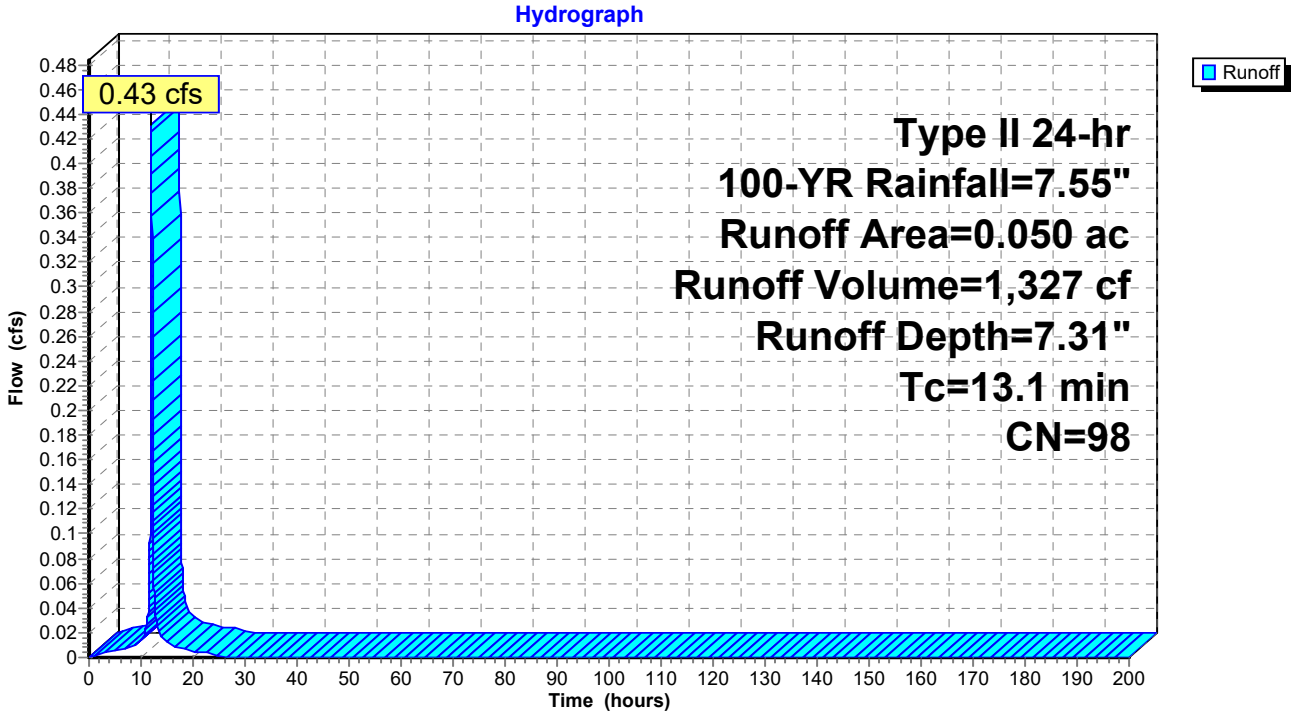
Runoff = 0.43 cfs @ 12.04 hrs, Volume= 1,327 cf, Depth= 7.31"
Routed to Link 12L : Pre D (Bypass)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.050	98	
	0.050		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1					**Direct Entry, Direct**

Subcatchment 11S: Pre D (Imp.)



Summary for Subcatchment 13S: Post D Bypass (Pervious)

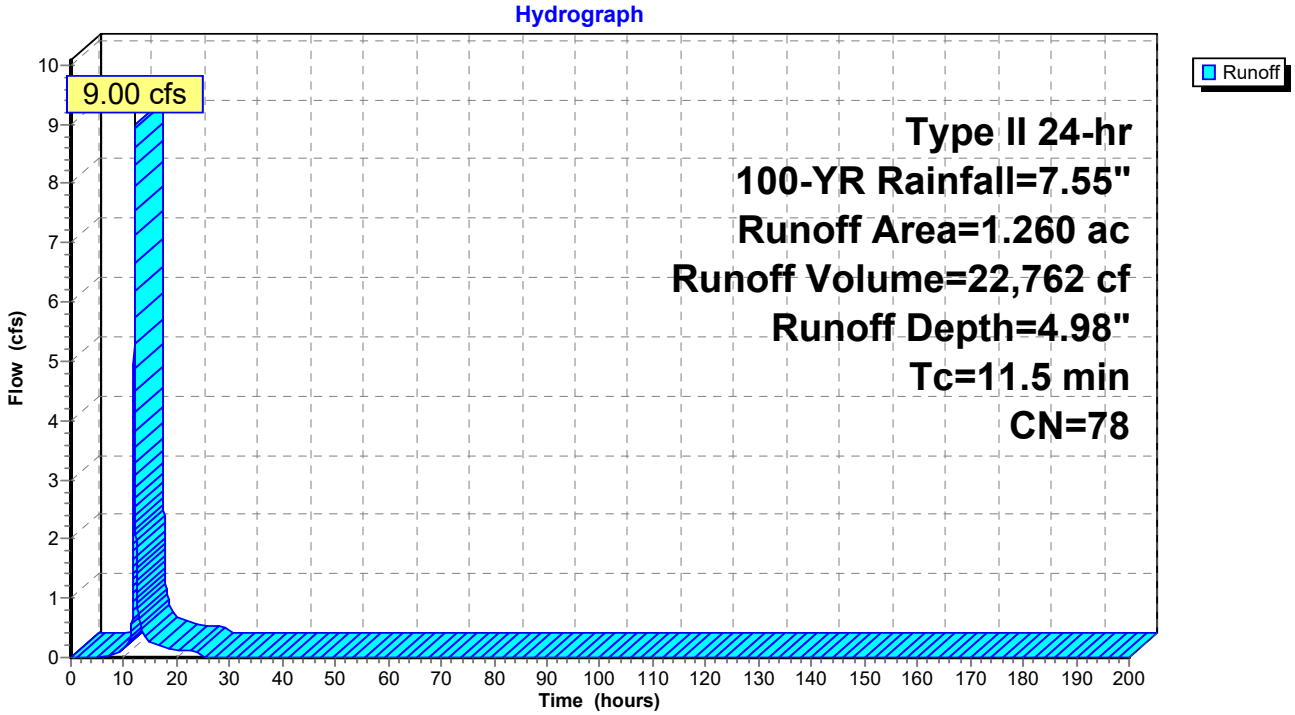
Runoff = 9.00 cfs @ 12.03 hrs, Volume= 22,762 cf, Depth= 4.98"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	1.260	78	
	1.260		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 13S: Post D Bypass (Pervious)



Summary for Subcatchment 14S: Pre A-1 CTP Basin (Pervious)

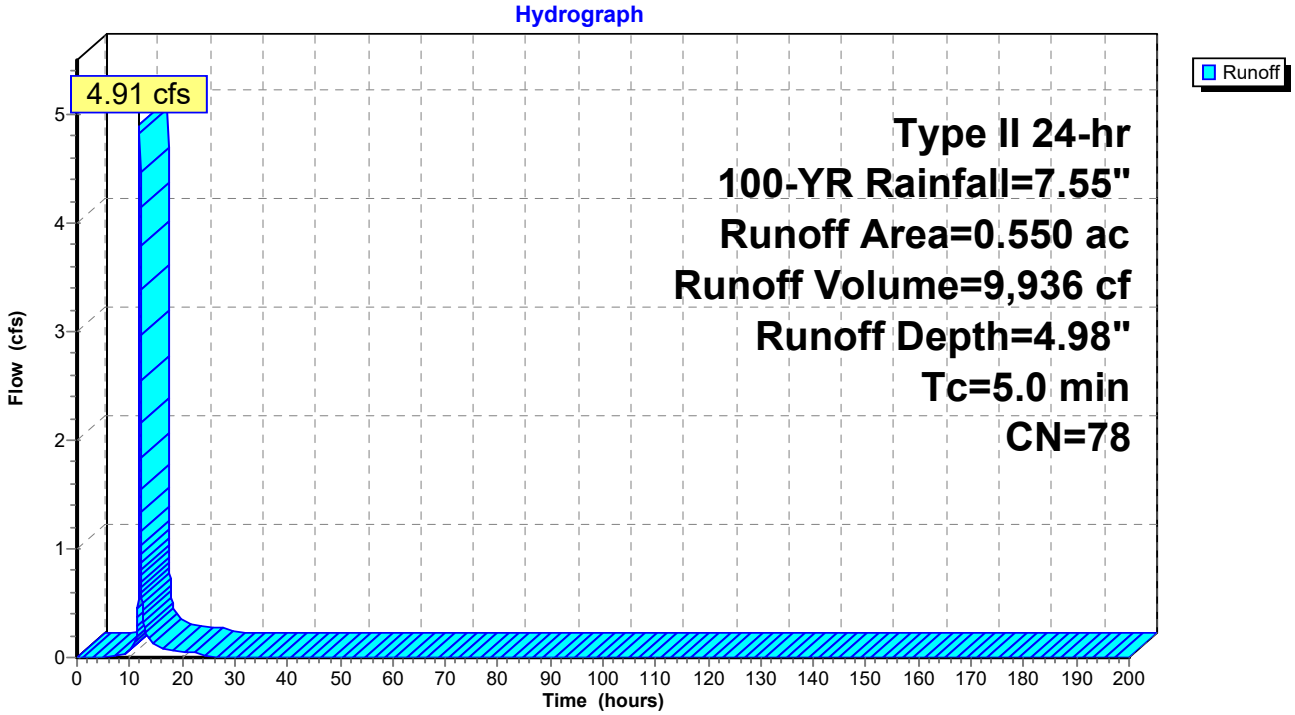
Runoff = 4.91 cfs @ 11.96 hrs, Volume= 9,936 cf, Depth= 4.98"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.550	78	
	0.550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 14S: Pre A-1 CTP Basin (Pervious)



Summary for Subcatchment 15S: Pre A-1 CTP Basin (Imp.)

[40] Hint: Not Described (Area=0)

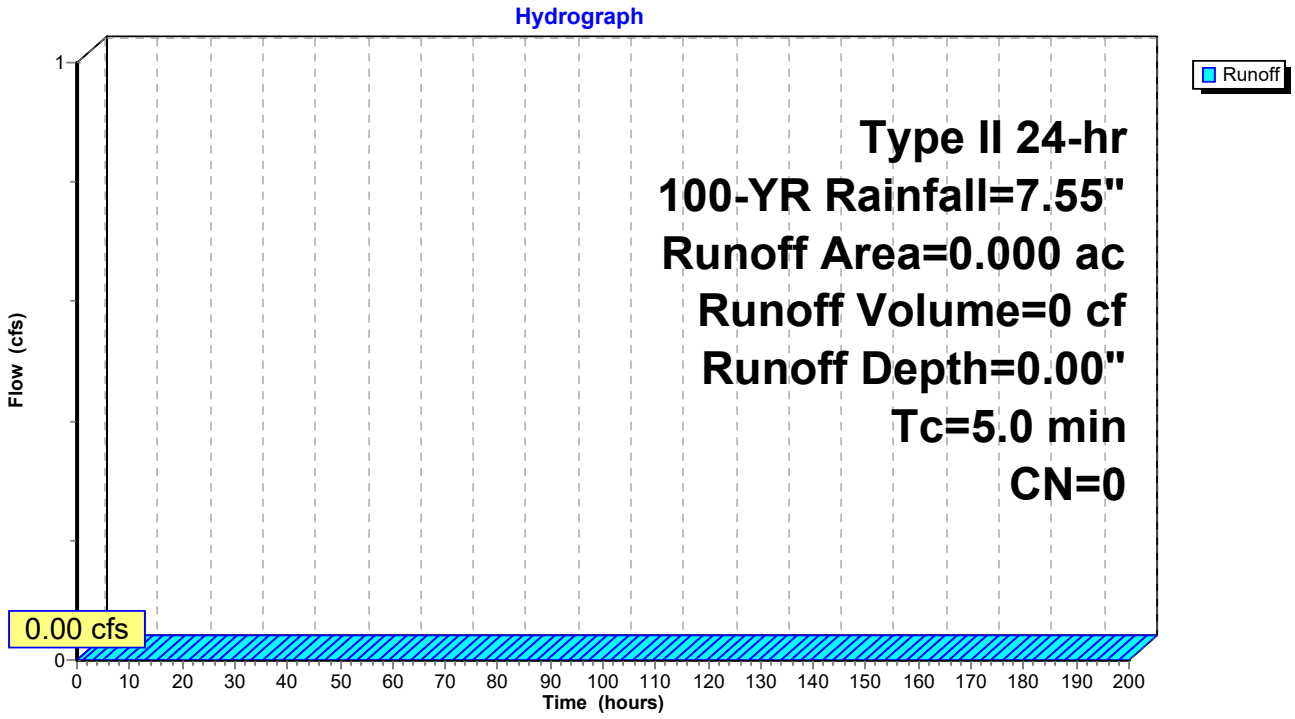
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 25L : To CTP Ex. Basin - PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 15S: Pre A-1 CTP Basin (Imp.)



Summary for Subcatchment 16S: Post D Bypass (Imp.)

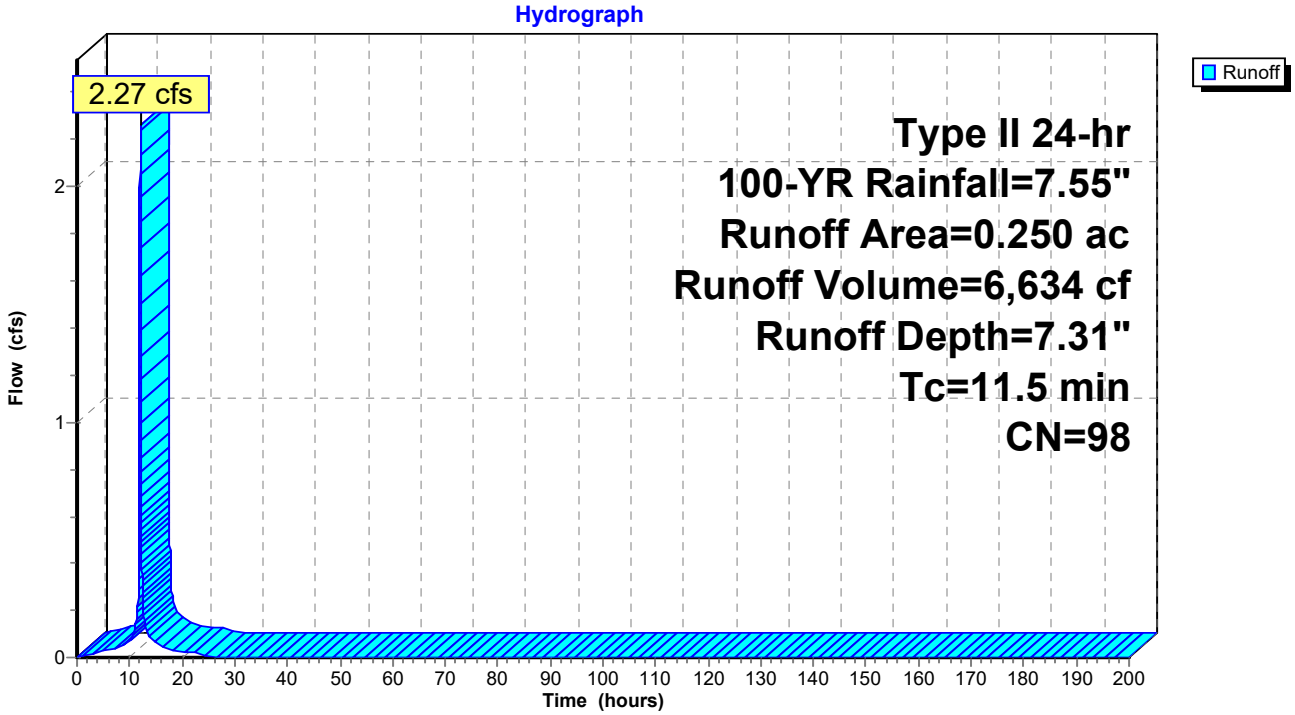
Runoff = 2.27 cfs @ 12.02 hrs, Volume= 6,634 cf, Depth= 7.31"
Routed to Link 17L : Post D Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.250	98	
	0.250		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5					**Direct Entry, Direct**

Subcatchment 16S: Post D Bypass (Imp.)



Summary for Subcatchment 18S: Post C Bypass (Pervious)

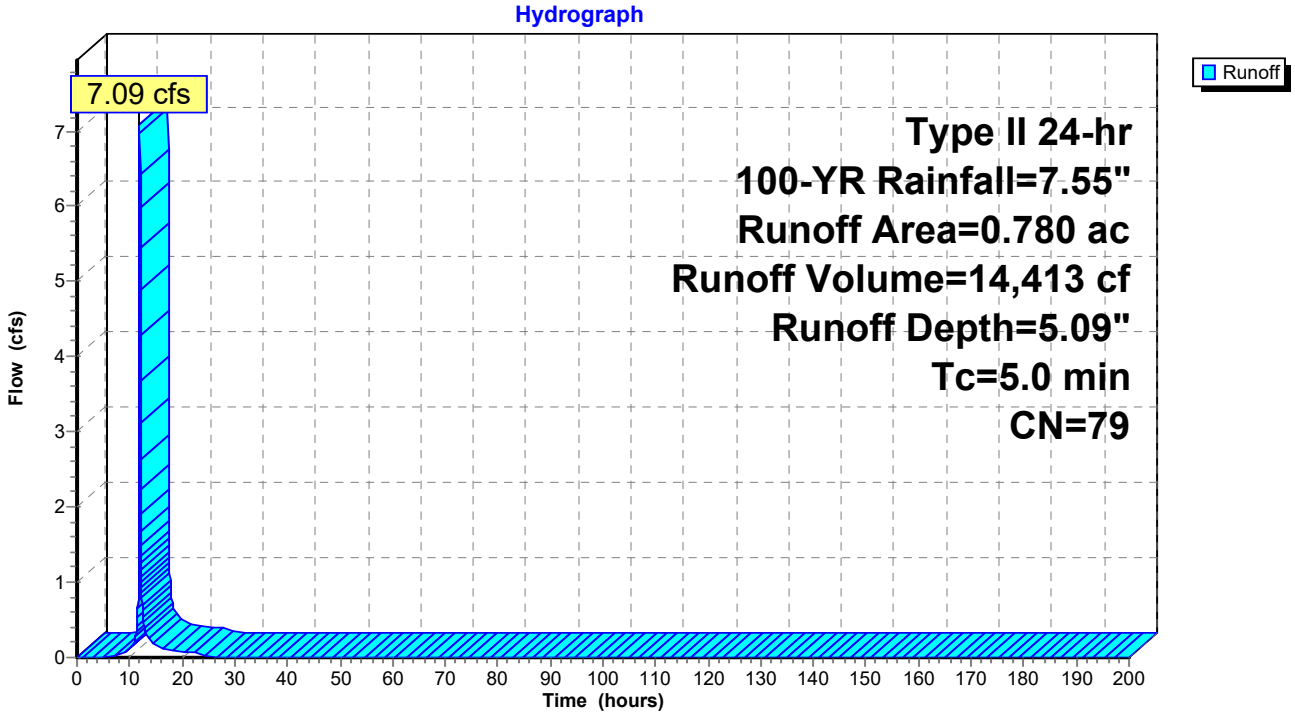
Runoff = 7.09 cfs @ 11.96 hrs, Volume= 14,413 cf, Depth= 5.09"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.780	79	
	0.780		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 18S: Post C Bypass (Pervious)



Summary for Subcatchment 19S: Post C Bypass (Imp.)

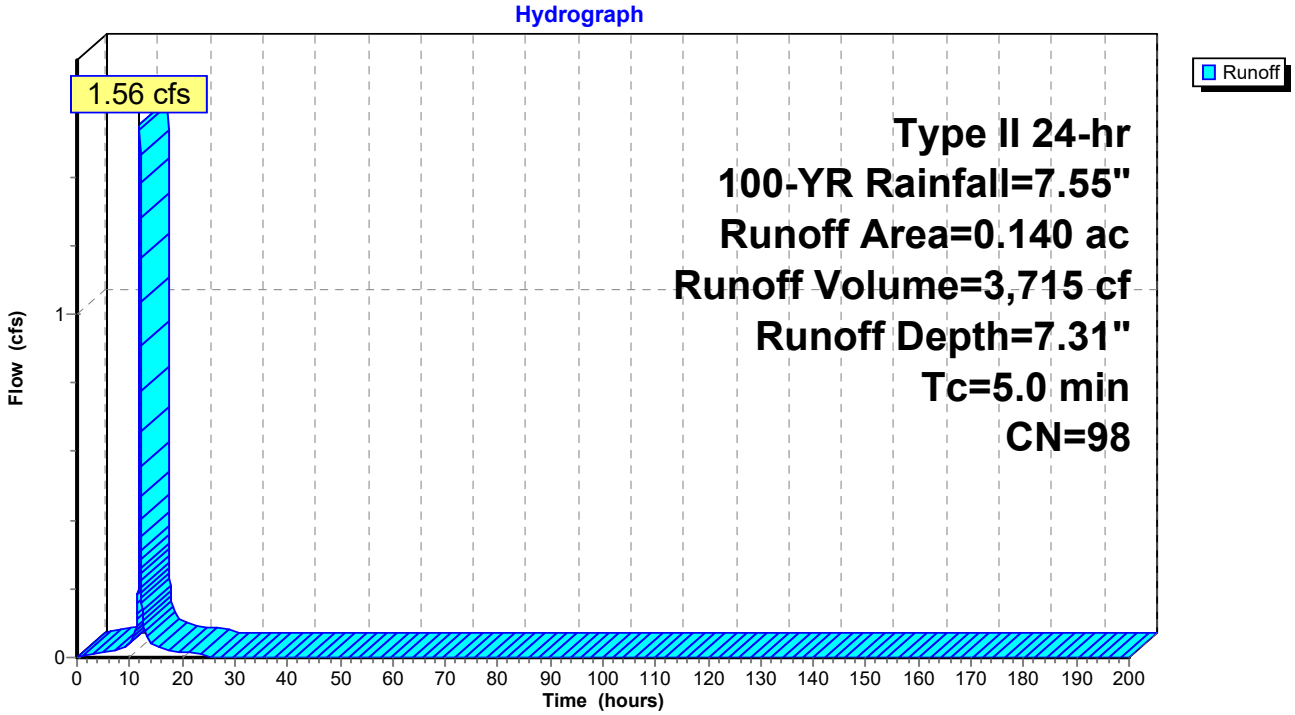
Runoff = 1.56 cfs @ 11.96 hrs, Volume= 3,715 cf, Depth= 7.31"
Routed to Link 20L : Post C Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.140	98	
	0.140		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 19S: Post C Bypass (Imp.)



Summary for Subcatchment 21S: Post B Bypass (Pervious)

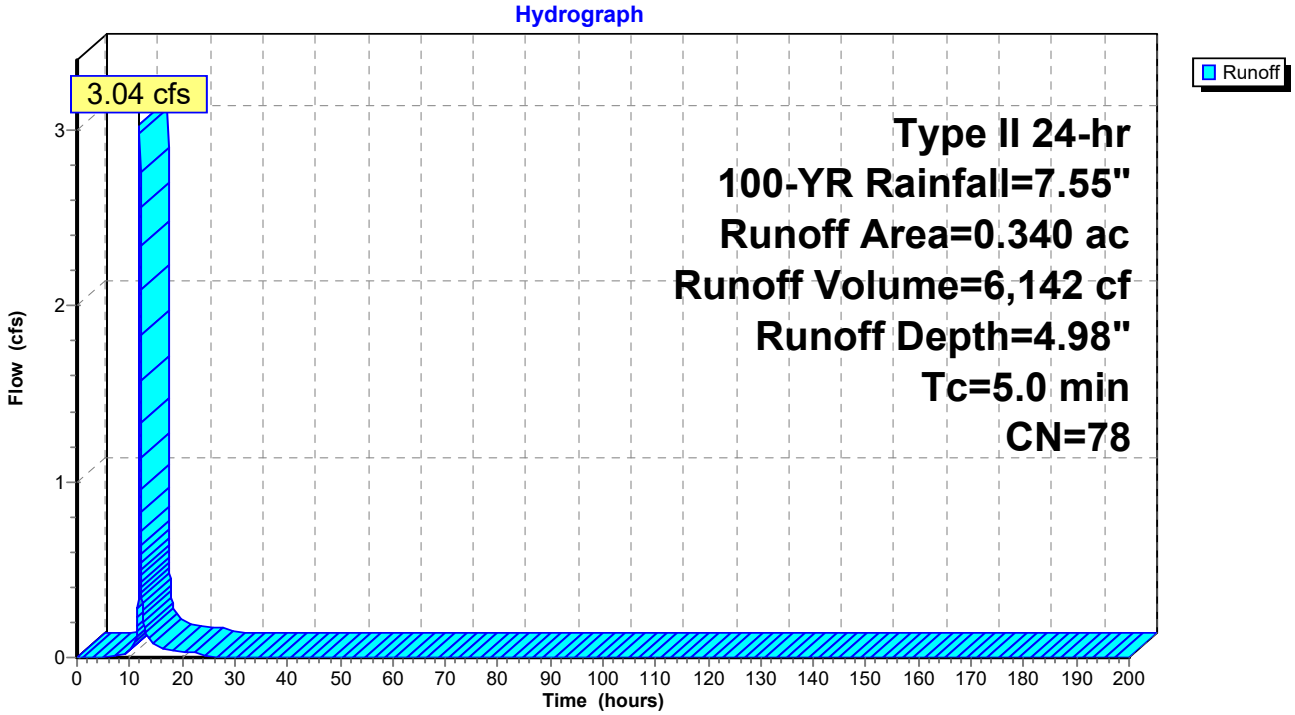
Runoff = 3.04 cfs @ 11.96 hrs, Volume= 6,142 cf, Depth= 4.98"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.340	78	
	0.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 21S: Post B Bypass (Pervious)



Summary for Subcatchment 22S: Post B Bypass (Imp.)

[40] Hint: Not Described (Area=0)

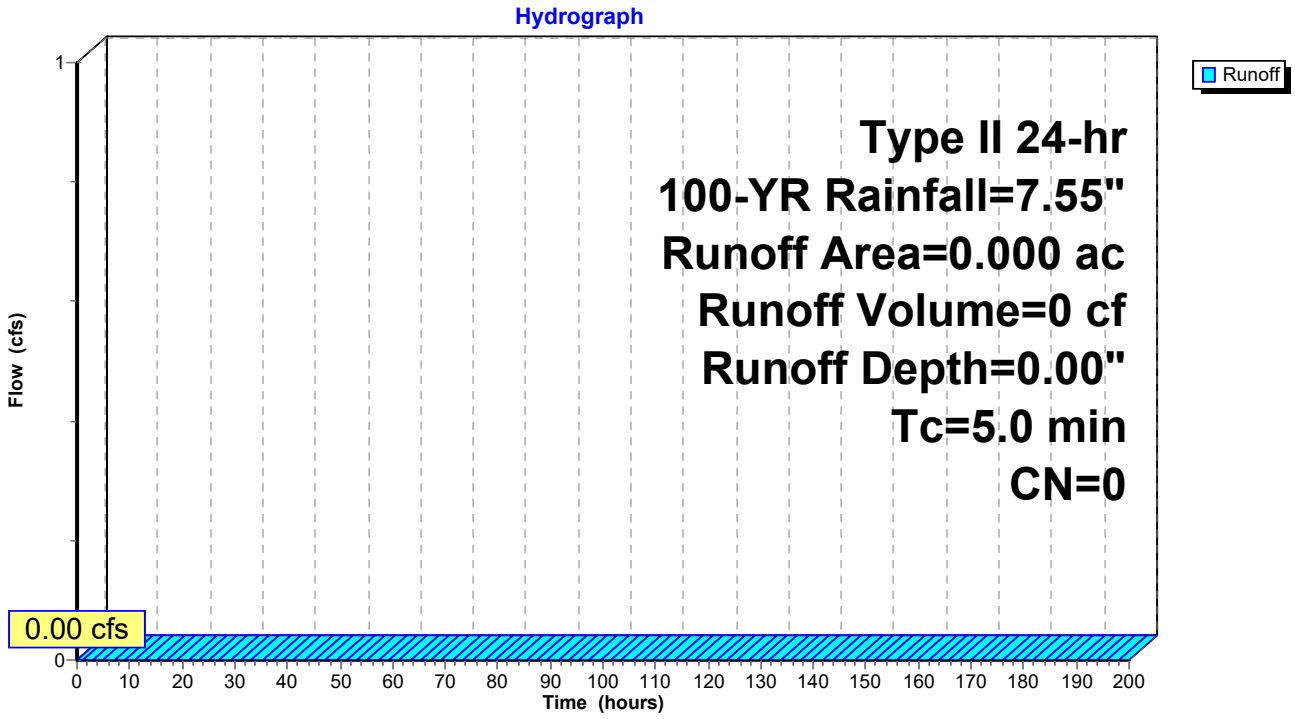
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 23L : Post B Bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.000	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 22S: Post B Bypass (Imp.)



Summary for Subcatchment 28S: Post A-1 Bypass (Pervious)

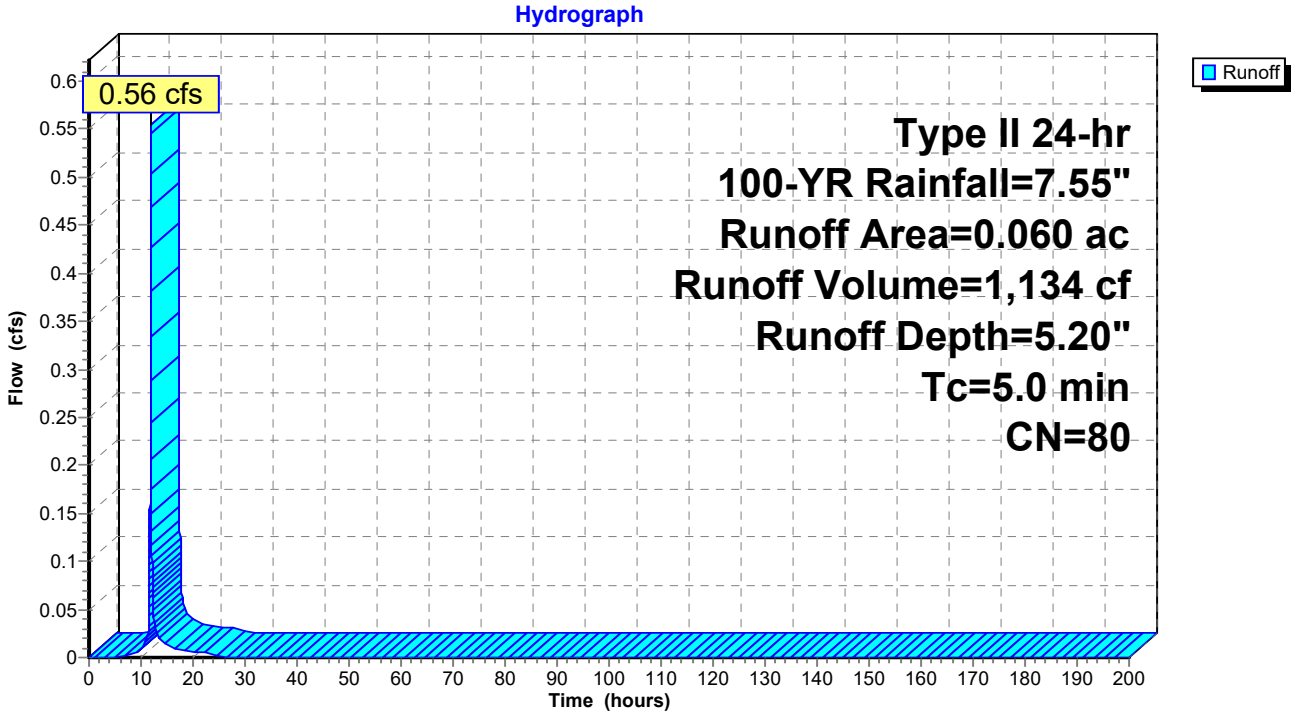
Runoff = 0.56 cfs @ 11.96 hrs, Volume= 1,134 cf, Depth= 5.20"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.060	80	
	0.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 28S: Post A-1 Bypass (Pervious)



Summary for Subcatchment 29S: Post A-1 Bypass (Imp.)

[40] Hint: Not Described (Area=0)

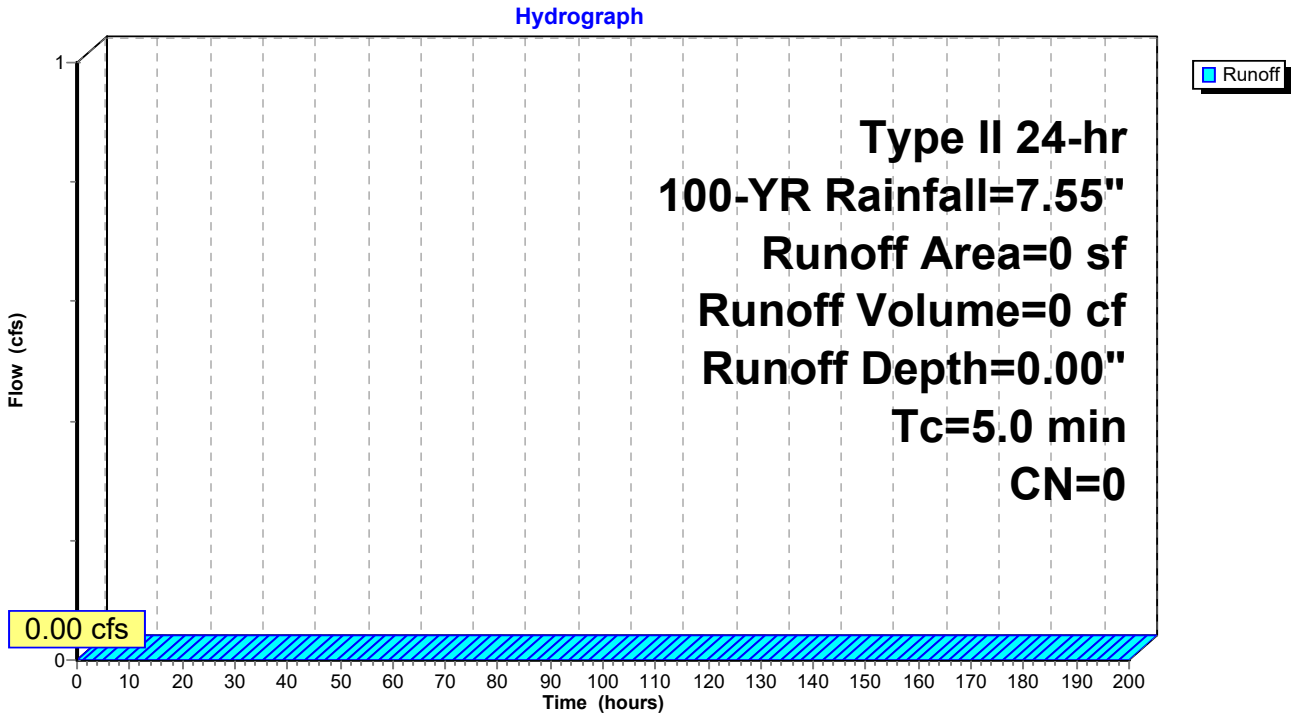
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 27L : Post POI A-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (sf)	CN	Description
*	0	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 29S: Post A-1 Bypass (Imp.)



Summary for Subcatchment 33S: To Basin 2 (Pervious)

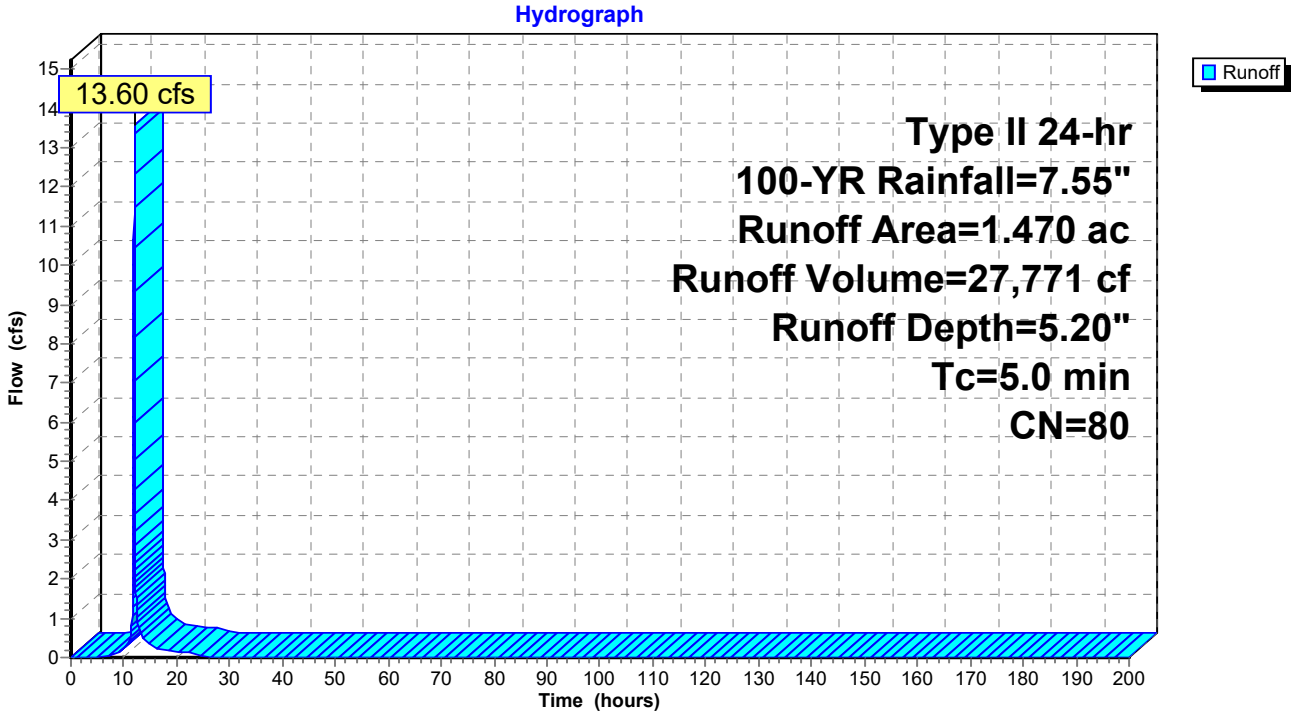
Runoff = 13.60 cfs @ 11.96 hrs, Volume= 27,771 cf, Depth= 5.20"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	1.470	80	
	1.470		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 33S: To Basin 2 (Pervious)



Summary for Subcatchment 34S: To Basin 2 (Imp.)

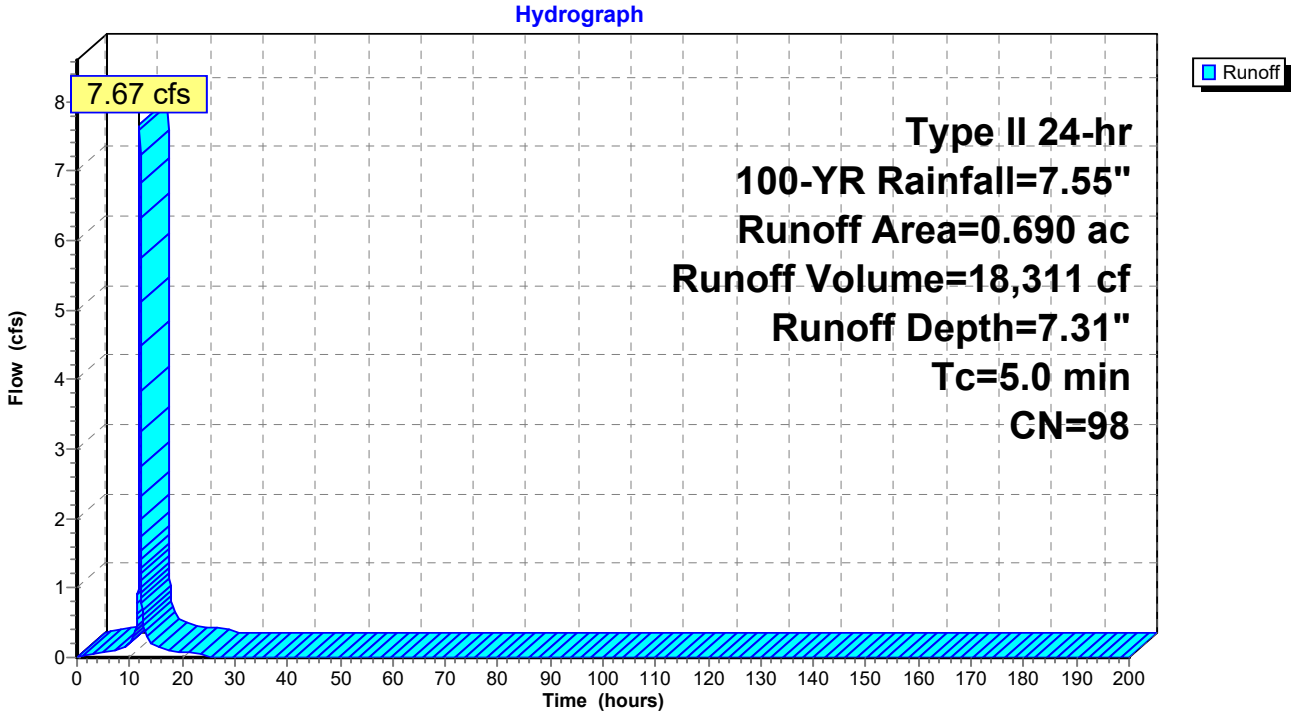
Runoff = 7.67 cfs @ 11.96 hrs, Volume= 18,311 cf, Depth= 7.31"
Routed to Pond 40P : Basin 2 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.690	98	
	0.690		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 34S: To Basin 2 (Imp.)



Summary for Subcatchment 35S: To Basin 1 (Pervious)

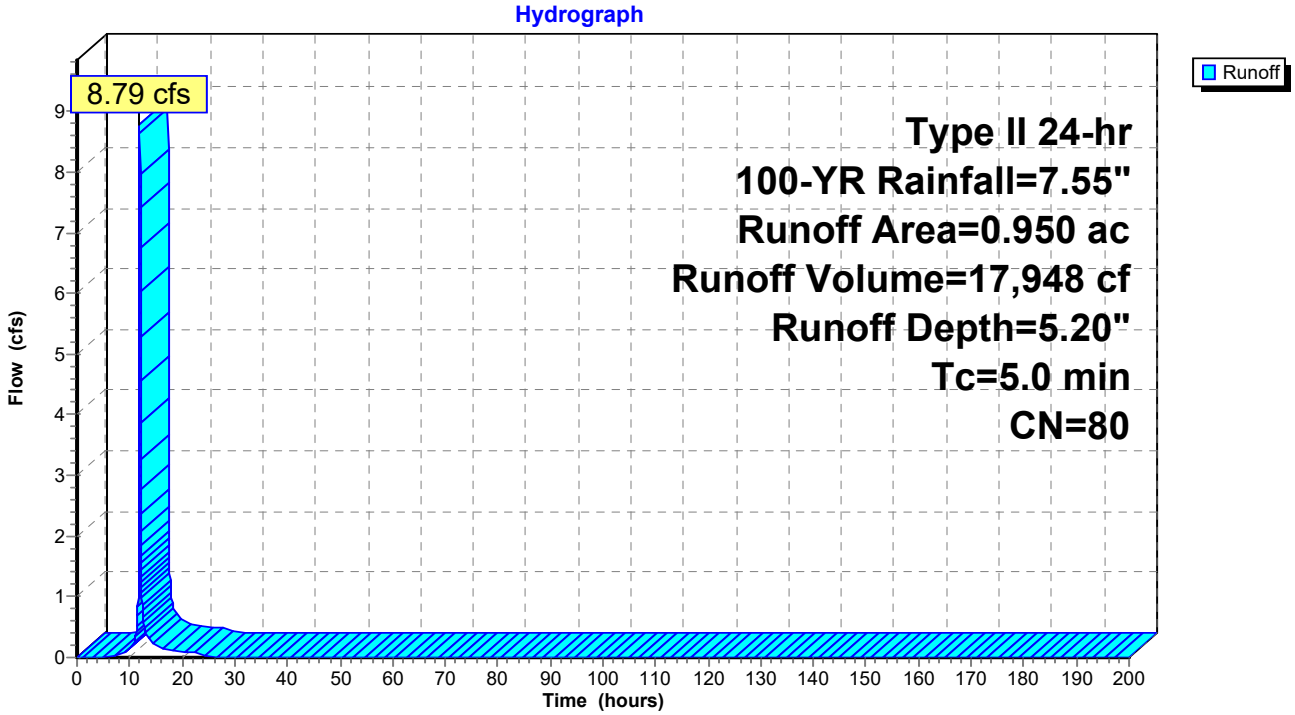
Runoff = 8.79 cfs @ 11.96 hrs, Volume= 17,948 cf, Depth= 5.20"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.950	80	
	0.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 35S: To Basin 1 (Pervious)



Summary for Subcatchment 36S: To Basin 1 (Imp.)

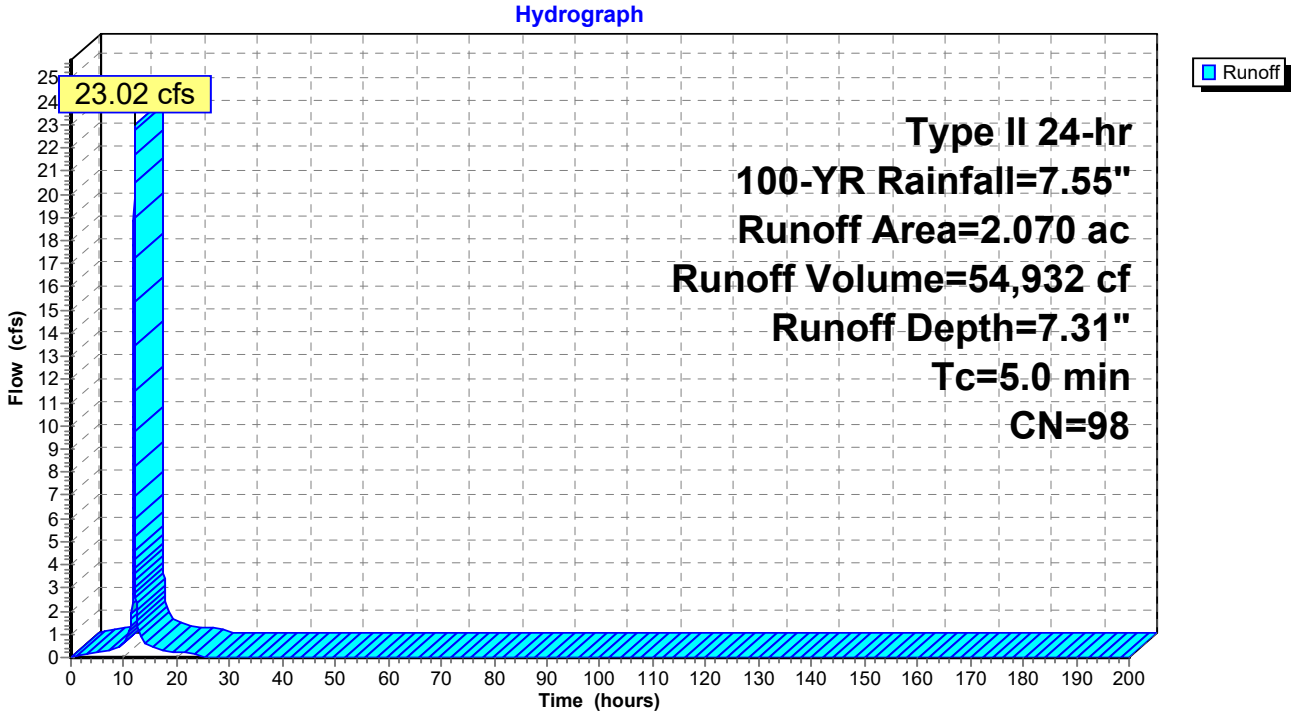
Runoff = 23.02 cfs @ 11.96 hrs, Volume= 54,932 cf, Depth= 7.31"
Routed to Pond 39P : Basin 1 (MRC)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	2.070	98	
	2.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct**

Subcatchment 36S: To Basin 1 (Imp.)



Summary for Subcatchment 37S: Post A Bypass (Pervious)

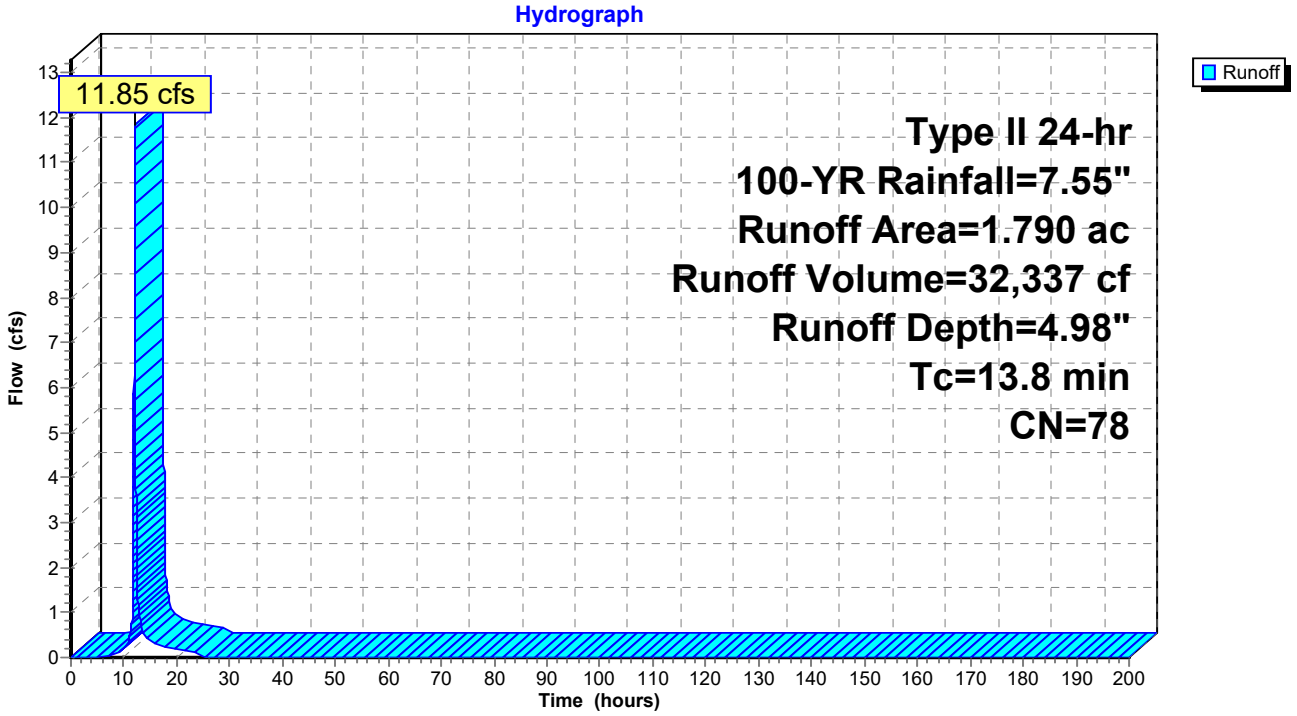
Runoff = 11.85 cfs @ 12.05 hrs, Volume= 32,337 cf, Depth= 4.98"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	1.790	78	
	1.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 37S: Post A Bypass (Pervious)



Summary for Subcatchment 38S: Post A Bypass (Imp.)

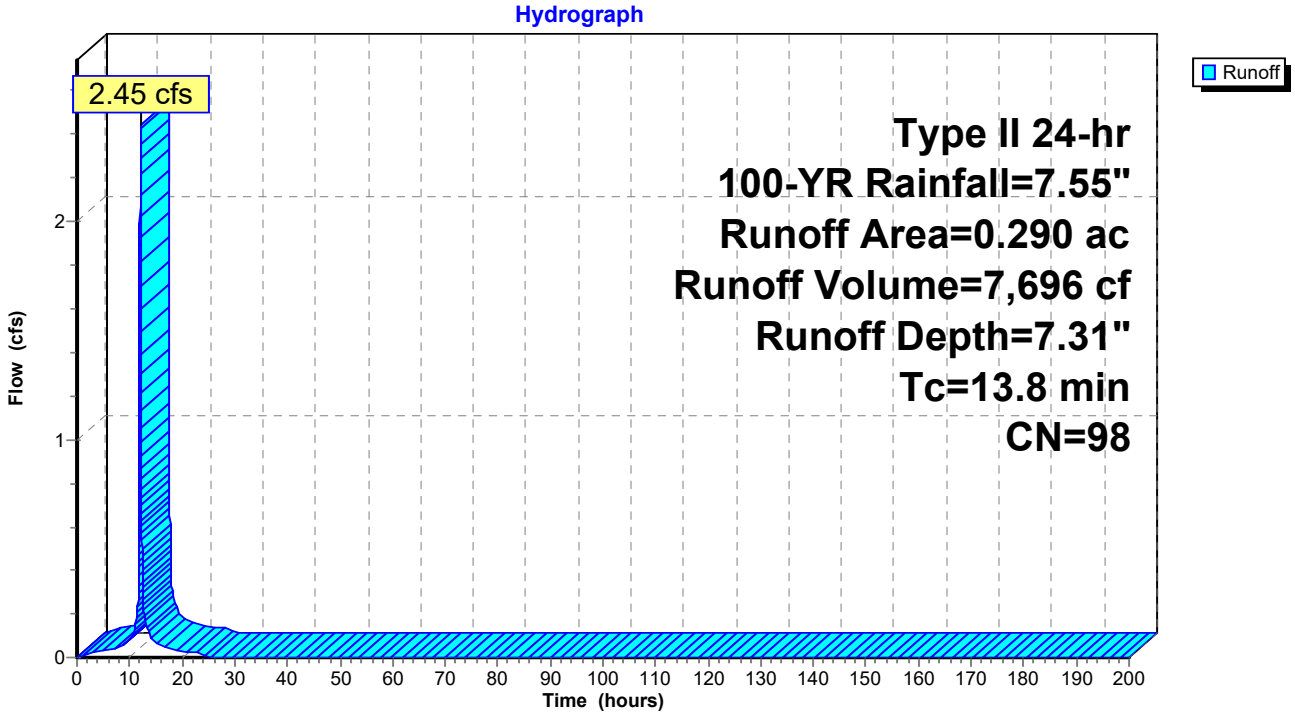
Runoff = 2.45 cfs @ 12.05 hrs, Volume= 7,696 cf, Depth= 7.31"
Routed to Link 26L : Culvert - POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-YR Rainfall=7.55"

	Area (ac)	CN	Description
*	0.290	98	
	0.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8					**Direct Entry, Direct**

Subcatchment 38S: Post A Bypass (Imp.)



Summary for Pond 39P: Basin 1 (MRC)

Inflow Area = 225,641 sf, 53.28% Impervious, Inflow Depth = 5.79" for 100-YR event
Inflow = 33.39 cfs @ 11.96 hrs, Volume= 108,916 cf
Outflow = 3.03 cfs @ 12.90 hrs, Volume= 106,342 cf, Atten= 91%, Lag= 56.3 min
Primary = 2.98 cfs @ 12.90 hrs, Volume= 91,374 cf
Routed to Link 27L : Post POI A-1
Secondary = 0.05 cfs @ 12.90 hrs, Volume= 14,968 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 367.73' @ 12.90 hrs Surf.Area= 13,702 sf Storage= 47,858 cf

Plug-Flow detention time= 649.1 min calculated for 106,342 cf (98% of inflow)
Center-of-Mass det. time= 634.8 min (1,456.0 - 821.2)

Volume	Invert	Avail.Storage	Storage Description
#1	361.00'	80,132 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

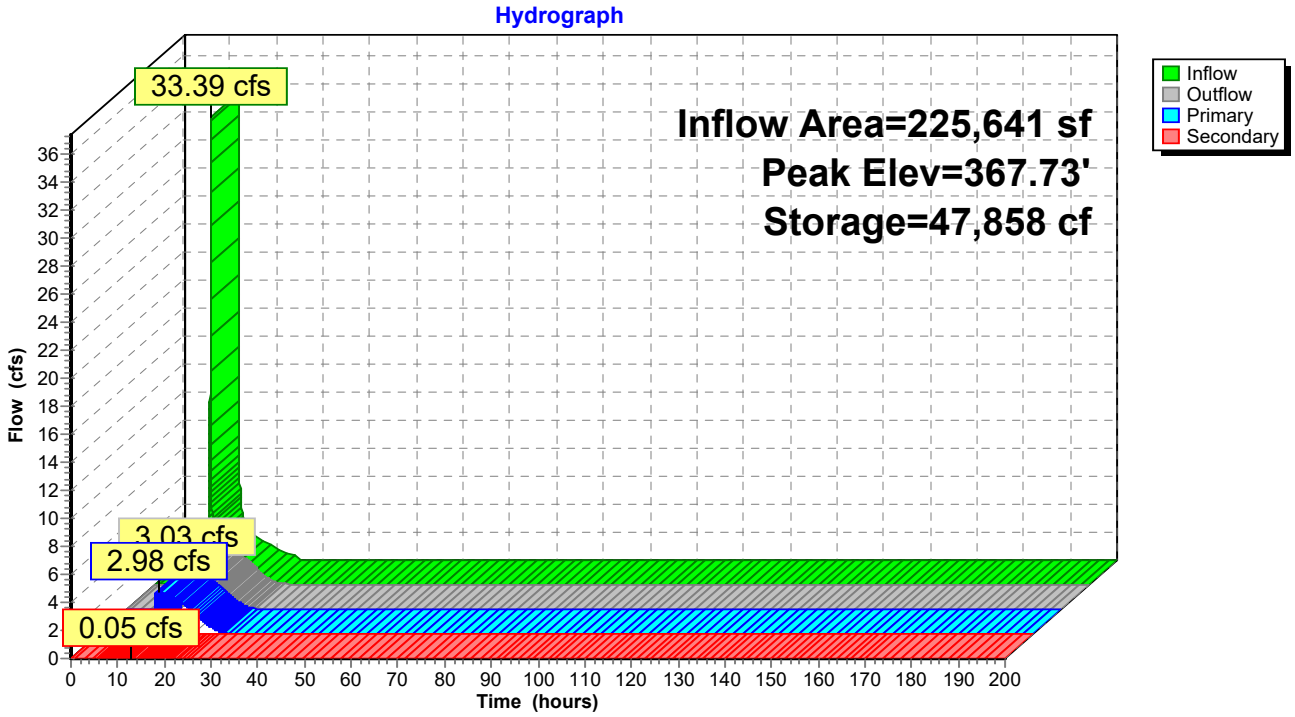
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
361.00	8,445	0.0	0	0	8,445
362.00	8,445	30.0	2,534	2,534	8,771
363.00	8,445	30.0	2,534	5,067	9,097
363.99	8,445	30.0	2,508	7,575	9,419
364.00	8,445	95.0	80	7,655	9,422
366.00	11,900	95.0	19,234	26,890	12,950
368.00	14,000	95.0	24,578	51,468	15,199
370.00	16,200	95.0	28,665	80,132	17,565

Device	Routing	Invert	Outlet Devices
#1	Primary	362.00'	**18.0" Round Culvert** L= 97.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 362.00' / 361.00' S= 0.0103 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	362.00'	**4.0" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#3	Device 2	362.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	364.75'	**9.0" W x 6.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.98 cfs @ 12.90 hrs HW=367.73' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 2.98 cfs of 18.68 cfs potential flow)
↑—**4=Orifice** (Orifice Controls 2.98 cfs @ 7.95 fps)

Secondary OutFlow Max=0.05 cfs @ 12.90 hrs HW=367.73' TW=0.00' (Dynamic Tailwater)
↑—**2=MRC Underdrain** (Passes 0.05 cfs of 0.99 cfs potential flow)
↑—**3=MRC Underdrain** (Orifice Controls 0.05 cfs @ 11.48 fps)

Pond 39P: Basin 1 (MRC)



Stage-Discharge for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
361.00	0.00	0.00	0.00
361.10	0.00	0.00	0.00
361.20	0.00	0.00	0.00
361.30	0.00	0.00	0.00
361.40	0.00	0.00	0.00
361.50	0.00	0.00	0.00
361.60	0.00	0.00	0.00
361.70	0.00	0.00	0.00
361.80	0.00	0.00	0.00
361.90	0.00	0.00	0.00
362.00	0.00	0.00	0.00
362.10	0.01	0.00	0.01
362.20	0.01	0.00	0.01
362.30	0.01	0.00	0.01
362.40	0.01	0.00	0.01
362.50	0.01	0.00	0.01
362.60	0.02	0.00	0.02
362.70	0.02	0.00	0.02
362.80	0.02	0.00	0.02
362.90	0.02	0.00	0.02
363.00	0.02	0.00	0.02
363.10	0.02	0.00	0.02
363.20	0.02	0.00	0.02
363.30	0.02	0.00	0.02
363.40	0.02	0.00	0.02
363.50	0.03	0.00	0.03
363.60	0.03	0.00	0.03
363.70	0.03	0.00	0.03
363.80	0.03	0.00	0.03
363.90	0.03	0.00	0.03
364.00	0.03	0.00	0.03
364.10	0.03	0.00	0.03
364.20	0.03	0.00	0.03
364.30	0.03	0.00	0.03
364.40	0.03	0.00	0.03
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.06	0.03	0.04
364.90	0.18	0.14	0.04
365.00	0.34	0.30	0.04
365.10	0.54	0.50	0.04
365.20	0.76	0.73	0.04
365.30	0.99	0.96	0.04
365.40	1.16	1.12	0.04
365.50	1.30	1.26	0.04
365.60	1.43	1.39	0.04
365.70	1.54	1.50	0.04
365.80	1.65	1.61	0.04
365.90	1.75	1.71	0.04
366.00	1.84	1.80	0.04
366.10	1.93	1.89	0.04
366.20	2.02	1.97	0.04
366.30	2.10	2.06	0.04
366.40	2.18	2.13	0.04
366.50	2.25	2.21	0.04
366.60	2.33	2.28	0.05
366.70	2.40	2.35	0.05
366.80	2.47	2.42	0.05
366.90	2.53	2.49	0.05
367.00	2.60	2.55	0.05
367.10	2.66	2.62	0.05
367.20	2.73	2.68	0.05
367.30	2.79	2.74	0.05
367.40	2.85	2.80	0.05
367.50	2.90	2.85	0.05
367.60	2.96	2.91	0.05
367.70	3.02	2.97	0.05
367.80	3.07	3.02	0.05
367.90	3.13	3.07	0.05
368.00	3.18	3.13	0.05
368.10	3.23	3.18	0.05
368.20	3.28	3.23	0.05
368.30	3.33	3.28	0.05
368.40	3.38	3.33	0.05
368.50	3.43	3.38	0.05
368.60	3.48	3.43	0.05
368.70	3.53	3.47	0.05
368.80	3.57	3.52	0.06
368.90	3.62	3.57	0.06
369.00	3.67	3.61	0.06
369.10	3.71	3.66	0.06
369.20	3.76	3.70	0.06
369.30	3.80	3.74	0.06
369.40	3.84	3.79	0.06
369.50	3.89	3.83	0.06
369.60	3.93	3.87	0.06
369.70	3.97	3.91	0.06
369.80	4.01	3.96	0.06
369.90	4.06	4.00	0.06
370.00	**4.10**	**4.04**	**0.06**

Stage-Area-Storage for Pond 39P: Basin 1 (MRC)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
361.00	8,445	0
361.10	8,445	253
361.20	8,445	507
361.30	8,445	760
361.40	8,445	1,013
361.50	8,445	1,267
361.60	8,445	1,520
361.70	8,445	1,773
361.80	8,445	2,027
361.90	8,445	2,280
362.00	8,445	2,534
362.10	8,445	2,787
362.20	8,445	3,040
362.30	8,445	3,294
362.40	8,445	3,547
362.50	8,445	3,800
362.60	8,445	4,054
362.70	8,445	4,307
362.80	8,445	4,560
362.90	8,445	4,814
363.00	8,445	5,067
363.10	8,445	5,320
363.20	8,445	5,574
363.30	8,445	5,827
363.40	8,445	6,080
363.50	8,445	6,334
363.60	8,445	6,587
363.70	8,445	6,840
363.80	8,445	7,094
363.90	8,445	7,347
364.00	8,445	7,655
364.10	8,604	8,465
364.20	8,764	9,290
364.30	8,926	10,130
364.40	9,089	10,986
364.50	9,253	11,857
364.60	9,419	12,744
364.70	9,587	13,647
364.80	9,756	14,566
364.90	9,927	15,501
365.00	10,099	16,452
365.10	10,272	17,420
365.20	10,447	18,404
365.30	10,624	19,405
365.40	10,801	20,422
365.50	10,981	21,457
365.60	11,162	22,509
365.70	11,344	23,578
365.80	11,528	24,664
365.90	11,713	25,768
366.00	11,900	26,890
366.10	12,001	28,025
366.20	12,102	29,170
366.30	12,204	30,324
366.40	12,306	31,489
366.50	12,409	32,663
366.60	12,512	33,846
366.70	12,616	35,040
366.80	12,720	36,243
366.90	12,824	37,457
367.00	12,929	38,680
367.10	13,034	39,913
367.20	13,140	41,156
367.30	13,246	42,410
367.40	13,352	43,673
367.50	13,459	44,946
367.60	13,566	46,230
367.70	13,674	47,524
367.80	13,782	48,828
367.90	13,891	50,143
368.00	14,000	51,468
368.10	14,106	52,803
368.20	14,213	54,148
368.30	14,320	55,503
368.40	14,427	56,869
368.50	14,535	58,244
368.60	14,643	59,630
368.70	14,752	61,026
368.80	14,861	62,433
368.90	14,970	63,850
369.00	15,080	65,277
369.10	15,190	66,715
369.20	15,301	68,163
369.30	15,412	69,622
369.40	15,523	71,092
369.50	15,635	72,572
369.60	15,747	74,062
369.70	15,860	75,564
369.80	15,973	77,076
369.90	16,086	78,599
370.00	**16,200**	**80,132**

Summary for Pond 40P: Basin 2 (MRC)

Inflow Area = 94,090 sf, 31.94% Impervious, Inflow Depth = 5.88" for 100-YR event
Inflow = 21.27 cfs @ 11.96 hrs, Volume= 46,082 cf
Outflow = 1.69 cfs @ 12.04 hrs, Volume= 45,243 cf, Atten= 92%, Lag= 4.8 min
Primary = 1.64 cfs @ 12.04 hrs, Volume= 36,036 cf
Routed to Pond 39P : Basin 1 (MRC)
Secondary = 0.05 cfs @ 12.50 hrs, Volume= 9,206 cf
Routed to Link 27L : Post POI A-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs
Peak Elev= 368.62' @ 12.50 hrs Surf.Area= 7,221 sf Storage= 25,962 cf

Plug-Flow detention time= 573.7 min calculated for 45,243 cf (98% of inflow)
Center-of-Mass det. time= 562.0 min (1,337.6 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1	362.00'	36,002 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

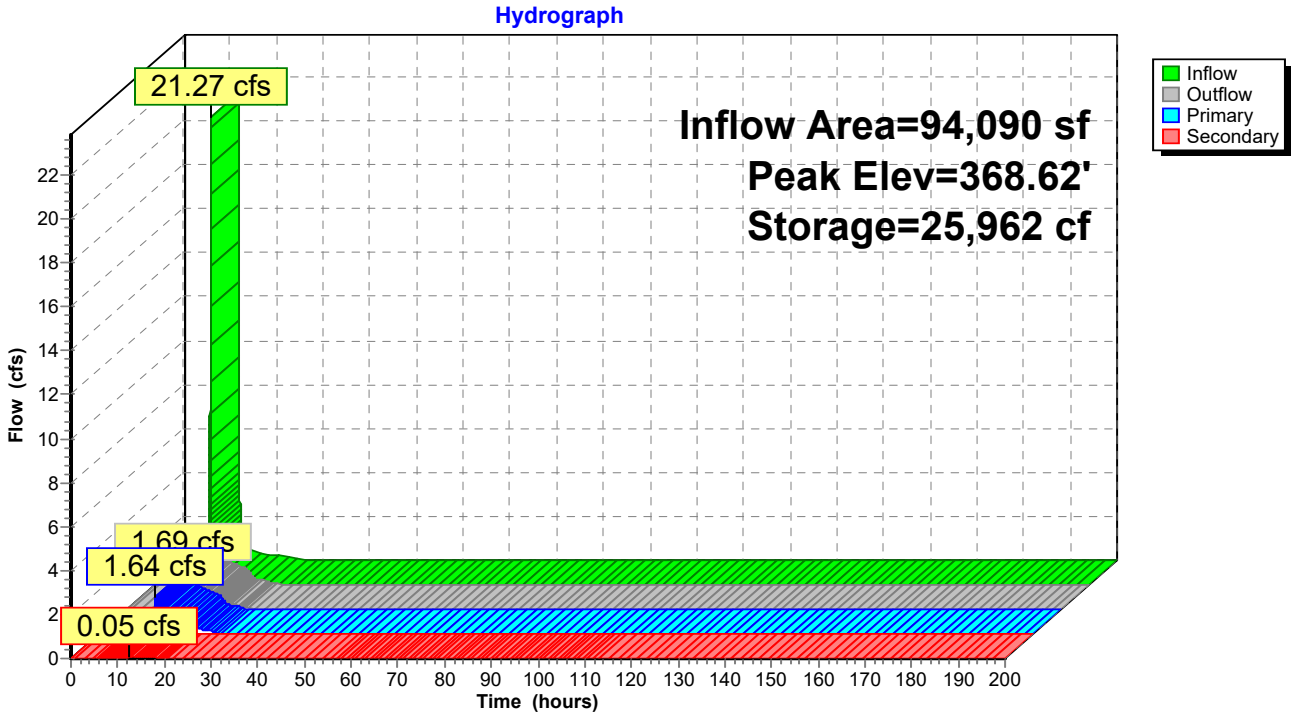
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
362.00	5,550	0.0	0	0	5,550
363.00	5,550	15.0	833	833	5,814
364.00	5,550	30.0	1,665	2,498	6,078
364.99	5,550	30.0	1,648	4,146	6,340
365.00	5,550	95.0	53	4,199	6,342
366.00	5,965	95.0	5,468	9,667	6,837
368.00	6,830	95.0	12,146	21,813	7,871
370.00	8,125	95.0	14,189	36,002	9,303

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	**18.0" Round Culvert** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Secondary	363.00'	**4.0" Round Culvert for MRC** L= 80.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 363.00' / 362.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#3	Device 2	363.00'	**0.9" Vert. MRC Underdrain** C= 0.600 Limited to weir flow at low heads
#4	Device 1	365.60'	**12.0" W x 4.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.60 cfs @ 12.04 hrs HW=368.27' TW=367.28' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.60 cfs of 8.47 cfs potential flow)
↑**4=Orifice** (Orifice Controls 1.60 cfs @ 4.79 fps)

Secondary OutFlow Max=0.05 cfs @ 12.50 hrs HW=368.62' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert for MRC** (Passes 0.05 cfs of 0.54 cfs potential flow)
↑**3=MRC Underdrain** (Orifice Controls 0.05 cfs @ 11.38 fps)

Pond 40P: Basin 2 (MRC)



Stage-Discharge for Pond 40P: Basin 2 (MRC)

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
362.00	0.00	0.00	0.00
362.10	0.00	0.00	0.00
362.20	0.00	0.00	0.00
362.30	0.00	0.00	0.00
362.40	0.00	0.00	0.00
362.50	0.00	0.00	0.00
362.60	0.00	0.00	0.00
362.70	0.00	0.00	0.00
362.80	0.00	0.00	0.00
362.90	0.00	0.00	0.00
363.00	0.00	0.00	0.00
363.10	0.01	0.00	0.01
363.20	0.01	0.00	0.01
363.30	0.01	0.00	0.01
363.40	0.01	0.00	0.01
363.50	0.01	0.00	0.01
363.60	0.02	0.00	0.02
363.70	0.02	0.00	0.02
363.80	0.02	0.00	0.02
363.90	0.02	0.00	0.02
364.00	0.02	0.00	0.02
364.10	0.02	0.00	0.02
364.20	0.02	0.00	0.02
364.30	0.02	0.00	0.02
364.40	0.02	0.00	0.02
364.50	0.03	0.00	0.03
364.60	0.03	0.00	0.03
364.70	0.03	0.00	0.03
364.80	0.03	0.00	0.03
364.90	0.03	0.00	0.03
365.00	0.03	0.00	0.03
365.10	0.03	0.00	0.03
365.20	0.03	0.00	0.03
365.30	0.03	0.00	0.03
365.40	0.03	0.00	0.03
365.50	0.03	0.00	0.03
365.60	0.03	0.00	0.03
365.70	0.14	0.10	0.03
365.80	0.32	0.29	0.04
365.90	0.56	0.53	0.04
366.00	0.79	0.76	0.04
366.10	0.95	0.92	0.04
366.20	1.09	1.05	0.04
366.30	1.21	1.17	0.04
366.40	1.31	1.27	0.04
366.50	1.41	1.37	0.04
366.60	1.50	1.46	0.04
366.70	1.59	1.55	0.04
366.80	1.67	1.63	0.04
366.90	1.75	1.71	0.04
367.00	1.82	1.78	0.04
367.10	1.89	1.85	0.04
367.20	1.96	1.92	0.04
367.30	2.03	1.99	0.04
367.40	2.09	2.05	0.04
367.50	2.16	2.11	0.04
367.60	2.22	2.17	0.05
367.70	2.28	2.23	0.05
367.80	2.33	2.29	0.05
367.90	2.39	2.34	0.05
368.00	2.45	2.40	0.05
368.10	2.50	2.45	0.05
368.20	2.55	2.50	0.05
368.30	2.60	2.55	0.05
368.40	2.65	2.60	0.05
368.50	2.70	2.65	0.05
368.60	2.75	2.70	0.05
368.70	2.80	2.75	0.05
368.80	2.85	2.79	0.05
368.90	2.89	2.84	0.05
369.00	2.94	2.89	0.05
369.10	2.98	2.93	0.05
369.20	3.03	2.97	0.05
369.30	3.07	3.02	0.05
369.40	3.11	3.06	0.05
369.50	3.15	3.10	0.05
369.60	3.20	3.14	0.05
369.70	3.24	3.18	0.05
369.80	3.28	3.22	0.06
369.90	3.32	3.26	0.06
370.00	**3.36**	**3.30**	**0.06**

Stage-Area-Storage for Pond 40P: Basin 2 (MRC)

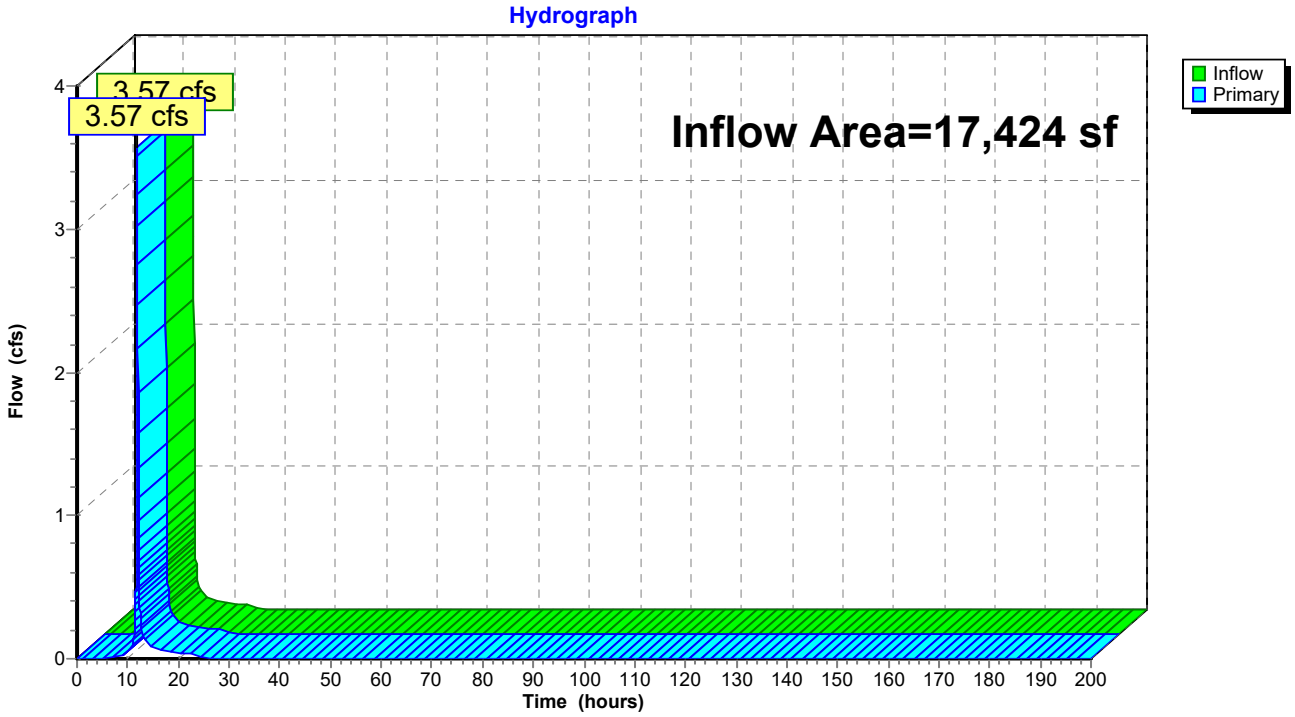
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
362.00	5,550	0
362.10	5,550	83
362.20	5,550	166
362.30	5,550	250
362.40	5,550	333
362.50	5,550	416
362.60	5,550	500
362.70	5,550	583
362.80	5,550	666
362.90	5,550	749
363.00	5,550	833
363.10	5,550	999
363.20	5,550	1,165
363.30	5,550	1,332
363.40	5,550	1,498
363.50	5,550	1,665
363.60	5,550	1,832
363.70	5,550	1,998
363.80	5,550	2,165
363.90	5,550	2,331
364.00	5,550	2,498
364.10	5,550	2,664
364.20	5,550	2,830
364.30	5,550	2,997
364.40	5,550	3,163
364.50	5,550	3,330
364.60	5,550	3,497
364.70	5,550	3,663
364.80	5,550	3,830
364.90	5,550	3,996
365.00	5,550	4,199
365.10	5,591	4,728
365.20	5,632	5,261
365.30	5,673	5,798
365.40	5,714	6,339
365.50	5,756	6,884
365.60	5,797	7,432
365.70	5,839	7,985
365.80	5,881	8,542
365.90	5,923	9,102
366.00	5,965	9,667
366.10	6,007	10,236
366.20	6,049	10,808
366.30	6,091	11,385
366.40	6,133	11,966
366.50	6,176	12,550
366.60	6,218	13,139
366.70	6,261	13,732
366.80	6,304	14,329
366.90	6,347	14,930
367.00	6,390	15,535
367.10	6,434	16,144
367.20	6,477	16,757
367.30	6,521	17,374
367.40	6,564	17,996
367.50	6,608	18,622
367.60	6,652	19,251
367.70	6,697	19,885
367.80	6,741	20,524
367.90	6,785	21,166
368.00	6,830	21,813
368.10	6,892	22,465
368.20	6,954	23,123
368.30	7,017	23,786
368.40	7,080	24,456
368.50	7,143	25,131
368.60	7,207	25,813
368.70	7,270	26,501
368.80	7,335	27,194
368.90	7,399	27,894
369.00	7,463	28,600
369.10	7,528	29,312
369.20	7,594	30,031
369.30	7,659	30,755
369.40	7,725	31,486
369.50	7,791	32,223
369.60	7,857	32,966
369.70	7,924	33,716
369.80	7,990	34,472
369.90	8,058	35,234
370.00	**8,125**	**36,002**

Summary for Link 6L: Pre B (Bypass)

Inflow Area = 17,424 sf, 0.00% Impervious, Inflow Depth = 4.98" for 100-YR event
Inflow = 3.57 cfs @ 11.96 hrs, Volume= 7,226 cf
Primary = 3.57 cfs @ 11.96 hrs, Volume= 7,226 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 6L: Pre B (Bypass)

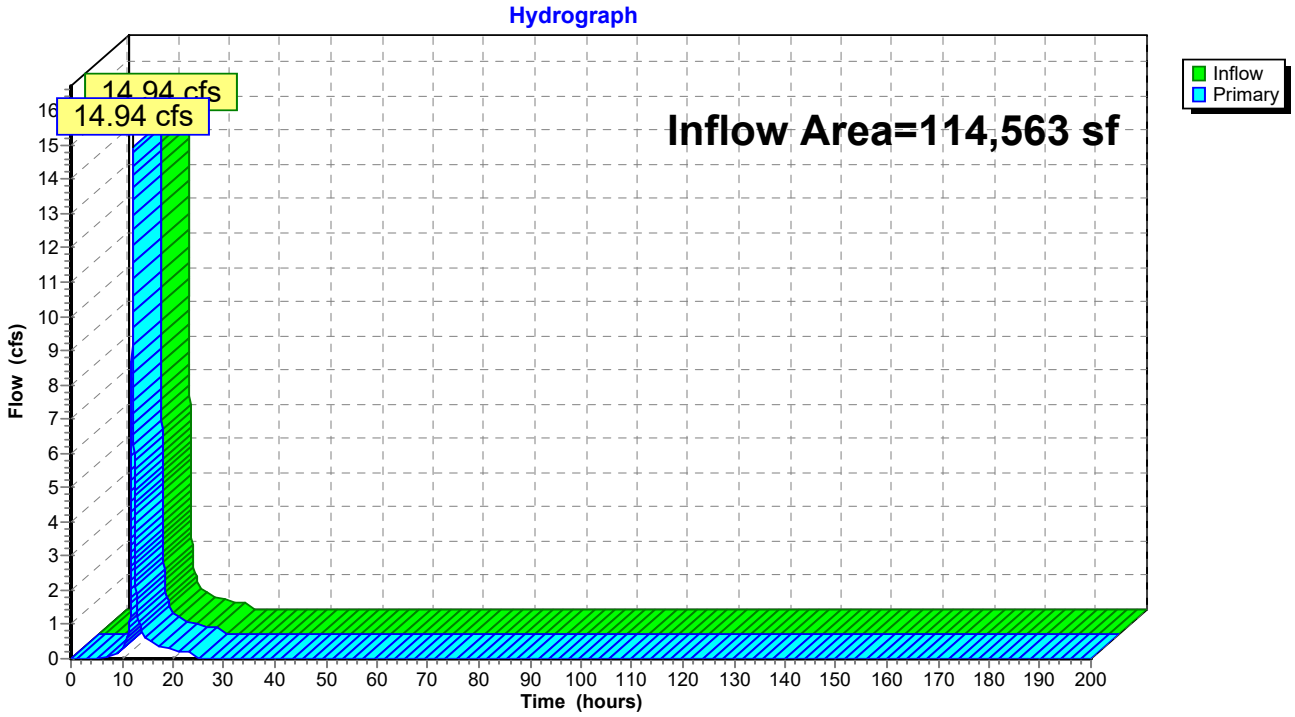


Summary for Link 9L: Pre C (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 5.02" for 100-YR event
Inflow = 14.94 cfs @ 12.12 hrs, Volume= 47,935 cf
Primary = 14.94 cfs @ 12.12 hrs, Volume= 47,935 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 9L: Pre C (Bypass)

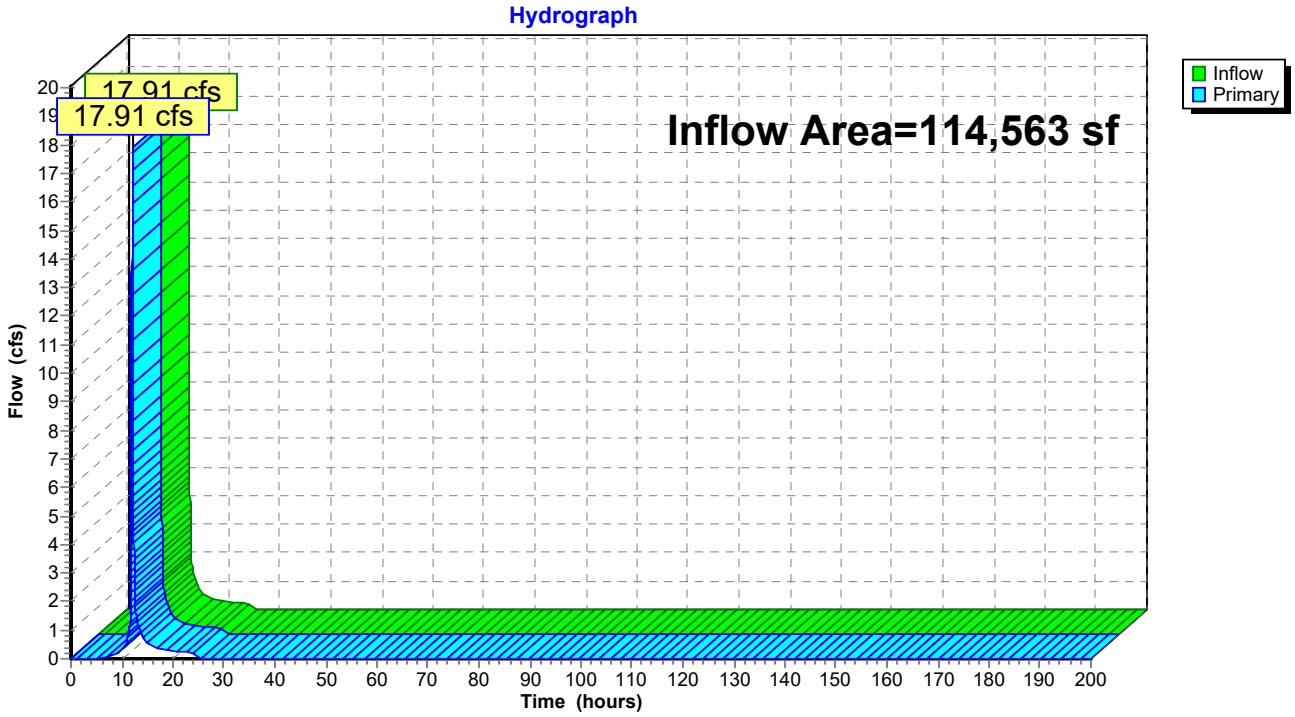


Summary for Link 12L: Pre D (Bypass)

Inflow Area = 114,563 sf, 1.90% Impervious, Inflow Depth = 5.02" for 100-YR event
Inflow = 17.91 cfs @ 12.05 hrs, Volume= 47,935 cf
Primary = 17.91 cfs @ 12.05 hrs, Volume= 47,935 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 12L: Pre D (Bypass)

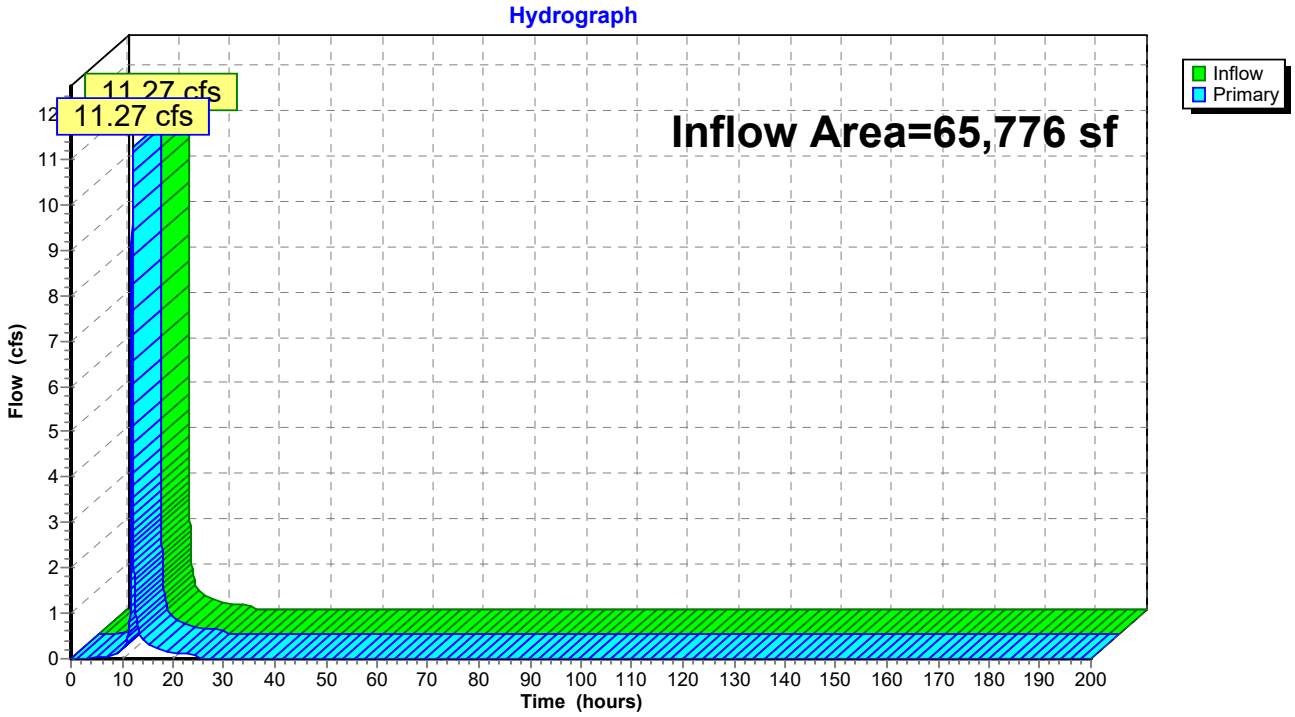


Summary for Link 17L: Post D Bypass

Inflow Area = 65,776 sf, 16.56% Impervious, Inflow Depth = 5.36" for 100-YR event
Inflow = 11.27 cfs @ 12.03 hrs, Volume= 29,396 cf
Primary = 11.27 cfs @ 12.03 hrs, Volume= 29,396 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 17L: Post D Bypass

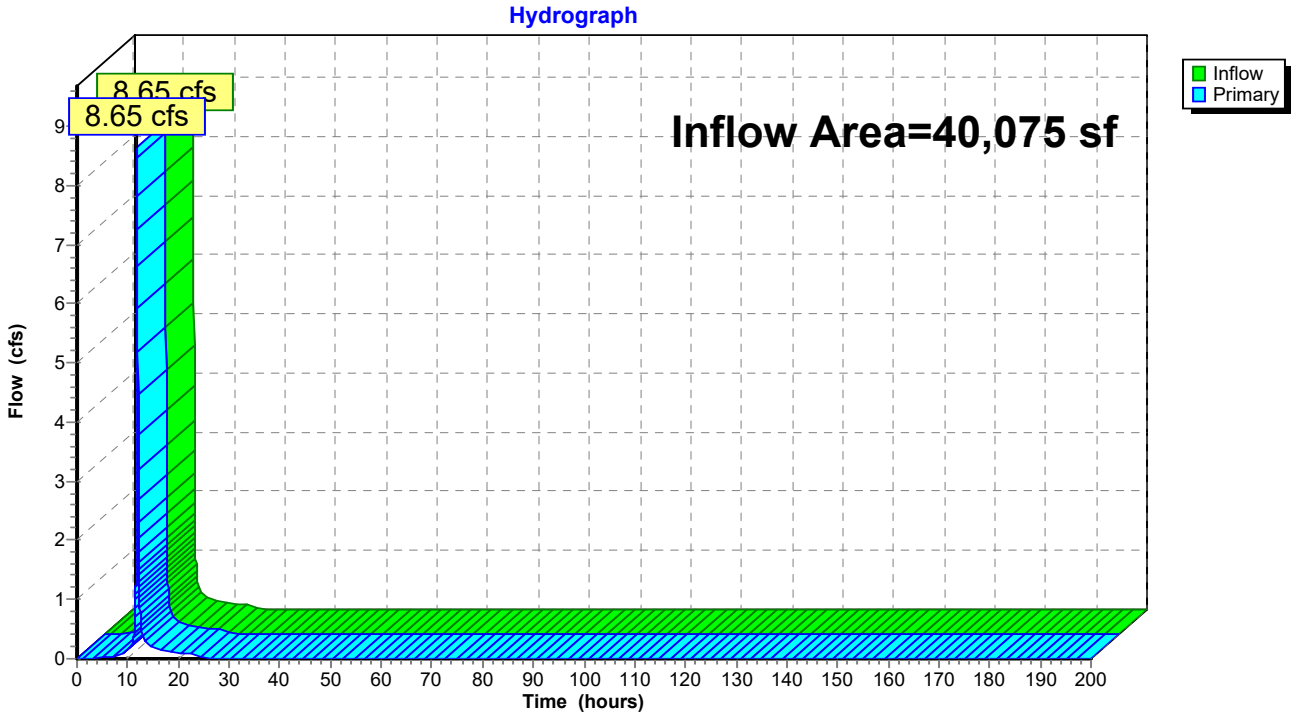


Summary for Link 20L: Post C Bypass

Inflow Area = 40,075 sf, 15.22% Impervious, Inflow Depth = 5.43" for 100-YR event
Inflow = 8.65 cfs @ 11.96 hrs, Volume= 18,128 cf
Primary = 8.65 cfs @ 11.96 hrs, Volume= 18,128 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 20L: Post C Bypass

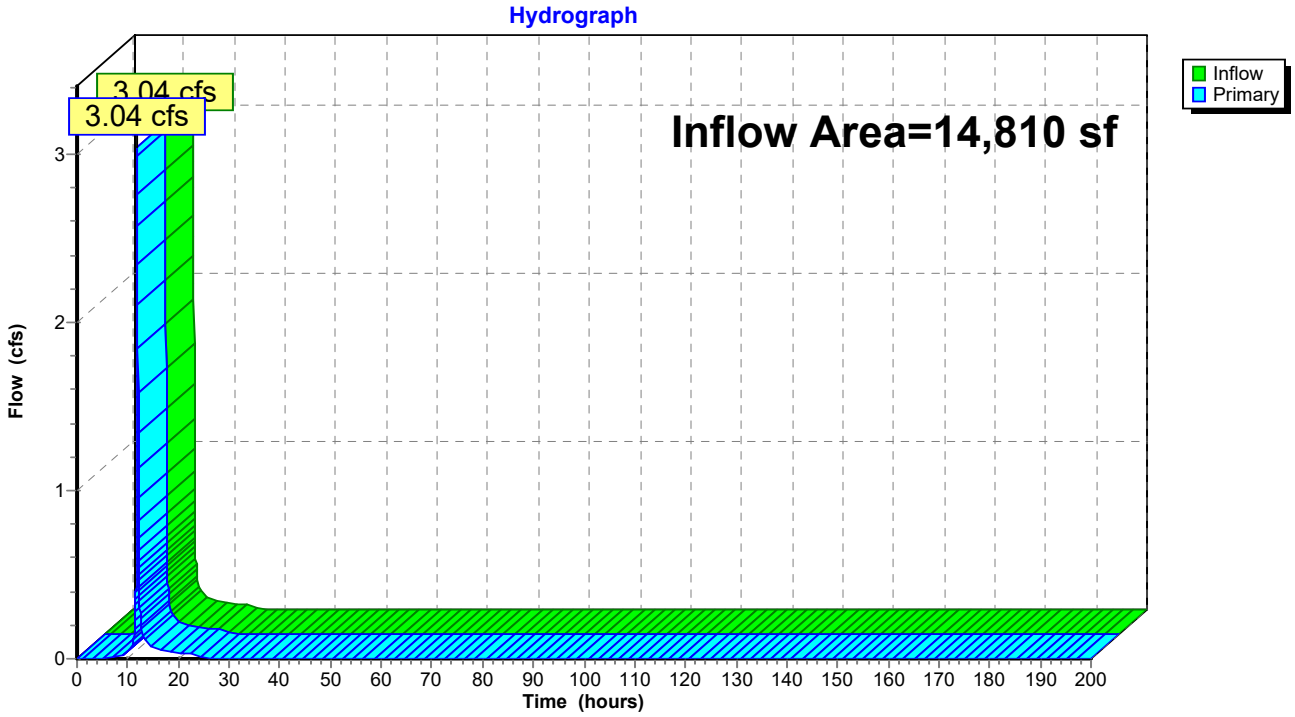


Summary for Link 23L: Post B Bypass

Inflow Area = 14,810 sf, 0.00% Impervious, Inflow Depth = 4.98" for 100-YR event
Inflow = 3.04 cfs @ 11.96 hrs, Volume= 6,142 cf
Primary = 3.04 cfs @ 11.96 hrs, Volume= 6,142 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 23L: Post B Bypass

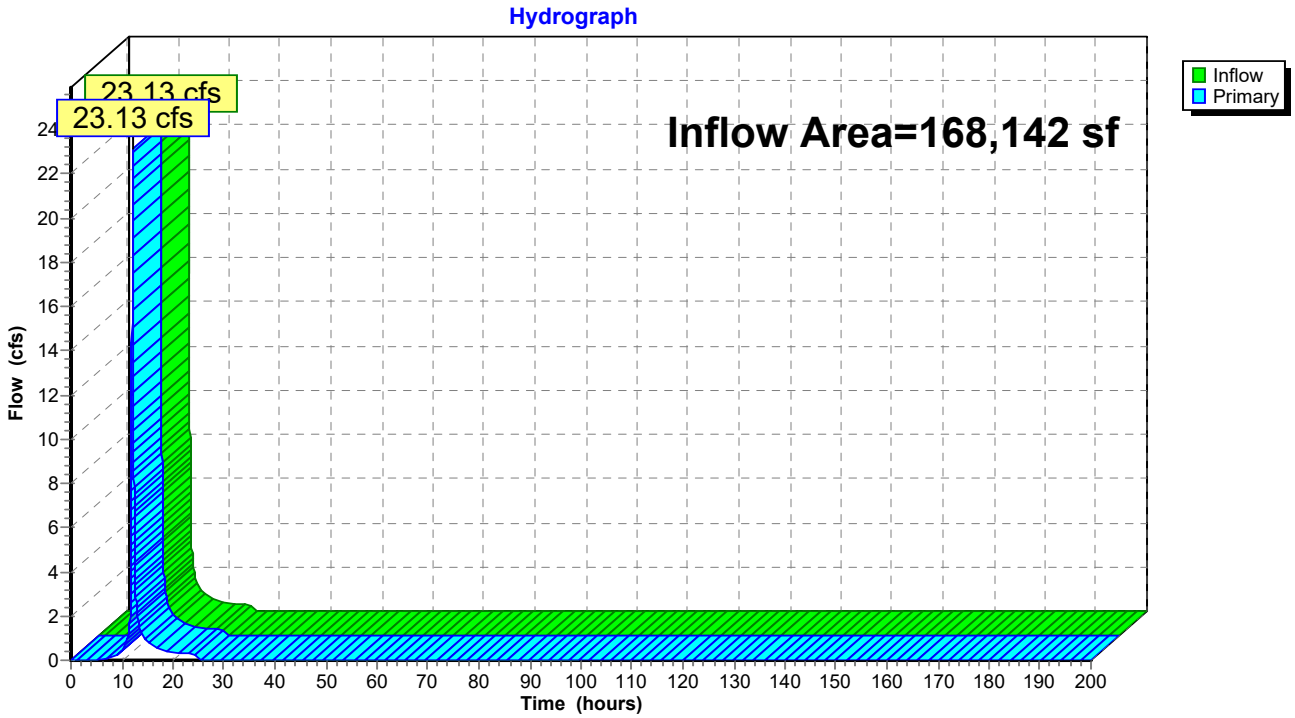


Summary for Link 24L: Culvert - PRE

Inflow Area = 168,142 sf, 5.18% Impervious, Inflow Depth = 5.10" for 100-YR event
Inflow = 23.13 cfs @ 12.09 hrs, Volume= 71,426 cf
Primary = 23.13 cfs @ 12.09 hrs, Volume= 71,426 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 25L : To CTP Ex. Basin - PRE

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 24L: Culvert - PRE

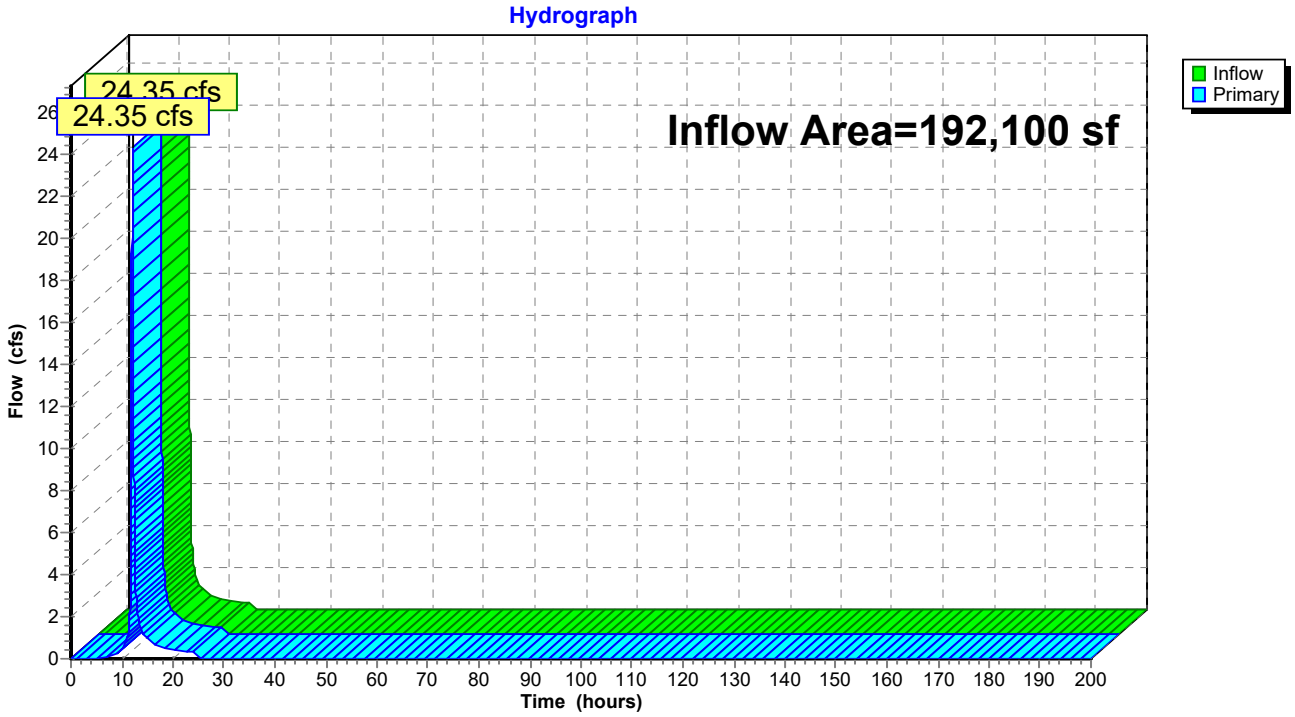


Summary for Link 25L: To CTP Ex. Basin - PRE

Inflow Area = 192,100 sf, 4.54% Impervious, Inflow Depth = 5.08" for 100-YR event
Inflow = 24.35 cfs @ 12.08 hrs, Volume= 81,362 cf
Primary = 24.35 cfs @ 12.08 hrs, Volume= 81,362 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 25L: To CTP Ex. Basin - PRE

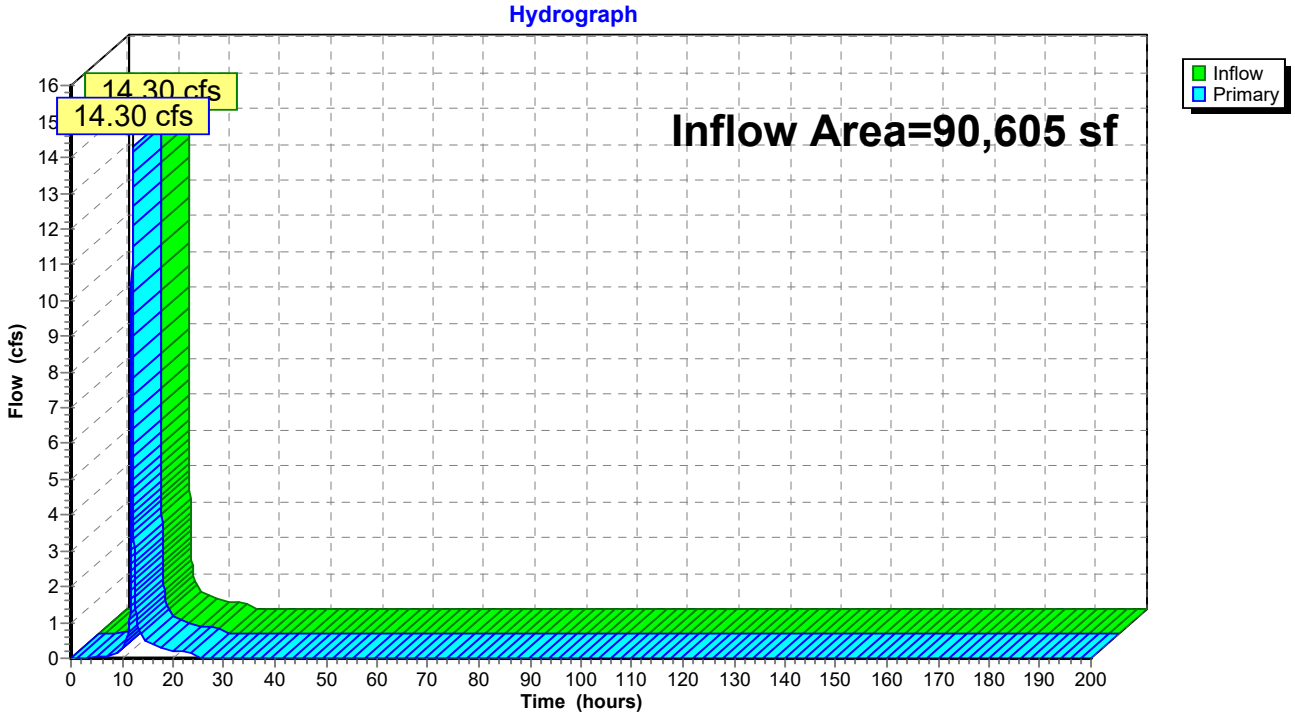


Summary for Link 26L: Culvert - POST

Inflow Area = 90,605 sf, 13.94% Impervious, Inflow Depth = 5.30" for 100-YR event
Inflow = 14.30 cfs @ 12.05 hrs, Volume= 40,032 cf
Primary = 14.30 cfs @ 12.05 hrs, Volume= 40,032 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 26L: Culvert - POST

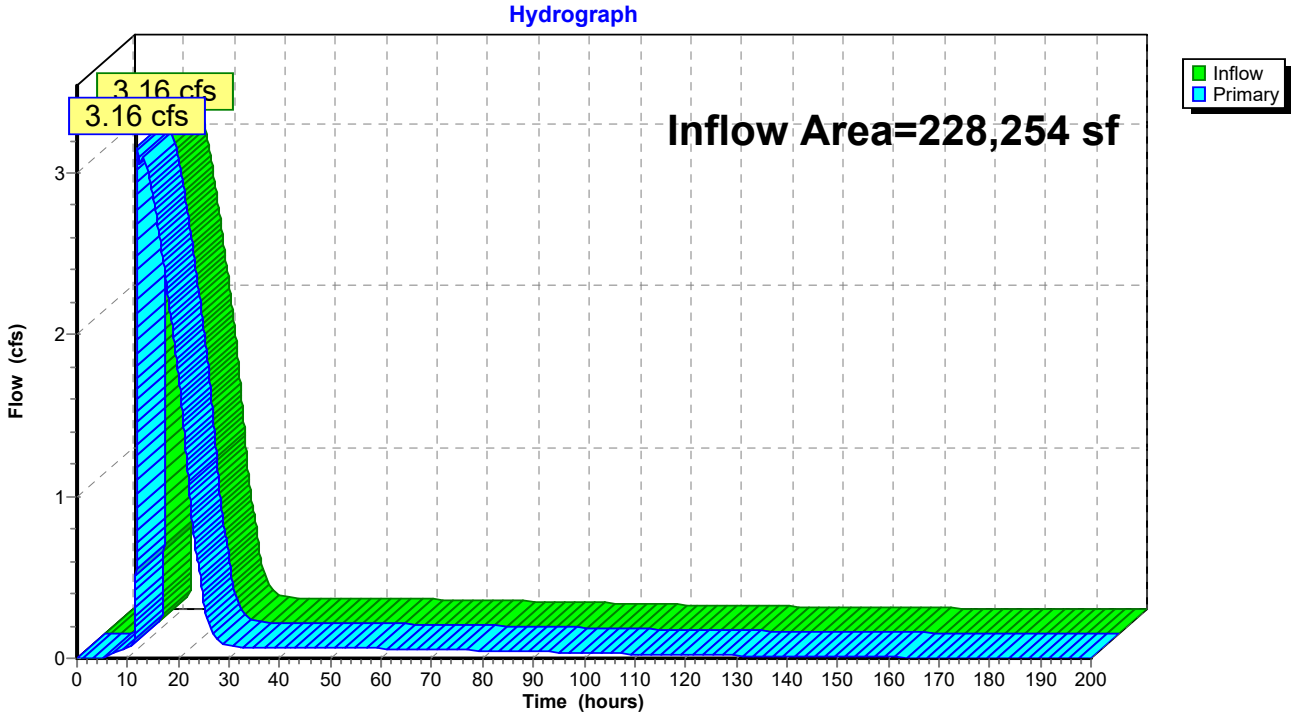


Summary for Link 27L: Post POI A-1

Inflow Area = 228,254 sf, 52.67% Impervious, Inflow Depth = 6.13" for 100-YR event
Inflow = 3.16 cfs @ 12.01 hrs, Volume= 116,682 cf
Primary = 3.16 cfs @ 12.01 hrs, Volume= 116,682 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 30L : To CTP Ex. Basin- POST

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 27L: Post POI A-1

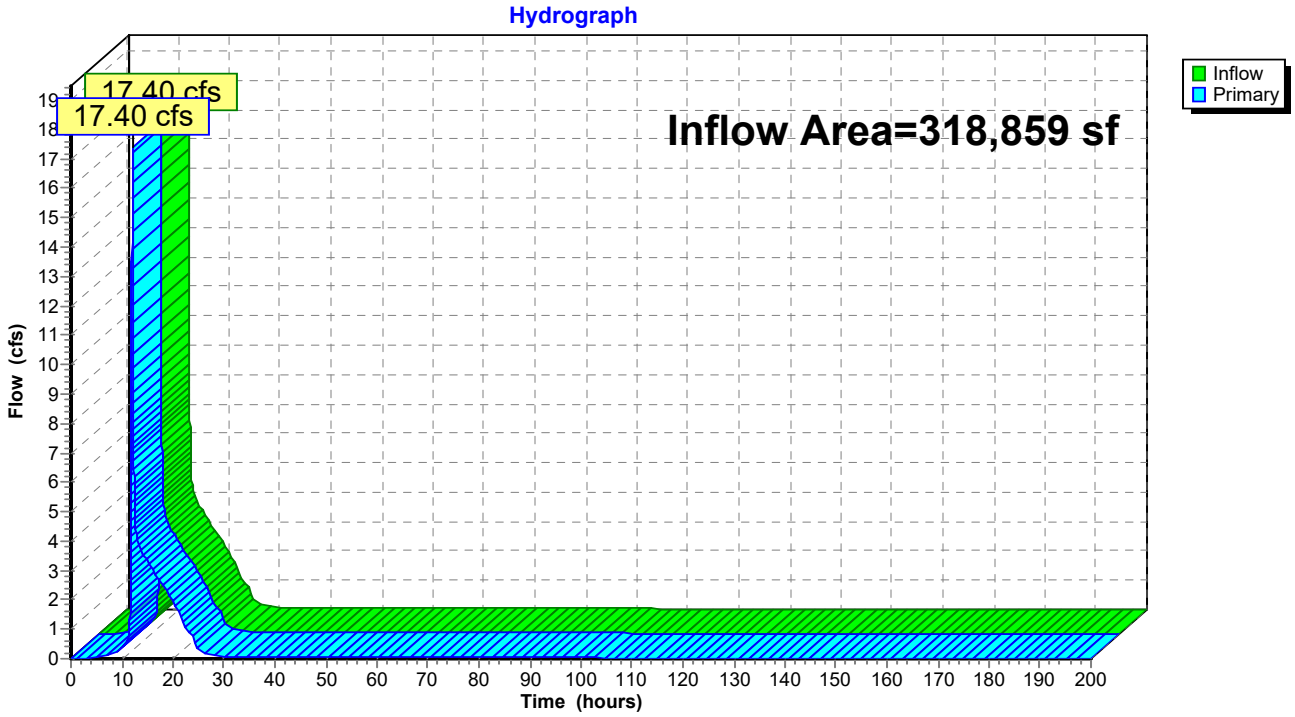


Summary for Link 30L: To CTP Ex. Basin- POST

Inflow Area = 318,859 sf, 41.67% Impervious, Inflow Depth = 5.90" for 100-YR event
Inflow = 17.40 cfs @ 12.05 hrs, Volume= 156,714 cf
Primary = 17.40 cfs @ 12.05 hrs, Volume= 156,714 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.01 hrs

Link 30L: To CTP Ex. Basin- POST



Storm Sewer Design Information

8

Intentionally left blank

Basin Design Calculations

9

MRC Design Spreadsheet
Emergency Spillway Calculations
NOAA Chapter 14 precipitation Data

MANAGED RELEASE BASIN #1
POI Basin 1

Actual Contributing Impervious Area to BMP =	**2.07**	**AC**	
Equivalent Impervious Area =	1.48	Acres = 1.2"/2 hour Volume ft^3 / (0.0833 * 43,560 ft^2/ac)	
MRC BMP Release Rate =	0.01	CFS	**Required Release Rate for 1.2"/2-hour Storm**
BMP Footprint Area =	8,445	SF	
Total Drainage Area to BMP =	**3.02**	**AC**	
Bottom BMP Elev. Top of Media	364.00	FT	
Bot. of Media	361.00	FT	
Δ 2 Ponding Elev. =	364.82		
Δ 2 Ponding Depth =	0.82	FT	(1-ft recommended, 2-ft max.) **OK**
2Yr/24Hr Overflow Ponding Depth =	0.50	FT	(2-ft Max for 2 Year) **OK**
2 Yr/24Hr Overflow Bypass Elevation =	**364.50**	FT	
Max. Ponding Depth 100 Yr =	3.65	FT	(4-ft max greater than 2 Yr) **OK**
100 Yr/24Hr Overflow Bypass Elevation =	**367.65**	FT	
Media Depth =	3.00	FT	(2-ft min, 4-ft max) **OK**
Media Void Space =	**30.0**	%	
Internal Water Storage (IWS) Depth =	1.00	FT	
Top of IWS Elev. =	362.00	FT	
Underdrain Pipe Diameter =	**4.00**	IN	
Underdrain Orifice Dia =	**0.90**	IN	
Underdrain Outlet Invert =	362.00	FT	
IWS Used for Routing =	**50.0**	%	(50% Max.)
Separation Distance (Groundwater) =	1.00	FT	Groundwater Elev. = **360.00**
Infiltration Rate =	0.00	IN/HR	
Total 2-yr/24-hr Runoff Volume Managed by BMP =	**13,942**	CF	(Taken from Hydrograph - Volume)
Total 1.2"/2-hour Runoff Vo. Permanently Removed =	**5,388**	CF	(Taken from Volume Routed to BMP 1.2" storm Hydrograph)

Dead Storage Depth =	1.00	FT		
Dead Storage Elev. =	362.00	FT		18200.0
Invert of Orifice =	362.17	FT	(Assume hole centered on 4" end cap)	
Dead storage volume =	**1,267**	**CF**	(Vol. bet. el. 364.00 and 362.00)	

	WATER SURFACE ELEVATON (FEET)	AREA (SQ.FT.)	AVERAGE AREA (SQ.FT.)	DIFF. IN ELEV. (FT)	STORAGE VOL. (CUBIC FEET) INCREMENTAL	VOID %	TOTAL	FLOW (CFS)	DEWATERING TIME (HRS)
Bottom of IWS (Min. 1')	**361**	**8,445**					0	0.00	
			8,445	1.00	8,445	**15**			
Top of IWS	**362**	**8,445**					1,267	#NUM!	#NUM!
			8,445	1.00	8,445	**30**			
	363	**8,445**					3,800	0.02	54.48
Top of Soil Media (Total Soil Max. 4')			8,445	1.00	8,445	**30**			
	364	**8,445**					6,334	0.03	61.15
			9,723	2.00	19,445	**95**			
	366	**11,000**					24,807	0.04	165.54
			12,250	2.00	24,500	**95**			
	368	**13,500**					48,082	0.05	260.06
			14,850	2.00	29,700	**95**			
	370	**16,200**					76,297	0.06	356.08
								#NUM!	#VALUE!
								#NUM!	#VALUE!

50% of IWS Void Volume can be included as available storage volume below orifice (50% of 30% = 15%)

Manual Volumes to match Hydraflow

Orifice Elevation =	**362.00**	ft	
IWS Storage Volume =	1,267	ft^3	
1.2"/2-hour Storage Vol. Elev. =	364	ft^3	**Flows at Elev. must be less than or equal to Release Rate for 1.2"/2-hour**

Total Basin Storage Vol. = Storage Volume + Infiltration Volume

= **13,942** ft^3 = **0.32 ac-ft**

Hydraflow 2-yr Volume Increase = **13,942** ft^3 **>** **13,942** ft^3 (Difference in Pre & Post before Routing)

* Use smaller of the two

Managed Volume = 13,942 ft^3 => Elevation = 364.82' = Surface Ponding Drain Down Time of 211 Hours

MANAGED RELEASE BASIN #2
POI Basin 2

Actual Contributing Impervious Area to BMP =	**0.69**	**AC**	
Equivalent Impervious Area =	0.91	Acres = 1.2"/2 hour Volume ft^3 / (0.0833 * 43,560 ft^2/ac)	
MRC BMP Release Rate =	0.01	CFS	**Required Release Rate for 1.2"/2-hour Storm**
BMP Footprint Area =	5,550	SF	
Total Drainage Area to BMP =	**2.16**	**AC**	
Bottom BMP Elev. Top of Media	365.00	FT	
Bot. of Media	362.00	FT	
Δ 2 Ponding Elev. =	365.74		
Δ 2 Ponding Depth =	0.74	FT	(1-ft recommended, 2-ft max.) **OK**
2Yr/24Hr Overflow Ponding Depth =	0.50	FT	(2-ft Max for 2 Year) **OK**
2 Yr/24Hr Overflow Bypass Elevation =	**365.50**	FT	
Max. Ponding Depth 100 Yr =	3.57	FT	(4-ft max greater than 2 Yr) **OK**
100 Yr/24Hr Overflow Bypass Elevation =	**368.57**	FT	
Media Depth =	3.00	FT	(2-ft min, 4-ft max) **OK**
Media Void Space =	**30.0**	%	
Internal Water Storage (IWS) Depth =	1.00	FT	
Top of IWS Elev. =	363.00	FT	
Underdrain Pipe Diameter =	**4.00**	IN	
Underdrain Orifice Dia =	**0.90**	IN	
Underdrain Outlet Invert =	363.00	FT	
IWS Used for Routing =	**50.0**	%	(50% Max.)
Separation Distance (Groundwater) =	2.00	FT	Groundwater Elev. = **360.00**
Infiltration Rate =	0.00	IN/HR	
Total 2-yr/24-hr Runoff Volume Managed by BMP =	**8,414**	CF	(Taken from DEP PCSM Spreadsheets - Volume)
Total 1.2"/2-hour Runoff Vo. Permanently Removed =	**3,286**	CF	(Taken from Volume Routed to BMP 1.2" storm Hydrograph)

Dead Storage Depth =	1.00	FT		
Dead Storage Elev. =	363.00	FT		18200.0
Invert of Orifice =	363.17	FT	(Assume hole centered on 4" end cap)	
Dead storage volume =	**833**	**CF**	(Vol. bet. el. 365.00 and 363.00)	

	WATER SURFACE ELEVATON (FEET)	AREA (SQ.FT.)	AVERAGE AREA (SQ.FT.)	DIFF. IN ELEV. (FT)	STORAGE VOL. (CUBIC FEET) INCREMENTAL	VOID %	TOTAL	FLOW (CFS)	DEWATERING TIME (HRS)
Bottom of IWS (Min. 1')	**362**	**5,550**					0	0.00	
			5,550	1.00	5,550	**15**			
Top of IWS	**363**	**5,550**					833	#NUM!	#NUM!
			5,550	1.00	5,550	**30**			
	364	**5,550**					2,498	0.02	35.80
Top of Soil Media (Total Soil Max. 4')			5,550	1.00	5,550	**30**			
	365	**5,550**					4,163	0.03	40.18
			5,758	1.00	5,758	**100**			
	366	**5,965**					9,920	0.04	77.01
			6,398	2.00	12,795	**100**			
	368	**6,830**					22,715	0.05	134.98
			7,478	2.00	14,955	**100**			
	370	**8,125**					37,670	0.06	188.24
						100		#NUM!	#VALUE!
						100		#NUM!	#VALUE!

50% of IWS Void Volume can be included as available storage volume below orifice (50% of 30% = 15%)
Manual Volumes to match Hydraflow

Orifice Elevation =	**363.00**	ft	
IWS Storage Volume =	833	ft^3	
1.2"/2-hour Storage Vol. Elev. =	364	ft^3	**Flows at Elev. must be less than or equal to Release Rate for 1.2"/2-hour**

Total Basin Storage Vol. = Storage Volume + Infiltration Volume

= **8,414** ft^3 = **0.19 ac-ft**

Hydraflow 2-yr Volume Increase = **8,414** ft^3 **>** **8,414** ft^3 (Difference in Pre & Post before Routing)
* Use smaller of the two

Managed Volume = 8,414 ft^3 => Elevation = 365.74' = Surface Ponding Drain Down Time of 118 Hours

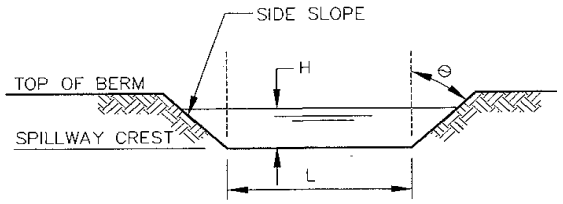
ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd

EMERGENCY SPILLWAY CALCULATION

Formula:
$Q = 2.7\ LH^{3/2}$



Basin Identification: Basin 1

Water Surface Elevation (Ft.)	Discharge Q (CFS)
368.50	0.0
368.60	3.4
368.70	9.7
368.80	17.7
368.90	27.3
369.00	38.2
369.10	50.2
369.20	63.3
369.30	77.3
369.40	92.2
369.50	108.0
369.60	124.6
369.70	142.0
369.80	160.1
369.90	178.9
370.00	198.4

Q_{100} to the Basin: 33.39
Top of Berm Elevation: 370.00
Spillway Crest Elevation: 368.50
Spillway Bottom Width (L): 40.0
Spillway Side Slope Run: 10.00
Spillway Side Slope Rise: 1.00
Side Angle (θ): 84.29

100 Year W.S.E.L.:	**368.96**
Freeboard to Top of Berm (Ft.):	**1.04**

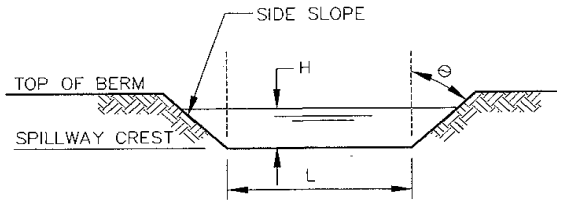
ESE Consultants, Inc.

New Britain CTP (8363)
New Britain Township
Bucks County, Pennsylvania

By: JMM
Date: 2/9/2023
Chk'd:
Rev'd

EMERGENCY SPILLWAY CALCULATION

Formula:
$Q = 2.7\ LH^{3/2}$



Basin Identification: Basin 2

Water Surface Elevation (Ft.)	Discharge Q (CFS)
368.70	0.0
368.80	5.1
368.90	14.5
369.00	26.6
369.10	41.0
369.20	57.3
369.30	75.3
369.40	94.9
369.50	115.9
369.60	138.3
369.70	162.0
369.80	186.9
369.90	213.0
370.00	240.1

Q_{100} to the Basin: 21.27
Top of Berm Elevation: 370.00
Spillway Crest Elevation: 368.70
Spillway Bottom Width (L): 60.0
Spillway Side Slope Run: 10.00
Spillway Side Slope Rise: 1.00
Side Angle (θ): 84.29

100 Year W.S.E.L.:	**368.96**
Freeboard to Top of Berm (Ft.):	**1.04**

NOAA Atlas 14, Volume 2, Version 3
Location name: New Britain Twp, Pennsylvania, USA*
Latitude: 40.2679°, Longitude: -75.2282°
Elevation: 373.7 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.338** (0.309-0.369)	**0.402** (0.368-0.440)	**0.473** (0.431-0.516)	**0.523** (0.477-0.572)	**0.584** (0.529-0.637)	**0.626** (0.564-0.684)	**0.666** (0.599-0.729)	**0.702** (0.628-0.770)	**0.745** (0.660-0.819)	**0.776** (0.683-0.855)
10-min	**0.540** (0.494-0.590)	**0.643** (0.588-0.704)	**0.757** (0.691-0.827)	**0.837** (0.763-0.914)	**0.931** (0.844-1.02)	**0.997** (0.899-1.09)	**1.06** (0.952-1.16)	**1.11** (0.995-1.22)	**1.18** (1.04-1.30)	**1.22** (1.08-1.35)
15-min	**0.675** (0.617-0.738)	**0.808** (0.740-0.885)	**0.958** (0.874-1.05)	**1.06** (0.965-1.16)	**1.18** (1.07-1.29)	**1.26** (1.14-1.38)	**1.34** (1.20-1.46)	**1.41** (1.25-1.54)	**1.48** (1.31-1.63)	**1.53** (1.35-1.69)
30-min	**0.925** (0.846-1.01)	**1.12** (1.02-1.22)	**1.36** (1.24-1.49)	**1.53** (1.40-1.68)	**1.75** (1.58-1.91)	**1.90** (1.71-2.08)	**2.05** (1.84-2.24)	**2.19** (1.95-2.40)	**2.36** (2.09-2.59)	**2.48** (2.19-2.74)
60-min	**1.15** (1.06-1.26)	**1.40** (1.28-1.53)	**1.75** (1.59-1.91)	**2.00** (1.82-2.18)	**2.33** (2.11-2.54)	**2.58** (2.32-2.81)	**2.82** (2.54-3.09)	**3.07** (2.74-3.36)	**3.39** (3.00-3.72)	**3.62** (3.19-4.00)
2-hr	**1.37** (1.25-1.51)	**1.67** (1.52-1.83)	**2.09** (1.90-2.29)	**2.41** (2.18-2.64)	**2.84** (2.56-3.11)	**3.18** (2.85-3.48)	**3.53** (3.14-3.86)	**3.87** (3.43-4.24)	**4.34** (3.80-4.77)	**4.70** (4.07-5.18)
3-hr	**1.50** (1.36-1.66)	**1.82** (1.65-2.01)	**2.29** (2.07-2.52)	**2.64** (2.39-2.91)	**3.12** (2.80-3.43)	**3.50** (3.13-3.85)	**3.89** (3.45-4.28)	**4.28** (3.77-4.72)	**4.81** (4.18-5.32)	**5.22** (4.50-5.79)
6-hr	**1.88** (1.71-2.08)	**2.27** (2.07-2.51)	**2.84** (2.58-3.13)	**3.30** (2.99-3.63)	**3.94** (3.54-4.34)	**4.47** (3.99-4.91)	**5.03** (4.44-5.53)	**5.61** (4.91-6.17)	**6.43** (5.53-7.10)	**7.09** (6.02-7.85)
12-hr	**2.29** (2.09-2.54)	**2.76** (2.52-3.07)	**3.47** (3.16-3.85)	**4.07** (3.68-4.50)	**4.93** (4.42-5.43)	**5.66** (5.03-6.23)	**6.45** (5.67-7.11)	**7.31** (6.34-8.06)	**8.56** (7.27-9.47)	**9.60** (8.03-10.6)
24-hr	**2.70** (2.49-2.95)	**3.25** (3.00-3.55)	**4.09** (3.76-4.45)	**4.78** (4.38-5.20)	**5.79** (5.27-6.28)	**6.64** (6.01-7.19)	**7.55** (6.80-8.18)	**8.54** (7.63-9.25)	**9.99** (8.81-10.8)	**11.2** (9.77-12.1)
2-day	**3.12** (2.85-3.44)	**3.77** (3.43-4.15)	**4.74** (4.32-5.22)	**5.53** (5.03-6.08)	**6.66** (6.02-7.31)	**7.59** (6.83-8.32)	**8.58** (7.67-9.40)	**9.64** (8.55-10.6)	**11.2** (9.80-12.2)	**12.4** (10.8-13.6)
3-day	**3.29** (3.02-3.61)	**3.97** (3.64-4.36)	**4.98** (4.56-5.46)	**5.79** (5.29-6.34)	**6.95** (6.32-7.60)	**7.91** (7.16-8.63)	**8.92** (8.03-9.73)	**9.99** (8.94-10.9)	**11.5** (10.2-12.6)	**12.8** (11.2-14.0)
4-day	**3.47** (3.20-3.79)	**4.18** (3.85-4.56)	**5.21** (4.80-5.69)	**6.05** (5.56-6.60)	**7.24** (6.62-7.89)	**8.22** (7.49-8.94)	**9.25** (8.39-10.1)	**10.3** (9.32-11.3)	**11.9** (10.6-13.0)	**13.1** (11.7-14.3)
7-day	**4.05** (3.76-4.40)	**4.85** (4.50-5.27)	**5.99** (5.55-6.51)	**6.92** (6.40-7.52)	**8.26** (7.60-8.95)	**9.36** (8.59-10.1)	**10.5** (9.60-11.4)	**11.8** (10.7-12.7)	**13.5** (12.2-14.6)	**14.9** (13.3-16.2)
10-day	**4.59** (4.28-4.96)	**5.49** (5.11-5.92)	**6.69** (6.22-7.21)	**7.65** (7.10-8.23)	**8.98** (8.31-9.66)	**10.1** (9.28-10.8)	**11.2** (10.3-12.0)	**12.3** (11.3-13.2)	**13.9** (12.6-15.0)	**15.2** (13.7-16.4)
20-day	**6.21** (5.80-6.65)	**7.37** (6.89-7.89)	**8.78** (8.20-9.41)	**9.89** (9.23-10.6)	**11.4** (10.6-12.2)	**12.6** (11.7-13.5)	**13.7** (12.7-14.7)	**14.9** (13.8-16.0)	**16.5** (15.1-17.7)	**17.7** (16.2-19.1)
30-day	**7.74** (7.31-8.19)	**9.11** (8.61-9.65)	**10.6** (10.0-11.2)	**11.8** (11.1-12.5)	**13.3** (12.5-14.1)	**14.4** (13.6-15.3)	**15.6** (14.6-16.5)	**16.7** (15.6-17.7)	**18.1** (16.9-19.3)	**19.2** (17.8-20.4)
45-day	**9.82** (9.32-10.4)	**11.5** (10.9-12.2)	**13.3** (12.6-14.0)	**14.5** (13.8-15.3)	**16.2** (15.3-17.0)	**17.4** (16.4-18.3)	**18.5** (17.5-19.5)	**19.6** (18.4-20.6)	**20.9** (19.6-22.1)	**21.8** (20.5-23.1)
60-day	**11.8** (11.2-12.4)	**13.8** (13.1-14.5)	**15.7** (15.0-16.6)	**17.2** (16.3-18.1)	**19.0** (18.0-20.0)	**20.3** (19.3-21.3)	**21.5** (20.4-22.6)	**22.6** (21.4-23.8)	**24.0** (22.7-25.3)	**24.9** (23.5-26.3)

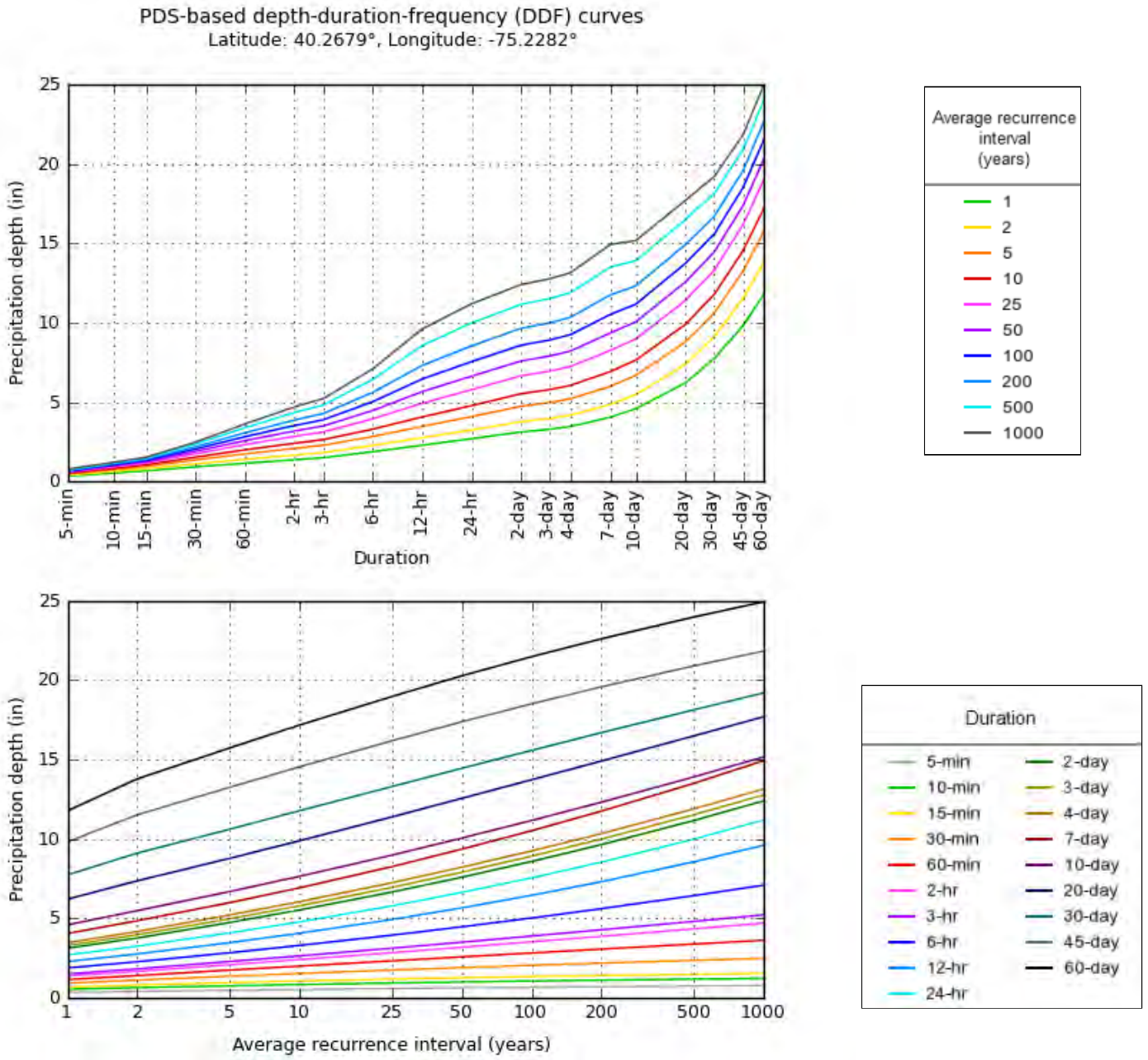
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Tue Jun 28 17:18:32 2022

Back to Top

Maps & aerials

Small scale terrain

ENVIRONMENTAL IMPACT STATEMENT REPORT

PREPARED FOR: BIRCH RUN AT NEW BRITAIN (aka NEW BRITAIN CTP)
LOCATED IN NEW BRITAIN TOWNSHIP, BUCKS COUNTY, PA

PREPARED BY ESE CONSULTANTS, INC.
1440 Virginia Drive, Fort Washington, PA 19034

Contents:

Executive Summary

ESE Consultants, Inc. (ESE) has prepared an Environmental Impact Statement Report on behalf of Toll Bros., Inc (Toll, TBI) in support of a proposed land development project known as Birch Run at New Britain (aka New Britain CTP Property), located near the intersection of County Line Road and W. Butler Avenue (Bus. Route 202) in New Britain Township, Bucks County, Pennsylvania. The project consists of three parcels of land proposing Planned Community Center Mixed Use (Use J31). Two of the three parcels have been previously approved and developed. The formerly developed parcels consist of TMP #26-06-101-003 (Creamery Tire) currently an existing flex space use and TMP #26-06-101 (Wawa) provides an existing convenient store and gasoline service station. This application is proposing an amended Conditional Use application for the remaining unimproved TMP # 26-06-101-004, owned by the CTP Management LLC.

Under the previous application an access road connecting all three parcels was constructed through this residential parcel in anticipation of future cohesive development of all three parcels and their uses. This project has considered several development alternatives, one of them being a B6 Multi-Family use featuring 64 condominium style homes. Several iterations of the B5 townhome use have been proposed with 62 and 57 3-story townhomes. After receiving input from Township officials and residents at several public meetings, Toll has incorporated the input resulting in the proposed 44 townhome plan. Site plan modifications resulted in decreased density, decreased impervious surface, increased open space and buffering of the adjacent properties and increased vehicular and pedestrian connections between the proposed residential use and adjacent properties.

The opportunity to include a residential element to the Butler Avenue Corridor would enhance the vibrancy of the existing commercial corridor and Township/County gateway. The proposed compact walkable community embraces many smart growth community objectives identified in the New Britain Township Comprehensive Plan. This project is expected to have no material negative impacts and the majority of the impacts of this project are positive to the health, safety, and general welfare of the neighborhood and surrounding area.

1. Overview

Purpose and scope: Toll Brothers, Inc. is a luxury residential home builder that has been building communities in Pennsylvania for more than 40 years. The purpose of this project is to develop this site with upscale residential townhomes to meet market needs. The applicant is proposing to develop the parcel TMP 26-06-004 under the B5 townhome use permitted in the C-1 zoning district under the J31 Planned Community Mixed Use. The proposed development would result in (44) townhome residences. The site will feature approximately 1.5- 2 acres of open space of which will be devoted to common open space for its future homeowners. Additional lands shall be devoted to buffering adjacent properties, stormwater management and preservation of existing natural resources. Additional improvements are also proposed on both the adjacent Creamery tire parcel and the Wawa parcel. These improvements will provide both enhanced aesthetics and increased vehicular and pedestrian connectivity to the adjacent existing commercial uses.

Benefits and suitability:

The anticipated public benefits are improved vehicular and pedestrian circulation from the site to adjacent parcels, increased tax revenue and improved on site drainage and stormwater management. This site offers the opportunity to create a walkable new residential community in an area where existing infrastructure already exists. The site lies within an existing commercial corridor and the Butler Avenue Corridor Overlay District serving as a gateway to Bucks County and New Britain Township. The site is not highly visible from the nearby intersecting major roads (County Line and W. Butler Ave). This condition does not create a desirable condition for commercial use, but is an asset for a complementary medium density residential use.

Site plan alterations:

The project will require the removal of an existing 1-story metal garage and vehicle storage area. Land disturbance and development of the proposed townhomes takes place primarily on the central area of the site an existing open field. The perimeter of the site is proposed to be cleared of any overgrowth of invasive species, trees that are in poor health or dead and supplemented with new buffer vegetation. The applicant is requesting permission to propose a vehicular and pedestrian crossing of a formerly created conservation easement on the Wawa parcel. This crossing will have minor impacts on the existing identified woodland area, no impacts to site wetlands and no losses of threatened or endangered species or habitats are expected.

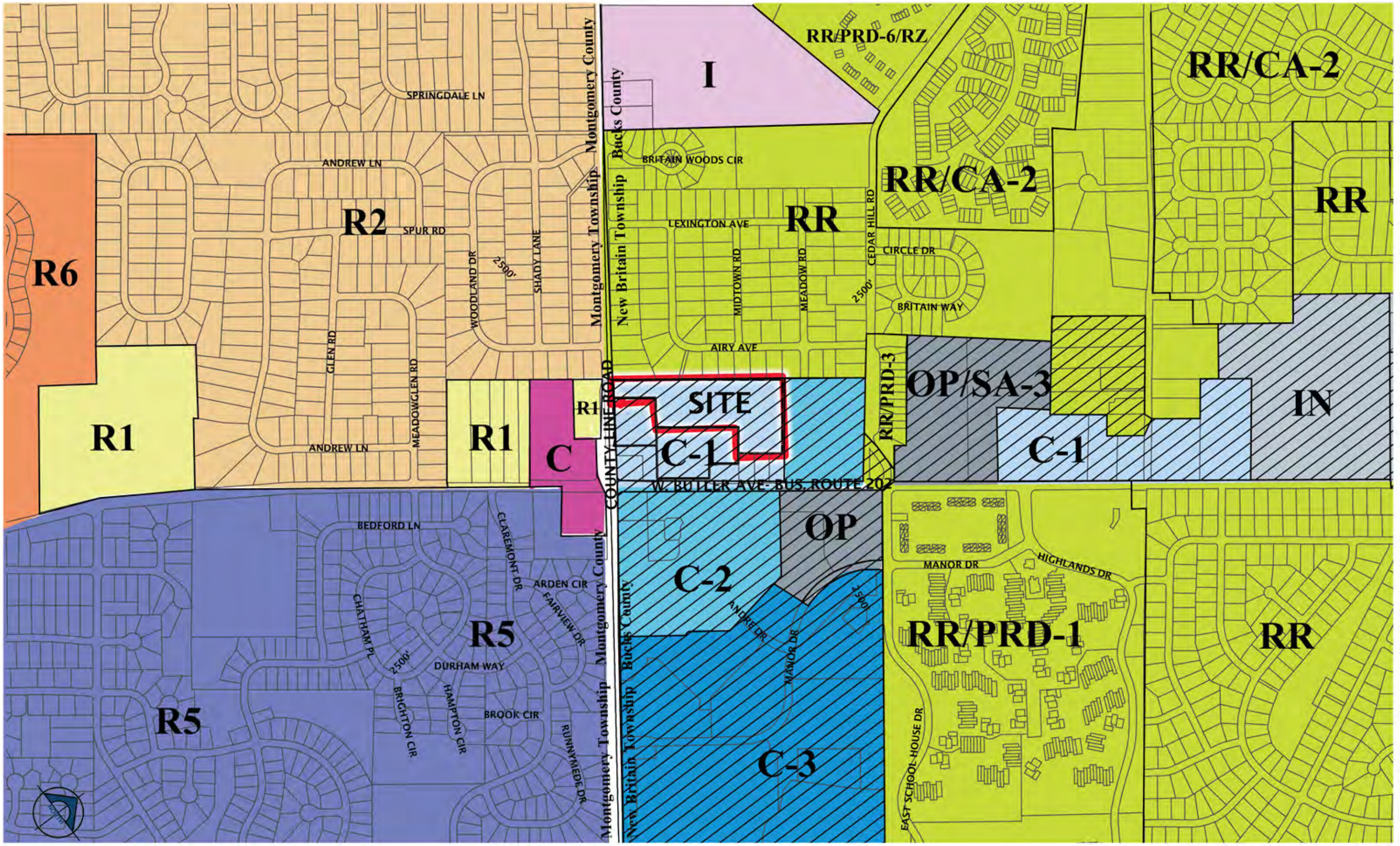
2. Compatibility

The site lies within Planning Area 2 per the New Britain Township comprehensive plan dated 2016. The proposed site plan is consistent with the character of current uses (multi-family, apartments, commercial-retail, and single family detached) within Planning Area 2. With the availability of existing infrastructure already in place on site or adjacent to, this site offers an opportunity to create a transitional residential use between the Butler Avenue commercial retail corridor and the single family detached homes located along the northern edge of the site. The proposed intensity of townhome use is a balanced approach to allow for buffering against adjacent existing properties, protection of natural resources, while creating a new walkable neighborhood community.

Per the comprehensive plan, Planning Area 2 also includes significant areas specifically dedicated to recreational use. The proposed site plan provides for common open space lands on site to meet passive low-intensity recreational needs of its residents. The applicant will also be providing a fee-in lieu of contribution to aid in township improvements or acquisitions on a

more regional open space recreational need. The proposed site plan B5 townhome use is permitted within under C-1 Zoning, under the J31 Planned Community Mixed Use. Open Space area exceeds the area required under J31 use.

3. **Location Map**
4. **Photographs**

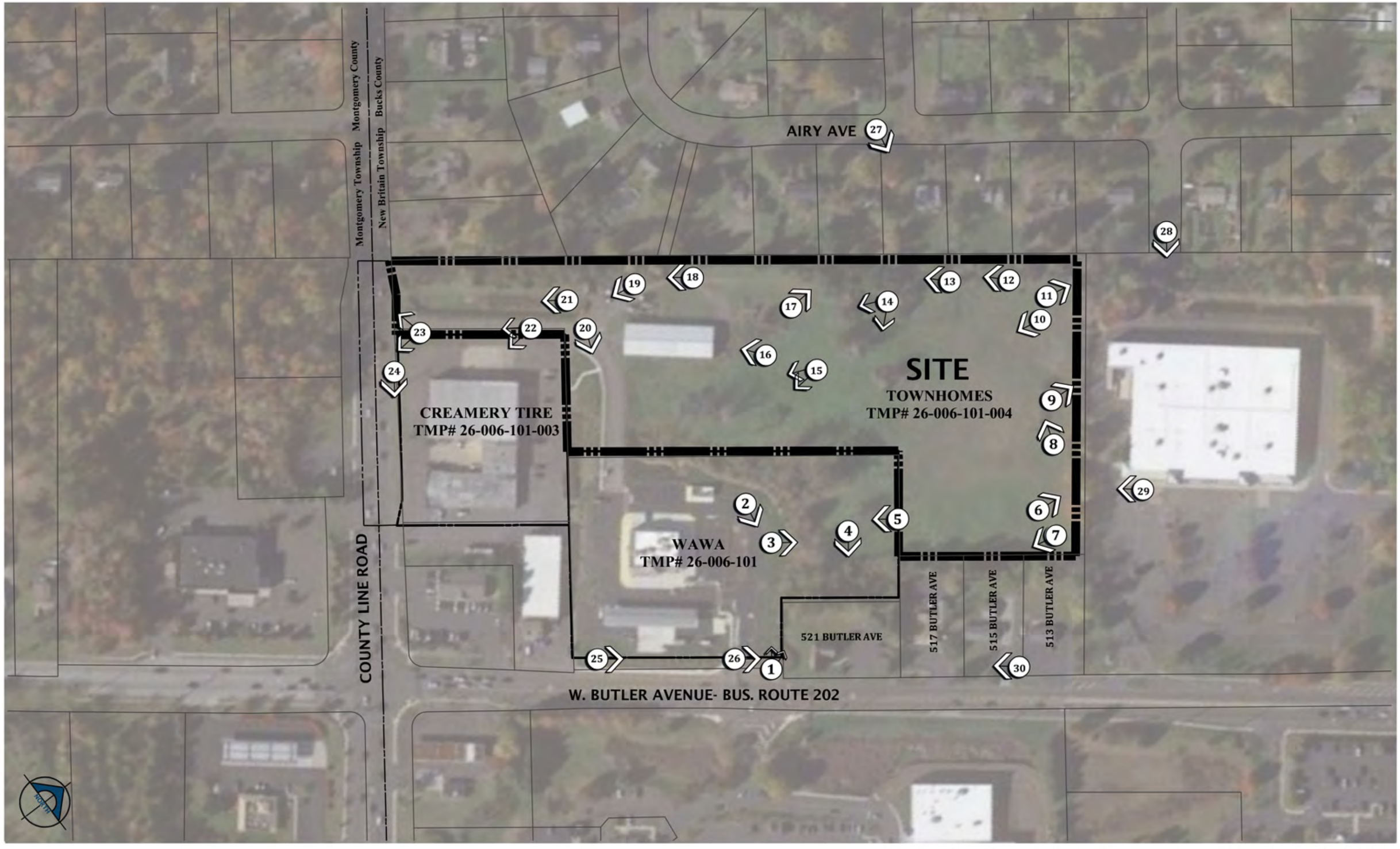


1. PARCEL DATA PROVIDED BY DELAWARE VALLEY REGIONAL PLANNING COMMISSION.
2. ZONING INFORMATION PROVIDED BY TOWNSHIP ZONING MAPS.

SCALE: 1"=600'

3. LOCATION PLAN

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY



4. SITE PHOTO LOCATION MAP

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY

1 VIEW OF PROPOSED PEDESTRIAN CONNECTION FROM BUTLER AVE TO SITE ALONG ADJACENT PARCEL (521 W. BUTLER AVE)

2 VIEW OF PROPOSED VEHICLE/PEDESTRIAN CONNECTION LOCATION FROM RESIDENTIAL PARCEL TO EXISTING WAWA ACCESS ROAD TO W. BUTLER AVE

3 VIEW OF PROPOSED VEHICLE/PEDESTRIAN CONNECTION LOCATION THROUGH EXISTING CONSERVATION EASEMENT - PROPOSED VEGETATION DISTURBANCE AREA

4 VIEW OF ADJACENT LOT (521 W. BUTLER AVE) FROM SITE

5 VIEW OF CONSERVATION EASEMENT AREA FROM SITE LOCATED BETWEEN WAWA PARCEL & RESIDENTIAL PARCEL

6 VIEW OF EXISTING BUFFER BETWEEN SITE AND ADJACENT EXTRA SPACE STORAGE PROPERTY

7 VIEW OF EXISTING HEDGE ROW BETWEEN SITE AND ADJACENT LOTS 517, 515 & 513 W. BUTLER AVE

*ALL PHOTOS DATED 2-6-2023

4. SITE PHOTOS

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY

8 INTERNAL VIEW OF EXISTING TO VEGETATION TO BE REMOVED

9 VIEW OF EXISTING ADJACENT BUFFER TO EXTRA SPACE STORAGE

10 VIEW ACROSS INTERNAL SITE FROM NORTHERN CORNER TOWARDS SOUTH WAWA PROPERTY

11 VIEW OF EXISTING VEGETATION ON ADJACENT EXTRA SPACE STORAGE PROPERTY

12 VIEW OF EXISTING VEGETATION ALONG ADJACENT AIRY AVENUE PROPERTIES

13 VIEW OF EXISTING VEGETATION ALONG ADJACENT AIRY AVENUE PROPERTIES TO BE REMOVED

*ALL PHOTOS DATED 2-6-2023

4. SITE PHOTOS

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY

14 VIEW OF EXISTING INTERNAL INDIVIDUAL TREES TO BE REMOVED

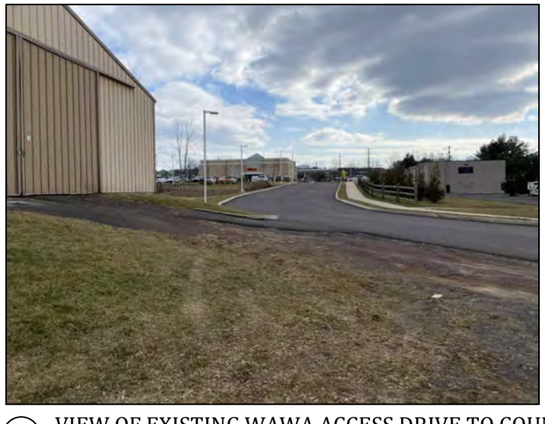
15 VIEW OF INTERNAL INDIVIDUAL TREES AND VEGETATION TO REMOVED (OUTSIDE CONSERVATION EASEMENT)

16 VIEW OF EXISTING GARAGE

19 VIEW OF EXISTING GARAGE ACCESS DRIVE AND VEHICLE STORAGE

17 VIEW OF BAMBOO AND VEGETATION TO BE REMOVED ALONG ADJACENT AIRY AVENUE PROPERTIES

18 VIEW OF EXISTING GARAGE ACCESS DRIVE AND VEHICLE STORAGE



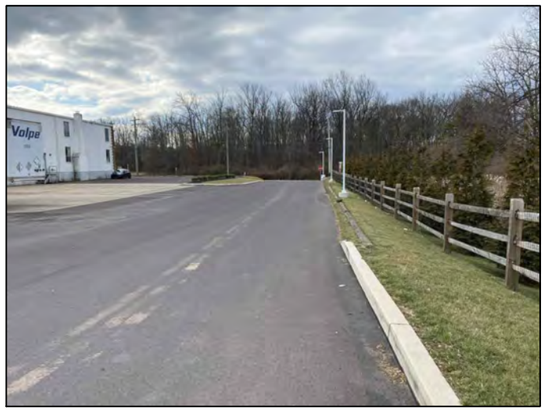
20 VIEW OF EXISTING WAWA ACCESS DRIVE TO COUNTY LINE ROAD AND PROPOSED RESIDENTIAL "ROAD A" ACCESS POINT.

4. SITE PHOTOS

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY

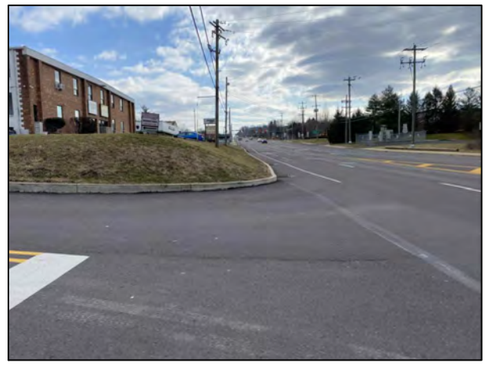
*ALL PHOTOS DATED 2-6-2023

21 VIEW OF EXISTING STORMWATER WETLANDS AREA ALONG WAWA ACCESS DRIVE TO COUNTY LINE ROAD



22 VIEW OF ADJACENT CREAMERY TIRE PROPERTY & ADJACENT ACCESS DRIVE TO COUNTY LINE ROAD

23 VIEW OF INTERSECTION OF WAWA ACCESS ROAD AND COUNTY LINE ROAD (NORTH AND SOUTH VIEWS)



24 CREAMY TIRE PROPERTY AND COUNTY LINE ROAD FRONTAGE

25 WAWA: BUTLER AVE FRONATGE

26 WAWA: BUTLER AVE PEDESTRIAN CROSSING AT INTERSECTION

*ALL PHOTOS DATED 2-6-2023

4. SITE PHOTOS

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY

27 VIEW FROM AIRY AVE TO SITE

28 VIEW OF ADJACENT DEAD END STREET

30 VIEW OF ADJACENT PARCELS FRONTING ON
W BUTLER AVENUE

29 VIEWS O F SITE FROM EXTRA SPACE STORAGE PROPERTY

*ALL PHOTOS DATED 2-6-2023

4. SITE PHOTOS

CTP PROPERTY, NEW BRITAIN TWP, BUCKS COUNTY

5. Description of the Project

The Conditional Use Plan submitted with this environmental impact assessment features 44 3-story front entry townhomes on an 8.6 acre lot. The proposed townhomes will be 3-bedroom homes with approximately 2,000 SF. Each home will have a 1-2 car garage with 1-2 car parking availability in the driveway. Primary access to the community will be provided from the existing access drive connecting the Wawa parcel to County Line Road on "Road A". An additional access easement has been obtained on Wawa parcel to provide a vehicular and pedestrian connection to Butler Avenue on "Road B". Proposed Road B will also provide potential future access to adjacent parcels not included in this application: Extra Space Storage Parcel north east of the site and the adjacent three parcels (513, 515, & 517 W. Butler Avenue). Pedestrian connectivity has been provided along proposed Roads A&B to the adjacent commercial-retail parcels extending out to both County Line Road and Butler Avenue. In addition to pedestrian connections additional landscape enhancements will be provided on the adjacent parcels (Creamery Tire and Wawa) included with this application.

The proposed plan will also provide stormwater and landscaping improvements that will enhance the environment. The applicant has identified potentially suitable locations for stormwater management areas as denoted on the plan and will ensure that the proposed stormwater management facilities result in no net gain in post-development runoff. The applicant will apply best management practices to ensure the protection of the local watershed and negate any potential impact on properties and receptors downstream. A majority of the existing vegetation located along the perimeter of the parcel is proposed to be retained. The perimeter vegetation has been left unmaintained and has become overrun with invasive species. Removal of invasive species and dead plant material and trash is proposed and will make way for new complementary landscape buffer plantings to enhance the visual screen between uses. These new plantings will consist of a mix of native shade, evergreen, ornamental trees and shrubs to create a seasonal visual interest between the properties. Several individual existing trees located within the central area of the site are proposed to be removed but it will be replaced. Additional plantings shall also be provided to allow for more species diversity to create a year-round aesthetically pleasing internal open space area. Street trees and foundation plantings are proposed internally within the community to create a highly functional and visually pleasing streetscape environment. On street parking will be provided for visitor parking. Additional site amenities include community identification signage, street lighting, community mail area, benches and trash receptacle shall also be included.

The site is currently owned by CTP Management LLC. Toll Brothers is proposing to construct a new residential community where open space lands, stormwater facilities, and roads are to be owned and maintained by a homeowner's association.

6. Physical Resources Inventory

See "Existing Features & Site Analysis Plan" prepared by ESE Consultants, dated February 21, 2023 for supporting data. Based on the Natural Resource Conservation Service's (NRCS) *Web Soil Survey*, the site contains the following mapping units:

- UfuB: Urban land, 0-8%
- UgB: Urban land-Abbottstown complex, 0-8 percent

Urban land and urban soil complexes are those that have been significantly altered from their original state by either cutting, filling, or paving. They retain the physical remnants of the original soil series, such as texture and coarse fragments, but some of their characteristics, such as drainage capability may have been changed or altered due to man-made impacts. Abbottstown soils are deep and very deep (with respect to depth to bedrock), somewhat poorly drained soils formed in the residuum from acid red shale, siltstone, and sandstone. Saturated hydraulic conductivity is moderately low to moderately high above a fragipan (dense, brittle soil horizon that inhibits downward migration of water) and moderately low in and below the fragipan. Bedrock refusal is typically around 59 inches. The soil series mapped on the site are not considered *Prime Agricultural* soils.

Bedrock geology is Brunswick Formation, which consists of reddish-brown mudstone, siltstone, and shale containing a few green and brown shale interbeds and red and dark-gray interbedded argillites near the base.

The northern portion of the site gently slopes to the west, while the remainder of the site generally slopes to the south and southwest. A spring-seep palustrine-emergent (PEM) wetland forms near the center of the site, with hydrology flowing gently and broadly to the southwest. Hydrology has been manipulated by a series of culverts and pipes that carries water underneath Wawa's access road from County Line Road and eventually discharges to a basin where the access road meets County Line Road. An exit culvert appears to carry waters to a stormwater collection pipe in County Line Road as no hydrological continuance was evident on the south side of the roadway.

7. Biological Inventory

Given the proximity of the site to surrounding urbanized and suburban development, site fauna expected to reside on or use this site as part of their range could include: birds, possum, rabbit, raccoon, squirrel, fox, deer, and skunk. Aquatic species such as turtles and frogs may utilize the wetland habitat but no formal biological surveys have been conducted and a site review for wetland delineation was performed in winter when most aquatic species are dormant. A review from the Pennsylvania Natural Diversity Index (PNDI) for this site came back clean indicating that there are no rare, threatened or endangered species habitats within the site. The PNDI report for this site is attached at the end of this report for reference.

Existing tree species classified as wooded vegetation consists primarily of canopy shade trees, species include: red maple (Acer rubrum), pin oak (Quercus palustris), white ash (Fraxinus americana), black cherry (Prunus serotina), Black Locust (Robinia pseudoacacia), silver maple (Acer saccharium), Mulberry (Morus alba). These areas are to be cleared of invasive species. Invasive vegetation was observed within the conservation easement area, as well as within the western edge of the site, species include: Multi-floral rose (Rosa multiflora) and bamboo. Several trees within the conservation easement have been overrun by vines and are in poor condition. Individual trees to be removed include the following species: Maple, Ash, Chestnut, Oak Elm and Willow. Bamboo has taken over an area along the western edge of the site and roots have likely intertwined with the adjacent trees making it difficult to save any of the nearby trees. Tree species observed within or adjacent to the Palustrine Emergent (PEM) wetland habitat included red maple (*Acer rubrum*) and pin oak (*Quercus palustris*). Shrub species observed included spicebush (*Lindera benzoin*) and multifloral rose (*Rosa multiflora*; considered invasive). Emergent species included narrow-leaved cattail (*Typha angustifolia*; invasive), carex sp., reed-canary grass (*Phalaris arundinacea*; invasive), and soft rush (*Juncus effusus*).

8. Land Use Inventory

The site is currently zoned Commercial C-1 and is currently being used as a commercial garage and vehicle storage and parking.

9. Surface Water Inventory

The site has an existing spring-seep wetland (PEM) and encompassed in a conservation easement. The proposed residential site will not have an impact on the wetland habitat. The existing and proposed runoff from the site calculations are shown in the Conditional Use Stormwater Report. The site drainage patterns will not significantly be altered. The proposed design will reduce the stormwater flows to the ordinance requirements. The wetlands areas have been delineated using the DEP and US Army Corps requirements.

10. Subsurface Water Inventory

The Brunswick formation shales and siltstones are typically highly fractured with many closely spaced joints, which results in relatively high well yields.

The proposed residential subdivision is to be serviced by public water and will not withdraw water, nor affect the existing wells in the surrounding area, if there are any. The proposed residential area will consist of some lawn and open space which will help in the water quality from the site.

11. Existing Features Inventory

The site features an existing shared access drive with a 60' wide right of way across the southern edge of the site. This access drive connects and provides access to all three parcels and extends to the County Line Road street frontage. This access drive that has been installed with the construction of the Wawa property also provides seven streetlights and a partial sidewalk along the Creamery tire parcel. Split rail fencing has also been installed along the sidewalk and along the stormwater basin. Along this access drive there also exists a stormwater management basin serving both the Creamery Tire and Wawa properties. Electric lines and utility poles run along the boundary line into between the Airy Avenue properties and the north western edge of the site from County Line Road extending beyond the Extra Space Storage property. A gravel parking/storage area and access drive connect the existing metal 1-story garage to the shared access drive. Signage for Wawa also lies within the access easement at County Line Road.

12. Historic Resources Inventory

The project site or its structures have not been identified on the National Register of Historic Places, the Pennsylvania Inventory of Historic Places, the Historic American Building Survey or the Bucks County Conservancy.

13. Visual Resources Inventory

The site lies within an existing commercial corridor. The site is not highly visible from the nearby intersecting major roads (County Line and W. Butler Ave). The site is tucked amongst previously developed properties. The perimeter of the site features filtered views on site and from adjacent properties, mature shade and evergreen trees line the property lines. Standing at the highpoint of the site near the northeastern corner of the site, one can visually see across the site down to County Line Road and out to Butler Avenue. Views in all locations from the site out are filtered with either sparse vegetation or structures. The project intent is to create a visual enclave to provide an enhanced vegetative buffer to and from adjacent uses.

14. Community Needs Inventory

Schools: The proposed development is projected to pay enough in annual property and earned income taxes to fully cover the annual costs of township services and public education on a per capita basis, without any deficits in fiscal impacts. Please refer to the attached Community Impact Study for more information on the projected Fiscal Impacts of the proposed development.

Parks and Recreation: New Britain Township is well-served by parks and recreation areas and has made several upgrades and additions to its park system in recent years since an increase in specific funding was enacted in 2020. Bucks County also levies an Open Space taxes that help

fund maintenance, land acquisition, and park improvements throughout the county. The proposed development will not have its own recreational facilities, though it will benefit from almost 2 acres of shared open space on site that will be maintained by a private homeowners' association (HOA). The developer is also expected to pay fees to the township to help fund any needed capacity improvements.

Libraries: The proposed townhomes will be served by the Bucks County Free Library System. The closest branch library is in Doylestown. This branch is funded through a combination of sources, including an active nonprofit "Friends Of" group that bridges the gap between budgetary costs and public expenditures with private fundraising efforts.

Healthcare: New Britain Township is well-located with private healthcare facilities and hospitals. Doylestown Hospital and its associated medical offices are very close to the proposed townhome development. Abington Hospital is a little farther to the south. The site will also be served by s CHOP (Children's Hospital) specialty care and surgery center, and by numerous specialist offices in Chalfont, Doylestown, Montgomeryville, and beyond.

Police, Fire, Ambulance, and EMS: Projected tax surpluses will cover the costs of police, fire, and EMS to the extent that those costs are covered by the township budget. New Britain Township has budgeted for upgrades to police department facilities and vehicles this year, which were planned for in the current 2022 Capital Plan. The townhome site will be served by the Chal-Brit Regional EMS which serves Chalfont Borough, New Britain Township, New Britain Borough, Hilltown Township, and Warrington Township. The Chal-Brit EMS is funded through a combination of a local services tax (levied on people who work in the townships/boroughs), additional public funds, membership fees voluntarily paid by residents, donations, and charges for services. The new homes are in a location that will be easy to reach for police, fire, and ambulances, and they will be designed for optimal road access, and to meet all the most current fire and life-safety standards for new construction.

See "Community Impact Statement" prepared by ESE Consultants, dated February, 22 2023 for supporting data.

15. Utility Needs Inventory

The proposed residential subdivision will be served by public water and sewer. The site will also be served by the other necessary franchise utilities such as cable, electric, gas, and phone. The site is located within the Townships Act 537 plan. The surrounding sites are developed and the utilities that serve those sites will be extended. Will serve letters from the North Wales Water Authority, PECO (gas and electric), Verizon (cable and phone) and Chalfont-New Britain Twp. Jt. Sewage Authority are attached to this conditional use submission.

The site is proposed to have 2 detention basins to treat and discharge the water from the site to meet the requirements of the Town and DEP. There will be storm sewer and swales to convey the water to the basins. The conditional use design provides for managed release concept (MRC) stormwater basins to allow for the possibility of infiltration/ evapotranspiration and water quality before discharge from the site.

16. Transportation

"Transportation System Inventory & Analysis" prepared by Traffic Planning and Design, dated February 9, 2023 for supporting data.

17. Adverse Impacts

(a) Water Quality and Quantity: During construction the soils may not be stabilized and may mix with the water and travel from where they were on the site. After construction, the water will flow on roads, roofs, and concrete which may increase the speed the water leaves the site and also collect particles.
(b) Air Quality- During construction phase, soil disturbance during grading activities may result in localized airborne dust as well as emissions from construction vehicles.
(c) Noise- During construction phase, impacts from noise are expected to be greatest during the site grading activities. Upon completion of project, typical noise level from residential use anticipated and will be governed by township code.
(d) Undesirable land use patterns-Proposed development of a partially developed parcel of land. Increased impervious surface will be eminent. Increase in traffic associated with 44 townhomes.
(e) Damage or destruction of significant plant or wildlife systems- minimal impacts to any significant plant or wildlife systems are anticipated. Project is proposing a disturbance of an existing conservation easement for a road and sidewalk crossing.
(f) Aesthetic values – In the short-term during site construction, significant clearing of vegetation is required, as well as earth moving and site construction activities. In the long-term when construction is complete, the site will be extensively landscaped and revegetated.
(g) Destruction of natural resources- Due to site grading and construction requirements, the land disturbance will result in the removal of some existing trees and fallow field is unavoidable.
(h) Displacement of people and businesses- No displacement of people or business is expected.
(i) Displacement of viable farms – No displacement of viable farms is expected.
(j) Employment and property taxes – No displacement of employment is expected. Property tax will increase for the parcel as a whole.
(k) Destruction of manmade resources – The existing metal garage, gravel access drive will be eliminated.

(l) Disruption of desirable community and regional growth – Toll Brothers, Inc. is luxury residential home builder that has been building highly desirable communities in the state for over 40 years. No anticipated undesirable outcomes to desirable community and regional growth. The proposed development is expected to pay enough in annual property and earned income taxes to fully cover the per capita costs of township services and public education, without any deficit in fiscal impacts. Please refer to the attached Community Impact Study for more information on the projected Fiscal Impact of the proposed development.

(m) Health, safety and well-being of the public – No adverse impacts to the health, safety and well-being of the public is expected as a result of this project.

18. Mitigation Measures

(a) Water Quality and Quantity - During construction the stormwater will be conveyed to silt fence and sediment basins to allow the sediment to settle out before discharge from the site. The water quality from the subdivision will be conveyed to the detention basins where the MRC design will filter the water thru the media in the bottom of the basin before discharging the lower storms. The site also has stabilized open space which will allow for contact with the soils and grass to help in treating the stormwater. The site and all the study points will reduce the water quantity to the Township ordinance and DEP requirements (which reduces all storm rates and any increase in the 2-year volume to below the pre-development amounts).

(b) Air Quality -During the site grading and construction phases, dust control shall be provided by routine watering of earthwork areas and street sweeping during construction activities. Minimal earthwork is anticipated to take place along the perimeter of the site and dust is not anticipated to impact neighboring properties. Upon completion of the project site soils will be stabilized, and no further air quality impacts associated with airborne dust are expected.

(c) Noise- Noise from large grading and excavating machinery is the most significant expected noise and is unavoidable. Sound levels from heavy sitework equipment such as graders, pavers, and dozers ranges from 80 to 120 decibels (dB), while other construction equipment such as power tools can range up to 115 dB. Factors that can affect the in-air noise over distance to adjacent properties, including topography, vegetation, temperature, and ambient noise. During construction when the ground is unpaved and uncompacted, the ground becomes absorptive of sound and less impact would be expected offsite. As more of the site becomes paved and structures are erected, surfaces become more reflective and can carry greater distances. This condition is expected to be temporary during the construction phase. To minimize disturbances to neighboring properties, all site work and construction will be limited to normal working hours (7:00 am to 5:00 pm). Construction vehicles will be equipped with the appropriate noise control measures (mufflers, dampers, etc.).

(d) Undesirable land use patterns – While impervious surfaces will be increased from the existing conditions, the project proposes a private homeowners association maintained open space with an array of BMP measures to mitigate surface water runoff and control discharges to surface waters.
(e) Damage or destruction of significant plant or wildlife systems- The project is not encroaching into any wetlands. Disturbance of a wooded area of approximately 4,300 sf is being proposed for the vehicular and pedestrian connection to the Wawa parcel. Disturbed area will be restabilized with appropriate seeding and any trees removed will be replaced.
(f) Aesthetic values –During construction, tire cleaning stations will be mandatory to ensure dirt from construction vehicles is minimized on adjacent shared roadways. Increased landscape vegetation and routine maintenance plan for the open space and the perimeter of the site is proposed and will provide an improved visual screen from and to adjacent properties.
(g) Destruction of natural resources- Proposed disturbances to approximately 300 sf of woodlands within a conservation easement is proposed. Several individual trees located in the central area of the site will also be removed. Many of the mature trees located on site are in poor health and have been overrun by invasive vines. Any trees proposed to be removed will be replaced with native species.

19. Irreversible Impacts

(a) Water Quality and Quantity- The land that the structures are on (roads, sidewalk, and homes) will not infiltrate or store the water that was previously performed prior to construction.
(b) Air Quality- Emissions to the ambient air are limited to discharges common to any residential housing community, and include typical sources such as emissions from automobiles, mowers, and combustion from water heaters and furnaces that burn fossil fuels such as natural gas. No emissions exceeding PA DEP standards nor changes in air quality is expected.
(c) Noise – It is expected the typical noise levels associated with from residential homes is unavoidable and not to exceed levels as governed by Township code.
(d) Undesirable land use patterns – increase in traffic associated with 44 townhomes.

List of Contributors:

Emily Stewart, RLA, AICP
Project Planner & Landscape Architect
1140 Virginia Drive, Fort Washington, PA 19034

Hannah Mazzaccaro, AICP, NJPP
Project Planner
1140 Virginia Drive, Fort Washington, PA 19034

Michael Warrick, Environmental Project Manager
Professional Wetland Scientist, Professional Soil Scientist
1140 Virginia Drive, Fort Washington, PA 19034

Jeffrey Madden, PE
Asst. Regional Director of Engineering
1140 Virginia Drive, Fort Washington, PA 19034

verizon

September 30, 2021

Casey Brady-Gold
Toll Brothers
1140 Virginia Dr.
Fort Washington, PA 19034

Project: Townhome Development, County Line Road and W. Butler Avenue, New Britain Township, Bucks County, PA

In reference to the above-mentioned Development, and subject to applicable laws, franchises, regulations and tariffs, Verizon Pennsylvania LLC will supply communication service at the Development if we receive the proper information, easements and payments needed such as:

1. One full set of paper development plans at no cost to Verizon.
2. Mailing addresses for each building when they become available to start to establish the 911 database.
3. Documentation granting all required rights-of-way and easements at no cost to Verizon.
4. Where applicable, payment in full of required advance construction payment based on estimated costs. The actual cost to you will depend on such factors as lot size, the proximity of existing feeder facilities, the existing feeder capacity, terrain and other environmental conditions (e.g., railroads, waterways). Please contact Verizon if you require a more precise estimate of construction costs for the Development.

Additionally, circumstances not currently known to Verizon may hinder or impede the installation of communication services and Verizon reserves the right to react to such circumstances in its discretion. Should you need any additional information, please do not hesitate to contact the local engineer, Chris Kintzly at 215-341-0840.

Sincerely,

Michael Foy
Senior Manager

North Wales Water Authority
PUBLICLY OWNED SINCE 1951

September 29, 2021

Casey Brady-Gold, P.E.
Assistant Land Development Manager
Toll Brothers
1140 Virginia Drive
Fort Washington, PA 19034

RE: County Line Road and W. Butler Ave.
New Britain Township, Bucks County, PA

Dear Mr. Brady-Gold:

Please be advised that the Authority does have water system capacity available for the proposed project, subject to the customer entering into an agreement with the Authority and paying all applicable fees and costs.

Said statement is to be considered as a preliminary indication of the Authority's willingness to serve and shall not be binding on the Authority until agreements and or additional capacity and connection fees have been satisfied.

Should you have any further questions please contact Brad Fisher at (215) 699-4836 or email to bfisher@nwwater.com.

Sincerely,

Brad Fisher, P.E.
Director of Engineering & Operations
North Wales Water Authority

PECO

AN EXELON COMPANY
400 Park Ave
Warminster, PA 18974

September 30, 2021

To: Casey Brady-Gold, P.E.
Assistant Land Development Manager
Toll Brothers
1140 Virginia Drive, Fort Washington, PA 19034

RE: Proposed New Development County Line and W. Butler Pike – New Britain Twp., Bucks County.

Dear Ms. Brady-Gold,

In response to your request, please be advised that your above-mentioned development is in PECO Energy Company's electric territory. Whether there is sufficient capacity in the electric system and natural gas system to serve your development will be determined based on the final approved plans for the development that are submitted by the builder at pre-design.

If you desire any further information, please do not hesitate to call me at (610) 517-0837.

Cordially,

Kevin Gorman

Kevin Gorman
Project Manager
PECO NRCG

1. PROJECT INFORMATION

Project Name: **New Britain CTP Site**
Date of Review: **9/24/2021 11:35:56 AM**
Project Category: **Development, Residential, Subdivision containing more than 2 lots and/or 2 single-family units**
Project Area: **7.86 acres**
County(s): **Bucks**
Township/Municipality(s): **NEW BRITAIN TOWNSHIP**
ZIP Code:
Quadrangle Name(s): **DOYLESTOWN**
Watersheds HUC 8: **Crosswicks-Neshaminy**
Watersheds HUC 12: **West Branch Neshaminy Creek**
Decimal Degrees: **40.268262, -75.228294**
Degrees Minutes Seconds: **40° 16' 5.7440" N, 75° 13' 41.8599" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

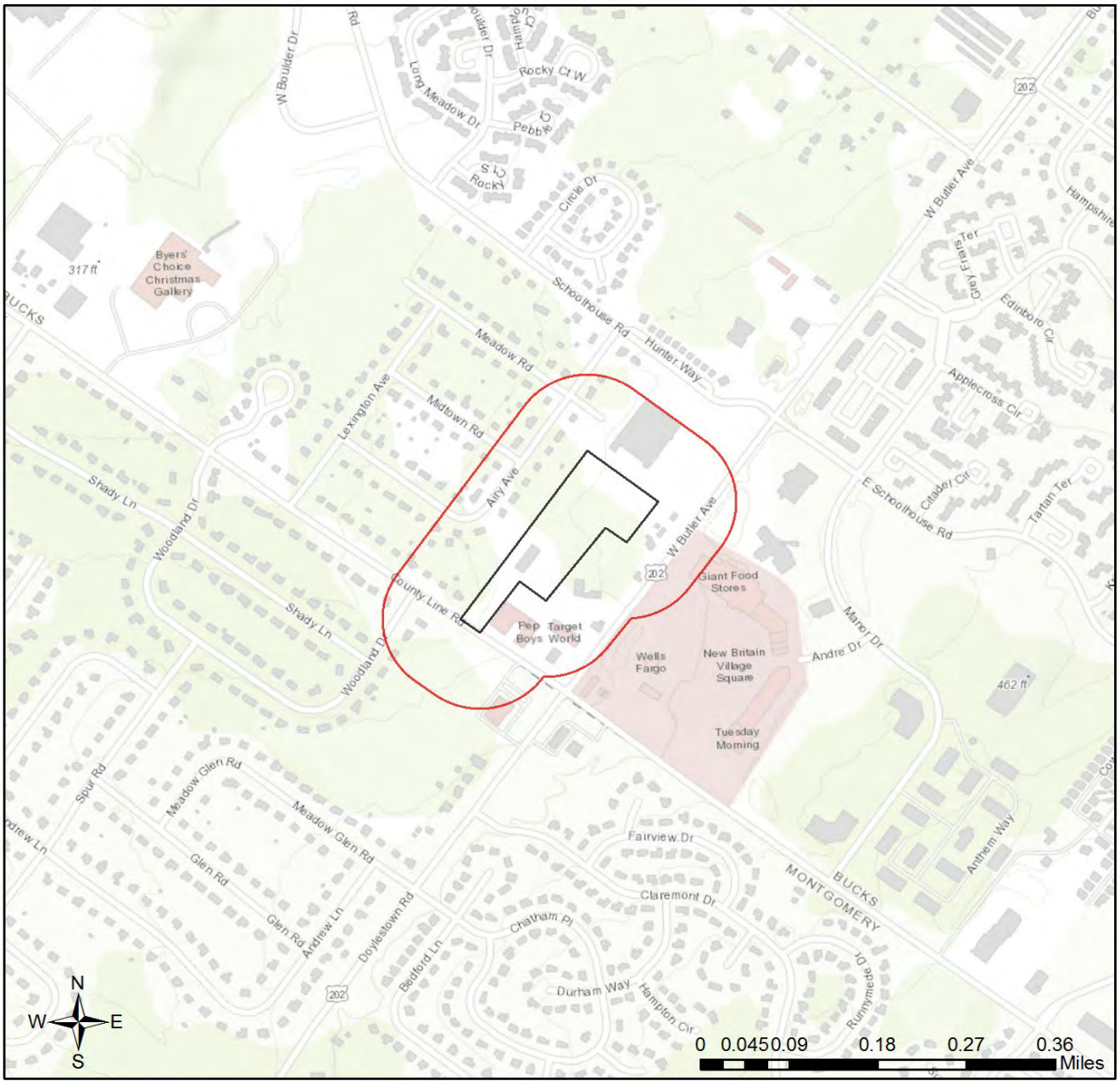
New Britain CTP Site

Project Boundary

Buffered Project Boundary

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

New Britain CTP Site



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: The proposed project is in the range of the Indiana bat. Describe how the project will affect bat habitat (forests, woodlots and trees) and indicate what measures will be taken in consideration of this. Round acreages up to the nearest acre (e.g., 0.2 acres = 1 acre).
Your answer is: The project will affect 1 to 39 acres of forests, woodlots and trees.

Q2: Is tree removal, tree cutting or forest clearing of 40 acres or more necessary to implement all aspects of this project?
Your answer is: No

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission
RESPONSE:
No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service
RESPONSE:
No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

ESE CONSULTANTS

ENGINEERING · PLANNING · SURVEYING · ENVIRONMENTAL

FISCAL IMPACT ANALYSIS

BIRCH RUN AT NEW BRITAIN

A.K.A. CTP MANAGEMENT PROPERTY

TOWNHOME RESIDENTIAL DEVELOPMENT

NEW BRITAIN TOWNSHIP, BUCKS COUNTY, PA

prepared for:

Toll Brothers, Inc.

prepared by:

Hannah Mazzaccaro, AICP / NJPP

February 22, 2023

ESE Consultants, Inc.
1140 Virginia Drive · Fort Washington, PA 19034
(215) 914-2050

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report analyzes the impacts a proposed townhome residential development will have on population growth, school enrollment, and public services in New Britain Township and Central Bucks School District. The proposed development consists of 44 luxury townhomes served by private roads and a Homeowners' Association (HOA). The projected population of the new homes is 121 residents, and it is estimated that 14 children from the new homes will attend local public schools. The development is expected to bring a combined total of $12,919 in annual surplus tax dollars to the township and school district, with the new residents paying more in property and earned income taxes than they are likely to consume each year in local public services.

Summary: ANNUAL FISCAL IMPACTS

	Annual Tax REVENUE	Annual Public COST	Annual Net SURPLUS
Municipal Services:	$60,500	($57,337)	$3,163
School District Services:	$278,332	($268,576)	$9,756
TOTALS:	$338,832	($325,913)	$12,919
TOTAL NET SURPLUS PUBLIC REVENUE:			**$12,919**
AVERAGE Net Surplus Per New Home (Average of 44 Homes):			$294

See the following tables for more detailed calculations and source data.

METHODOLOGY

This analysis uses the per capita multiplier method of fiscal impact analysis, which establishes average costs per person for public services and compares those costs with projected tax revenue streams from a proposed development.

The per capita multipliers used herein to project population changes and school enrollment are from the most recent update to Rutgers University's Center for Urban Policy Research (CUPR) report "Who Lives in New Jersey Housing?" published November 2018, which were derived from detailed analysis of US Census Bureau data at the census block level based on newer housing units built between 2000 and 2016. The CUPR data set is the standard used for per capita multiplier projections in the US, and it is the data source New Britain Township's SALDO specifies using for fiscal impact calculations.

POPULATION PROJECTIONS

Total Population by Age

New Britain Township is in central Bucks County, just north of the Montgomery County line. The proposed townhome development site is in the most densely populated and developed area of the township between Montgomeryville and Doylestown, centered around the Route 202 corridor, which is characterized by a mix of single and multi-family residential, commercial, retail, and industrial land uses.

The township last updated its Comprehensive Plan in 2016 when the 2010 Census Bureau population count was 11,070 people. As of the 2020 Census, the population grew to 12,335 people living in 4,456 households, with an average household size of 2.77 people. The proposed residential development is estimated to add a total of 121 residents in 44 households to the township with an average household size of 2.755 people (using Rutgers demographic multipliers). The 44 proposed homes will be traditional 3-bedroom townhomes. All units will be for sale for homeownership (not rentals).

The number of families with children living in a new housing unit correlates to the size, value, tenure (homeowner vs. rental) and number of bedrooms in the home. The following table (Table 1) lists the projected population of each new unit broken down by age cohorts. See below for source data information.

Table 1: PROJECTED POPULATION BY AGE

UNIT TYPE	# Units	Pre-School: 0-4 Years	School-Age: 5-17 Years	Parents: 18-44 Years	Middle-Aged: 45-64 Years	Seniors: 65-75+ Years	**TOTAL PERSONS**
3-BR Single-Family Attached Townhomes	Per Unit	0.258	0.403	1.070	0.727	0.297	2.755
	x 44 Units	11	18	47	32	13	**121**

Demographic multipliers for average household size are from the 2018 Rutgers University Center for Urban Policy Research (CUPR) report "Who Lives in New Jersey Housing," page 34: Table II-A-1. Total Persons and Persons by Age (Newer housing units built 2000-2016, from 2012-2016 ACS). See attached for more information and tables. Although the report is based on New Jersey census data, it is the best available data for demographics in the northeastern US and is the widely used standard for fiscal impact calculations. New Britain Township SALDO requires applicants to use the latest Rutgers data for demographic projections for fiscal impact analysis. Fractional numbers are rounded in the total.

Public School Enrollment

The proposed 44-townhome development is expected to house approximately 29 total children under the age of 18 (24% of the total new residents). On average, at any given snapshot in time, 11 of the projected children will be infants and preschoolers 0-4 years old, not yet in school, and 18 of the children will be school-aged. Of those 18 school-aged children, 14 are expected to attend public schools, factoring out children enrolled in private schools or homeschooled based on local data. The 14 public school children will be spread out throughout the K-12 grades in multiple public schools.

The Central Bucks School District is the largest suburban school district in Pennsylvania, with just over 17,500 students in Kindergarten through twelfth grade in twenty-three (23) schools, as of the current school year. The proposed development is in the catchment areas for Simon Butler Elementary School (K-6), Unami Middle School (7-9) and Central Bucks South High School (10-12).

The following table (Table 2) projects the number of children estimated to attend Central Bucks Public Schools in each grade-level grouping in the new homes.

Table 2: PUBLIC SCHOOL CHILDREN

	# Units	Butler Elementary School (K-6)	Unami Middle School (7-9)	CB South High School (10-12)	TOTAL NEW STUDENTS
3-BR Single-Family Attached Townhomes	Per Unit	0.199	0.063	0.056	0.318
	x 44 Units	9	3	2	14

Data from 2018 Rutgers CUPR report, page 40: Table II-A-3. Public School Children. Fractional numbers of students are rounded in the total. Multipliers are pro-rated to account for differences in grade level groupings between the Rutgers data and CBSD schools.

According to a recent study commissioned by the school district (Crabtree, Rohrbaugh & Associates, 2021 – 2022), Central Bucks School District has had declining enrollment for the last decade, decreasing by nearly 3,000 students since the 2010-2011 school year. The district is currently considering a realignment of grades to K-5, 6-8, and 9-12, adjusting the catchment boundaries of some schools, and possible closure of one elementary school.

The pandemic in the 2019-2020 school year caused a large drop in student numbers, with more than 600 students leaving the district during that time, in part due to an increase in home-schooling and private school attendance.

The projected increase in students from the proposed new homes will be gradual over a period of 2 to 3 years as the community is built out and sold to homeowners. Given that the district has had a large decline in enrollment recently, it is anticipated that the schools' physical space and facilities will be able to easily absorb an increase in enrollment without the need for capital improvements. Staffing levels may need to increase slightly to accommodate the new students at the elementary school level, but probably not at the middle or high school levels, given that the increase is likely to be between 0 and 2 new students per grade.

The largest impact to the district as a direct result of this development will likely be the need to provide bussing to the new community for 9 new elementary students, 3 new middle schoolers, and 2 new high schoolers, and possibly for some private school students living in the new homes.

FISCAL IMPACTS

The Per Capita Multiplier method of fiscal impact assessment estimates future public costs by dividing annual budgetary expenses by the number of residents in the municipality or pupils in the district and then uses the resulting per-person amount to estimate how much it will cost to provide public services to the population of a new development. Future revenues from the new community are calculated by estimating the property taxes and earned income taxes that will be paid, based on home values and a conservative estimate of minimum household incomes in the new homes.

Home Values

The proposed development will consist of 44 market-rate townhomes with 3 bedrooms each. The (16) end units are expected to sell for about $30,000 more than the (28) smaller interior units, which share party walls with units on both sides. The weighted average delivered price of all the townhomes will be $615,904, which includes all the options and upgrades that homeowners typically choose as part of the home-buying and construction process.

Proposed development sales prices (from Toll Brothers):

- (16) 3-Bedroom End Unit Townhomes
    - Average delivered market rate sales price: $634,995
- (28) 3-Bedroom Interior Unit Townhomes
    - Average delivered market rate sales price: $604,995
- Weighted average sales price for all (44) townhomes: $615,904

TOTAL Market Value – All 44 Homes: $27,099,776

In Bucks County, homes are currently assessed at a factor of 13.70 of their market values (market value divided by 13.70 = assessed value). This number is also used to calculate real estate transfer taxes.

The sales of the new homes will be spread out over a phased multi-year construction period; this analysis measures the fiscal impact as though all the homes were built-out and occupied, using current budgetary numbers and current home values.

Property Tax Revenues

Homes in New Britain Township are assessed at a factor of 13.70 of their market values, based on the Bucks County Common Level Ratio (market value divided by 13.70 = assessed value). Table 3A summarizes the annual property tax revenue projected to be paid by each home, and the total annual revenues generated by the project when it is fully built out. Each of the townhomes will pay an average of $7,237 in annual property taxes to the township and school district. (Additional taxes are paid to Bucks County, but those are not included in this analysis.)

Table 3A: ANNUAL PROPERTY TAX REVENUES

Average Assessed Value: ($615,904 Weighted Avg. Sales Price divided by 13.70 Bucks County Common Level Ratio)		AVERAGE ASSESSED VALUE:	**TOTAL - 44 TOWNHOMES:**
		$44,956	$1,978,086
Millage Rates Per $1000 of Assessed Value: (2023)			
New Britain Township:	14.500	$652	**$28,682**
Central Bucks School District:	127.840	$5,747	**$252,878**
TOTAL TAX REVENUE PER HOME:		**$6,399**	**$281,561**

Average market values are based on Toll Brothers' recent sales figures for similar home models in Bucks County and local comparable sales. According to the state-published Common Level Ratio (last updated January 2023), homes in Bucks County are currently assessed at a ratio of 13.70. Assessed Value of properties in Bucks County for taxation purposes should equal 7.3% of the fair market value, because properties in Bucks County have not been fully reassessed since 1972.

Earned Income Taxes

A large portion of New Britain Township's annual revenue comes from a local tax on households' earned income. New Britain has a relatively high median household income of $115,700, according to the latest US Census data. This is higher than the Bucks and Montgomery County median household incomes of about $99,000 (the two counties' incomes were nearly the same in 2021). Toll Brothers builds luxury homes at the higher end of the new housing market, and their buyers typically earn much more than the area median income, so the following estimate is conservatively less than what the township and school district would likely gain from the new residents' earned income taxes. The assumed household income of $115,700 is on par with the minimum required for a mortgage on a home in the $600,000 range, assuming a 20% minimum down-payment, low debt-to-income ratio, and high credit score.

Table 3B: ANNUAL EARNED INCOME TAX REVENUES

Average Household Income (assumed to be at least as much as Township Median Income, from 2020 US Census)		AVG. HOUSEHOLD INCOME	**TOTAL - 44 TOWNHOMES:**
		$115,700	$5,090,800
Earned Income Tax Rates (Resident who works outside Twp.):			
New Britain Township:	0.625%	$723	**$31,818**
Central Bucks School District:	0.500%	$579	**$25,454**
TOTAL TAX REVENUE PER HOME:		**$1,302**	**$57,272**

Municipal Fiscal Impact

New Britain Township's adopted 2023 Budget reports that the amount raised by local property and earned income taxes for the prior year was $6,078,173. Of that amount, approximately 4% is paid by commercial and industrial land uses, leaving $5,835,046 to be paid by residential property taxpayers for public services. Dividing this amount by 12,335 people (US Census Bureau estimate, 2021) results in a Per Capita tax-supported Cost of Services of $473 per person.

Using the per capita cost multiplier, it will cost a total of $57,337 ($473 x 121 people) for New Britain Township to provide annual public services to the new residents. The township will gain $57,337 per year in new tax revenue (property taxes + earned income taxes) from the 44 proposed homes, providing a net fiscal surplus of $3,163 annually. The proposed homes will pay more than the amount needed to provide municipal services such as police, fire, and emergency services, road maintenance and public works, parks and recreation, social services, courts, and other administrative functions. The proposed community will be served by private roads and utilities, privately funded by Homeowners' Association fees, further reducing the impact of the new homes.

Table 4: MUNICIPAL FISCAL IMPACT

	Annual Tax REVENUE	Annual Per Capita Public Cost	x Estimated Community Population	Total Annual Public COST:	Annual Net SURPLUS
Municipal Property & Earned Income Taxes:	$60,500	$473	121	($57,337)	$3,163
				TOTAL MUNICIPAL NET SURPLUS REVENUE:	$3,163
				AVERAGE Net Surplus Per New Home (Average of All 44 Units):	$72

Per Capita cost of Township services is calculated by dividing the total revenue raised from property taxes and earned income taxes from the New Britain Twp. Budget ($6,078,173) by the number of residents in the township (12,335 people as of the 2020 US Census). The resulting tax-supported cost per capita is $493. According to the township budget and the Bucks County property classification report, approximately 4% of the taxable property value in New Britain Twp. is tax-paying commercial, therefore the residential taxpayer per capita cost and residential tax burden is reduced by 4% to $473 per person.

School District Fiscal Impact

As detailed in the school enrollment projections above, the proposed townhome residential development is expected to increase enrollment in the Central Bucks School District by 14 students when the project is fully built-out and occupied, with the new students spread out between 3 different schools in 13 grade levels.

Calculating the per pupil educational expenditures from the CBSD 2022-23 Budget, it will cost $19,184 per student, and a total of $268,576 ($19,184 x 14 students) to provide educational services to the new residents. Using the tax revenue calculations in Tables 3A & 3B, the school district will gain $278,332 per year in tax revenue from the 44 new homes, providing a net fiscal surplus of $9,756 annually.

The proposed homes will pay more than the amount needed to educate the expected increase of children in the district. The district may need to increase bus transportation, staffing, and supplies to accommodate the new students in each of the local schools, but the surplus revenue is likely to cover any increased expenses. It is worth noting that large single-family homes in the township (4+ bedrooms) typically do not pay in taxes the full amount needed to educate the number of children living in each home. The fiscal impact of townhomes on local schools is typically better than that of larger homes.

Table 5: SCHOOL DISTRICT FISCAL IMPACT

	Annual Property Tax REVENUE	Annual Per Pupil Cost	x Estimated Public School Children	Total Annual Public COST:	Annual Net SURPLUS
K-12 PUBLIC SCHOOL SERVICES – Property & Earned Income Taxes	$278,332	$19,184	14	($268,576)	$9,756
				TOTAL SCHOOLS NET SURPLUS REVENUE:	**$9,756**
				AVERAGE Net Surplus Per New Home (Average of All 44 Units):	$222

Per Pupil cost calculated by taking the 2021-22 total expenditures from the 2023 CBSD Budget ($335,794,679, not including debt service and interfund transfers), and dividing by the total 2021-22 CBSD enrollment of 17,504 students, for a total educational services cost of $19,184 per pupil. The prior year is used so that numbers are based on actual expenditures, not projected budgeted amounts.

APPENDICES:

- Cover Page & Selected Data Tables - Rutgers CUPR Report, “Who Lives in New Jersey Housing,” published November 2018
- PA Real Estate Valuation Factors table (January 2023)
- Millage Rates (January 2023)
- Preparer’s Professional Qualifications

RUTGERS
Edward J. Bloustein School
of Planning and Public Policy

Who Lives in New Jersey Housing?

UPDATED NEW JERSEY DEMOGRAPHIC MULTIPLIERS

The Profile of Occupants of Residential Development in New Jersey

Alexandru Voicu and David Listokin
CENTER FOR URBAN POLICY RESEARCH
EDWARD J. BLOUSTEIN SCHOOL OF PLANNING AND PUBLIC POLICY
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK, NEW JERSEY

November 2018

CONTENTS

TABLE II-A-1. STATEWIDE NEW JERSEY
TOTAL PERSONS AND PERSONS BY AGE (Newer housing units built 2000-2016, from 2012-2016 ACS)

STRUCTURE TYPE/ BEDROOMS VALUE/TENURE		TOTAL PERSONS	AGE 0-4	5-17	18-34	35-44	45-54	55-64	65-74	75+
Single-Family Detached (Own/Rent), 2 BR										
All Values		1.830	0.039	0.060	0.119	0.064	0.122	0.310	0.665	0.451
Below Median	$284,000	1.782	0.065	0.080	0.174	0.091	0.111	0.275	0.539	0.448
Above Median	$284,000	1.880	0.013	0.039	0.063	0.036	0.133	0.346	0.794	0.455
Single-Family Detached (Own/Rent), 3 BR										
All Values		2.762	0.169	0.446	0.471	0.420	0.344	0.355	0.382	0.177
Below Median	$304,000	2.898	0.205	0.518	0.609	0.487	0.362	0.322	0.262	0.132
Above Median	$304,000	2.606	0.127	0.362	0.312	0.342	0.322	0.392	0.519	0.228
Single-Family Detached (Own/Rent), 4-5 BR										
All Values		3.780	0.266	1.044	0.548	0.651	0.692	0.329	0.170	0.079
Below Median	$506,000	3.837	0.288	1.031	0.655	0.674	0.647	0.300	0.165	0.076
Above Median	$506,000	3.719	0.243	1.057	0.433	0.627	0.740	0.360	0.177	0.082
Single-Family Attached (Own/Rent), 2 BR										
All Values		2.311	0.218	0.274	0.499	0.420	0.270	0.272	0.216	0.142
Below Median	$238,000	2.265	0.226	0.302	0.634	0.345	0.219	0.272	0.172	0.094
Above Median	$238,000	2.359	0.209	0.245	0.361	0.498	0.321	0.272	0.261	0.191
Single-Family Attached (Own/Rent), 3 BR										
All Values		3.002	0.301	0.572	0.675	0.547	0.363	0.316	0.162	0.065
Below Median	$283,000	3.241	0.344	0.735	0.841	0.528	0.378	0.255	0.108	0.053
Above Median	$283,000	2.755	0.258	0.403	0.504	0.566	0.348	0.379	0.219	0.078
2-4 Units (Own/Rent), 0-1 BR										
All Values		2.003	0.180	0.212	0.732	0.333	0.211	0.169	0.078	0.089
Below Median	$114,000	1.770	0.174	0.150	0.687	0.271	0.163	0.168	0.095	0.063
Above Median	$114,000	2.246	0.186	0.277	0.779	0.398	0.261	0.170	0.059	0.117
2-4 Units (Own/Rent), 2 BR										
All Values		2.829	0.349	0.501	0.827	0.477	0.297	0.228	0.095	0.055
Below Median	$145,000	2.877	0.412	0.520	0.926	0.436	0.288	0.198	0.058	0.039
Above Median	$145,000	2.779	0.283	0.480	0.723	0.520	0.305	0.260	0.135	0.073
2-4 Units (Own/Rent), 3 BR										
All Values		3.707	0.372	0.841	1.102	0.565	0.465	0.233	0.090	0.039
Below Median	$178,000	3.678	0.363	0.920	1.126	0.501	0.451	0.207	0.079	0.031
Above Median	$178,000	3.738	0.382	0.759	1.077	0.631	0.480	0.260	0.102	0.047

TABLE II-A-3. STATEWIDE NEW JERSEY.

PUBLIC SCHOOL CHILDREN (PSC) (Newer housing units built 2000-2016, from 2012-2016 ACS)

STRUCTURE TYPE/ BEDROOMS VALUE/TENURE		TOTAL PSC	PUBLIC SCHOOL GRADE Elementary (K-5)	Junior High School (6-8)	High School (9-12)
Single-Family Detached (Own/Rent), 2 BR					
All Values		0.052	0.027	0.012	0.013
Below Median	$284,000	0.071	0.035	0.018	0.018
Above Median	$284,000	0.033	0.019	0.007	0.008
Single-Family Detached (Own/Rent), 3 BR					
All Values		0.385	0.187	0.095	0.104
Below Median	$304,000	0.453	0.216	0.108	0.129
Above Median	$304,000	0.307	0.153	0.079	0.074
Single-Family Detached (Own/Rent), 4-5 BR					
All Values		0.848	0.381	0.219	0.248
Below Median	$506,000	0.851	0.397	0.219	0.235
Above Median	$506,000	0.846	0.364	0.220	0.261
Single-Family Attached (Own/Rent), 2 BR					
All Values		0.226	0.126	0.037	0.062
Below Median	$238,000	0.258	0.128	0.054	0.076
Above Median	$238,000	0.193	0.125	0.020	0.048
Single-Family Attached (Own/Rent), 3 BR					
All Values		0.477	0.246	0.112	0.118
Below Median	$283,000	0.630	0.318	0.141	0.172
Above Median	$283,000	0.318	0.173	0.083	0.062
2-4 Units (Own/Rent), 0-1 BR					
All Values		0.175	0.092	0.033	0.050
Below Median	$114,000	0.103	0.086	0.009	0.008
Above Median	$114,000	0.251	0.098	0.058	0.095
2-4 Units (Own/Rent), 2 BR					
All Values		0.471	0.242	0.096	0.133
Below Median	$145,000	0.500	0.272	0.116	0.112
Above Median	$145,000	0.439	0.209	0.075	0.155
2-4 Units (Own/Rent), 3 BR					
All Values		0.760	0.361	0.193	0.206
Below Median	$178,000	0.835	0.398	0.225	0.212
Above Median	$178,000	0.681	0.322	0.159	0.200

pennsylvania
DEPARTMENT OF REVENUE

REALTY TRANSFER TAX
2021 COMMON LEVEL RATIO
REAL ESTATE VALUATION FACTORS

January 2023

The following real estate valuation factors are based on sales data compiled by the State Tax Equalization Board in 2021. These factors are the mathematical reciprocals of the actual common level ratio (CLR). For Pennsylvania Realty Transfer Tax purposes, these factors are applicable for documents accepted from **July 1, 2022 to June 30, 2023.** The date of acceptance of a document is rebuttably presumed to be its date of execution, that is, the date specified in the body of the document as the date of the instrument (61 Pa. Code § 91.102).

COUNTY	CLR FACTOR	COUNTY	CLR FACTOR	COUNTY	CLR FACTOR
Adams	1.14	Elk	3.98	Montour	1.81
Allegheny	1.57	Erie	1.41	Northampton	4.61
Armstrong	2.46	Fayette	1.93	Northumberland	8.20
Beaver	6.76	Forest	6.85	Perry	1.41
Bedford	1.39	Franklin	10.53	Philadelphia[1]	1.08[a]
Berks	2.22	Fulton	3.76	Philadelphia[1]	1.00[b]
Blair	1.16	Greene	2.19	Pike	8.26
Bradford	4.33	Huntingdon	6.54	Potter	4.37
Bucks	13.70	Indiana	1.06	Schuylkill	3.82
Butler	14.08	Jefferson	3.66	Snyder	8.40
Cambria	6.06	Juniata	9.35	Somerset	4.24
Cameron	4.18	Lackawanna	12.20	Sullivan	1.81
Carbon	4.12	Lancaster	1.47	Susquehanna	4.52
Centre	4.67	Lawrence	1.67	Tioga	1.94
Chester	2.53	Lebanon	1.39	Union	1.80
Clarion	3.44	Lehigh	1.57	Venango	1.52
Clearfield	9.90	Luzerne	1.32	Warren	5.26
Clinton	1.57	Lycoming	1.79	Washington	1.19
Columbia	5.78	McKean	1.24	Wayne	1.75
Crawford	4.69	Mercer	6.99	Westmoreland	9.09
Cumberland	1.17	Mifflin	3.51	Wyoming	7.04
Dauphin	1.91	Monroe	1.65	York	1.52
Delaware	1.37	Montgomery	2.53		

(1) Adjusted by the Department of Revenue to reflect an assessment base change effective January 1, 2023.
(a) The previous assessed value and CLRF of 1.08 applies to documents accepted from July 1, 2022 to December 31, 2022.
(b) The new assessed value and CLRF of 1.00 applies to documents accepted from January 1, 2023 to June 30, 2023.

ESE CONSULTANTS
ENGINEERING · PLANNING · SURVEYING · ENVIRONMENTAL

HANNAH MAZZACCARO
AICP, PP

Ms. Mazzaccaro is a Professional Planner with almost twenty years' experience in local land use planning for municipal stakeholders and private development clients. She has designed hundreds of residential and mixed-use developments, and drafted zoning ordinances, community plans, environmental impact statements, fiscal impact studies, and other planning reports for project review and approvals. Ms. Mazzaccaro maintains planning certifications with annual continuing education in land use trends and best practices.

Professional Licensure

- **New Jersey State Board of Professional Planners**, Licensed since 2015
  License # 33LI00630100
- **American Institute of Certified Planners**, Licensed since 2006, License # 147777

Employment History

- **ESE Consultants**
  2012- Present & 2004-2006
- **Montgomery County Planning Commission**
  2008-2012
- **Barton Partners Architects & Planners**
  2006-2008

Education

- **Master of City Planning, University of Pennsylvania,** 2004

Volunteer Service

- **Zoning Hearing Board**, Cheltenham Township, PA, Voting Member, 2018-Present
- **Planning Commission**, Cheltenham Township, PA, Former Voting Member, 2016-2018
- **Environmental Advisory Council**, Cheltenham Township, PA, 2009 - 2012
- **Troop Committee Member**,
  Scouts BSA, Wyncote Troop 116

Selected Projects

- South Brunswick Twp., Middlesex County, NJ
  Major Road Property, Site Planning & Environmental Impact Assessment, 2012-2018
- West Windsor Township, Mercer County, NJ
  Proposed Age-Restricted Community, COAH Site Suitability Report, 2018
- Hillsborough Township, Somerset County, NJ
  Royce Brook Planned Residential District, Zoning Ordinance, Adopted 2020
- Florham Park Borough, Morris County, NJ
  Multifamily Residential Community, Site Planning & Zoning Ordinance, Adopted 2017
- Franklin Township, Somerset County, NJ
  Bunker Hill Residential Re-Zoning, Fiscal Impact Analysis, 2017
- Alpha Borough, Warren County, NJ
  Proposed Seniors Affordable Housing Re-Zoning Request, Site Planning, Planning Board Testimony & Fiscal Impact Analysis, 2008
- Cheltenham Twp., Montgomery County, PA
  Riparian Corridor Conservation Overlay District Ordinance, Adopted 2016 and Sustainability Plan, Adopted 2013
- Douglass Township, Montgomery County, PA
  Revitalizing Gilbertsville: Douglass Township Economic Revitalization Plan, 2011
- Fiscal Impact Studies for development proposals in Warminster Township, Buckingham Township, Upper Makefield Township, Doylestown Township, and Langhorne Borough, and for communities throughout NY, NJ, CT, and MA

TRAFFIC PLANNING AND DESIGN, INC.

WWW.TRAFFICPD.COM

February 9, 2023

Mr. Michael Downs, P.E.
Vice President, Land Development
Toll Brothers
1140 Virginia Drive
Fort Washington, PA 19034

RE: TRANSPORTATION SYSTEM INVENTORY & ANALYSIS
New Britain Townhome Development
New Britain Township, Bucks County
TPD Job #TOLB.00046

Dear Michael:

Traffic Planning and Design, Inc. (TPD) has completed a Transportation System Inventory & Analysis with respect to traffic operations associated with the proposed New Britain Townhome Development in New Britain Township, Bucks County, Pennsylvania. The subject site is located on the northeastern quadrant of the signalized intersection of County Line Road (S.R. 2038) and West Butler Avenue (S.R. 4202), behind the recently constructed WAWA Convenience Market with Gasoline, as shown in **Figure 1.** As shown in **Figure 2**, the Proposed Site will consist of approximately 44 townhomes with access being through connections to the new WAWA and adjacent retail driveways. This evaluation analyzed the impact of the Proposed New Britain Townhome Development on the signalized intersection of County Line Road (S.R. 2038) and West Butler Avenue (S.R. 4202), as well as the new WAWA and adjacent retail driveways under Existing and Future (No-Build and Build) Conditions. TPD assumed a design year of 2027.

Manual Turning Movement Counts

Manual traffic counts were conducted on 15-minute intervals during the weekday morning (7:00 to 9:00 A.M.) and weekday evening (4:00 to 6:00 P.M.) peak periods. Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 1**.

TABLE 1
MANUAL TRAFFIC COUNT INFORMATION[1]

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour
County Line Road (S.R. 2038) & W. Butler Avenue (S.R. 4202)	Tuesday, February 22, 2022	Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:15 to 5:15 P.M.
County Line Road (S.R. 2038) & Site Driveway		Weekday A.M.	7:15 to 8:15 A.M.
		Weekday P.M.	4:30 to 5:30 P.M.
W. Butler Avenue (S.R. 4202) & Site Driveway		Weekday A.M.	7:30 to 8:30 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.

1 =Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

2022 Existing Condition traffic volumes for the weekday A.M and weekday P.M. peak hours are illustrated in **Figure 3**. Manual traffic count data sheets are provided in **Appendix A**. ***It should be noted that, the new WAWA was confirmed to be fully open and operational at the time these counts were conducted.***

BASE (NO-BUILD) CONDITIONS

A background growth factor for the roadways in the study area was developed based on growth factors for August 2021 to July 2022 obtained from the PennDOT Bureau of Planning and Research (BPR). The PennDOT BPR suggests using a background growth trend factor of 0.29% per year in Bucks County for urban non-interstate roadways. As such, the background growth factor was applied annually to yield an overall growth percentage of 1.46% (0.29% per year compounded for 5 years) for the 2027 design year.

The additional traffic volumes due to the background growth were added to the existing traffic data to produce the base (future no-build) conditions traffic volumes for the weekday A.M. and weekday P.M. peak hours, as shown in **Figure 4.**

Sight Distance Analysis

A sight distance analysis was prepared for the proposed site driveways. In general, recommended safe sight distances depend upon the posted speed limit and roadway grades. The existing sight distances at the proposed driveways were measured in accordance with PennDOT Publication 282 Highway Occupancy Permit Guidelines and compared to PennDOT's desirable sight distance standard, which is identified in 67 PA Code Chapter 441.8(h), "Access to and Occupancy of Highways by Driveways and Local Roads." In addition, measured sight distances at the proposed driveways were compared to PennDOT's safe stopping sight distance standard, which is calculated by the following equation:

$$\mathbf{SSSD = 1.47VT + V^2/[30(f \pm g)]}$$

SSSD = safe stopping sight distance (acceptable sight distance)
V = Vehicle Speed
T = Perception Reaction Time of Driver (2.5 seconds)
f = Coefficient of Friction for Wet Pavements
g = Percent of Roadway Grade Divided by 100

Table 2 shows the measured, desirable, acceptable (SSSD), and required sight distances at the existing site driveways for vehicles entering and exiting the site via the through connections to the new WAWA and adjacent retail driveways.

TABLE 2
SIGHT DISTANCE ANALYSIS
EXISTING SITE DRIVEWAYS

	Direction	Posted Speed (mph)	Sight Distances (feet)			
			Grade[1] (%)	DES[2]	SSSD[2,3]	EXIST
West Butler Avenue Driveway						
Exiting Movements	*To the left*	45	-2	635	481	**700**
	To the right	45	+1	570	453	**725+**
Entering Left Turns	*Approaching same direction*	45	+1	N/A	453	**725+**
	Approaching opposite direction	45	-2	445	481	**700**
County Line Road Driveway						
Exiting Movements	*To the left*	45	-1	500[4]	471	**725+**
	To the right	45	-2	570[4]	481	**725+**
Entering Left Turns	*Approaching same direction*	45	-2	N/A	481	**725+**
	Approaching opposite direction	45	-1	470[4]	471	**725+**

DES = PennDOT Desirable Sight Distance
SSSD = PennDOT Acceptable Sight Distance
EXIST = Existing (measured) Sight Distance

1 = Roadway Grade Approaching Driveway
2 = Based on the posted speed
3 = Based on the posted speed + 5mph
4 = Based on 4 Lane Cross-Section

As shown in **Table 2** above, the measured sight distances at the existing site driveways exceed all (Desirable and SSSD) PennDOT Sight Distance Criteria.

TRIP GENERATION

The trip generation rates for the proposed site were obtained from the manual *Trip Generation*, 11th Edition, 2021, an Institute of Transportation Engineers (ITE) Informational Report. For the proposed development, Land Use Code #215 (Single-Family Attached Housing) was utilized to calculate the number of vehicular trips the development will generate during the following time periods: (1) Average Weekday; (2) Weekday A.M. peak hour; and (3) Weekday P.M. peak hour.

Table 3 shows the rates and directional percentages for the analyzed time periods.

TABLE 3
ITE TRIP GENERATION DATA

Land Use (ITE #)	Time Period	Size (X)	Rate	Enter %
Single-Family Attached Housing (ITE #215)	Average Weekday	44 DU	T = 7.20*(X)	50%
	Weekday AM Peak Hour		T = 0.48*(X)	25%
	Weekday PM Peak Hour		T = 0.57*(X)	59%

T = Total Trips; X = Independent Variable, DU = Dwelling Units

The calculated trip generation for the proposed development is shown in **Table 4**.

TABLE 4
TRIP GENERATION – PROPOSED DEVELOPMENT

Time Period	Total		
	Total	Enter	Exit
Average Weekday	318	159	159
Weekday A.M.	21	5	16
Weekday P.M.	25	15	10

Based on the information contained in Table 4, the Proposed Site will generate a total of 21 new trips during the weekday A.M. peak hour and 25 new trips during the weekday P.M. peak hour.

TRIP DISTRIBUTION

The distribution and assignment of new trips generated by the proposed development was based upon existing traffic patterns in the Study Area. Based on this evaluation, the new trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 5.**

TABLE 5
TRIP DISTRIBUTION PERCENTAGES

Direction - To/From	Assignment - To/From	Distribution Percentage
		AM/PM
South	via County Line Road	32%
North	via County Line Road	30%
East	via Butler Avenue	20%
West	via Butler Avenue	18%

The distribution of site-generated trips for the proposed development during the weekday A.M. and weekday P.M. peak hours are shown in **Figure 5**. The trip assignment percentage information is included in **Appendix B**.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The site-generated trips for the proposed development were added to the base condition traffic volumes to develop the projected (future build) condition traffic volumes for the weekday A.M. and weekday P.M. Peak Hours are shown in **Figure 6.** Traffic volume development worksheets are also contained in **Appendix B.**

LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 6**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

TABLE 6
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS[1]

Level of Service	Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10 and < 20	> 10 and < 15
C	> 20 and < 35	> 15 and < 25
D	> 35 and < 55	> 25 and < 35
E	> 55 and < 80	> 35 and < 50
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0

[1]*Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board's Highway Capacity Manual 2010*

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M. and weekday P.M. peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the *Highway Capacity Manual* (HCM) 6th Edition using *Synchro* version 10.3, build 151, revision 0 software, a Trafficware product.

The following conditions were analyzed, as applicable:

- 2022 Existing conditions;
- 2027 Base conditions (build-out year without development);
- 2027 Projected conditions (build-out year with development).

It should be noted that based on methodologies contained in Chapter 10 of PennDOT's Publication 46, TPD adjusted the following 2010 HCM default values in the *Synchro 10* capacity analysis. These adjustments were made at the signalized intersections within the study area for all time periods based on the study area location being classified as Suburban:

- Base saturation flow rates for signalized intersections. The saturation flow rate was changed from the default value of 1900 to 1800 based on Exhibit 10-9.
- Start-up lost time and extension of effective green time for signalized intersections. The startup lost time was changed from the default value of 2.0 seconds to 2.5 seconds. Based on the total clearance time (yellow plus all-red time) being greater than 5 seconds, the extension of green time was changed from the default value of 2 seconds to 3.5 seconds. These adjusted values were based on Exhibit 10-10.
- Critical and Follow-Up Gap times were adjusted relative to the difference between default and PA Default values contained in Exhibits 10-11 and 10-12. As requested by PennDOT, worksheets/tables showing how these values were calculated are included in **Appendix C**.

Per PennDOT standards, the signal timings at the study area intersections were optimized under the base (no-build) conditions.

In addition, capacity analyses were conducted at the proposed site driveway intersections under the projected conditions. The capacity analysis worksheets are included in **Appendix D**. The PennDOT signal plans are included in **Appendix E**.

PennDOT's Transportation Impact Study Guidelines outlined in Strike-Off Letter 470-09-4, dated February 12, 2009 contain the following criteria regarding levels of service:

- Page 29 of the Guidelines state that if evaluation of the With Development Horizon Year Scenario to the Without Development Horizon Year Scenario indicates that the overall intersection level of service has dropped, the applicant will be required to mitigate the level of service if the increase in overall intersection delay is greater than 10-seconds. If the overall intersection delay increase is less than or equal to 10-seconds, mitigation of the intersection will not be required.
- Page 29 of the Guidelines state that for mitigation scenarios, applicants are expected to mitigate the overall intersection LOS to the original Without Development LOS; the 10-second delay variance is not applied to mitigation scenarios. Applicants may be required to address available storage and queue lengths at critical movements or approaches even if the overall LOS requirements are met.
- Page 31 of the Guidelines state that if signalization is the preferred alternative for mitigation, overall intersection LOS C in rural areas and LOS D in urban areas is acceptable.
- Page 31 of the Guidelines states new signalized or unsignalized intersection established to serve as access to the development shall be designed to operate at minimum LOS C for rural areas, and minimum LOS D for urban areas.

LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections are shown in **Table 7** for the weekday A.M. and weekday P.M. peak hours.

TABLE 7
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour			Weekday PM. Peak Hour		
		2022 Exist	2027 Base	2027 Proj.	2022 Exist	2027 Base	2027 Proj.
County Line Road (S.R. 2038) & W. Butler Avenue (S.R. 4202)	EBL	C	C	C	C	C	C
	EBT	D	D	D	D	D	D
	EBR	C	C	C	C	C	C
	WBL	C	C	C	C	C	C
	WBT	D	D	D	C	C	C
	WBR	C	C	C	C	C	C
	NBL	C	C	C	C	C	C
	NBT	C	C	C	D	D	D
	NBTR	C	C	C	D	D	D
	SBL	C	C	C	C	C	C
	SBT	C	C	C	D	D	D
	SBTR	C	C	C	D	D	D
	ILOS	**C (33.3)**	**C (33.3)**	**C (33.3)**	**D (36.5)**	**D (37.0)**	**D (37.3)**
County Line Road (S.R. 2038) & Site Driveway	WBLR	B	B	B	B	B	B
	SBL	B	B	B	B	B	B
	ILOS	**A (0.7)**	**A (0.7)**	**A (0.8)**	**A (0.4)**	**A (0.4)**	**A (0.5)**

Exist. = Existing Condition, Base = No-Build scenario, Proj. = Build scenario
1 = Future Conditions with improvements

TABLE 7
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY CON'T

Intersection	Movement	Weekday A.M. Peak Hour			Weekday PM. Peak Hour		
		2022 Exist	2027		2022 Exist	2027	
			Base	Proj.		Base	Proj.
W. Butler Avenue (S.R. 4202) & Site Driveway	EBL	A	A	A	A	A	A
	EBT	A	A	A	A	A	A
	EBR	A	A	A	A	A	A
	WBL	A	A	A	A	A	A
	WBTR	A	A	A	A	A	A
	NBL	E	E	E	D	D	D
	NBTR	D	D	D	D	D	D
	SBL	E	E	E	E	E	E
	SBTR	D	D	D	D	D	D
	ILOS	**B (11.4)**	**B (11.4)**	**B (11.9)**	**B (11.4)**	**B (11.6)**	**B (11.8)**

Exist. = Existing Condition, Base = No-Build scenario, Proj. = Build scenario
1 = Future Conditions with improvements

As shown in **Table 7**, under all projected (build) conditions with the development of the proposed site, and with the site-related recommendations, all study area intersections will satisfy PennDOT ILOS Standards.

95TH PERCENTILE QUEUE ANALYSIS

Queue analyses were conducted at the study area intersections using *Synchro 10* software. For this analysis, the 95th percentile queue is defined as the queue length that is exceeded in 5% of the signal cycles. As an example, for a signal with a 90-second cycle, this means that the 95th percentile queue length will be exceeded during 2 of the 40 signal cycles that occur during the peak hour. The queue analysis results are summarized in **Table 8** for the analyzed peak hours.

TABLE 8
95TH QUEUE ANALYSIS SUMMARY

Intersection	Movement	Existing Storage	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
			2022 Exist	2027		2022 Exist	2027	
				Base	Proj.		Base	Proj.
County Line Road (S.R. 2038) & W. Butler Avenue (S.R. 4202)	EBL	195′	93′	93′	93′	53′	55′	55′
	EBT	1000′+[2]	260′	260′	263′	380′	388′	390′
	EBR	400′	65′	65′	65′	48′	50′	50′
	WBL	245′	168′	170′	175′	103′	105′	108′
	WBT	505[2]	288′	288′	290′	250′	255′	258′
	WBR	95′	55′	55′	55′	43′	45′	45′
	NBL	355′	70′	70′	70′	143′	148′	148′
	NBT	525′[2]	290′	295′	295′	388′	395′	400′
	NBTR	525′[2]	295′	300′	303′	388′	398′	403′
	SBL	430′	90′	90′	90′	130′	133′	135′
	SBT	475′[2]	305′	308′	310′	350′	355′	358′
	SBTR	475′	313′	318′	318′	355′	360′	360′
County Line Road (S.R. 2038) & Site Driveway	WBLR	285[2]	8′	10′	10′	5′	5′	5′
	SBL	125′	5′	5′	5′	3′	3′	5′

Exist. = Existing Condition, Base = No-Build scenario, Proj. = Build scenario
1 = Future Conditions with improvements
2 = Existing Storage to next intersection

TABLE 8
95TH QUEUE ANALYSIS SUMMARY CON'T

Intersection	Movement	Existing Storage	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
			2022 Exist	2027		2022 Exist	2027	
				Base	Proj.		Base	Proj.
W. Butler Avenue (S.R. 4202) & Site Driveway	EBL	85′	15′	15′	18′	8′	8′	10′
	EBT	505′[2]	118′	123′	125′	213′	218′	218′
	EBR	190′	10′	10′	10′	25′	25′	25′
	WBL	150′	13′	13′	13′	15′	18′	18′
	WBTR	800′[2]	115′	120′	125′	90′	95′	98′
	NBL	60′	25′	25′	25′	33′	33′	33′
	NBTR	100′	43′	45′	45′	85′	85′	85′
	SBL	75′	80′	83′	88′	68′	70′	73′
	SBTR	75′	85′	88′	98′	43′	43′	48′

Exist. = Existing Condition, Base = No-Build scenario, Proj. = Build scenario
1 = Future Conditions with improvements
2 = Existing Storage to next intersection

Queue analysis worksheets are included with the capacity analysis worksheets provided in **Appendix D**.

AUXILIARY TURN LANE ANALYSIS

Methodology

TPD evaluated auxiliary turn lane warrants at the Proposed Driveways. The warrant analysis methodology contained within Chapter 11 of PennDOT's *Publication 46*, Section 11.17 and Strike-Off Letter 470-08-07 was utilized for this evaluation.

Findings

Table 9 summarizes the results of the auxiliary turn lane analysis at the site access intersections.

TABLE 9
AUXILIARY TURN LANE ANALYSIS SUMMARY

Intersection	Auxiliary Lane	Warrant Satisfied?	Warranted Storage	Existing Storage
County Line Road Driveway	NB Right-Turn Lane	No	--	--
	SB Left-Turn Lane	Yes	125′	125′ (5′)
West Butler Avenue Driveway	EB Left-Turn Lane	Yes	175′	85′ (18′)
	WB Right-Turn Lane	Yes	225′	--

*(Maximum 95th Percentile Queue Based on **Table 7**)*

As shown in **Table 9:**

County Line Road Driveway - A 125′ left turn lane will be warranted on the southbound approach to the existing County Line Road Driveway. Currently, there exists a 125′ southbound left turn lane so no further improvements would be required.

West Butler Avenue Driveway - A 175′ left turn lane is warranted on the eastbound approach to the existing West Butler Avenue Driveway. Currently there is an 85′ left turn lane which appears to maximize the

separation with the westbound left turn lane at the signalized County Line Road/West Butler Avenue intersection. As shown in **Table 8**, the maximum queue experienced at this location will be 18'. Therefore, it is TPD's opinion this lane is adequate, and was the length of the lane provided as part of the recently completed Wawa project.

A 225' right turn lane is warranted on the westbound approach to the West Butler Avenue Driveway. There is currently no auxiliary right turn on the west bound approach. It should be noted that this lane was warranted during the WAWA project but could not be provided due to the inability to acquire ROW from the adjacent property owner.

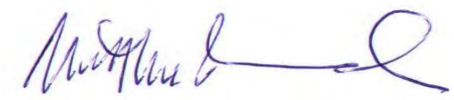
The calculations for the auxiliary turn lane warrants are included in **Appendix F**.

CONCLUSIONS

- The subject site is located on the northeastern quadrant of the signalized intersection of County Line Road (S.R. 2038) and West Butler Avenue (S.R. 4202), behind the new WAWA Convenience Market with Gasoline;
- The proposed site will consist of approximately 44 townhomes with access being through connections to the new WAWA and adjacent retail driveways.
- The Proposed Site will generate 21 new trips during the weekday A.M. peak hour and 25 new trips during the weekday P.M. peak hour.
- Under all projected (build) conditions with the development of the proposed site, and with the site-related recommendations, all study area intersections will satisfy PennDOT ILOS Standards and as such, no further traffic improvements are necessary.

If you have any questions, or require additional information, please feel free to contact us.

Sincerely,
TRAFFIC PLANNING AND DESIGN, INC.



Matthew I. Hammond, P.E.
Executive Vice President
mhammond@trafficpd.com

Attachments: Appendices A-F

cc: New Britain Township
Project Team
TPD File

$FILE$
$DATE$ $TIME$ $USER$ $MODEL$

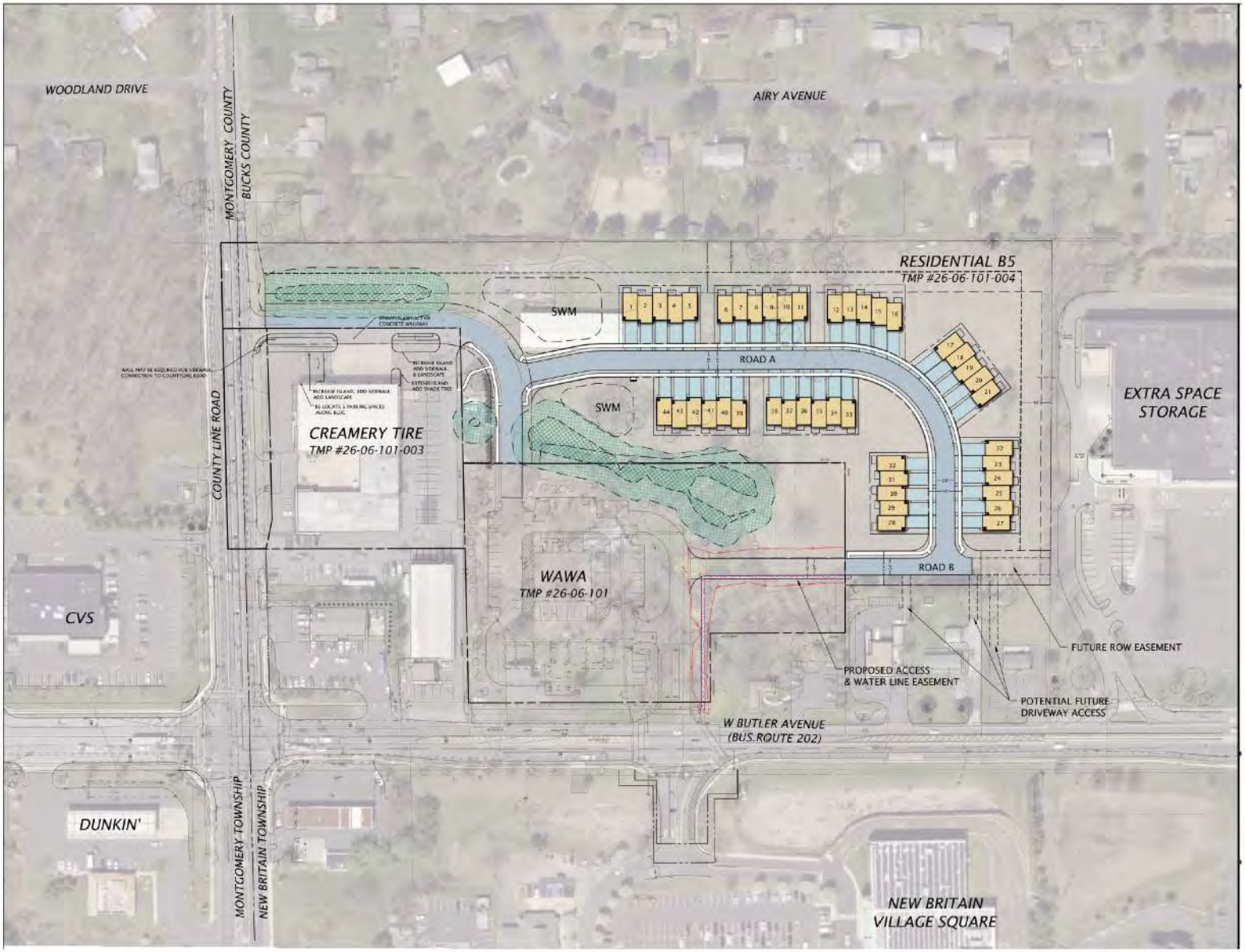
Est. 1989

TRAFFIC PLANNING AND DESIGN, INC.

www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE 1

SITE LOCATION

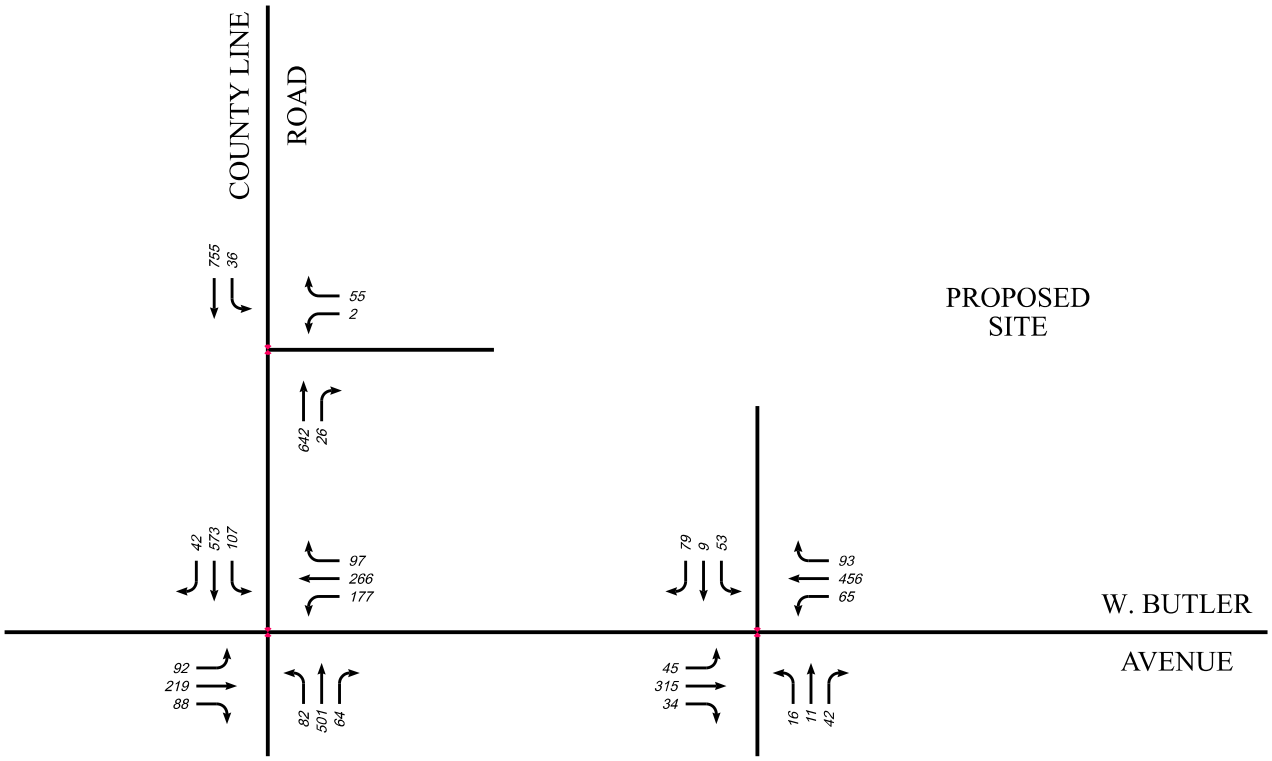


Est. 1989
TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

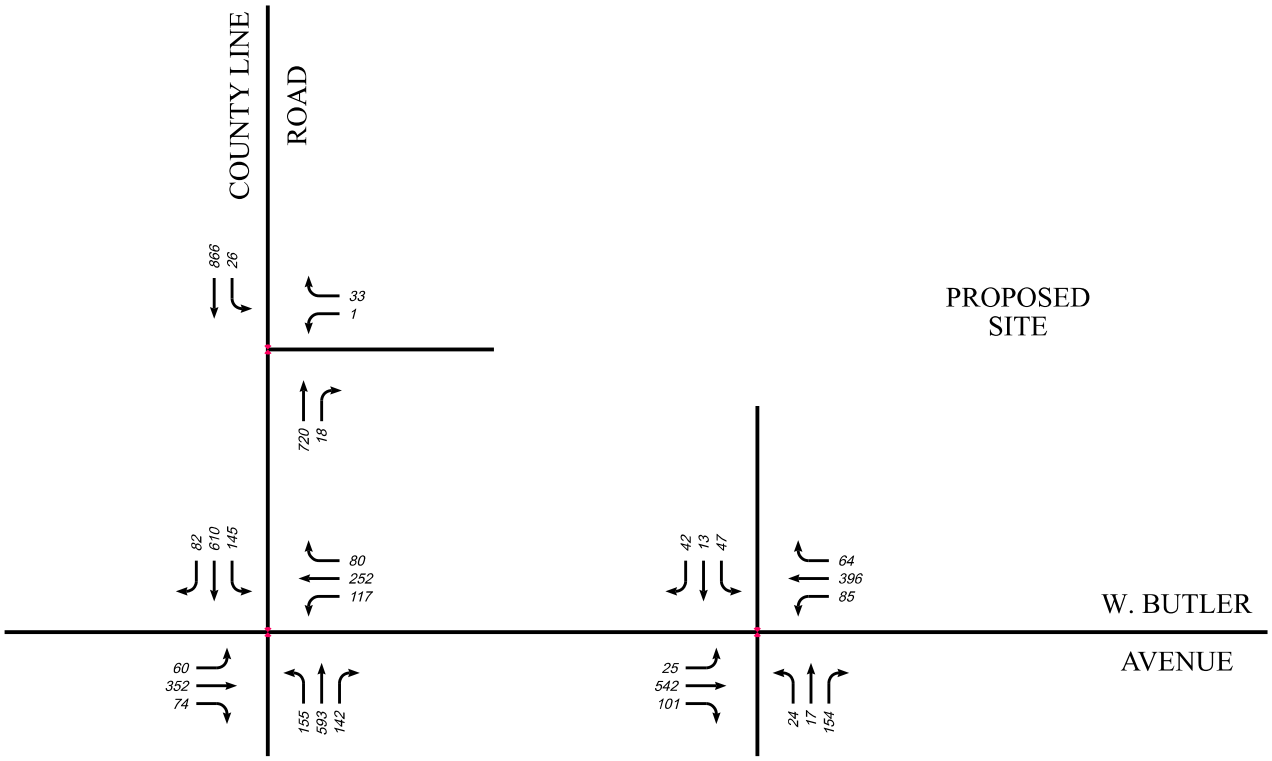
FIGURE 2

SITE PLAN

WEEKDAY A.M. PEAK HOUR



WEEKDAY P.M. PEAK HOUR



KEY:

SCHEMATIC DRAWING:NOT TO SCALE

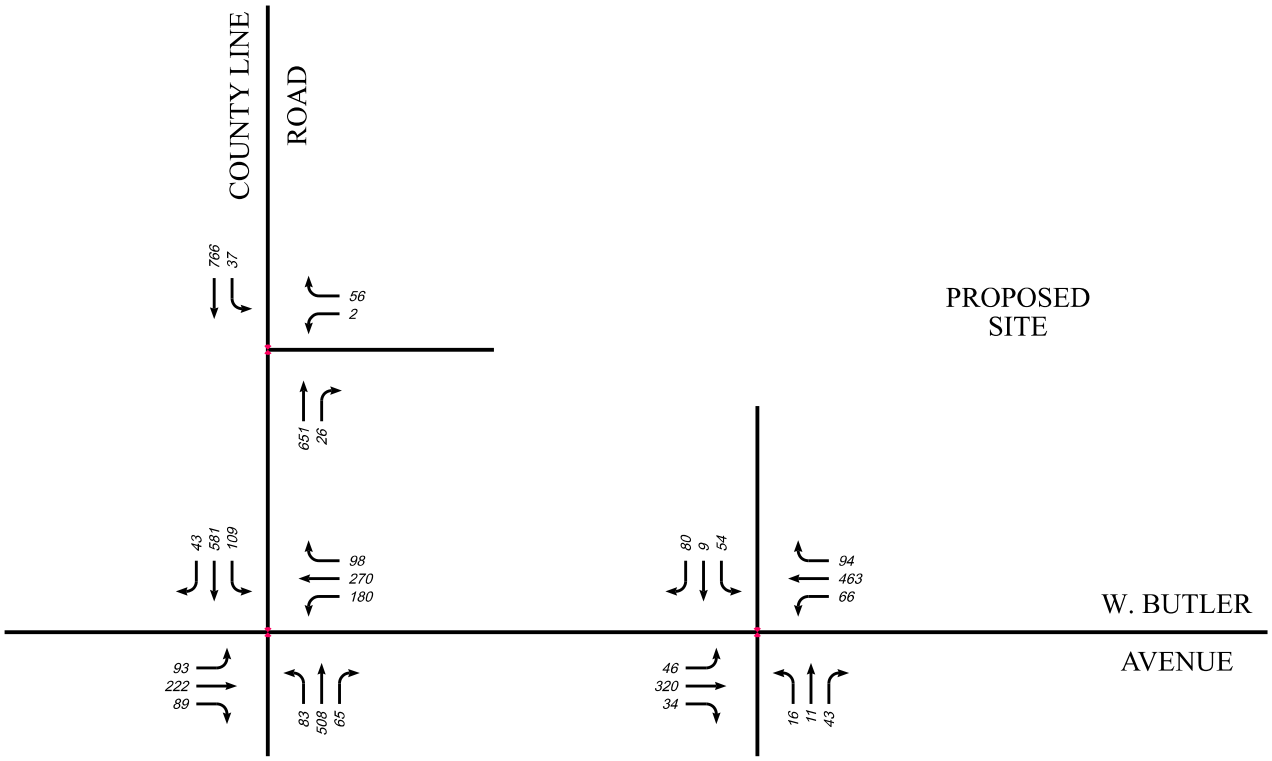
TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE 3

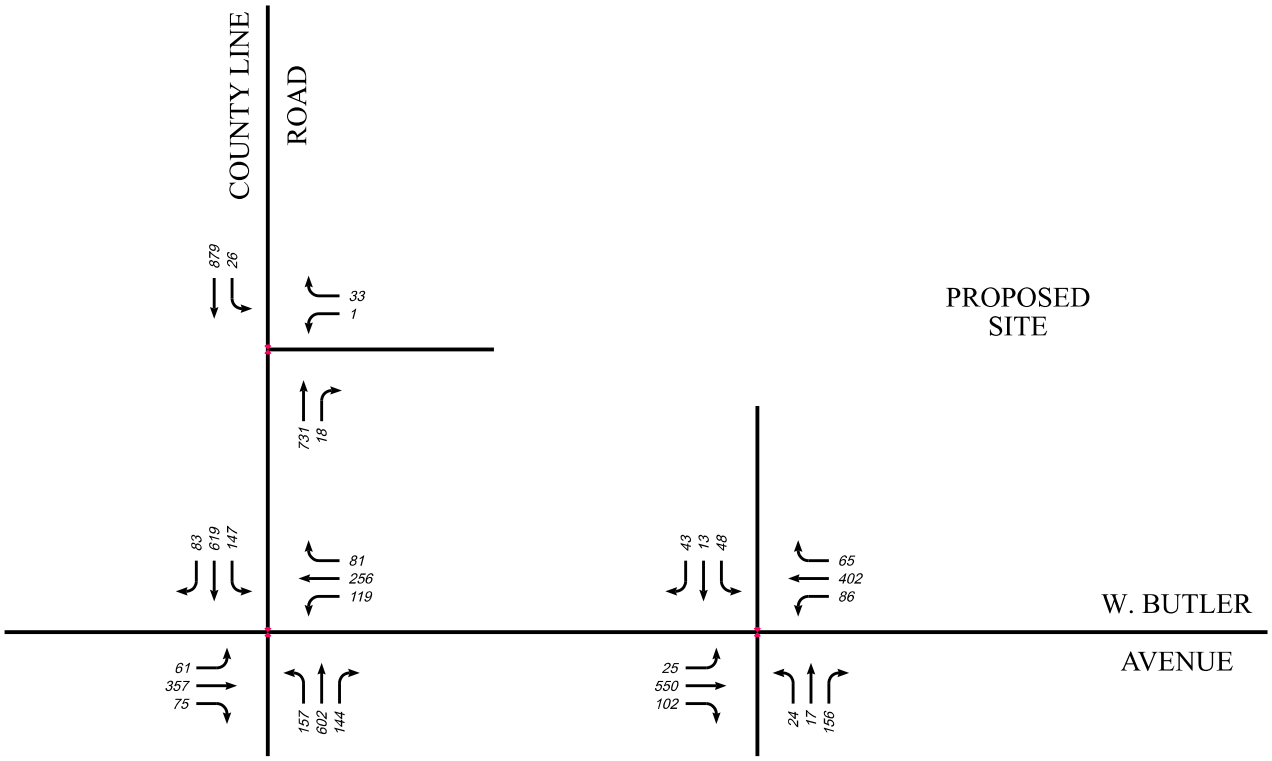
2022 EXISTING CONDITIONS
WEEKDAY PEAK HOURS
TRAFFIC VOLUMES

$FILE$ $DATE$ $TIME$ $USER$ $MODEL$

WEEKDAY A.M. PEAK HOUR



WEEKDAY P.M. PEAK HOUR



KEY:

SCHEMATIC DRAWING:NOT TO SCALE

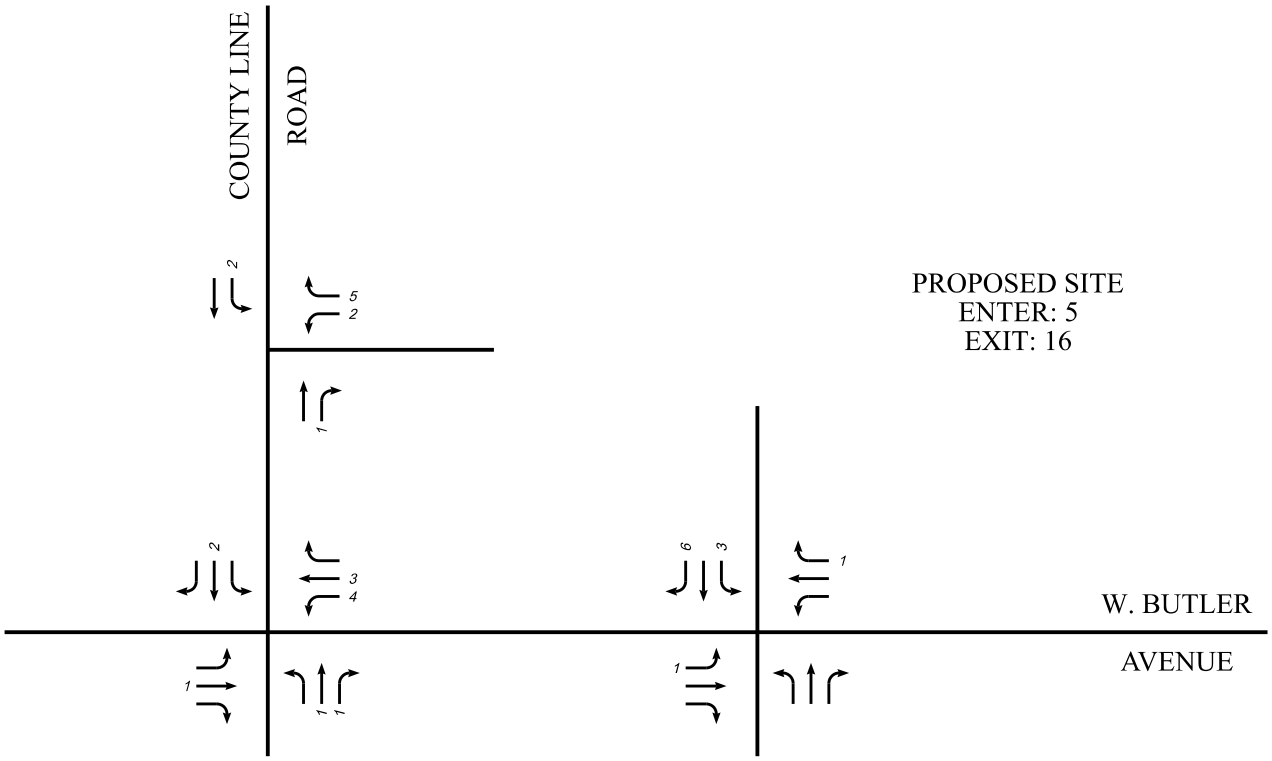
TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE 4

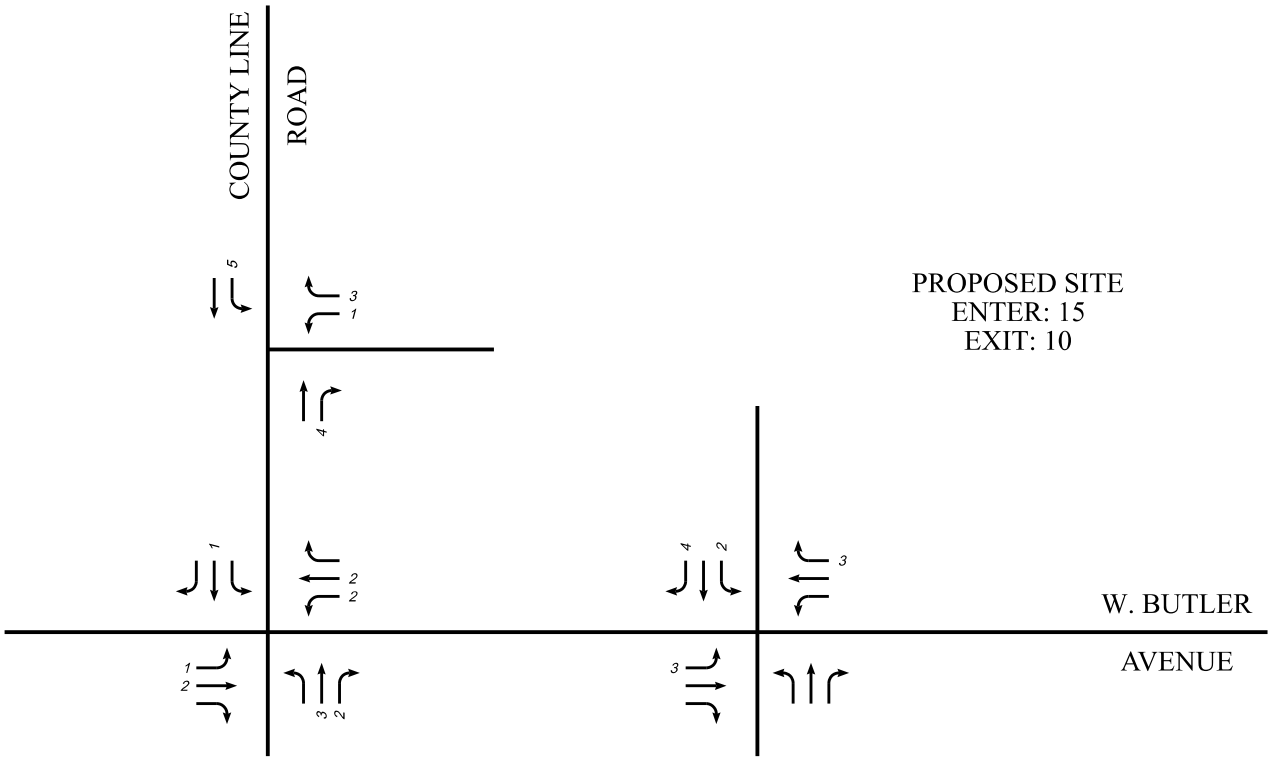
2027 BASE CONDITIONS
WEEKDAY PEAK HOURS
TRAFFIC VOLUMES

$FILE$ $DATE$ $TIME$ $USER$ $MODEL$

WEEKDAY A.M. PEAK HOUR



WEEKDAY P.M. PEAK HOUR



KEY:

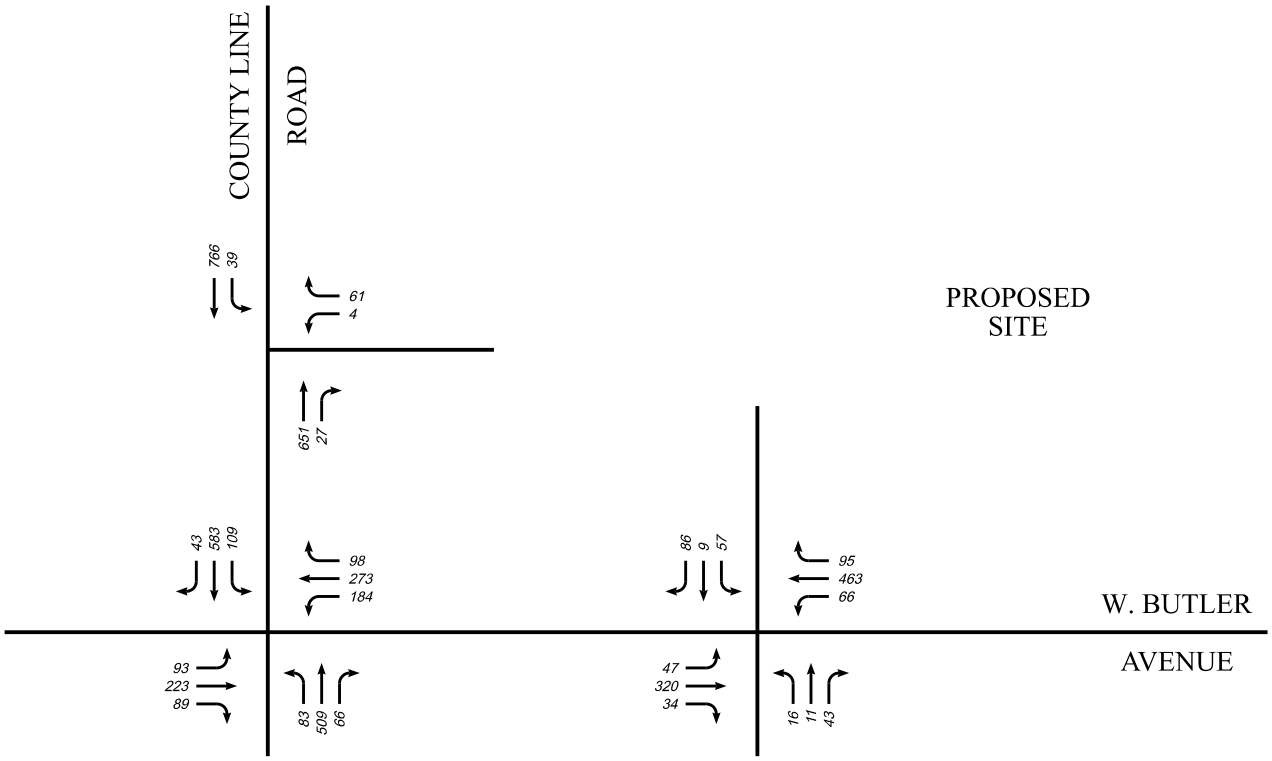
SCHEMATIC DRAWING:NOT TO SCALE

Est. 1989
TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

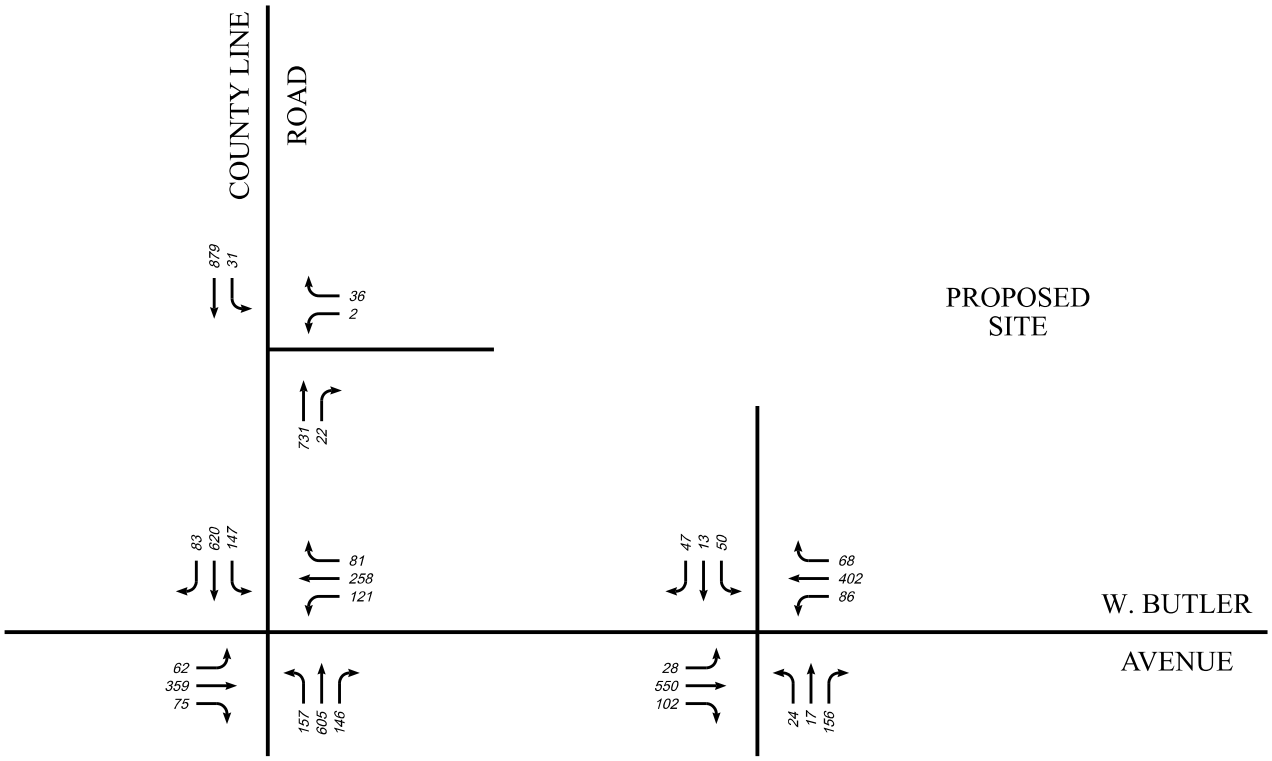
FIGURE 5

TOWNHOME DEVELOPMENT
WEEKDAY PEAK HOURS
TRIP DISTRIBUTIONS

WEEKDAY A.M. PEAK HOUR

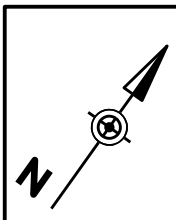


WEEKDAY P.M. PEAK HOUR



KEY:

SCHEMATIC DRAWING:NOT TO SCALE



Est. 1989
TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE 6

2027 PROJECTED CONDITIONS
WEEKDAY PEAK HOURS
TRAFFIC VOLUMES

APPENDIX A:

Manual Traffic Count Data

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and County Line Road
Site Code:
Start Date: 02/22/2022

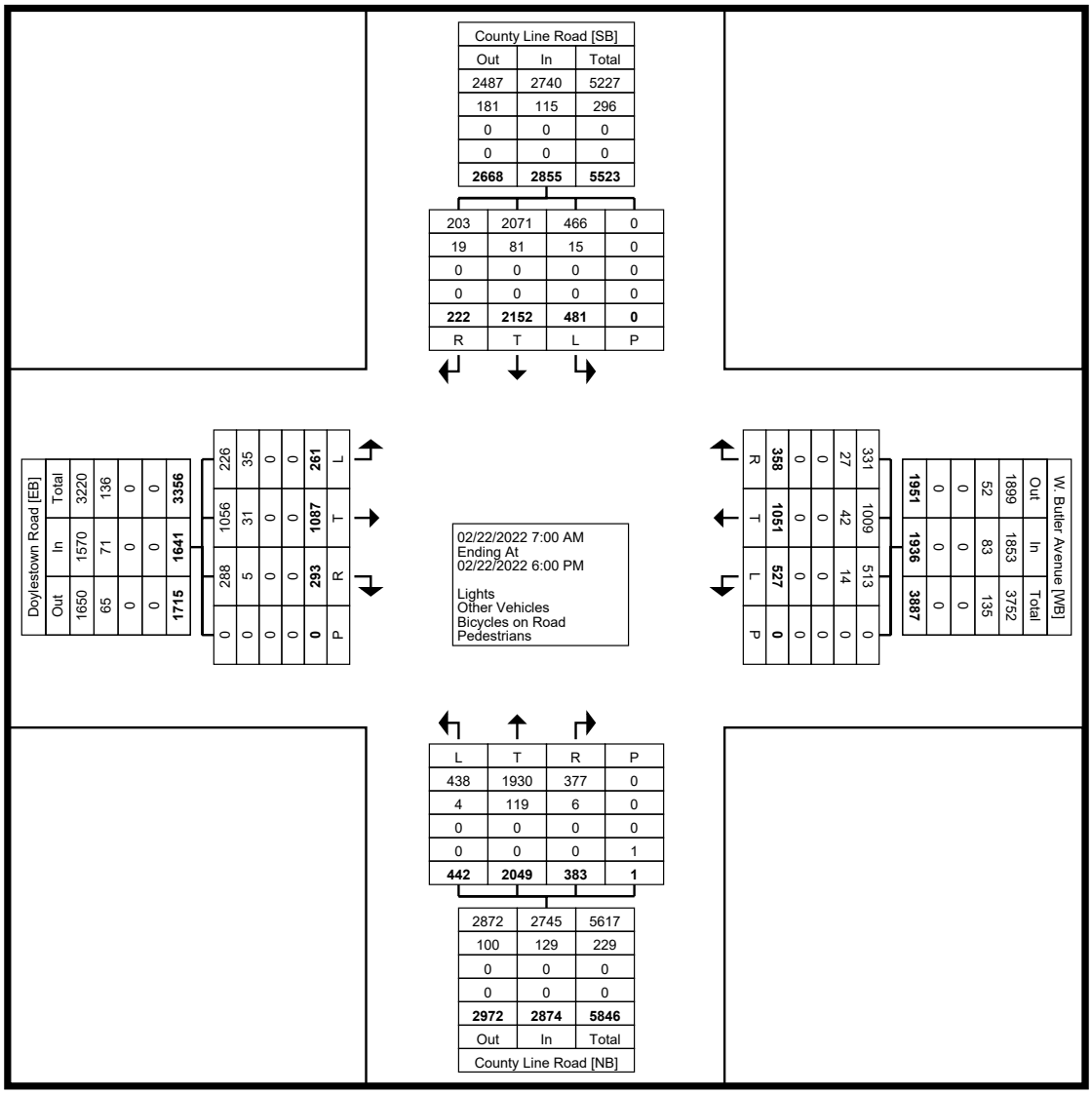
Turning Movement Data

Start Time	Doylestown Road Eastbound						W. Butler Avenue Westbound						County Line Road Northbound						County Line Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:00 AM	13	43	5	4	0	65	39	54	8	10	0	111	7	96	11	1	0	115	15	113	6	0	0	134	425
7:15 AM	12	45	14	5	0	76	42	83	7	11	0	143	15	114	10	2	0	141	24	135	8	0	0	167	527
7:30 AM	24	48	12	5	0	89	50	78	12	15	0	155	18	152	15	1	0	186	35	152	10	0	0	197	627
7:45 AM	27	57	15	9	0	108	48	61	17	8	0	134	18	115	15	7	0	155	30	155	14	0	0	199	596
Hourly Total	76	193	46	23	0	338	179	276	44	44	0	543	58	477	51	11	0	597	104	555	38	0	0	697	2175
8:00 AM	22	43	18	8	0	91	38	46	12	8	0	104	19	105	12	1	0	137	25	142	7	2	0	176	508
8:15 AM	19	71	12	9	0	111	41	81	12	13	0	147	27	129	12	1	0	169	17	124	8	1	0	150	577
8:30 AM	20	46	9	10	0	85	26	70	10	9	0	115	28	101	9	1	0	139	28	119	12	0	0	159	498
8:45 AM	12	62	9	9	0	92	31	63	6	8	0	108	23	116	14	5	1	158	16	93	7	6	0	122	480
Hourly Total	73	222	48	36	0	379	136	260	40	38	0	474	97	451	47	8	1	603	86	478	34	9	0	607	2063
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	9	80	10	5	0	104	29	69	19	11	0	128	33	125	23	5	0	186	37	147	20	0	0	204	622
4:15 PM	9	95	13	4	0	121	29	71	15	8	0	123	34	135	26	6	0	201	25	135	19	2	0	181	626
4:30 PM	19	88	11	5	0	123	23	60	9	7	0	99	50	158	29	5	0	242	45	172	27	0	0	244	708
4:45 PM	14	86	10	9	0	119	27	66	13	6	0	112	38	169	25	14	0	246	34	139	15	1	0	189	666
Hourly Total	51	349	44	23	0	467	108	266	56	32	0	462	155	587	103	30	0	875	141	593	81	3	0	818	2622
5:00 PM	18	83	14	8	0	123	38	55	8	14	0	115	33	131	28	9	0	201	41	164	17	1	0	223	662
5:15 PM	15	82	8	10	0	115	18	68	16	15	0	117	36	129	31	3	0	199	42	126	13	0	0	181	612
5:30 PM	16	80	7	10	0	113	25	60	13	16	0	114	26	150	27	2	0	205	40	143	14	0	0	197	629
5:45 PM	12	78	11	5	0	106	23	66	11	11	0	111	37	124	23	10	0	194	27	93	10	2	0	132	543
Hourly Total	61	323	40	33	0	457	104	249	48	56	0	457	132	534	109	24	0	799	150	526	54	3	0	733	2446
Grand Total	261	1087	178	115	0	1641	527	1051	188	170	0	1936	442	2049	310	73	1	2874	481	2152	207	15	0	2855	9306
Approach %	15.9	66.2	10.8	7.0	-	-	27.2	54.3	9.7	8.8	-	-	15.4	71.3	10.8	2.5	-	-	16.8	75.4	7.3	0.5	-	-	-
Total %	2.8	11.7	1.9	1.2	-	17.6	5.7	11.3	2.0	1.8	-	20.8	4.7	22.0	3.3	0.8	-	30.9	5.2	23.1	2.2	0.2	-	30.7	-
Lights	226	1056	173	115	-	1570	513	1009	168	163	-	1853	438	1930	304	73	-	2745	466	2071	190	13	-	2740	8908
% Lights	86.6	97.1	97.2	100.0	-	95.7	97.3	96.0	89.4	95.9	-	95.7	99.1	94.2	98.1	100.0	-	95.5	96.9	96.2	91.8	86.7	-	96.0	95.7
Other Vehicles	35	31	5	0	-	71	14	42	20	7	-	83	4	119	6	0	-	129	15	81	17	2	-	115	398
% Other Vehicles	13.4	2.9	2.8	0.0	-	4.3	2.7	4.0	10.6	4.1	-	4.3	0.9	5.8	1.9	0.0	-	4.5	3.1	3.8	8.2	13.3	-	4.0	4.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and County Line Road
Site Code:
Start Date: 02/22/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and County Line Road
Site Code:
Start Date: 02/22/2022

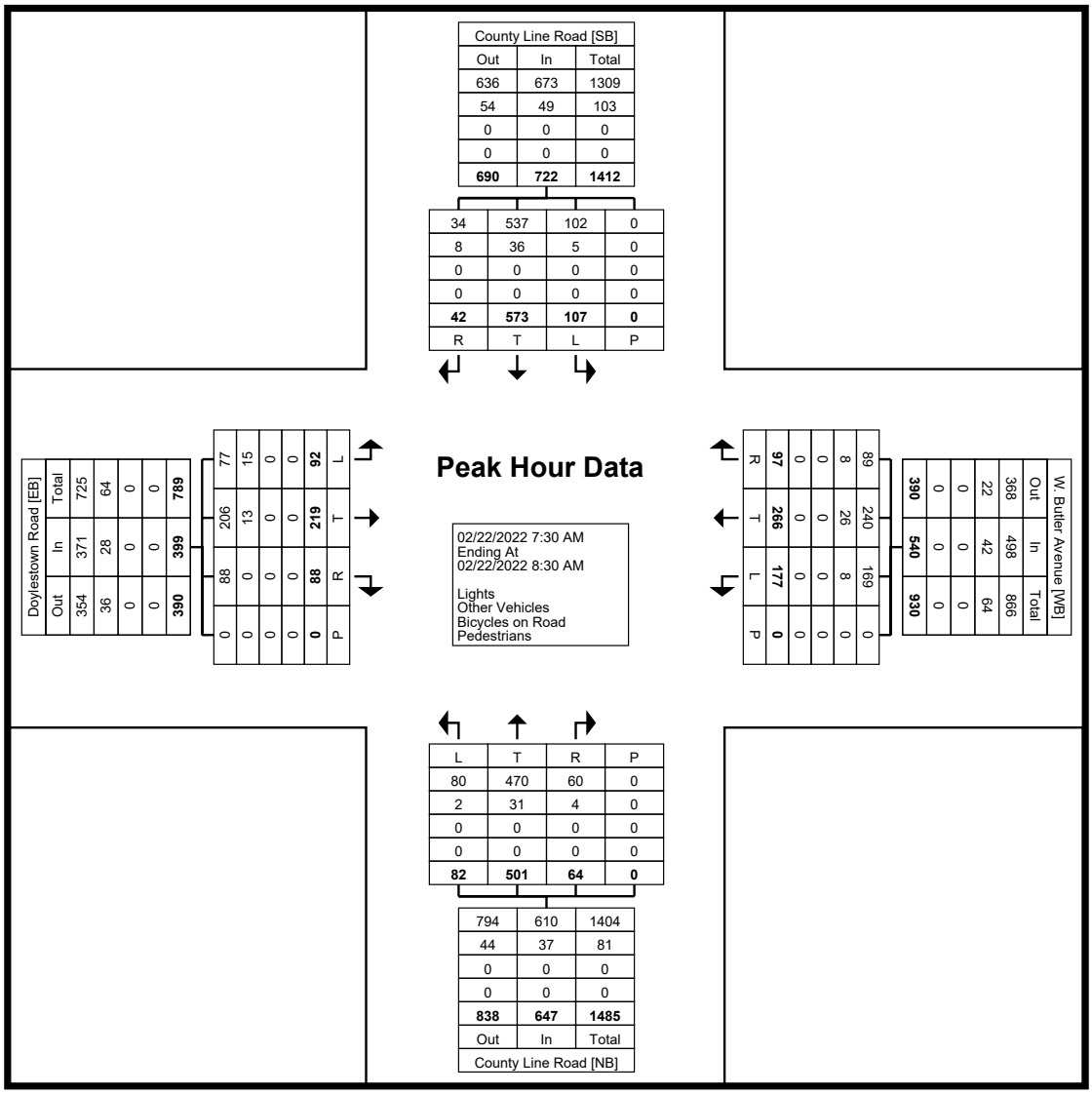
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Doylestown Road Eastbound						W. Butler Avenue Westbound						County Line Road Northbound						County Line Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:30 AM	24	48	12	5	0	89	50	78	12	15	0	155	18	152	15	1	0	186	35	152	10	0	0	197	627
7:45 AM	27	57	15	9	0	108	48	61	17	8	0	134	18	115	15	7	0	155	30	155	14	0	0	199	596
8:00 AM	22	43	18	8	0	91	38	46	12	8	0	104	19	105	12	1	0	137	25	142	7	2	0	176	508
8:15 AM	19	71	12	9	0	111	41	81	12	13	0	147	27	129	12	1	0	169	17	124	8	1	0	150	577
Total	92	219	57	31	0	399	177	266	53	44	0	540	82	501	54	10	0	647	107	573	39	3	0	722	2308
Approach %	23.1	54.9	14.3	7.8	-	-	32.8	49.3	9.8	8.1	-	-	12.7	77.4	8.3	1.5	-	-	14.8	79.4	5.4	0.4	-	-	-
Total %	4.0	9.5	2.5	1.3	-	17.3	7.7	11.5	2.3	1.9	-	23.4	3.6	21.7	2.3	0.4	-	28.0	4.6	24.8	1.7	0.1	-	31.3	-
PHF	0.852	0.771	0.792	0.861	-	0.899	0.885	0.821	0.779	0.733	-	0.871	0.759	0.824	0.900	0.357	-	0.870	0.764	0.924	0.696	0.375	-	0.907	0.920
Lights	77	206	57	31	-	371	169	240	47	42	-	498	80	470	50	10	-	610	102	537	32	2	-	673	2152
% Lights	83.7	94.1	100.0	100.0	-	93.0	95.5	90.2	88.7	95.5	-	92.2	97.6	93.8	92.6	100.0	-	94.3	95.3	93.7	82.1	66.7	-	93.2	93.2
Other Vehicles	15	13	0	0	-	28	8	26	6	2	-	42	2	31	4	0	-	37	5	36	7	1	-	49	156
% Other Vehicles	16.3	5.9	0.0	0.0	-	7.0	4.5	9.8	11.3	4.5	-	7.8	2.4	6.2	7.4	0.0	-	5.7	4.7	6.3	17.9	33.3	-	6.8	6.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and County Line Road
Site Code:
Start Date: 02/22/2022



Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and County Line Road
Site Code:
Start Date: 02/22/2022

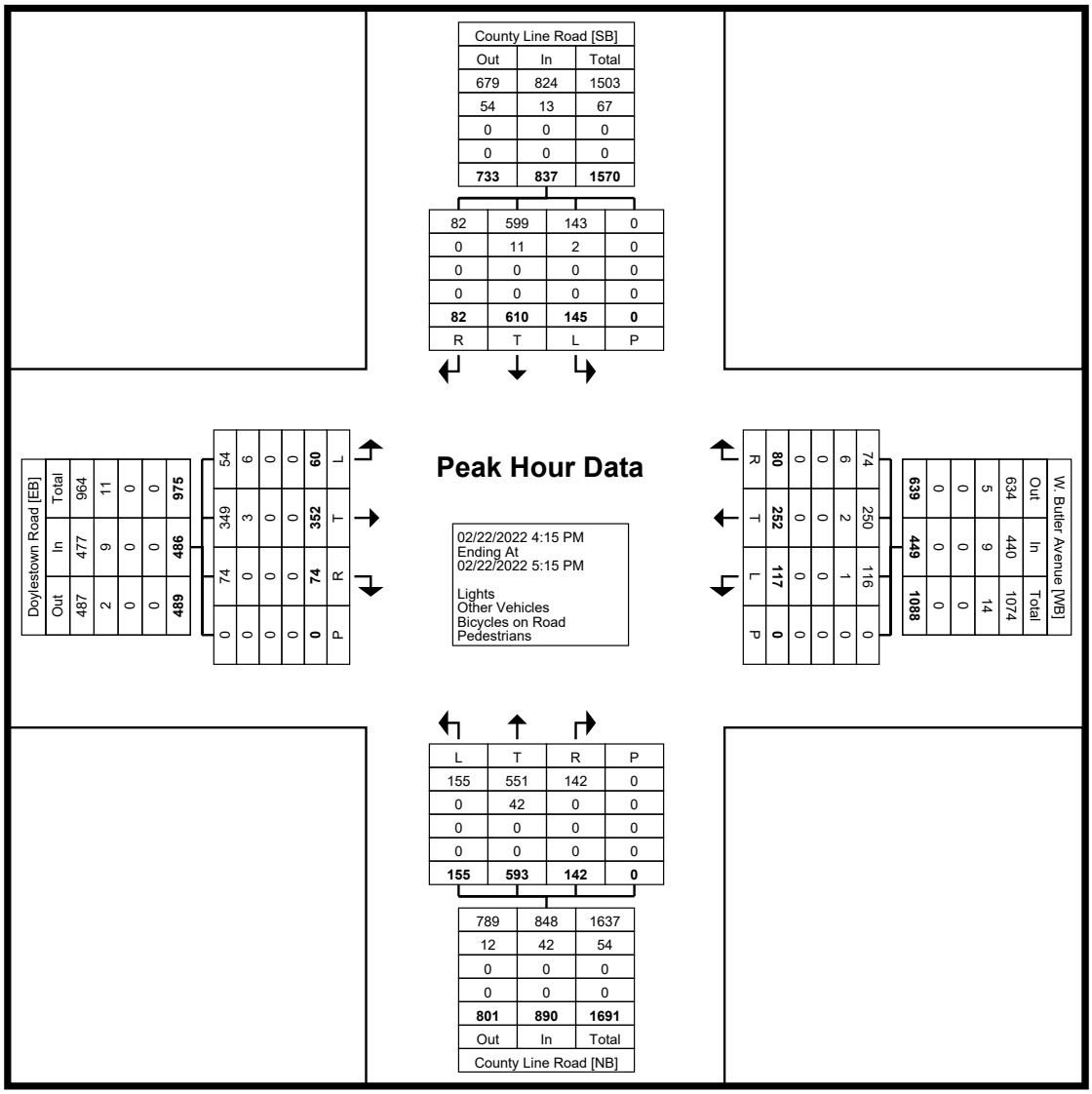
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Doylestown Road Eastbound						W. Butler Avenue Westbound						County Line Road Northbound						County Line Road Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:15 PM	9	95	13	4	0	121	29	71	15	8	0	123	34	135	26	6	0	201	25	135	19	2	0	181	626
4:30 PM	19	88	11	5	0	123	23	60	9	7	0	99	50	158	29	5	0	242	45	172	27	0	0	244	708
4:45 PM	14	86	10	9	0	119	27	66	13	6	0	112	38	169	25	14	0	246	34	139	15	1	0	189	666
5:00 PM	18	83	14	8	0	123	38	55	8	14	0	115	33	131	28	9	0	201	41	164	17	1	0	223	662
Total	60	352	48	26	0	486	117	252	45	35	0	449	155	593	108	34	0	890	145	610	78	4	0	837	2662
Approach %	12.3	72.4	9.9	5.3	-	-	26.1	56.1	10.0	7.8	-	-	17.4	66.6	12.1	3.8	-	-	17.3	72.9	9.3	0.5	-	-	-
Total %	2.3	13.2	1.8	1.0	-	18.3	4.4	9.5	1.7	1.3	-	16.9	5.8	22.3	4.1	1.3	-	33.4	5.4	22.9	2.9	0.2	-	31.4	-
PHF	0.789	0.926	0.857	0.722	-	0.988	0.770	0.887	0.750	0.625	-	0.913	0.775	0.877	0.931	0.607	-	0.904	0.806	0.887	0.722	0.500	-	0.858	0.940
Lights	54	349	48	26	-	477	116	250	40	34	-	440	155	551	108	34	-	848	143	599	78	4	-	824	2589
% Lights	90.0	99.1	100.0	100.0	-	98.1	99.1	99.2	88.9	97.1	-	98.0	100.0	92.9	100.0	100.0	-	95.3	98.6	98.2	100.0	100.0	-	98.4	97.3
Other Vehicles	6	3	0	0	-	9	1	2	5	1	-	9	0	42	0	0	-	42	2	11	0	0	-	13	73
% Other Vehicles	10.0	0.9	0.0	0.0	-	1.9	0.9	0.8	11.1	2.9	-	2.0	0.0	7.1	0.0	0.0	-	4.7	1.4	1.8	0.0	0.0	-	1.6	2.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and County Line Road
Site Code:
Start Date: 02/22/2022



Turning Movement Peak Hour Data Plot (4:15 PM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: County Line Road and Wawa Driveway
Site Code:
Start Date: 02/22/2022

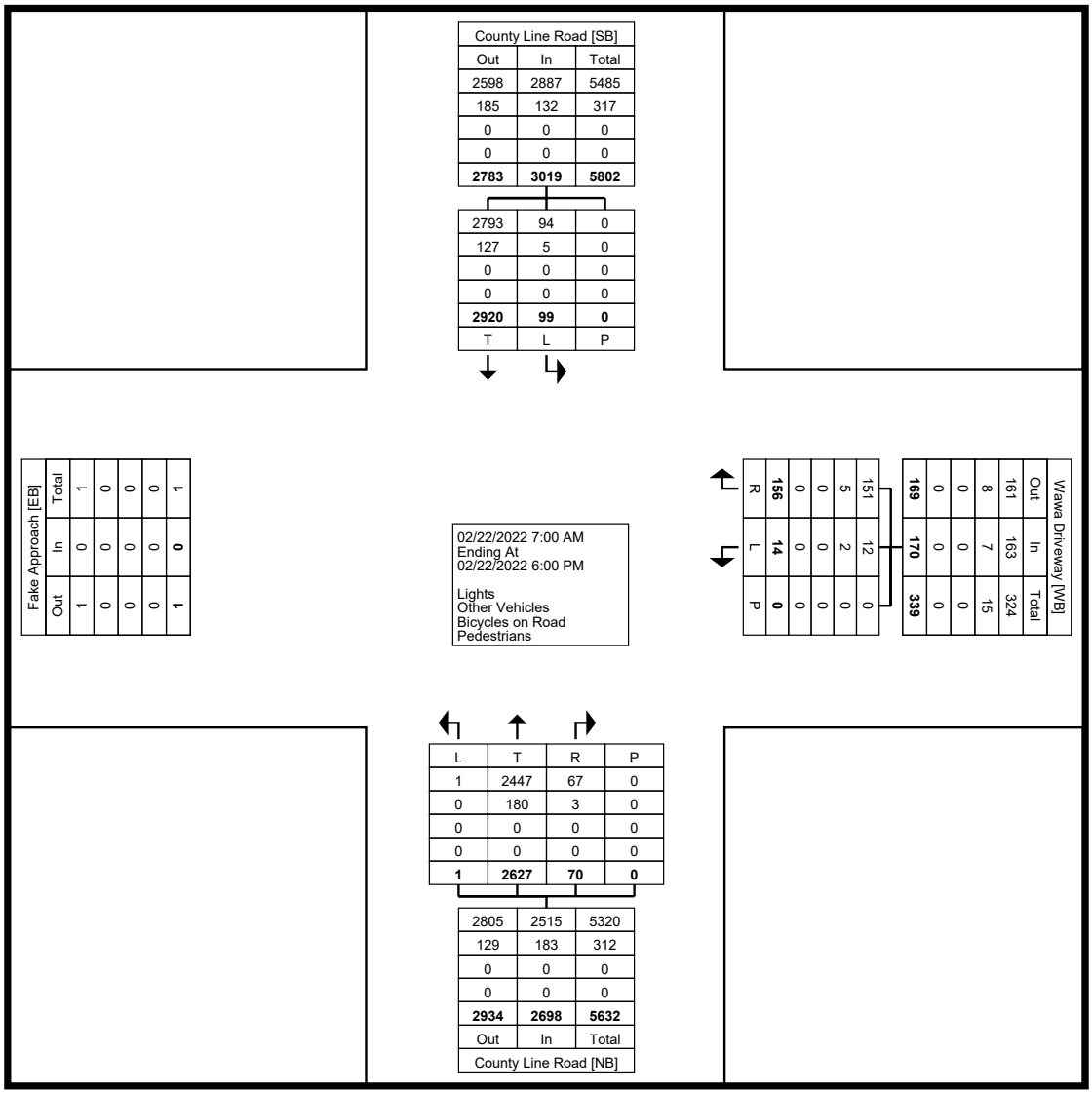
Turning Movement Data

Start Time	Wawa Driveway Westbound				County Line Road Northbound					County Line Road Southbound				
	Left	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
7:00 AM	0	8	0	8	0	124	5	0	129	6	143	0	149	286
7:15 AM	0	20	0	20	0	144	8	0	152	8	174	0	182	354
7:30 AM	0	14	0	14	0	204	3	0	207	10	200	0	210	431
7:45 AM	1	9	0	10	0	155	3	0	158	9	203	0	212	380
Hourly Total	1	51	0	52	0	627	19	0	646	33	720	0	753	1451
8:00 AM	1	12	0	13	0	139	12	0	151	9	178	0	187	351
8:15 AM	1	19	0	20	0	150	6	0	156	5	152	0	157	333
8:30 AM	7	6	0	13	0	146	6	0	152	4	161	0	165	330
8:45 AM	0	15	0	15	0	151	2	0	153	2	129	0	131	299
Hourly Total	9	52	0	61	0	586	26	0	612	20	620	0	640	1313
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	1	6	0	7	0	179	1	0	180	4	203	0	207	394
4:15 PM	0	4	0	4	0	164	1	0	165	4	179	0	183	352
4:30 PM	0	9	0	9	0	182	5	0	187	8	250	0	258	454
4:45 PM	0	6	0	6	0	181	5	0	186	9	183	0	192	384
Hourly Total	1	25	0	26	0	706	12	0	718	25	815	0	840	1584
5:00 PM	1	12	0	13	0	178	2	0	180	6	235	0	241	434
5:15 PM	0	6	0	6	0	179	6	0	185	3	198	0	201	392
5:30 PM	1	5	0	6	1	202	1	0	204	7	209	0	216	426
5:45 PM	1	5	0	6	0	149	4	0	153	5	123	0	128	287
Hourly Total	3	28	0	31	1	708	13	0	722	21	765	0	786	1539
Grand Total	14	156	0	170	1	2627	70	0	2698	99	2920	0	3019	5887
Approach %	8.2	91.8	-	-	0.0	97.4	2.6	-	-	3.3	96.7	-	-	-
Total %	0.2	2.6	-	2.9	0.0	44.6	1.2	-	45.8	1.7	49.6	-	51.3	-
Lights	12	151	-	163	1	2447	67	-	2515	94	2793	-	2887	5565
% Lights	85.7	96.8	-	95.9	100.0	93.1	95.7	-	93.2	94.9	95.7	-	95.6	94.5
Other Vehicles	2	5	-	7	0	180	3	-	183	5	127	-	132	322
% Other Vehicles	14.3	3.2	-	4.1	0.0	6.9	4.3	-	6.8	5.1	4.3	-	4.4	5.5
Bicycles on Road	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	0	-	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: County Line Road and Wawa Driveway
Site Code:
Start Date: 02/22/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: County Line Road and Wawa Driveway
Site Code:
Start Date: 02/22/2022

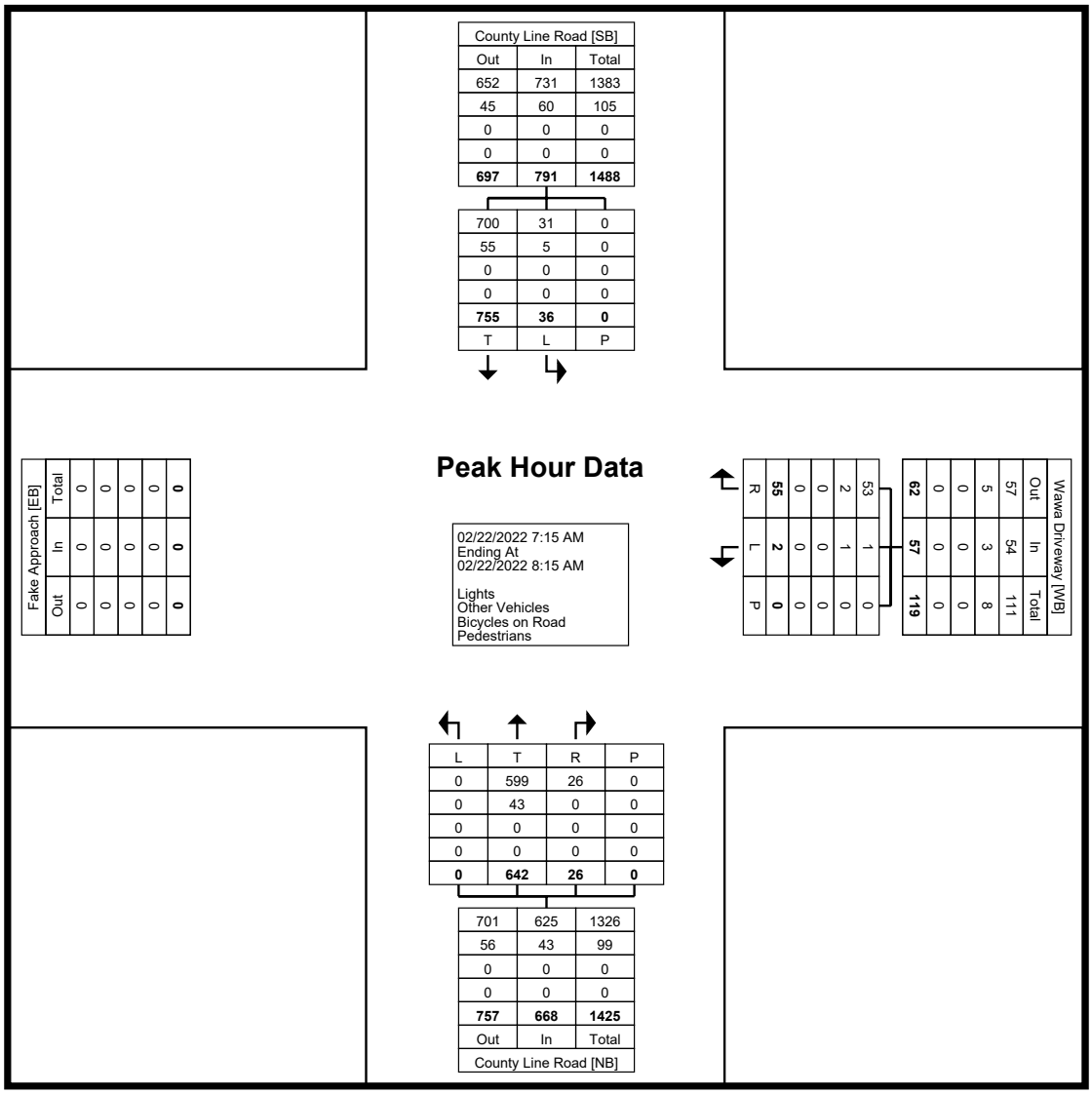
Turning Movement Peak Hour Data (7:15 AM)

Start Time	Wawa Driveway Westbound				County Line Road Northbound					County Line Road Southbound				
	Left	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
7:15 AM	0	20	0	20	0	144	8	0	152	8	174	0	182	354
7:30 AM	0	14	0	14	0	204	3	0	207	10	200	0	210	431
7:45 AM	1	9	0	10	0	155	3	0	158	9	203	0	212	380
8:00 AM	1	12	0	13	0	139	12	0	151	9	178	0	187	351
Total	2	55	0	57	0	642	26	0	668	36	755	0	791	1516
Approach %	3.5	96.5	-	-	0.0	96.1	3.9	-	-	4.6	95.4	-	-	-
Total %	0.1	3.6	-	3.8	0.0	42.3	1.7	-	44.1	2.4	49.8	-	52.2	-
PHF	0.500	0.688	-	0.713	0.000	0.787	0.542	-	0.807	0.900	0.930	-	0.933	0.879
Lights	1	53	-	54	0	599	26	-	625	31	700	-	731	1410
% Lights	50.0	96.4	-	94.7	-	93.3	100.0	-	93.6	86.1	92.7	-	92.4	93.0
Other Vehicles	1	2	-	3	0	43	0	-	43	5	55	-	60	106
% Other Vehicles	50.0	3.6	-	5.3	-	6.7	0.0	-	6.4	13.9	7.3	-	7.6	7.0
Bicycles on Road	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	0	-	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: County Line Road and Wawa Driveway
Site Code:
Start Date: 02/22/2022



Turning Movement Peak Hour Data Plot (7:15 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: County Line Road and Wawa Driveway
Site Code:
Start Date: 02/22/2022

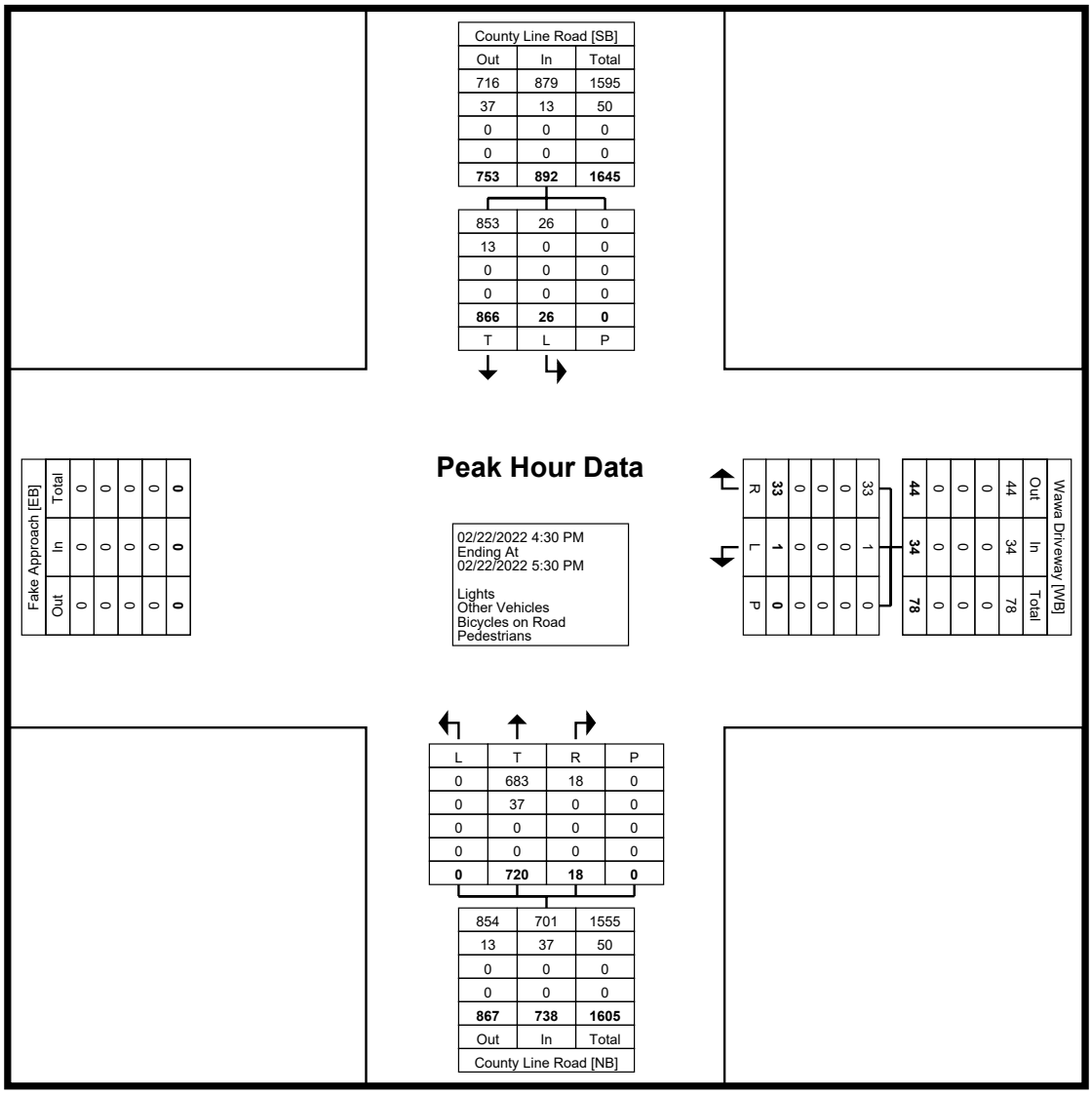
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Wawa Driveway Westbound				County Line Road Northbound					County Line Road Southbound				
	Left	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
4:30 PM	0	9	0	9	0	182	5	0	187	8	250	0	258	454
4:45 PM	0	6	0	6	0	181	5	0	186	9	183	0	192	384
5:00 PM	1	12	0	13	0	178	2	0	180	6	235	0	241	434
5:15 PM	0	6	0	6	0	179	6	0	185	3	198	0	201	392
Total	1	33	0	34	0	720	18	0	738	26	866	0	892	1664
Approach %	2.9	97.1	-	-	0.0	97.6	2.4	-	-	2.9	97.1	-	-	-
Total %	0.1	2.0	-	2.0	0.0	43.3	1.1	-	44.4	1.6	52.0	-	53.6	-
PHF	0.250	0.688	-	0.654	0.000	0.989	0.750	-	0.987	0.722	0.866	-	0.864	0.916
Lights	1	33	-	34	0	683	18	-	701	26	853	-	879	1614
% Lights	100.0	100.0	-	100.0	-	94.9	100.0	-	95.0	100.0	98.5	-	98.5	97.0
Other Vehicles	0	0	-	0	0	37	0	-	37	0	13	-	13	50
% Other Vehicles	0.0	0.0	-	0.0	-	5.1	0.0	-	5.0	0.0	1.5	-	1.5	3.0
Bicycles on Road	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	0	-	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: County Line Road and Wawa Driveway
Site Code:
Start Date: 02/22/2022



Turning Movement Peak Hour Data Plot (4:30 PM)

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Count Name: W. Butler Avenue and Wawa Driveway
Site Code:
Start Date: 02/22/2022

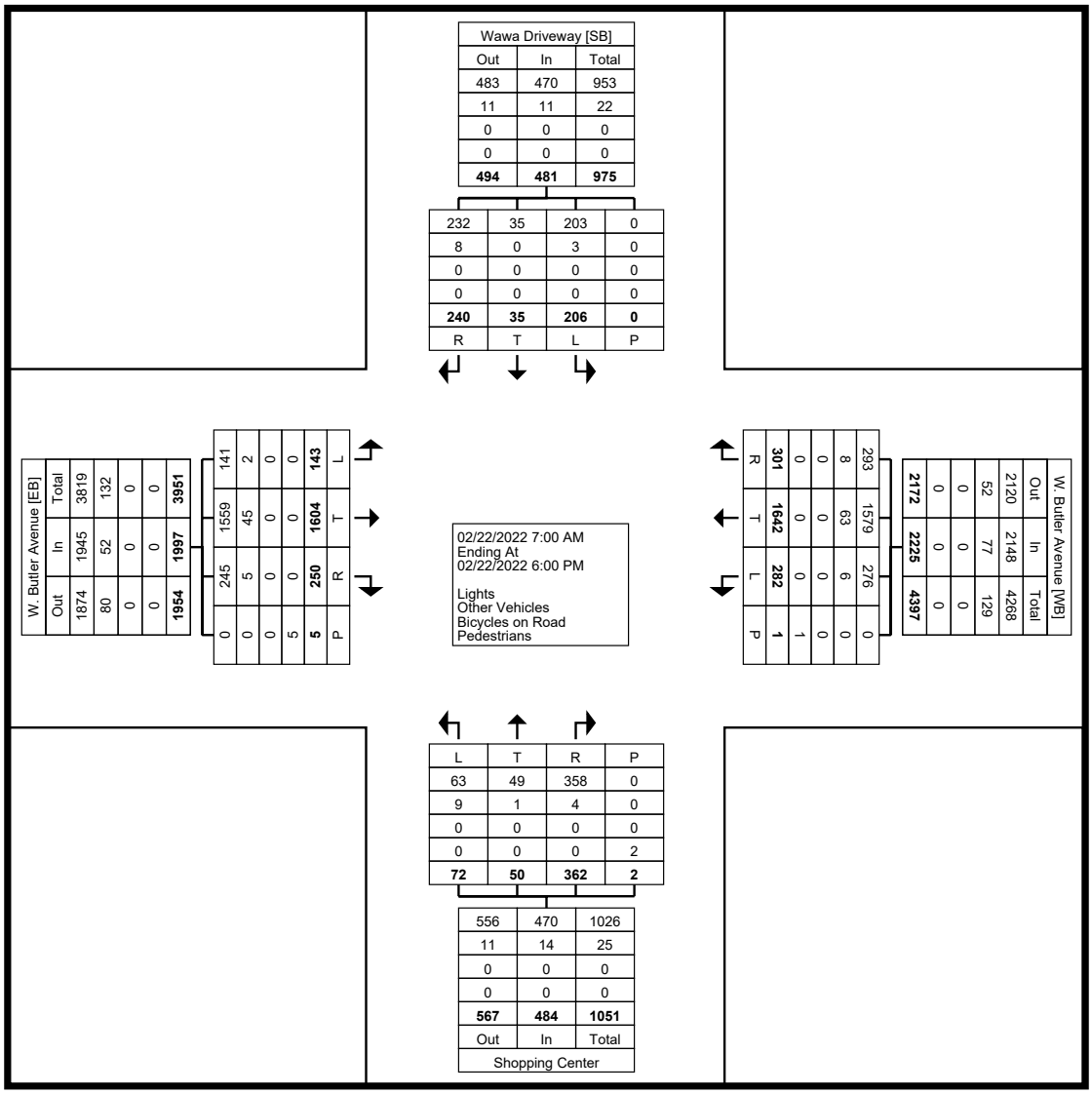
Turning Movement Data

Start Time	W. Butler Avenue Eastbound						W. Butler Avenue Westbound						Shopping Center Driveway Northbound						Wawa Driveway Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:00 AM	8	54	9	0	0	71	9	89	19	2	0	119	3	1	0	5	0	9	11	1	7	13	0	32	231
7:15 AM	13	64	5	1	0	83	16	119	23	1	0	159	4	1	1	2	0	8	13	2	5	12	0	32	282
7:30 AM	18	77	3	2	0	100	11	124	25	0	0	160	6	2	3	5	0	16	10	2	12	13	0	37	313
7:45 AM	10	89	8	0	0	107	14	106	16	3	0	139	3	3	5	5	0	16	17	2	12	9	0	40	302
Hourly Total	49	284	25	3	0	361	50	438	83	6	0	577	16	7	9	17	0	49	51	7	36	47	0	141	1128
8:00 AM	8	68	6	1	1	83	16	103	23	1	0	143	1	1	5	7	0	14	10	1	10	6	0	27	267
8:15 AM	9	81	12	2	0	104	24	123	22	3	0	172	6	5	6	6	0	23	16	4	13	4	0	37	336
8:30 AM	13	63	10	1	0	87	9	103	21	5	0	138	1	3	8	7	0	19	13	0	8	3	0	24	268
8:45 AM	6	81	12	2	0	101	14	86	21	0	0	121	2	3	4	7	0	16	13	2	18	4	0	37	275
Hourly Total	36	293	40	6	1	375	63	415	87	9	0	574	10	12	23	27	0	72	52	7	49	17	0	125	1146
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	9	127	14	1	0	151	20	119	14	1	0	154	8	1	9	21	0	39	7	2	4	9	0	22	366
4:15 PM	7	125	22	1	0	155	17	100	12	2	0	131	4	2	9	22	0	37	15	0	3	9	0	27	350
4:30 PM	9	121	25	1	2	156	26	86	8	0	1	120	4	7	18	20	1	49	16	1	4	10	0	31	356
4:45 PM	3	152	18	4	0	177	19	105	26	2	0	152	4	1	13	27	0	45	14	4	4	3	0	25	399
Hourly Total	28	525	79	7	2	639	82	410	60	5	1	557	20	11	49	90	1	170	52	7	15	31	0	105	1471
5:00 PM	6	132	21	4	0	163	16	102	15	0	0	133	9	6	10	34	0	59	10	7	5	9	0	31	386
5:15 PM	5	137	21	8	0	171	19	94	9	2	0	124	4	5	10	27	0	46	12	1	4	8	0	25	366
5:30 PM	11	121	17	8	1	157	31	95	9	1	0	136	7	5	10	23	0	45	11	1	4	5	0	21	359
5:45 PM	8	112	5	6	1	131	21	88	14	1	0	124	6	4	12	21	1	43	18	5	6	4	0	33	331
Hourly Total	30	502	64	26	2	622	87	379	47	4	0	517	26	20	42	105	1	193	51	14	19	26	0	110	1442
Grand Total	143	1604	208	42	5	1997	282	1642	277	24	1	2225	72	50	123	239	2	484	206	35	119	121	0	481	5187
Approach %	7.2	80.3	10.4	2.1	-	-	12.7	73.8	12.4	1.1	-	-	14.9	10.3	25.4	49.4	-	-	42.8	7.3	24.7	25.2	-	-	-
Total %	2.8	30.9	4.0	0.8	-	38.5	5.4	31.7	5.3	0.5	-	42.9	1.4	1.0	2.4	4.6	-	9.3	4.0	0.7	2.3	2.3	-	9.3	-
Lights	141	1559	203	42	-	1945	276	1579	270	23	-	2148	63	49	119	239	-	470	203	35	113	119	-	470	5033
% Lights	98.6	97.2	97.6	100.0	-	97.4	97.9	96.2	97.5	95.8	-	96.5	87.5	98.0	96.7	100.0	-	97.1	98.5	100.0	95.0	98.3	-	97.7	97.0
Other Vehicles	2	45	5	0	-	52	6	63	7	1	-	77	9	1	4	0	-	14	3	0	6	2	-	11	154
% Other Vehicles	1.4	2.8	2.4	0.0	-	2.6	2.1	3.8	2.5	4.2	-	3.5	12.5	2.0	3.3	0.0	-	2.9	1.5	0.0	5.0	1.7	-	2.3	3.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and Wawa Driveway
Site Code:
Start Date: 02/22/2022



Turning Movement Data Plot

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and Wawa Driveway
Site Code:
Start Date: 02/22/2022

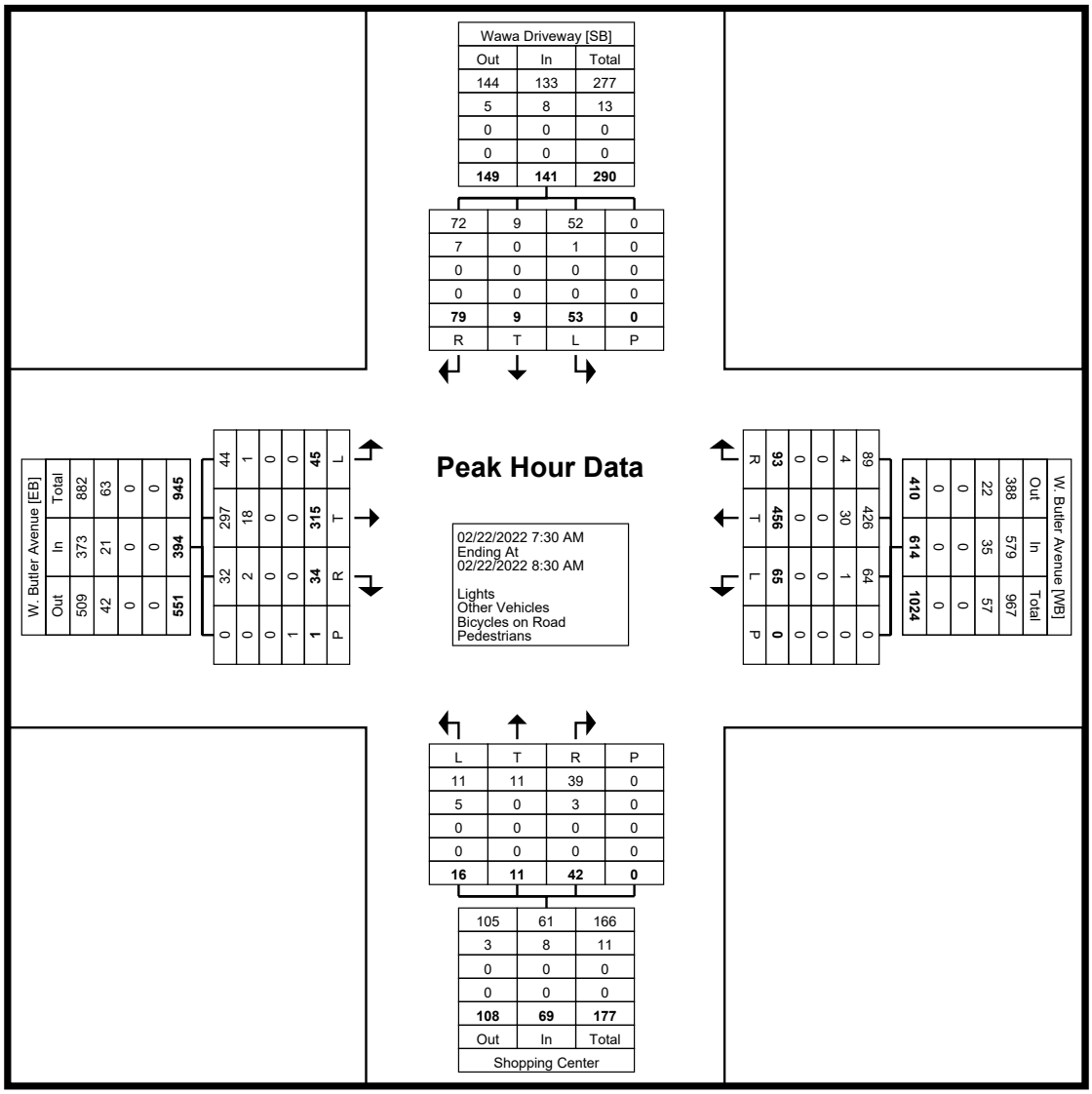
Turning Movement Peak Hour Data (7:30 AM)

Start Time	W. Butler Avenue Eastbound						W. Butler Avenue Westbound						Shopping Center Driveway Northbound						Wawa Driveway Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
7:30 AM	18	77	3	2	0	100	11	124	25	0	0	160	6	2	3	5	0	16	10	2	12	13	0	37	313
7:45 AM	10	89	8	0	0	107	14	106	16	3	0	139	3	3	5	5	0	16	17	2	12	9	0	40	302
8:00 AM	8	68	6	1	1	83	16	103	23	1	0	143	1	1	5	7	0	14	10	1	10	6	0	27	267
8:15 AM	9	81	12	2	0	104	24	123	22	3	0	172	6	5	6	6	0	23	16	4	13	4	0	37	336
Total	45	315	29	5	1	394	65	456	86	7	0	614	16	11	19	23	0	69	53	9	47	32	0	141	1218
Approach %	11.4	79.9	7.4	1.3	-	-	10.6	74.3	14.0	1.1	-	-	23.2	15.9	27.5	33.3	-	-	37.6	6.4	33.3	22.7	-	-	-
Total %	3.7	25.9	2.4	0.4	-	32.3	5.3	37.4	7.1	0.6	-	50.4	1.3	0.9	1.6	1.9	-	5.7	4.4	0.7	3.9	2.6	-	11.6	-
PHF	0.625	0.885	0.604	0.625	-	0.921	0.677	0.919	0.860	0.583	-	0.892	0.667	0.550	0.792	0.821	-	0.750	0.779	0.563	0.904	0.615	-	0.881	0.906
Lights	44	297	27	5	-	373	64	426	82	7	-	579	11	11	16	23	-	61	52	9	42	30	-	133	1146
% Lights	97.8	94.3	93.1	100.0	-	94.7	98.5	93.4	95.3	100.0	-	94.3	68.8	100.0	84.2	100.0	-	88.4	98.1	100.0	89.4	93.8	-	94.3	94.1
Other Vehicles	1	18	2	0	-	21	1	30	4	0	-	35	5	0	3	0	-	8	1	0	5	2	-	8	72
% Other Vehicles	2.2	5.7	6.9	0.0	-	5.3	1.5	6.6	4.7	0.0	-	5.7	31.3	0.0	15.8	0.0	-	11.6	1.9	0.0	10.6	6.3	-	5.7	5.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and Wawa Driveway
Site Code:
Start Date: 02/22/2022



Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and Wawa Driveway
Site Code:
Start Date: 02/22/2022

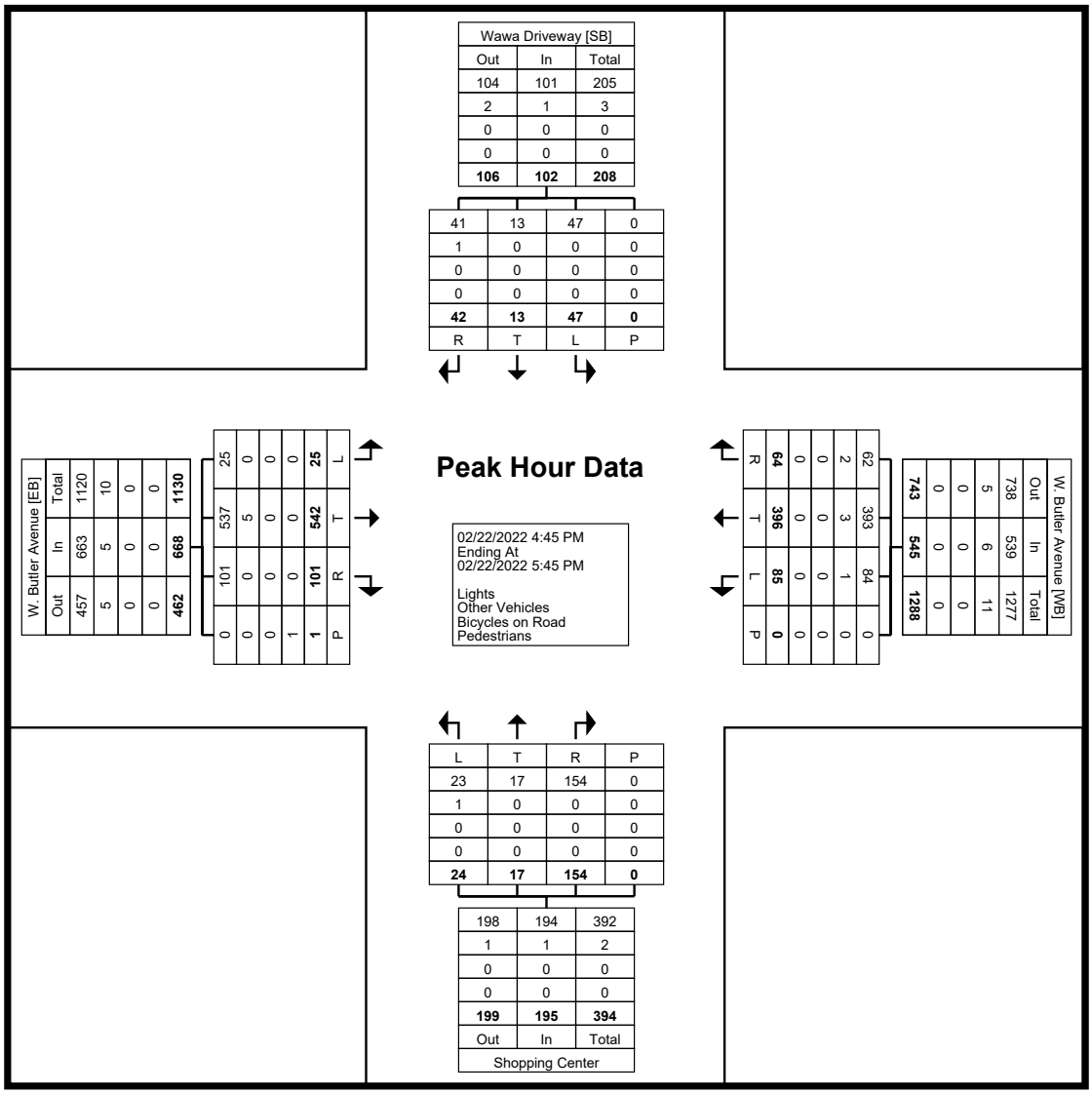
Turning Movement Peak Hour Data (4:45 PM)

Start Time	W. Butler Avenue Eastbound						W. Butler Avenue Westbound						Shopping Center Driveway Northbound						Wawa Driveway Southbound						Int. Total
	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	Left	Thru	Right	Right on Red	Peds	App. Total	
4:45 PM	3	152	18	4	0	177	19	105	26	2	0	152	4	1	13	27	0	45	14	4	4	3	0	25	399
5:00 PM	6	132	21	4	0	163	16	102	15	0	0	133	9	6	10	34	0	59	10	7	5	9	0	31	386
5:15 PM	5	137	21	8	0	171	19	94	9	2	0	124	4	5	10	27	0	46	12	1	4	8	0	25	366
5:30 PM	11	121	17	8	1	157	31	95	9	1	0	136	7	5	10	23	0	45	11	1	4	5	0	21	359
Total	25	542	77	24	1	668	85	396	59	5	0	545	24	17	43	111	0	195	47	13	17	25	0	102	1510
Approach %	3.7	81.1	11.5	3.6	-	-	15.6	72.7	10.8	0.9	-	-	12.3	8.7	22.1	56.9	-	-	46.1	12.7	16.7	24.5	-	-	-
Total %	1.7	35.9	5.1	1.6	-	44.2	5.6	26.2	3.9	0.3	-	36.1	1.6	1.1	2.8	7.4	-	12.9	3.1	0.9	1.1	1.7	-	6.8	-
PHF	0.568	0.891	0.917	0.750	-	0.944	0.685	0.943	0.567	0.625	-	0.896	0.667	0.708	0.827	0.816	-	0.826	0.839	0.464	0.850	0.694	-	0.823	0.946
Lights	25	537	77	24	-	663	84	393	57	5	-	539	23	17	43	111	-	194	47	13	16	25	-	101	1497
% Lights	100.0	99.1	100.0	100.0	-	99.3	98.8	99.2	96.6	100.0	-	98.9	95.8	100.0	100.0	100.0	-	99.5	100.0	100.0	94.1	100.0	-	99.0	99.1
Other Vehicles	0	5	0	0	-	5	1	3	2	0	-	6	1	0	0	0	-	1	0	0	1	0	-	1	13
% Other Vehicles	0.0	0.9	0.0	0.0	-	0.7	1.2	0.8	3.4	0.0	-	1.1	4.2	0.0	0.0	0.0	-	0.5	0.0	0.0	5.9	0.0	-	1.0	0.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Counter:: Mio
Counted By:: Mio
Weather:: Rain

Count Name: W. Butler Avenue and Wawa Driveway
Site Code:
Start Date: 02/22/2022



Turning Movement Peak Hour Data Plot (4:45 PM)

APPENDIX B:

Volume Development Spreadsheets & Trip Assignment Percentages

TPD# TOLB.00046
2/3/2023
Traffic Volumes Worksheet
Intersection: **West Butler Avenue & County Line Road**
Synchro Node: **1** **Adjacent intersections:** **West** **0** **East** **0** **North** **0** **South** **0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**92**	**219**	**88**	**177**	**266**	**97**	**82**	**501**	**64**	**107**	**573**	**42**	**2308**
Balancing													0
Existing Volumes (Balanced)	**92**	**219**	**88**	**177**	**266**	**97**	**82**	**501**	**64**	**107**	**573**	**42**	**2308**
Base growth (0.29% compounded for 5 yrs)	1	3	1	3	4	1	1	7	1	2	8	1	33
2027 Base Volumes	**93**	**222**	**89**	**180**	**270**	**98**	**83**	**508**	**65**	**109**	**581**	**43**	**2341**

ENTER = **5**
EXIT = **16**

Trip Assignment % - New Enter	5.0%	13.0%						22.0%	10.0%				
Trip Assignment % - New Exit				22.0%	18.0%						10.0%		
New Trips		1		4	3			1	1		2		**12**
2027 Projected Volumes	**93**	**223**	**89**	**184**	**273**	**98**	**83**	**509**	**66**	**109**	**583**	**43**	**2353**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**60**	**352**	**74**	**117**	**252**	**80**	**155**	**593**	**142**	**145**	**610**	**82**	**2662**
Balancing													0
Existing Volumes (Balanced)	**60**	**352**	**74**	**117**	**252**	**80**	**155**	**593**	**142**	**145**	**610**	**82**	**2662**
Base growth (0.29% compounded for 5 yrs)	1	5	1	2	4	1	2	9	2	2	9	1	39
2027 Base Volumes	**61**	**357**	**75**	**119**	**256**	**81**	**157**	**602**	**144**	**147**	**619**	**83**	**2701**

ENTER = **15**
EXIT = **10**

Trip Assignment % - New Enter	5.0%	13.0%						22.0%	10.0%				
Trip Assignment % - New Exit				22.0%	18.0%						10.0%		
New Trips	1	2		2	2			3	2		1		**13**
2027 Projected Volumes	**62**	**359**	**75**	**121**	**258**	**81**	**157**	**605**	**146**	**147**	**620**	**83**	**2714**

TPD# TOLB.00046
2/3/2023
Traffic Volumes Worksheet

Intersection:	**County Line Road and Site Driveway**
Synchro Node:	**2** Adjacent intersections: West **0** East **0** North **0** South **0**

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts				**2**		**55**		**642**	**26**	**36**	**755**		**1516**
Balancing													0
Existing Volumes (Balanced)				**2**		**55**		**642**	**26**	**36**	**755**		**1516**
Base growth (0.29% compounded for 5 yrs)				0		1		9	0	1	11		22
2027 Base Volumes				**2**	**0**	**56**	**0**	**651**	**26**	**37**	**766**	**0**	**1538**

ENTER =	**5**	
EXIT =	**16**	

Trip Assignment % - New Enter									27.0%	30.0%			
Trip Assignment % - New Exit				10.0%		30.0%							
New Trips				2		5			1	2			**10**
2027 Projected Volumes				**4**		**61**		**651**	**27**	**39**	**766**		**1548**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts				**1**		**33**		**720**	**18**	**26**	**866**		**1664**
Balancing													0
Existing Volumes (Balanced)				**1**		**33**		**720**	**18**	**26**	**866**		**1664**
Base growth (0.29% compounded for 5 yrs)				0		0		11	0	0	13		24
2027 Base Volumes	**0**	**0**	**0**	**1**	**0**	**33**	**0**	**731**	**18**	**26**	**879**	**0**	**1688**

ENTER =	**15**	
EXIT =	**10**	

Trip Assignment % - New Enter									27.0%	30.0%			
Trip Assignment % - New Exit				10.0%		30.0%							
New Trips				1		3			4	5			**13**
2027 Projected Volumes				**2**		**36**		**731**	**22**	**31**	**879**		**1701**

TPD# TOLB.00046
2/3/2023
Traffic Volumes Worksheet

Intersection: West Butler Avenue & New Britain Village Square Shopping Center/Site Driveway

Synchro Node: 3 Adjacent intersections: West 0 East 0 North 0 South 0

Time Period: Weekday A.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**45**	**315**	**34**	**65**	**456**	**93**	**16**	**11**	**42**	**53**	**9**	**79**	**1218**
Balancing													0
Existing Volumes (Balanced)	**45**	**315**	**34**	**65**	**456**	**93**	**16**	**11**	**42**	**53**	**9**	**79**	**1218**
Base growth (0.29% compounded for 5 yrs)	1	5	0	1	7	1	0	0	1	1	0	1	18
2027 Base Volumes	**46**	**320**	**34**	**66**	**463**	**94**	**16**	**11**	**43**	**54**	**9**	**80**	**1236**

ENTER = 5
EXIT = 16

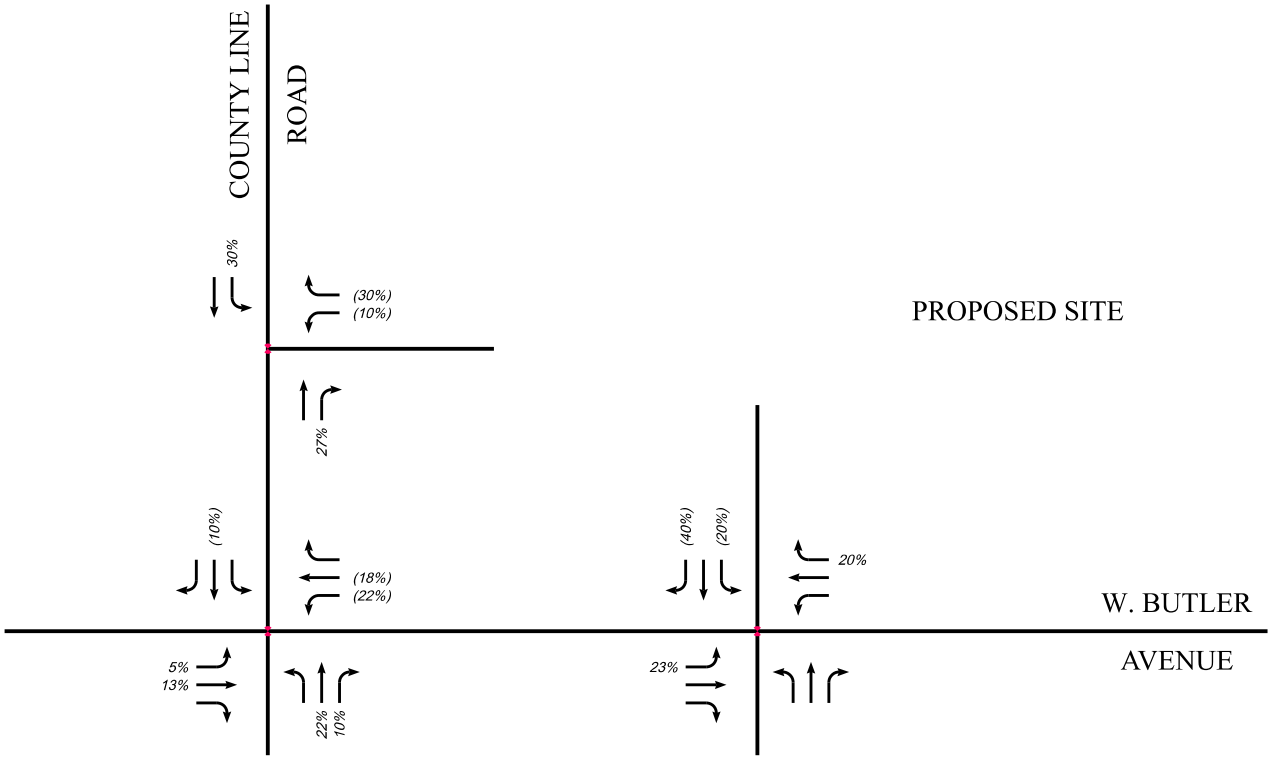
Trip Assignment % - New Enter	23.0%					20.0%							
Trip Assignment % - New Exit										20.0%		40.0%	
New Trips	1					1				3		6	**11**
2027 Projected Volumes	**47**	**320**	**34**	**66**	**463**	**95**	**16**	**11**	**43**	**57**	**9**	**86**	**1247**

Time Period: Weekday P.M. Peak Hour

	Eastbound			Westbound			Northbound			Southbound			Intersection
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Volume
2022 Existing Counts	**25**	**542**	**101**	**85**	**396**	**64**	**24**	**17**	**154**	**47**	**13**	**42**	**1510**
Balancing													0
Existing Volumes (Balanced)	**25**	**542**	**101**	**85**	**396**	**64**	**24**	**17**	**154**	**47**	**13**	**42**	**1510**
Base growth (0.29% compounded for 5 yrs)	0	8	1	1	6	1	0	0	2	1	0	1	21
2027 Base Volumes	**25**	**550**	**102**	**86**	**402**	**65**	**24**	**17**	**156**	**48**	**13**	**43**	**1531**

ENTER = 15
EXIT = 10

Trip Assignment % - New Enter	23.0%					20.0%							
Trip Assignment % - New Exit										20.0%		40.0%	
New Trips	3					3				2		4	**12**
2027 Projected Volumes	**28**	**550**	**102**	**86**	**402**	**68**	**24**	**17**	**156**	**50**	**13**	**47**	**1543**



KEY:

SCHEMATIC DRAWING:NOT TO SCALE

N

Est. 1989

TRAFFIC PLANNING AND DESIGN, INC.

www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

FIGURE B-1

TOWNHOME DEVELOPMENT
WEEKDAY NEW TRIP ASSIGNMENT
ENTERING % (EXITING %)

$FILE$ $DATE$ $TIME$ $USER$ $MODEL$

APPENDIX C:

Critical/Follow-up Gap Data

CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

$t_{c,x} = t_{c,\,base} + t_{c,HV} * P_{HV} + t_{c,G} * G - t_{3,LT}$

where:

$t_{c,x}$ = critical headway for movement x (s)
$t_{c,base}$ = base crtitcal headway from Chapter 10 of PennDOT Publication 46
$t_{c,HV}$ = adjustment factor for heavy vehciles (1.0 for major streets with one lane in each direction; 2.0 for major streets with two or three lanes in each direction) (s)
P_{HV} = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P_{HV}=0.02 for 2% heavy vehciles)
$t_{c,G}$ = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)
G = percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)
$t_{c,base}$ = adjustment factor for intersction geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 4.3)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
6	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
8	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
10	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4

LEFT TURN FROM MINOR ROADWAY - TWO LANES - 4-LEG INTERSECTION ($t_{c,\,base}$ = 7.1)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
1	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
2	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
3	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
4	7.1	6.9	7.3	6.7	7.5	6.5	7.7	6.3	7.9	6.1	8.1	5.9	8.3	5.7	8.5	5.5	8.7	5.3	8.9	5.1	9.1
5	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
6	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
7	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
8	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
9	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2
10	7.2	7.0	7.4	6.8	7.6	6.6	7.8	6.4	8.0	6.2	8.2	6.0	8.4	5.8	8.6	5.6	8.8	5.4	9.0	5.2	9.2

THROUGH TRAFFIC ON MINOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 6.5)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
1	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
2	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
3	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
4	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
5	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
6	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
7	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
8	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
9	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6
10	6.6	6.4	6.8	6.2	7.0	6.0	7.2	5.8	7.4	5.6	7.6	5.4	7.8	5.2	8.0	5.0	8.2	4.8	8.4	4.6	8.6

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 6.2)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
1	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
2	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
3	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
4	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
5	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
6	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
7	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
8	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
9	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
10	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3

CRITICAL HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

$t_{c,x} = t_{c,\,base} + t_{c,HV} * P_{HV} + t_{c,G} * G - t_{3,LT}$

where:

$t_{c,x}$ = critical headway for movement x (s)
$t_{c,base}$ = base crtitcal headway from Chapter 10 of PennDOT Publication 46
$t_{c,HV}$ = adjustment factor for heavy vehciles (1.0 for major streets with one lane in each direction; 2.0 for major streets with two or three lanes in each direction) (s)
P_{HV} = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P_{HV}=0.02 for 2% heavy vehciles)
$t_{c,G}$ = adjustment factor for grade (0.1 for Movement 9 and 12; 0.2 for Movements 7,8,10, and 11) (s)
G = percent grade (expressed as an integer; e.g., G= -2 for a 2% downhill grade)
$t_{c,base}$ = adjustment factor for intersction geometry (0.7 for minor street left-turn movement at three-leg intersections; 0.0 otherwise) (s)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 4.3)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
5	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
6	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
7	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
8	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
10	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4

LEFT TURN FROM MINOR ROADWAY - TWO LANES - 3-LEG INTERSECTION ($t_{c,\,base}$ = 7.1)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
1	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
2	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
3	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
4	6.4	6.2	6.6	6.0	6.8	5.8	7.0	5.6	7.2	5.4	7.4	5.2	7.6	5.0	7.8	4.8	8.0	4.6	8.2	4.4	8.4
5	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
6	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
7	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
8	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
9	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5
10	6.5	6.3	6.7	6.1	6.9	5.9	7.1	5.7	7.3	5.5	7.5	5.3	7.7	5.1	7.9	4.9	8.1	4.7	8.3	4.5	8.5

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{c,\,base}$ = 6.2)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
1	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
2	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
3	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
4	6.2	6.1	6.3	6.0	6.4	5.9	6.5	5.8	6.6	5.7	6.7	5.6	6.8	5.5	6.9	5.4	7.0	5.3	7.1	5.2	7.2
5	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
6	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
7	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
8	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
9	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3
10	6.3	6.2	6.4	6.1	6.5	6.0	6.6	5.9	6.7	5.8	6.8	5.7	6.9	5.6	7.0	5.5	7.1	5.4	7.2	5.3	7.3

FOLLOW-UP HEADWAY CALCULATIONS FOR TWSC INTERSECTION WITHIN SUBURBAN LAND USE CONTEXT
BASED ON PENNSYLVANIA DEFAULT VALUES FROM CHAPTER 10 OF PENNDOT PUBLICATION 46

$t_{f,x} = t_{f,\,base} + t_{f,HV} * P_{HV}$

where:

$t_{f,x}$ = follow-up headway for movement x (s)
$t_{f,base}$ = base follow-up headway from Chapter 10 of PennDOT Publication 46
$t_{f,HV}$ = adjustment factor for heavy vehciles (0.9 for major streets with one lane in each direction; 1.0 for major streets with two or three lanes in each direction) (s)
P_{HV} = proportion of heavy vehciles for movement (expressed as a decimal; e.g., P_{HV}=0.02 for 2% heavy vehciles)

LEFT TURN FROM MAJOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 3.0)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
7	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
9	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
10	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

LEFT TURN FROM MINOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 3.0)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
7	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
9	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
10	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

THROUGH TRAFFIC ON MINOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 4.0)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
6	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
7	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
9	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
10	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1

RIGHT TURN FROM MINOR ROADWAY - TWO LANES ($t_{f,\,base}$ = 3.1)

GRADE	0	-1	1	-2	2	-3	3	-4	4	-5	5	-6	6	-7	7	-8	8	-9	9	-10	10
HV %																					
0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
4	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
6	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
7	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
10	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2

APPENDIX D:

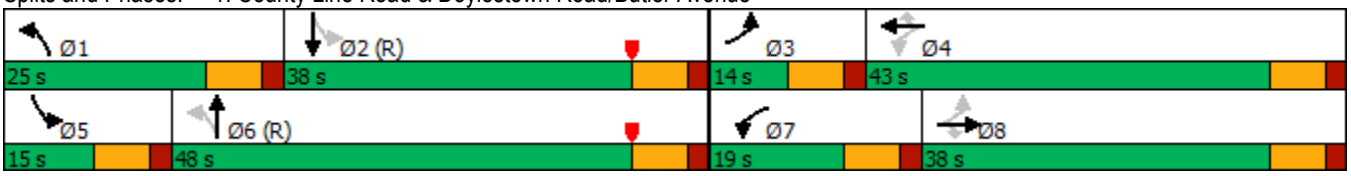
Capacity Analysis Worksheets

Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	219	88	177	266	97	82	501	64	107	573	42
Future Volume (vph)	92	219	88	177	266	97	82	501	64	107	573	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	14	11	12	13	11	11	11	11	11	11
Grade (%)		1%			-2%			4%			-4%	
Storage Length (ft)	195		400	245		95	355		0	430		475
Storage Lanes	1		0	1		1	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.983			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1467	1690	1624	1590	1653	1479	1588	3005	0	1606	3123	0
Flt Permitted	0.488			0.413			0.258			0.321		
Satd. Flow (perm)	753	1690	1624	691	1653	1479	431	3005	0	543	3123	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227			227		13			6	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		575			640			788			611	
Travel Time (s)		8.7			9.7			11.9			9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	6%	0%	5%	10%	8%	2%	6%	6%	5%	6%	19%
Adj. Flow (vph)	100	238	96	192	289	105	89	545	70	116	623	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	238	96	192	289	105	89	615	0	116	669	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6			2		
Detector Phase	3	8	8	7	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	17.0		12.0	17.0	
Total Split (s)	14.0	38.0	38.0	19.0	43.0	43.0	25.0	48.0		15.0	38.0	
Total Split (%)	11.7%	31.7%	31.7%	15.8%	35.8%	35.8%	20.8%	40.0%		12.5%	31.7%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	Max	Max	None	Max	Max	None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: County Line Road & Doylestown Road/Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	219	88	177	266	97	82	501	64	107	573	42
Future Volume (veh/h)	92	219	88	177	266	97	82	501	64	107	573	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1570	1710	1866	1803	1732	1831	1683	1626	1626	1878	1864	1679
Adj Flow Rate, veh/h	100	238	62	192	289	57	89	545	59	116	623	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	6	0	5	10	8	2	6	6	5	6	19
Cap, veh/h	307	459	425	399	534	478	310	1004	108	348	1221	84
Arrive On Green	0.07	0.27	0.27	0.11	0.31	0.31	0.06	0.36	0.35	0.07	0.36	0.35
Sat Flow, veh/h	1495	1710	1582	1718	1732	1552	1603	2813	304	1789	3361	232
Grp Volume(v), veh/h	100	238	62	192	289	57	89	299	305	116	328	338
Grp Sat Flow(s),veh/h/ln	1495	1710	1582	1718	1732	1552	1603	1545	1572	1789	1771	1822
Q Serve(g_s), s	5.7	14.2	3.6	9.3	16.6	3.2	4.1	18.5	18.6	4.8	17.4	17.4
Cycle Q Clear(g_c), s	5.7	14.2	3.6	9.3	16.6	3.2	4.1	18.5	18.6	4.8	17.4	17.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		0.13
Lane Grp Cap(c), veh/h	307	459	425	399	534	478	310	552	561	348	643	662
V/C Ratio(X)	0.33	0.52	0.15	0.48	0.54	0.12	0.29	0.54	0.54	0.33	0.51	0.51
Avail Cap(c_a), veh/h	307	459	425	402	534	478	465	552	561	360	643	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	37.3	33.4	26.7	34.5	29.8	22.8	30.7	30.9	22.9	29.9	29.9
Incr Delay (d2), s/veh	0.6	4.1	0.7	0.8	3.5	0.5	0.5	3.8	3.8	0.6	2.9	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	10.4	2.6	6.7	11.5	2.2	2.8	11.6	11.8	3.6	12.2	12.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.7	41.4	34.1	27.5	38.0	30.3	23.3	34.5	34.6	23.4	32.7	32.7
LnGrp LOS	C	D	C	C	D	C	C	C	C	C	C	C
Approach Vol, veh/h		400			538			693			782	
Approach Delay, s/veh		37.4			33.4			33.1			31.3	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	49.6	14.0	43.0	14.2	48.8	18.8	38.2
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	18.0	31.0	7.0	36.0	8.0	41.0	12.0	31.0
Max Q Clear Time (g_c+I1), s	6.6	19.9	8.2	19.1	7.3	21.0	11.8	16.7
Green Ext Time (p_c), s	0.2	1.9	0.0	1.1	0.0	2.0	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	55	642	26	36	755
Future Volume (vph)	2	55	642	26	36	755
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	11	11	11
Grade (%)	-9%		-3%			2%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.869		0.994			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1548	0	3125	0	1435	1610
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1548	0	3125	0	1435	1610
Link Speed (mph)	25		45			45
Link Distance (ft)	303		611			227
Travel Time (s)	8.3		9.3			3.4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	50%	4%	7%	0%	14%	7%
Adj. Flow (vph)	2	63	730	30	41	858
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	760	0	41	858
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	55	642	26	36	755
Future Vol, veh/h	2	55	642	26	36	755
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-9	-	-3	-	-	2
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	4	7	0	14	7
Mvmt Flow	2	63	730	30	41	858

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1685	380	0	0	760	0
Stage 1	745	-	-	-	-	-
Stage 2	940	-	-	-	-	-
Critical Hdwy	5.55	6.06	-	-	4.5	-
Critical Hdwy Stg 1	4.75	-	-	-	-	-
Critical Hdwy Stg 2	4.35	-	-	-	-	-
Follow-up Hdwy	3.5	3.1	-	-	3.1	-
Pot Cap-1 Maneuver	156	718	-	-	612	-
Stage 1	541	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	146	718	-	-	612	-
Mov Cap-2 Maneuver	146	-	-	-	-	-
Stage 1	541	-	-	-	-	-
Stage 2	470	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0.5
HCM LOS	B		

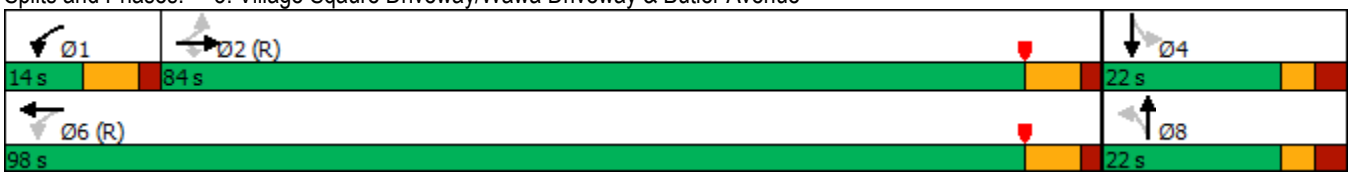
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	631	612	-
HCM Lane V/C Ratio	-	-	0.103	0.067	-
HCM Control Delay (s)	-	-	11.4	11.3	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	315	34	65	456	93	16	11	42	53	9	79
Future Volume (vph)	45	315	34	65	456	93	16	11	42	53	9	79
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	12	13	11	12	12	11	14	12	11	14	12
Grade (%)		2%			-3%			-5%			4%	
Storage Length (ft)	85		190	150		0	60		100	75		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98									
Frt			0.850		0.975			0.881			0.865	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1604	1681	1477	1645	1673	0	1293	1643	0	1588	1506	0
Flt Permitted	0.437			0.502			0.628			0.719		
Satd. Flow (perm)	738	1681	1446	869	1673	0	855	1643	0	1202	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91		26			46			87	
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		640			305			156			178	
Travel Time (s)		9.7			4.6			4.3			4.9	
Confl. Peds. (#/hr)	1		1									
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	6%	6%	2%	7%	4%	31%	0%	7%	2%	0%	9%
Adj. Flow (vph)	49	346	37	71	501	102	18	12	46	58	10	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	346	37	71	603	0	18	58	0	58	97	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0	12.0	22.0		11.0	11.0		11.0	11.0	
Total Split (s)	84.0	84.0	84.0	14.0	98.0		22.0	22.0		22.0	22.0	
Total Split (%)	70.0%	70.0%	70.0%	11.7%	81.7%		18.3%	18.3%		18.3%	18.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 72 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	

Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 3: Village Sqaure Driveway/Wawa Driveway & Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	315	34	65	456	93	16	11	42	53	9	79
Future Volume (veh/h)	45	315	34	65	456	93	16	11	42	53	9	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1693	1761	1883	1812	1855	1545	2066	1887	1683	1779	1584
Adj Flow Rate, veh/h	49	346	32	71	501	94	18	12	21	58	10	52
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	6	6	2	7	4	31	0	7	2	0	9
Cap, veh/h	617	1226	1080	803	1217	228	120	60	104	154	22	115
Arrive On Green	0.72	0.72	0.72	0.05	0.82	0.81	0.09	0.09	0.08	0.09	0.09	0.08
Sat Flow, veh/h	769	1693	1491	1794	1484	278	1107	674	1179	1238	249	1296
Grp Volume(v), veh/h	49	346	32	71	0	595	18	0	33	58	0	62
Grp Sat Flow(s),veh/h/ln	769	1693	1491	1794	0	1762	1107	0	1853	1238	0	1546
Q Serve(g_s), s	2.3	8.5	0.7	1.0	0.0	11.1	1.9	0.0	2.0	5.5	0.0	4.6
Cycle Q Clear(g_c), s	2.3	8.5	0.7	1.0	0.0	11.1	6.0	0.0	2.0	6.9	0.0	4.6
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.64	1.00		0.84
Lane Grp Cap(c), veh/h	617	1226	1080	803	0	1445	120	0	164	154	0	137
V/C Ratio(X)	0.08	0.28	0.03	0.09	0.00	0.41	0.15	0.00	0.20	0.38	0.00	0.45
Avail Cap(c_a), veh/h	617	1226	1080	840	0	1445	179	0	263	220	0	219
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.9	5.7	4.7	3.3	0.0	3.0	54.6	0.0	51.1	53.8	0.0	52.4
Incr Delay (d2), s/veh	0.2	0.5	0.0	0.0	0.0	0.9	0.6	0.0	0.6	1.5	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	4.7	0.4	0.5	0.0	4.6	1.0	0.0	1.7	3.2	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.1	6.3	4.7	3.3	0.0	3.8	55.1	0.0	51.7	55.3	0.0	54.7
LnGrp LOS	A	A	A	A	A	A	E	A	D	E	A	D
Approach Vol, veh/h		427			666			51			120	
Approach Delay, s/veh		6.0			3.8			52.9			55.0	
Approach LOS		A			A			D			D	

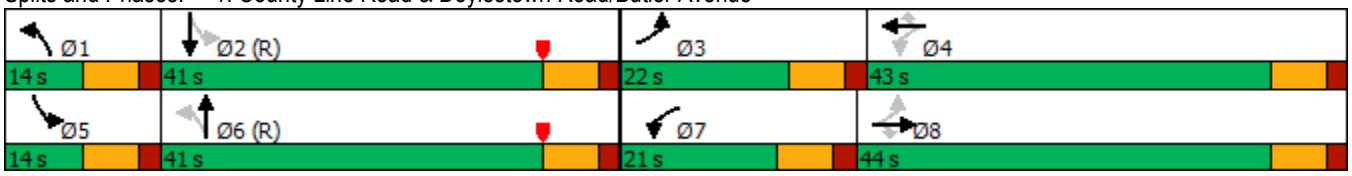
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.5	92.9		15.6		104.4		15.6				
Change Period (Y+Rc), s	7.0	7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s	7.0	77.0		16.0		91.0		16.0				
Max Q Clear Time (g_c+I1), s	3.5	11.0		9.4		13.1		8.5				
Green Ext Time (p_c), s	0.0	1.7		0.2		2.4		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		11.4	
HCM 6th LOS		B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	352	74	117	252	80	155	593	142	145	610	82
Future Volume (vph)	60	352	74	117	252	80	155	593	142	145	610	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	14	11	12	13	11	11	11	11	11	11
Grade (%)		1%			-2%			4%			-4%	
Storage Length (ft)	195		400	245		95	355		0	430		475
Storage Lanes	1		0	1		1	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.971			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	1773	1624	1653	1800	1479	1620	2978	0	1669	3254	0
Flt Permitted	0.547			0.333			0.176			0.148		
Satd. Flow (perm)	891	1773	1624	579	1800	1479	300	2978	0	260	3254	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164		25			12	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		575			640			788			611	
Travel Time (s)		8.7			9.7			11.9			9.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	10%	1%	0%	1%	1%	8%	0%	7%	0%	1%	2%	0%
Adj. Flow (vph)	64	374	79	124	268	85	165	631	151	154	649	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	374	79	124	268	85	165	782	0	154	736	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6			2		
Detector Phase	3	8	8	7	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	17.0		12.0	17.0	
Total Split (s)	22.0	44.0	44.0	21.0	43.0	43.0	14.0	41.0		14.0	41.0	
Total Split (%)	18.3%	36.7%	36.7%	17.5%	35.8%	35.8%	11.7%	34.2%		11.7%	34.2%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	Max	Max	None	Max	Max	None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: County Line Road & Doylestown Road/Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	352	74	117	252	80	155	593	142	145	610	82
Future Volume (veh/h)	60	352	74	117	252	80	155	593	142	145	610	82
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1654	1780	1866	1860	1860	1831	1711	1612	1711	1935	1921	1949
Adj Flow Rate, veh/h	64	374	51	124	268	48	165	631	115	154	649	83
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	10	1	0	1	1	8	0	7	0	1	2	0
Cap, veh/h	356	564	501	322	634	529	286	884	161	279	1112	142
Arrive On Green	0.05	0.32	0.32	0.08	0.34	0.34	0.07	0.34	0.33	0.07	0.34	0.33
Sat Flow, veh/h	1575	1780	1582	1772	1860	1552	1629	2589	471	1843	3255	416
Grp Volume(v), veh/h	64	374	51	124	268	48	165	373	373	154	363	369
Grp Sat Flow(s),veh/h/ln	1575	1780	1582	1772	1860	1552	1629	1532	1528	1843	1825	1846
Q Serve(g_s), s	3.2	21.8	2.7	5.5	13.3	2.5	8.0	25.4	25.6	6.5	19.7	19.7
Cycle Q Clear(g_c), s	3.2	21.8	2.7	5.5	13.3	2.5	8.0	25.4	25.6	6.5	19.7	19.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		0.23
Lane Grp Cap(c), veh/h	356	564	501	322	634	529	286	523	522	279	623	630
V/C Ratio(X)	0.18	0.66	0.10	0.38	0.42	0.09	0.58	0.71	0.71	0.55	0.58	0.58
Avail Cap(c_a), veh/h	486	564	501	411	634	529	286	523	522	279	623	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	35.5	29.0	26.1	30.5	26.9	25.5	34.4	34.6	26.3	32.5	32.6
Incr Delay (d2), s/veh	0.2	6.0	0.4	0.7	2.0	0.3	2.8	8.0	8.1	2.4	4.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.1	15.2	1.9	4.1	10.0	1.7	5.7	15.5	15.5	5.2	14.0	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	41.5	29.4	26.9	32.4	27.2	28.4	42.4	42.7	28.7	36.4	36.5
LnGrp LOS	C	D	C	C	C	C	C	D	D	C	D	D
Approach Vol, veh/h		489			440			911			886	
Approach Delay, s/veh		38.2			30.3			40.0			35.1	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	47.0	12.1	46.9	14.0	47.0	15.0	44.0
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	7.0	34.0	15.0	36.0	7.0	34.0	14.0	37.0
Max Q Clear Time (g_c+I1), s	10.5	22.2	5.7	15.8	9.0	27.9	8.0	24.3
Green Ext Time (p_c), s	0.0	2.1	0.1	1.0	0.0	1.6	0.2	1.2

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	33	720	18	26	866
Future Volume (vph)	1	33	720	18	26	866
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	11	11	11
Grade (%)	-9%		-3%			2%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.869		0.996			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1633	0	3187	0	1636	1689
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1633	0	3187	0	1636	1689
Link Speed (mph)	25		45			45
Link Distance (ft)	303		611			227
Travel Time (s)	8.3		9.3			3.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	5%	0%	0%	2%
Adj. Flow (vph)	1	36	783	20	28	941
Shared Lane Traffic (%)						
Lane Group Flow (vph)	37	0	803	0	28	941
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	33	720	18	26	866
Future Vol, veh/h	1	33	720	18	26	866
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-9	-	-3	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	0	0	2
Mvmt Flow	1	36	783	20	28	941

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1790	402	0	0	803	0
Stage 1	793	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Critical Hdwy	4.8	6	-	-	4.3	-
Critical Hdwy Stg 1	4	-	-	-	-	-
Critical Hdwy Stg 2	3.6	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	212	703	-	-	631	-
Stage 1	679	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	203	703	-	-	631	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	623	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.3
HCM LOS	B		

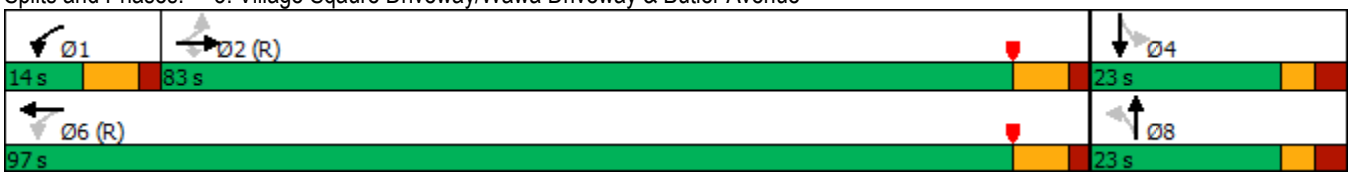
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	656	631	-
HCM Lane V/C Ratio	-	-	0.056	0.045	-
HCM Control Delay (s)	-	-	10.8	11	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

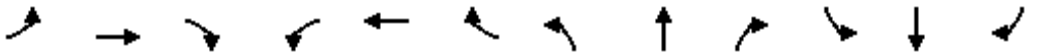
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	542	101	85	396	64	24	17	154	47	13	42
Future Volume (vph)	25	542	101	85	396	64	24	17	154	47	13	42
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	12	13	11	12	12	11	14	12	11	14	12
Grade (%)		2%			-3%			-5%			4%	
Storage Length (ft)	85		190	150		0	60		100	75		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98									
Frt			0.850		0.979			0.865			0.886	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1636	1764	1565	1661	1766	0	1629	1702	0	1620	1642	0
Flt Permitted	0.487			0.359			0.719			0.321		
Satd. Flow (perm)	839	1764	1533	628	1766	0	1233	1702	0	547	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			106		20			162			44	
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		640			305			156			178	
Travel Time (s)		9.7			4.6			4.3			4.9	
Confl. Peds. (#/hr)	1		1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	4%	0%	0%	0%	0%	2%
Adj. Flow (vph)	26	571	106	89	417	67	25	18	162	49	14	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	571	106	89	484	0	25	180	0	49	58	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0	12.0	22.0		11.0	11.0		11.0	11.0	
Total Split (s)	83.0	83.0	83.0	14.0	97.0		23.0	23.0		23.0	23.0	
Total Split (%)	69.2%	69.2%	69.2%	11.7%	80.8%		19.2%	19.2%		19.2%	19.2%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 73 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	

Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: Village Sqaure Driveway/Wawa Driveway & Butler Avenue





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	542	101	85	396	64	24	17	154	47	13	42
Future Volume (veh/h)	25	542	101	85	396	64	24	17	154	47	13	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1778	1764	1849	1898	1898	1869	1929	2066	1986	1711	1779	1683
Adj Flow Rate, veh/h	26	571	81	89	417	62	25	18	45	49	14	18
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	1	1	3	4	0	0	0	0	2
Cap, veh/h	681	1259	1118	603	1310	195	177	51	126	144	68	88
Arrive On Green	0.71	0.71	0.71	0.05	0.81	0.80	0.10	0.10	0.09	0.10	0.10	0.09
Sat Flow, veh/h	870	1764	1566	1807	1614	240	1421	523	1307	1225	707	909
Grp Volume(v), veh/h	26	571	81	89	0	479	25	0	63	49	0	32
Grp Sat Flow(s),veh/h/ln	870	1764	1566	1807	0	1854	1421	0	1830	1225	0	1616
Q Serve(g_s), s	1.1	16.4	1.9	1.4	0.0	7.9	2.0	0.0	3.9	4.7	0.0	2.2
Cycle Q Clear(g_c), s	1.1	16.4	1.9	1.4	0.0	7.9	3.7	0.0	3.9	8.0	0.0	2.2
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.71	1.00		0.56
Lane Grp Cap(c), veh/h	681	1259	1118	603	0	1505	177	0	177	144	0	156
V/C Ratio(X)	0.04	0.45	0.07	0.15	0.00	0.32	0.14	0.00	0.36	0.34	0.00	0.20
Avail Cap(c_a), veh/h	681	1259	1118	637	0	1505	253	0	275	209	0	242
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.69	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.1	7.3	5.2	4.7	0.0	2.9	51.4	0.0	51.0	54.2	0.0	50.2
Incr Delay (d2), s/veh	0.1	0.8	0.1	0.1	0.0	0.6	0.4	0.0	1.2	1.4	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	8.5	1.0	0.6	0.0	3.6	1.3	0.0	3.4	2.7	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.1	8.1	5.3	4.8	0.0	3.4	51.8	0.0	52.3	55.6	0.0	50.8
LnGrp LOS	A	A	A	A	A	A	D	A	D	E	A	D
Approach Vol, veh/h		678			568			88			81	
Approach Delay, s/veh		7.6			3.7			52.1			53.7	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.7	91.7		16.6		103.4		16.6				
Change Period (Y+Rc), s	7.0	7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s	7.0	76.0		17.0		90.0		17.0				
Max Q Clear Time (g_c+I1), s	3.9	18.9		10.5		9.9		6.2				
Green Ext Time (p_c), s	0.1	2.7		0.1		1.8		0.2				

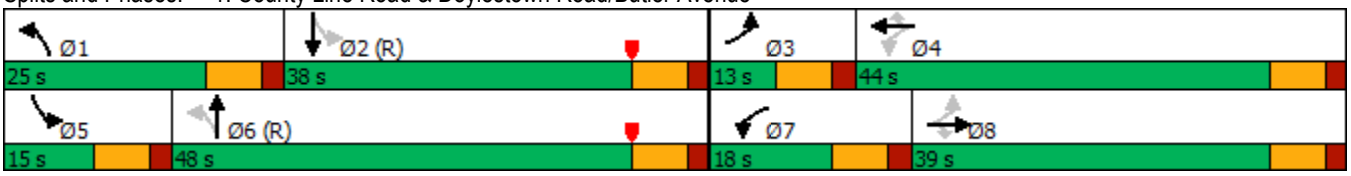
Intersection Summary			
HCM 6th Ctrl Delay		11.4	
HCM 6th LOS		B	

2027 Base (No-Build) Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	222	89	180	270	98	83	508	65	109	581	43
Future Volume (vph)	93	222	89	180	270	98	83	508	65	109	581	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	14	11	12	13	11	11	11	11	11	11
Grade (%)		1%			-2%			4%			-4%	
Storage Length (ft)	195		400	245		95	355		0	430		475
Storage Lanes	1		0	1		1	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.983			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1467	1690	1624	1590	1653	1479	1588	3005	0	1606	3123	0
Flt Permitted	0.491			0.413			0.252			0.315		
Satd. Flow (perm)	758	1690	1624	691	1653	1479	421	3005	0	532	3123	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227			227		13			6	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		575			640			788			611	
Travel Time (s)		8.7			9.7			11.9			9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	6%	0%	5%	10%	8%	2%	6%	6%	5%	6%	19%
Adj. Flow (vph)	101	241	97	196	293	107	90	552	71	118	632	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	241	97	196	293	107	90	623	0	118	679	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6			2		
Detector Phase	3	8	8	7	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	17.0		12.0	17.0	
Total Split (s)	13.0	39.0	39.0	18.0	44.0	44.0	25.0	48.0		15.0	38.0	
Total Split (%)	10.8%	32.5%	32.5%	15.0%	36.7%	36.7%	20.8%	40.0%		12.5%	31.7%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	Max	Max	None	Max	Max	None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: County Line Road & Doylestown Road/Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	222	89	180	270	98	83	508	65	109	581	43
Future Volume (veh/h)	93	222	89	180	270	98	83	508	65	109	581	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1570	1710	1866	1803	1732	1831	1683	1626	1626	1878	1864	1679
Adj Flow Rate, veh/h	101	241	63	196	293	59	90	552	60	118	632	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	6	0	5	10	8	2	6	6	5	6	19
Cap, veh/h	301	470	435	394	549	491	307	1002	109	345	1218	85
Arrive On Green	0.06	0.28	0.28	0.10	0.32	0.32	0.06	0.36	0.35	0.07	0.36	0.35
Sat Flow, veh/h	1495	1710	1582	1718	1732	1552	1603	2812	305	1789	3359	234
Grp Volume(v), veh/h	101	241	63	196	293	59	90	303	309	118	333	343
Grp Sat Flow(s),veh/h/ln	1495	1710	1582	1718	1732	1552	1603	1545	1572	1789	1771	1822
Q Serve(g_s), s	5.8	14.3	3.6	9.5	16.7	3.2	4.2	18.8	19.0	4.9	17.7	17.8
Cycle Q Clear(g_c), s	5.8	14.3	3.6	9.5	16.7	3.2	4.2	18.8	19.0	4.9	17.7	17.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.19	1.00		0.13
Lane Grp Cap(c), veh/h	301	470	435	394	549	491	307	550	560	345	642	661
V/C Ratio(X)	0.34	0.51	0.14	0.50	0.53	0.12	0.29	0.55	0.55	0.34	0.52	0.52
Avail Cap(c_a), veh/h	301	470	435	394	549	491	461	550	560	356	642	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.2	36.7	32.8	26.7	33.7	29.1	22.9	30.9	31.0	23.0	30.0	30.1
Incr Delay (d2), s/veh	0.7	4.0	0.7	0.9	3.3	0.4	0.5	3.9	3.9	0.6	3.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	10.4	2.6	6.8	11.5	2.2	2.8	11.8	12.0	3.6	12.3	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.9	40.7	33.5	27.6	37.1	29.6	23.4	34.8	34.9	23.5	33.0	33.0
LnGrp LOS	C	D	C	C	D	C	C	C	C	C	C	C
Approach Vol, veh/h		405			548			702			794	
Approach Delay, s/veh		36.9			32.9			33.4			31.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	49.5	13.0	44.0	14.2	48.8	18.0	39.0
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	18.0	31.0	6.0	37.0	8.0	41.0	11.0	32.0
Max Q Clear Time (g_c+I1), s	6.7	20.2	8.3	19.2	7.4	21.3	12.0	16.8
Green Ext Time (p_c), s	0.2	1.9	0.0	1.1	0.0	2.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	56	651	26	37	766
Future Volume (vph)	2	56	651	26	37	766
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	11	11	11
Grade (%)	-9%		-3%			2%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.869		0.994			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1548	0	3125	0	1435	1610
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1548	0	3125	0	1435	1610
Link Speed (mph)	25		45			45
Link Distance (ft)	303		611			227
Travel Time (s)	8.3		9.3			3.4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	50%	4%	7%	0%	14%	7%
Adj. Flow (vph)	2	64	740	30	42	870
Shared Lane Traffic (%)						
Lane Group Flow (vph)	66	0	770	0	42	870
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	56	651	26	37	766
Future Vol, veh/h	2	56	651	26	37	766
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-9	-	-3	-	-	2
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	4	7	0	14	7
Mvmt Flow	2	64	740	30	42	870

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1709	385	0	0	770	0
Stage 1	755	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Critical Hdwy	5.55	6.06	-	-	4.5	-
Critical Hdwy Stg 1	4.75	-	-	-	-	-
Critical Hdwy Stg 2	4.35	-	-	-	-	-
Follow-up Hdwy	3.5	3.1	-	-	3.1	-
Pot Cap-1 Maneuver	151	714	-	-	607	-
Stage 1	536	-	-	-	-	-
Stage 2	498	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	141	714	-	-	607	-
Mov Cap-2 Maneuver	141	-	-	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	464	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0.5
HCM LOS	B		

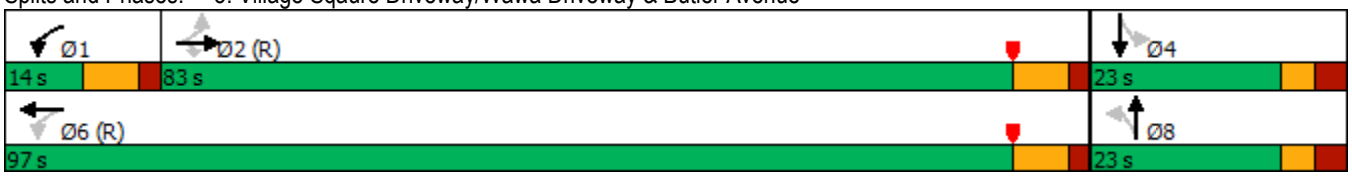
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	626	607	-
HCM Lane V/C Ratio	-	-	0.105	0.069	-
HCM Control Delay (s)	-	-	11.4	11.4	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	320	34	66	463	94	16	11	43	54	9	80
Future Volume (vph)	46	320	34	66	463	94	16	11	43	54	9	80
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	12	13	11	12	12	11	14	12	11	14	12
Grade (%)		2%			-3%			-5%			4%	
Storage Length (ft)	85		190	150		0	60		100	75		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98									
Frt			0.850		0.975			0.881			0.865	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1604	1681	1477	1645	1673	0	1293	1642	0	1588	1506	0
Flt Permitted	0.433			0.498			0.625			0.719		
Satd. Flow (perm)	731	1681	1446	862	1673	0	851	1642	0	1202	1506	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91		25			47			88	
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		640			305			156			178	
Travel Time (s)		9.7			4.6			4.3			4.9	
Confl. Peds. (#/hr)	1		1									
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	6%	6%	2%	7%	4%	31%	0%	7%	2%	0%	9%
Adj. Flow (vph)	51	352	37	73	509	103	18	12	47	59	10	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	352	37	73	612	0	18	59	0	59	98	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0	12.0	22.0		11.0	11.0		11.0	11.0	
Total Split (s)	83.0	83.0	83.0	14.0	97.0		23.0	23.0		23.0	23.0	
Total Split (%)	69.2%	69.2%	69.2%	11.7%	80.8%		19.2%	19.2%		19.2%	19.2%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 72 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	

Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 3: Village Sqaure Driveway/Wawa Driveway & Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	320	34	66	463	94	16	11	43	54	9	80
Future Volume (veh/h)	46	320	34	66	463	94	16	11	43	54	9	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1693	1761	1883	1812	1855	1545	2066	1887	1683	1779	1584
Adj Flow Rate, veh/h	51	352	32	73	509	95	18	12	22	59	10	53
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	6	6	2	7	4	31	0	7	2	0	9
Cap, veh/h	611	1223	1077	796	1216	227	121	59	108	155	22	117
Arrive On Green	0.72	0.72	0.72	0.05	0.82	0.81	0.09	0.09	0.08	0.09	0.09	0.08
Sat Flow, veh/h	763	1693	1491	1794	1485	277	1106	653	1197	1237	245	1300
Grp Volume(v), veh/h	51	352	32	73	0	604	18	0	34	59	0	63
Grp Sat Flow(s),veh/h/ln	763	1693	1491	1794	0	1762	1106	0	1850	1237	0	1545
Q Serve(g_s), s	2.4	8.8	0.7	1.1	0.0	11.4	1.9	0.0	2.1	5.5	0.0	4.7
Cycle Q Clear(g_c), s	2.4	8.8	0.7	1.1	0.0	11.4	6.0	0.0	2.1	7.1	0.0	4.7
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.65	1.00		0.84
Lane Grp Cap(c), veh/h	611	1223	1077	796	0	1442	121	0	166	155	0	139
V/C Ratio(X)	0.08	0.29	0.03	0.09	0.00	0.42	0.15	0.00	0.20	0.38	0.00	0.45
Avail Cap(c_a), veh/h	611	1223	1077	833	0	1442	188	0	278	229	0	232
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.0	5.8	4.7	3.3	0.0	3.0	54.4	0.0	50.9	53.7	0.0	52.2
Incr Delay (d2), s/veh	0.2	0.5	0.0	0.0	0.0	0.9	0.6	0.0	0.6	1.5	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	4.9	0.4	0.5	0.0	4.8	1.0	0.0	1.8	3.3	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.2	6.4	4.8	3.4	0.0	3.9	55.0	0.0	51.5	55.2	0.0	54.5
LnGrp LOS	A	A	A	A	A	A	E	A	D	E	A	D
Approach Vol, veh/h		435			677			52			122	
Approach Delay, s/veh		6.1			3.9			52.7			54.9	
Approach LOS		A			A			D			D	

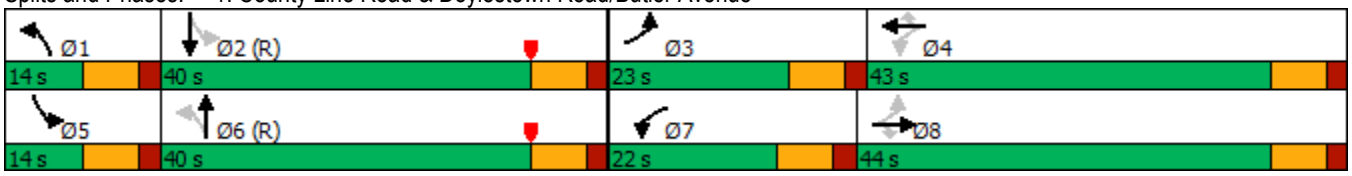
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.6	92.7		15.8		104.2		15.8				
Change Period (Y+Rc), s	7.0	7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s	7.0	76.0		17.0		90.0		17.0				
Max Q Clear Time (g_c+I1), s	3.6	11.3		9.6		13.4		8.5				
Green Ext Time (p_c), s	0.0	1.8		0.2		2.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		11.4	
HCM 6th LOS		B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	357	75	119	256	81	157	602	144	147	619	83
Future Volume (vph)	61	357	75	119	256	81	157	602	144	147	619	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	14	11	12	13	11	11	11	11	11	11
Grade (%)		1%			-2%			4%			-4%	
Storage Length (ft)	195		400	245		95	355		0	430		475
Storage Lanes	1		0	1		1	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.971			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	1773	1624	1653	1800	1479	1620	2978	0	1669	3254	0
Flt Permitted	0.546			0.334			0.160			0.132		
Satd. Flow (perm)	889	1773	1624	581	1800	1479	273	2978	0	232	3254	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164		24			12	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		575			640			788			611	
Travel Time (s)		8.7			9.7			11.9			9.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	10%	1%	0%	1%	1%	8%	0%	7%	0%	1%	2%	0%
Adj. Flow (vph)	65	380	80	127	272	86	167	640	153	156	659	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	380	80	127	272	86	167	793	0	156	747	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6			2		
Detector Phase	3	8	8	7	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	17.0		12.0	17.0	
Total Split (s)	23.0	44.0	44.0	22.0	43.0	43.0	14.0	40.0		14.0	40.0	
Total Split (%)	19.2%	36.7%	36.7%	18.3%	35.8%	35.8%	11.7%	33.3%		11.7%	33.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	Max	Max	None	Max	Max	None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: County Line Road & Doylestown Road/Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	357	75	119	256	81	157	602	144	147	619	83
Future Volume (veh/h)	61	357	75	119	256	81	157	602	144	147	619	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1654	1780	1866	1860	1860	1831	1711	1612	1711	1935	1921	1949
Adj Flow Rate, veh/h	65	380	52	127	272	49	167	640	117	156	659	84
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	10	1	0	1	1	8	0	7	0	1	2	0
Cap, veh/h	355	564	501	320	636	530	282	880	161	273	1108	141
Arrive On Green	0.05	0.32	0.32	0.08	0.34	0.34	0.07	0.34	0.33	0.07	0.34	0.33
Sat Flow, veh/h	1575	1780	1582	1772	1860	1552	1629	2587	472	1843	3256	415
Grp Volume(v), veh/h	65	380	52	127	272	49	167	379	378	156	369	374
Grp Sat Flow(s),veh/h/ln	1575	1780	1582	1772	1860	1552	1629	1532	1527	1843	1825	1846
Q Serve(g_s), s	3.3	22.3	2.8	5.6	13.5	2.6	8.0	26.0	26.1	6.6	20.1	20.2
Cycle Q Clear(g_c), s	3.3	22.3	2.8	5.6	13.5	2.6	8.0	26.0	26.1	6.6	20.1	20.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		0.22
Lane Grp Cap(c), veh/h	355	564	501	320	636	530	282	521	520	273	621	628
V/C Ratio(X)	0.18	0.67	0.10	0.40	0.43	0.09	0.59	0.73	0.73	0.57	0.59	0.60
Avail Cap(c_a), veh/h	497	564	501	421	636	530	282	521	520	273	621	628
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	35.6	29.0	26.2	30.5	26.9	26.0	34.7	34.9	26.6	32.7	32.9
Incr Delay (d2), s/veh	0.2	6.3	0.4	0.8	2.0	0.3	3.3	8.6	8.7	2.8	4.2	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	15.5	2.0	4.2	10.2	1.8	5.9	15.8	15.9	5.3	14.2	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	41.9	29.4	26.9	32.5	27.2	29.3	43.3	43.5	29.5	36.9	37.0
LnGrp LOS	C	D	C	C	C	C	C	D	D	C	D	D
Approach Vol, veh/h		497			448			924			899	
Approach Delay, s/veh		38.5			30.3			40.9			35.6	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	46.8	12.2	47.0	14.0	46.8	15.2	44.0
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	7.0	33.0	16.0	36.0	7.0	33.0	15.0	37.0
Max Q Clear Time (g_c+I1), s	10.5	22.6	5.8	16.0	9.1	28.5	8.1	24.8
Green Ext Time (p_c), s	0.0	2.1	0.1	1.0	0.0	1.3	0.2	1.2

Intersection Summary	
HCM 6th Ctrl Delay	37.0
HCM 6th LOS	D

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	33	731	18	26	879
Future Volume (vph)	1	33	731	18	26	879
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	11	11	11
Grade (%)	-9%		-3%			2%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.869		0.996			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1633	0	3187	0	1636	1689
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1633	0	3187	0	1636	1689
Link Speed (mph)	25		45			45
Link Distance (ft)	303		611			227
Travel Time (s)	8.3		9.3			3.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	5%	0%	0%	2%
Adj. Flow (vph)	1	36	795	20	28	955
Shared Lane Traffic (%)						
Lane Group Flow (vph)	37	0	815	0	28	955
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	33	731	18	26	879
Future Vol, veh/h	1	33	731	18	26	879
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-9	-	-3	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	0	0	2
Mvmt Flow	1	36	795	20	28	955

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1816	408	0	0	815	0
Stage 1	805	-	-	-	-	-
Stage 2	1011	-	-	-	-	-
Critical Hdwy	4.8	6	-	-	4.3	-
Critical Hdwy Stg 1	4	-	-	-	-	-
Critical Hdwy Stg 2	3.6	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	207	698	-	-	625	-
Stage 1	673	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	198	698	-	-	625	-
Mov Cap-2 Maneuver	198	-	-	-	-	-
Stage 1	673	-	-	-	-	-
Stage 2	617	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.3
HCM LOS	B		

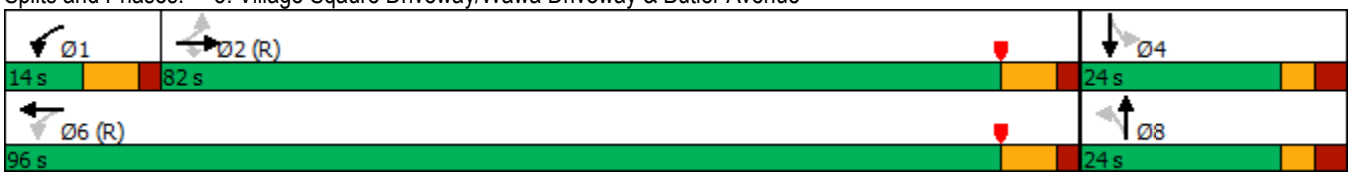
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	650	625	-
HCM Lane V/C Ratio	-	-	0.057	0.045	-
HCM Control Delay (s)	-	-	10.9	11	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	550	102	86	402	65	24	17	156	48	13	43
Future Volume (vph)	25	550	102	86	402	65	24	17	156	48	13	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	12	13	11	12	12	11	14	12	11	14	12
Grade (%)		2%			-3%			-5%			4%	
Storage Length (ft)	85		190	150		0	60		100	75		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98									
Frt			0.850		0.979			0.865			0.886	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1636	1764	1565	1661	1766	0	1629	1702	0	1620	1642	0
Flt Permitted	0.484			0.353			0.719			0.322		
Satd. Flow (perm)	833	1764	1533	617	1766	0	1233	1702	0	549	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			107		19			164			45	
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		640			305			156			178	
Travel Time (s)		9.7			4.6			4.3			4.9	
Confl. Peds. (#/hr)	1		1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	4%	0%	0%	0%	0%	2%
Adj. Flow (vph)	26	579	107	91	423	68	25	18	164	51	14	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	579	107	91	491	0	25	182	0	51	59	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0	12.0	22.0		11.0	11.0		11.0	11.0	
Total Split (s)	82.0	82.0	82.0	14.0	96.0		24.0	24.0		24.0	24.0	
Total Split (%)	68.3%	68.3%	68.3%	11.7%	80.0%		20.0%	20.0%		20.0%	20.0%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 73 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	

Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: Village Sqaure Driveway/Wawa Driveway & Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	550	102	86	402	65	24	17	156	48	13	43
Future Volume (veh/h)	25	550	102	86	402	65	24	17	156	48	13	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1778	1764	1849	1898	1898	1869	1929	2066	1986	1711	1779	1683
Adj Flow Rate, veh/h	26	579	82	91	423	63	25	18	47	51	14	19
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	1	1	3	4	0	0	0	0	2
Cap, veh/h	675	1254	1113	594	1305	194	180	50	132	146	68	92
Arrive On Green	0.71	0.71	0.71	0.05	0.81	0.80	0.10	0.10	0.09	0.10	0.10	0.09
Sat Flow, veh/h	865	1764	1566	1807	1614	240	1419	506	1322	1223	684	928
Grp Volume(v), veh/h	26	579	82	91	0	486	25	0	65	51	0	33
Grp Sat Flow(s),veh/h/ln	865	1764	1566	1807	0	1854	1419	0	1828	1223	0	1612
Q Serve(g_s), s	1.1	17.0	1.9	1.4	0.0	8.2	2.0	0.0	4.0	4.9	0.0	2.3
Cycle Q Clear(g_c), s	1.1	17.0	1.9	1.4	0.0	8.2	3.7	0.0	4.0	8.4	0.0	2.3
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.72	1.00		0.58
Lane Grp Cap(c), veh/h	675	1254	1113	594	0	1500	180	0	182	146	0	160
V/C Ratio(X)	0.04	0.46	0.07	0.15	0.00	0.32	0.14	0.00	0.36	0.35	0.00	0.21
Avail Cap(c_a), veh/h	675	1254	1113	627	0	1500	264	0	289	218	0	255
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.2	7.5	5.3	4.9	0.0	3.0	51.2	0.0	50.8	54.1	0.0	49.9
Incr Delay (d2), s/veh	0.1	0.8	0.1	0.1	0.0	0.6	0.3	0.0	1.2	1.4	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	8.7	1.0	0.7	0.0	3.8	1.3	0.0	3.4	2.8	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.2	8.3	5.4	5.0	0.0	3.6	51.5	0.0	52.0	55.5	0.0	50.6
LnGrp LOS	A	A	A	A	A	A	D	A	D	E	A	D
Approach Vol, veh/h		687			577			90			84	
Approach Delay, s/veh		7.8			3.8			51.8			53.6	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.8	91.3		16.9		103.1		16.9				
Change Period (Y+Rc), s	7.0	7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s	7.0	75.0		18.0		89.0		18.0				
Max Q Clear Time (g_c+I1), s	3.9	19.5		10.9		10.2		6.2				
Green Ext Time (p_c), s	0.1	2.8		0.1		1.8		0.2				

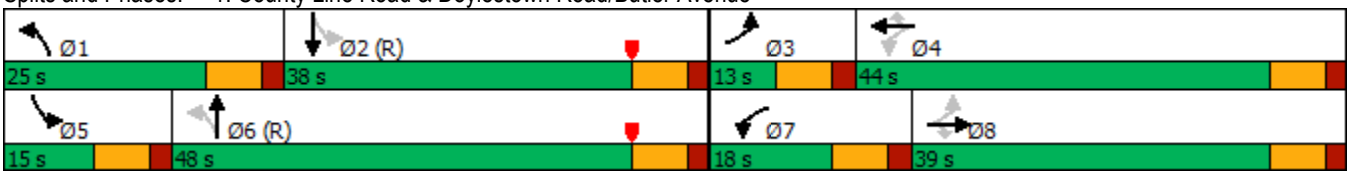
Intersection Summary												
HCM 6th Ctrl Delay			11.6									
HCM 6th LOS			B									

2027 Projected (Build) Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	223	89	184	273	98	83	509	66	109	583	43
Future Volume (vph)	93	223	89	184	273	98	83	509	66	109	583	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	14	11	12	13	11	11	11	11	11	11
Grade (%)		1%			-2%			4%			-4%	
Storage Length (ft)	195		400	245		95	355		0	430		475
Storage Lanes	1		0	1		1	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.983			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1467	1690	1624	1590	1653	1479	1588	3005	0	1606	3123	0
Flt Permitted	0.484			0.412			0.251			0.314		
Satd. Flow (perm)	747	1690	1624	690	1653	1479	420	3005	0	531	3123	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227			227		13			6	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		575			640			788			611	
Travel Time (s)		8.7			9.7			11.9			9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	6%	0%	5%	10%	8%	2%	6%	6%	5%	6%	19%
Adj. Flow (vph)	101	242	97	200	297	107	90	553	72	118	634	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	242	97	200	297	107	90	625	0	118	681	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6			2		
Detector Phase	3	8	8	7	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	17.0		12.0	17.0	
Total Split (s)	13.0	39.0	39.0	18.0	44.0	44.0	25.0	48.0		15.0	38.0	
Total Split (%)	10.8%	32.5%	32.5%	15.0%	36.7%	36.7%	20.8%	40.0%		12.5%	31.7%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	Max	Max	None	Max	Max	None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: County Line Road & Doylestown Road/Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	223	89	184	273	98	83	509	66	109	583	43
Future Volume (veh/h)	93	223	89	184	273	98	83	509	66	109	583	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1570	1710	1866	1803	1732	1831	1683	1626	1626	1878	1864	1679
Adj Flow Rate, veh/h	101	242	63	200	297	59	90	553	61	118	634	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	16	6	0	5	10	8	2	6	6	5	6	19
Cap, veh/h	298	470	435	393	549	491	307	1000	110	344	1219	84
Arrive On Green	0.06	0.28	0.28	0.10	0.32	0.32	0.06	0.36	0.35	0.07	0.36	0.35
Sat Flow, veh/h	1495	1710	1582	1718	1732	1552	1603	2807	309	1789	3359	233
Grp Volume(v), veh/h	101	242	63	200	297	59	90	304	310	118	334	344
Grp Sat Flow(s),veh/h/ln	1495	1710	1582	1718	1732	1552	1603	1545	1571	1789	1771	1822
Q Serve(g_s), s	5.8	14.3	3.6	9.7	17.0	3.2	4.2	18.9	19.0	4.9	17.8	17.8
Cycle Q Clear(g_c), s	5.8	14.3	3.6	9.7	17.0	3.2	4.2	18.9	19.0	4.9	17.8	17.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.20	1.00		0.13
Lane Grp Cap(c), veh/h	298	470	435	393	549	491	307	550	560	344	642	661
V/C Ratio(X)	0.34	0.51	0.14	0.51	0.54	0.12	0.29	0.55	0.55	0.34	0.52	0.52
Avail Cap(c_a), veh/h	298	470	435	393	549	491	461	550	560	355	642	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	36.7	32.8	26.8	33.8	29.1	22.9	30.9	31.1	23.0	30.0	30.1
Incr Delay (d2), s/veh	0.7	4.0	0.7	1.0	3.4	0.4	0.5	3.9	3.9	0.6	3.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	10.5	2.6	7.0	11.6	2.2	2.8	11.8	12.1	3.6	12.4	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.9	40.7	33.5	27.7	37.2	29.6	23.4	34.9	35.0	23.6	33.0	33.0
LnGrp LOS	C	D	C	C	D	C	C	C	C	C	C	C
Approach Vol, veh/h		406			556			704			796	
Approach Delay, s/veh		36.9			33.0			33.5			31.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	49.5	13.0	44.0	14.2	48.8	18.0	39.0
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	18.0	31.0	6.0	37.0	8.0	41.0	11.0	32.0
Max Q Clear Time (g_c+I1), s	6.7	20.3	8.3	19.5	7.4	21.4	12.2	16.8
Green Ext Time (p_c), s	0.2	1.9	0.0	1.1	0.0	2.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	61	651	27	39	766
Future Volume (vph)	4	61	651	27	39	766
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	11	11	11
Grade (%)	-9%		-3%			2%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.874		0.994			
Flt Protected	0.997				0.950	
Satd. Flow (prot)	1530	0	3125	0	1435	1610
Flt Permitted	0.997				0.950	
Satd. Flow (perm)	1530	0	3125	0	1435	1610
Link Speed (mph)	25		45			45
Link Distance (ft)	303		611			227
Travel Time (s)	8.3		9.3			3.4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	50%	4%	7%	0%	14%	7%
Adj. Flow (vph)	5	69	740	31	44	870
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	771	0	44	870
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	61	651	27	39	766
Future Vol, veh/h	4	61	651	27	39	766
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-9	-	-3	-	-	2
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	50	4	7	0	14	7
Mvmt Flow	5	69	740	31	44	870

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1714	386	0	0	771	0
Stage 1	756	-	-	-	-	-
Stage 2	958	-	-	-	-	-
Critical Hdwy	5.55	6.06	-	-	4.5	-
Critical Hdwy Stg 1	4.75	-	-	-	-	-
Critical Hdwy Stg 2	4.35	-	-	-	-	-
Follow-up Hdwy	3.5	3.1	-	-	3.1	-
Pot Cap-1 Maneuver	150	713	-	-	606	-
Stage 1	536	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	139	713	-	-	606	-
Mov Cap-2 Maneuver	139	-	-	-	-	-
Stage 1	536	-	-	-	-	-
Stage 2	461	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	0.6
HCM LOS	B		

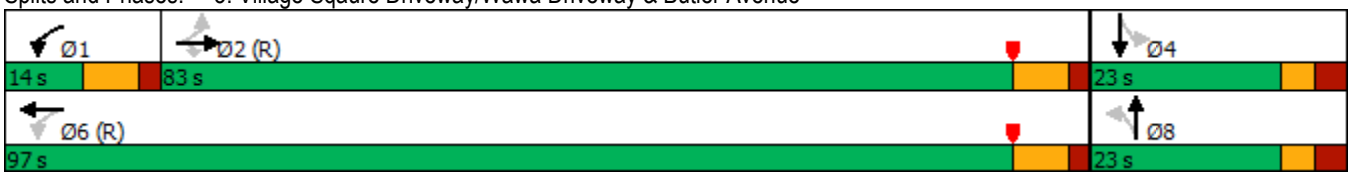
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	569	606	-
HCM Lane V/C Ratio	-	-	0.13	0.073	-
HCM Control Delay (s)	-	-	12.3	11.4	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	320	34	66	463	95	16	11	43	57	9	86
Future Volume (vph)	47	320	34	66	463	95	16	11	43	57	9	86
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	12	13	11	12	12	11	14	12	11	14	12
Grade (%)		2%			-3%			-5%			4%	
Storage Length (ft)	85		190	150		0	60		100	75		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98									
Frt			0.850		0.975			0.881			0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1604	1681	1477	1645	1673	0	1293	1642	0	1588	1503	0
Flt Permitted	0.433			0.497			0.599			0.719		
Satd. Flow (perm)	731	1681	1446	861	1673	0	816	1642	0	1202	1503	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91		25			47			95	
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		640			305			156			178	
Travel Time (s)		9.7			4.6			4.3			4.9	
Confl. Peds. (#/hr)	1		1									
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	6%	6%	2%	7%	4%	31%	0%	7%	2%	0%	9%
Adj. Flow (vph)	52	352	37	73	509	104	18	12	47	63	10	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	352	37	73	613	0	18	59	0	63	105	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0	12.0	22.0		11.0	11.0		11.0	11.0	
Total Split (s)	83.0	83.0	83.0	14.0	97.0		23.0	23.0		23.0	23.0	
Total Split (%)	69.2%	69.2%	69.2%	11.7%	80.8%		19.2%	19.2%		19.2%	19.2%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 72 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	

Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 3: Village Sqaure Driveway/Wawa Driveway & Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	320	34	66	463	95	16	11	43	57	9	86
Future Volume (veh/h)	47	320	34	66	463	95	16	11	43	57	9	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1693	1761	1883	1812	1855	1545	2066	1887	1683	1779	1584
Adj Flow Rate, veh/h	52	352	32	73	509	96	18	12	22	63	10	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	6	6	2	7	4	31	0	7	2	0	9
Cap, veh/h	608	1217	1072	792	1208	228	119	61	112	159	21	123
Arrive On Green	0.72	0.72	0.72	0.05	0.82	0.81	0.09	0.09	0.08	0.09	0.09	0.08
Sat Flow, veh/h	762	1693	1491	1794	1482	280	1099	653	1197	1237	220	1321
Grp Volume(v), veh/h	52	352	32	73	0	605	18	0	34	63	0	70
Grp Sat Flow(s),veh/h/ln	762	1693	1491	1794	0	1762	1099	0	1850	1237	0	1541
Q Serve(g_s), s	2.5	8.9	0.7	1.1	0.0	11.7	1.9	0.0	2.0	5.9	0.0	5.2
Cycle Q Clear(g_c), s	2.5	8.9	0.7	1.1	0.0	11.7	6.6	0.0	2.0	7.5	0.0	5.2
Prop In Lane	1.00		1.00	1.00		0.16	1.00		0.65	1.00		0.86
Lane Grp Cap(c), veh/h	608	1217	1072	792	0	1436	119	0	172	159	0	144
V/C Ratio(X)	0.09	0.29	0.03	0.09	0.00	0.42	0.15	0.00	0.20	0.40	0.00	0.49
Avail Cap(c_a), veh/h	608	1217	1072	828	0	1436	182	0	278	230	0	231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.1	6.0	4.8	3.4	0.0	3.2	54.6	0.0	50.6	53.5	0.0	52.1
Incr Delay (d2), s/veh	0.2	0.5	0.0	0.0	0.0	0.9	0.6	0.0	0.6	1.6	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	5.0	0.4	0.5	0.0	5.0	1.0	0.0	1.8	3.5	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.3	6.5	4.9	3.5	0.0	4.1	55.2	0.0	51.1	55.1	0.0	54.6
LnGrp LOS	A	A	A	A	A	A	E	A	D	E	A	D
Approach Vol, veh/h		436			678			52			133	
Approach Delay, s/veh		6.3			4.0			52.5			54.8	
Approach LOS		A			A			D			D	

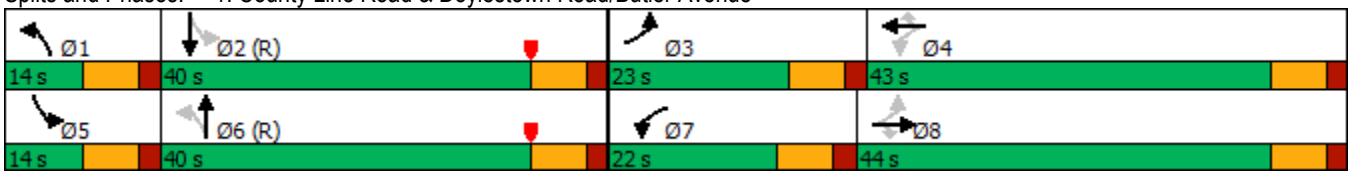
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.6	92.3		16.2		103.8		16.2				
Change Period (Y+Rc), s	7.0	7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s	7.0	76.0		17.0		90.0		17.0				
Max Q Clear Time (g_c+I1), s	3.6	11.4		10.0		13.7		9.1				
Green Ext Time (p_c), s	0.0	1.8		0.2		2.5		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			11.9									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	359	75	121	258	81	157	605	146	147	620	83
Future Volume (vph)	62	359	75	121	258	81	157	605	146	147	620	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	14	11	12	13	11	11	11	11	11	11
Grade (%)		1%			-2%			4%			-4%	
Storage Length (ft)	195		400	245		95	355		0	430		475
Storage Lanes	1		0	1		1	2		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.971			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	1773	1624	1653	1800	1479	1620	2978	0	1669	3254	0
Flt Permitted	0.545			0.331			0.159			0.128		
Satd. Flow (perm)	887	1773	1624	576	1800	1479	271	2978	0	225	3254	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			164		24			12	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		575			640			788			611	
Travel Time (s)		8.7			9.7			11.9			9.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	10%	1%	0%	1%	1%	8%	0%	7%	0%	1%	2%	0%
Adj. Flow (vph)	66	382	80	129	274	86	167	644	155	156	660	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	382	80	129	274	86	167	799	0	156	748	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6			2		
Detector Phase	3	8	8	7	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	17.0		12.0	17.0	
Total Split (s)	23.0	44.0	44.0	22.0	43.0	43.0	14.0	40.0		14.0	40.0	
Total Split (%)	19.2%	36.7%	36.7%	18.3%	35.8%	35.8%	11.7%	33.3%		11.7%	33.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	Max	Max	None	Max	Max	None	C-Max		None	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: County Line Road & Doylestown Road/Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	359	75	121	258	81	157	605	146	147	620	83
Future Volume (veh/h)	62	359	75	121	258	81	157	605	146	147	620	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1654	1780	1866	1860	1860	1831	1711	1612	1711	1935	1921	1949
Adj Flow Rate, veh/h	66	382	52	129	274	49	167	644	119	156	660	84
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	10	1	0	1	1	8	0	7	0	1	2	0
Cap, veh/h	355	564	501	320	636	531	281	876	162	270	1105	141
Arrive On Green	0.05	0.32	0.32	0.08	0.34	0.34	0.07	0.34	0.33	0.07	0.34	0.33
Sat Flow, veh/h	1575	1780	1582	1772	1860	1552	1629	2582	476	1843	3257	414
Grp Volume(v), veh/h	66	382	52	129	274	49	167	382	381	156	369	375
Grp Sat Flow(s),veh/h/ln	1575	1780	1582	1772	1860	1552	1629	1532	1527	1843	1825	1846
Q Serve(g_s), s	3.3	22.4	2.8	5.7	13.6	2.6	8.0	26.3	26.4	6.6	20.1	20.2
Cycle Q Clear(g_c), s	3.3	22.4	2.8	5.7	13.6	2.6	8.0	26.3	26.4	6.6	20.1	20.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		0.22
Lane Grp Cap(c), veh/h	355	564	501	320	636	531	281	520	518	270	619	627
V/C Ratio(X)	0.19	0.68	0.10	0.40	0.43	0.09	0.59	0.73	0.74	0.58	0.60	0.60
Avail Cap(c_a), veh/h	496	564	501	420	636	531	281	520	518	270	619	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	35.7	29.0	26.2	30.5	26.8	26.1	34.9	35.1	26.8	32.8	33.0
Incr Delay (d2), s/veh	0.2	6.4	0.4	0.8	2.0	0.3	3.3	8.9	9.0	3.0	4.2	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	15.6	2.0	4.3	10.3	1.8	5.9	16.0	16.1	5.4	14.3	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	42.1	29.4	27.0	32.5	27.2	29.5	43.8	44.1	29.8	37.0	37.1
LnGrp LOS	C	D	C	C	C	C	C	D	D	C	D	D
Approach Vol, veh/h		500			452			930			900	
Approach Delay, s/veh		38.6			30.3			41.3			35.8	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	46.7	12.2	47.0	14.0	46.7	15.3	44.0
Change Period (Y+Rc), s	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Max Green Setting (Gmax), s	7.0	33.0	16.0	36.0	7.0	33.0	15.0	37.0
Max Q Clear Time (g_c+I1), s	10.5	22.6	5.8	16.1	9.1	28.8	8.2	24.9
Green Ext Time (p_c), s	0.0	2.1	0.1	1.0	0.0	1.2	0.2	1.2

Intersection Summary	
HCM 6th Ctrl Delay	37.3
HCM 6th LOS	D

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	36	731	22	31	879
Future Volume (vph)	2	36	731	22	31	879
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	11	11	11	11
Grade (%)	-9%		-3%			2%
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.872		0.996			
Flt Protected	0.998				0.950	
Satd. Flow (prot)	1637	0	3187	0	1636	1689
Flt Permitted	0.998				0.950	
Satd. Flow (perm)	1637	0	3187	0	1636	1689
Link Speed (mph)	25		45			45
Link Distance (ft)	303		611			227
Travel Time (s)	8.3		9.3			3.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	5%	0%	0%	2%
Adj. Flow (vph)	2	39	795	24	34	955
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	0	819	0	34	955
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	36	731	22	31	879
Future Vol, veh/h	2	36	731	22	31	879
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-9	-	-3	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	5	0	0	2
Mvmt Flow	2	39	795	24	34	955

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1830	410	0	0	819	0
Stage 1	807	-	-	-	-	-
Stage 2	1023	-	-	-	-	-
Critical Hdwy	4.8	6	-	-	4.3	-
Critical Hdwy Stg 1	4	-	-	-	-	-
Critical Hdwy Stg 2	3.6	-	-	-	-	-
Follow-up Hdwy	3	3.1	-	-	3	-
Pot Cap-1 Maneuver	204	696	-	-	622	-
Stage 1	672	-	-	-	-	-
Stage 2	641	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	193	696	-	-	622	-
Mov Cap-2 Maneuver	193	-	-	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	606	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.4
HCM LOS	B		

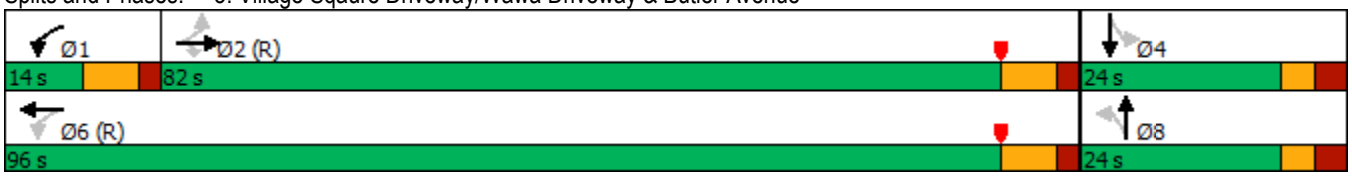
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	612	622	-
HCM Lane V/C Ratio	-	-	0.067	0.054	-
HCM Control Delay (s)	-	-	11.3	11.1	-
HCM Lane LOS	-	-	B	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	550	102	86	402	68	24	17	156	50	13	47
Future Volume (vph)	28	550	102	86	402	68	24	17	156	50	13	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	11	12	13	11	12	12	11	14	12	11	14	12
Grade (%)		2%			-3%			-5%			4%	
Storage Length (ft)	85		190	150		0	60		100	75		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98									
Frt			0.850		0.978			0.865			0.883	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1636	1764	1565	1661	1764	0	1629	1702	0	1620	1636	0
Flt Permitted	0.482			0.352			0.716			0.330		
Satd. Flow (perm)	830	1764	1533	616	1764	0	1228	1702	0	563	1636	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			107		20			164			49	
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		640			305			156			178	
Travel Time (s)		9.7			4.6			4.3			4.9	
Confl. Peds. (#/hr)	1		1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	0%	1%	1%	3%	4%	0%	0%	0%	0%	2%
Adj. Flow (vph)	29	579	107	91	423	72	25	18	164	53	14	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	579	107	91	495	0	25	182	0	53	63	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	5.0	15.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.0	22.0	22.0	12.0	22.0		11.0	11.0		11.0	11.0	
Total Split (s)	82.0	82.0	82.0	14.0	96.0		24.0	24.0		24.0	24.0	
Total Split (%)	68.3%	68.3%	68.3%	11.7%	80.0%		20.0%	20.0%		20.0%	20.0%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 73 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	

Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 3: Village Sqaure Driveway/Wawa Driveway & Butler Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	550	102	86	402	68	24	17	156	50	13	47
Future Volume (veh/h)	28	550	102	86	402	68	24	17	156	50	13	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1778	1764	1849	1898	1898	1869	1929	2066	1986	1711	1779	1683
Adj Flow Rate, veh/h	29	579	82	91	423	67	25	18	47	53	14	23
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	1	0	1	1	3	4	0	0	0	0	2
Cap, veh/h	671	1251	1110	592	1290	204	179	51	134	148	61	101
Arrive On Green	0.71	0.71	0.71	0.05	0.81	0.80	0.10	0.10	0.09	0.10	0.10	0.09
Sat Flow, veh/h	861	1764	1566	1807	1599	253	1414	506	1322	1223	605	995
Grp Volume(v), veh/h	29	579	82	91	0	490	25	0	65	53	0	37
Grp Sat Flow(s),veh/h/ln	861	1764	1566	1807	0	1852	1414	0	1828	1223	0	1600
Q Serve(g_s), s	1.2	17.1	1.9	1.4	0.0	8.4	2.0	0.0	4.0	5.0	0.0	2.6
Cycle Q Clear(g_c), s	1.2	17.1	1.9	1.4	0.0	8.4	4.0	0.0	4.0	8.5	0.0	2.6
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.72	1.00		0.62
Lane Grp Cap(c), veh/h	671	1251	1110	592	0	1495	179	0	185	148	0	162
V/C Ratio(X)	0.04	0.46	0.07	0.15	0.00	0.33	0.14	0.00	0.35	0.36	0.00	0.23
Avail Cap(c_a), veh/h	671	1251	1110	625	0	1495	260	0	289	218	0	253
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.66	0.66	0.66	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.3	7.6	5.4	4.9	0.0	3.1	51.3	0.0	50.6	54.0	0.0	49.9
Incr Delay (d2), s/veh	0.1	0.8	0.1	0.1	0.0	0.6	0.4	0.0	1.1	1.5	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	8.7	1.0	0.7	0.0	3.9	1.3	0.0	3.4	2.9	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.3	8.4	5.4	5.0	0.0	3.6	51.6	0.0	51.7	55.5	0.0	50.6
LnGrp LOS	A	A	A	A	A	A	D	A	D	E	A	D
Approach Vol, veh/h		690			581			90			90	
Approach Delay, s/veh		7.9			3.9			51.7			53.5	
Approach LOS		A			A			D			D	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	11.8	91.1		17.1		102.9		17.1				
Change Period (Y+Rc), s	7.0	7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s	7.0	75.0		18.0		89.0		18.0				
Max Q Clear Time (g_c+I1), s	3.9	19.6		11.0		10.4		6.5				
Green Ext Time (p_c), s	0.1	2.8		0.1		1.9		0.2				

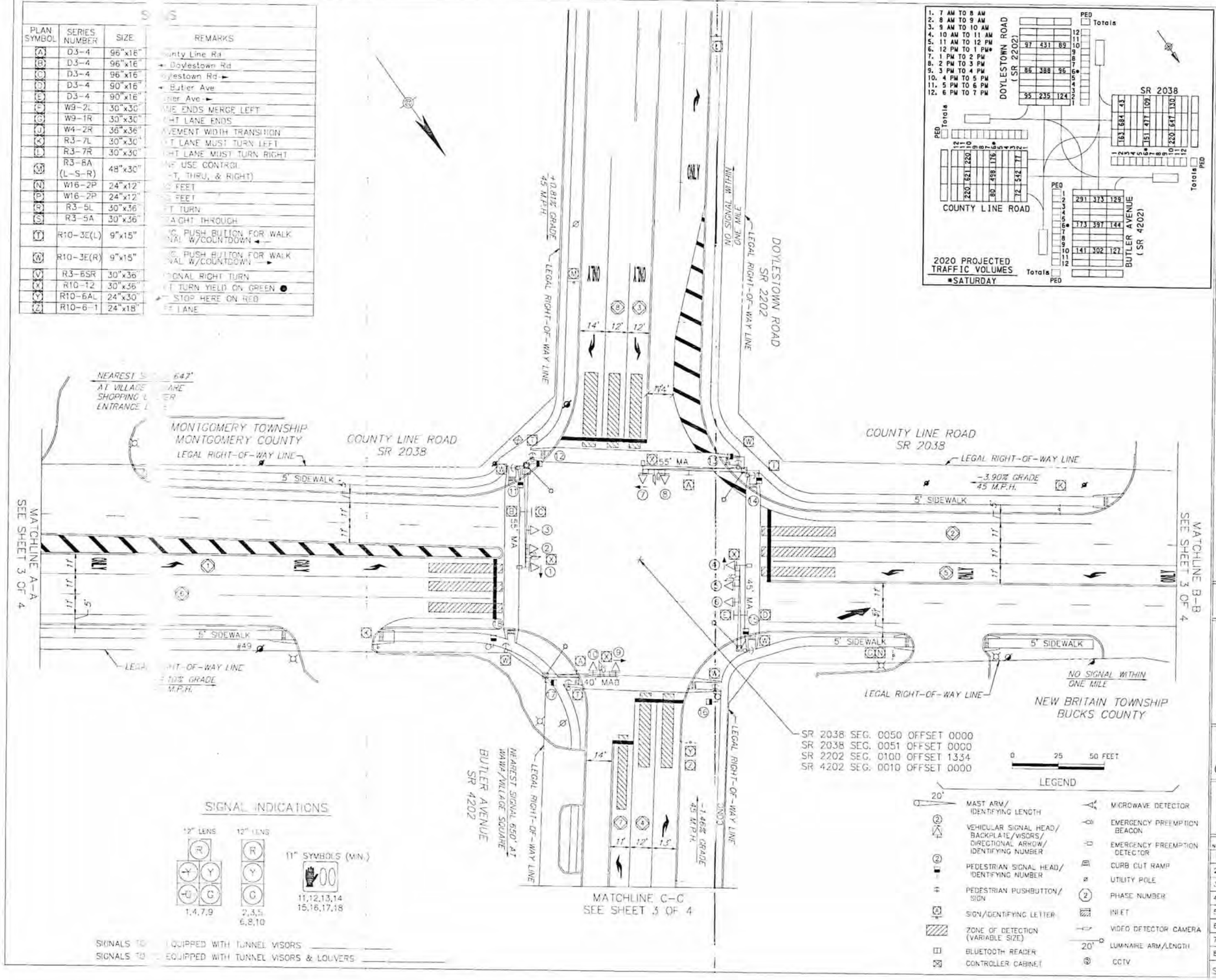
Intersection Summary			
HCM 6th Ctrl Delay		11.8	
HCM 6th LOS		B	

APPENDIX E:

PennDOT Traffic Signal Plans

SIGNS

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	D3-4	96"x16"	unty Line Rd
B	D3-4	96"x16"	← Doylestown Rd
C	D3-4	96"x16"	ylestown Rd →
D	D3-4	90"x16"	← Butler Ave
E	D3-4	90"x16"	tler Ave →
F	W9-2L	30"x30"	NE ENDS MERGE LEFT
G	W9-1R	30"x30"	HT LANE ENDS
H	W4-2R	36"x36"	AVEMENT WIDTH TRANSITION
J	R3-7L	30"x30"	T LANE MUST TURN LEFT
K	R3-7R	30"x30"	HT LANE MUST TURN RIGHT
M	R3-8A (L-S-R)	48"x30"	NE USE CONTROL (T, THRU, & RIGHT)
N	W16-2P	24"x12"	0 FEET
O	W16-2P	24"x12"	5 FEET
P	R3-5L	30"x36"	T TURN
Q	R3-5A	30"x36"	AIGHT THROUGH
T	R10-3E(L)	9"x15"	C PUSH BUTTON FOR WALK NAL W/COUNTDOWN ←
W	R10-3E(R)	9"x15"	C PUSH BUTTON FOR WALK VAL W/COUNTDOWN →
X	R3-6SR	30"x36"	IONAL RIGHT TURN
Y	R10-12	30"x36"	T TURN YIELD ON GREEN ●
Z	R10-6AL	24"x30"	STOP HERE ON RED
Z1	R10-6-1	24"x18"	T LANE



GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLES PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE O THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWIN ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEE

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURE AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORE OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT # I-0120

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/BUCKS

MUNICIPALITY: MONTGOMERY/NEW BRITAIN TOWNSHIP

INTERSECTION: DOYLESTOWN ROAD (SR 2202)/ BUTLER AVENUE (SR 4202) AND COUNTY LINE ROAD (SR 2038)

REVIEWED:

Jeanne McCreary — DATE 01/29/202
PRINCIPAL OFFICIAL

RECOMMENDED:

MARK L. KRAY — 8-26-97
DATE

DOUGLAS W. MAY — 8-26-97
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./ REVW	DATE	REVW	DATE	RECOM	DAT
1	AS BUILT	MT	3/14	NBP	5/11/14	ABPATEL	9/22
2	AS BUILT - SR 0202 7/T ADAPTIVE OPERATION	PAI	11/13/18	NBP	1/7/19	DLA	1/7/
3	EASTBOUND SR 4202 LANE REVISE EB L LANE, WEST LEG DYNAMIC ADD NORTH LEG SIDEWALK, ADD OPTICAL EVP	TPD	12/27/19			DLA	2/4/
4							
5							
6							
7							
8							

SHEET 2 OF 4 | PERMIT # 64-0336 | FILE # 0336

SIGNAL INDICATIONS

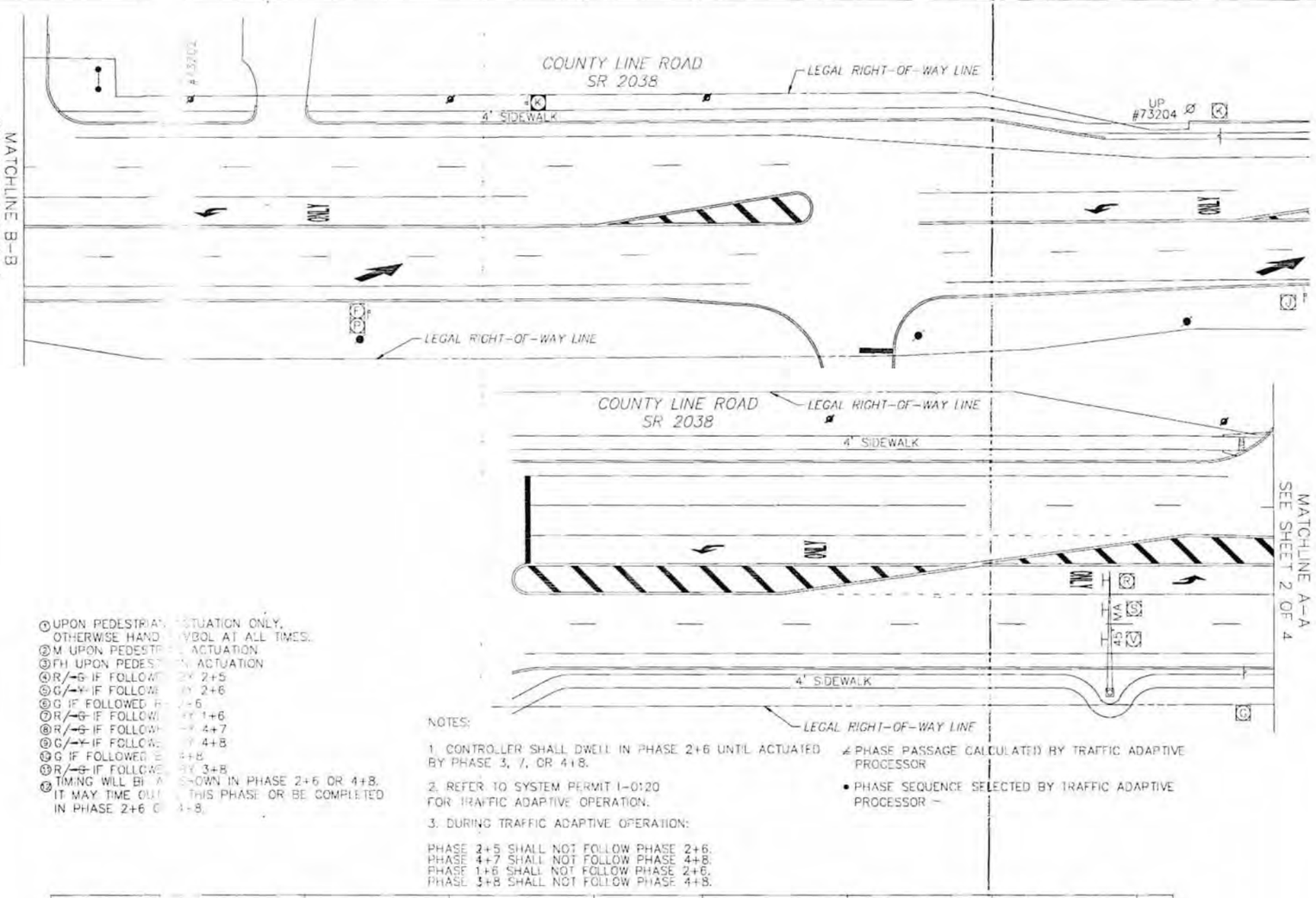
11" SYMBOLS (MIN.)

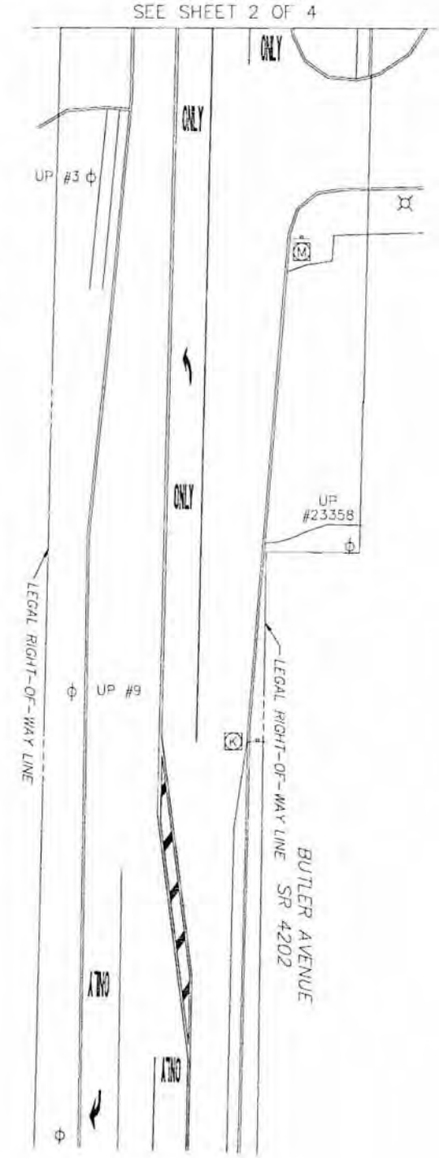
11,12,13,14
15,16,17,18

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS _____
SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS & LOUVERS _____

LEGEND

- 20' MAST ARM/ IDENTIFYING LENGTH
- VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- SIGN/IDENTIFYING LETTER
- ZONE OF DETECTION (VARIABLE SIZE)
- BLUETOOTH READER
- CONTROLLER CABINET
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- (2) PHASE NUMBER
- INLET
- VIDEO DETECTOR CAMERA
- 20' LUMINAIRE ARM/LENGTH
- CCTV





0 25 50 FEET

LEGEND

- 20' MAST ARM/ IDENTIFYING LENGTH
- (2) VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- (2) PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- (A) SIGN/IDENTIFYING LETTER
- ZONE OF DETECTION (VARIABLE SIZE)
- BLUETOOTH READER
- CONTROLLER CABINET
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- (2) PHASE NUMBER
- INLET
- VIDEO DETECTOR CAMERA
- 20' LUMINAIRE ARM/LENGTH
- (C) CCTV

① UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE HAND SYMBOL AT ALL TIMES.
② M UPON PEDESTRIAN ACTUATION
③ FH UPON PEDESTRIAN ACTUATION
④ R/→G IF FOLLOWING 2+5
⑤ G/→Y IF FOLLOWING 2+6
⑥ G IF FOLLOWED BY 2+6
⑦ R/→G IF FOLLOWING 1+6
⑧ R/→G IF FOLLOWING 4+7
⑨ G/→Y IF FOLLOWING 4+8
⑩ G IF FOLLOWED BY 4+8
⑪ R/→G IF FOLLOWING 3+8
⑫ TIMING WILL BE SHOWN IN PHASE 2+6 OR 4+8. IT MAY TIME OUT THIS PHASE OR BE COMPLETED IN PHASE 2+6 OR 4+8.

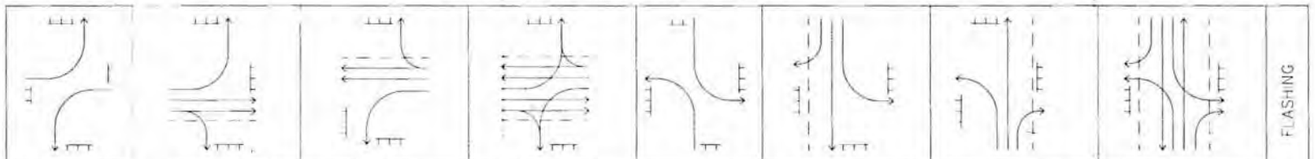
NOTES:

1. CONTROLLER SHALL DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 3, 7, OR 4+8.
2. REFER TO SYSTEM PERMIT I-0120 FOR TRAFFIC ADAPTIVE OPERATION.
3. DURING TRAFFIC ADAPTIVE OPERATION:

PHASE 2+5 SHALL NOT FOLLOW PHASE 2+6.
PHASE 4+7 SHALL NOT FOLLOW PHASE 4+8.
PHASE 1+6 SHALL NOT FOLLOW PHASE 2+6.
PHASE 3+8 SHALL NOT FOLLOW PHASE 4+8.

≠ PHASE PASSAGE CALCULATED BY TRAFFIC ADAPTIVE PROCESSOR

• PHASE SEQUENCE SELECTED BY TRAFFIC ADAPTIVE PROCESSOR –



PHASE	1+5			1+6			2+5				2+6				3+7			3+8				4+7				4+8				FLASHING
INTERV / SIGNALS	1	2	3	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1	R→GR ⚠③		R⑪	R	R	R	G→⑤	G→⑤	Y⑤	R⑥	G①	G	Y	R	R	R	R	R	R	R	R	R	R	R	R①	R	R	R	R	Y
2-3	R	R	F	R	R	R	G	G	Y⑥	R⑥	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
4	R→GR ⚠③		R⑪	G→⑤	Y⑤	R⑥	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
5-6	R	R	F	Y	Y⑥	R⑥	R	R	R	R	G	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Y
7	R	R	F	R	R	R	R	R	R	R	R	R	R	R	R→GR ⚠③		R⑧	R	R	R	R	G→⑤	G→⑤	Y⑤	R⑧	G	G	Y	R	R
8	R	R	F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	G	Y⑨	R⑧	G	G	Y	R	R
9	R	R	F	R	R	R	R	R	R	R	R	R	R	R	R→GR ⚠③		R⑪	C→G	G→G	Y⑤	R⑤	R	R	R	R	G	G	Y	R	R
10	R	R	F	R	R	R	R	R	R	R	R	R	R	R	R	R	R	C	G	Y⑨	R⑨	R	R	R	R	C	G	Y	R	R
11,18	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H②	H③	H	H	H	H	H	H	H②	H③	H	H	OFF
12-13	H	H	H	H	H	H	H②	H③	H	H	H②	H③	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	OFF
14-15	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H②	H③	H	H	H②	H③	H	H	OFF
16-17	H	H	H	H③	H	H	H	H	H	H	H②	H③	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	OFF
FIXED TIME		5	2		5	2		5	2			5	2			5	2		5	2			5	2			5	2		
MIN. GREEN	5			5			5				10				5			5				5				5				
PASSAGE	1≠			1≠			1≠				1≠				1≠			1≠				1≠				1≠				
PEDESTRIAN				⑫			⑫				7	26						⑫				⑫				7	19			
MAX. 1	7			7			7				32				7			7				7				26				
MEMORY	NL			NL			NL				SVR				NL			NL				NL				NL				

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWI ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNAL SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FE

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURE AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR T INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEA OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BOR OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT # I-0120

PENNSYLVANIA DEPARTMENT OF TRANSPORTATIO
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/BUCKS
MUNICIPALITY: MONTGOMERY/NEW BRITAIN TOWNSH
INTERSECTION: DOYLESTOWN ROAD (SR 2202)/
BUTLER AVENUE (SR 4202) AND
COUNTY LINE ROAD (SR 2038)

REVIEWED:

Darren McCreary 01/20/2020
PRINCIPAL OFFICIAL DATE

RECOMMENDED:

MARK L. KRAY 8-26-
DATE

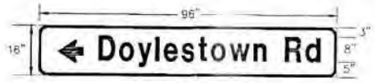
DOUGLAS W. MAY 8-26-
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./ REVW.	DATE	REVW.	DATE	RECOM.	
1	AS BUILT	MT	3/14	NBP	6/11/14	ABPATEL	6
2	AS BUILT - SR 0202 7/T ADAPTIVE OPERATION	PAI	11/13/18	NBP	1/7/19	DLA	1
3	LENGTHEN SB LT LANE, REVISE LB EB LANE, WEST LEG DRIVEWAYS, ADD NORTH LEG SIGNALS, ADD OPTICAL SVP	TPD	12/27/19	NBP	1/2/20	DLA	2
4							
5							
6							
7							
8							

SHEET 3 OF 4 | PERMIT # 64-0336 | FILE # 0336

SIGN (A) DETAIL

CLEARVIEW SERIES 1-W
9% REDUCED
10.6" UC/6" LC
WHITE REFLECTORIZED LEGEND AND BORDER ON GREEN REFLECTORIZED BACKGROUND

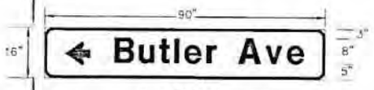


SIGN (B) DETAIL

CLEARVIEW SERIES 1-W
8" UC/6" LC
WHITE REFLECTORIZED LEGEND AND BORDER ON GREEN REFLECTORIZED BACKGROUND
0.8" BORDER
2.5" CORNER RADII

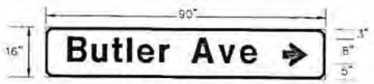
SIGN (C) DETAIL

CLEARVIEW SERIES 1-W
8" UC/6" LC
WHITE REFLECTORIZED LEGEND AND BORDER ON GREEN REFLECTORIZED BACKGROUND
0.8" BORDER
2.5" CORNER RADII



SIGN (D) DETAIL

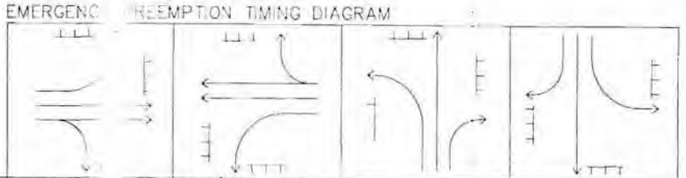
CLEARVIEW SERIES 3-W
8" UC/6" LC
WHITE REFLECTORIZED LEGEND AND BORDER ON GREEN REFLECTORIZED BACKGROUND
0.8" BORDER
2.5" CORNER RADII



SIGN (E) DETAIL

CLEARVIEW SERIES 3-W
8" UC/6" LC
WHITE REFLECTORIZED LEGEND AND BORDER ON GREEN REFLECTORIZED BACKGROUND
0.8" BORDER
2.5" CORNER RADII

EMERGENCY PREEMPTION TIMING DIAGRAM



PHASE		6			2			4			8		
INTERV. / SIGNALS		31	33		34	35	36	37	38	39	40	41	42
1	SELECTIVE CLEARANCE	R	R	SELECTIVE CLEARANCE	G/→G	Y ⑦	R⑧	R	R	R	R	R	R
2-3		R	R		G	Y ⑦	R⑧	R	R	R	R	R	R
4		G/→G	R⑧		R	R	R	R	R	R	R	R	R
5-6		G	R⑧		R	R	R	R	R	R	R	R	R
7		R	R		R	R	R	G/→G	Y	R	R	R	R
8		R	R		R	R	R	G	Y	R	R	R	R
9		R	R		R	R	R	R	R	R	G/→G	Y	R
10		R	R		R	R	R	R	R	R	G	Y	R
11,18		H	H		H	H	H	H	H	H	H	H	H
12,13		H	H		H	H	H	H	H	H	H	H	H
14,15		H	H		H	H	H	H	H	H	H	H	H
16,17		H	H		H	H	H	H	H	H	H	H	H
		**	2		**	5	2	**	5	2	**	5	2

⑦ G/→G WHEN RETURNING TO NORMAL OPERATION
⑧ G WHEN RETURNING TO NORMAL OPERATION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PREEMPTION.

** FOR DURATION OF PRE-EMPTION

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND & WESTBOUND APPROACHES OF COUNTY LINE ROAD AND THE NORTHBOUND AND SOUTHBOUND APPROACHES OF DOYLESTOWN ROAD/BUTLER AVENUE WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY, THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (1+6,2+5,3+8, OR 4+7) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED DURING THE "MAN" INTERVAL, THE MAN INTERVAL SHALL TERMINATE IMMEDIATELY FOLLOWED BY THE "FLASHING HAND" INDICATION IN ITS ENTIRETY, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE PROCEEDING TO THE PRE-EMPTION PHASE.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE 2, 4, 6 OR 8, IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 12 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

0 25 50 FEET

LEGEND

- 20' MAST ARM/ IDENTIFYING LENGTH
- (2) VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER
- (2) PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER
- PEDESTRIAN PUSHBUTTON/ SIGN
- (A) SIGN/IDENTIFYING LETTER
- ZONE OF DETECTION (VARIABLE SIZE)
- BLUETOOTH READER
- CONTROLLER CABINET
- MICROWAVE DETECTOR
- EMERGENCY PREEMPTION BEACON
- EMERGENCY PREEMPTION DETECTOR
- CURB CUT RAMP
- UTILITY POLE
- (2) PHASE NUMBER
- INLET
- VIDEO DETECTOR CAMERA
- 20' LUMINAIRE ARM/LENGTH
- (2) CCTV

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS, FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT # 1-0120

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/BUCKS
MUNICIPALITY: MONTGOMERY/NEW BRITAIN TOWNSHIP
INTERSECTION: DOYLESTOWN ROAD (SR 2202)/ BUTLER AVENUE (SR 4202) AND COUNTY LINE ROAD (SR 2038)

REVIEWED:

Pamela McCreary — 01/20/2020
OFFICIAL — DATE

RECOMMENDED:

MARK L. KRAY — 8-26-97
DATE

DOUGLAS W. MAY — 8-26-97
DISTRICT TRAFFIC ENGINEER — DATE

NO	REVISION	DES./ REVW.	DATE	REVW	DATE	RECOM	DATE
1	AS BUILT	MT	3/14	NBP	6/11/14	ASPATEL	9/2/14
2	AS BUILT - SR 0202 317 ADAPTIVE OPERATION	PAI	11/13/18	NBP	1/7/19	DLA	1/7/19
3	ENGINEER SW LT LANE, REVISE EB LT LANE, WEST LEG DRIVEWAYS, AND NORTH LEG SIDEWALK AND DETECTOR	TPD	12/27/19	NBP	1/31/20	DLA	2/4/20
4							
5							
6							
7							
8							

SHEET 4 OF 4 | PERMIT # 64-0336 | FILE # 0336

MOVEMENT, SEQUENCE, AND TIMING DIAGRAM

PHASE	1+6				2+6				4+8				FLASH
INTERVAL / SIGNAL	1	2	3	4	5	6	7	8	9	10	11	12	
1	G/G	G/G	Y①	R②	G	G	Y	R	R	R	R	R	Y
2	G	G	Y②	R②	G	G	Y	R	R	R	R	R	Y
3	R	R	R	R	G	G	Y	R	R	R	R	R	Y
4	R	R	R	R	G	G	Y	R	R	R	R	R	Y
5,6	R	R	R	R	R	R	R	R	G	G	Y	R	R
7,8	R	R	R	R	R	R	R	R	G	G	Y	R	R
9,10	M	FH	H	H	M	FH	H	H	H	H	H	H	OFF
11,12	H	H	H	H	M	FH	H	H	H	H	H	H	OFF
13,14	H	H	H	H	H	H	H	H	M	FH	H	H	OFF
15,16	H	H	H	H	H	H	H	H	M	FH	H	H	OFF

FIXED			5	2			5	2			3	3
MINIMUM	5				15				5			
PASSAGE	≠				≠				≠			
MAX 1	10				90				17			
PEDESTRIAN ✳	③				7	31			7	19		
MEMORY	NL				SVR				NL			

REFER TO SYSTEM PERMIT #1-0120 FOR PROGRAM TIMINGS AND WEEKLY PROGRAM CHART

OPERATION NOTES

① G/G IF FOLLOWED BY 2+6
② G IF FOLLOWED BY 2+6
③ TIMING WILL BE AS SHOWN IN PHASE 2+6. IT MAY TIME OUT IN THIS PHASE OR BE COMPLETED IN PHASE 2+6.
✳ UPON PEDESTRIAN ACTUATION, OTHERWISE HAND SYMBOL AT ALL TIMES

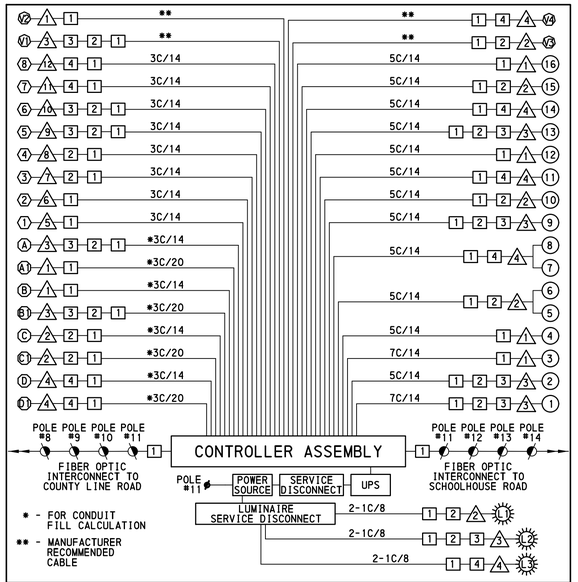
≠ PHASE PASSAGE CALCULATED BY TRAFFIC ADAPTIVE PROCESSOR
• PHASE SEQUENCE SELECTED BY TRAFFIC ADAPTIVE PROCESSOR
• TRAFFIC ADAPTIVE SYSTEM TO OPERATE WITH PEDESTRIAN MODULE
✳ UPON PEDESTRIAN ACTUATION, OTHERWISE HAND SYMBOL AT ALL TIMES
• PEDESTRIAN COUNTDOWN TIMER TO COUNT DOWN DURING FLASHING HAND INTERVAL

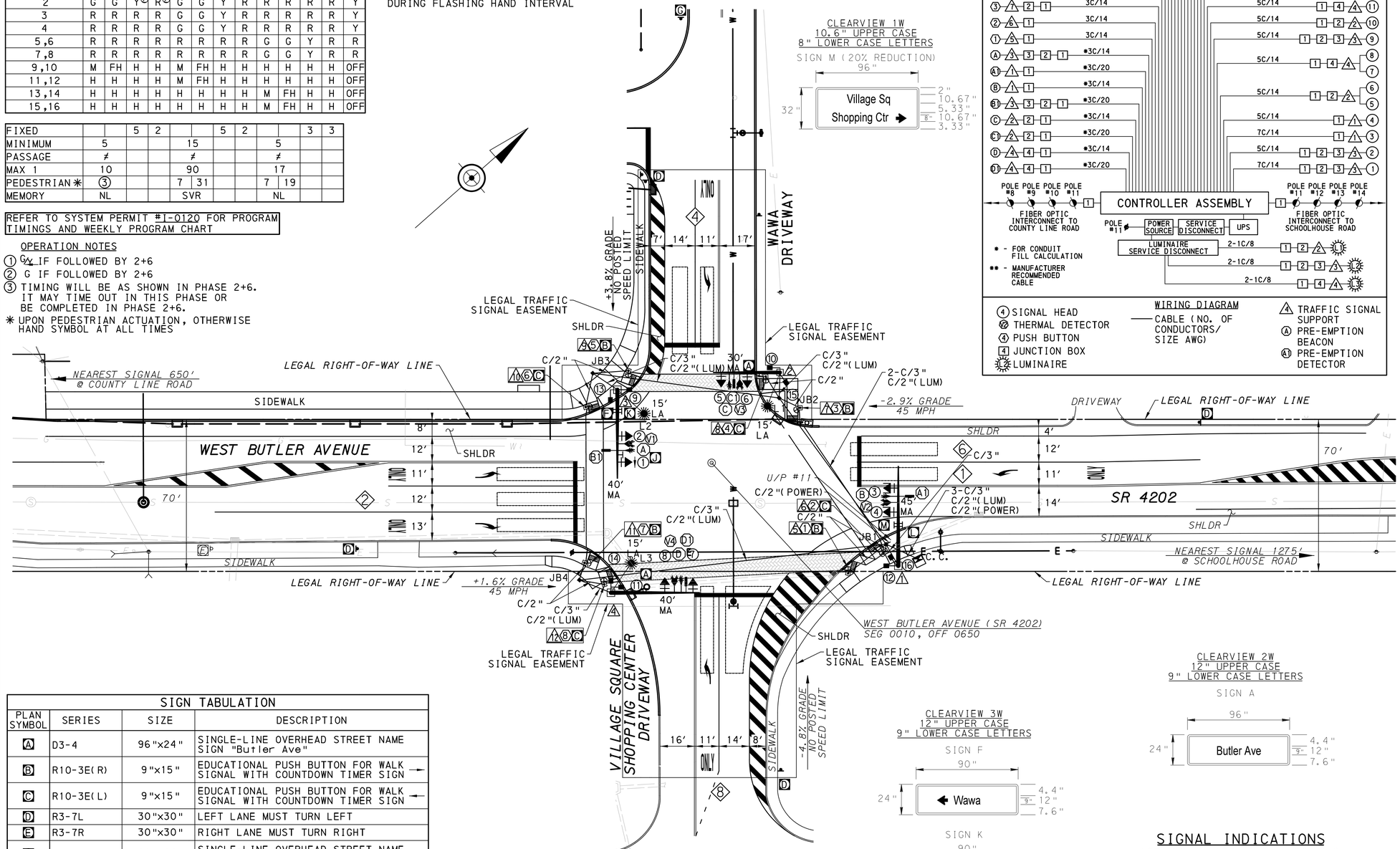
CLEARVIEW 2W
10.6" UPPER CASE
8" LOWER CASE LETTERS

SIGN L
96"
32"
Village Sq
Shopping Ctr
2" 10.67" 5.33" 8" 10.67" 3.33"

CLEARVIEW 1W
10.6" UPPER CASE
8" LOWER CASE LETTERS

SIGN M (20% REDUCTION)
96"
32"
Village Sq
Shopping Ctr
2" 10.67" 5.33" 8" 10.67" 3.33"





SIGN TABULATION			
PLAN SYMBOL	SERIES	SIZE	DESCRIPTION
Ⓐ	D3-4	96"x24"	SINGLE-LINE OVERHEAD STREET NAME SIGN "Butler Ave"
Ⓑ	R10-3E(R)	9"x15"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER SIGN →
Ⓒ	R10-3E(L)	9"x15"	EDUCATIONAL PUSH BUTTON FOR WALK SIGNAL WITH COUNTDOWN TIMER SIGN ←
Ⓓ	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
Ⓔ	R3-7R	30"x30"	RIGHT LANE MUST TURN RIGHT
Ⓕ	D3-4	90"x24"	SINGLE-LINE OVERHEAD STREET NAME SIGN "← Wawa"
Ⓖ	R3-8A(L-SR)	30"x30"	LANE USE CONTROL SIGN
Ⓙ	R10-12	30"x36"	LEFT TURN YIELD ON GREEN ●
Ⓚ	D3-4	90"x24"	SINGLE-LINE OVERHEAD STREET NAME SIGN "Wawa →"
Ⓛ	D3-5	96"x32"	DOUBLE-LINE OVERHEAD STREET NAME SIGN "← Village Sq Shopping Ctr"
Ⓜ	D3-5	96"x32"	DOUBLE-LINE OVERHEAD STREET NAME SIGN "Village Sq Shopping Ctr →"

DOT PERMIT ISSUED
PERMIT # 61-3975
DATE: 02/04/2020

CLEARVIEW 3W
12" UPPER CASE
9" LOWER CASE LETTERS

SIGN F
90"
24"
← Wawa
4.4" 9" 12" 7.6"

SIGN K
90"
24"
Wawa →
4.4" 9" 12" 7.6"

CLEARVIEW 2W
12" UPPER CASE
9" LOWER CASE LETTERS

SIGN A
96"
24"
Butler Ave
4.4" 9" 12" 7.6"

SIGNAL INDICATIONS

16"X18" COUNTDOWN — 9,10,11,12 13,14,15,16
12" LENS — 2,3,4 5,6,7,8
12" LENS — 1

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	4202	---	1 OF 2
NEW BRITAIN TOWNSHIP				

REVISION NUMBER	REVISIONS	DATE	BY

TRAFFIC SIGNAL NOTES

DO NOT MODIFY INSTALLATION WITHOUT PRIOR WRITTEN APPROVAL.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ARE PART OF THE PERMIT. INSTALL AND MAINTAIN IN ACCORDANCE WITH PUBLICATION 212 AND PUBLICATION 236.

POST MOUNTED SIGNALS: INSTALL WITH A MINIMUM SIGNAL HEAD CLEARANCE OF 2 FEET BEHIND FACE OF CURB OR EDGE OF SHOULDER; AND 8 FEET ABOVE SIDEWALK OR PAVEMENT GRADE.

OVERHEAD SIGNALS: INSTALL WITH A MINIMUM SIGNAL HEAD CLEARANCE OF 2 FEET BEHIND FACE OF CURB OR EDGE OF SHOULDER. PROVIDE A MINIMUM SIGNAL HEAD CLEARANCE OF 16 FEET ABOVE ROADWAY; RIGIDLY MOUNT, TOP AND BOTTOM; AND EQUIP WITH BACKPLATES. PROVIDE A MINIMUM HORIZONTAL DISTANCE OF 8 FEET BETWEEN SIGNALS AS MEASURED AT RIGHT ANGLES TO THE APPROACH.

DETERMINE WITH A PENNDOT REPRESENTATIVE, THE EXACT LOCATION OF DETECTORS PRIOR TO INSTALLATION.

CONSULT WITH LOCAL OFFICIALS AND UTILITIES TO RESOLVE CONFLICTS PRIOR TO CONSTRUCTION.

COMPLY WITH PROVISIONS OF ACT 287 FOR PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES.

ALL WORK SHALL BE IN ACCORDANCE WITH PENNDOT SPECIFICATION FORM 408, AS SUPPLEMENTED AND AMENDED.

THIS CONSTRUCTION PLAN WAS PREPARED FROM THE OFFICIAL PENNDOT PERMIT PLAN. COPIES OF THE SIGNED PERMIT CAN BE OBTAINED FROM THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REFERENCE PERMIT NUMBER 61-3975.

LEGEND

EXISTING	PROPOSED	
25' MA	25' MA	MAST ARM/ IDENTIFYING LENGTH
		PEDESTAL POLE
		PUSHBUTTON POLE
		VEHICULAR SIGNAL HEAD/BACKPLATE/TUNNEL VISOR/DIRECTIONAL ARROW
		PEDESTRIAN SIGNAL HEAD
		PEDESTRIAN PUSHBUTTON
		SIGN
6'X20'	6'X40'	LOOP SENSOR/SIZE
		AREA OF DETECTION
		DETECTABLE WARNING SURFACE
		EMERGENCY PRE-EMPTION DETECTOR
		EMERGENCY PRE-EMPTION FLASHING BEACON
		CONTROLLER CABINET
JB4	JB4	JUNCTION BOX
C	C/1"	CONDUIT/IDENTIFYING DIAMETER
DC	DC	DEPRESSED CURB
15' LA L4	15' LA L4	LUMINAIRE/IDENTIFYING LENGTH
		THERMAL DETECTOR
		FISH EYE CAMERA
		STOP BAR RADAR DETECTOR
		ADVANCE RADAR DETECTOR
		COMMUNICATIONS ANTENNA
X X	X X	FENCE
		GUIDE RAIL
		UTILITY POLE
		PHASE NUMBER

TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

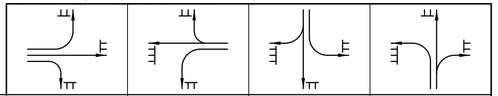
DATE: 12/27/19	DRAWN BY: MJR	JOB NO: PRPV.00030

TRAFFIC SIGNAL CONSTRUCTION PLAN

COUNTY: BUCKS
MUNICIPALITY: NEW BRITAIN TOWNSHIP
INTERSECTION: WEST BUTLER AVENUE (SR 4202) & VILLAGE SQUARE/WAWA DRIVEWAYS

0 25 50 FEET

EMERGENCY PRE-EMPTION PHASING
MOVEMENT, SEQUENCE, AND TIMING DIAGRAM



PHASE		2				6				4				8		
SIGNAL \ INTERVAL		13	14	15		16	17	18		19	20	21		22	23	24
1	SELECTIVE CLEARANCE	R	R	R	SELECTIVE CLEARANCE	G/Gⓑ	Yⓓ	Rⓒ	SELECTIVE CLEARANCE	R	R	R	SELECTIVE CLEARANCE	R	R	R
2		R	R	R		G	Yⓓ	Rⓒ		R	R	R		R	R	R
3		G	Yⓓ	Rⓒ		R	R	R		R	R	R		R	R	R
4		G	Yⓓ	Rⓒ		R	R	R		R	R	R		R	R	R
5,6		R	R	R		R	R	R		R	R	R		G	Y	R
7,8		R	R	R		R	R	R		G	Y	R		R	R	R
9,10		H	H	H		H	H	H		H	H	H		H	H	H
11,12		H	H	H		H	H	H		H	H	H		H	H	H
13,14		H	H	H		H	H	H		H	H	H		H	H	H
15,16		H	H	H		H	H	H		H	H	H		H	H	H
FIXED		▲	5	2		▲	5	2		▲	3	3		▲	3	3

▲ FOR DURATION OF PRE-EMPTION

EMERGENCY PRE-EMPTION
OPERATION NOTES

ⓐ SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION

ⓑ SIGNAL TO INDICATE G/Y WHEN RETURNING TO NORMAL OPERATION

NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

EMERGENCY PRE-EMPTION NOTES:

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE NORTHBOUND AND SOUTHBOUND APPROACHES OF BUTLER AVENUE (SR 4202) AND THE EASTBOUND AND WESTBOUND APPROACHES OF VILLAGE SQUARE SHOPPING CENTER DRIVEWAY/WAWA DRIVEWAY WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL FLASH WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THE APPROPRIATE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (1+6) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON AND THE SIGNAL IS PRE-EMPTED, THE PED "WALK" (MAN) INTERVAL SHALL TERMINATE IMMEDIATELY AND THE PED "CLEAR" (FLASHING HAND AND COUNTDOWN TIMER) INTERVAL SHALL TIME OUT, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE GOING INTO EMERGENCY PREEMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE 2,4,6 OR 8 IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 5 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.

DOT PERMIT ISSUED
PERMIT # 61-3975
DATE: 02/04/2020

CONTRACTORS NOTES:

ALL WORK TO CONFORM WITH LATEST NEW BRITAIN TOWNSHIP SPECIFICATIONS FOR TRAFFIC SIGNAL EQUIPMENT, PENNDOT FORM 408, PENNDOT RC-67M, AND PENNDOT TC-8800 SERIES.

JB #1 TO BE TYPE 17"X30". JB #2, 3 & 4 TO BE JB-27.

INSTALL NEW TRAFFIC SIGNAL CONTROLLER: TS-2 TYPE 2 CABINET (TYPE I MOUNTING) WITH ECONOLITE ATC TIMER, RHYTHM INSYNC: THERMAL WITH PEDESTRIAN INTERCEPT MODULE, ECONOLITE DBL SERIES/ALPHA BATTERY BACKUP SYSTEM, EMERGENCY GENERATOR CONNECTION, FIBER OPTIC PATCH PANEL, ETHERNET SWITCH (COMNET CNGE3FE8MS), AND GTT 764 EMERGENCY VEHICLE PREEMPTION.

THE FOLLOWING ITEMS ARE TO BE IP-ADDRESSABLE WITH AN ETHERNET PORT: TIMER UNIT, MALFUNCTION MANAGEMENT UNIT, BATTERY BACKUP SYSTEM, AND VEHICLE DETECTION. CONTRACTOR IS TO REQUEST THE IP ADDRESS FOR EACH DEVICE FROM THE DISTRICT AND LABEL ON EACH DEVICE.

INSTALL POLES #1,2,3,4,5,6,7,8,9,10,11 & 12, SIGNAL HEADS, LUMINAIRES, THERMAL DETECTION CAMERAS, PUSH BUTTONS AND SIGNS AS SHOWN. POLES #8,9,10,11,12,13 & 14 TO BE TYPE B PEDESTRIAN PUSH BUTTON POLES. MAST ARMS TO BE GALVANIZED STEEL. PUSH BUTTON POLES TO BE ALUMINUM.

LUMINAIRES TO BE LED (250 WATT, HPS EQUIVALENT).

DO NOT CONNECT LUMINAIRES TO OPERATE WITH THE UPS BATTERY BACKUP SYSTEM.

THE BATTERY BACK-UP SYSTEM IS TO BE CAPABLE OF 8 HOURS OF CONTINUOUS OPERATION DURING A POWER FAILURE AND BE EQUIPPED WITH STREETSIDE INDICATION LIGHTS (GREEN FOR NORMAL AC POWER USAGE AND ILLUMINATED RED UPON BATTERY BACKUP POWER USAGE) MOUNTED ON THE OUTSIDE OF THE CONTROLLER CABINET.

ALL RED, YELLOW AND GREEN INDICATIONS INCLUDING ARROWS, PEDESTRIAN HAND/MAN AND COUNTDOWN INDICATIONS TO BE EQUIPPED WITH PENNDOT APPROVED LED LENSES, AS MANUFACTURED BY DIALIGHT.

PEDESTRIAN PUSHBUTTONS TO BE EQUIPPED WITH LATCHING LED CONFIRMATION LIGHTS AND CONFIRMATION TONE AND 2" ADA COMPLIANT PLUNGERS AS MANUFACTURED BY POLARA.

THERMAL IMAGING DETECTION CAMERA SYSTEM TO BE TRAFISENSE ETH AS MANUFACTURED BY FLIR.

THE LOCATION OF THE VEHICLE DETECTION EQUIPMENT IS TO BE REVIEWED AND APPROVED BY THE SUPPLIER PRIOR TO INSTALLATION.

FOR LIMITS AND TYPES OF PAVEMENT MARKINGS, SEE PAVEMENT MARKING AND SIGNING PLANS PREPARED BY TPD.

INSTALL UNDERGROUND CONDUIT, JUNCTION BOXES, AND AERIAL CONNECTIONS NECESSARY FOR THE FIBER OPTIC TAIL TO BE ROUTED FROM PENNDOT'S TRUNK LINE TO THE CONTROLLER ASSEMBLY. PROVIDE A MINIMUM OF 1/4" GALVANIZED MESSENGER WIRE FOR AERIAL ATTACHMENT OF FIBER. PROPOSED UNDERGROUND CONDUIT CONTAINING COMMUNICATIONS CABLE EXCEPT AS SHARED WITH SIGNAL CABLE TO BE PLACED A MINIMUM OF 36" BELOW GRADE.

FOR INSTALLATION OF CONDUIT CONTAINING ONLY NON-METALLIC WIRING, A FIBER OPTIC LOCATOR TAPE IS TO BE PLACED WITH THE CONDUIT IN THE TRENCH. THE LOCATOR TAPE IS TO INCLUDE A METALLIC STRIP TO BE DETECTED BY A LOCATOR DEVICE.

WHERE FIBER OPTIC CABLE RUNS DOWN UTILITY POLES, A METAL GUARD (20 FEET IN LENGTH) IS TO BE INSTALLED ALONG THE POLE TO PROTECT THE FIBER OPTIC CABLE.

INSTALL ALL FUSION SPLICES TO THE PENNDOT AERIAL FIBER TRUNK LINE AS REQUIRED TO PROVIDE A DROP CABLE (12-STRAND SINGLE MODE LOOSE TUBE) FOR CONNECTION TO THE TRAFFIC SIGNAL CONTROLLER PER PENNDOT DISTRICT 6-0 FIBER SPECIFICATIONS USING AN EXISTING OR INSTALL NEW SPLICE ENCLOSURE AT THE NEAREST UTILITY POLE TO THE CONTROLLER. CONTACT JOHN LYNCH(JJLYNCH@PA.GOV, 610-205-6577) PRIOR TO FIBER WORK AND FOR PENNDOT DISTRICT 6-0 FIBER SPECIFICATIONS AND ASSIGNMENTS.

ROUTE FIBER OPTIC TAIL TO THE CONTROLLER (SPOOL 100' OF FIBER AT THE INTERSECTION), TIP THE FIBER WITH CONNECTORS, TEST, LABEL, AND CONNECT TO PATCH PANEL AND ETHERNET SWITCH USING LC CONNECTORS PER PENNDOT DISTRICT 6-0 FIBER SPECIFICATIONS. FIBER TERMINATIONS TO BE MADE BY PRE-TERMINATED CABLE ASSEMBLIES OR BY FUSION SPLICING PRE-TERMINATED SINGLE MODE FIBER PIGTAILS TO THE FIBER BONE CABLE OR DROP CABLE. MECHANICAL, CHEMICAL OR EPOXY TYPE CONNECTORS AND SPLICES ARE UNACCEPTABLE.

CONTRACTOR TO CONTRACT WITH RHYTHM ENGINEERING TO INSTALL INSYNC TRAFFIC SIGNAL ADAPTIVE SYSTEM AT INTERSECTION, INTEGRATE INTO INSYNC PORTAL WEB PAGE, AND PROVIDE CENTRALSYNC DATA FILES AND TIMING DOCUMENT AT CONCLUSION OF PROJECT.

FINAL ADAPTIVE CONFIGURATION SETTINGS UPON COMPLETION OF THE ADJUSTMENT PERIOD ARE TO BE PROMPTLY PROVIDED BY THE SUPPLIER TO THE ENGINEER. AS-BUILT SYSTEM PERMIT PLANS WITH FINAL TIMINGS UPON COMPLETION OF CONSTRUCTION ARE TO BE PREPARED BY THE ENGINEER.

OBTAIN NECESSARY CENTRACS SYSTEM SOFTWARE LICENSE AND UPDATE SYSTEM DATABASE/GRAPHICS TO INCORPORATE THIS INTERSECTION INTO THE SYSTEM.

TURN ON HIGH RESOLUTION DATA LOGGER AND PROVIDE DETAILED DETECTOR MAPPING TO PENNDOT.

AT THE INTERSECTION OF COUNTY LINE ROAD & WEST BUTLER AVENUE/DOYLESTOWN ROAD, INSTALL GTT 764 OPTICAL EMERGENCY VEHICLE PREEMPTION.

UPON COMPLETION OF FINAL INSPECTION, THE CONTRACTOR IS TO SUBMIT AS-BUILT PLANS INCLUDING ALL UNDERGROUND CONDUIT TO NEW BRITAIN TOWNSHIP.

THE TOWNSHIP MUST BE MADE AWARE OF AND BE PRESENT AT THE PRE-CONSTRUCTION MEETING AND POLE SPOT MEETING WITH PENNDOT.

THE TOWNSHIP MUST BE PROVIDED ALL SHOP DRAWINGS AND CATALOG CUTS FOR REVIEW AND APPROVAL.

THE TOWNSHIP MUST BE GIVEN THE CONSTRUCTION SCHEDULE AND BE NOTIFIED 24 HOURS PRIOR TO WORK COMMENCING SO THEY MAY BE PRESENT FOR ANY SIGNIFICANT CONSTRUCTION (FOUNDATION POURING, COUNDUIT TRENCHING, ETC.) AT THE INTERSECTION.

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	4202	---	2 OF 2
NEW BRITAIN TOWNSHIP				

REVISION NUMBER	REVISIONS	DATE	BY

TRAFFIC SIGNAL NOTES

DO NOT MODIFY INSTALLATION WITHOUT PRIOR WRITTEN APPROVAL.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ARE PART OF THE PERMIT. INSTALL AND MAINTAIN IN ACCORDANCE WITH PUBLICATION 212 AND PUBLICATION 236.

POST MOUNTED SIGNALS: INSTALL WITH A MINIMUM SIGNAL HEAD CLEARANCE OF 2 FEET BEHIND FACE OF CURB OR EDGE OF SHOULDER; AND 8 FEET ABOVE SIDEWALK OR PAVEMENT GRADE.

OVERHEAD SIGNALS: INSTALL WITH A MINIMUM SIGNAL HEAD CLEARANCE OF 2 FEET BEHIND FACE OF CURB OR EDGE OF SHOULDER. PROVIDE A MINIMUM SIGNAL HEAD CLEARANCE OF 16 FEET ABOVE ROADWAY; RIGIDLY MOUNT, TOP AND BOTTOM; AND EQUIP WITH BACKPLATES. PROVIDE A MINIMUM HORIZONTAL DISTANCE OF 8 FEET BETWEEN SIGNALS AS MEASURED AT RIGHT ANGLES TO THE APPROACH.

DETERMINE WITH A PENNDOT REPRESENTATIVE, THE EXACT LOCATION OF DETECTORS PRIOR TO INSTALLATION.

CONSULT WITH LOCAL OFFICIALS AND UTILITIES TO RESOLVE CONFLICTS PRIOR TO CONSTRUCTION.

COMPLY WITH PROVISIONS OF ACT 287 FOR PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES.

ALL WORK SHALL BE IN ACCORDANCE WITH PENNDOT SPECIFICATION FORM 408, AS SUPPLEMENTED AND AMENDED.

THIS CONSTRUCTION PLAN WAS PREPARED FROM THE OFFICIAL PENNDOT PERMIT PLAN. COPIES OF THE SIGNED PERMIT CAN BE OBTAINED FROM THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION REFERENCE PERMIT NUMBER 61-3975.

LEGEND

EXISTING	PROPOSED	
25' MA	25' MA	MAST ARM/ IDENTIFYING LENGTH
		PEDESTAL POLE
		PUSHBUTTON POLE
		VEHICULAR SIGNAL HEAD/BACKPLATE/TUNNEL VISOR/DIRECTIONAL ARROW
		PEDESTRIAN SIGNAL HEAD
		PEDESTRIAN PUSHBUTTON
		SIGN
6'X20'	6'X40'	LOOP SENSOR/SIZE
		AREA OF DETECTION
		DETECTABLE WARNING SURFACE
		EMERGENCY PRE-EMPTION DETECTOR
		EMERGENCY PRE-EMPTION FLASHING BEACON
		CONTROLLER CABINET
JB4	JB4	JUNCTION BOX
C	C/1"	CONDUIT/IDENTIFYING DIAMETER
DC	DC	DEPRESSED CURB
15' LA L4	15' LA L4	LUMINAIRE/IDENTIFYING LENGTH
		THERMAL DETECTOR
		FISH EYE CAMERA
		STOP BAR RADAR DETECTOR
		ADVANCE RADAR DETECTOR
		COMMUNICATIONS ANTENNA
		FENCE
		GUIDE RAIL
		UTILITY POLE
		PHASE NUMBER

TRAFFIC PLANNING AND DESIGN, INC.
www.TrafficPD.com | 610.326.3100 | TPD@TrafficPD.com

DATE: 12/27/19 | DRAWN BY: MJR | JOB NO: PRPV.00030

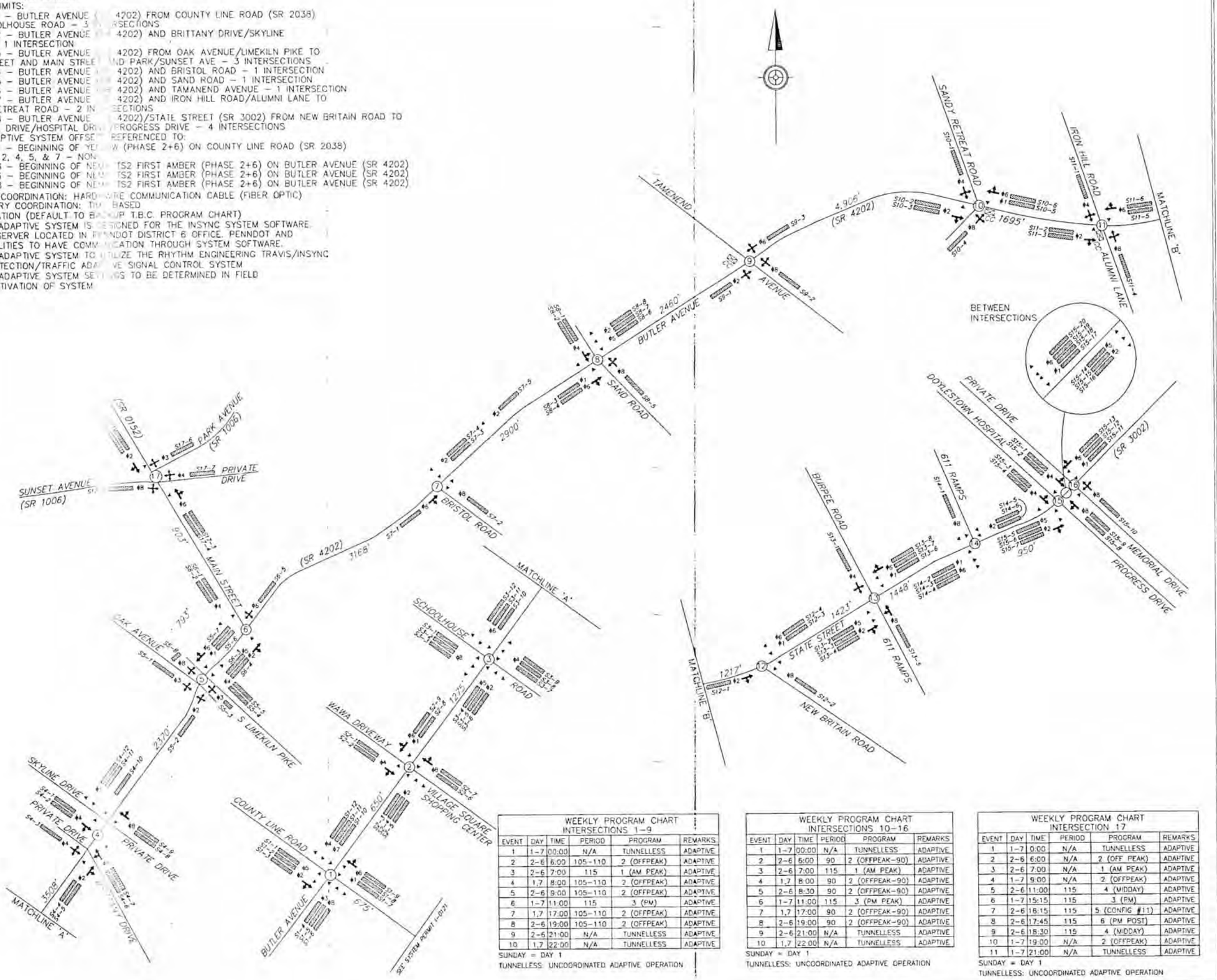
TRAFFIC SIGNAL CONSTRUCTION PLAN

COUNTY: BUCKS
MUNICIPALITY: NEW BRITAIN TOWNSHIP
INTERSECTION: WEST BUTLER AVENUE (SR 4202) & VILLAGE SQUARE/WAWA DRIVEWAYS

0 25 50 FEET

SYSTEM NOTES

1. PROGRAMS TO BE SELECTED BY CLOSED LOOP SYSTEM, TRAFFIC ADAPTIVE SYSTEM OR T.B.C. BACKUP.
2. SYSTEM LIMITS:
   SYSTEM 1 – BUTLER AVENUE (SR 4202) FROM COUNTY LINE ROAD (SR 2038) TO SCHOOLHOUSE ROAD – 3 INTERSECTIONS
   SYSTEM 2 – BUTLER AVENUE (SR 4202) AND BRITTANY DRIVE/SKYLINE DRIVE – 1 INTERSECTION
   SYSTEM 3 – BUTLER AVENUE (SR 4202) FROM OAK AVENUE/LIMEKILN PIKE TO MAIN STREET AND MAIN STREET AND PARK/SUNSET AVE – 3 INTERSECTIONS
   SYSTEM 4 – BUTLER AVENUE (SR 4202) AND BRISTOL ROAD – 1 INTERSECTION
   SYSTEM 5 – BUTLER AVENUE (SR 4202) AND SAND ROAD – 1 INTERSECTION
   SYSTEM 6 – BUTLER AVENUE (SR 4202) AND TAMANEND AVENUE – 1 INTERSECTION
   SYSTEM 7 – BUTLER AVENUE (SR 4202) AND IRON HILL ROAD/ALUMNI LANE TO SHADY RETREAT ROAD – 2 INTERSECTIONS
   SYSTEM 8 – BUTLER AVENUE (SR 4202)/STATE STREET (SR 3002) FROM NEW BRITAIN ROAD TO MEMORIAL DRIVE/HOSPITAL DRIVE/PROGRESS DRIVE – 4 INTERSECTIONS
3. NON-ADAPTIVE SYSTEM OFFSETS REFERENCED TO:
   SYSTEM 1 – BEGINNING OF YELLOW (PHASE 2+6) ON COUNTY LINE ROAD (SR 2038)
   SYSTEMS 2, 4, 5, & 7 – NON-
   SYSTEM 3 – BEGINNING OF NEMA TS2 FIRST AMBER (PHASE 2+6) ON BUTLER AVENUE (SR 4202)
   SYSTEM 6 – BEGINNING OF NEMA TS2 FIRST AMBER (PHASE 2+6) ON BUTLER AVENUE (SR 4202)
   SYSTEM 8 – BEGINNING OF NEMA TS2 FIRST AMBER (PHASE 2+6) ON BUTLER AVENUE (SR 4202)
4. PRIMARY COORDINATION: HARDWIRE COMMUNICATION CABLE (FIBER OPTIC)
5. SECONDARY COORDINATION: TIME BASED COORDINATION (DEFAULT TO BACKUP T.B.C. PROGRAM CHART)
6. TRAFFIC ADAPTIVE SYSTEM IS DESIGNED FOR THE INSYNC SYSTEM SOFTWARE. SYSTEM SERVER LOCATED IN PENNDOT DISTRICT 6 OFFICE. PENNDOT AND MUNICIPALITIES TO HAVE COMMUNICATION THROUGH SYSTEM SOFTWARE.
7. TRAFFIC ADAPTIVE SYSTEM TO UTILIZE THE RHYTHM ENGINEERING TRAVIS/INSYNC VIDEO DETECTION/TRAFFIC ADAPTIVE SIGNAL CONTROL SYSTEM
8. TRAFFIC ADAPTIVE SYSTEM SETTINGS TO BE DETERMINED IN FIELD UPON ACTIVATION OF SYSTEM



WEEKLY PROGRAM CHART
INTERSECTIONS 1–9

EVENT	DAY	TIME	PERIOD	PROGRAM	REMARKS
1	1–7	00:00	N/A	TUNNELLESS	ADAPTIVE
2	2–6	6:00	105–110	2 (OFFPEAK)	ADAPTIVE
3	2–6	7:00	115	1 (AM PEAK)	ADAPTIVE
4	1,7	8:00	105–110	2 (OFFPEAK)	ADAPTIVE
5	2–6	9:00	105–110	2 (OFFPEAK)	ADAPTIVE
6	1–7	11:00	115	3 (PM)	ADAPTIVE
7	1,7	17:00	105–110	2 (OFFPEAK)	ADAPTIVE
8	2–6	19:00	105–110	2 (OFFPEAK)	ADAPTIVE
9	2–6	21:00	N/A	TUNNELLESS	ADAPTIVE
10	1,7	22:00	N/A	TUNNELLESS	ADAPTIVE

SUNDAY = DAY 1
TUNNELLESS: UNCOORDINATED ADAPTIVE OPERATION

WEEKLY PROGRAM CHART
INTERSECTIONS 10–16

EVENT	DAY	TIME	PERIOD	PROGRAM	REMARKS
1	1–7	00:00	N/A	TUNNELLESS	ADAPTIVE
2	2–6	6:00	90	2 (OFFPEAK–90)	ADAPTIVE
3	2–6	7:00	115	1 (AM PEAK)	ADAPTIVE
4	1,7	8:00	90	2 (OFFPEAK–90)	ADAPTIVE
5	2–6	8:30	90	2 (OFFPEAK–90)	ADAPTIVE
6	1–7	11:00	115	3 (PM PEAK)	ADAPTIVE
7	1,7	17:00	90	2 (OFFPEAK–90)	ADAPTIVE
8	2–6	19:00	90	2 (OFFPEAK–90)	ADAPTIVE
9	2–6	21:00	N/A	TUNNELLESS	ADAPTIVE
10	1,7	22:00	N/A	TUNNELLESS	ADAPTIVE

SUNDAY = DAY 1
TUNNELLESS: UNCOORDINATED ADAPTIVE OPERATION

WEEKLY PROGRAM CHART
INTERSECTION 17

EVENT	DAY	TIME	PERIOD	PROGRAM	REMARKS
1	1–7	0:00	N/A	TUNNELLESS	ADAPTIVE
2	2–6	6:00	N/A	2 (OFF PEAK)	ADAPTIVE
3	2–6	7:00	N/A	1 (AM PEAK)	ADAPTIVE
4	1–7	9:00	N/A	2 (OFFPEAK)	ADAPTIVE
5	2–6	11:00	115	4 (MIDDAY)	ADAPTIVE
6	1–7	15:15	115	3 (PM)	ADAPTIVE
7	2–6	16:15	115	5 (CONFIG #11)	ADAPTIVE
8	2–6	17:45	115	6 (PM POST)	ADAPTIVE
9	2–6	18:30	115	4 (MIDDAY)	ADAPTIVE
10	1–7	19:00	N/A	2 (OFFPEAK)	ADAPTIVE
11	1–7	21:00	N/A	TUNNELLESS	ADAPTIVE

SUNDAY = DAY 1
TUNNELLESS: UNCOORDINATED ADAPTIVE OPERATION

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

SYSTEM PERMIT PLAN

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/BUCKS
MUNICIPALITY: MONTGOMERY TWP., NEW BRITAIN TWP., CHALFONT BORO., NEW BRITAIN BORO., DOYLESTOWN TWP.
INTERSECTION: BUTLER AVE/STATE STREET
SR 4202/SR 3002 CORRIDOR

REVIEWED:

MONTGOMERY TWP. MUNICIPAL OFFICIAL

NEW BRITAIN TWP. MUNICIPAL OFFICIAL — 01/21/2020

CHALFONT BORO. MUNICIPAL OFFICIAL

NEW BRITAIN BORO. MUNICIPAL OFFICIAL — DATE

DOYLESTOWN TWP. MUNICIPAL OFFICIAL — DATE

RECOMMENDED:

NBPATEL — 2/10/14

ABPATEL — 2/10/14
DISTRICT TRAFFIC ENGINEER — DATE

NO	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	D
1	ADDED INTERSECTION 16	MCM	5/20/16	NBP	6/2/16	ABP	6/
2	ADDED INTERSECTION 9	H&K	12/12/17	NBP	4/6/18	DLA	4/
3	ADDED INTERSECTION 2 (WAWA DRIVEWAY/VILLAGE SQUARE)	TPD	10/22/19	NBP	2/4/2020	DLA	2/
4							
5							
6							
7							
8							

SYSTEM PERMIT #6-0120 — SHEET 1 OF 3

TRAFFIC ADAPTIVE TIMING PROGRAM

CYCLE/SPLIT/OFFSET

Program 1 = AM PEAK

	Intersections	File #	TUNNEL DURATION 1	2 (NB)	3	4	5	6 (SB)	7	8	Period	Remarks	Facilitator Offset	Forward Offset	Backward Offset
1	COUNTY LINE ROAD & BUTLER AVENUE	0336		30				25			115	TRAFFIC ADAPTIVE			33
2	BUTLER AVENUE & WAWA DRIVEWAY/VILLAGE SQUARE	3975									115	TRAFFIC ADAPTIVE			
3	BUTLER AVENUE & SCHOOLHOUSE ROAD	2392		30				25			115	TRAFFIC ADAPTIVE		33	68
4	BUTLER AVENUE & SKYLINE DRIVE/BRITTANY DRIVE	1681		30				25			115	TRAFFIC ADAPTIVE		68	50
5	BUTLER AVENUE & OAK AVENUE/LIMEKILN PIKE	1715		50				64			115	TRAFFIC ADAPTIVE		46	17
6	BUTLER AVENUE & MAIN STREET	0605		30				33			115	TRAFFIC ADAPTIVE	PH. 2 = 10	17	64
7	BUTLER AVENUE & BRISTOL ROAD	1624		30				30			115	TRAFFIC ADAPTIVE		59	48
8	BUTLER AVENUE & SAND ROAD	2904		45				30			115	TRAFFIC ADAPTIVE		55	47
9	BUTLER AVENUE & TAMENEND AVENUE	2018		30				25			115	TRAFFIC ADAPTIVE		43	
10	BUTLER AVENUE & SHADY RETREAT ROAD	3936		30				37			115	TRAFFIC ADAPTIVE			
11	BUTLER AVENUE & IRON HILL ROAD/ALUMNI LANE	2146		30				37			115	TRAFFIC ADAPTIVE			19
12	STATE STREET & NEW BRITAIN ROAD	2422		30				25			115	TRAFFIC ADAPTIVE		19	22
13	STATE STREET & BURPEE ROAD/611 RAMPS	1845		30				25			115	TRAFFIC ADAPTIVE	PH. 6 = 36	22	19
14	STATE STREET & 611 RAMPS	2838		30				30			115	TRAFFIC ADAPTIVE		19	15
15	STATE STREET & HOSPITAL/PROGRESS DRIVE	2590		30				25			115	TRAFFIC ADAPTIVE		15	5
16	STATE STREET & MEMORIAL DRIVE	2590		30				25			115	TRAFFIC ADAPTIVE		5	
17	MAIN STREET & SUNSET/PARK AVENUE	3320									N/A	TRAFFIC ADAPTIVE			

CYCLE/SPLIT/OFFSET

Program 2 = OFF PEAK

	Intersections	File #	TUNNEL DURATION 1	2 (NB)	3	4	5	6 (SB)	7	8	Period	Remarks	Facilitator Offset	Forward Offset	Backward Offset
1	COUNTY LINE ROAD & BUTLER AVENUE	0336		25				25			105–110	TRAFFIC ADAPTIVE			33
2	BUTLER AVENUE & WAWA DRIVEWAY/VILLAGE SQUARE	3975									105–110	TRAFFIC ADAPTIVE			
3	BUTLER AVENUE & SCHOOLHOUSE ROAD	2392		25				25			105–110	TRAFFIC ADAPTIVE		33	68
4	BUTLER AVENUE & SKYLINE DRIVE/BRITTANY DRIVE	1681		25				40			105–110	TRAFFIC ADAPTIVE		68	50
5	BUTLER AVENUE & OAK AVENUE/LIMEKILN PIKE	1715		28				56			105–110	TRAFFIC ADAPTIVE		46	17
6	BUTLER AVENUE & MAIN STREET	0605		50				25			105–110	TRAFFIC ADAPTIVE	PH. 2 = 15	17	64
7	BUTLER AVENUE & BRISTOL ROAD	1624		25				33			105–110	TRAFFIC ADAPTIVE		59	48
8	BUTLER AVENUE & SAND ROAD	2904		30				25			105–110	TRAFFIC ADAPTIVE		55	47
9	BUTLER AVENUE & TAMENEND AVENUE	2018		25				25			105–110	TRAFFIC ADAPTIVE		43	
10	BUTLER AVENUE & SHADY RETREAT ROAD	3936		15				15			90	TRAFFIC ADAPTIVE			
11	BUTLER AVENUE & IRON HILL ROAD/ALUMNI LANE	2146		15				15			90	TRAFFIC ADAPTIVE			19
12	STATE STREET & NEW BRITAIN ROAD	2422		40				15			90	TRAFFIC ADAPTIVE		19	22
13	STATE STREET & BURPEE ROAD/611 RAMPS	1845		20				15			90	TRAFFIC ADAPTIVE	PH. 6 = –3	22	19
14	STATE STREET & 611 RAMPS	2838		15				15			90	TRAFFIC ADAPTIVE		19	15
15	STATE STREET & HOSPITAL/PROGRESS DRIVE	2590		15				15			90	TRAFFIC ADAPTIVE		15	5
16	STATE STREET & MEMORIAL DRIVE	2590		15				15			90	TRAFFIC ADAPTIVE		5	
17	MAIN STREET & SUNSET/PARK AVENUE	3320									N/A	TRAFFIC ADAPTIVE			

CYCLE/SPLIT/OFFSET

Program 3 = PM PEAK

	Intersections	File #	TUNNEL DURATION 1	2 (NB)	3	4	5	6 (SB)	7	8	Period	Remarks	Facilitator Offset	Forward Offset	Backward Offset
1	COUNTY LINE ROAD & BUTLER AVENUE	0336		30				25			115	TRAFFIC ADAPTIVE			33
2	BUTLER AVENUE & WAWA DRIVEWAY/VILLAGE SQUARE	3975									115	TRAFFIC ADAPTIVE			
3	BUTLER AVENUE & SCHOOLHOUSE ROAD	2392		30				25			115	TRAFFIC ADAPTIVE		33	68
4	BUTLER AVENUE & SKYLINE DRIVE/BRITTANY DRIVE	1681		30				25			115	TRAFFIC ADAPTIVE		68	50
5	BUTLER AVENUE & OAK AVENUE/LIMEKILN PIKE	1715		50				64			115	TRAFFIC ADAPTIVE		46	17
6	BUTLER AVENUE & MAIN STREET	0605		79				30			115	TRAFFIC ADAPTIVE	PH. 2 = 10	17	64
7	BUTLER AVENUE & BRISTOL ROAD	1624		30				30			115	TRAFFIC ADAPTIVE		59	48
8	BUTLER AVENUE & SAND ROAD	2904		40				30			115	TRAFFIC ADAPTIVE		55	47
9	BUTLER AVENUE & TAMENEND AVENUE	2018		30				25			115	TRAFFIC ADAPTIVE		43	
10	BUTLER AVENUE & SHADY RETREAT ROAD	3936		30				35			115	TRAFFIC ADAPTIVE			
11	BUTLER AVENUE & IRON HILL ROAD/ALUMNI LANE	2146		30				35			115	TRAFFIC ADAPTIVE			19
12	STATE STREET & NEW BRITAIN ROAD	2422		30				25			115	TRAFFIC ADAPTIVE		19	22
13	STATE STREET & BURPEE ROAD/611 RAMPS	1845		30				25			115	TRAFFIC ADAPTIVE	PH. 6 = 36	22	19
14	STATE STREET & 611 RAMPS	2838		30				30			115	TRAFFIC ADAPTIVE		19	15
15	STATE STREET & HOSPITAL/PROGRESS DRIVE	2590		50				30			115	TRAFFIC ADAPTIVE		15	5
16	STATE STREET & MEMORIAL DRIVE	2590		55				25			115	TRAFFIC ADAPTIVE		5	
17	MAIN STREET & SUNSET/PARK AVENUE	3320						65			115	TRAFFIC ADAPTIVE		–31	

CYCLE/SPLIT/OFFSET

Program 4 = MIDDAY

	Intersections	File #	TUNNEL DURATION 1	2 (NB)	3	4	5	6 (SB)	7	8	Period	Remarks	Facilitator Offset	Forward Offset	Backward Offset
17	MAIN STREET & SUNSET/PARK AVENUE	3320						52			115	TRAFFIC ADAPTIVE		25	

CYCLE/SPLIT/OFFSET

Program 5 = CONFIG all

	Intersections	File #	TUNNEL DURATION 1	2 (NB)	3	4	5	6 (SB)	7	8	Period	Remarks	Facilitator Offset	Forward Offset	Backward Offset
17	MAIN STREET & SUNSET/PARK AVENUE	3320						60			115	TRAFFIC ADAPTIVE		–23	

CYCLE/SPLIT/OFFSET

Program 6 = PM POST

	Intersections	File #	TUNNEL DURATION 1	2 (NB)	3	4	5	6 (SB)	7	8	Period	Remarks	Facilitator Offset	Forward Offset	Backward Offset
17	MAIN STREET & SUNSET/PARK AVENUE	3320						65			115	TRAFFIC ADAPTIVE		–30	

NOTES: – ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
– REFER TO SIGNAL PERMIT PLAN FOR MAXIMUM, CLEARANCE AND PED TIMES

– TRAFFIC ADAPTIVE FACILITATOR FOR INTERSECTION FOR INTERSECTIONS 1–9 & 17 = INTERSECTION 5
– TRAFFIC ADAPTIVE FACILITATOR FOR INTERSECTION FOR INTERSECTIONS 10–16 = INTERSECTION 12

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEE

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEAR OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORE OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

SYSTEM PERMIT PLAN

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/BUCKS

MUNICIPALITY: MONTGOMERY TWP., NEW BRITAIN TWP., CHALFONT BORO., NEW BRITAIN BORO., DOYLESTOWN TW

INTERSECTION: BUTLER AVE/STATE STREET
SR 4202/SR 3002 CORRIDOR

REVIEWED:

MONTGOMERY TWP. MUNICIPAL OFFICIAL

NEW BRITAIN TWP. MUNICIPAL OFFICIAL — 01/21/2020

CHALFONT BORO. MUNICIPAL OFFICIAL

NEW BRITAIN BORO. MUNICIPAL OFFICIAL — DATE

DOYLESTOWN TWP. MUNICIPAL OFFICIAL — DATE

RECOMMENDED:

NBPATEL — 2/10/1

ABPATEL — 2/10/1
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	D
1	ADDED INTERSECTION 18	McM	5/20/16	NBP	6/2/16	ABP	6/
2	ADDED INTERSECTION 9	H&K	12/12/17	NBP	4/6/18	DLA	4/
3	ADDED INTERSECTION 2 (WAWA DRIVEWAY/VILLAGE SQUARE)	TPD	10/22/19	NBP	2/4/2020	DLA	2/
4							
5							
6							
7							
8							

SYSTEM PERMIT #1-0120 | SHEET 2 OF 3

BACK-UP TBC TIMING PROGRAM

CYCLE/SPLIT/OFFSET

Program 1

	Intersection	File #	Phase 1	2	3	4	5	6	7	8	Cycle	Offset	Remarks
1	COUNTY LINE ROAD & BUTLER AVENUE	0336	25 (LEAD)	38	14 (LEAD)	43	15 (LEAD)	48	19 (LEAD)	38	120	0	
2	BUTLER AVENUE & WAWA DRIVEWAY/VILLAGE SQUARE	3975	14 (LEAD)	84	–	22	–	98	–	22	120	72	
3	BUTLER AVENUE & SCHOOLHOUSE ROAD	2392	–	85	–	35	13 (LEAD)	72	–	35	120	62	
4	BUTLER AVENUE & SKYLINE DRIVE/BRITTANY DRIVE	1681	–	43	–	36	–	43	–	36	–	0	FREE
5	BUTLER AVENUE & OAK AVENUE/LIMEKILN PIKE	1715	27 (LEAD)	48	12 (LEAD)	23	–	75	–	23	110	108	
6	BUTLER AVENUE & MAIN STREET	0605	–	68	–	–	23 (LEAD)	45	–	42	110	56	
7	BUTLER AVENUE & BRISTOL ROAD	1624	–	49	–	–	–	49	–	26	–	0	FREE
8	BUTLER AVENUE & SAND ROAD	2904	–	65	–	35	–	65	–	25	–	0	FREE
9	BUTLER AVENUE & TAMENEND AVENUE	2018	–	70	–	–	–	70	–	22	90	–	
10	BUTLER AVENUE & SHADY RETREAT ROAD	3936	14 (LEAD)	46	–	20	–	60	–	20	80	34	
11	BUTLER AVENUE & IRON HILL ROAD/ALUMNI LANE	2146	–	39	–	31	–	39	–	31	–	0	FREE
12	STATE STREET & NEW BRITAIN ROAD	2422	14 (LEAD)	52	–	–	–	66	–	14	80	4	
13	STATE STREET & BURPEE ROAD/611 RAMPS	1845	13 (LEAD)	24	–	43	13 (LEAD)	24	–	43	80	26	
14	STATE STREET & 611 RAMPS	2838	26 (LEAD)	30	–	–	–	56	–	24	80	63	
15	STATE STREET & HOSPITAL/PROGRESS DRIVE	2590	22 (LEAD)	34	–	24	22 (LEAD)	34	–	24	80	0	
16	STATE STREET & MEMORIAL DRIVE	2590	22 (LEAD)	34	–	24	22 (LEAD)	34	–	24	80	0	
17	MAIN STREET & SUNSET PARK AVENUE	3320	–	71	25 (LEAD)	14	–	71	–	14	110	–	

CYCLE/SPLIT/OFFSET

Program 2

	Intersection	File #	Phase 1	2	3	4	5	6	7	8	Cycle	Offset	Remarks
1	COUNTY LINE ROAD & BUTLER AVENUE	0336	14 (LEAD)	41	22 (LEAD)	43	14 (LEAD)	41	21 (LEAD)	44	120	0	
2	BUTLER AVENUE & WAWA DRIVEWAY/VILLAGE SQUARE	3975	14 (LEAD)	83	–	23	–	97	–	23	120	73	
3	BUTLER AVENUE & SCHOOLHOUSE ROAD	2392	–	81	–	39	37 (LEAD)	44	–	39	120	26	
4	BUTLER AVENUE & SKYLINE DRIVE/BRITTANY DRIVE	1681	–	43	–	36	–	43	–	36	–	0	FREE
5	BUTLER AVENUE & OAK AVENUE/LIMEKILN PIKE	1715	14 (LEAD)	23	21 (LEAD)	22	–	37	–	22	80	0	
6	BUTLER AVENUE & MAIN STREET	0605	–	58	–	–	17 (LEAD)	41	–	22	80	28	
7	BUTLER AVENUE & BRISTOL ROAD	1624	–	49	–	–	–	49	–	26	–	0	FREE
8	BUTLER AVENUE & SAND ROAD	2904	–	65	–	35	–	65	–	25	–	0	FREE
9	BUTLER AVENUE & TAMENEND AVENUE	2018	–	42	–	–	–	42	–	20	60	–	
10	BUTLER AVENUE & SHADY RETREAT ROAD	3936	14 (LEAD)	38	–	18	–	52	–	18	70	28	
11	BUTLER AVENUE & IRON HILL ROAD/ALUMNI LANE	2146	–	39	–	31	–	39	–	31	–	0	FREE
12	STATE STREET & NEW BRITAIN ROAD	2422	14 (LEAD)	30	–	–	–	44	–	24	70	7	
13	STATE STREET & BURPEE ROAD/611 RAMPS	1845	13 (LEAD)	34	–	23	13 (LEAD)	34	–	23	70	30	
14	STATE STREET & 611 RAMPS	2838	14 (LEAD)	34	–	–	–	48	–	22	70	4	
15	STATE STREET & HOSPITAL/PROGRESS DRIVE	2590	10 (LEAD)	35	–	25	10 (LEAD)	35	–	25	70	0	
16	STATE STREET & MEMORIAL DRIVE	2590	10 (LEAD)	35	–	25	10 (LEAD)	35	–	25	70	0	
17	MAIN STREET & SUNSET PARK AVENUE	3320	–	36	22 (LEAD)	22	–	36	–	22	80	–	

CYCLE/SPLIT/OFFSET

Program 3

	Intersection	File #	Phase 1	2	3	4	5	6	7	8	Cycle	Offset	Remarks
1	COUNTY LINE ROAD & BUTLER AVENUE	0336	14 (LEAD)	45	20 (LEAD)	31	14 (LEAD)	45	17 (LEAD)	34	110	0	
2	BUTLER AVENUE & WAWA DRIVEWAY/VILLAGE SQUARE	3975	18 (LEAD)	68	–	24	–	86	–	24	110	93	
3	BUTLER AVENUE & SCHOOLHOUSE ROAD	2392	–	89	–	21	15 (LEAD)	74	–	21	110	56	
4	BUTLER AVENUE & SKYLINE DRIVE/BRITTANY DRIVE	1681	–	43	–	36	–	43	–	36	–	0	FREE
5	BUTLER AVENUE & OAK AVENUE/LIMEKILN PIKE	1715	19 (LEAD)	28	21 (LEAD)	20	–	47	–	20	90	0	
6	BUTLER AVENUE & MAIN STREET	0605	–	68	–	–	30 (LEAD)	38	–	22	90	40	
7	BUTLER AVENUE & BRISTOL ROAD	1624	–	35	–	–	–	35	–	25	–	0	FREE
8	BUTLER AVENUE & SAND ROAD	2904	–	65	–	35	–	65	–	25	–	0	FREE
9	BUTLER AVENUE & TAMENEND AVENUE	2018	–	40	–	20	–	40	–	20	–	0	FREE
10	BUTLER AVENUE & SHADY RETREAT ROAD	3936	12 (LEAD)	45	–	23	–	57	–	23	80	0	FREE
11	BUTLER AVENUE & IRON HILL ROAD/ALUMNI LANE	2146	–	44	–	36	–	44	–	36	–	0	FREE
12	STATE STREET & NEW BRITAIN ROAD	2422	20 (LEAD)	45	–	–	–	65	–	25	90	68	
13	STATE STREET & BURPEE ROAD/611 RAMPS	1845	15 (LEAD)	43	–	32	15 (LEAD)	43	–	32	90	8	
14	STATE STREET & 611 RAMPS	2838	20 (LEAD)	40	–			60	–	30	90	75	
15	STATE STREET & HOSPITAL/PROGRESS DRIVE	2590	18 (LEAD)	47	–	25	18 (LEAD)	47	–	25	90	0	
16	STATE STREET & MEMORIAL DRIVE	2590	18 (LEAD)	47	–	25	18 (LEAD)	47	–	25	90	0	
17	MAIN STREET & SUNSET PARK AVENUE	3320	–	63	17 (LEAD)	16	–	63	–	16	96	–	

NOTES: – ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
REFER TO SIGNAL PERMIT PLAN FOR MAXIMUM, CLEARANCE AND PED TIMES.

WEEKLY/BACKUP PROGRAM CHART
INTERSECTIONS 1–3

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	7	00:00	–		FREE	
2	1–5	06:00	120		1	
3	1–5	10:00	110		3	
4	1–5	16:00	120		2	
5	1–5	19:00	–		FREE	
6	6	10:00	110		3	
7	6	16:00	–		FREE	

MONDAY = DAY 1

WEEKLY/BACKUP PROGRAM CHART
INTERSECTIONS 4, 8

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	1–7	00:00	–		MAX 1	

MONDAY = DAY 1

WEEKLY/BACKUP PROGRAM CHART
INTERSECTIONS 5–6

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	1–7	00:00	–		MAX 1	
2	1–5	06:00	110		1	
3	1–5	10:00	80		2	
4	1–5	14:00	90		3	
5	1–5	19:00	80		2	
6	6,7	08:00	80		2	
7	1–7	23:00	–		MAX 1	

MONDAY = DAY 1

WEEKLY/BACKUP PROGRAM CHART
INTERSECTIONS 7, 10, 11

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	1–7	00:00	–		MAX 1	
2	1–5	15:00	–		MAX 2	
3	1–5	19:00	–		MAX 1	

MONDAY = DAY 1

WEEKLY/BACKUP PROGRAM CHART
INTERSECTION 9

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	1–7	00:00	–		MAX 1	
2	6,7	06:00	–		MAX 1	
3	1–5	06:00	90		1	
4	1–5	10:00	–		MAX 1	
5	1–5	15:00	60		2	
6	1–5	19:00	–		MAX 1	

MONDAY = DAY 1

WEEKLY/BACKUP PROGRAM CHART
INTERSECTIONS 12–16

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	1–7	00:00	–		MAX 1	
2	1–5	06:00	80		1	
3	1–5	10:00	70		2	
4	1–5	15:00	90		3	
5	1–7	20:00	–		MAX 1	
6	6,7	07:00	70		2	

MONDAY = DAY 1

WEEKLY/BACKUP PROGRAM CHART
INTERSECTIONS 17

EVENT	DAY	TIME	CYCLE		PROGRAM	REMARKS
1	6,7	00:00	80		2	MAX 2
2	1–5	06:00	110		1	MAX 1
3	1–5	10:00	80		2	MAX 2
4	1–5	15:00	96		3	MAX 3
5	1–5	18:00	80		2	MAX 2

MONDAY = DAY 1

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-7800 SERIES.

SYSTEM PERMIT PLAN

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: MONTGOMERY/BUCKS

MUNICIPALITY: MONTGOMERY TWP., NEW BRITAIN TWP., CHALFONT BORO., NEW BRITAIN BORO., DOYLESTOWN TWP.

INTERSECTION: BUTLER AVE/STATE STREET
SR 4202/SR 3002 CORRIDOR

REVIEWED:

MONTGOMERY TWP. MUNICIPAL OFFICIAL

NEW BRITAIN TWP. MUNICIPAL OFFICIAL — 01/21/2020

CHALFONT BORO. MUNICIPAL OFFICIAL

NEW BRITAIN BORO. MUNICIPAL OFFICIAL — DATE

DOYLESTOWN TWP. MUNICIPAL OFFICIAL — DATE

RECOMMENDED:

NBPATEL — 2/10/14

ABPATEL — 2/10/14
DISTRICT TRAFFIC ENGINEER — DATE

NO.	REVISION	DES./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	ADDED INTERSECTION 16	MeM	5/20/16	NBP	6/2/16	ABP	6/2/
2	ADDED INTERSECTION 9	H&K	12/12/17	NBP	4/6/18	DLA	4/9/
3	ADDED INTERSECTION 2 (WAWA DRIVEWAY/VILLAGE SQUARE)	TPD	10/22/19	NBP	10/24/19	DLA	7/4
4							
5							
6							
7							
8							

SYSTEM PERMIT #1-0120 — SHEET 3 OF 3

APPENDIX F:

Auxiliary Turn Lane Warrant Analysis Worksheets

County Line Road and Site Driveway

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: County Line Road (SR 2038) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	2
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	45		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	39	14.0%	42
	Through	-	766	7.0%	793
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	651	7.0%	674
	Right	Yes	27	0.0%	27

Advancing Volume:	835
Opposing Volume:	701
Left Turn Volume:	42
% Left Turns in Advancing Volume:	5.03%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	651	7.0%	N/A
	Right	-	27	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 7**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	42
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	45

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

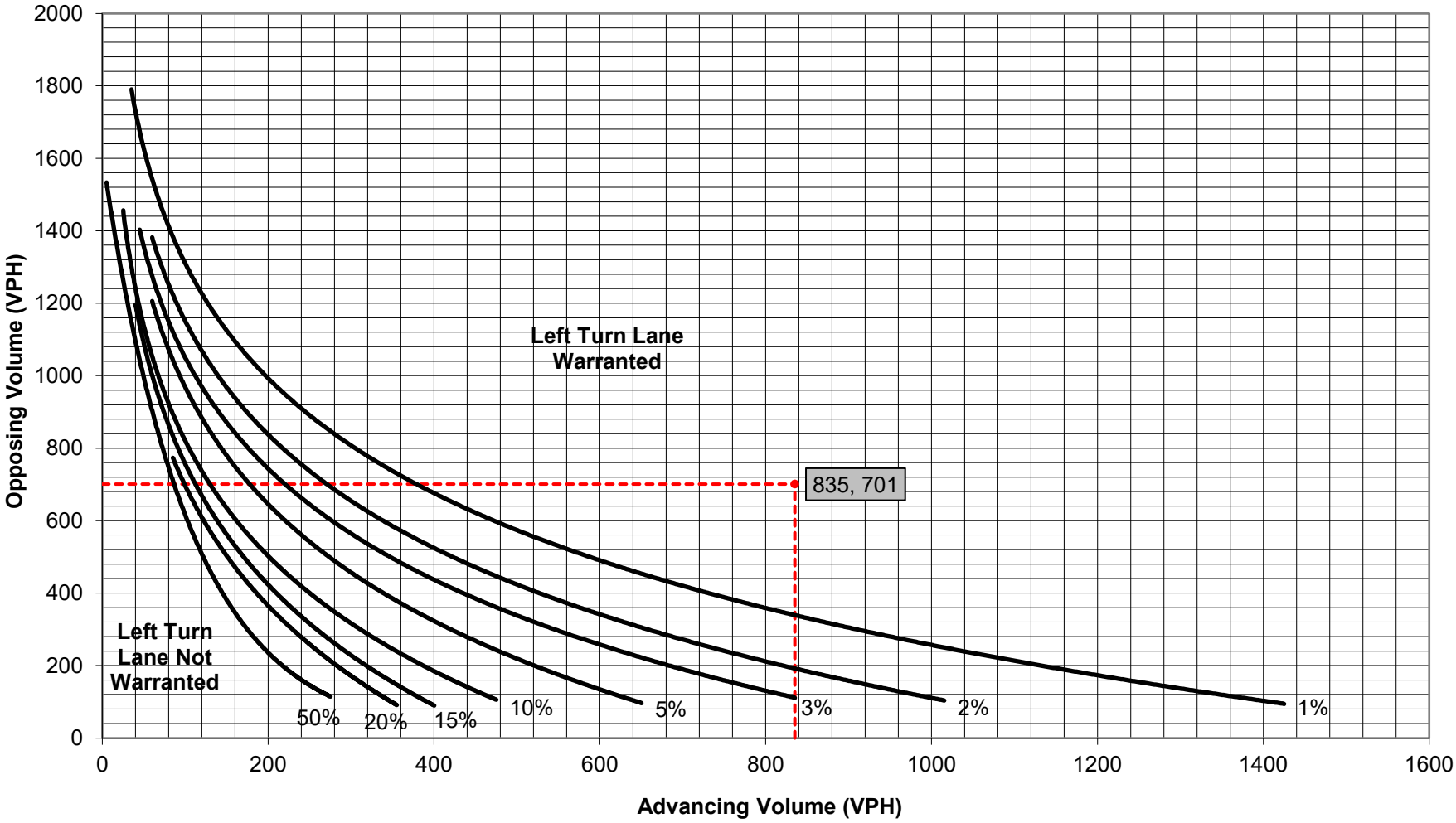
Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**125**	**Feet**
Condition C:	**N/A**	**Feet**
Required Left Turn Lane Storage Length:	**125**	**Feet**

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 7. Warrant for left turn lanes on four-lane, undivided highways (unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: County Line Road (SR 2038) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	2
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	45	**Type of Analysis**	
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	39	14.0%	N/A
	Through	-	766	7.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	651	7.0%	N/A
	Right	Yes	27	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	651	7.0%	674
	Right	-	27	0.0%	27

Advancing Volume:	701
Right Turn Volume:	27

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 12

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	27
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	45

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

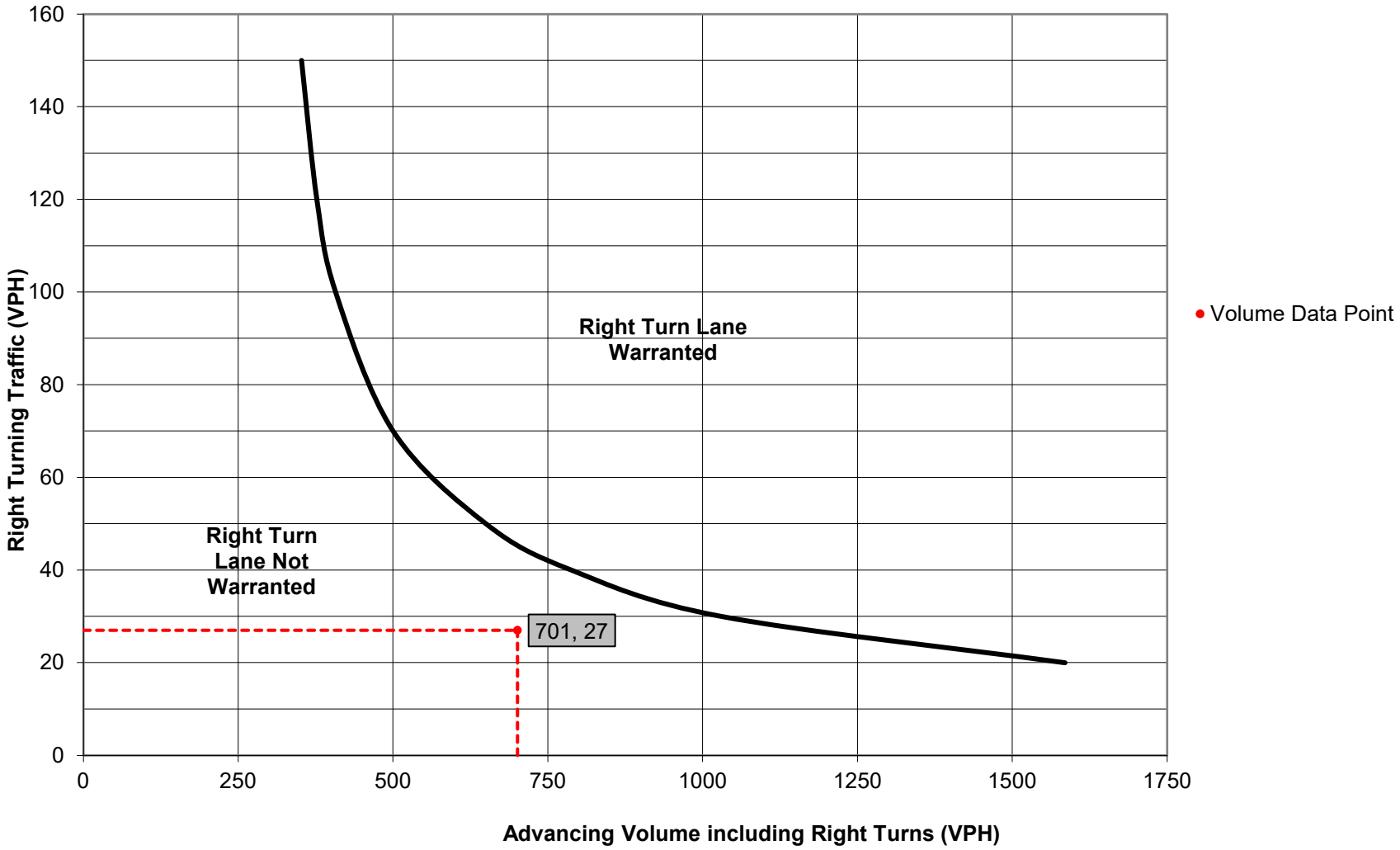
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 12. Warrant for right turn lanes on four-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: County Line Road (SR 2038) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	2
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	45	**Type of Analysis**	
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	31	0.0%	31
	Through	-	879	2.0%	888
	Right	Yes	0	0.0%	0
Opposing	Left	Yes	0	0.0%	0
	Through	-	731	5.0%	750
	Right	Yes	22	0.0%	22

Advancing Volume:	919
Opposing Volume:	772
Left Turn Volume:	31
% Left Turns in Advancing Volume:	3.37%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	N/A
	Through	-	731	5.0%	N/A
	Right	-	22	0.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 7

Warrant Met?: Yes

Right Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	31
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	45

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

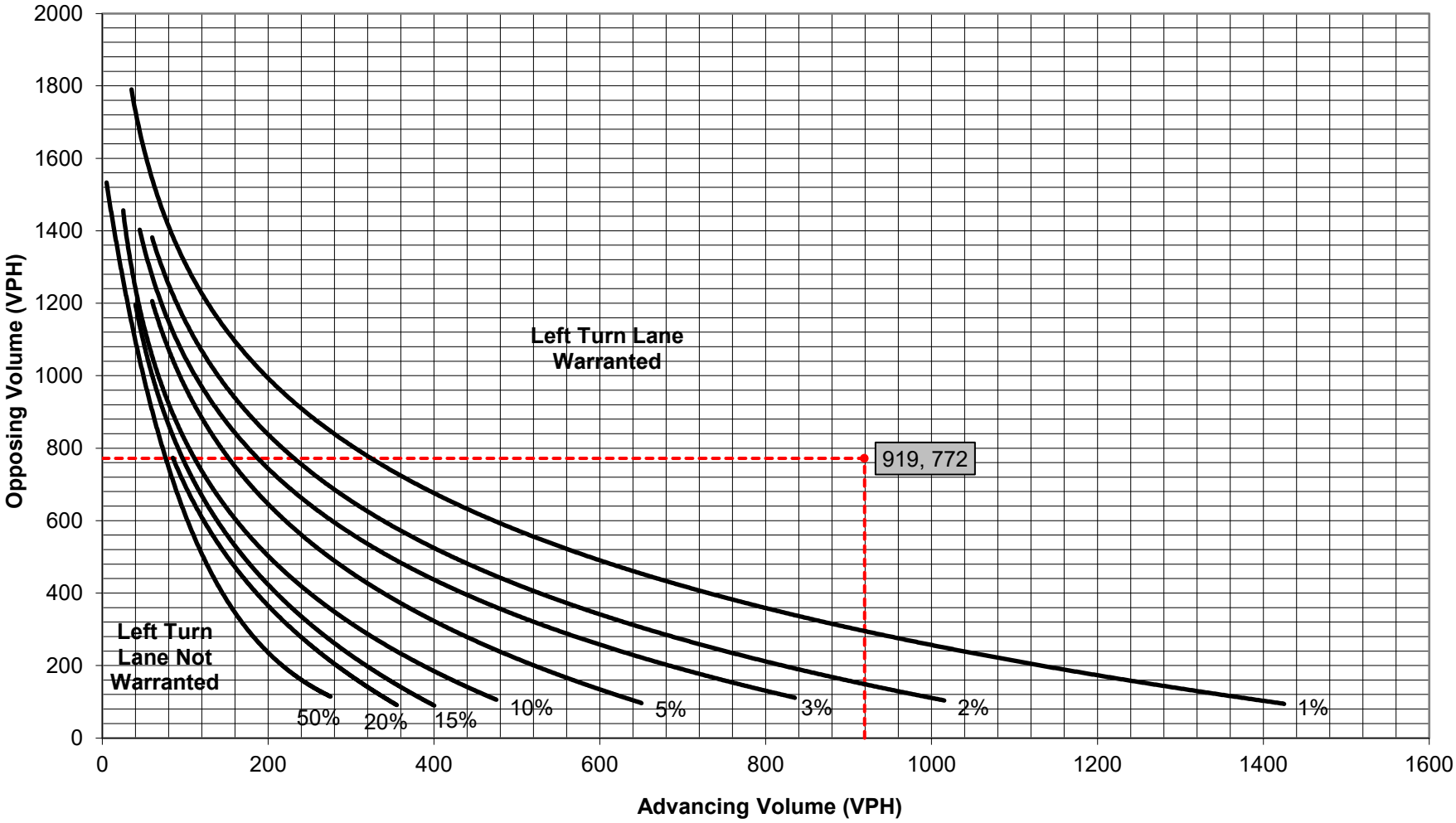
Left Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	125	Feet
Condition C:	N/A	Feet
Required Left Turn Lane Storage Length:	125	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 7. Warrant for left turn lanes on four-lane, undivided highways (unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: County Line Road (SR 2038) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	2
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Unsignalized		
Posted Speed Limit (MPH):	45	**Type of Analysis**	
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	31	0.0%	N/A
	Through	-	879	2.0%	N/A
	Right	Yes	0	0.0%	N/A
Opposing	Left	Yes	0	0.0%	N/A
	Through	-	731	5.0%	N/A
	Right	Yes	22	0.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	0	0.0%	0
	Through	-	731	5.0%	750
	Right	-	22	0.0%	22

Advancing Volume:	772
Right Turn Volume:	22

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 12

Warrant Met?: No

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Unsignalized
Design Hour Volume of Turning Lane:	22
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	45

Average # of Vehicles/Cycle: N/A

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

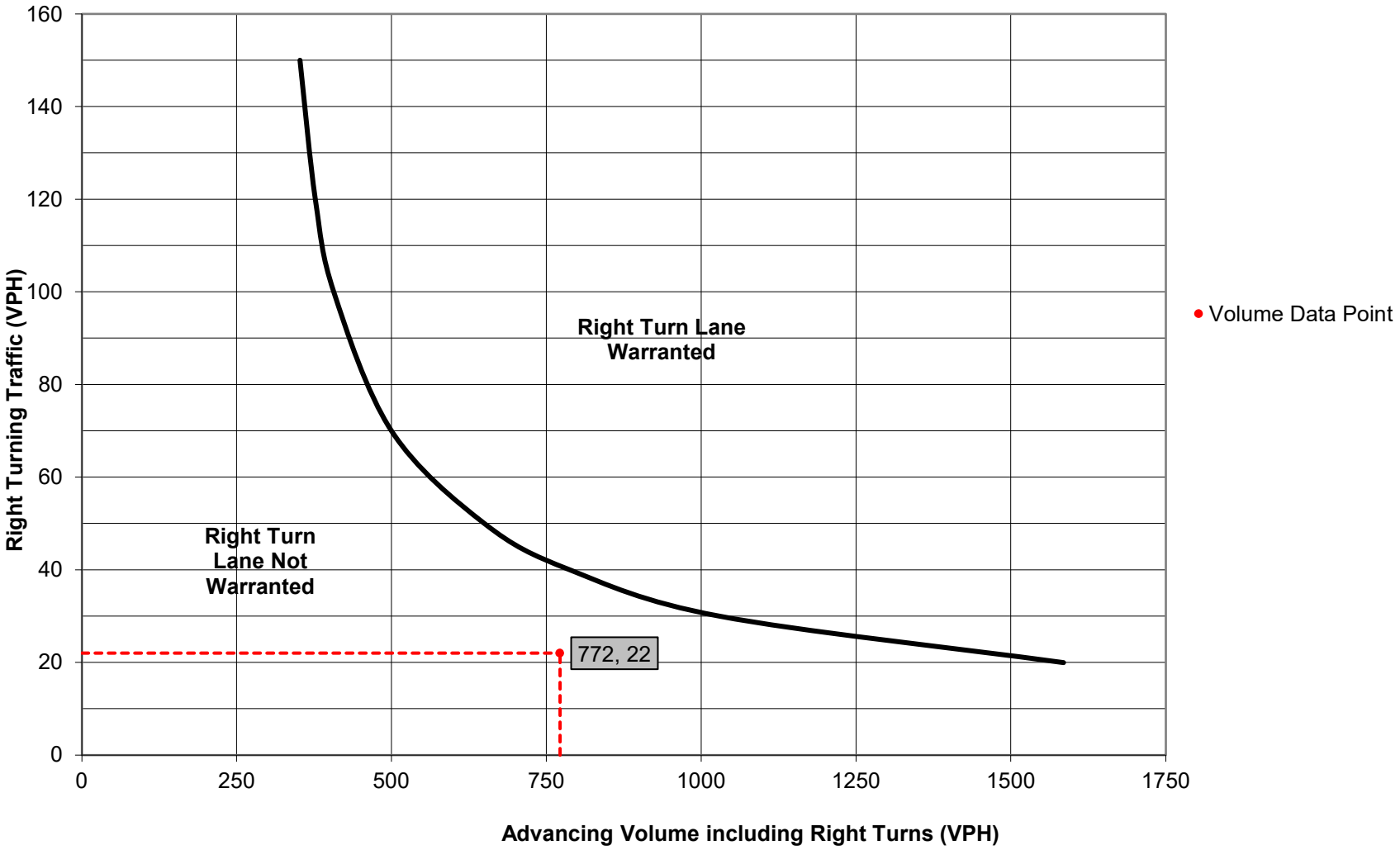
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 12. Warrant for right turn lanes on four-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)



W. Butler Avenue and Site Driveway

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: W. Butler Avenue (SR 4202) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	45		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	47	2.0%	48
	Through	-	320	6.0%	330
	Right	Yes	34	6.0%	36
Opposing	Left	Yes	66	2.0%	67
	Through	-	463	7.0%	480
	Right	Yes	95	4.0%	97

Advancing Volume:	414
Opposing Volume:	644
Left Turn Volume:	48
% Left Turns in Advancing Volume:	11.59%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	66	2.0%	N/A
	Through	-	463	7.0%	N/A
	Right	-	95	4.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 3**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	48
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	30

Average # of Vehicles/Cycle: 2.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

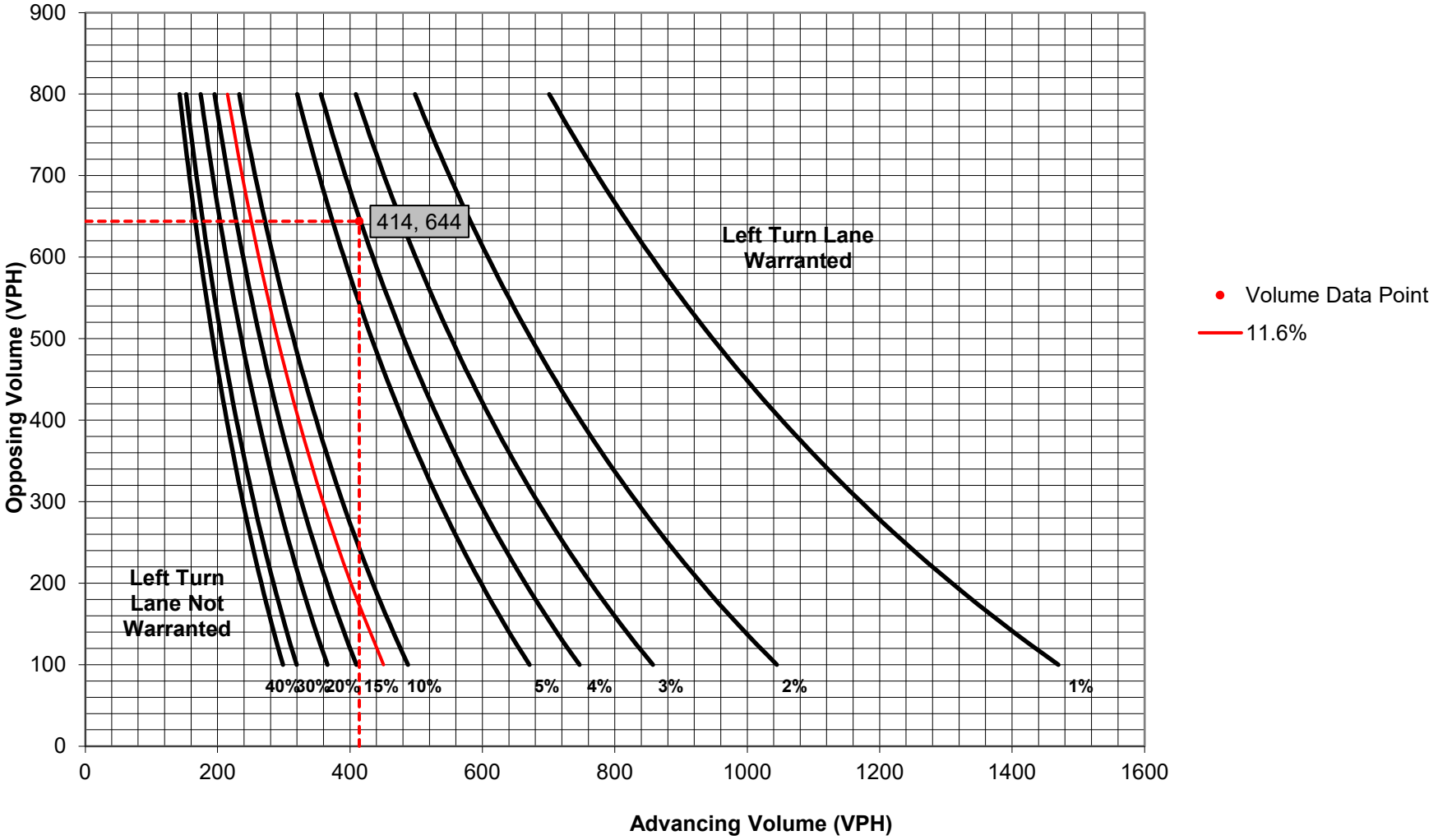
Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**125**	**Feet**
Condition C:	**175**	**Feet**
Required Left Turn Lane Storage Length:	**175**	**Feet**

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 3. Warrant for left turn lanes on two-lane highways
(45 mph speed, unsignalized and signalized intersections)
(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: W. Butler Avenue (SR 4202) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	AM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	45		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	47	2.0%	N/A
	Through	-	320	6.0%	N/A
	Right	Yes	34	6.0%	N/A
Opposing	Left	Yes	66	2.0%	N/A
	Through	-	463	7.0%	N/A
	Right	Yes	95	4.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	66	2.0%	67
	Through	-	463	7.0%	480
	Right	-	95	4.0%	97

Advancing Volume:	644
Right Turn Volume:	97

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 10

Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	97
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	30

Average # of Vehicles/Cycle: 3.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

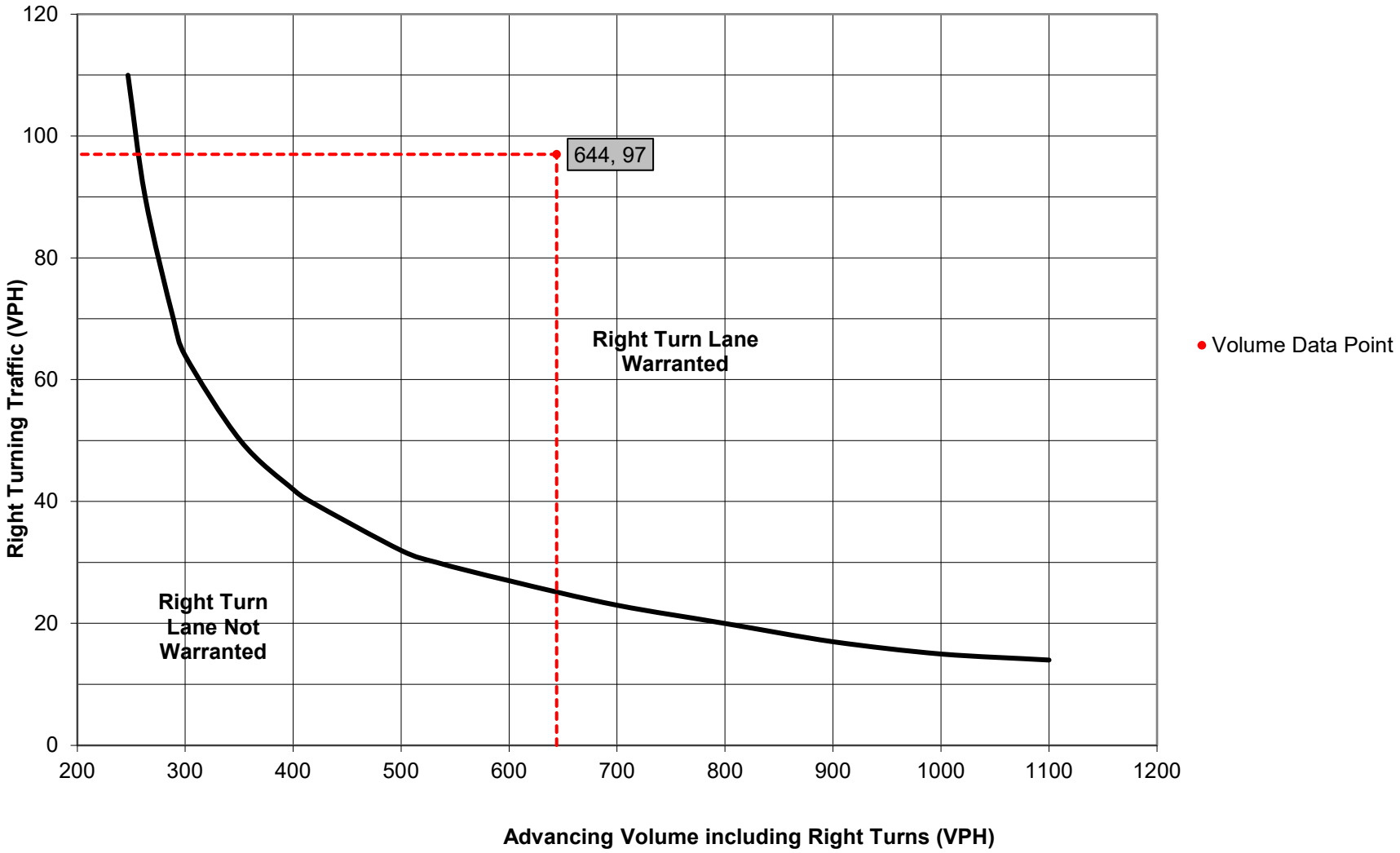
Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	125	Feet
Condition C:	225	Feet
Required Right Turn Lane Storage Length:	225	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: W. Butler Avenue (SR 4202) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	45		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Left Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	28	0.0%	28
	Through	-	550	1.0%	553
	Right	Yes	102	0.0%	102
Opposing	Left	Yes	86	1.0%	87
	Through	-	402	1.0%	405
	Right	Yes	68	3.0%	70

Advancing Volume:	683
Opposing Volume:	562
Left Turn Volume:	28
% Left Turns in Advancing Volume:	4.10%

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	86	1.0%	N/A
	Through	-	402	1.0%	N/A
	Right	-	68	3.0%	N/A

Advancing Volume:	N/A
Right Turn Volume:	N/A

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: **Figure 3**

Warrant Met?: **Yes**

Right Turn Lane Warrant Findings

Applicable Warrant Figure: **N/A**

Warrant Met?: **N/A**

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	28
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	30

Average # of Vehicles/Cycle: 1.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	**N/A**	**Feet**
Condition B:	**125**	**Feet**
Condition C:	**150**	**Feet**
Required Left Turn Lane Storage Length:	**150**	**Feet**

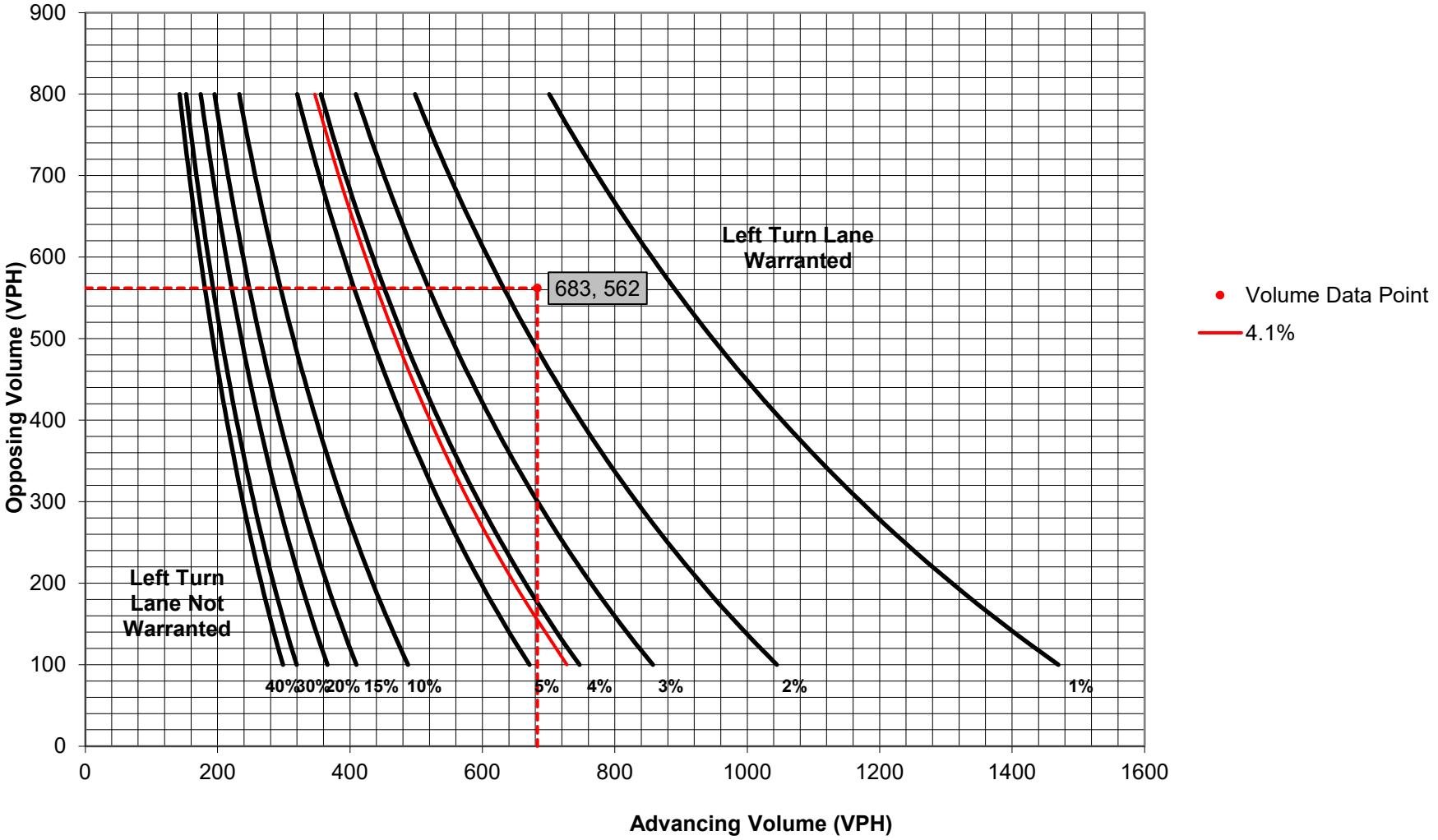
Additional Findings:

N/A

Additional Comments / Justifications:

Figure 3. Warrant for left turn lanes on two-lane highways (45 mph speed, unsignalized and signalized intersections)

(L = % Left Turns in Advancing Volume)



Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality:	New Britain Township	**Analysis Date:**	2/3/2023
County:	Bucks County	**Conducted By:**	BH
PennDOT Engineering District:	6	**Checked By:**	MB
		Agency/Company Name:	Traffic Planning and Design, Inc.

Intersection & Approach Description: W. Butler Avenue (SR 4202) and Site Driveway

Analysis Period:	2027 Build	**Number of Approach Lanes:**	1
Design Hour:	PM Peak Hour	**Undivided or Divided Highway:**	Undivided
Intersection Control:	Signalized		
Posted Speed Limit (MPH):	45		**Type of Analysis**
Type of Terrain:	Level	**Left or Right-Turn Lane Analysis?:**	Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	28	0.0%	N/A
	Through	-	550	1.0%	N/A
	Right	Yes	102	0.0%	N/A
Opposing	Left	Yes	86	1.0%	N/A
	Through	-	402	1.0%	N/A
	Right	Yes	68	3.0%	N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations

Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	86	1.0%	87
	Through	-	402	1.0%	405
	Right	-	68	3.0%	70

Advancing Volume:	562
Right Turn Volume:	70

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings

Applicable Warrant Figure: N/A

Warrant Met?: N/A

Right Turn Lane Warrant Findings

Applicable Warrant Figure: Figure 10

Warrant Met?: Yes

TURN LANE LENGTH CALCULATIONS

Intersection Control:	Signalized
Design Hour Volume of Turning Lane:	70
Cycles Per Hour (Assumed):	Known
Cycles Per Hour (If Known):	30

Average # of Vehicles/Cycle: 2.0

PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	125	Feet
Condition C:	175	Feet
Required Right Turn Lane Storage Length:	175	Feet

Additional Findings:

N/A

Additional Comments / Justifications:

Figure 10. Warrant for right turn lanes on two-lane roadways
(45 mph or greater speeds, unsignalized and signalized intersections)