Public Hearing: YES ☒ NO ☐ **Department:** Planning & Sustainability

SUBJECT:

COMMISSION DISTRICT(S): 1 & 7

Application of Embry Hills Church of Christ c/o Michelle Battle for a Special Land Use Permit (SLUP) to add a new 700-seat sanctuary and expand the parking lot to accommodate 243 parking spaces, at 3214 Chamblee-Tucker Road.

PETITION NO: D1. SLUP-20-1244110 2020-0836

PROPOSED USE: New 700-seat sanctuary and expansion of parking lot.

LOCATION: 3214 Chamblee-Tucker Road, Chamblee, GA 30341

PARCEL NO. : 18-283-02-012, 18-284-04-007 & 18-284-04-008
INFO. CONTACT: Jeremy McNeil, Sr Planner

PHONE NUMBER: 404-371-2155

PURPOSE:

Application of Embry Hills Church of Christ c/o Michelle Battle for a Special Land Use Permit (SLUP) to add a new 700-seat sanctuary and expand the parking lot to accommodate 243 parking spaces. The property is located on the north side of Chamblee Tucker Road, approximately 150 feet east of North Embry Circle, at 3214, 3220, and 3250 Chamblee Tucker Road in Chamblee, Georgia. The property has approximately 811 feet of frontage along Chamblee Tucker Road and contains 5.8 acres.

RECOMMENDATION:

COMMUNITY COUNCIL: (12/14/2020) Denial. **(8/17/2020)** Full Cycle Deferral.

PLANNING COMMISSION: (1/7/2021) Approval. **(9/1/2020)** Full Cycle Deferral.

PLANNING STAFF: Approval with conditions.

STAFF ANALYSIS: The site is located within the Suburban Character Area (SUB) per the DeKalb County 2035 Comprehensive Plan. The proposed church expansion is consistent with the following area policies: The non-residential development in suburban areas shall be limited to small-scale convenience goods/services to meet the needs of the surrounding residents. Also, based off the submitted materials, the proposed church expansion should not create adverse impacts upon any adjoining land use by reason of noise, smoke, odor, dust, vibration, etc. Therefore, it is the recommendation of Staff that this application be "Approved, with conditions".

PLANNING COMMISSION VOTE: (1/7/2021) Approval 8-0-0. P. Womack, Jr. moved, E. Patton seconded for Approval. **(9/1/2020) Full Cycle Deferral 7-0-0.** P. Womack, Jr. moved, G. McCoy seconded for a "Full Cycle Deferral". V. Moore was no longer present.

COMMUNITY COUNCIL VOTE/RECOMMENDATION: (12/14/2020) Denial 3-2-0. **(8/17/2020)** Full Cycle Deferral 4-0-0.

Recommended Conditions-SLUP-20-1244110

1. Additional landscaping in the required parking setbacks, as approved by the County Arborist, to help enhance the visual buffer.
2. Additional fencing along the edge of the parking lot areas to help shield headlights from spillover onto adjacent residential properties.
3. New 6” high curbing around the perimeter of the existing rear parking lot.
4. A minimum of 58 parking spaces shall be constructed of a pervious surface in the new parking lot.
5. Site and building lights to be downward facing and designed so as not to be directed at residential properties or spill onto said properties.
6. Security gates with locks shall be maintained to the entrance to the rear parking area to cut down on unauthorized usage.

Michael Thurmond
Chief Executive Officer

DeKalb County Department of Planning & Sustainability

330 Ponce De Leon Avenue, Suite 300
Decatur, GA 30030
(404) 371-2155 / plandev@dekalbcountyga.gov

Planning Commission Hearing Date: January 7, 2021
Board of Commissioners Hearing Date: January 28, 2021

STAFF ANALYSIS

Case No.:	SLUP-20-1244110	**Agenda #:** D1
Location/Address:	North side of Chamblee Tucker Road, approximately 150 feet east of North Embry Circle, at 3214, 3220, and 3250 Chamblee Tucker Road Chamblee, Georgia.	**Commission District:** 01 **Super District:** 07
Parcel ID:	18-283-02-012; 18-284-04-007; and 18-284-04-008	
Request:	A Special Land Use Permit (SLUP) to add a new 700-seat sanctuary and expand the parking lot to accommodate 243 parking spaces.	
Property Owner/Agent:	Embry Hills Church of Christ	
Applicant/Agent:	Battle Law P.C.	
Acreage:	5.80 acres	
Existing Land Use:	Place of worship and three detached single-family structures.	
Surrounding Properties/ Adjacent Zoning:	**North:** R-100 (Residential Medium Lot-100) District; Detached Single Family Residences. **East:** NS (Neighborhood Shopping Commercial) District; *Asiklar Camisi (Masjid)*. **South:** R-100 (Residential Medium Lot-100) and RSM (Small Lot Residential Mix); Detached Single Family Residences and Muti-Family housing. **West:** R-100 (Residential Medium Lot) District; Detached Single Family Residences.	
Comprehensive Plan:	**Suburban (SUB)**	[X] **Consistent** [ ] **Inconsistent**

Proposed Density: N/A	**Existing Density:** N/A
Proposed Square Ft.: N/A	**Existing Units/Square Feet:** N/A
Proposed Lot Coverage: 55%	**Existing Lot Coverage: 43%**

SUBJECT PROPERTIES

The subject properties are located on the north side of Chamblee Tucker Road, approximately 150 feet east of North Embry Circle, at 3214, 3220, and 3250 Chamblee Tucker Road Chamblee, Georgia. All three sites combined contain approximately 5.80 acres with approximately 670 feet of frontage along Chamblee Tucker Road. The surrounding properties to the north are detached, single-family residences. The surrounding properties to the south across Chamblee Tucker Road are detached, single-family residences and multi-family housing. The property west of the subject property is a detached, single-family residence. The subject property to the east is the location of *Asiklar Camisi (Masjid).* The subject properties are zoned R-100 (Residential Medium Lot-100) District.

ADJACENT ZONING

The properties are currently zoned R-100 (Residential Medium Lot-100) District along the Chamblee Tucker road corridor. To the south of the site properties, across Chamblee Tucker Road, are R-100 (Residential Medium Lot-100) and RSM (Small Residential Lot Mix) zoned properties. To the north and west of the subject properties are R-100 (Residential Medium Lot-100) zoned properties. Directly east of the subject properties, is the NS (Neighborhood Shopping Commercial) zoning district.

PROJECT ANALYSIS

The applicant is requesting a Special Land Use Permit (SLUP) for the expansion of an existing place of worship. Based on the submitted materials, the applicant is proposing to demolish the three single family home buildings on the subject properties; expand the existing church building that will include a new sanctuary with 700 fixed seats; expand the parking lot area to provide for a total of 243 parking spaces at a ratio of 1 space for every 2.88 fixed seats; and enlarge the existing detention pond and "install on-site water quality."

The submitted site plan depicts the existing place of worship with the proposed addition. The site plan also depicts 243 parking spaces along the western, eastern, and northern parts of the structure. Also, located east of the proposed structure is placement of the proposed renovated detention pond.

The existing sidewalk along Chamblee Tucker Road will be maintained to provide pedestrian access to the place of worship. The existing ingress and egress from Chamblee Tucker Road will also to be maintained for entry/exit for the place of worship.

IMPACT ANALYSIS

Section 27-7.4.6 of the DeKalb County Code states that the following criteria shall be applied in evaluating and deciding any application for a Special Land Use Permit.

A. Adequacy of the size of the site for the use contemplated and whether or not adequate land area is available for the proposed use including provision of all required yards, open space, off-street parking, and all other applicable requirements of the zoning district in which the use is proposed to be located:

Located on 5.80 acres, adequate land area is available to for the proposed church expansion. All required yards, open space, and off-street parking are satisfied within the R-100 (Residential Medium Lot-100) District.

B. Compatibility of the proposed use with adjacent properties and land uses and with other properties and land uses in the district:

The current use is compatible with the adjacent and surrounding properties.

C. Adequacy of public services, public facilities, and utilities to serve the contemplated use:

It appears that there are adequate public streets and services are available for the proposed church expansion.

D. **Adequacy of the public street on which the use is proposed to be located and whether or not there is sufficient traffic carrying capacity for the proposed use, so as not to unduly increase traffic or create congestion in the area:**

The subject property is located on Chamblee-Tucker Road which is classified as a "minor arterial" street and has adequate capacity to handle the volume of traffic generated by the proposed use.

E. Whether or not existing land uses located along access routes to the site will be adversely affected by the character of the vehicles or the volume of traffic generated by the proposed use.

The proposal will not adversely affect the character of the vehicles or the volume of traffic generated by the proposed use. Traffic generated by the subject property has already been absorbed and accommodated over the past years as a place of worship.

F. Adequacy of ingress and egress to the subject property and to all proposed buildings, structures, and uses thereon, with particular reference to pedestrian and automotive safety and convenience, traffic flow and control, and access in the event of fire or other emergency:

Based on the submitted site plan, there is one access point to the site with street frontage along Chamblee Tucker Road. Emergency vehicles can access the site safely from this one access point. According to the site plan, it appears traffic will flow in a circular pattern to access the drive-through lane and available parking spaces.

G. Whether or not the proposed use would create adverse impacts upon any adjoining land use by reason of noise, smoke, odor, dust, or vibration that would be generated by the proposed use:

The proposed church expansion should not create adverse impacts upon any adjoining land use by reason of noise, smoke, odor, dust or vibration.

H. Whether or not the proposed use would create adverse impacts upon any adjoining land use by reason of the hours of operation of the proposed use:

The hours of operation of the place of worship should not create adverse impacts upon adjoining land uses.

I. Whether or not the proposed use will create adverse impacts upon any adjoining land use by reason of the manner of operation of the proposed use.

The manner of operation for the proposed place of worship should not create adverse impacts upon adjoining land uses.

Whether or not the proposed use is otherwise consistent with the requirements of the zoning district classification in which the use is proposed to be located.

Places of Worships are a permitted use within the R-100 (Residential Medium Lot-100) District with a Special Land Use Permit (SLUP).

J. Whether or not the proposed use is consistent with the policies of the comprehensive plan.

The site is located within the Suburban Character Area (SUB) per the *DeKalb County 2035 Comprehensive Plan*. The proposed church expansion is consistent with the following area policies: The non-residential development in suburban areas shall be limited to small-scale convenience goods/services to meet the needs of the surrounding residents.

K. Whether or not the proposed use provides for all required buffer zones and transitional buffer zones where required by the regulations of the zoning district in which the use is proposed to be located.

The proposed church expansion will abut R-100 (Medium Residential Lot) District to the north and west. The applicant will provide a 20-foot transitional buffer adjacent to all residential areas.

L. Whether or not there is adequate provision of refuse and service areas.

Adequate provision of refuse areas will be provided on site.

M. Whether the length of time for which the special land use permit is granted should be limited in duration:

There does not appear to be any compelling reasons for limiting the duration of the requested Special Land Use Permit.

N. Whether or not the size, scale and massing of proposed buildings are appropriate in relation to the size of the subject property and in relation to the size, scale and massing of adjacent and nearby lots and buildings.

The proposed SLUP is compatible in size and massing of adjacent and nearby commercial buildings in the area.

O. Whether the proposed use will adversely affect historic buildings, sites, districts, or archaeological resources.

The proposed SLUP will not adversely affect historic buildings, sites, districts, or archaeological resources.

P. Whether the proposed use satisfies the requirements contained within the supplemental regulations for such special land use permit.

The proposed SLUP complies with all of the following supplemental regulations per Sec.27-4.2.42. of the DeKalb County Zoning Code:

A. *Any building or structure established in connection with places of worship, monasteries or convents shall be located at least fifty (50) feet from any residentially zoned property. Where the adjoining property is zoned for nonresidential use, the setback for any building or structure shall be no less than twenty (20) feet for a side-yard and no less than thirty (30) feet for a rear-yard.*

B. *The required setback from any street right-of-way shall be the front-yard setback for the applicable residential district.*

C. *The parking areas and driveways for any such uses shall be located at least twenty (20) feet from any property line, with a visual screen, provided by a six-foot-high fence or sufficient vegetation established within that area.*

D. *Places of worship, convents and monasteries shall be located on a minimum lot area of three (3) acres and shall have frontage of at least one hundred (100) feet along a public street.*

E. *Places of worship, convents and monasteries shall be located only on a thoroughfare or arterial.*

F. *Any uses, buildings or structures operated by a place of worship that are not specifically included within the definition of place of worship must fully comply with the applicable zoning district regulations, including, but not limited to, any requirement for a special land use permit.*

R. Whether or not the proposed use will create a negative shadow impact on any adjoining lot or building as a result of the proposed building height.

The proposed SLUP request does not create a negative shadow impact on any adjoining lot or building.

S. Whether the proposed use would be consistent with the needs of the neighborhood or the community as a whole, be compatible with the neighborhood, and would not be in conflict with the overall objective of the comprehensive plan.

The proposed SLUP request may be consistent with the needs of the neighborhood or the community as a whole and would not be in conflict with the overall objective of the *Comprehensive Plan*.

COMPLIANCE WITH DISTRICT STANDARDS

The site zoned R-100 (Residential Medium Lot-100) District must comply with minimum development standards per Article 2 – Table 2.2 Residential Zoning Districts Dimensional Requirements of the DeKalb County Zoning Ordinance.

STANDARD	REQUIREMENT	PROPOSED	COMPLIANCE
LOT WIDTH (M)	MININUM OF 100 FEET ON A PUBLIC STREET FRONTAGE	627 FEET	YES
LOT AREA (M)	15,000 SQUARE FEET	252,648 SQUARE FEET	YES
LOT COVERAGE	Max. 35%	57%	No. A variance is required
FRONT BUILDING SETBACK	40 FEET	40 FEET	YES
SIDE BUILDING SETBACK	10 FEET	50 FEET	YES
REAR SETBACK	40 FEET	50 FEET	YES
HEIGHT	35 FEET	2 stories	YES
OPEN SPACE	MINIMUM 20%	45%	YES
PARKING – ARTICLE 6	175 (MIN) (One (1) space for each four (4) seats in the largest assembly room) 350 (MAX) (One (1) space for each two (2) seats in the largest assembly room)	243 SPACES	YES

STAFF RECOMMENDATION:

The site is located within the Suburban Character Area (SUB) per the DeKalb County 2035 Comprehensive Plan. The proposed church expansion is consistent with the following area policies: The non-residential development in suburban areas shall be limited to small-scale convenience goods/services to meet the needs of the surrounding residents. Also, based of the submitted materials, the proposed church expansion will not create adverse impacts upon any adjoining land use by reason of noise, smoke, odor, dust or vibration. Therefore, the Planning and Sustainability Department recommends **approval** of the requested Special Land Use Permit (SLUP) subject to the following conditions:

1. Additional landscaping in the required parking setbacks, as approved by the County Arborist, to help enhance the visual buffer.
2. Additional fencing along the edge of the parking lot areas to help shield headlights from spillover onto adjacent residential properties.
3. New 6" high curbing around the perimeter of the existing rear parking lot.
4. A minimum of 58 parking spaces shall be constructed of a pervious surface in the new parking lot
5. Site and building lights to be downward facing and designed so as not to be directed at residential properties or spill onto said properties
6. Security gates with locks shall be maintained to the entrance to the rear parking area to cut down on unauthorized usage.

Attachments:

1. Department and Division Comments
2. Application
3. Site Plan
4. Zoning Map and Land Use Map
5. Aerial Photograph/Site Photographs

(N-4)

DEKALB COUNTY GOVERNMENT
PLANNING DEPARTMENT
DISTRIBUTION FORM

NOTE: ***PLEASE RETURN ALL COMMENTS VIA EMAIL OR FAX TO EXPEDITE THE PROCESS TO MADOLYN SPANN MSPANN@DEKALBCOUNTYGA.GOV OR JOHN REID JREID@DEKALBCOUNTYGA.GOV***

COMMENTS FORM:
PUBLIC WORKS TRAFFIC ENGINEERING

Case No.: SLUP-20-1244110 **Parcel I.D. #:** 18-283-02-012

Address: 3214 Chamblee Tucker Rd Chamblee, GA

Adjacent Roadway (s):

_____	_____
_____ (classification)	_____ (classification)
Capacity (TPD) _____	**Capacity (TPD)** _____
Latest Count (TPD) _____	**Latest Count (TPD)** _____
Hourly Capacity (VPH) _____	**Hourly Capacity (VPH)** _____
Peak Hour. Volume (VPH) _____	**Peak Hour. Volume (VPH)** _____
Existing number of traffic lanes _____	**Existing number of traffic lanes** _____
Existing right of way width _____	**Existing right of way width** _____
Proposed number of traffic lanes _____	**Proposed number of traffic lanes** _____
Proposed right of way width _____	**Proposed right of way width** _____

Please provide additional information relating to the following statement.

According to studies conducted by the Institute of Traffic Engineers (ITE) 6/7TH Edition (whichever is applicable), churches generate an average of fifteen (15) vehicle trip end (VTE) per 1, 000 square feet of floor area, with an eight (8%) percent peak hour factor. Based on the above formula, the _____square foot place of worship building would generate _____ vehicle trip ends, with approximately ___ peak hour vehicle trip ends.

Single Family residence, on the other hand, would generate ten (10) VTE's per day per dwelling unit, with a ten (10%) percent peak hour factor. Based on the above referenced formula, the _____ (Single Family Residential) District designation which allows a maximum of ____units per acres, and the given fact that the project site is approximately ____ acres in land area, _____ daily vehicle trip end, and ___ peak hour vehicle trip end would be generated with residential development of the parcel.

COMMENTS:

Plans & field reviewed. Found nothing that would interrup Traffic flow.

Signature: _____

DEKALB COUNTY GOVERNMENT
PLANNING DEPARTMENT
DISTRIBUTION FORM

The following areas below may warrant comments from the Development Division. Please respond accordingly as the issues relate to the proposed request and the site plan enclosed as it relates to Chapter 14. You may address applicable disciplines.

DEVELOPMENT ANALYSIS:

- **Transportation/Access/Row**

  Consult the Georgia DOT as well as the DeKalb County Transportation Department prior to land development permit. Verify widths from the centerline of the roadways to the property line for possible right-of-way dedication. Improvements within the right-of-way may be required as a condition for land development application review approval. Safe vehicular circulation is required. Paved off-street parking is required.

- **Storm Water Management**

  Compliance with the Georgia Stormwater Management Manual, DeKalb County Code of Ordinances 14-40 for Stormwater Management and 14-42 for Storm Water Quality Control, to include Runoff Reduction Volume where applicable is required as a condition of land development permit approval. Use Volume Three of the G.S.M.M. for best maintenance practices. Use the NOAA Atlas 14 Point Precipitation Data set specific to the site. Recommend Low Impact Development features/ Green Infrastructure be included in the proposed site design to protect as much as practicable the statewaters and special flood hazard areas.

- **Flood Hazard Area/Wetlands**

  The presence of FEMA Flood Hazard Area was not indicated in the County G.I.S. mapping records for the site; and should be noted in the plans at the time of any land development permit application. Encroachment of flood hazard areas require compliance with Article IV of Chapter 14 and FEMA floodplain regulations.

- **Landscaping/Tree Preservation**

  Landscaping and tree preservation plans for any building, or parking lot must comply with DeKalb County Code of Ordinances 14-39 as well as Chapter 27 Article 5 and are subject to approval from the County Arborist.

- **Tributary Buffer**

  State water buffer was reflected in the G.I.S. records for the site. Typical state waters buffer have a 75' undisturbed stream buffer and land development within the undisturbed creek buffer is prohibited without a variance per DeKalb County Code of Ordinances 14-44.1.

- **Fire Safety**

  Plans for land development permit must comply with Chapter 12 DeKalb County Code for fire protection and prevention.

DEKALB COUNTY GOVERNMENT
PLANNING DEPARTMENT
DISTRIBUTION FORM

NOTE: PLEASE RETURN ALL COMMENTS VIA EMAIL OR FAX TO EXPEDITE THE PROCESS TO MICHELLE M ALEXANDER mmalexander@dekalbcountyga.gov OR JOHN REID JREID@DEKALBCOUNTYGA.GOV

COMMENTS FORM:
PUBLIC WORKS WATER AND SEWER

Case No.: SLUP-20-1244110

Parcel I.D. #: 18-283-02-012; 18-284-04-007; and 18-284-04-008

Address: 3214, 3220, and 3250 Chamblee Tucker Road

Chamblee, Georgia

WATER:

Size of existing water main: 8" DI Water Main _____ (adequate/inadequate)

Distance from property to nearest main: Adjacent to Property

Size of line required, if inadequate: N/A

SEWER:

Outfall Servicing Project: North Fork Peachtree Creek Basin

Is sewer adjacent to property: Yes (X) No ( ) If no, distance to nearest line:_____

Water Treatment Facility: R M Clayton WTF _____ **( ) adequate ( ) inadequate**

Sewage Capacity; * **(MGPD)** **Current Flow:** 127 **(MGPD)**

COMMENTS:

* Please note that the sewer capacity has not been reviewed or approved for this project. A Sewer Capacity Request (SCR) must be completed and submitted for review. This can be a lengthy process and should be addressed early in the process.

Signature: _____

DEKALB COUNTY GOVERNMENT
PLANNING DEPARTMENT
DISTRIBUTION FORM

NOTE: PLEASE RETURN ALL COMMENTS VIA EMAIL OR FAX TO EXPEDITE THE PROCESS TO MICHELLE M ALEXANDER mmalexander@dekalbcountyga.gov OR JOHN REID JREID@DEKALBCOUNTYGA.GOV

COMMENTS FORM:
PUBLIC WORKS WATER AND SEWER

Case No.: Z-20-1244119

Parcel I.D. #: 18-050-12-005

Address: 1377 Scott Boulevard

Decatur, Georgia

WATER:

Size of existing water main: 8" DI Water Main (adequate/inadequate)

Distance from property to nearest main: Adjacent to Property

Size of line required, if inadequate: N/A

SEWER:

Outfall Servicing Project: South Fork Peachtree Creek Basin

Is sewer adjacent to property: Yes (X) No ( ) If no, distance to nearest line:____

Water Treatment Facility: R M Clayton WTF ( ) adequate ( ) inadequate

Sewage Capacity; * (MGPD) **Current Flow:** 127 (MGPD)

COMMENTS:

* Please note that the sewer capacity has not been reviewed or approved for this project. A Sewer Capacity Request (SCR) must be completed and submitted for review. This can be a lengthy process and should be addressed early in the process.

Signature:

08/13/2020

To: Mr. John Reid, Senior Planner
From: Ryan Cira, Environmental Health Manager
Cc: Alan Gaines, Technical Services Manager
Re: Rezone Application Review

General Comments:

DeKalb County Health Regulations prohibit use of on-site sewage disposal systems for:

- multiple dwellings
- food service establishments
- hotels and motels
- commercial laundries
- funeral homes
- schools
- nursing care facilities
- personal care homes with more than six (6) clients
- child or adult day care facilities with more than six (6) clients
- residential facilities containing food service establishments

If proposal will use on-site sewage disposal, please contact the Land Use Section (404) 508-7900.

Any proposal, which will alter wastewater flow to an on-site sewage disposal system, must be reviewed by this office prior to construction.

This office must approve any proposed food service operation or swimming pool prior to starting construction.

Public health recommends the inclusion of sidewalks to continue a preexisting sidewalk network or begin a new sidewalk network. Sidewalks can provide safe and convenient pedestrian access to a community-oriented facility and access to adjacent facilities and neighborhoods.

For a public transportation route, there shall be a 5ft. sidewalk with a buffer between the sidewalk and the road. There shall be enough space next to sidewalk for bus shelter's concrete pad installation. Recommendation: Provide trash can with liner at each bus stop with bench and monitor for proper removal of waste.

Since DeKalb County is classified as a Zone 1 radon county, this office recommends the use of radon resistant construction.

New Cases:

N.1 SLUP-20-12244105 2020-0833 / 18-111-03-018
2933 North Druid Hills Road, Atlanta, GA 30329

- **Please review general comments.**
- **Septic system installed on location surrounding 2933 North Druid Hills. The location with septic system installed was 2814 North Druid Hills Road on 08/02/1963.**

N.2 LP-20-1244107 / 2020-0834 /18-196-04,18-196-04-033, 18-196-04-034, 18-196-04-035, 18-196-04-037, 18-196-04-038, 18-196-04-039, 18-196-04-040, 18-196-04-041
2814 Clairemont Road, Atlanta, GA 30329

- **Please review general comments.**
- **Septic installed on property 2920 Clairmont Road on 04/07/1974 within the vicinity of property 2814 Clairemont.**
-

N.3 Z-20-1244108 / 2020-0835 / 18-196004-029, 18-196-04-033, 18-196-04-034, 18-196-04-035, 18-196-04-037, 18-196-04-038, 18-196-04-039, 18-196-04-040, 18-196-04-041
2814 Clairmont Road, Atlanta, GA 30329

- **Please review general comments.**
-

N.4 SLUP-20-1244110 / 2020-0836 / 18-283-02-012, 18-283-02-007, 18-283-02-008
3214 Chamblee-Tucker Road, Chamblee, GA 30341

- **Please review general comments.**
- **Septic system installed on property 04/13/1961**

N.5 LP-20-1244114 / 2020-0837 / 16-252-02-002
8400 Pleasant Hill Way, Lithonia, GA 30058

- **Please review general comments.**
- **Septic system installed on property near vicinity at 8406 Pleasant Hill Way**
-

N.6 Z-20-1244113 / 2020-0838 / 16-254-02-002
8400 Pleasant Hill Way, Lithonia, GA 30058

- **Please review general comments.**
-

N.7 Z-20-1244119 / 2020-0839 / 18-050-12-005
1377 Scott Blvd., Decatur, GA 30030

- **Please review general comments.**

N.8 Z-20-1244120 / 2020-0840 / 15-201-07-001, 15-201-07-003, 15-201-07-004, 15-201-07-005, 15-201-07-007
3229 Memorial Drive, Decatur, GA 30032

- **Septic system installed on in same vicinity. The location is 3232 Memorial Drive on 04/21/1970.**
- **Please review general comments.**

N.9 TA-20-1244141 / 2020-0841 / 18-043-01-004
4900 Memorial Drive, Stone Mountain, GA 30083

- **Please review general comments.**
- **Septic System installed on 09/11/1964 at property 4947 Memorial Drive.**

DeKalb County
GEORGIA

404.371.2155 (o)
404.371.4556 (f)
DeKalbCountyGa.gov

Clark Harrison Building
330 W. Ponce de Leon Ave
Decatur, GA 30030

DEPARTMENT OF PLANNING & SUSTAINABILITY

SPECIAL LAND USE PERMIT APPLICATION

Amendments will not be accepted after 5 working days after the filing date.

Date Received: _____ Application No.: _____

APPLICANT NAME: Embry Hills Church of Christ, Inc. c/o Battle Law, P. C.

Daytime Phone #: 404.601.7616 Fax #: 404.745.0045

Mailing Address: One West Court Square Suite 750 Decatur, GA 30030

_____ E-mail: mlb@battlelawpc.com

OWNER NAME: Embry Hills Church of Christ, Inc. (If more than one owner, attach contact information for each owner)

Daytime Phone #: 770.455.8412 Fax #: _____

Mailing Address: 3250 Chamble Tucker Road , Atlanta, GA 30341

_____ E-mail: jjohnson@fg-inc.net

SUBJECT PROPERTY ADDRESS OR LOCATION: 3214,3220 & 3250 Chamblee-Tucker Road

Atlanta, DeKalb County, GA, 30341

District(s): 18 Land Lot(s): 283 & 284 Block(s): 02 & 04 Parcel(s): 012, 007 & 008

Acreage or Square Feet: +/-5.80 Commission District(s): 1 & 7 Existing Zoning: R-100

Proposed Special Land Use (SLUP): A SLUP for a Place of Worship pursuant to DeKalb County Zoning Ordinance

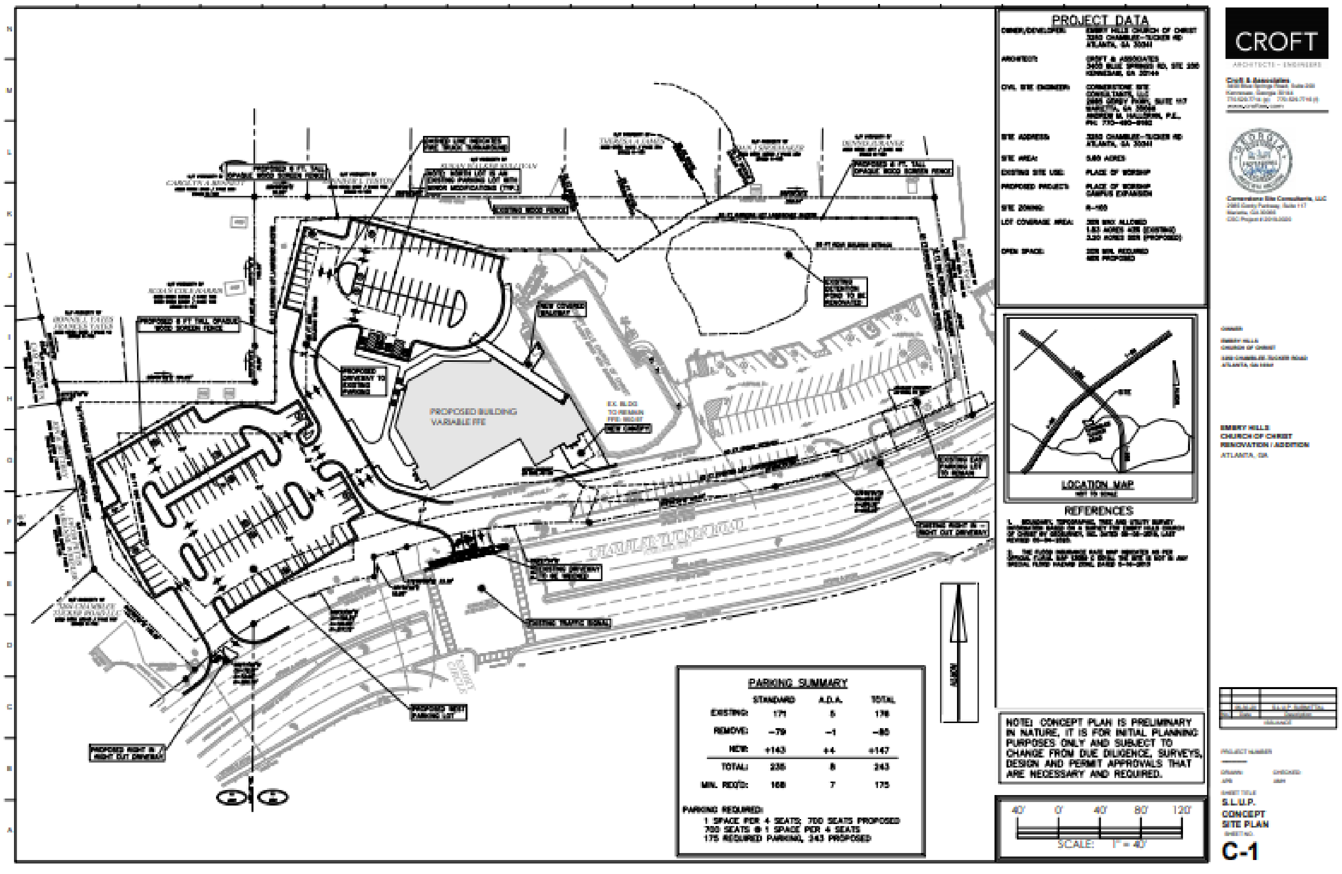
I hereby authorize the staff of the Planning and Development Department to inspect the property that is the subject of this application.

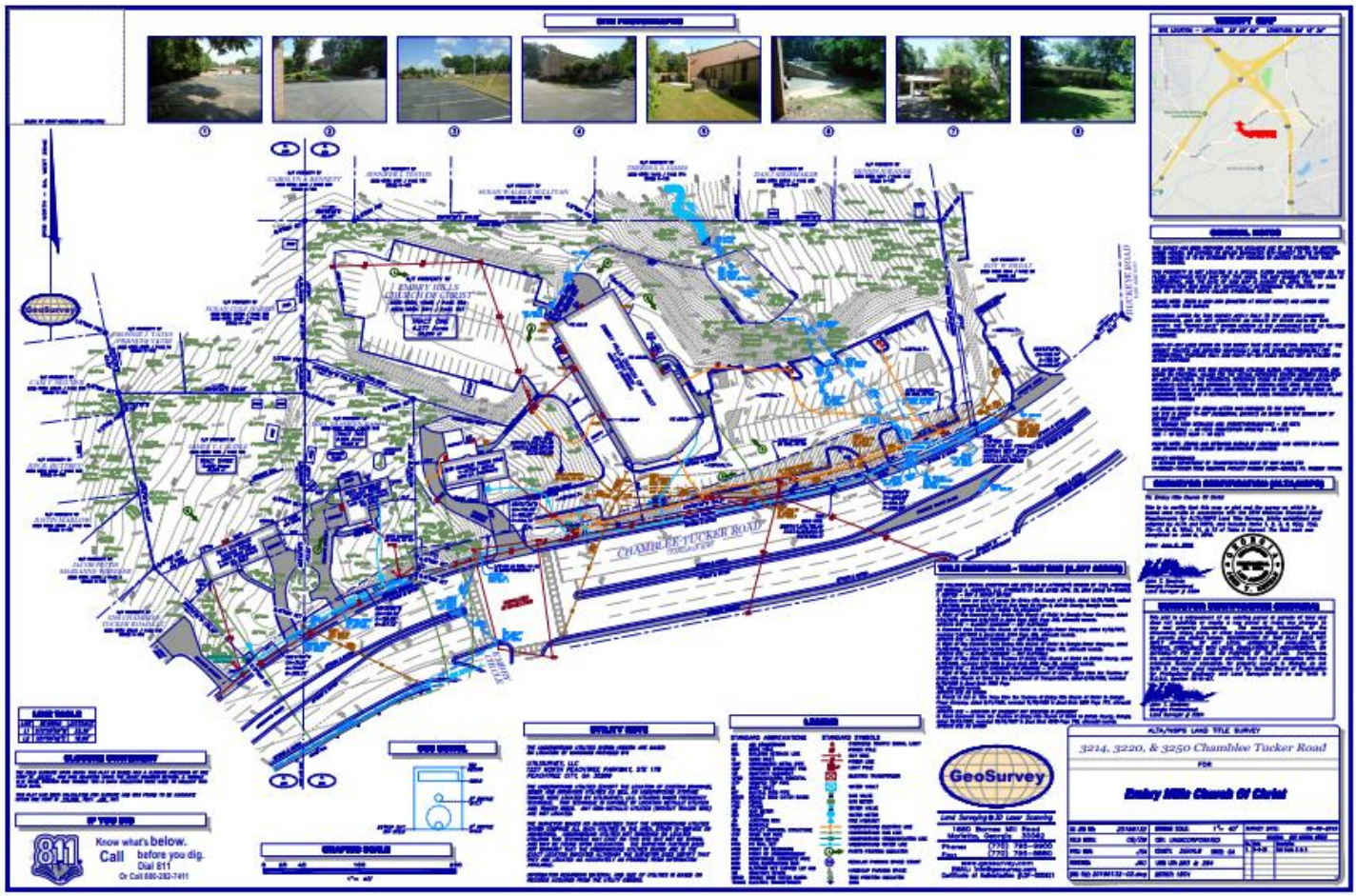
Owner: ____ Agent: X **Signature of Applicant:** Battle Law P.C.
(Check One)

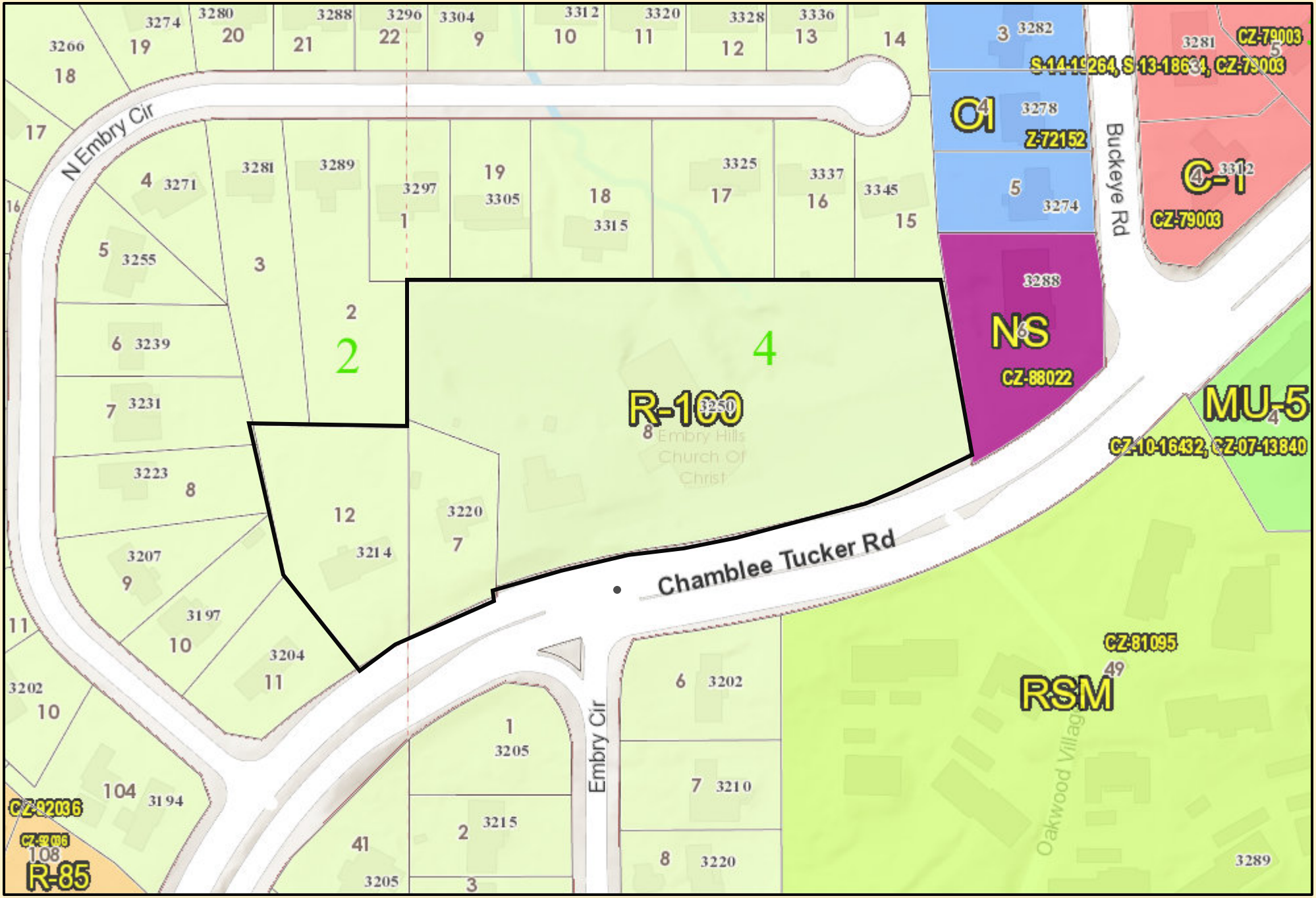
Printed Name of Applicant: Battle Law, P.C.

Notary Signature and Seal:

JANET JENNINGS
Notary Public, Cobb Co., Georgia
My Commission Expires 5-6-2024


PROJECT DATA
OWNER/DEVELOPER: EMBRY HILLS CHURCH OF CHRIST
3250 CHAMBLEE-TUCKER RD
ATLANTA, GA 30341
ARCHITECT: CROFT & ASSOCIATES
KENNESAW, GA 30144
CIVIL SITE ENGINEER:
SITE ADDRESS: 3250 CHAMBLEE-TUCKER RD
ATLANTA, GA 30341
SITE AREA: 5.60 ACRES
EXISTING SITE USE: PLACE OF WORSHIP
PROPOSED PROJECT: PLACE OF WORSHIP CAMPUS EXPANSION
SITE ZONING: R-100
LOT COVERAGE AREA:
OPEN SPACE:
PROPOSED BUILDING
VARIABLE FFE
EX. BLDG
TO REMAIN
NEW CANOPY
PROPOSED 6 FT. TALL OPAQUE WOOD SCREEN FENCE
EXISTING WOOD FENCE
EXISTING DETENTION POND TO BE RENOVATED
PROPOSED RIGHT IN / RIGHT OUT DRIVEWAY
PROPOSED NEW PARKING LOT
EXISTING TRAFFIC SIGNAL
EXISTING RIGHT IN - RIGHT OUT DRIVEWAY
LOCATION MAP
NOT TO SCALE
REFERENCES
PARKING SUMMARY
	STANDARD	A.D.A.	TOTAL
EXISTING:	171	5	176
REMOVE:	-79	-1	-80
NEW:	+143	+4	+147
TOTAL:	235	8	243
MIN. REQ'D:	168	7	175
PARKING REQUIRED:
1 SPACE PER 4 SEATS; 700 SEATS PROPOSED
700 SEATS @ 1 SPACE PER 4 SEATS
175 REQUIRED PARKING, 243 PROPOSED
NOTE: CONCEPT PLAN IS PRELIMINARY IN NATURE. IT IS FOR INITIAL PLANNING PURPOSES ONLY AND SUBJECT TO CHANGE FROM DUE DILIGENCE, SURVEYS, DESIGN AND PERMIT APPROVALS THAT ARE NECESSARY AND REQUIRED.
40' 0' 40' 80' 120'
SCALE: 1" = 40'
CROFT
ARCHITECTS - ENGINEERS
Croft & Associates
Cornerstone Site Consultants, LLC
EMBRY HILLS
CHURCH OF CHRIST
RENOVATION / ADDITION
ATLANTA, GA
PROJECT NUMBER
DRAWN:
CHECKED:
SHEET TITLE
S.L.U.P.
CONCEPT
SITE PLAN
SHEET NO.
C-1


SITE PHOTOGRAPHS
VICINITY MAP
GENERAL NOTES
CHAMBLEE TUCKER ROAD
FLOOD STATEMENT
UTILITY NOTE
LEGEND
GRAPHIC SCALE
LAND SURVEYOR'S CERTIFICATION
ZONING INFORMATION
ALTA/NSPS LAND TITLE SURVEY
3214, 3220, & 3250 Chamblee Tucker Road
FOR
Embry Hills Church Of Christ
GeoSurvey
Land Surveying & 3D Laser Scanning
Know what's below.
Call before you dig.
Dial 811
Or Call 800-282-7411



Zoning Map

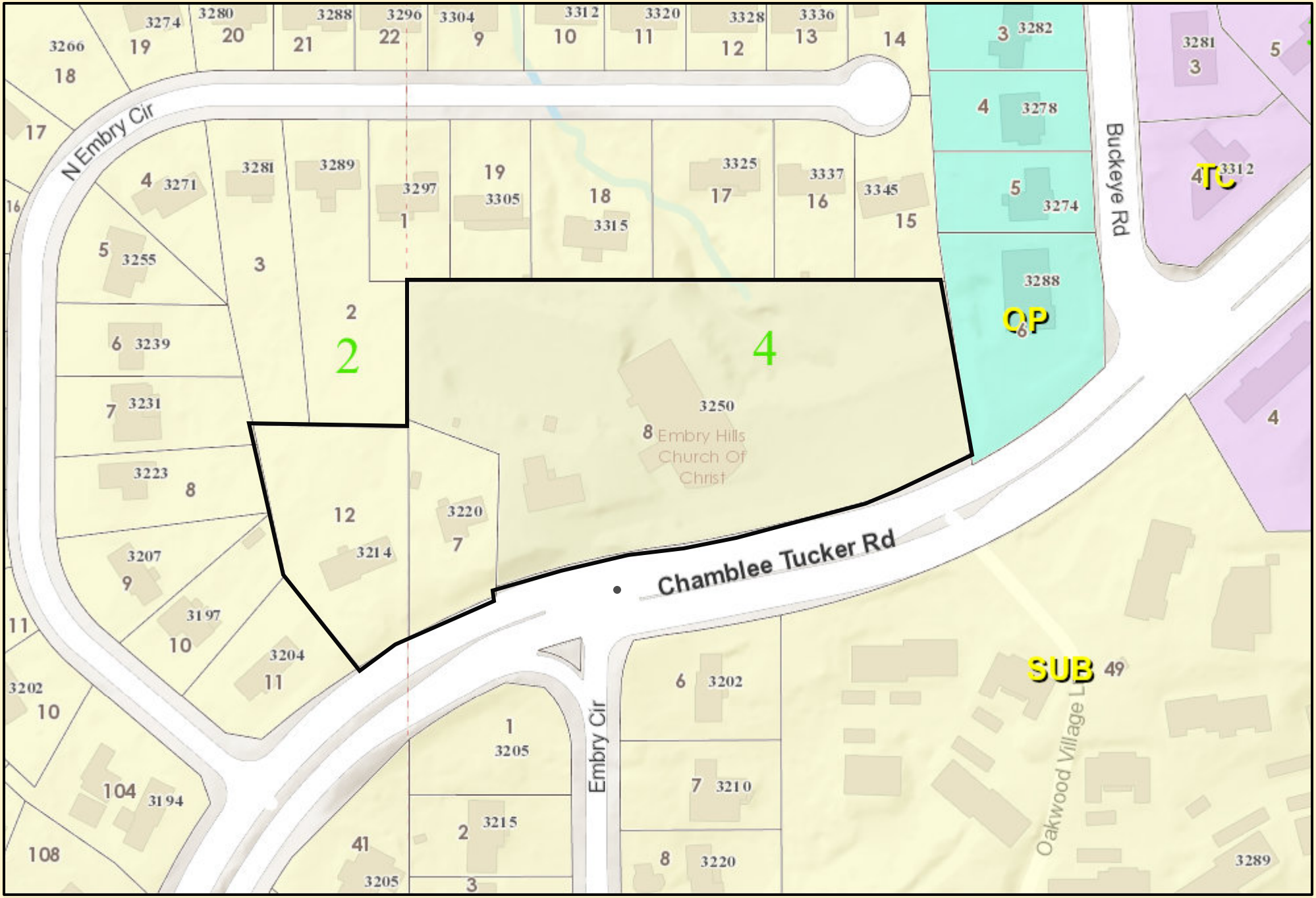
0 0.0075 0.015 0.03 0.045 0.06 mi

Date Printed: 8/6/2020

N

DeKalb County GIS Disclaimer

The maps and data, contained on DeKalb County's Geographic Information System (GIS) are subject to constant change. While DeKalb County strives to provide accurate and up-to-date information, the information is provided "as is" without warranty, representation or guarantee of any kind as to the content, sequence, accuracy, timeliness or completeness of any of the database information provided herein. DeKalb County explicitly disclaims all representations and warranties, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose. In no event shall DeKalb County be liable for any special, indirect, or consequential damages whatsoever resulting from loss of use, data, or profits, whether in an action of contract, negligence, or other actions, arising out of or in connection with the use of the maps and/or data herein provided. The maps and data are for illustration purposes only and should not be relied upon for any reason. The maps and data are not suitable for site-specific decision-making nor should it be construed or used as a legal description. The areas depicted by maps and data are approximate, and are not necessarily accurate to surveying or engineering standards.



Future Land Use Map

0 0.0075 0.015 0.03 0.045 0.06 mi

Date Printed: 8/6/2020

N

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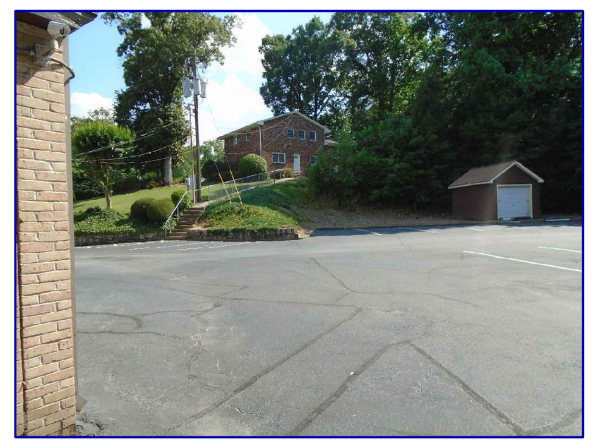
SITE PHOTOGRAPHS


1


2


3


4


5


6

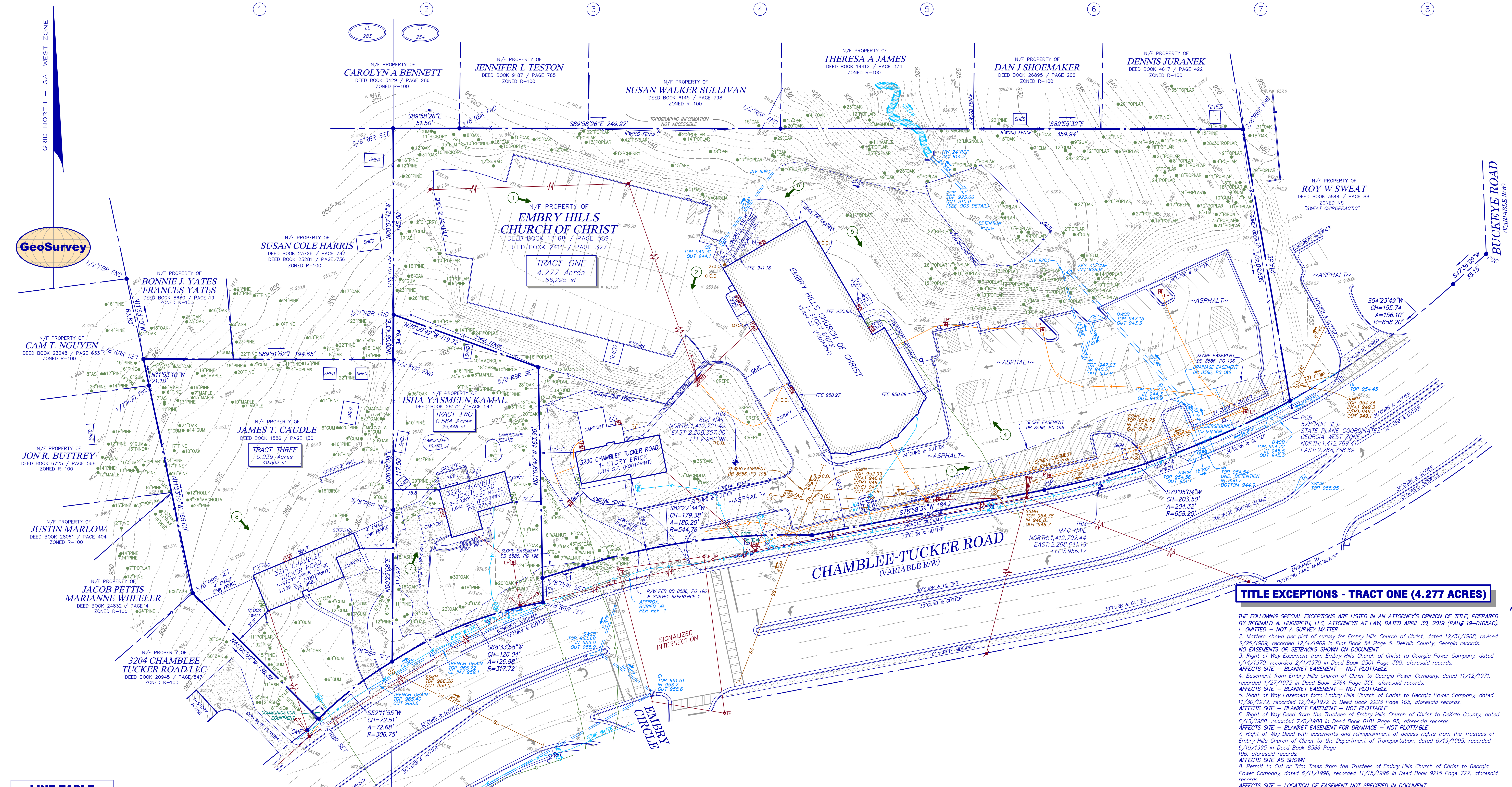

7


8

VICINITY MAP

SITE LOCATION – LATITUDE: 33° 53' 02" LONGITUDE: 84° 15' 34"

(CLERK OF COURT RECORDING INFORMATION)



LINE TABLE

LINE	BEARING	DISTANCE
L1	S72°58'59"W	33.36'
L2	S01°09'42"E	18.95'

CLOSURE STATEMENT

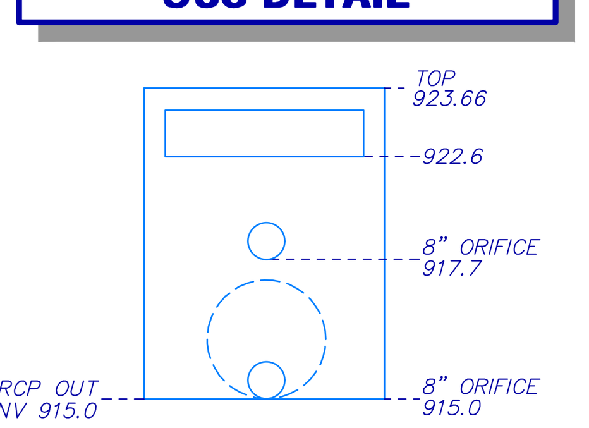
THE FIELD CLOSURE UPON WHICH THIS PLAT IS BASED HAS A CLOSURE PRECISION OF ONE FOOT IN 23,157 , AND WAS ADJUSTED USING THE LEAST SQUARES METHOD. A TRIMBLE S-6 TOTAL STATION AND TRIMBLE TSC-3 DATA COLLECTOR WERE USED TO COLLECT THIS FIELD DATA.

THIS PLAT HAS BEEN CALCULATED FOR CLOSURE AND WAS FOUND TO BE ACCURATE WITHIN ONE FOOT IN 111,789 FEET. JTN INIT.

IF YOU DIG

Know what's **below.**
Call before you dig.
Dial 811
Or Call 800-282-7411

OCS DETAIL



GRAPHIC SCALE

0 20 40 100 200

1" = 40'

UTILITY NOTE

THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON LOCATION OF MARKINGS PROVIDED BY:

UTILISURVEY, LLC
1227 NORTH PEACHTREE PARKWAY, STE 178
PEACHTREE CITY, GA 30269

THE UNDERGROUND UTILITIES (EXCEPT THE LOCATION OF EXISTING DRAINAGE, SEWER AND IRRIGATION UTILITIES AS WELL AS UNDERGROUND STORAGE TANKS) WERE LOCATED BY UTILISURVEY, LLC. UTILIZING RADIO FREQUENCY TECHNIQUE. THIS TECHNIQUE IS CAPABLE OF LOCATING METALLIC UTILITIES AND TRACER WIRES. ANY NON-METALLIC UTILITIES (WITHOUT TRACER WIRE) ARE NOT LOCATED.

THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN-SERVICE OR ABANDONED. UNDERGROUND UTILITIES NOT OBSERVED OR LOCATED UTILIZING THIS TECHNIQUE MAY EXIST ON THIS SITE BUT NOT BE SHOWN, AND MAY BE FOUND UPON EXCAVATION. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH THE SURVEYOR DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.

INFORMATION REGARDING MATERIAL AND SIZE OF UTILITIES IS BASED ON RECORDS ACQUIRED FROM THE UTILITY OWNERS.

LEGEND

STANDARD ABBREVIATIONS

AC	AIR CONDITIONER
BH	BORE HOLE
BSL	BUILDING SETBACK LINE
CI	CURB INLET
CMP	CORRUGATED METAL PIPE
CMF	CONCRETE MONUMENT FND
CO	SANITARY CLEANOUT
CPED	COMMUNICATION PEDESTAL
CTP	CRIMPED TOP PIPE
DI	DROP INLET
DIP	DUCTILE IRON PIPE
DWCB	DOUBLE WING CATCH BASIN
FNC	FENCE
FND	FOUND
GM	GAS METER
INV	INVERT
JB	JUNCTION BOX
MH	MANHOLE
OCS	OUTLET CONTROL STRUCTURE
OTP	OPEN TOP PIPE
PM	POWER METER
PKS	PK NAIL SET
POB	POINT OF BEGINNING
POC	POINT OF COMMENCEMENT
RCP	REINFORCED CONCRETE PIPE
RBR	IRON REINFORCING BAR
RBS	5/8"RBR SET CAPPED LSF 621
SS	SANITARY SEWER
SWCB	SINGLE WING CATCH BASIN
TRANS	ELECTRIC TRANSFORMER

STANDARD SYMBOLS

OVERHEAD TRAFFIC SIGNAL LIGHT
POWER POLE
GUY WIRE
POWER LINE
LP LIGHT POLE
ELECTRIC TRANSFORMER
WATER VAULT
GV GAS VALVE
GM GAS METER
WV WATER VALVE
WM WATER METER
FIRE HYDRANT
E UNDERGROUND ELECTRIC LINE
G UNDERGROUND GAS LINE
CM UNDERGROUND COMMUNICATION LINE
W UNDERGROUND WATER LINE
1 PHOTO POSITION INDICATOR
XX REGULAR PARKING SPACE COUNT
HANDICAP PARKING SPACE
TREE POSITION INDICATOR
SIGN

GENERAL NOTES

THIS SURVEY HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE PERSON OR ENTITIES NAMED HEREON. NO EXPRESS OR IMPLIED WARRANTIES WITH RESPECT TO THE INFORMATION SHOWN HEREON IS TO BE EXTENDED TO ANY PERSONS OR ENTITIES OTHER THAN THOSE SHOWN HEREON.

THIS PROPERTY IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA BASED ON THE FLOOD INSURANCE RATE MAP FOR THIS AREA. THE MAP NUMBER FOR THIS AREA IS 13089C0019K, AND THE DATE OF SAID MAP IS AUGUST 15, 2019. THIS DETERMINATION WAS MADE BY GRAPHICALLY DETERMINING THE POSITION OF THIS SITE ON SAID FIRM MAPS UNLESS OTHERWISE NOTED.

PLEASE NOTE: TREES 6-INCH DBH (DIAMETER AT BREAST HEIGHT) AND LARGER WERE LOCATED FOR THIS SURVEY.

REVISIONS LISTED ON THIS SURVEY APPLY ONLY TO THE SPECIFIC CHANGES REFERENCED, AND DO NOT CONSTITUTE AN UPDATE OF OTHER DATA ON THIS SURVEY. THE "SURVEY DATE" SHOWN HEREON IS THE APPLICABLE DATE AS RELATED TO PROVISIONS OF STATUTES OF LIMITATION UNLESS SPECIFICALLY NOTED OTHERWISE.

RIGHT-OF-WAY LINES SHOWN ON THIS SURVEY THAT ARE NOT ACTUAL BOUNDARIES OF THE SUBJECT TRACT(S) ARE DEPICTED GRAPHICALLY AND ARE SHOWN APPROXIMATELY FOR INFORMATIONAL PURPOSES ONLY. SAID RIGHT-OF-WAY LINES SHOULD NOT BE UTILIZED FOR DESIGN PURPOSES

THE DATUM FOR THIS SITE WAS ESTABLISHED UTILIZING GLOBAL POSITIONING SYSTEMS, AND BASED ON POSITIONAL VALUES FOR THE VIRTUAL REFERENCE STATION NETWORK DEVELOPED BY eGPS SOLUTIONS. THE HORIZONTAL REFERENCE FRAME IS NORTH AMERICAN DATUM OF 1983(2011)-STATE PLANE COORDINATE SYSTEM OF GEORGIA-WEST ZONE. THE VERTICAL REFERENCE FRAME IS NORTH AMERICAN VERTICAL DATUM OF 1988. ANY DIRECTIONS OR DIMENSIONS SHOWN ARE A RECTANGULAR, GROUND LEVEL PROJECTION OF THE STATE PLANE COORDINATE SYSTEM.

NO ZONING REPORT OR ZONING LETTER WAS PROVIDED TO THE SURVEYOR.
THE SITE IS ZONED "R-100" (RESIDENTIAL DISTRICT) AS SHOWN ON THE ZONING MAP OF DEKALB COUNTY.
THE MINIMUM YARD SETBACKS ARE: FRONT(THOROUGHFARE) – 50 FEET; FRONT(ARTERIAL) – 40 FEET; FRONT(OTHER STREETS) – 35 FEET; SIDE – 10 FEET; REAR – 40 FEET.

PLEASE NOTE: ZONING AND SETBACKS SHOULD BE CONFIRMED AND VERIFIED BY PLANNING AND ZONING PRIOR TO DESIGN OR CONSTRUCTION ACTIVITIES.

SURVEY REFERENCES
1> GEORGIA DEPARTMENT OF TRANSPORTATION RIGHT OF WAY PLANS FOR CHAMBLEE-TUCKER ROAD WIDENING, PROJECT NUMBER IXAMR-9265(5), P.I. NUMBER 751380.

SURVEYOR CERTIFICATION (ALTA/NSPS)

To: Embry Hills Church Of Christ

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 6(a), 7(a), 7(b-1), 8, 9, 10(a), 11, & 13 of Table A thereof. The field work was completed on June 6, 2019.

Date: June 6, 2019

John T. Newman
Georgia Professional
Land Surveyor # 3324

GEORGIA REGISTERED PROFESSIONAL NO. 3324 LAND SURVEYOR JOHN T. NEWMAN

TITLE EXCEPTIONS - TRACT ONE (4.277 ACRES)

THE FOLLOWING SPECIAL EXCEPTIONS ARE LISTED IN AN ATTORNEY'S OPINION OF TITLE, PREPARED BY REGINALD A. HUDSPETH, LLC, ATTORNEYS AT LAW, DATED APRIL 30, 2019 (RAH# 19-0105AC).

1. OMITTED – NOT A SURVEY MATTER
2. Matters shown per plat of survey for Embry Hills Church of Christ, dated 12/31/1968, revised 3/25/1969, recorded 12/4/1969 in Plat Book 54 Page 5, DeKalb County, Georgia records.
NO EASEMENTS OR SETBACKS SHOWN ON DOCUMENT
3. Right of Way Easement from Embry Hills Church of Christ to Georgia Power Company, dated 1/14/1970, recorded 2/4/1970 in Deed Book 2501 Page 390, aforesaid records.
AFFECTS SITE – BLANKET EASEMENT – NOT PLOTTABLE
4. Easement from Embry Hills Church of Christ to Georgia Power Company, dated 11/12/1971, recorded 1/27/1972 in Deed Book 2764 Page 356, aforesaid records.
AFFECTS SITE – BLANKET EASEMENT – NOT PLOTTABLE
5. Right of Way Easement form Embry Hills Church of Christ to Georgia Power Company, dated 11/30/1972, recorded 12/14/1972 in Deed Book 2928 Page 105, aforesaid records.
AFFECTS SITE – BLANKET EASEMENT – NOT PLOTTABLE
6. Right of Way Deed from the Trustees of Embry Hills Church of Christ to DeKalb County, dated 6/13/1988, recorded 7/8/1988 in Deed Book 6181 Page 95, aforesaid records.
AFFECTS SITE – BLANKET EASEMENT FOR DRAINAGE – NOT PLOTTABLE
7. Right of Way Deed with easements and relinquishment of access rights from the Trustees of Embry Hills Church of Christ to the Department of Transportation, dated 6/19/1995, recorded 6/19/1995 in Deed Book 8586 Page 196, aforesaid records.
AFFECTS SITE AS SHOWN
8. Permit to Cut or Trim Trees from the Trustees of Embry Hills Church of Christ to Georgia Power Company, dated 6/11/1996, recorded 11/15/1996 in Deed Book 9215 Page 777, aforesaid records.
AFFECTS SITE – LOCATION OF EASEMENT NOT SPECIFIED IN DOCUMENT
9. Sewer Easement from the Trustees of Embry Hills Church of Christ to DeKalb County, Georgia, dated 10/13/1997, recorded 10/16/1997 in Deed Book 9648 Page 746, aforesaid records.
AFFECTS SITE AS SHOWN

SURVEYOR CERTIFICATION (GEORGIA)

This plat is a retracement of an existing parcel or parcels of land and does not subdivide or create a new parcel or make any changes to any real property boundaries. The recording information of the documents, maps, plats, or other instruments which created the parcel or parcels are stated hereon. RECORDATION OF THIS PLAT DOES NOT IMPLY APPROVAL OF ANY LOCAL JURISDICTION, AVAILABILITY OF PERMITS, COMPLIANCE WITH LOCAL REGULATIONS OR REQUIREMENTS, OR SUITABILITY FOR ANY USE OR PURPOSE OF THE LAND. Furthermore, the undersigned land surveyor certifies that this plat complies with the minimum technical standards for property surveys in Georgia as set forth in the rules and regulations of the Georgia Board of Registration for Professional Engineers and Land Surveyors and as set forth in O.C.G.A. Section 15-6-67.

John T. Newman
Georgia Professional
Land Surveyor # 3324

GeoSurvey
Land Surveying • 3D Laser Scanning
1660 Barnes Mill Road
Marietta, Georgia 30062
Phone: (770) 795-9900
Fax: (770) 795-8880
www.geosurvey.com
EMAIL: info@geosurvey.com
Certificate of Authorization #LSF-000621

ALTA/NSPS LAND TITLE SURVEY

3214, 3220, & 3250 Chamblee Tucker Road

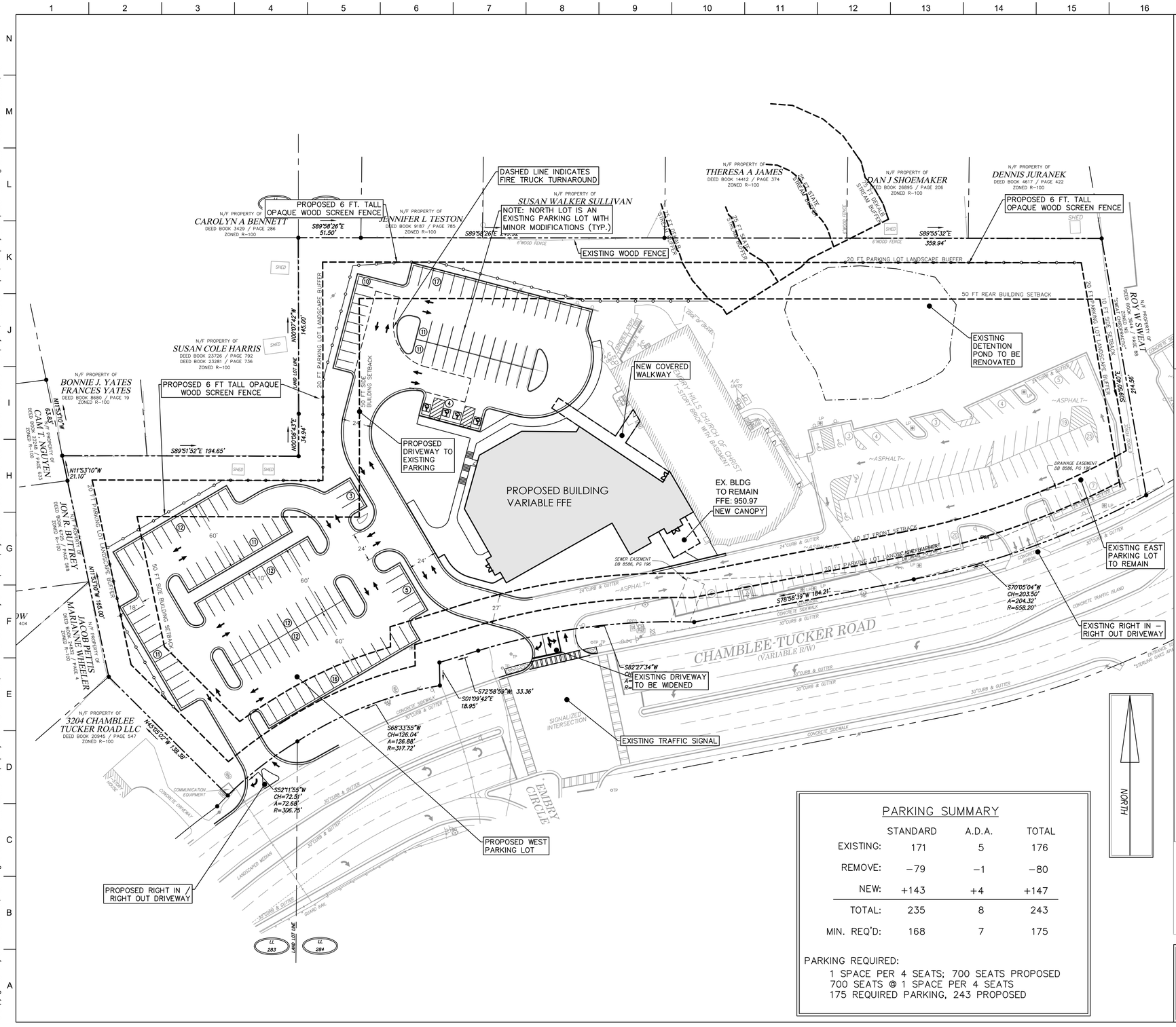
FOR

Embry Hills Church Of Christ

GS JOB NO: 20196132	DRAWING SCALE: 1"= 40'	SURVEY DATE: 06-06-2019
FIELD WORK: CB/ZM	CITY: UNINCORPORATED	
PROJ MGR: JTN	COUNTY: DEKALB STATE: GA	
REVIEWED: JRC	LAND LOT: 283 & 284	
DWG FILE: 20196132-02.dwg	DISTRICT: 18TH	

REVISIONS (SEE GENERAL NOTES)

No.	Date	Description
1.	5-4-20	Add tracts 2 & 3



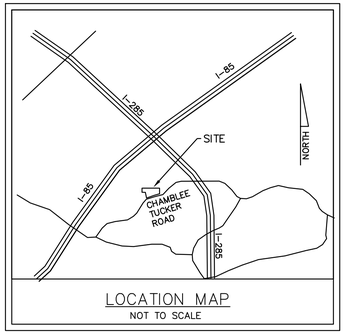
PROJECT DATA

OWNER/DEVELOPER:	EMBRY HILLS CHURCH OF CHRIST 3250 CHAMBLEE–TUCKER RD ATLANTA, GA 30341
ARCHITECT:	CROFT & ASSOCIATES 3400 BLUE SPRINGS RD, STE 200 KENNESAW, GA 30144
CIVIL SITE ENGINEER:	CORNERSTONE SITE CONSULTANTS, LLC 2985 GORDY PKWY, SUITE 117 MARIETTA, GA 30066 ANDREW M. HALLORAN, P.E., PH: 770–490–9182
SITE ADDRESS:	3250 CHAMBLEE–TUCKER RD ATLANTA, GA 30341
SITE AREA:	5.80 ACRES
EXISTING SITE USE:	PLACE OF WORSHIP
PROPOSED PROJECT:	PLACE OF WORSHIP CAMPUS EXPANSION
SITE ZONING:	R–100
LOT COVERAGE AREA:	35% MAX ALLOWED 1.83 ACRES 43% (EXISTING) 3.20 ACRES 55% (PROPOSED)
OPEN SPACE:	20% MIN. REQUIRED 45% PROPOSED

PARKING SUMMARY

	STANDARD	A.D.A.	TOTAL
EXISTING:	171	5	176
REMOVE:	–79	–1	–80
NEW:	+143	+4	+147
TOTAL:	235	8	243
MIN. REQ'D:	168	7	175

PARKING REQUIRED:
1 SPACE PER 4 SEATS; 700 SEATS PROPOSED
700 SEATS @ 1 SPACE PER 4 SEATS
175 REQUIRED PARKING, 243 PROPOSED



LOCATION MAP
NOT TO SCALE

REFERENCES

1. BOUNDARY, TOPOGRAPHIC, TREE AND UTILITY SURVEY INFORMATION BASED ON A SURVEY FOR EMBRY HILLS CHURCH OF CHRIST BY GEOSURVEY, INC. DATED 06–06–2019, LAST REVISED 05–04–2020.

2. THE FLOOD INSURANCE RATE MAP INDICATES AS PER OFFICIAL F.I.R.M. MAP 13089 C 0019J, THE SITE IS NOT IN ANY SPECIAL FLOOD HAZARD ZONE, DATED 5–16–2013

NOTE: CONCEPT PLAN IS PRELIMINARY IN NATURE, IT IS FOR INITIAL PLANNING PURPOSES ONLY AND SUBJECT TO CHANGE FROM DUE DILIGENCE, SURVEYS, DESIGN AND PERMIT APPROVALS THAT ARE NECESSARY AND REQUIRED.

40' 0' 40' 80' 120'
SCALE: 1" = 40'

CROFT
ARCHITECTS • ENGINEERS

Croft & Associates
3400 Blue Springs Road, Suite 200
Kennesaw, Georgia 30144
770.529.7714 (p) 770.529.7716 (f)
www.croftae.com

GEORGIA REGISTERED No. 25813 PROFESSIONAL ENGINEER ANDREW M. HALLORAN

Cornerstone Site Consultants, LLC
2985 Gordy Parkway, Suite 117
Marietta, GA 30066
CSC Project # 2019-0020

OWNER

EMBRY HILLS CHURCH OF CHRIST
3250 CHAMBLEE-TUCKER ROAD
ATLANTA, GA 30341

EMBRY HILLS CHURCH OF CHRIST RENOVATION / ADDITION
ATLANTA, GA

No.	Date	Description
	06-30-20	S.L.U.P. SUBMITTAL
ISSUANCE		

PROJECT NUMBER

DRAWN: APB
CHECKED: AMH

SHEET TITLE
S.L.U.P. CONCEPT SITE PLAN
SHEET NO.
C-1

SECTION 5.4.4.D – PARKING AREA LANDSCAPING:

WEST PARKING LOT
REQ'D: 10% OF TOTAL PARKING LOT TO BE LANDSCAPED
REQ'D: 10% (35,525 SF) = 3,553 SF
PROPOSED: 3,620 SF

REQ'D: 1 TREE PER 8 SPACES WEST LOT ONLY
REQ'D: 94 SPACES @ 1 TREE/8 SPACES
REQ'D: 12 PARKING LOT TREES

PROPOSED: 16 PARKING LOT TREES

REQ'D: 1 LANDSCAPE ISLAND PER 10 SPACES
REQ'D: 94 SPACES @ 1 ISLAND / 10 SPACES
REQ'D: 10 LANDSCAPE ISLANDS

PROPOSED: 16 LANDSCAPE ISLANDS

SECTION 5.4.4.D – PARKING AREA LANDSCAPING:

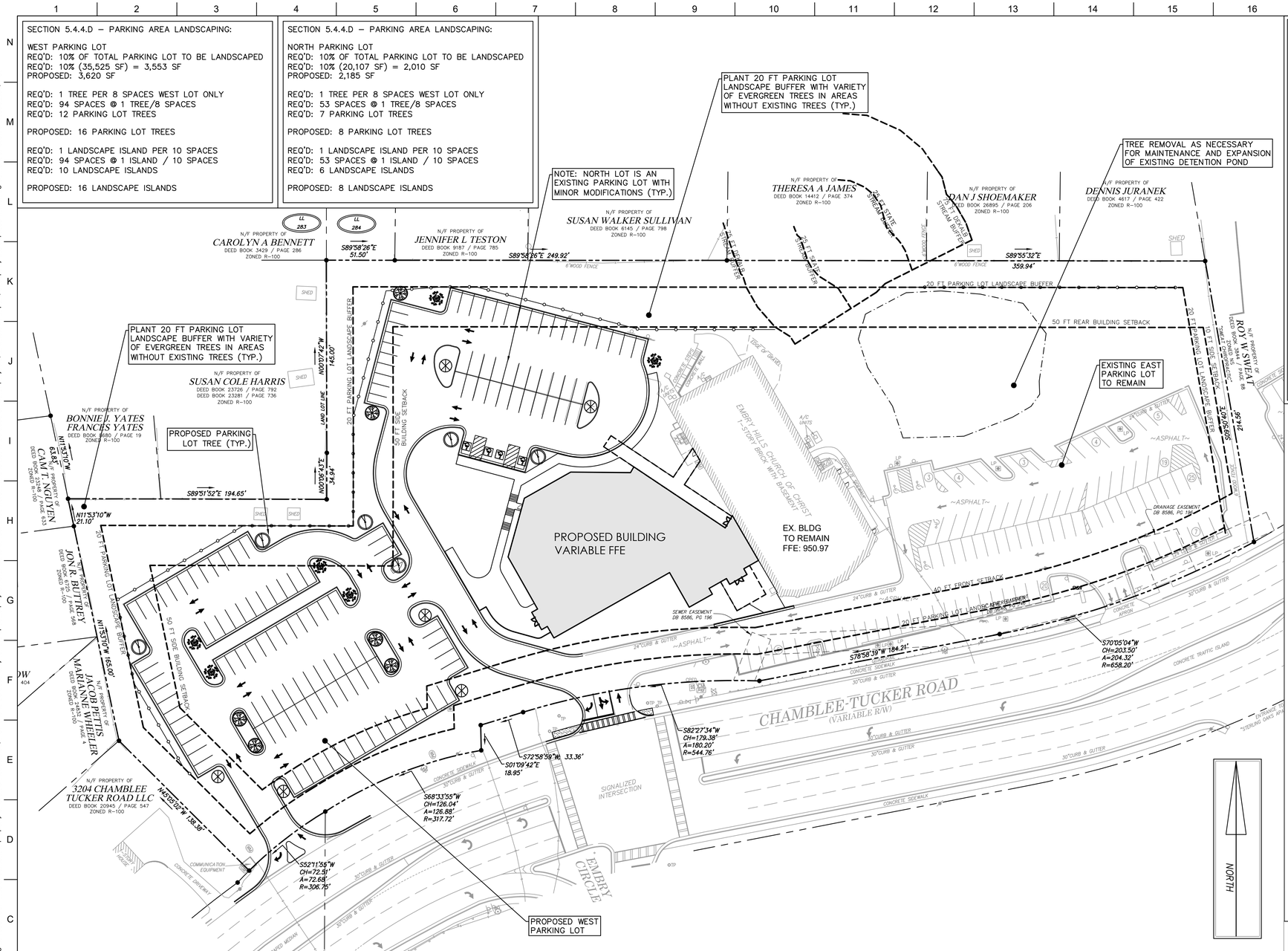
NORTH PARKING LOT
REQ'D: 10% OF TOTAL PARKING LOT TO BE LANDSCAPED
REQ'D: 10% (20,107 SF) = 2,010 SF
PROPOSED: 2,185 SF

REQ'D: 1 TREE PER 8 SPACES WEST LOT ONLY
REQ'D: 53 SPACES @ 1 TREE/8 SPACES
REQ'D: 7 PARKING LOT TREES

PROPOSED: 8 PARKING LOT TREES

REQ'D: 1 LANDSCAPE ISLAND PER 10 SPACES
REQ'D: 53 SPACES @ 1 ISLAND / 10 SPACES
REQ'D: 6 LANDSCAPE ISLANDS

PROPOSED: 8 LANDSCAPE ISLANDS



PROJECT DATA

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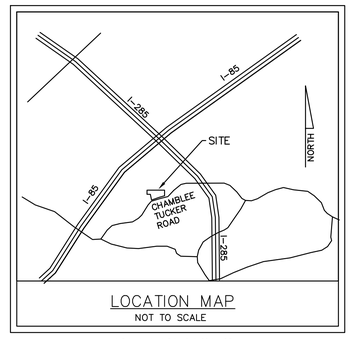
ARCHITECT:	CROFT & ASSOCIATES 3400 BLUE SPRINGS RD, STE 200 KENNESAW, GA 30144
CIVIL SITE ENGINEER:	CORNERSTONE SITE CONSULTANTS, LLC 2985 GORDY PKWY, SUITE 117 MARIETTA, GA 30066 ANDREW M. HALLORAN, P.E., PH: 770–490–9182
SITE ADDRESS:	3250 CHAMBLEE–TUCKER RD ATLANTA, GA 30341
SITE AREA:	5.80 ACRES
EXISTING SITE USE:	PLACE OF WORSHIP
PROPOSED PROJECT:	PLACE OF WORSHIP CAMPUS EXPANSION
SITE ZONING:	R–100
LOT COVERAGE AREA:	35% MAX ALLOWED 1.83 ACRES 43% (EXISTING) 3.20 ACRES 55% (PROPOSED)
OPEN SPACE:	20% MIN. REQUIRED 45% PROPOSED



LOCATION MAP
NOT TO SCALE

REFERENCES

1. BOUNDARY, TOPOGRAPHIC, TREE AND UTILITY SURVEY INFORMATION BASED ON A SURVEY FOR EMBRY HILLS CHURCH OF CHRIST BY GEOSURVEY, INC. DATED 06–06–2019, LAST REVISED 05–04–2020.

2. THE FLOOD INSURANCE RATE MAP INDICATES AS PER OFFICIAL F.I.R.M. MAP 13089 C 0019J, THE SITE IS NOT IN ANY SPECIAL FLOOD HAZARD ZONE, DATED 5–16–2013

PROPOSED PLANT LIST

SYMBOL	COMMON NAME	BOTANICAL NAME	NO. OF TREES	NO. OF TREE ORDINANCE TREES*	MINIMUM TREE SIZE	UNITS PER TREE	TOTAL UNITS	TOTAL TREE ORDINANCE UNITS**	% TREE ORDINANCE UNITS***
	RED MAPLE – "OCTOBER GLORY"	ACER RUBRUM	6	6	2 – 2.5" CAL.	0.4	2.4	2.4	25%
	ALLEE ELM	ULMUS PARVIFOLIA 'ALLEE'	6	6	2 – 2.5" CAL.	0.4	2.4	2.4	25%
	WILLOW OAK	QUERCUS PHELLOS	6	6	2 – 2.5" CAL.	0.4	2.4	2.4	25%
	TULIP POPLAR	LIRIODENDRON TULIPIFERA	6	6	2 – 2.5" CAL.	0.4	2.4	2.4	25%
		TOTAL=	24					9.6	100%

* NUMBER OF TREES WHICH CAN BE COUNTED TOWARD MEETING TREE ORDINANCE REQUIREMENTS (AFTER GENUS CAP); ** NUMBER OF UNITS WHICH CAN BE COUNTED TOWARD MEETING TREE ORDINANCE REQUIREMENTS (AFTER GENUS CAP)
*** PERCENT OF TREE ORDINANCE UNITS PER TREE SPECIES TO TOTAL TREE ORDINANCE UNITS

DEKALB COUNTY TREE CALCULATIONS

TREE PRESERVATION – CODE 14.39(G)1:
REQ'D = 5.80 AC x 120 INCHES
REQ'D = 696 INCHES
PROPOSED = 780 INCHES OF EX. TREES TO REMAIN

TREE DENSITY – CODE 14.39(G)3:
REQ'D = 30 TREE UNITS/ AC @ 5.80 ACRES
REQ'D = 174 TREE UNITS
PROPOSED = 264 EX. TREE UNITS TO REMAIN THEREFORE DENSITY MET

NOTE: CONCEPT PLAN IS PRELIMINARY IN NATURE, IT IS FOR INITIAL PLANNING PURPOSES ONLY AND SUBJECT TO CHANGE FROM DUE DILIGENCE, SURVEYS, DESIGN AND PERMIT APPROVALS THAT ARE NECESSARY AND REQUIRED.

40' 0' 40' 80' 120'
SCALE: 1" = 40'

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ARCHITECTS • ENGINEERS

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Marietta, GA 30066
CSC Project # 2019-0020

OWNER

EMBRY HILLS CHURCH OF CHRIST
3250 CHAMBLEE-TUCKER ROAD
ATLANTA, GA 30341

EMBRY HILLS CHURCH OF CHRIST RENOVATION / ADDITION
ATLANTA, GA

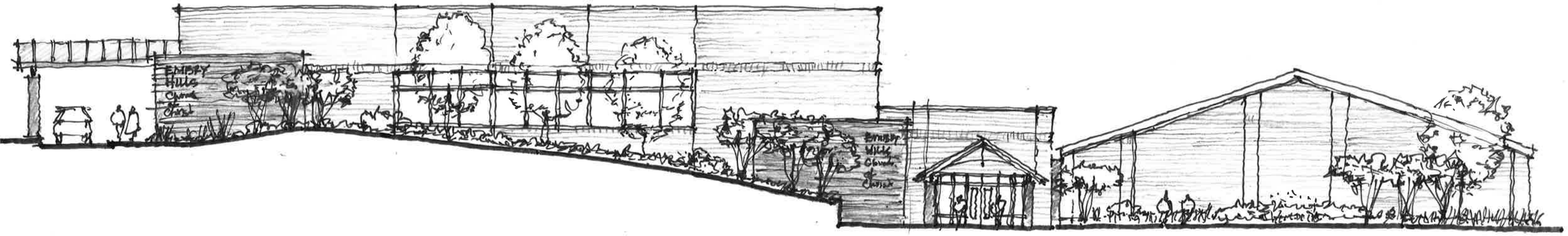
No.	Date	Description
	06-30-20	S.L.U.P. SUBMITTAL
ISSUANCE		

PROJECT NUMBER

DRAWN: APB
CHECKED: AMH

SHEET TITLE
S.L.U.P.
TREE PLAN

SHEET NO.
T-1



NEW SANCTUARY

NEW ENTRY CONNECTOR

EXISTING

Conceptual Elevation Chamblee-Tucker Road - EMBERY HILLS CHURCH OF CHRIST 9.26.2020

Stormwater Management Report

For

Renovations & Additions to Embry Hills Church of Christ

Owner / Developer

Embry Hills Church of Christ

3250 Chamblee-Tucker Road

Atlanta, GA 30341

Issue Date: 11-14-2020

Prepared By:

Cornerstone Site Consultants, LLC

2985 Gordy Parkway, Suite 117, Marietta, GA 30066

770-490-9182; Project #: 2019-0020

Table of Contents

Introduction

Basin Analysis

Appendices

Introduction

The purpose of this hydrology study is to demonstrate the design intent of the stormwater management plan associated with the proposed improvements for the Embry Hills Church of Christ, Special Land Use Permit would be able to meet Dekalb County stormwater requirements. Since minor changes to the final design may occur during the design and land disturbance permitting process, this report may be revised in the future, but still meet the design intent.

Background

This is a stormwater management report for the proposed building and parking lot project at the existing campus for the Embry Hills Church of Christ located at 3250 Chamblee Tucker Road. There is an existing detention pond located in the "East" basin that collects drainage from the existing building and parking lot as well as a large offsite area from the Chamblee Tucker Right of Way. There is a small existing gravel infiltration basin in the Northeast corner of the existing parking lot that was installed in 2015. The church has acquired 2 additional single family homes to the west of their original campus boundary to a total site area of 5.8 acres. The proposed project seeks to build a new building, driveway and expanded parking lots. The new driveway and building are in the East basin, and the new parking lot in the west basin include a pervious paver system in a majority of the new parking lot combined with an underground stormwater detention system that allows for infiltration. The outlet from this pond is proposed to be directed through a new storm pipe system to the renovated East pond. The redeveloped disturbed area for the proposed building and parking lot is less than 40%. Approximately 0.80 acres of impervious area in the East basin is new/redeveloped and the remaining impervious area is existing. Therefore, the water quality/channel protection for the redeveloped portion of the east basin is limited to treating just the 0.80 acres of new/redeveloped impervious area. The existing stone infiltration basin in the Northeast corner of the "east basin' will remain. The detention pond is designed based on modeling the east basin in the "wooded" condition and 90% of those peak flowrates as the allowable flowrate. The West basin provides for full runoff reduction, water quality, channel protection and detention. The south basin is reduced to a very small area and no treatment is necessary.

Methodology:

The Dekalb County stormwater code references the use of the 2016 Georgia Stormwater Manual as the reference guide for stormwater management analysis. Rainfall data used for the analysis was based on data from NOAA specific to the site location. Copies of this data sheet and the computer model are provided in the appendix of this report. The TR-55 method was used for hydrology analysis of the onsite pre-developed and post-developed conditions as well as the downstream conditions through the Hydrostudio software. The travel times of the maximum flow path were determined using TR55 method which were then used to determine the time of concentration for each basin. A copy of these references can be found in the

attachments section at the end of this study. The minimum time of concentration of 5 minutes was used for the analysis of all basins with a computed time of concentration less than 5 minutes. Runoff coefficients were based on the Georgia Stormwater Manual Table 4-3, where "CN" values are dependent on soil conditions, site terrain and topography. The design storms for the 1, 2, 5, 10, 25, 50 and 100-year storm events were used to calculate the peak flowrates for both existing and proposed basins. A summary of the peak flow rates can be found at the end of the basin study. The storm sewer pipe analysis used hydrology calculations based on the rational method and calculations modeled through Hydraflow Storm Sewers, version 2018.

Executive Summary:

This is an executive summary of the key pre-developed and post-developed hydrology study metrics for the proposed development. Downstream Hydrological Assessment was done for the 100 year storm per Georgia Stormwater Manual.

Peak Flow Summary: East Basin – based on the current Dekalb County code for allowable flow rates to demonstrate the pond is designed to control flowrates with the proposed development to current code. The Allowable pre-flow is based on the church property reset to wooded conditions (CN = 55) and factored by 90% as required by Dekalb County then added with the peak runoff flow from the offsite basin from the west including drainage from Chamblee Road.

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Allowable Pre- flow @ Study Pt (90% of onsite) (cfs) Hyd. # 9	Post – developed flow @ Study Pt (cfs) Hyd. # 16	Storage (CF) Hyd. # 15	Ponding Elevation (ft) Hyd. # 15	Change (CFS)
East	5.42	1	3.36	21.26	20.08	921.31	22016	**-1.18**
		2	3.68	24.19	23.23	921.65	23965	**-0.96**
		5	4.38	31.09	29.47	922.33	28073	**-1.62**
		10	4.99	37.40	34.13	922.91	31794	**-3.27**
		25	5.87	46.82	39.20	923.75	37689	**-7.62**
		50	6.58	54.63	42.29	924.45	42971	**-12.34**
		100	7.33	63.05	46.28	925.18	48872	**-16.77**

Peak Flow Summary: East Basin – comparison of existing (current) conditions.

The previous chart is provided for Dekalb County permit review to demonstrate that the proposed pond meets the criteria for current Dekalb County code. The chart below is provided for the general public to provide the modeling data comparing the existing (current) conditions to proposed design to demonstrate the anticipated improvement in the peak flowrate control with the proposed improvements to the detention pond.

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Existing Flow @ Study Pt (cfs) Hyd. # 6	Post – developed flow @ Study Pt (cfs) Hyd. # 16	Change (CFS)	% Decrease
East	5.42	1	3.36	25.65	20.08	-5.57	**-21.72%**
		2	3.68	29.70	23.23	-6.47	**-21.78%**
		5	4.38	38.58	29.47	-9.11	**-23.61%**
		10	4.99	51.84	34.13	-17.71	**-34.16%**
		25	5.87	65.43	39.20	-26.23	**-40.09%**
		50	6.58	75.27	42.29	-32.98	**-43.82%**
		100	7.33	85.72	46.28	-39.44	**-46.01%**

Peak Flow Summary: West Basin – based on the current Dekalb County code for allowable flow rates to demonstrate the west pond is designed to control flowrates with the proposed development to current code. The Allowable pre-flow is based on the church property reset to wooded conditions (CN = 55) and factored by 90% as required by Dekalb County. Note that the drainage from this detention pond will be routed over to the detention pond in the east basin. As shown in the chart below, the analysis indicates the proposed development will reduce the peak runoff rates in this basin.

Peak Flow Summary: West Basin

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Allowable Pre-developed flow (90% of onsite) @ Study Pt (cfs) Hyd. #19	Post – developed flow @ Study Pt (cfs) Hyd. # 20	Ponding Elevation (ft) Hyd. #13	Storage (CF) Hyd. # 13	Change (CFS)	% of Allowable
West	0.36	1	3.36	0.36	0.20	4705	949.94	**-0.16**	**44%**
		2	3.68	0.60	0.31	5240	950.05	**-0.29**	**48%**
		5	4.38	1.25	0.58	5778	950.16	**-0.67**	**54%**
		10	4.99	1.91	0.86	6354	950.27	**-1.05**	**55%**
		25	5.87	2.99	1.30	7424	950.48	**-1.69**	**57%**
		50	6.58	3.94	1.69	8407	950.68	**-2.25**	**57%**
		100	7.33	5.00	2.12	9581	950.92	**-2.88**	**58%**

Peak Flow Summary: South Basin – based on the current Dekalb County code for allowable flow rates to demonstrate the west pond is designed to control flowrates with the proposed development to current code. The Allowable pre-flow is based on the church property reset to wooded conditions (CN = 55) and factored by 90% as required by Dekalb County. As shown in the chart below, the analysis indicates the proposed development will reduce the peak runoff rates in this basin.

Peak Flow Summary: South Basin

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Allowable Pre-developed flow (90% of onsite) @ Study Pt Hyd. # 23 (cfs)	Post – developed flow @ Study Pt Hyd. #24 (cfs)	Change (CFS)	% of Allowable
South	0.02	1	3.36	0.04	0.02	**-0.02**	**-50%**
		2	3.68	0.07	0.02	**-0.05**	**-71%**
		5	4.38	0.14	0.04	**-0.1**	**-71%**
		10	4.99	0.21	0.05	**-0.16**	**-76%**
		25	5.87	0.34	0.07	**-0.27**	**-79%**
		50	6.58	0.44	0.09	**-0.35**	**-80%**
		100	7.33	0.56	0.11	**-0.45**	**-80%**

Peak Flow Summary: Downstream Basin – The downstream conditions were studied at three locations. The chart below is the 10% downstream study point at North Fork Peachtree Creek, and the chart indicates a decrease in peak flowrates as a result of the proposed detention pond improvements. The second analysis is the downstream channel just to the north of the pond in the neighborhood, and the proposed detention pond improvements will reduce the peak flowrate and the velocity in the channel as compared with existing conditions. The third analysis is on the storm pipe system in North Embry Circle, which indicates that the proposed detention pond improvements will reduce the backwater at the entrance to the storm pipe.

Peak Flow Summary Part 1 : Downstream Basin @ North Fork Peachtree Creek

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Allowable Pre-developed flow @ Study Pt Hyd. # 26 (cfs)	Post – developed flow @ Study Pt Hyd. #28 (cfs)	Change (CFS)
Down stream	5500	1	3.36	5847.5	5844.4	**-3.1**
		2	3.68	6866.8	6862.8	**-4.0**
		5	4.38	9170.1	9164.0	**-6.1**
		10	4.99	11236.1	11229.0	**-7.1**
		25	5.87	14283.0	14274.5	**-8.5**
		50	6.58	16772.1	16763.3	**-8.8**
		100	7.33	19418.2	19410.1	**-8.1**

Downstream Channel Flow Summary Part 2:

The existing channel north of the detention pond was analyzed and the modeling indicates that the proposed stormwater pond improvements will both decrease the peak flowrate and the velocity in the downstream channel:

Storm Event	Current Conditions Peak Flowrate (CFS)	Post Development Conditions Peak Flowrate with Detention Pond Improvements (CFS)	Change
1 yr	25.65	20.08	**-5.57**
10 yr	51.84	34.13	**-17.71**
100 yr	85.72	46.82	**-38.9**

Storm Event	Current Conditions Velocity (FPS)	Post Development Conditions Velocity with Detention Pond Improvements (FPS)	Change
1 yr	6.93	6.46	**-0.47**
10 yr	8.39	7.48	**-0.91**
100 yr	9.54	8.16	**-1.38**

Downstream Storm Pipe Summary at North Embry Circle Part 3:

The storm pipe analysis of the existing downstream 36" storm pipe system on North Embry Circle is provided in Appendix F. Here is the summary of the analysis:

Current conditions: the existing 36" storm pipe system the drains under Embry Hills circle is modeled with a headwater at the entrance to the existing pipe that would rise to the street level at 913.36, which would indicate the 100 year flow to the storm pipe could over top Embry Hills Circle during a 100 year storm event.

Post developed conditions (with detention pond improvements) :

The headwater at the entrance to the existing pipe is modeled at 909.88, which is 3.48 feet below the road elevation and just a foot above the top of the storm pipe for a significant improvement from the existing conditions.

Therefore the proposed detention pond improvements will significantly reduce the headwater on the storm pipe and allow it to convey the water with a lower headwater.

In addition, we do recommend that Dekalb County further evaluate this storm pipe system for any potential maintenance of the storm pipe line.

East Basin Analysis

Pre-developed conditions hydrologic analysis

There is an existing detention pond in the East basin on the site. Appendix D1 provides the predeveloped drainage map outlining the 4.0 acre onsite basin area that drains to the existing detention pond as well as a 4.77 acre offsite area from offsite properties and Chamblee Tucker Road storm pipe system that discharge into the existing detention pond. A small 0.37 acre bypass basin is also shown that drains just north of the pond area.

The first part of the analysis was to model the existing detention pond system under current existing conditions. The results are listed in the model as hydrograph #6. The summary of the peak storms routed through the existing detention pond is in the next page and the model suggests that the larger storms could overtop the detention pond dam and only provides minimal detention to the larger storms.

Per Dekalb County code, the onsite 4 acre basin was modeled as a wooded condition to mimic the pre-developed peak runoff rates of the area prior to development as hydrograph #8, and only 90% of this rate was modeled to provide the 10% reduction required by Dekalb County. Then hydrograph #8 was added to the 4.77 acre offsite area hydrograph # 2 to create a study point for allowable flowrates as a basis for this design listed as hydrograph #9 for the comparison study point.

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	NRCS Runoff	Pre East Onsite Ex Pond	10.38	12.18		16.26	19.91	25.26	29.67	34.36
2	NRCS Runoff	Pre East Offsite	20.87	23.26		28.46	32.96	39.43	44.62	50.08
3	Junction	Pre To Ex East Pond	31.10	35.31		44.61	52.80	64.68	74.28	84.44
4	Pond Route	Pre East Pond Routed	25.54	29.51		38.20	51.23	64.48	74.02	84.13
5	NRCS Runoff	Pre East Bypass	0.115	0.191		0.397	0.608	0.952	1.255	1.595
6	Junction	Pre East Study Pt - Ex	25.65	29.70		38.58	51.84	65.43	75.27	85.72
8	NRCS Runoff	Pre East -90% condition	0.951	1.626		3.490	5.416	8.574	11.35	14.47
9	Junction	Pre East Study Pt Code	21.26	24.19		31.09	37.40	46.82	54.63	63.05

Time of concentration calculations are provided in Appendix E where a minimum of 5 minutes is used for any basins that compute Tc times less than 5 minutes. According to the USDA soil maps, the soils on the site include soil groups which have a hydraulic soil group designation of TYPE B. The TR-55 model computed a hydrograph.

East Basin Existing Detention Pond Summary Data:

The purpose of this chart is just to demonstrate the model's indication of the current (existing) peak flow rates out of the existing detention pond and the ponding levels in the existing detention pond.

Design Storm (yrs.)	Peak Inflow rate (cfs)	Peak Outflow rate (cfs)	Ponding elevation (ft)	Peak storage volume (cf)
1	31.10	25.54	923.27	12302
2	35.31	29.51	923.49	13192
5	44.61	38.20	924.04	15348
10	52.80	51.23	924.21	15982
25	64.68	64.48	924.31	16411
50	74.28	74.02	924.38	16683
100	84.44	84.13	924.45	16953

NOTE: Top of dam is approximately 924.00

Post Developed - To Pond

In the post developed conditions as shown on the post development drainage map in Appendix D2, the church proposes to build a new church building and driveway within the east basin drainage area. This will convert about 0.28 acres of landscape/wooded area to impervious area in this basin and modeled as hydrograph #11. In addition, the church plans to build a new parking lot in the West basin with some pervious pavers in the parking areas (modeled as hydrograph #12) and then routed through a proposed underground stormwater detention pond (hydrograph #13). Due to the lack of a defined storm channel system in the west basin and proximity to nearby homes, the drainage from the west detention pond will be diverted to the east basin so that it drains into a defined channel. Notice that the outflow hydrograph flowrates from the west basin are all below 1 cfs except for the 100 year storm. Therefore hydrograph # 14 combines the east basin, west basin and the offsite basin from Chamblee tucker road and routes that through the proposed renovation to the existing pond as hydrograph #15 and then combined with the small bypass area just north of the pond for a Post Developed study point as hydrograph #16.

Hyd.	Hydrograph	Hydrograph	Peak Outflow (cfs)							
11	NRCS Runoff	Post East Onsite to Pond	11.86	13.74		17.95	21.67	27.16	31.62	36.33
12	NRCS Runoff	Post West to West Pond	3.090	3.551		4.575	5.489	6.814	7.884	9.015
13	Pond Route	Post West Pond Routed	0.025	0.043		0.128	0.259	0.585	0.957	1.477
14	Junction	Post To East Pond	32.65	36.93		46.38	54.65	66.61	76.41	86.89
15	Pond Route	Post East Pond Routed	19.98	23.07		29.17	33.70	38.55	41.45	45.28
16	Junction	Post East Study Pt	20.08	23.23		29.47	34.13	39.20	42.29	46.28

Time of concentration is 5 minutes for the basin. According to the USDA soil maps, the soils on the site include soil groups which have a hydraulic soil group designation of TYPE B. The TR-55 model computed a hydrograph.

Post Developed Bypass analysis

The 0.37 acre bypass basin is a small wooded basin that is outside the existing detention pond area and remains relatively wooded in the post condition.

Runoff Reduction:

Runoff Reduction treatment for the new impervious area of the developed site will be provided by the pervious pavers and underground detention system in the west basin.

Water Quality:

As noted on the Pre-developed drainage map, there is a small existing gravel infiltration trench providing water quality to the existing parking lot in the Northeast corner of the site. Water quality volume is provided for the basin through the modified detention pond as a stormwater pond with a low flow orifice and gravel filter. See appendix B for calculations.

Channel Protection:

Channel protection for the redeveloped onsite area is provided by extended detention in the expanded detention pond system. Calculations are provided in appendix B.

Stormwater Detention:

The existing detention pond is proposed to be expanded to provide storage volume for the onsite impervious area. A summary of the detention pond model is provided below.

Proposed Expanded East Detention Pond Summary Data:

Design Storm (yrs.)	Peak Inflow rate (cfs)	Peak Outflow rate (cfs)	Ponding elevation (ft)	Peak storage volume (cf)
1	32.65	19.98	921.31	22016
2	36.93	23.07	921.65	23965
5	46.38	29.17	922.33	28073
10	54.65	33.70	922.91	31794
25	66.61	38.55	923.75	37689
50	76.41	42.29	924.45	42971
100	86.89	45.28	925.18	48872

NOTE: Top of expanded detention pond elevation proposed at 926.00

Conclusion:

In summary, the proposed expanded detention pond provides 2 to 3 times more storage volume than in the existing detention pond and controls the outflow peak design flowrates to the code allowable flowrates for this basin.

West Basin Analysis

Pre-developed conditions hydrologic analysis

The pre developed drainage map in Appendix D outlines a 1.29 acre basin that drains to the northwest and consists of impervious area from existing houses, driveways, landscaped and wooded areas. The actual existing conditions is modeled as hydrograph # 18. The drainage from this basin generally sheet flows to the existing homes to the north west. The west basin is then modeled as "wooded" conditions, a CN of 55 in hydrograph #19.

Time of concentration is 5 minutes for the basin. According to the USDA soil maps, the soils on the site include soil groups which have a hydraulic soil group designation of Type B.

Post Developed - To Pond

As shown on the post developed drainage map, the church proposes a new parking lot in this basin with a mixture of paved surfaces and pervious paver surfaces (Hydrograph #12) that will then drain to a proposed underground detention pond. The outlet pipe from that detention pond will drain to the east basin as described in the east basin analysis with hydrograph #13, and will not drain to the western study point.

Time of concentration is 5 minutes for the basin. According to the USDA soil maps, the soils on the site include soil groups which have a hydraulic soil group designation of TYPE B. The TR-55 model computed a hydrograph. Below are the impervious area calculations and basin description.

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
12	NRCS Runoff	Post West to West Pond	3.090	3.551		4.575	5.489	6.814	7.884	9.015
13	Pond Route	Post West Pond Routed	0.025	0.043		0.128	0.259	0.585	0.957	1.477

Post Developed Bypass analysis

The bypass basin consists of the remainder of the west basin that consists of some landscaped slopes and wooded areas. Since the drainage from the proposed detention pond will drain to the east basin, this bypass area is the only drainage that will drain to the west basin study point. This is modeled as hydrograph #20

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
18	NRCS Runoff	Pre West - actual	1.242	1.648		2.626	3.557	4.999	6.228	7.573
19	NRCS Runoff	Pre West - 90% condition	0.360	0.599		1.246	1.905	2.986	3.936	5.000
20	NRCS Runoff	Post West Study Point	0.204	0.312		0.584	0.862	1.303	1.688	2.117

Runoff Reduction:

Runoff Reduction for the new impervious area of the developed site will be provided by a combination of the pervious paver system allowing infiltration through the pervious nature of the pavers and a gravel infiltration trench below the underground detention pond system. The detail of the system is included in the construction plans on sheet C502 and in Appendix G. The runoff reduction volume design is provided in Appendix B of this report. This would satisfy water quality as well.

Channel Protection:

Channel protection requirement is met by limited the outflow from this detention pond to less than 2 cfs for the 1 year storm per GA stormwater manual section 2.2.4.2.

Stormwater Detention:

A detention pond system is proposed for the storage with an outlet control structure from an underground storm pipe detention system with infiltration gravel trench below, which drains to the new storm sewer system to the East basin detention pond. A summary of the detention pond model is provided below.

West Underground Detention Pond Summary Data:

Design Storm (yrs.)	Peak Inflow rate (cfs)	Peak Outflow rate (cfs)	Ponding elevation (ft)	Peak storage volume (cf)
1	2.85	0.03	949.94	4705
2	3.30	0.04	950.05	5240
5	4.31	0.13	950.16	5778
10	5.20	0.26	950.27	6354
25	6.52	0.59	950.48	7424
50	7.59	0.96	950.68	8407
100	8.72	1.48	950.92	9581

NOTE: Top of underground detention pond elevation proposed at 952.00

Peak Flow Summary: West Basin

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Allowable Pre-developed flow @ Study Pt (cfs) Hyd. #19	Post – developed flow @ Study Pt (cfs) Hyd. # 20	Ponding Elevation (ft) Hyd. #13	Storage (CF) Hyd. # 13	Change (CFS)	% of Allowable
West	0.36	1	3.36	0.40	0.20	4705	949.94	**-0.20**	**50.00%**
		2	3.68	0.67	0.31	5240	950.05	**-0.36**	**46.27%**
		5	4.38	1.39	0.58	5778	950.16	**-0.81**	**41.73%**
		10	4.99	2.12	0.86	6354	950.27	**-1.26**	**40.57%**
		25	5.87	3.32	1.30	7424	950.48	**-2.02**	**39.16%**
		50	6.58	4.38	1.69	8407	950.68	**-2.69**	**38.58%**
		100	7.33	5.56	2.12	9581	950.92	**-3.44**	**38.13%**

Conclusion:

In summary, the proposed west basin detention pond provides the stormwater treatment with a very low outflow rate diverted to the eastern basin. The remaining west basin bypass area is shown in the chart above to be 50% or less than the allowable rates, which is considerably less than the 90% required by Dekalb County.

South Basin Analysis

Pre-developed conditions hydrologic analysis

The pre developed drainage map in Appendix D outlines a small 0.14 acre basin that drains to the south to the Chamblee Tucker Right of way and consists of impervious area from existing houses, driveways, landscaped and wooded areas. The actual existing conditions is modeled as hydrograph # 22. The drainage from this basin generally sheet flows to the street. The west basin is then modeled as "wooded" conditions, a CN of 55 in hydrograph #23.

Time of concentration is 5 minutes for the basin. According to the USDA soil maps, the soils on the site include soil groups which have a hydraulic soil group designation of Type B.

Post Developed conditions

As shown on the post developed drainage map, this basin is reduced in area to approximately 0.02 acres. The remaining landscape area drains to the street and a reduced flowrate is shown by hydrograph #24.

Time of concentration is 5 minutes for the basin. According to the USDA soil maps, the soils on the site include soil groups which have a hydraulic soil group designation of TYPE B. The TR-55 model computed a hydrograph. Below are the impervious area calculations and basin description.

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
22	NRCS Runoff	Pre South - actual	0.162	0.209		0.321	0.426	0.589	0.726	0.875
23	NRCS Runoff	Pre South-90% condition	0.040	0.067		0.140	0.213	0.335	0.441	0.560
24	NRCS Runoff	Post South Study Point	0.016	0.021		0.036	0.049	0.071	0.089	0.110

Peak Flow Summary: South Basin

Basin	Post Cumulative Drainage Area (Ac.)	Return Frequency (years)	Precipitation Value for 24 hr Event (in.)	Allowable Pre-developed flow @ Study Pt Hyd. # 23 (cfs)	Post – developed flow @ Study Pt Hyd. #24 (cfs)	Change (CFS)	% of Allowable
South	0.02	1	3.36	0.04	0.02	**-0.02**	**50.00%**
		2	3.68	0.07	0.02	**-0.05**	**28.57%**
		5	4.38	0.15	0.04	**-0.11**	**26.67%**
		10	4.99	0.23	0.05	**-0.18**	**21.74%**
		25	5.87	0.36	0.07	**-0.29**	**19.44%**
		50	6.58	0.48	0.09	**-0.39**	**18.75%**
		100	7.33	0.60	0.11	**-0.49**	**18.33%**

Conclusion:

In summary, the reduction in the area left in proposed south basin naturally decreases the developed peak runoff flowrates shown in the chart above to be 50% or less than the allowable rates, which is considerably less than the 90% required by Dekalb County. Since there is a decrease in the runoff rate and no impervious area proposed, no further stormwater management is proposed in this basin.

Downstream Analysis:

Appendix D3 shows the downstream drainage map. The study point contains a 5500 acre downstream basin that is modeled as hydrograph #26, where the site is less at 10% of the basin. The location was estimated to be in a drainage channel just prior to convergence with North Fork Peachtree Creek. The downstream basin is then modeled without the onsite area and drainage from Chamblee Tucker as hydrograph #27. Then hydrograph #27 is added to the post development hydrographs from the East and West basins to develop hydrograph #28 to demonstrate the post conditions at the 10 % downstream study point. The summary indicates a decrease in the downstream condition as a result of stormwater management.

Basin	Return Frequency	Pre-developed flow (cfs) Hyd. # 26	Post –developed flow (cfs) Hyd. # 28	Change (cfs)
Downstream	1	5847.5	5844.4	**-3.1**
	2	6866.8	6862.8	**-4.0**
	5	9170.1	9164.0	**-6.1**
	10	11236.1	11229	**-7.1**
	25	14283.0	14274.5	**-8.5**
	50	16772.1	16763.3	**-8.8**
	100	19418.2	19410.1	**-8.1**

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
26	NRCS Runoff	Pre Downstream with site	5847.5	6866.8		9170.1	11236.1	14283.0	16772.1	19418.2
27	NRCS Runoff	Downstream w/o site	5836.4	6853.8		9152.7	11214.8	14256.0	16740.3	19381.4
28	Junction	Post Downstream with site	5844.4	6862.8		9164.0	11229.0	14274.5	16763.3	19410.1

Conclusion

This report provided a stormwater analysis of the existing conditions, post developed conditions, downstream and on-site storm sewer system for the building and parking lot project for Embry Hills Church of Christ, located at 3250 Chamblee Tucker Road. The renovated and proposed stormwater detention ponds if constructed as designed indicate a significant reduction in peak flowrates. The downstream conditions analysis indicates a slight decrease to the peak flowrates to the 10% study point. New on-site storm sewer pipe systems were designed to provide capacity for the 100 year peak flow runoff rate design storm.

Appendix A Stormwater code

DeKalb County
GEORGIA

404.371.2155(o)
404.371.4556 (f)
DeKalbCountyga.gov

Clark Harrison Building
330 W. Ponce de Leon Ave
Decatur, GA 30030

DEPARTMENT OF PLANNING & SUSTAINABILITY

REVIEW CHECKLIST for STORMWATER MANAGEMENT PLANS

DEVELOPMENT NAME: _____ **(PHASE/UNIT)**_____
TAX PARCEL NUMBER: _____ ADDRESS: _____
DISTRICT: _____ LAND LOT: _____ ZONING DISTRICT: _____ OVERLAY: _____
REVIEWED BY: _____ ENGINEER/PHONE:_____
DATE: _____ PROJECT NUMBER: _____
COMMERCIAL_ INDUSTRIAL_ MUNICIPAL_ RESIDENTIAL_ MIXED_

Note: Plans must adhere to guidelines in the Georgia Stormwater Management Manual (GSMM) Volumes I, II, and III as well as the DeKalb County Government Ordinances inclusive of Chapters 14, 22.5, and 27 Specific references are made to Chapter 14 Sections 37, 38, 39, 40, 42, 44.1, 166, 167, 217, 218, 219, and Article 4.

Provide the following:

A. BACKGROUND/GENERAL INFORMATION

1 Development name on the cover of the report
2 Engineer's seal, signature, address and telephone number on the cover of the report
3 Developer's name, address, and telephone number on the cover of the report
4 Date on the cover of the report and vicinity map in the report
5 Include revision date on the cover of the report
6 Provide statement of post-construction pond/storm water drainage ownership.

B. REGULATORY

1 For all proposed developments, including public single-family residential, execute and return the attached Operation & Maintenance Agreement, **The Agreement must be approved and recorded prior to the pre-construction meeting**. The agreement must state the deed book and page of the property in addition to defining minimum recommended post construction inspection and maintenance schedule and site specific plan. **Refer to GSMM Volume Three and include best practices.**

2 **A stream buffer variance is required for encroachment of stream buffers**.

3 Contact the Army Corps of Engineers for permit determination/approval. ACOE approval is required prior to stormwater plan approval if it applies to the proposed scope of work.

4 Provide flood study per the Flood Plain Management Ordinance and in accordance with FEMA approved methodology if it applies.

5 Add engineer's certification to plans: "Engineer certifies that the flood study was prepared in accordance with a FEMA approved methodology". IF a LOMR or CLOMR, etc. is needed, the Applicant must send documents to FEMA w/copy sent along with plans.

6 Provide wetlands delineation. Show limits and area (acres or square feet) of encroachment and the 25' undisturbed DeKalb County buffer.

7 Offsite easements are/may be required (see plans). (Offsite easement needed for stormwater on a permanent basis must be delineated, legal description written and recorded in perpetuity at DC courthouse).

8 Other _____

_____

_____

C. STORMWATER MANAGEMENT REPORT/HYDRO

1. The submittal does not meet the requirements of the DeKalb County ordinances and G.S.M.M. Please refer to the appropriate sections in the regulations that cover the topics of water quality treatment, runoff reduction volume (RRV), channel protection volume, over-bank flood protection, extreme flood protection, and ten-percent downstream analysis and comply.

2. Consider the use of available Better Site Design (checking for availability for usage to decrease the size of the pond) "credits" to reduce WQV and CPV.

3. Provide supporting engineering calculations for all Better Site Design "credits". Please see Section 1.4.4 of the GSMM for a complete listing of all available design credits.

4. Provide brief summary of Better Site Design "credits". Per the GSMM, design credits cannot be claimed twice for the same area. Credit areas and features must be identified and delineated on the construction drawings and final plat.

5. Provide executive summary of the report's findings to include a table similar to:

Flow Summary

Basin	Cumulative Drainage Area	Return Frequency Storm (yrs)	Precipitation Value for 24 hour Event (inches)	Pre-development Flow (cfs)	Post-development Flow (cfs)	Ponding Elevation (ft MSL)	Storage (cubic feet)
		1					
		2					
		5					
		10					
		25					
		50					
		100					
		10% D.S.					

DeKalb County requires post development release flow rates not to exceed pre development flows.

6. Include a narrative paragraph/summary in the report that includes a description of existing site, soils, slopes, vegetative cover, and proposed improvements, methodologies and procedures, calculations, summary of results and a conclusion detailing the findings of the drainage investigation.

7. State the existing and proposed impervious surface by acre and percent of site for each basin.

8. Provide a breakdown of proposed impervious surface by roofs, roads, sidewalks, access drives, driveways, etc.

9. Delineate all drainage areas/basins to include offsite drainage and bypass.

10. Detailed pre and post developed drainage area maps are required.

11. DeKalb Rational "C" and/or SCS "CN" values need clarification and/or further explanation (see hydro).

12. **P**rovide a list or table of the rainfall values used. Use 3.36 inch as the value for the one year (1-year) precipitation depth when using the Annual Maximum time series, or use the Partial Duration time series http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ga: NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES.

13. **Show** segmented time of concentration (TC) **flow paths on scaled** drainage maps. The time of concentration (TC) for pre and/or post developed conditions needs clarification and/or further explanation (see hydro).

14. The SCS method and other approved methodologies are required for detention analysis. The Flow Summary Rational method is only acceptable for pipe design within certain acreage limits. The DeKalb Rational Method can be used for detention design for drainage areas up to 5 acres.

15. A 10% downstream analysis is required. Provide basin drainage map showing P0S, and peak flow analysis results with and without detention to the labelled study point.

16. The 10% downstream analysis must specifically prove and state that no structures (businesses, homes, culverts, streets, etc) between the analysis points will be adversely impacted by the increase in site runoff based on hydrograph timings to the 10% downstream study point.

17. Provide RRV, WQV and CPV calculations. If RRV is not included provide detailed technical justification based on soil characteristics and or site topography related to best practices for runoff reduction volume.

18. Provide fore-bay calculations (0. l"/acre of impervious area). Can be counted towards total WQV.

19. Provide WQV and/or CPV orifice sizing calculations for the 24-hour drawdown.

20. Round orifice size up to the next highest whole number (e.g. computed = 2.6", round to 3").

21. Spreadsheets for WQV, CPV, Orifice sizing, Bio-retention, Sand Filter sizing, and other Green Infrastructure/Low Impact Development features and the Manning's Equation. Please use and include these with your submittal.

22. The pond report (stage-storage) does not agree with what is dimensioned on the plans.

23. The volumes required by the hydro do not agree with the proposed pond grading on the plans.

24. Provide 50% of net WQV as dead pool storage for Wet Extended Detention pond.

25. Micro pool pond required (for less than 10 acre drainage areas). Show 25-30% of net WQV as dead pool storage.

26. Show that the 100-year storm, including offsite pass-through, is safely passed around or through the pond and through the emergency overflow weir. Otherwise, show how the offsite will be managed.

27. Disturbed bypass areas greater than 10% of the drainage basin require water quality treatment.

28. Extended dry detention may be used to fully meet CPV, Qp25 and Qf (The 100-year, 24-hour storm event) requirements only.

29. Extended dry detention must be used in conjunction with other onsite BMPs to meet the 80% TSS water quality requirements of the GSMM.

30. Underground detention must comply with Section 3.4.3 of the GSMM.

31. Include Outlet Control Structure (OCS) and pond cross section details in the study. See Section 3.2, and Appendix in the GSMM for pond detail requirements.

32. If CPV is waived, then the 2 through 25 year attenuation is required as well as safely passing the 100 year storm.

33. If WQV and CPV requirements are met, the only additional requirements are flood control for the 25-year event and safe passage of the 100-year event.

34. Other _____

35. For projects other than stormwater hotspots, if less than 40 % of the site is being disturbed only that portion of the property is required to meet the stormwater compliance regulations.

36. Minimize the area of land disturbed, designing to maintenance existing grades where practical and maximizing the use of low impact features and Green Infrastructure as much as practical. Include best management practices per volume three of the G.S.M.M.

D. PLAN/DETAIL SHEETS

1. Show existing and proposed R/W lines, lot lines/building envelop pavement and other impervious areas, curb and gutter, and R/W widths.

2. Provide floodplain statement. Reference the 2016, or most recent, FEMA Firm Panel number and any applicable CLOMA.

3. Provide wetlands statement. (The statement is to indicate if the site is within any area of a wetland)

4. Delineate wetland areas and note the areas (in acres/ft^2) to be impacted. Show 25' wetland buffer.

5. Provide a copy of wetland study and/or N.W.I. Map number if wetland is to be impacted.

6. Show areas of proposed cut/fill in the floodplain. Provide cut and fill sections. Cut and fill must balance, within boundary of site. Maximum compensatory grading is 150 cubic yards of per acre of floodplain on site. See Floodplain Management Ordinance for additional cut/fill requirements.

7. Show all existing and proposed lakes with surface area, normal pool elevation, and dam height, top width, % slopes. Provide details for existing/proposed outlets/drain pipes and spillways.

8. Show/note all Minimum Floor Elevations (MFE) for all lots located adjacent to the FEMA designated flood hazard area. For residential developments, the MFE is measured as 3' above the 100-year flood elevation to the bottom of the footing, or one foot above top of dam or wall.

9. Show/note the 100-year flood plain limits/sections, elevations, floodway limits. Indicate the source of the information.

10. Provide a copy of FEMA approved methodology flood study.

11. Show the 25' (state) and 50' (county) undisturbed stream buffers from the edge of wrested development.

12. Show stream buffer as **measured from the wrested bank**, **not the centerline of the creek**.

13. Show/note the boundaries of other natural feature protection and conservation areas such as wetlands, lakes, ponds, and other setbacks (e.g. septic tank and drinking water well setbacks).

14. Provide plan view of major manhole junctions to include pipe sizes, materials, angles and invert elevations.

15. Identify/show/delineate alt Better Site Design "credits". **Note on plan that any conservation areas will be recorded at the DeKalb County Courthouse in perpetuity with the affected properties.**

16. Show grading of all open channels. Include cross-sections and calculations to provide 25-year storm capacity, velocities, dimensions, freeboard, and permanent grassing/sodding details to sustain the Q_{p25} velocity.

17. Drainage other than sheet flow across two or more lots requires a dedicated drainage easement. Define any such drainage easements with adequate labels.

18. **Show a 15 ft minimum Access/Maintenance easement to and 10 ft minimum around the outer limits of the pond(s) from the right-of-way.**

19. Use Formula One at end of this section to determine the minimum drainage easement width requirement per Section 14-40b (Standards) (10' minimum).

20. Show storm sewers extending to the rear of the lot unless discharging to defined channel approved by the Land Development Department.

21. Show water quality ponds and BMPs outside of creeks/streams, floodplains, wetlands, and buffers.

22. General minimum slope for pond(s) is 3:1. Show 3:1 grading of pond(s).

23. Residential pond(s) should be located within a subdivision common place. No part of the facility should be located on private property.

24. Pond construction requires minimum setback of 20' from property line, 100' to 250' from a Private well and 50' from a septic tank/leach field

25. Show and dimension the aquatic bench.

26. Show the fore bay. (0.1" per impervious acre)

27. Show the micro pool (25-30% of net WQV).

28. Show a safety bench if the pond is deeper than 4'or required slopes of greater than 3:1.

29. Provide pond under drain (3" mm. drain pipe with 3" mm. gate valve located in OCS). Also, provide manufacturer and maintenance specs.

30. Add note to plan: "The pond's maintenance under drain is intended to drain the pond for infrequent maintenance and inspection purposes. The gate valve must be closed immediately after construction of the pond. After construction is completed, it can only be opened upon authorization by the DeKalb County Land Development Department."

31. Provide a complete pond profile detail sheet including compaction detail, water surface elevations, structure and freeboard elevations, perforated and wrapped under drain pipe, material specifications, cutoff trench with anti-seep collar, orifice and spillway sizes and location, standard 10' embankment berm width and minimum slopes of 3:1 per GSMM. (excavated ponds require an 8' minimum top of berm width).

32. Provide construction detail for emergency spillway.

33. Consider use of reverse slope pipe attached to riser, with its inlet submerged 1' below the permanent pool elevation.

34. For earthen pond embankments, use impervious cut-off trench with anti-seep collar to restrict piping of soils through embankment.

35. Provide a trash rack or skimmer hood. (a flat top trash rack is not advised for private developments. It is not allowed for public single-family residential developments). Trash rack must have 10 times the surface area of the orifice it protects.

36. Provide a wetland seeding schedule for extended detention wet pond. See Appendix F of the GSMM.

37. Add note to plan: "No woody vegetation is allowed within 15' of the downstream toe of earthen embankment". (i.e. stumps, etc)

38. Add note to plans that all retaining wall designs greater than 4' in height shall be submitted and approved by the DeKalb County Land Development Department prior to installation. Keystone block walls are unacceptable for the pond's retaining wall.

39. HDPE pipe is only allowed outside of the R/W and on non-single family projects (i.e. commercial, industrial). (Junction boxes are required to have manhole access. Plans should reference AASHTO M294 requirements.

40. Provide pipe bedding detail.

41. Show curb inlet placement at low points in road.

42. Show the 100-year ponding elevation at inlet. Ponding shall not occur on adjacent property without obtaining a drainage easement.

43. Provide appropriate energy dissipation devices at all pipe outlets, open channels, and outlet control structures and culverts if exit velocities exceed 4 fps. Show/note the type of energy dissipation to be provided. Provide sizing calculations if rip-rap is proposed.

44. Provide emergency spillway construction detail.

45. If water depth in a pond is 4 feet or greater provide 5' chain link fence with 10' access gates to be placed **at the outer edge** of the 10' access easement to service **around the pond**.

Formula 1
Drainage Easement Formula

The following formula is a tool to be used in determining the required width for drainage easements assigned to storm pipes.

The minimum required easement width for storm pipe installation is a function of the required clearance on each side of the pipe, the pipe diameter, the embankment slope and the pipe's depth of cover at the deepest point. The County typical minimum width is 15 feet.

Given a minimum 2 feet of clearance between the pipe walls and an embankment slope of 2:1 (H:V), the formula is:
Minimum easement width = 4' + diameter + (3 x maximum pipe cover depth) = total easement width (feet), to be centered on structure/pipe.

E. PIPE PROFILES/CULVERT DESIGN/OPEN CHANNELS

Pipe

1. Show a minimum of 18" of cover for pipe. Additional cover may be required depending on expected loading.

2. All pipes requiring a manhole base larger than 48" in diameter must be identified by showing base unit and reduction cone, inverts of pipes, etc.

3. Verify that the pond outlet discharge pipe has been checked for inlet and outlet control.

4. Match crowns on adjacent pipe.

5. Provide a minimum of 12"vertical and horizontal separation between all buried utilities & storm pipes.

6. Show all sanitary and water line, and other utility crossings on storm profiles.

7. Show catch basin top and pipe invert elevations.

8. Show curb inlet at low point of Street

9. Provide pipe profiles with existing and proposed ground surface profiles, pipe lengths, slopes, inverts, type, and hydraulic grade lines.

10. Show 25-year hydraulic grade line. It must be below the crown of the pipe. Please provide supporting data in pipe profile chart or hydro study.

11. Note on plans: All storm pipe and structures shall comply with GADOT standards for design, construction, and installation.

12. Inverts on all structures shown to be paved smooth.

13. All metal pipes used must be BCCMP with re-rolled ends and hugger/corrugated bands used for connection.

14. Minimum acceptable pipe diameter for County maintained sections and systems is 18 inches.

15. Minimum slope is 1% for BCCMP and 0.50% for RCP. For slopes < 1%, show that a minimum of 2.5 fps is attained for the 2-year frequency event.

16. Velocity in pipe No. (s) _____
exceeds 15 fps. Velocities should be between 3-15 fps.

17. CMP' or BCCMP pipe(s) exceed(s) 12% slope. RCP pipe exceed(s) 12% slope.

18. On CMP pipe exceeding a 12% slope, show anchor collars. Provide construction detail and locations.

19. RCP is recommended under roads.

20. Angle conflict among pipes will require a larger manhole for structure.

Provide Pipe chart indicating the following:
1. Pipe Numbers
2. Invert elevations
3. Pipe Sizes
4. Pipe Slope
5. Pipe Length
6. Contributing Drainage Area
7. Design discharge (Q25 for piped drainage; Q100 for culverts)

8. Design storm frequency (25-year for piped drainage; 100-year for culverts)
9. Runoff Coefficient for CMP
10. Pipe material/coating. Indicate corrugation spacing and height
11. Velocity (V25 may not exceed erosive velocity at outlet headwall unless additional energy dissipation is provided.)
12. Gutter spread (not to exceed eight feet in width for a 10-year design storm event)

Open channel chart indicating the following:
1. Open Channel Numbers
2. Contributing Drainage Area
3. Runoff coefficient (per future land use plan and assuming no detention)
4. Conveyance Size. Provide typical cross section
5. Lining Material (riprap, sod, vegetative, etc.)
6. Channel Length
7. Channel Slope (for min and max values)

8. Velocity (V25 may not exceed erosive velocity)
9. Design Storm frequency (25-year)
10. Design discharge (25-year)
11. Normal flow Depth (25-year)
12. Indicate free board capacity

Culverts
1. Headwater & Tail water Limitations: for drainage facilities with cross-sectional areas equal to or less than 30 ft^2, HW/D for the 1OO-year frequency storm must be equal to or less than 1.5. For drainage facilities with cross-sectional areas greater than 30 ft^2, HW/D for the 100-year frequency storm must be equal to or less than 1.2. Culverts must be sized to maintain flood-free conditions on major thoroughfares with at least 18-inches freeboard at the low-point of the road. (All criteria from Section 4.3, culvert design, of the GSMM are required.)

2. As stated above, inlet/outlet control calculations are required for all street crossings in addition to Manning's equation. Insure that Tc is representative of the drainage area.

3. The weighted runoff coefficient for major culvert analysis (Q=CfCIA) should be based on full build-out using the current zoning plan for the entire receiving area (Cf = Frequency factor).

4. Show 25-year ponding limits above pipe (culvert) unless detention or floodplain conveyance.

5. Show 25-year hydraulic grade line in all culverts unless detention or floodplain conveyance.

6. RCP is required for culvert(s) placed in streams with any base flow.

OTHER REVIEW COMMENTS:

DeKalb County
GEORGIA

404.371.2155(o)
404.371.4556 (f)
DeKalbCountyga.gov

Clark Harrison Building
330 W. Ponce de Leon Ave
Decatur, GA 30030

Appendix B Data

- Rainfall reference table
- CN Values
- Site Review Tool
- Water Quality Design

NOAA Atlas 14, Volume 9, Version 2
Location name: Atlanta, Georgia, USA*
Latitude: 33.8841°, Longitude: -84.2596°
Elevation: 942.63 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

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	**0.405** (0.323-0.515)	**0.466** (0.371-0.593)	**0.568** (0.451-0.724)	**0.655** (0.518-0.837)	**0.779** (0.602-1.01)	**0.876** (0.666-1.15)	**0.976** (0.724-1.29)	**1.08** (0.777-1.45)	**1.22** (0.854-1.66)	**1.33** (0.912-1.82)
10-min	**0.593** (0.473-0.755)	**0.683** (0.543-0.869)	**0.832** (0.661-1.06)	**0.960** (0.759-1.23)	**1.14** (0.882-1.48)	**1.28** (0.975-1.68)	**1.43** (1.06-1.89)	**1.58** (1.14-2.12)	**1.79** (1.25-2.43)	**1.95** (1.34-2.67)
15-min	**0.724** (0.577-0.920)	**0.832** (0.663-1.06)	**1.01** (0.806-1.29)	**1.17** (0.926-1.49)	**1.39** (1.08-1.81)	**1.57** (1.19-2.05)	**1.74** (1.29-2.31)	**1.93** (1.39-2.59)	**2.18** (1.53-2.97)	**2.38** (1.63-3.25)
30-min	**1.02** (0.815-1.30)	**1.18** (0.937-1.50)	**1.44** (1.14-1.83)	**1.66** (1.31-2.12)	**1.97** (1.52-2.56)	**2.22** (1.69-2.90)	**2.47** (1.83-3.27)	**2.73** (1.97-3.67)	**3.09** (2.16-4.21)	**3.37** (2.31-4.62)
60-min	**1.31** (1.04-1.67)	**1.50** (1.19-1.91)	**1.83** (1.45-2.32)	**2.11** (1.67-2.69)	**2.52** (1.95-3.28)	**2.84** (2.17-3.73)	**3.19** (2.37-4.23)	**3.55** (2.56-4.77)	**4.05** (2.83-5.51)	**4.44** (3.04-6.07)
2-hr	**1.60** (1.29-2.00)	**1.82** (1.47-2.29)	**2.21** (1.78-2.78)	**2.56** (2.05-3.22)	**3.06** (2.41-3.95)	**3.47** (2.68-4.50)	**3.90** (2.94-5.12)	**4.36** (3.19-5.79)	**5.00** (3.55-6.73)	**5.50** (3.83-7.43)
3-hr	**1.78** (1.45-2.21)	**2.02** (1.64-2.51)	**2.44** (1.98-3.04)	**2.82** (2.28-3.52)	**3.38** (2.69-4.33)	**3.84** (3.00-4.94)	**4.33** (3.30-5.64)	**4.86** (3.59-6.41)	**5.60** (4.02-7.48)	**6.19** (4.34-8.29)
6-hr	**2.19** (1.80-2.68)	**2.45** (2.02-3.01)	**2.93** (2.40-3.59)	**3.36** (2.75-4.13)	**4.01** (3.23-5.07)	**4.55** (3.60-5.78)	**5.13** (3.96-6.60)	**5.76** (4.32-7.50)	**6.65** (4.85-8.78)	**7.37** (5.25-9.74)
12-hr	**2.72** (2.27-3.28)	**3.03** (2.52-3.66)	**3.57** (2.97-4.32)	**4.07** (3.37-4.93)	**4.80** (3.92-5.98)	**5.42** (4.35-6.77)	**6.07** (4.76-7.69)	**6.78** (5.16-8.70)	**7.78** (5.76-10.1)	**8.58** (6.21-11.2)
24-hr	**3.27** (2.77-3.89)	**3.68** (3.11-4.38)	**4.38** (3.69-5.21)	**4.99** (4.18-5.95)	**5.87** (4.84-7.16)	**6.58** (5.34-8.08)	**7.33** (5.81-9.11)	**8.11** (6.26-10.2)	**9.20** (6.91-11.8)	**10.1** (7.40-12.9)
2-day	**3.79** (3.25-4.44)	**4.34** (3.71-5.08)	**5.25** (4.48-6.16)	**6.03** (5.13-7.09)	**7.12** (5.94-8.53)	**7.98** (6.55-9.63)	**8.86** (7.12-10.8)	**9.77** (7.64-12.1)	**11.0** (8.38-13.9)	**12.0** (8.94-15.2)
3-day	**4.18** (3.61-4.85)	**4.74** (4.09-5.51)	**5.70** (4.91-6.62)						**12.1** 2-15.1)	**13.2** (9.98-16.6)
4-day	**4.52** (3.92-5.21)	**5.08** (4.41-5.86)	**6.06** (5.24-6.99)						**13.0** 1-16.2)	**14.3** (10.9-17.9)
7-day	**5.37** (4.71-6.11)	**5.98** (5.24-6.81)	**7.05** (6.17-8.04)						**15.3** 1-18.9)	**16.9** (13.0-20.9)
10-day	**6.09** (5.39-6.88)	**6.76** (5.97-7.63)	**7.94** (7.00-8.98)	**9.01** (7.91-10.2)	**10.6** (9.21-12.4)	**11.9** (10.2-14.0)	**13.4** (11.2-15.9)	**14.9** (12.1-17.9)	**17.1** (13.5-20.9)	**18.8** (14.6-23.1)
20-day	**8.16** (7.31-9.06)	**9.00** (8.07-10.0)	**10.5** (9.36-11.7)	**11.8** (10.5-13.1)	**13.6** (12.0-15.6)	**15.2** (13.1-17.4)	**16.8** (14.2-19.5)	**18.5** (15.3-21.9)	**20.9** (16.8-25.1)	**22.7** (18.0-27.5)
30-day	**10.0** (9.04-11.0)	**11.0** (9.96-12.1)	**12.7** (11.5-14.0)	**14.2** (12.7-15.7)	**16.2** (14.3-18.3)	**17.9** (15.6-20.3)	**19.5** (16.7-22.5)	**21.2** (17.7-24.8)	**23.6** (19.2-28.0)	**25.4** (20.3-30.4)
45-day	**12.5** (11.4-13.6)	**13.8** (12.6-15.0)	**15.8** (14.4-17.3)	**17.5** (15.9-19.2)	**19.8** (17.5-21.9)	**21.4** (18.8-24.0)	**23.1** (19.9-26.3)	**24.8** (20.8-28.6)	**26.9** (22.0-31.6)	**28.5** (23.0-33.8)
60-day	**14.8** (13.5-16.0)	**16.3** (14.9-17.6)	**18.6** (17.0-20.2)	**20.5** (18.7-22.3)	**22.9** (20.4-25.2)	**24.7** (21.7-27.3)	**26.3** (22.7-29.6)	**27.9** (23.5-31.8)	**29.8** (24.5-34.6)	**31.1** (25.3-36.7)

Changed to 3.36 in the computer model per Dekalb County Review Standards

[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.

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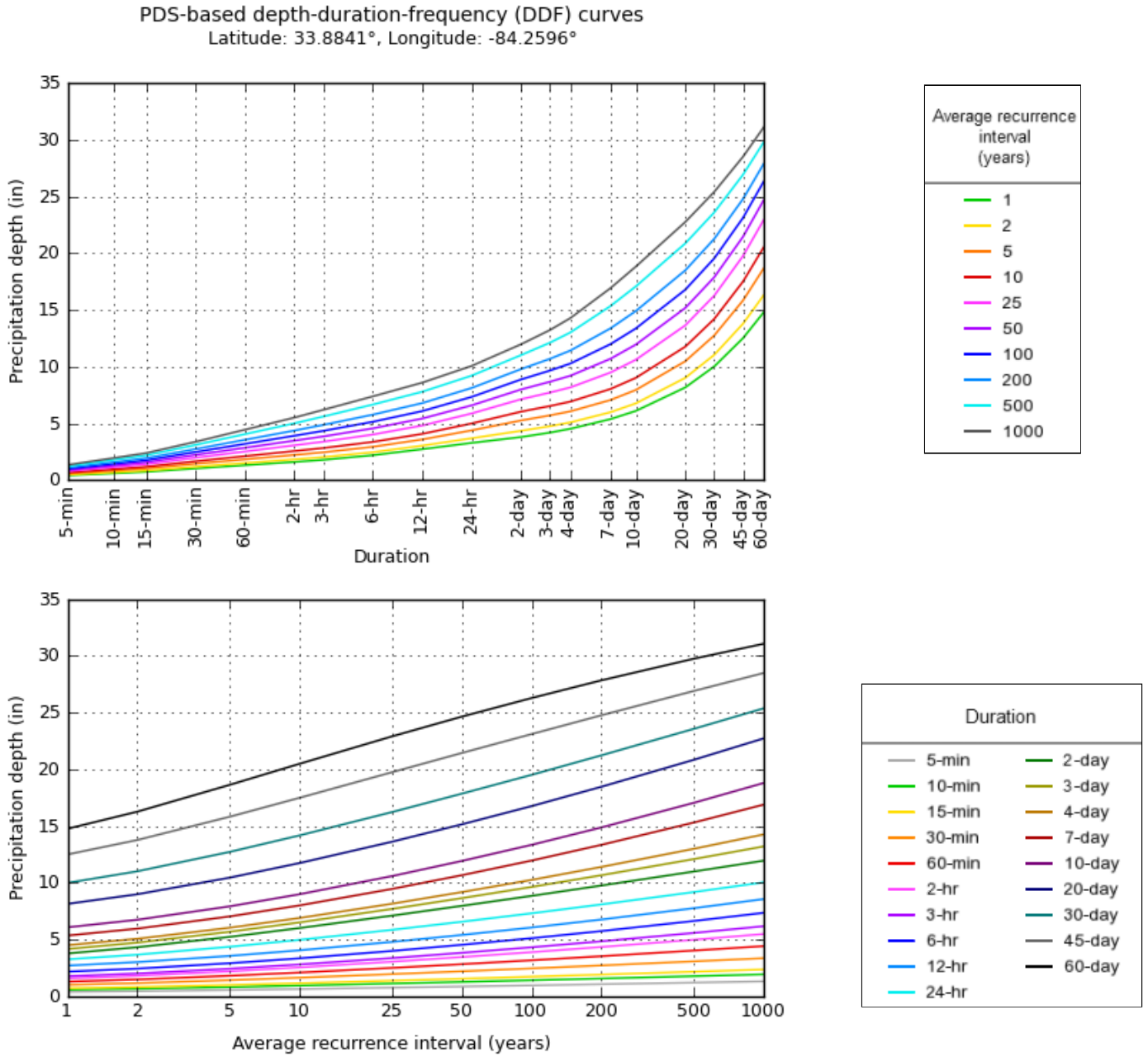
Back to Top

PF graphical



NOAA Atlas 14, Volume 9, Version 2

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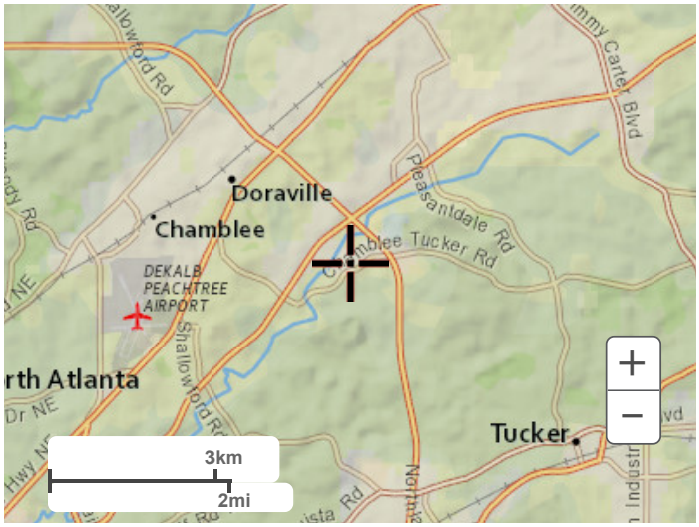
Back to Top

Maps & aerials

Small scale terrain



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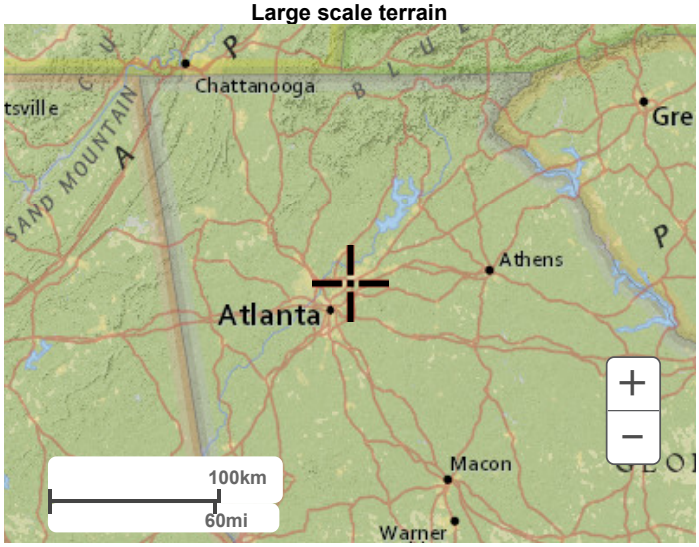

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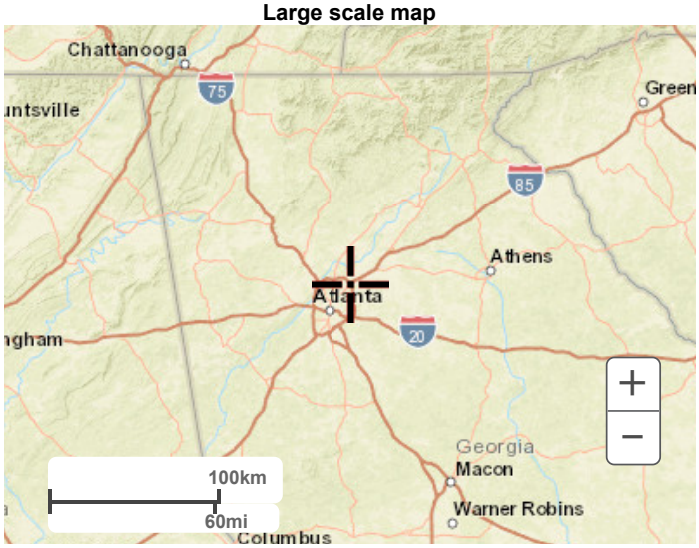

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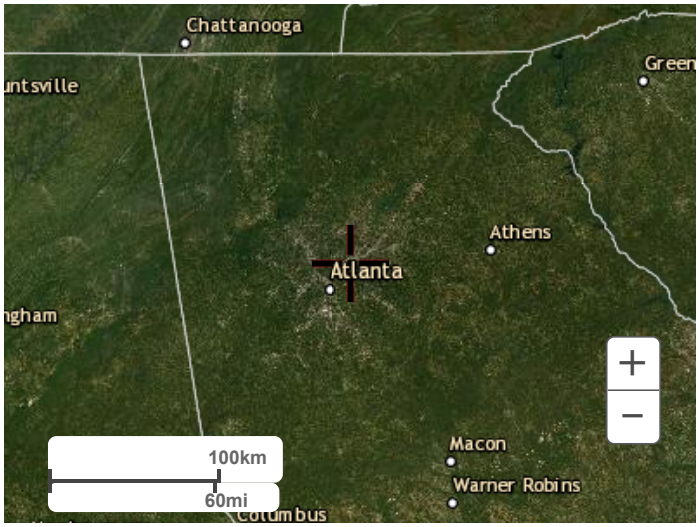

Back to Top

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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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NOAA Atlas 14, Volume 9, Version 2
Location name: Atlanta, Georgia, USA*
Latitude: 33.8856°, Longitude: -84.255°
Elevation: 958.4 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

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/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.86** (3.88-6.18)	**5.59** (4.45-7.12)	**6.82** (5.41-8.69)	**7.86** (6.22-10.0)	**9.35** (7.22-12.2)	**10.5** (7.99-13.8)	**11.7** (8.69-15.5)	**13.0** (9.32-17.4)	**14.7** (10.2-19.9)	**16.0** (10.9-21.9)
10-min	**3.56** (2.84-4.53)	**4.10** (3.26-5.21)	**4.99** (3.97-6.36)	**5.76** (4.55-7.35)	**6.84** (5.29-8.90)	**7.70** (5.85-10.1)	**8.58** (6.36-11.4)	**9.49** (6.83-12.7)	**10.7** (7.50-14.6)	**11.7** (8.01-16.0)
15-min	**2.90** (2.31-3.68)	**3.33** (2.65-4.24)	**4.06** (3.22-5.17)	**4.68** (3.70-5.98)	**5.56** (4.30-7.24)	**6.26** (4.76-8.19)	**6.98** (5.17-9.24)	**7.72** (5.55-10.4)	**8.72** (6.10-11.9)	**9.51** (6.51-13.0)
30-min	**2.05** (1.63-2.60)	**2.35** (1.87-3.00)	**2.87** (2.28-3.66)	**3.31** (2.62-4.23)	**3.94** (3.05-5.12)	**4.43** (3.37-5.80)	**4.94** (3.66-6.54)	**5.47** (3.93-7.34)	**6.19** (4.32-8.42)	**6.74** (4.62-9.23)
60-min	**1.31** (1.04-1.67)	**1.50** (1.19-1.91)	**1.83** (1.45-2.32)	**2.11** (1.67-2.69)	**2.52** (1.95-3.28)	**2.84** (2.17-3.73)	**3.19** (2.37-4.23)	**3.55** (2.56-4.77)	**4.05** (2.83-5.51)	**4.44** (3.04-6.07)
2-hr	**0.798** (0.644-1.00)	**0.911** (0.734-1.14)	**1.11** (0.890-1.39)	**1.28** (1.02-1.61)	**1.53** (1.20-1.97)	**1.74** (1.34-2.25)	**1.95** (1.47-2.56)	**2.18** (1.59-2.89)	**2.50** (1.78-3.36)	**2.75** (1.91-3.72)
3-hr	**0.593** (0.482-0.737)	**0.673** (0.547-0.837)	**0.814** (0.659-1.01)	**0.939** (0.758-1.17)	**1.13** (0.894-1.44)	**1.28** (0.998-1.65)	**1.44** (1.10-1.88)	**1.62** (1.20-2.13)	**1.86** (1.34-2.49)	**2.06** (1.45-2.76)
6-hr	**0.365** (0.301-0.447)	**0.409** (0.337-0.502)	**0.489** (0.401-0.600)	**0.561** (0.459-0.690)	**0.669** (0.540-0.847)	**0.760** (0.601-0.965)	**0.857** (0.662-1.10)	**0.962** (0.722-1.25)	**1.11** (0.810-1.47)	**1.23** (0.877-1.63)
12-hr	**0.226** (0.188-0.272)	**0.251** (0.209-0.304)	**0.297** (0.247-0.359)	**0.337** (0.280-0.409)	**0.399** (0.326-0.496)	**0.450** (0.361-0.562)	**0.504** (0.395-0.638)	**0.563** (0.428-0.722)	**0.645** (0.478-0.840)	**0.712** (0.516-0.929)
24-hr	**0.136** (0.115-0.162)	**0.153** (0.130-0.182)	**0.182** (0.154-0.217)	**0.208** (0.174-0.248)	**0.244** (0.202-0.299)	**0.274** (0.222-0.337)	**0.305** (0.242-0.380)	**0.338** (0.261-0.426)	**0.383** (0.288-0.490)	**0.419** (0.308-0.539)
2-day	**0.079** (0.068-0.092)	**0.090** (0.077-0.106)	**0.109** (0.093-0.128)	**0.126** (0.107-0.148)	**0.148** (0.124-0.178)	**0.166** (0.137-0.201)	**0.185** (0.148-0.226)	**0.204** (0.159-0.253)	**0.229** (0.175-0.289)	**0.249** (0.186-0.316)
3-day	**0.058** (0.050-0.067)	**0.066** (0.057-0.076)	**0.079** (0.068-0.092)	**0.091** (0.078-0.106)	**0.107** (0.090-0.128)	**0.120** (0.100-0.144)	**0.134** (0.109-0.163)	**0.148** (0.117-0.183)	**0.168** (0.129-0.210)	**0.184** (0.139-0.231)
4-day	**0.047** (0.041-0.054)	**0.053** (0.046-0.061)	**0.063** (0.055-0.073)	**0.072** (0.062-0.083)	**0.085** (0.072-0.101)	**0.096** (0.080-0.114)	**0.107** (0.087-0.129)	**0.119** (0.095-0.146)	**0.136** (0.105-0.169)	**0.149** (0.113-0.186)
7-day	**0.032** (0.028-0.036)	**0.036** (0.031-0.041)	**0.042** (0.037-0.048)	**0.048** (0.042-0.055)	**0.056** (0.049-0.066)	**0.064** (0.054-0.075)	**0.071** (0.059-0.085)	**0.080** (0.064-0.097)	**0.091** (0.072-0.112)	**0.101** (0.078-0.124)
10-day	**0.025**	**0.028**	**0.033**	**0.038**	**0.044**	**0.050**	**0.056**	**0.062**	**0.071**	**0.078**

	(0.022-0.029)	(0.025-0.032)	(0.029-0.037)	(0.033-0.043)	(0.038-0.051)	(0.042-0.058)	(0.047-0.066)	(0.051-0.075)	(0.056-0.087)	(0.061-0.096)
20-day	**0.017** (0.015-0.019)	**0.019** (0.017-0.021)	**0.022** (0.019-0.024)	**0.024** (0.022-0.027)	**0.028** (0.025-0.032)	**0.032** (0.027-0.036)	**0.035** (0.030-0.041)	**0.038** (0.032-0.046)	**0.043** (0.035-0.052)	**0.047** (0.037-0.057)
30-day	**0.014** (0.013-0.015)	**0.015** (0.014-0.017)	**0.018** (0.016-0.019)	**0.020** (0.018-0.022)	**0.023** (0.020-0.025)	**0.025** (0.022-0.028)	**0.027** (0.023-0.031)	**0.029** (0.025-0.034)	**0.033** (0.027-0.039)	**0.035** (0.028-0.042)
45-day	**0.012** (0.011-0.013)	**0.013** (0.012-0.014)	**0.015** (0.013-0.016)	**0.016** (0.015-0.018)	**0.018** (0.016-0.020)	**0.020** (0.017-0.022)	**0.021** (0.018-0.024)	**0.023** (0.019-0.026)	**0.025** (0.020-0.029)	**0.026** (0.021-0.031)
60-day	**0.010** (0.009-0.011)	**0.011** (0.010-0.012)	**0.013** (0.012-0.014)	**0.014** (0.013-0.015)	**0.016** (0.014-0.017)	**0.017** (0.015-0.019)	**0.018** (0.016-0.021)	**0.019** (0.016-0.022)	**0.021** (0.017-0.024)	**0.022** (0.018-0.025)

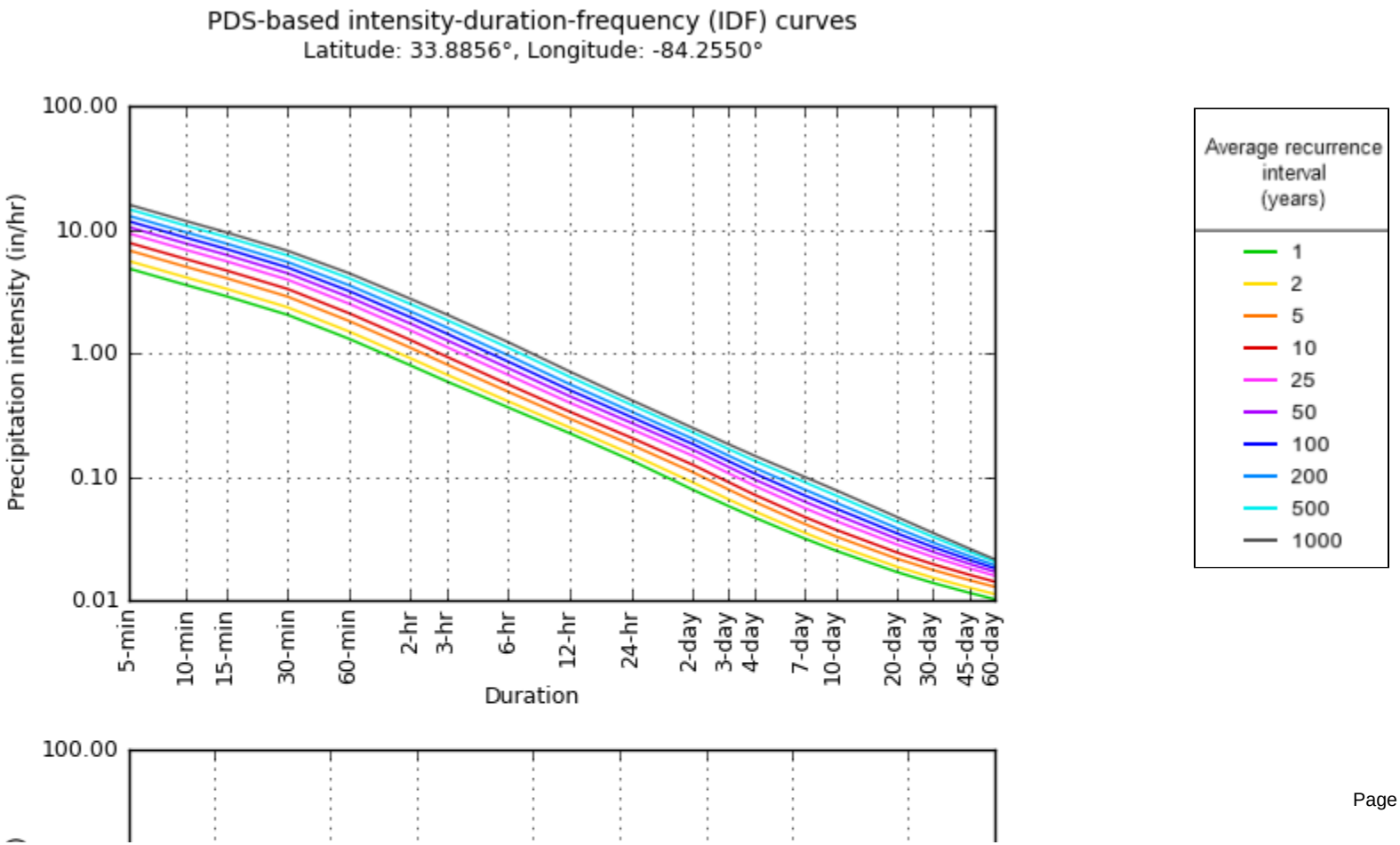
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

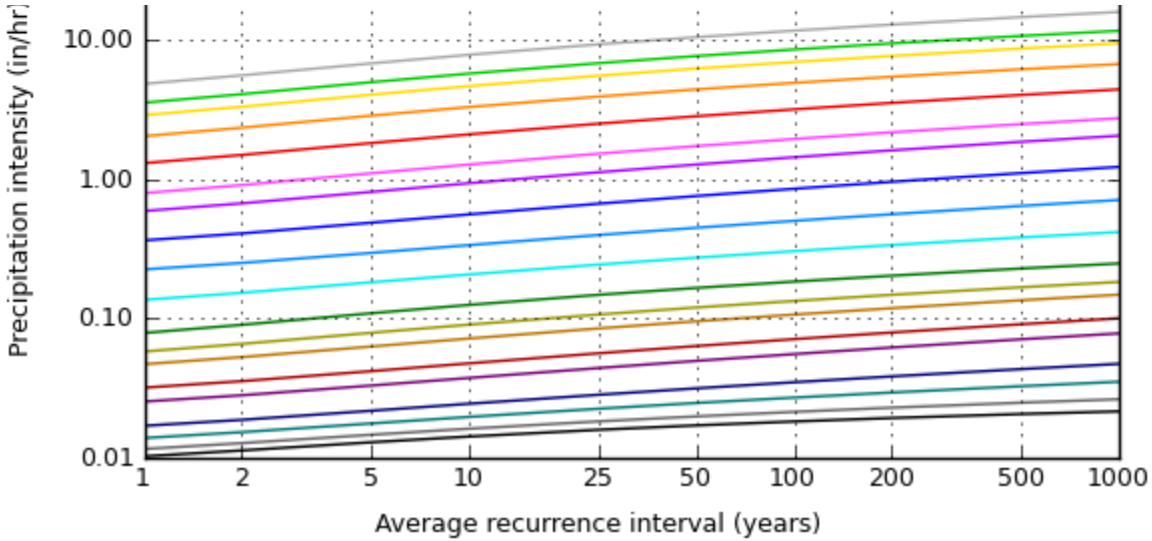
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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 9, Version 2

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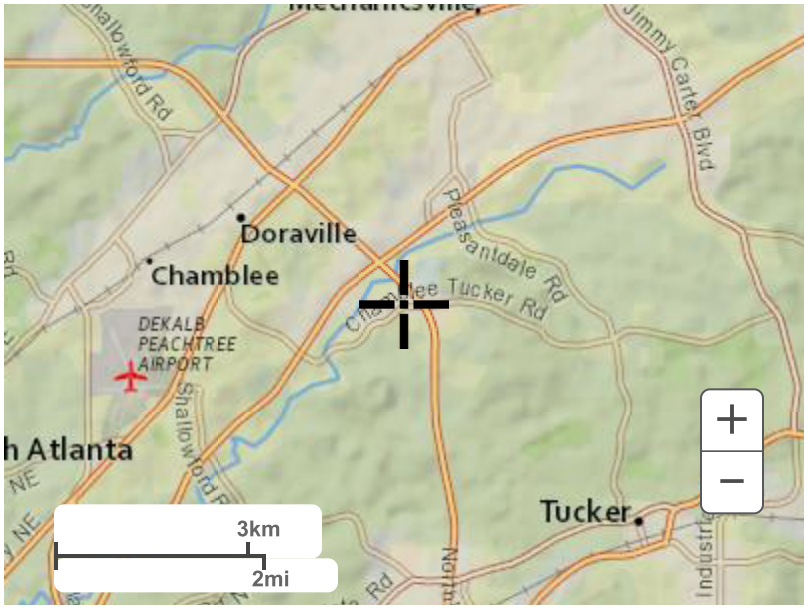
Back to Top

Maps & aerials

Small scale terrain



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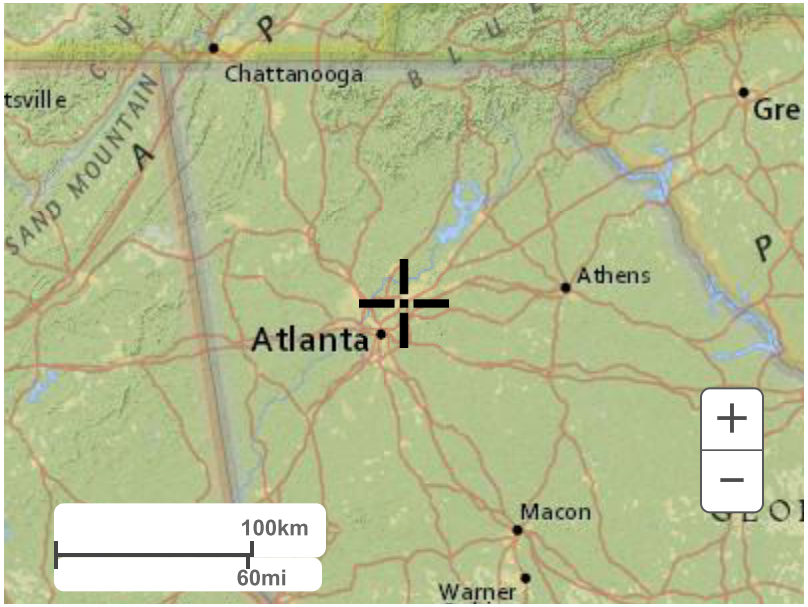

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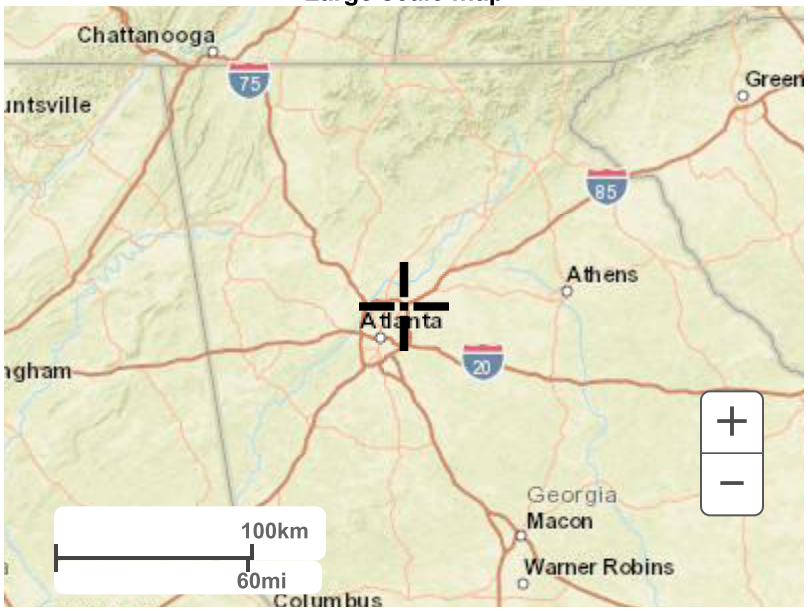

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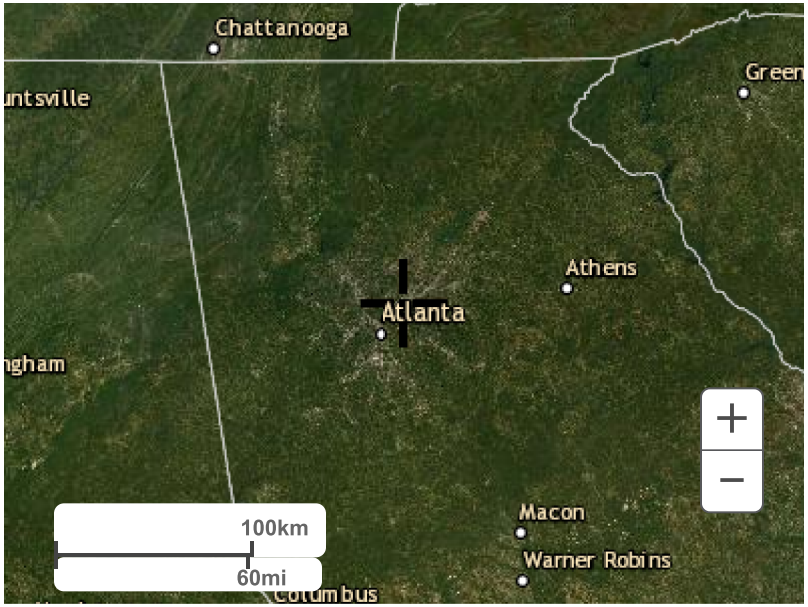

Back to Top

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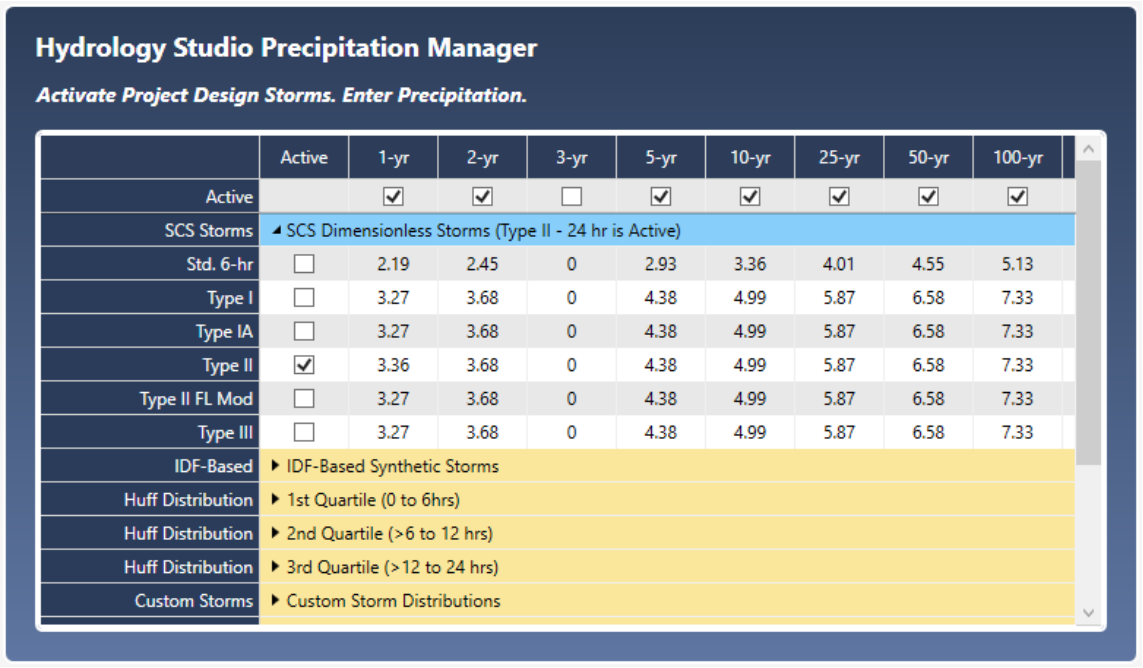


Embry Hills 2020 Precipitation Data

Table 2.1.5-1 Runoff Curve Numbers[1]

Cover description			Curve numbers for hydrologic soil groups			
Cover type and hydrologic condition		*Average percent impervious area*[2]	A	B	C	D
Cultivated land:	without conservation treatment		72	81	88	91
	with conservation treatment		62	71	78	81
Pasture or range land:	poor condition		68	79	86	89
	good condition		39	61	74	80
Meadow: good condition			30	58	71	78
Wood or forest land:	thin stand, poor cover		45	66	77	83
	good cover		25	55	70	77
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]						
Poor condition (grass cover <50%)			68	79	86	89
Fair condition (grass cover 50% to 75%)			49	69	79	84
Good condition (grass cover > 75%)			39	61	74	80
Impervious areas:						
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)			98	98	98	98
Streets and roads:						
Paved; curbs and storm drains (excluding right-of-way)			98	98	98	98
Paved; open ditches (including right-of-way)			83	89	92	93
Gravel (including right-of-way)			76	85	89	91
Dirt (including right-of-way)			72	82	87	89
Urban districts:						
Commercial and business		85%	89	92	94	95
Industrial		72%	81	88	91	93
Residential districts by average lot size:						
1/8 acre or less (town houses)		65%	77	85	90	92
1/4 acre		38%	61	75	83	87
1/3 acre		30%	57	72	81	86
1/2 acre		25%	54	70	80	85
1 acre		20%	51	68	79	84
2 acres		12%	46	65	77	82
Developing urban areas and Newly graded areas (pervious areas only, no vegetation)			77	86	91	94

[1] Average runoff condition, and $I_a = 0.2S$

[2] The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. If the impervious area is not connected, the SCS method has an adjustment to reduce the effect.

[3] CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.

East Basin			
Water Quality & Channel Protection Sizing Calculation			
Note: This for just the redeveloped area			
Water Quality Volume	**Value**	**Units**	**Notes**
Impervious Area	0.8	acres	Redeveloped East Basin
Total Drainage Area	0.8	acres	
% Impervious	100		
Rv	0.95	Inches	
WQv	0.076	Acre-feet	
Required WQv	3310.56	CF	
Proposed WQv	3400	CF	3310 CF - 25% to micropool
			3310 CF - 25%(3310) = 2485 CF
Water Quality Release			
Proposed WQv for Release	2530	CF	
Avg. Release Rate	0.02928241	CFS	
Upper WQv Elevation	916.6	FT	
Lower WQv Elevation	915	FT	
Avg. Head	0.8	FT	
Orifice Area	0.00679935	SF	
Orifice Diameter	1.11652925	IN	Use 1" for Design
Channel Protection Volume			
P	3.36		1 year rainfall
CN for site	98		From Hydroflow
Ia	0.04		
Ia / P	0.01		
Tc	0.1	hours	
qu	1000		From Figure 2.1.5-6
qo/qi	0.018		
vs/vr	0.65760449		
Runoff Volume	8513		From Hydroflow - 1 year developed storm volume
vr	2.93	Inches	
Cpv	0.12851669	acre feet	
Required Cpv	5598	CF	
Proposed Cpv	*6950*	*CF*	Elev. 918
Channel Protection Release			
Proposed WQv for Release	4420	CF	6950 - 2530 = 4420
Avg. Release Rate	0.05115741	CFS	
Upper WQv Elevation	918	FT	
Lower WQv Elevation	916.6	FT	
Avg. Head	0.7	FT	
Orifice Area	0.01269888	SF	
Orifice Diameter	1.52587503	IN	Use 1.5" for Design

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool
Version 2.2

General Information

Name of Developer:	Embry Hills Church of Christ	**Date Submitted:**	11/10/2020
Development Name:	Building Addition	**Permit Number:**	
Site Location / Address:	3250 Chamblee Tucker Road	**Developer Contact:**	
	Atlanta, GA	**Phone Number:**	
		Name of Engineer(s):	Cornerstone Site Consultants
Development Type:	Institutional, Public & Semi Public	**Maintenance Responsibility:**	Embry Hills Church of Christ

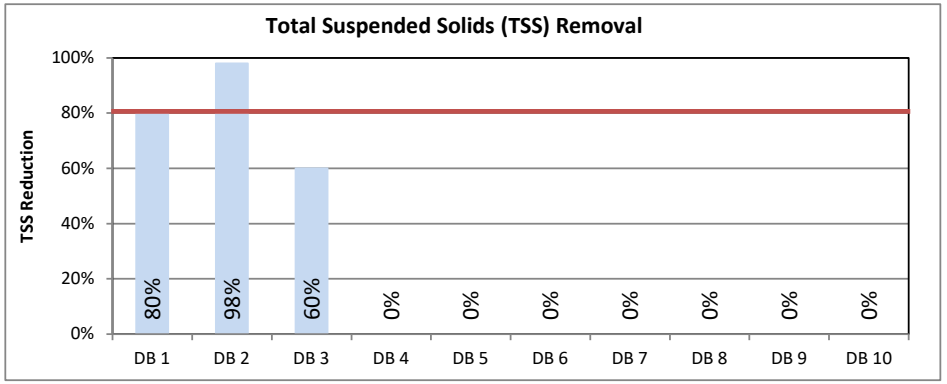
Site Summary

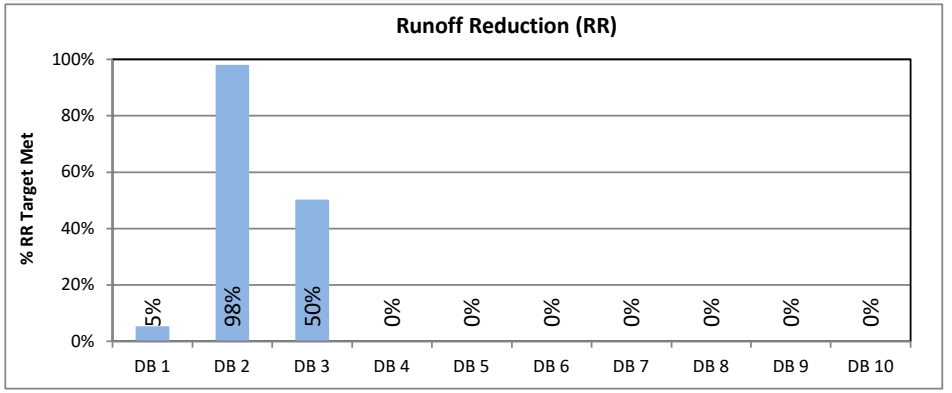
Total Pre-Development Area (ac):	**5.80**
Total Post-Development Area (ac):	**5.80**
Total Treated Area (ac):	**5.43**
Total Untreated Area (ac):	**0.37**

		I (ac)	P (ac)	CA (ac)
East Basin	**DB 1**	2.30	2.07	0.00
West Basin	**DB 2**	0.46	0.95	0.00
South Basin	**DB 3**	0.00	0.02	0.00
Drainage Basin 4	**DB 4**	0.00	0.00	0.00
Drainage Basin 5	**DB 5**	0.00	0.00	0.00
Drainage Basin 6	**DB 6**	0.00	0.00	0.00
Drainage Basin 7	**DB 7**	0.00	0.00	0.00
Drainage Basin 8	**DB 8**	0.00	0.00	0.00
Drainage Basin 9	**DB 9**	0.00	0.00	0.00
Drainage Basin 10	**DB 10**	0.00	0.00	0.00
	TOTAL	**2.76**	**3.04**	**0.00**

I = Impervious Area, P = Pervious Area, CA = Conservation Area

Target Runoff Reduction Volume Achieved?	**No**
Target TSS Removal Achieved?	**Yes**
Total Target Runoff Reduction Volume (cf)	10,070
Runoff Reduction Volume Achieved (cf)	2,140
Total Target Water Quality Volume (cf)	12,084
% TSS Removal Achieved	84%





Official Use Only

Tracking #:		**Conditions of Approval:**	
Reviewed By:			
Date Approved:			

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: East Basin

data input cells
calculation cells
constant values

Site Data

Indicate Pre-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG* A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Woods - Good Condition		30	4.37	55		70		77	4.37	100%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		4.37		0.00		0.00		4.37	100%

*HSG = hydrologic soil group

Impervious (ac)	0.00
Weighted CN	55
Potential Max Soil Retention, S_{pre} (in)	8.18

Indicate Post-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Impervious		98	2.30	98		98		98	2.30	53%
Open space - Good condition (grass cover > 75%)		39	1.00	61		74		80	1.00	23%
Woods - Good Condition		30	1.07	55		70		77	1.07	24%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		4.37		0.00		0.00		4.37	100%

Impervious (ac)	2.30
Rv	0.52
Weighted CN	79
Potential Max Soil Retention, S_{post} (in)	2.66

Conservation Area Credits

Scenario 1: Natural Conservation Area **See the GSMM Volume 2, Section 2.3.3.3 for more information.*

☐ Check the box if a portion of the post-developed area is protected by a conservation easement or equivalent form of protection.

Area (ac) of development protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 1 box above is checked

Scenario 2: Site Reforestation/Revegetation **See the GSMM Volume 2, Section 4.22 for more information.*

☐ Check the box if a portion of the post-developed area employs site reforestation/revegetation and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development reforested/revegetated and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 2 box above is checked

Scenario 3: Soil Restoration **See the GSMM Volume 2, Section 4.23 for more information.*

☐ Check the box if a portion of the post-developed area employs soil restoration and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development with restored soils and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 3 box above is checked

Scenario 4: Site Reforestation/Revegetation & Soil Restoration **See the GSMM Volume 2, Section 4.22 and 4.23 for more information.*

☐ Check the box if the same portion of the post-developed area employs site reforestation/revegetation and soil restoration, and is protected by a conservation easement or equivalent form of protection.

Area (ac) with restored soils in a reforested & revegetated area and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 4 box above is checked

Total Conservation Area Credit (acres) **0.00**

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: East Basin

data input cells
calculation cells
constant values

Water Quality Goals

Target Runoff Reduction Storm (in): 1.00

Total Site Area for Water Quality Volume (acres)	4.37
Target Runoff Reduction Volume (cf)	8,307
Target Water Quality Volume (cf)	9,969

Select BMPs for Runoff Reduction and Water Quality

		Area Draining to Each BMP			Storage Volume Provided by BMP (cf)	RR Conveyance Volume Provided by BMP (cf)	Down-stream BMP	Runoff Reduction Calculations						WQ Calculations	
		On-site Pervious Area (acres)	On-site Impervious Area (acres)	Offsite Area (acres)				RR Volume from Direct Drainage (cf)	RR Volume from Upstream Practices (cf)	Total RR Volume Received by BMP (cf)	Runoff Reduction %	RR Achieved (cf)	Remaining RR Volume (cf)	WQ$_v$ from Direct Drainage (cf)	Effective TSS Removal %
BMP 1	Infiltration Trench	0.07	0.13		420		BMP 2	461	0	461	100%	420	41	553	100%
BMP 2	Stormwater Pond	1.63	2.17	4.77	10,000			7,779	41	7,820	0%	0	7,820	9,335	80%
BMP 3	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 4	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 5	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 6	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 7	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 8	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 9	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 10	Select a BMP…							0	0	0	N/A	0	0	0	N/A
	TOTAL	1.70	2.30	4.77				8,240				420		9,888	
	UNTREATED AREA (acres)	0.37	0.00												

Target Runoff Reduction Volume (cf)	8,307
Target Achieved?	No
Remaining Runoff Reduction Volume (cf)	7,887

Target Water Quality Volume (cf)	9,969
% TSS Removal Achieved	80%
Target Achieved?	Yes!
Remaining TSS Removal %	0%

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: East Basin

data input cells
calculation cells
constant values

Channel and Flood Protection Calculations

	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Target Rainfall Event (in)				

	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Pre-Development Runoff Volume (in)	0.00	0.00	0.00	0.00
Post Development Runoff Volume (in) with no BMPs	0.00	0.00	0.00	0.00
Post-Development Runoff Volume (in) with BMPs	0.00	0.00	0.00	0.00
Adjusted CN	**0**	**0**	**0**	**0**

*See Stormwater Management Standards to Determine Detention Requirements.

Comments

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: West Basin

data input cells
calculation cells
constant values

Site Data

Indicate Pre-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG* A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Woods - Good Condition		30	1.29	55		70		77	1.29	100%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		1.29		0.00		0.00		1.29	100%

*HSG = hydrologic soil group

Impervious (ac)	0.00
Weighted CN	55
Potential Max Soil Retention, S_{pre} (in)	8.18

Indicate Post-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Impervious		98	0.46	98		98		98	0.46	33%
Open space - Fair condition (grass cover 50% to 75%)		49	0.31	69		79		84	0.31	22%
Open space - Good condition (grass cover > 75%)		39	0.19	61		74		80	0.19	13%
Open space - Good condition (grass cover > 75%)		39	0.15	61		74		80	0.15	11%
Woods - Good Condition		30	0.30	55		70		77	0.30	21%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		1.41		0.00		0.00		1.41	100%

Impervious (ac)	0.46
Rv	0.34
Weighted CN	74
Potential Max Soil Retention, S_{post} (in)	3.60

Conservation Area Credits

Scenario 1: Natural Conservation Area **See the GSMM Volume 2, Section 2.3.3.3 for more information.*

☐ Check the box if a portion of the post-developed area is protected by a conservation easement or equivalent form of protection.

Area (ac) of development protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 1 box above is checked

Scenario 2: Site Reforestation/Revegetation **See the GSMM Volume 2, Section 4.22 for more information.*

☐ Check the box if a portion of the post-developed area employs site reforestation/revegetation and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development reforested/revegetated and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 2 box above is checked

Scenario 3: Soil Restoration **See the GSMM Volume 2, Section 4.23 for more information.*

☐ Check the box if a portion of the post-developed area employs soil restoration and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development with restored soils and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 3 box above is checked

Scenario 4: Site Reforestation/Revegetation & Soil Restoration **See the GSMM Volume 2, Section 4.22 and 4.23 for more information.*

☐ Check the box if the same portion of the post-developed area employs site reforestation/revegetation and soil restoration, and is protected by a conservation easement or equivalent form of protection.

Area (ac) with restored soils in a reforested & revegetated area and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 4 box above is checked

Total Conservation Area Credit (acres) **0.00**

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: West Basin

data input cells
calculation cells
constant values

Water Quality Goals

Target Runoff Reduction Storm (in): 1.00

Total Site Area for Water Quality Volume (acres)	1.41
Target Runoff Reduction Volume (cf)	1,759
Target Water Quality Volume (cf)	2,110

Select BMPs for Runoff Reduction and Water Quality

		Area Draining to Each BMP			Storage Volume Provided by BMP (cf)	RR Conveyance Volume Provided by BMP (cf)	Down-stream BMP	Runoff Reduction Calculations						WQ Calculations	
		On-site Pervious Area (acres)	On-site Impervious Area (acres)	Offsite Area (acres)				RR Volume from Direct Drainage (cf)	RR Volume from Upstream Practices (cf)	Total RR Volume Received by BMP (cf)	Runoff Reduction %	RR Achieved (cf)	Remaining RR Volume (cf)	WQ_v from Direct Drainage (cf)	Effective TSS Removal %
BMP 1	Infiltration Trench	0.50	0.46		2,500			1,677	0	1,677	100%	1,677	0	2,012	100%
BMP 2	Vegetated Filter Strip (A & B hydrologic soils)	0.45				82		82	0	82	50%	41	41	98	60%
BMP 3	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 4	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 5	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 6	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 7	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 8	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 9	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 10	Select a BMP…							0	0	0	N/A	0	0	0	N/A
	TOTAL	0.95	0.46	0.00				1,759				1,718		2,110	
	UNTREATED AREA (acres)	0.00	0.00												

Target Runoff Reduction Volume (cf)	1,759
Target Achieved?	No
Remaining Runoff Reduction Volume (cf)	41

Target Water Quality Volume (cf)	2,110
% TSS Removal Achieved	98%
Target Achieved?	Yes!
Remaining TSS Removal %	0%

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: West Basin

data input cells
calculation cells
constant values

Channel and Flood Protection Calculations

	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Target Rainfall Event (in)				

	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Pre-Development Runoff Volume (in)	0.00	0.00	0.00	0.00
Post Development Runoff Volume (in) with no BMPs	0.00	0.00	0.00	0.00
Post-Development Runoff Volume (in) with BMPs	0.00	0.00	0.00	0.00
Adjusted CN	**0**	**0**	**0**	**0**

*See Stormwater Management Standards to Determine Detention Requirements.

Comments

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: South Basin

data input cells
calculation cells
constant values

Site Data

Indicate Pre-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG* A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Woods - Good Condition		30	0.14	55		70		77	0.14	100%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		0.14		0.00		0.00		0.14	100%

*HSG = hydrologic soil group

Impervious (ac)	0.00
Weighted CN	55
Potential Max Soil Retention, S_{pre} (in)	8.18

Indicate Post-Development Land Cover and Runoff Curve Numbers in the Site's Disturbed Area

Cover Type	HSG A (acres)	CN	HSG B (acres)	CN	HSG C (acres)	CN	HSG D (acres)	CN	Total	% Cover
Woods - Good Condition		30	0.02	55		70		77	0.02	100%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Select a land cover type…		0		0		0		0	0.00	0%
Local Jurisdiction Input									0.00	0%
Other									0.00	0%
Total	0.00		0.02		0.00		0.00		0.02	100%

Impervious (ac)	0.00
Rv	0.05
Weighted CN	55
Potential Max Soil Retention, S_{post} (in)	8.18

Conservation Area Credits

Scenario 1: Natural Conservation Area **See the GSMM Volume 2, Section 2.3.3.3 for more information.*

☐ Check the box if a portion of the post-developed area is protected by a conservation easement or equivalent form of protection.

Area (ac) of development protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 1 box above is checked

Scenario 2: Site Reforestation/Revegetation **See the GSMM Volume 2, Section 4.22 for more information.*

☐ Check the box if a portion of the post-developed area employs site reforestation/revegetation and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development reforested/revegetated and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 2 box above is checked

Scenario 3: Soil Restoration **See the GSMM Volume 2, Section 4.23 for more information.*

☐ Check the box if a portion of the post-developed area employs soil restoration and is protected by a conservation easement or equivalent form of protection.

Area (ac) of development with restored soils and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 3 box above is checked

Scenario 4: Site Reforestation/Revegetation & Soil Restoration **See the GSMM Volume 2, Section 4.22 and 4.23 for more information.*

☐ Check the box if the same portion of the post-developed area employs site reforestation/revegetation and soil restoration, and is protected by a conservation easement or equivalent form of protection.

Area (ac) with restored soils in a reforested & revegetated area and protected by a conservation easement or equivalent form of protection.

Note: The green cell will unlock if the Scenario 4 box above is checked

Total Conservation Area Credit (acres) **0.00**

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: South Basin

data input cells
calculation cells
constant values

Water Quality Goals

Target Runoff Reduction Storm (in): 1.00

Total Site Area for Water Quality Volume (acres)	0.02
Target Runoff Reduction Volume (cf)	4
Target Water Quality Volume (cf)	4

Select BMPs for Runoff Reduction and Water Quality

		Area Draining to Each BMP			Storage Volume Provided by BMP (cf)	RR Conveyance Volume Provided by BMP (cf)	Down-stream BMP	Runoff Reduction Calculations						WQ Calculations	
		On-site Pervious Area (acres)	On-site Impervious Area (acres)	Offsite Area (acres)				RR Volume from Direct Drainage (cf)	RR Volume from Upstream Practices (cf)	Total RR Volume Received by BMP (cf)	Runoff Reduction %	RR Achieved (cf)	Remaining RR Volume (cf)	WQ$_v$ from Direct Drainage (cf)	Effective TSS Removal %
BMP 1	Vegetated Filter Strip (A & B hydrologic soils)	0.02				4		4	0	4	50%	2	2	4	60%
BMP 2	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 3	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 4	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 5	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 6	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 7	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 8	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 9	Select a BMP…							0	0	0	N/A	0	0	0	N/A
BMP 10	Select a BMP…							0	0	0	N/A	0	0	0	N/A
	TOTAL	0.02	0.00	0.00				4				2		4	
	UNTREATED AREA (acres)	0.00	0.00												

Target Runoff Reduction Volume (cf)	4
Target Achieved?	No
Remaining Runoff Reduction Volume (cf)	2

Target Water Quality Volume (cf)	4
% TSS Removal Achieved	60%
Target Achieved?	No
Remaining TSS Removal %	20%

Georgia Stormwater Management Manual
Stormwater Quality Site Development Review Tool, v2.2

Development Name: Building Addition
Drainage Basin Name: South Basin

data input cells
calculation cells
constant values

Channel and Flood Protection Calculations

	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Target Rainfall Event (in)				

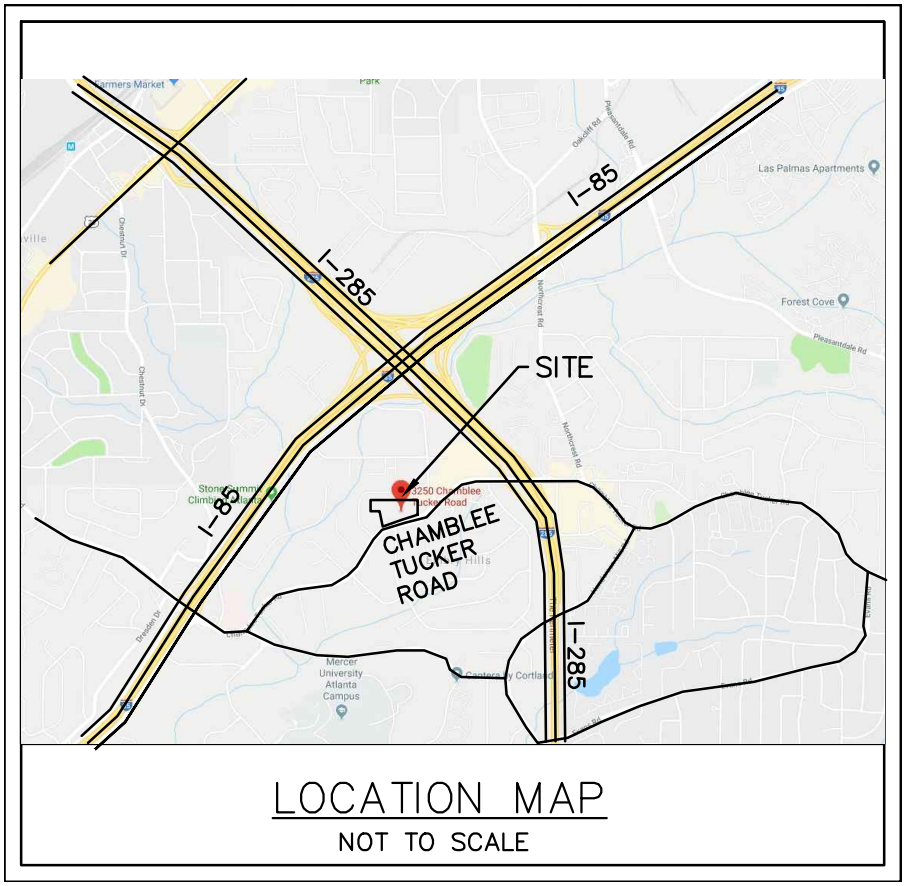
	1-yr, 24-hr storm	2-yr, 24-hr storm	25-yr, 24-hr storm	100-yr, 24-hr storm
Pre-Development Runoff Volume (in)	0.00	0.00	0.00	0.00
Post Development Runoff Volume (in) with no BMPs	0.00	0.00	0.00	0.00
Post-Development Runoff Volume (in) with BMPs	0.00	0.00	0.00	0.00
Adjusted CN	**0**	**0**	**0**	**0**

*See Stormwater Management Standards to Determine Detention Requirements.

Comments

Appendix C Reference Maps

- Location map
- FEMA map
- USGS Quad map
- Soil Survey
- Soil Hydro Map



LOCATION MAP

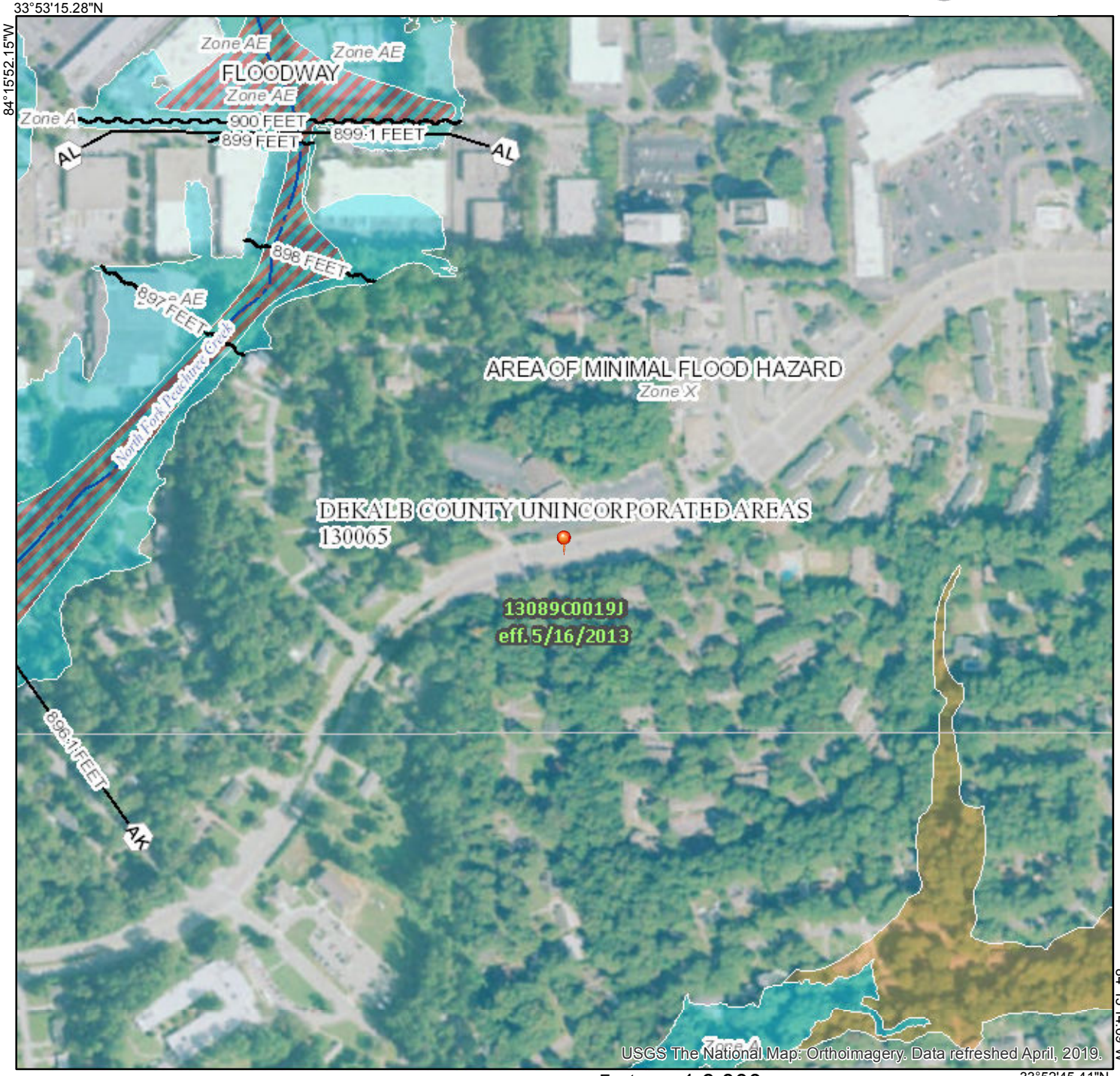
NOT TO SCALE

National Flood Hazard Layer FIRMette

FEMA

33°53'15.28"N

84°15'52.15"W



84°15'14.69"W

33°52'45.41"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

C2 - FEMA MAP

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

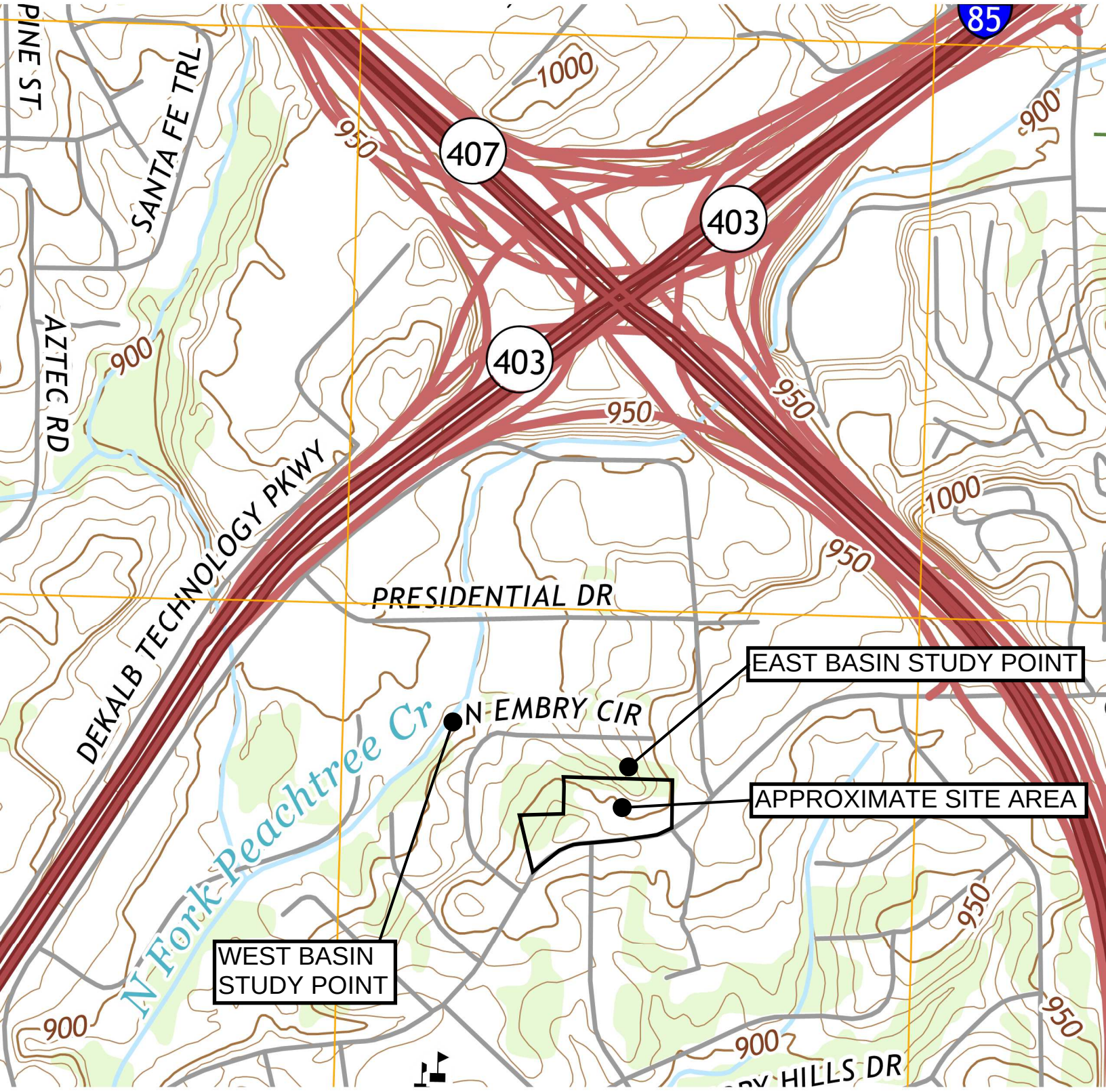
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

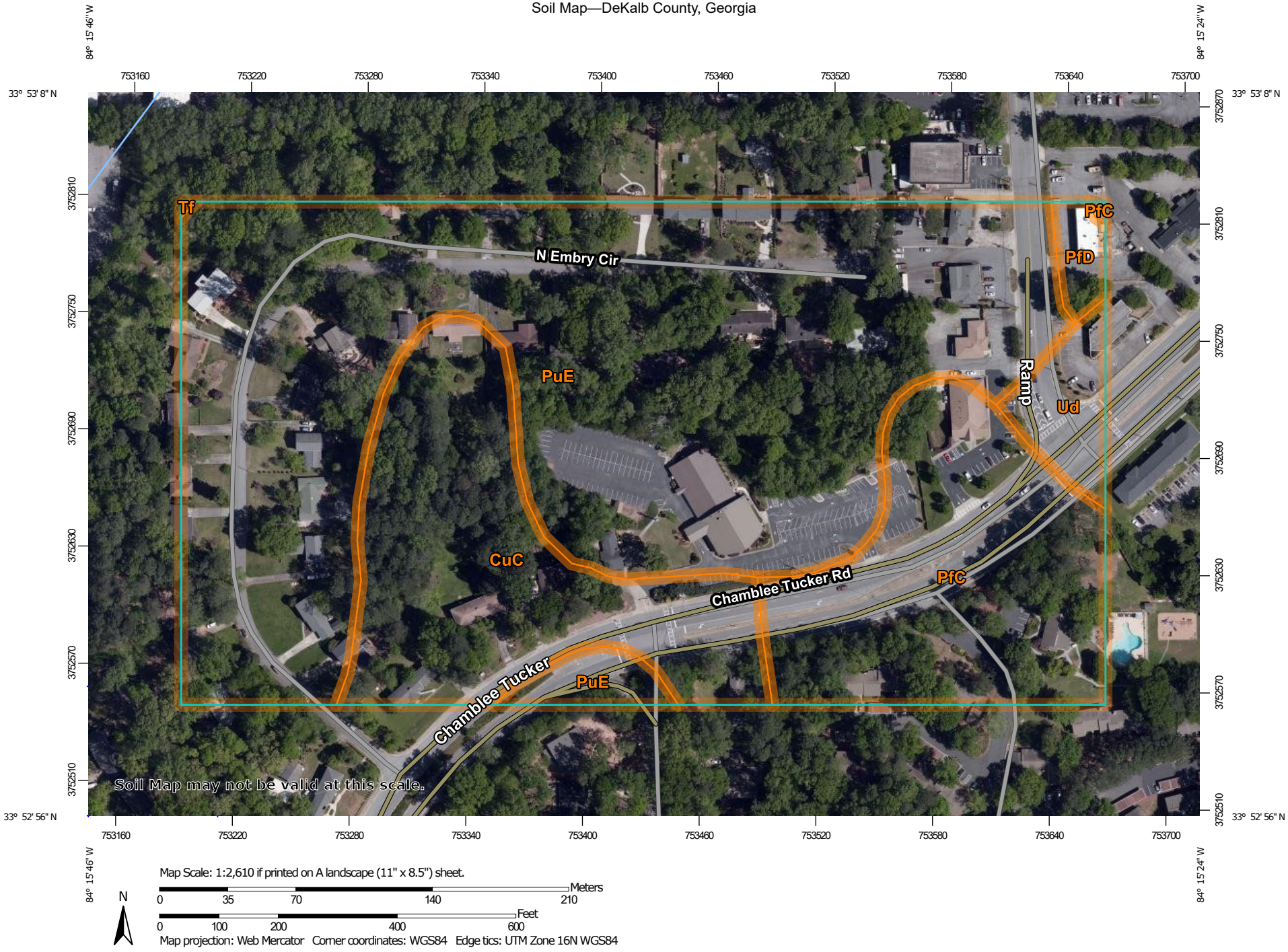
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/4/2019 at 11:25:25 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



USGS MAP

(NOT TO SCALE)



Map Scale: 1:2,610 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: DeKalb County, Georgia
Survey Area Data: Version 11, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 13, 2019—Apr 22, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CuC	Cecil-Urban land complex, 2 to 10 percent slopes	5.5	18.0%
PfC	Pacolet sandy loam, 2 to 10 percent slopes	5.2	17.0%
PfD	Pacolet sandy loam, 10 to 15 percent slopes	0.3	1.1%
PuE	Pacolet-Urban land complex, 10 to 25 percent slopes	18.6	61.2%
Tf	Toccoa sandy loam, 0 to 2 percent slopes, frequently flooded	0.0	0.0%
Ud	Urban land	0.8	2.7%
Totals for Area of Interest		**30.4**	**100.0%**

ESTIMATED SOIL PROPERTIES

SOIL SERIES	PERMEABILITY (In./Hrs.)	SOIL REACTION (pH)	SHRINK-SWELL POTENTIAL	CORROSIVITY		DEPTH TO:		FLOOD FRE-QUENCY	HYDRO-GROUP	SEPTIC TANK ABSORPTION FIELDS
				STEEL	CONCRETE	WATER TABLE (Ft.)	BEDROCK (In.)			
BRASSTOWN	0.6-2.0	4.5-6.0	Low	Mod.	High	>6.0	40-60	None	B	2-8%:M;r,pk 8-15%:M;r,pk,s 15+%:S;s
BREVARD	0.6-2.0	4.5-6.0	Low	Mod.	Mod.	>6.0	>60	None	B	2-8%:L 8-15%:M;s 15+%:S;s
BROOKMAN	0.06-0.2	4.5-7.8	Mod.	Mod.	Mod.	0-1.0	>60	None Rare Occ Freq	D	None, Rare:S;w,pk Occ,Freq:S;f,w,pk
BUNCOMBE	6.0-20	4.5-6.0	Low	Low	Mod.	>6.0	>60	Rare Occ Freq	A	Rare:S;pf Occ,Freq:S;f,pf
BURTON	0.6-6.0	3.6-6.0	Low	High	High	>6.0	20-40	None	B	5-%:S;r 15+%:S;r,s
CAHABA	0.6-2.0	4.5-6.0	Low	Mod.	Mod.	>6.0	>60	None Rare Occ	B	None:L Rare:M;f Occ:S;f
CAINHOY	<0.06	6.6-8.4	High	High	High	+1-1.0	>60	Freq	A	S;pf
CAPE FEAR	0.06-0.2	4.5-6.0	Mod.	High	High	0-1.5	>60	None Rare	D	S;w,pk
CAPERS	<0.06	6.6-8.4	High	High	High	+1-1.0	>60	Freq	D	S;w,f,pk
CAPSHAW	0.06-0.2	5.1-7.8	Mod.	High	Mod.	3.5-5.0	48>60	None	C	S;pk
CARNEGIE	0.2-0.6	4.5-5.5	Low	Low	Mod.	>6.0	>60	None	C	S;pk
CARTECAY	2.0-6.0	5.1-6.5	Low	Low	Mod.	0.5-1.5	>60	Occ Freq	C	S;w,f
CATASKA	2.0-20	4.5-5.5	Low	Low	Mod.	>6.0	20-40	None	B	10-15%:S;r 15+%:S;r,s
CECIL	0.6-0.2	4.5-5.5	Low	Mod.	Mod.	>6.0	>60	Non	B	0-8%:M;pk 8-15%:M;pk,s 15+%:S;s
CEDARBLUFF	0.06-0.2	5.1-6.0	Mod.	High	Mod.	0.5-1.0	>60	Freq	C	S;f,pk,w
CENTENARY	2.0-0.6	4.5-6.0	Low	Mod.	High	3.5-5.0	>60	None	A	S;w,p,f
CHANDLER	2.0-0.6	4.5-6.0	Low	Low	High	>6.0	>60	None	B	S;s

GaSWCC

ESTIMATED SOIL PROPERTIES

SOIL SERIES	PERMEABILITY (In./Hrs.)	SOIL REACTION (pH)	SHRINK-SWELL POTENTIAL	CORROSIVITY		DEPTH TO:		FLOOD FRE-QUENCY	HYDRO-GROUP	SEPTIC TANK ABSORPTION FIELDS
				STEEL	CONCRETE	WATER TABLE (Ft.)	BEDROCK (In.)			
OSIER	6.0-2.0	3.6-6.0	Low	High	High	0-1.0	>60	None Rare Occ Freq	A/D	None, Rare:S;w,pf Occ, Freq:S;w,f,pf
OUSLEY	6.0-20	4.5-5.5	Low	Low	High	1.5-3.0	>60	Occ Freq	C	S;f,w,pf
PACOLET	0.6-2.0	4.5-6.0	Low	High	High	>6.0	>60	None	B	2-8%:M;pk 8-15%:M;s,pk 15+%:S;s
PASQUATANK	0.6-2.0	4.5-5.5	Low	High	Mod.	1.0-2.0	>60	None	B/D	S;w
PELHAM	0.6-2.0	3.6-5.5	Low	High	High	0-1.0	>60	None Rare Occ Freq	B/D	None, Rare:S;w Occ, Freq:S;w,f
PELION	.06-0.6	3.6-5.5	Low	High	High	1.0-2.5	>60	None	B/D	S;pk,w
PERSANTI	0.06-0.2	3.6-5.5	Mod.	High	High	2.0-3.5	>60	None	C	S;w,pk
PICKNEY	6.0-20	3.6-6.0	Low	High	High	+1-1.0	>60	None	A/D	S;w,pf
PLUMMER	0.6-2.0	3.6-5.5	Low	Mod.	High	0-1.0	>60	None Rare Occ Freq	B/D	None, Rare:S;w,pf Occ, Freq:S;w,f,pf
POINDEXTER	0.6-2.0	5.1-7.3	Low	Mod.	Mod.	>6.0	20-40	None	B	2-15%:S;r 15+%:S;r,s
PONZER	0.06-2.0	3.6-7.8	Low	High	High	0-1.0	>60	None Rare Occ Freq	D	Rare:S;w,pk Occ, Freq:S;f,w,pk
POOLER	0.06-0.2	3.6-5.5	Mod.	High	High	0-1.0	>60	None	D	S;pk,w
PORTERS	2.0-6.0	4.5-6.0	Low	Low	High	>6.0	40-60	None	B	8-15%:M;r,s 6-8%:M;r 15+%:S;s
PORTSMOUTH	0.6-2.0	3.6-6.0	Low	High	High	0-1.0	>60	None	B/D	S;w,pf
POTTSBURG	0.6-2.0	3.6-6.0	Low	High	High	0-1.0	>60	None Rare Occ	B/D	None,Rare:S;w,pf Occ:S;f,w,pf
RABUN	0.6-2.0	5.1-6.5	Low	High	Mod.	>6.0	>60	None	B	2-8%:M;pk 8-15%:M;s,pk 15+%:S;s
RAINS	0.6-2.0	3.6-5.5	Low	High	High	0-1.0	>60	None Rare Occ Freq	B/D	None,Rare:S;w Occ,Freq:S;f,w

GaSWCC

Appendix D Drainage Maps

- Predeveloped Conditions Drainage Map
- Post Developed Conditions Drainage Map
- 10% Downstream Drainage Map
- Inlet Drainage Map

EXISTING 36" CULVERT

N. Embry Circle

EAST BASIN STUDY POINT

EAST BASIN BYPASS
0.37 AC
CN = 55

OFFSITE EAST BASIN – BEGIN 50 LF
PAVED OVERLAND FLOWPATH
SLOPE = (974–972)/50 = 4.0%

OFFSITE EAST BASIN – BEGIN 115 LF
GRASSED SHALLOW FLOWPATH
SLOPE = (929–920)/115 = 7.83%

OFFSITE EAST BASIN – BEGIN 300 LF
PAVED SHALLOW CHANNEL FLOWPATH
SLOPE = (972–959)/300 = 4.33%

EAST BYPASS BASIN – BEGIN 180 LF
GRASSED OVERLAND FLOW
SLOPE = (950–913)/180 = 20.56%

EAST BASIN – BEGIN 225 LF PAVED
SHALLOW CHANNEL FLOW
SLOPE = (944–920)/225 = 10.67%

EAST BASIN – BEGIN 138 LF PAVED
OVERLAND FLOWPATH
SLOPE = (953–949.30)/138 = 2.68%

EAST BASIN – BEGIN 63 LF SHALLOW
UN–PAVED CHANNEL FLOWPATH
SLOPE = (972–953)/63 = 30.16%

WEST BASIN
STUDY POINT

WEST BASIN
D.A. = 1.29 AC
0.20 AC @ CN=98
0.26 AC @ CN=61
0.83 AC @ CN=55

OFFSITE EAST BASIN – BEGIN 461 LF
PIPE–NETWORK FLOWPATH
SLOPE = (954–929)/461 = 5.42%

OFFSITE EAST BASIN
TO EX. POND
4.77 AC @ CN=92

EAST BASIN – BEGIN 67 LF PAVED
OVERLAND FLOWPATH
SLOPE = (975–972)/67 = 4.48%

EAST BASIN – BEGIN 28 LF GRASSED
OVERLAND FLOWPATH
SLOPE = (977.50–975)/28 = 8.9%

WEST BASIN – BEGIN 241 LF SHALLOW
UN–PAVED CHANNEL FLOWPATH
SLOPE = (970–944)/241 = 10.8%

WEST BASIN – BEGIN 38 LF GRASSED
OVERLAND FLOWPATH
SLOPE = (977.5–974)/38 = 9.2%

WEST BASIN – BEGIN 74 LF PAVED
SHALLOW OVERLAND FLOWPATH
SLOPE = (974–970)/74 = 5.4%

ONSITE EAST BASIN
TO EX. POND
D.A. = 4.00 AC
2.02 AC. @ CN = 98
1.08 AC @ CN = 61
0.90 AC @ CN = 55

SOUTH BASIN
STUDY POINT

SOUTH BASIN
D.A. = 0.14 AC
0.03 AC @ CN=98
0.02 AC @ CN=61
0.09 AC @ CN=55

ONSITE EAST BASIN
SUB–AREA TO EX. GRAVEL
INFILTRATION TRENCH
D.A. = 0.20 AC
0.13 AC. @ CN = 98
0.07 AC @ CN = 61

NOTE: FLOWPATH IS SO SHORT,
MINIMUM OF 5 MINUTES USED FOR Tc

EXISTING CURB INLETS AT
APARTMENT ENTRANCE AREA
ASSUMED TO FLOW SOUTHWARD

Buckeye Rd

N Embry Cir

Chamblee Tucker Road

Oakwood Village Ln

NORTH

60' 0' 60' 120' 180'
SCALE: 1" = 60'

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Cornerstone Site Consultants, LLC
2985 Gordy Parkway, Suite 119
Marietta, GA 30066
CSC Project # 2019-0020

OWNER
EMBRY HILLS
CHURCH OF CHRIST
3250 CHAMBLEE-TUCKER ROAD
ATLANTA, GA 30341

EMBRY HILLS
CHURCH OF CHRIST
RENOVATION / ADDITION
ATLANTA, GA

No.	Date	Description
		ISSUANCE

PROJECT NUMBER

DRAWN: CHC
CHECKED: AMH

SHEET TITLE
PREDEVELOPED DRAINAGE MAP

SHEET NO.
HY01

EXISTING 36" CULVERT

EAST BASIN STUDY POINT

NOTE: TOP OF DAM SLOPES INWARD TO POND

EAST BYPASS BASIN – BEGIN 130 LF
GRASSED OVERLAND FLOW
SLOPE = (939.72–913)/130 = 20.56%

EAST BASIN BYPASS
0.37 AC @ CN = 55

EAST BYPASS BASIN – BEGIN 50 LF
GRASSED OVERLAND FLOW
SLOPE = (950–939.72)/50 = 20.56%

EXPANDED EXISTING DETENTION POND

WEST BASIN BYPASS
D.A. = 0.45 AC
0.15 AC @ CN=61
0.30 AC @ CN=55

EAST BASIN – BEGIN 465 LF PAVED
CHANNEL FLOWPATH
SLOPE = (948–918)/465 = 6.45%

EAST BASIN TO POND
D.A. = 4.00 AC
2.30 AC @ CN=98
1.00 AC @ CN=61
0.70 AC @ CN=92

WEST BASIN STUDY POINT

PROPOSED BUILDING
VARIABLE FFE

EX. BLDG
TO REMAIN
FFE: 950.97

WEST BYPASS – BEGIN 70 LF
GRASSED OVERLAND FLOW
SLOPE = (953–944)/70 = 12.86%

WEST BYPASS – BEGIN 50 LF
GRASSED OVERLAND FLOW
SLOPE = (956–953)/50 = 6.0%

OFFSITE EAST BASIN
TO DET. POND
4.77 AC @ CN=92

EAST BASIN – BEGIN 164 LF PAVED
SHALLOW FLOWPATH
SLOPE = (965–955.50)/164 = 5.79%

EAST BASIN – BEGIN 25 LF
GRASSED OVERLAND FLOWPATH
SLOPE = (975–965)/25 = 40%

Yellow hatch indicates
new / redeveloped
impervious area

SHADED AREA INDICATES PROPOSED
UNDERGROUND DETENTION POND

WEST BASIN – BEGIN 25 LF
GRASSED OVERLAND FLOWPATH
SLOPE = (975–965)/25 = 40%

SOUTH BASIN
0.02 AC

WEST BASIN – BEGIN 326 LF
PAVED OVERLAND FLOWPATH
SLOPE = (965–954)/326 = 3.37%

SOUTH BASIN
STUDY POINT

WEST BASIN TO
EAST POND
D.A. = 0.96 AC
0.51 AC @ CN = 98
0.26 AC. @ CN = 69
0.19 AC. @ CN = 61

ONSITE EAST BASIN
SUB–AREA TO EX. GRAVEL
INFILTRATION TRENCH
D.A. = 0.20 AC
0.13 AC. @ CN = 98
0.07 AC @ CN = 61

Impervious area from driveway aisles and some parking areas not suitable for pervious paving materials.

Pervious paving materials area limited to selected parking space areas

NORTH

60' 0' 60' 120' 180'
SCALE: 1" = 60'

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EMBRY HILLS
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ATLANTA, GA

No.	Date	Description
		ISSUANCE

PROJECT NUMBER

DRAWN: CHC
CHECKED: AMH

SHEET TITLE: POST DEVELOPED DRAINAGE MAP

SHEET NO.: HY02

350 AC @ CN=75 ($\frac{1}{4}$ ACRE LOTS)

TOTAL AREA: 5500 AC
2220 AC @ CN=92 (COMMERCIAL)
350 AC @ CN=75 ($\frac{1}{4}$ ACRE LOTS)
830 AC @ CN=72 ($\frac{1}{3}$ ACRE LOTS)
2100 AC @ CN=70 ($\frac{1}{2}$ ACRE LOTS)

830 AC @ CN=72 ($\frac{1}{3}$ ACRE LOTS)

DOWNSTREAM BASIN – BEGIN 100 LF
PAVED OVERLAND FLOW
SLOPE 2%

DOWNSTREAM BASIN – BEGIN 565 LF
UNPAVED SHALLOW FLOW
SLOPE 2.65%

DOWNSTREAM BASIN – BEGIN 1,805 LF
PAVED SHALLOW FLOW
SLOPE 1.00%

DOWNSTREAM BASIN – BEGIN 7,938 LF
CHANNEL FLOW
SLOPE 0.50%

2220 AC @ CN=92 (COMMERCIAL)

APPROXIMATE TIME OF CONCENTRATION FLOWPATH

DOWNSTREAM BASIN – BEGIN 12,753 LF
CHANNEL FLOW
SLOPE 0.80%

2100 AC @ CN=70 ($\frac{1}{2}$ ACRE LOTS)

DOWNSTREAM STUDY POINT

SITE AREA

NORTH

1000' 0' 1000' 2000' 3000'
SCALE: 1" = 1000'

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ATLANTA, GA

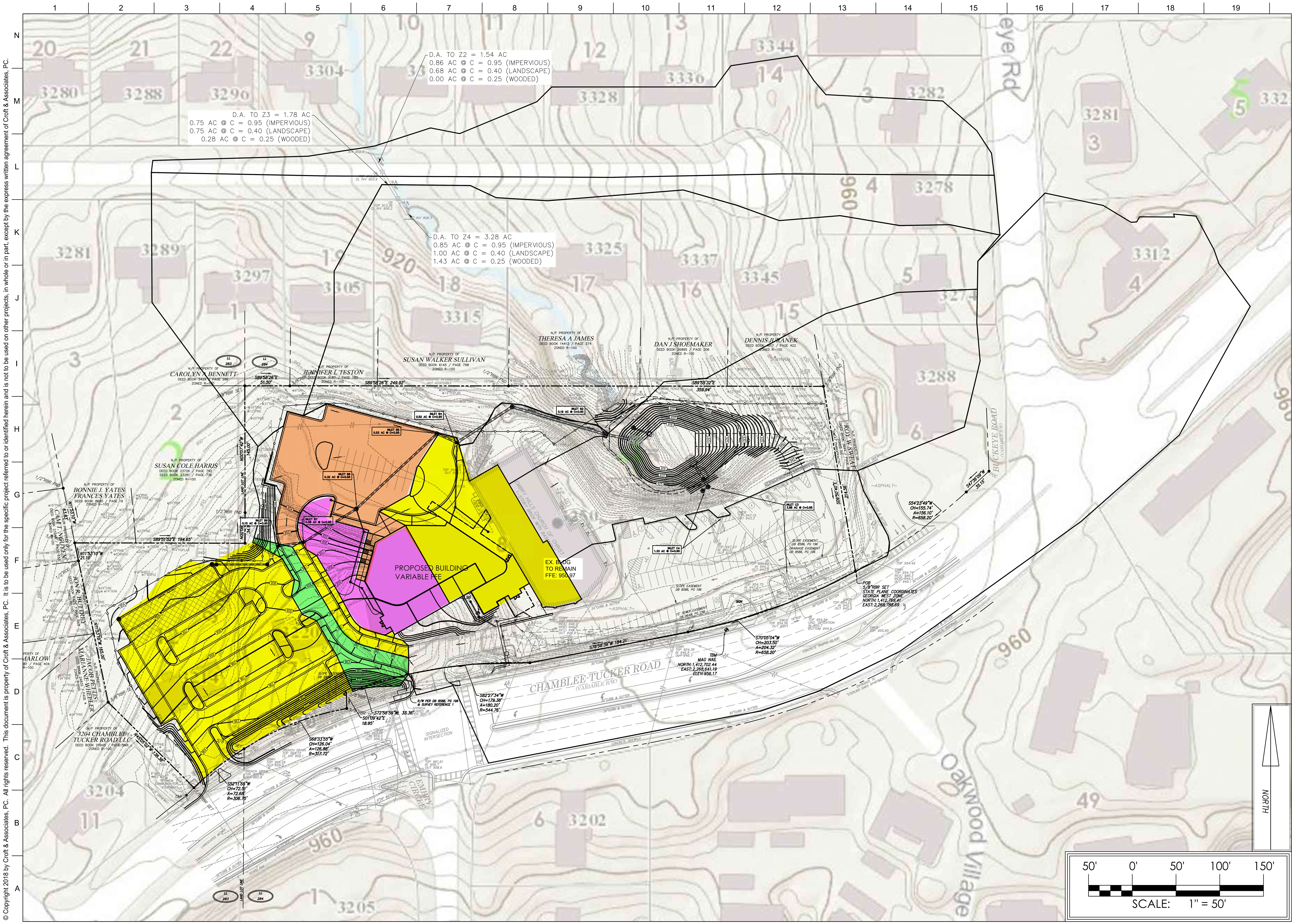
No.	Date	Description
		ISSUANCE

PROJECT NUMBER

DRAWN: CHC
CHECKED: AMH

SHEET TITLE: DOWNSTREAM DRAINAGE MAP

SHEET NO.: HY03



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RENOVATION / ADDITION
ATLANTA, GA

No.	Date	Description
ISSUANCE		

PROJECT NUMBER

DRAWN: CHC
CHECKED: AMH

SHEET TITLE INLET DRAINAGE MAP

SHEET NO.

HY04

Appendix E Hydraflow Computer Model Data

- Summary Pages
- Time of Concentration Calculations
- Hydrographs

Hydrograph by Return Period

Hydrology Studio v 3.0.0.16

Project Name:

11-12-2020

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	NRCS Runoff	Pre East Onsite Ex Pond	10.38	12.18		16.26	19.91	25.26	29.67	34.36
2	NRCS Runoff	Pre East Offsite	20.87	23.26		28.46	32.96	39.43	44.62	50.08
3	Junction	Pre To Ex East Pond	31.10	35.31		44.61	52.80	64.68	74.28	84.44
4	Pond Route	Pre East Pond Routed	25.54	29.51		38.20	51.23	64.48	74.02	84.13
5	NRCS Runoff	Pre East Bypass	0.115	0.191		0.397	0.608	0.952	1.255	1.595
6	Junction	Pre East Study Pt - Ex	25.65	29.70		38.58	51.84	65.43	75.27	85.72
8	NRCS Runoff	Pre East -90% condition	0.951	1.626		3.490	5.416	8.574	11.35	14.47
9	Junction	Pre East Study Pt Code	21.26	24.19		31.09	37.40	46.82	54.63	63.05
11	NRCS Runoff	Post East Onsite to Pond	11.86	13.74		17.95	21.67			
12	NRCS Runoff	Post West to West Pond	3.090	3.551		4.575	5.489	6.814	7.884	9.015
13	Pond Route	Post West Pond Routed	0.025	0.043		0.128	0.259	0.585	0.957	1.477
14	Junction	Post To East Pond	32.65	36.93		46.38	54.65	66.61	76.41	86.89
15	Pond Route	Post East Pond Routed	19.98	23.07		29.17	33.70	38.55	41.45	45.28
16	Junction	Post East Study Pt	20.08	23.23		29.47	34.13	39.20	42.29	46.28
18	NRCS Runoff	Pre West - actual	1.242	1.648		2.626	3.557	4.999	6.228	7.573
19	NRCS Runoff	Pre West - 90% condition	0.360	0.599		1.246	1.905	2.986	3.936	5.000
20	NRCS Runoff	Post West Study Point	0.204	0.312		0.584	0.862	1.303	1.688	2.117
22	NRCS Runoff	Pre South - actual	0.162	0.209		0.321	0.426	0.589	0.726	0.875
23	NRCS Runoff	Pre South-90% condition	0.040	0.067		0.140	0.213	0.335	0.441	0.560
24	NRCS Runoff	Post South Study Point	0.016	0.021		0.036	0.049	0.071	0.089	0.110
26	NRCS Runoff	Pre Downstream with site	5847.5	6866.8		9170.1	11236.1	14283.0	16772.1	19418.2
27	NRCS Runoff	Downstream w/o site	5836.4	6853.8		9152.7	11214.8	14256.0	16740.3	19381.4
28	Junction	Post Downstream with site	5844.4	6862.8		9164.0	11229.0	14274.5	16763.3	19410.1

East

This is what is going to east pond from west pond

Hydrograph 1-yr Summary

Project Name:

11-12-2020

Hydrology Studio v 3.0.0.16

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	10.38	11.97	20,841	----		
2	NRCS Runoff	Pre East Offsite	20.87	11.95	44,693	----		
3	Junction	Pre To Ex East Pond	31.10	11.95	65,534	1, 2		
4	Pond Route	Pre East Pond Routed	25.54	12.00	65,534	3	923.27	12,302
5	NRCS Runoff	Pre East Bypass	0.115	12.00	415	----		
6	Junction	Pre East Study Pt - Ex	25.65	12.00	65,949	4, 5		
8	NRCS Runoff	Pre East -90% condition	0.951	12.03	4,278	----		
9	Junction	Pre East Study Pt Code	21.26	11.95	48,972	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	11.86	11.97	23,897	----		
12	NRCS Runoff	Post West to West Pond	3.090	11.97	6,258	----		
13	Pond Route	Post West Pond Routed	0.025	24.03	2,895	12	949.94	4,705
14	Junction	Post To East Pond	32.65	11.95	71,485	2, 11, 13		
15	Pond Route	Post East Pond Routed	19.98	12.03	68,899	14	921.31	22,016
16	Junction	Post East Study Pt	20.08	12.03	69,314	5, 15		
18	NRCS Runoff	Pre West - actual	1.242	11.97	2,862	----		
19	NRCS Runoff	Pre West - 90% condition	0.360	12.00	1,302	----		
20	NRCS Runoff	Post West Study Point	0.204	12.00	614	----		
22	NRCS Runoff	Pre South - actual	0.162	11.97	356	----		
23	NRCS Runoff	Pre South-90% condition	0.040	12.00	146	----		
24	NRCS Runoff	Post South Study Point	0.016	11.98	38.3	----		
26	NRCS Runoff	Pre Downstream with site	5847.5	12.33	30,321,020	----		
27	NRCS Runoff	Downstream w/o site	5836.4	12.33	30,263,520	----		
28	Junction	Post Downstream with site	5844.4	12.33	30,333,340	16, 20, 27		

Hydrograph 2-yr Summary

Project Name:

11-12-2020

Hydrology Studio v 3.0.0.16

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	12.18	11.97	24,489	----		
2	NRCS Runoff	Pre East Offsite	23.26	11.95	50,164	----		
3	Junction	Pre To Ex East Pond	35.31	11.95	74,653	1, 2		
4	Pond Route	Pre East Pond Routed	29.51	12.00	74,653	3	923.49	13,192
5	NRCS Runoff	Pre East Bypass	0.191	12.00	566	----		
6	Junction	Pre East Study Pt - Ex	29.70	12.00	75,218	4, 5		
8	NRCS Runoff	Pre East -90% condition	1.626	12.03	5,826	----		
9	Junction	Pre East Study Pt Code	24.19	11.97	55,990	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	13.74	11.97	27,782	----		
12	NRCS Runoff	Post West to West Pond	3.551	11.97	7,227	----		
13	Pond Route	Post West Pond Routed	0.043	19.47	3,482	12	950.05	5,240
14	Junction	Post To East Pond	36.93	11.95	81,429	2, 11, 13		
15	Pond Route	Post East Pond Routed	23.07	12.03	78,801	14	921.65	23,965
16	Junction	Post East Study Pt	23.23	12.03	79,367	5, 15		
18	NRCS Runoff	Pre West - actual	1.648	11.97	3,618	----		
19	NRCS Runoff	Pre West - 90% condition	0.599	12.00	1,773	----		
20	NRCS Runoff	Post West Study Point	0.312	11.98	817	----		
22	NRCS Runoff	Pre South - actual	0.209	11.97	445	----		
23	NRCS Runoff	Pre South-90% condition	0.067	12.00	199	----		
24	NRCS Runoff	Post South Study Point	0.021	11.97	49.1	----		
26	NRCS Runoff	Pre Downstream with site	6866.8	12.33	35,373,840	----		
27	NRCS Runoff	Downstream w/o site	6853.8	12.33	35,306,750	----		
28	Junction	Post Downstream with site	6862.8	12.33	35,387,200	16, 20, 27		

Hydrograph 5-yr Summary

Project Name:

11-12-2020

Hydrology Studio v 3.0.0.16

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	16.26	11.97	32,854	----		
2	NRCS Runoff	Pre East Offsite	28.46	11.95	62,238	----		
3	Junction	Pre To Ex East Pond	44.61	11.95	95,092	1, 2		
4	Pond Route	Pre East Pond Routed	38.20	12.00	95,091	3	924.04	15,348
5	NRCS Runoff	Pre East Bypass	0.397	11.98	954	----		
6	Junction	Pre East Study Pt - Ex	38.58	12.00	96,046	4, 5		
8	NRCS Runoff	Pre East -90% condition	3.490	12.02	9,829	----		
9	Junction	Pre East Study Pt Code	31.09	11.97	72,067	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	17.95	11.97	36,605	----		
12	NRCS Runoff	Post West to West Pond	4.575	11.95	9,413	----		
13	Pond Route	Post West Pond Routed	0.128	14.27	5,554	12	950.16	5,778
14	Junction	Post To East Pond	46.38	11.95	104,397	2, 11, 13		
15	Pond Route	Post East Pond Routed	29.17	12.03	101,756	14	922.33	28,073
16	Junction	Post East Study Pt	29.47	12.03	102,711	5, 15		
18	NRCS Runoff	Pre West - actual	2.626	11.97	5,465	----		
19	NRCS Runoff	Pre West - 90% condition	1.246	11.98	2,992	----		
20	NRCS Runoff	Post West Study Point	0.584	11.97	1,333	----		
22	NRCS Runoff	Pre South - actual	0.321	11.97	658	----		
23	NRCS Runoff	Pre South-90% condition	0.140	11.98	335	----		
24	NRCS Runoff	Post South Study Point	0.036	11.97	75.8	----		
26	NRCS Runoff	Pre Downstream with site	9170.1	12.33	46,883,410	----		
27	NRCS Runoff	Downstream w/o site	9152.7	12.33	46,794,510	----		
28	Junction	Post Downstream with site	9164.0	12.33	46,898,740	16, 20, 27		

Hydrograph 10-yr Summary

Project Name:

11-12-2020

Hydrology Studio v 3.0.0.16

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	19.91	11.97	40,477	----		
2	NRCS Runoff	Pre East Offsite	32.96	11.95	72,845	----		
3	Junction	Pre To Ex East Pond	52.80	11.95	113,322	1, 2		
4	Pond Route	Pre East Pond Routed	51.23	11.97	113,321	3	924.21	15,982
5	NRCS Runoff	Pre East Bypass	0.608	11.97	1,350	----		
6	Junction	Pre East Study Pt - Ex	51.84	11.97	114,672	4, 5		
8	NRCS Runoff	Pre East -90% condition	5.416	12.00	13,909	----		
9	Junction	Pre East Study Pt Code	37.40	11.97	86,754	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	21.67	11.97	44,569	----		
12	NRCS Runoff	Post West to West Pond	5.489	11.95	11,374	----		
13	Pond Route	Post West Pond Routed	0.259	13.05	7,441	12	950.27	6,354
14	Junction	Post To East Pond	54.65	11.95	124,855	2, 11, 13		
15	Pond Route	Post East Pond Routed	33.70	12.03	122,207	14	922.91	31,794
16	Junction	Post East Study Pt	34.13	12.03	123,557	5, 15		
18	NRCS Runoff	Pre West - actual	3.557	11.97	7,256	----		
19	NRCS Runoff	Pre West - 90% condition	1.905	11.97	4,234	----		
20	NRCS Runoff	Post West Study Point	0.862	11.97	1,852	----		
22	NRCS Runoff	Pre South - actual	0.426	11.97	863	----		
23	NRCS Runoff	Pre South-90% condition	0.213	11.97	474	----		
24	NRCS Runoff	Post South Study Point	0.049	11.97	102	----		
26	NRCS Runoff	Pre Downstream with site	11236.1	12.32	57,304,950	----		
27	NRCS Runoff	Downstream w/o site	11214.8	12.32	57,196,260	----		
28	Junction	Post Downstream with site	11229.0	12.32	57,321,870	16, 20, 27		

Hydrograph 25-yr Summary

Project Name:

11-12-2020

Hydrology Studio v 3.0.0.16

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	25.26	11.97	51,874	----		
2	NRCS Runoff	Pre East Offsite	39.43	11.95	88,240	----		
3	Junction	Pre To Ex East Pond	64.68	11.95	140,114	1, 2		
4	Pond Route	Pre East Pond Routed	64.48	11.97	140,113	3	924.31	16,411
5	NRCS Runoff	Pre East Bypass	0.952	11.97	2,000	----		
6	Junction	Pre East Study Pt - Ex	65.43	11.97	142,113	4, 5		
8	NRCS Runoff	Pre East -90% condition	8.574	12.00	20,595	----		
9	Junction	Pre East Study Pt Code	46.82	11.97	108,835	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	27.16	11.95	56,383	----		
12	NRCS Runoff	Post West to West Pond	6.814	11.95	14,270	----		
13	Pond Route	Post West Pond Routed	0.585	12.45	10,250	12	950.48	7,424
14	Junction	Post To East Pond	66.61	11.95	154,874	2, 11, 13		
15	Pond Route	Post East Pond Routed	38.55	12.03	152,215	14	923.75	37,689
16	Junction	Post East Study Pt	39.20	12.03	154,214	5, 15		
18	NRCS Runoff	Pre West - actual	4.999	11.97	10,074	----		
19	NRCS Runoff	Pre West - 90% condition	2.986	11.97	6,269	----		
20	NRCS Runoff	Post West Study Point	1.303	11.97	2,691	----		
22	NRCS Runoff	Pre South - actual	0.589	11.97	1,183	----		
23	NRCS Runoff	Pre South-90% condition	0.335	11.97	703	----		
24	NRCS Runoff	Post South Study Point	0.071	11.97	144	----		
26	NRCS Runoff	Pre Downstream with site	14283.0	12.32	72,803,180	----		
27	NRCS Runoff	Downstream w/o site	14256.0	12.32	72,665,090	----		
28	Junction	Post Downstream with site	14274.5	12.32	72,822,790	16, 20, 27		

Hydrograph 50-yr Summary

Project Name:

11-12-2020

Hydrology Studio v 3.0.0.16

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	29.67	11.95	61,328	----		
2	NRCS Runoff	Pre East Offsite	44.62	11.95	100,717	----		
3	Junction	Pre To Ex East Pond	74.28	11.95	162,045	1, 2		
4	Pond Route	Pre East Pond Routed	74.02	11.97	162,044	3	924.38	16,683
5	NRCS Runoff	Pre East Bypass	1.255	11.97	2,579	----		
6	Junction	Pre East Study Pt - Ex	75.27	11.97	164,623	4, 5		
8	NRCS Runoff	Pre East -90% condition	11.35	12.00	26,563	----		
9	Junction	Pre East Study Pt Code	54.63	11.97	127,280	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	31.62	11.95	66,122	----		
12	NRCS Runoff	Post West to West Pond	7.884	11.95	16,648	----		
13	Pond Route	Post West Pond Routed	0.957	12.22	12,571	12	950.68	8,407
14	Junction	Post To East Pond	76.41	11.95	179,409	2, 11, 13		
15	Pond Route	Post East Pond Routed	41.45	12.03	176,744	14	924.45	42,971
16	Junction	Post East Study Pt	42.29	12.03	179,323	5, 15		
18	NRCS Runoff	Pre West - actual	6.228	11.97	12,510	----		
19	NRCS Runoff	Pre West - 90% condition	3.936	11.97	8,086	----		
20	NRCS Runoff	Post West Study Point	1.688	11.97	3,434	----		
22	NRCS Runoff	Pre South - actual	0.726	11.97	1,458	----		
23	NRCS Runoff	Pre South-90% condition	0.441	11.97	906	----		
24	NRCS Runoff	Post South Study Point	0.089	11.97	180	----		
26	NRCS Runoff	Pre Downstream with site	16772.1	12.32	85,604,490	----		
27	NRCS Runoff	Downstream w/o site	16740.3	12.32	85,442,230	----		
28	Junction	Post Downstream with site	16763.3	12.32	85,625,520	16, 20, 27		

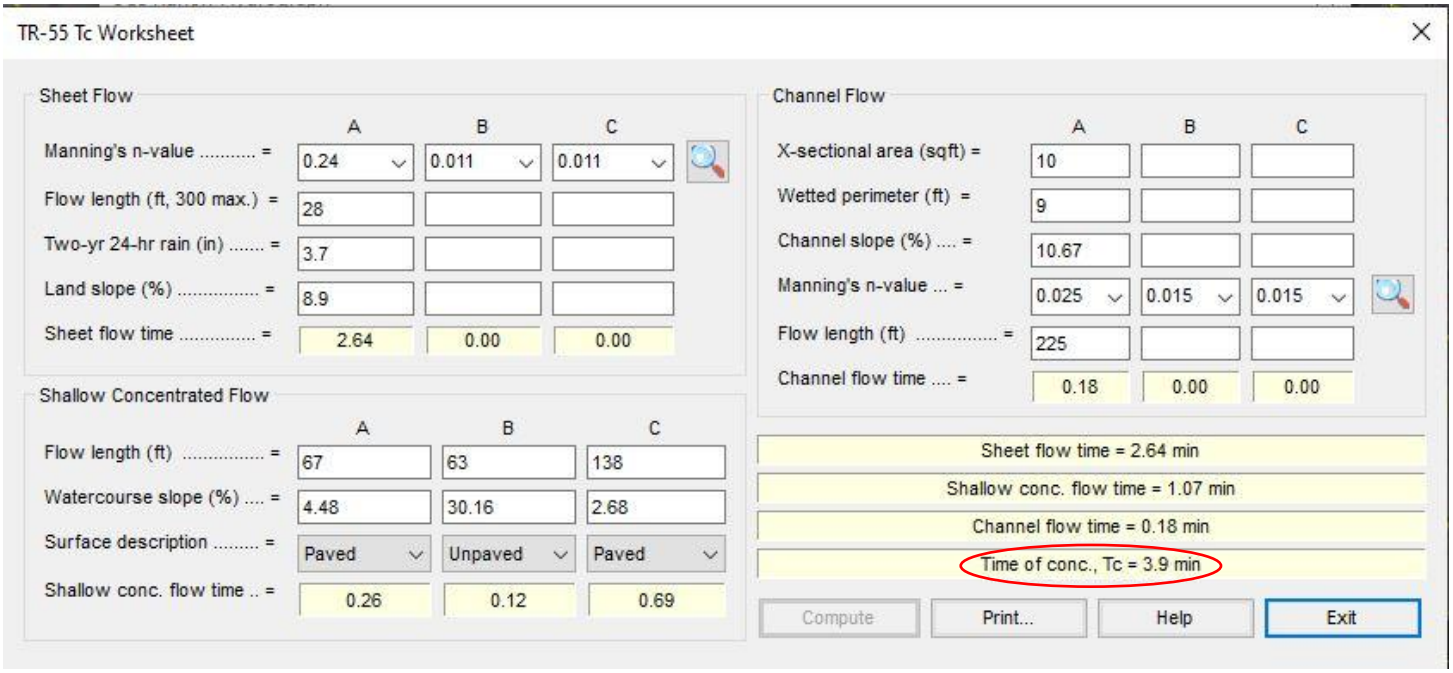
Hydrograph 100-yr Summary

Project Name:

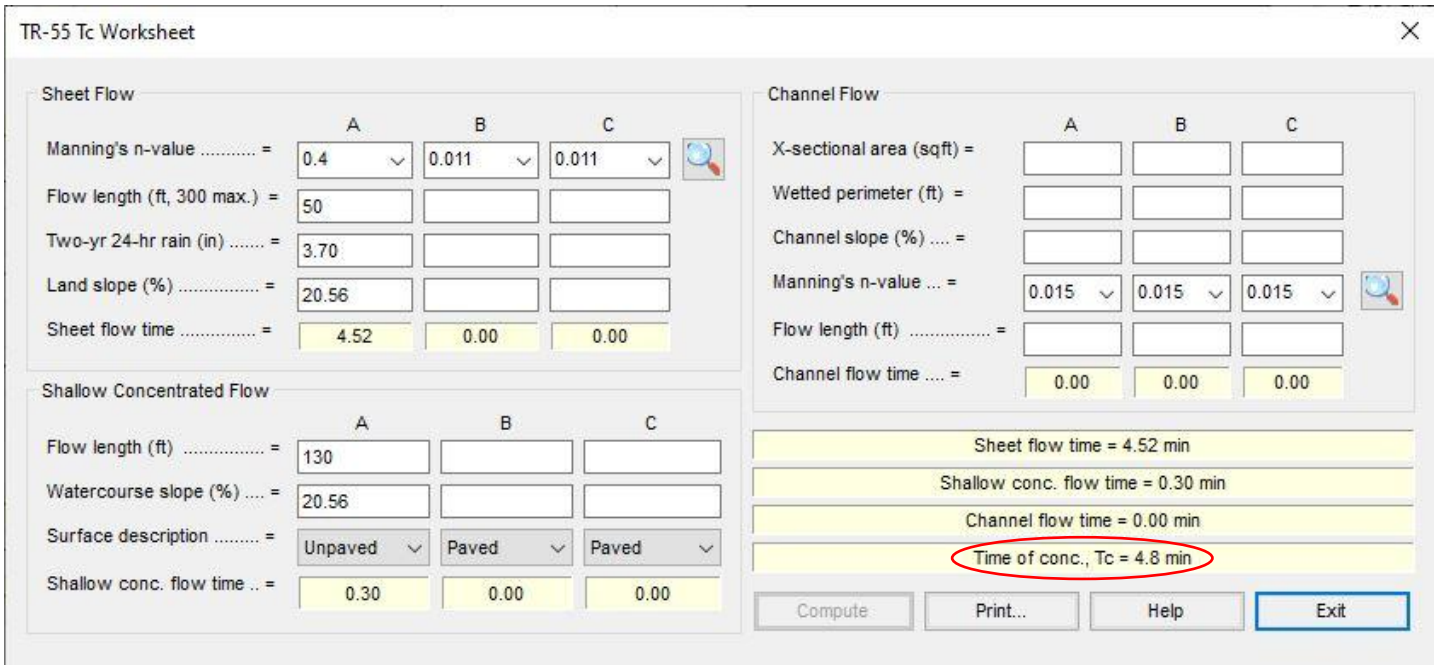
11-12-2020

Hydrology Studio v 3.0.0.16

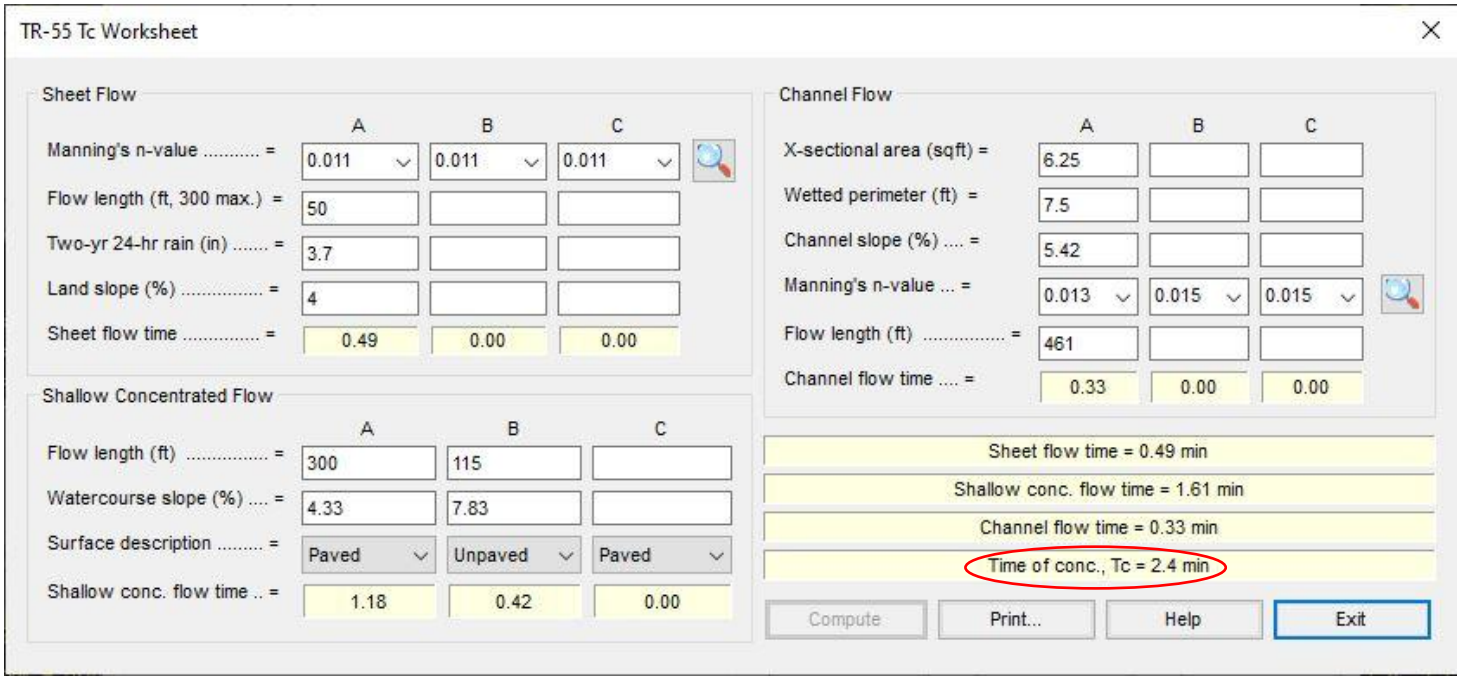
Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre East Onsite Ex Pond	34.36	11.95	71,503	----		
2	NRCS Runoff	Pre East Offsite	50.08	11.95	113,936	----		
3	Junction	Pre To Ex East Pond	84.44	11.95	185,439	1, 2		
4	Pond Route	Pre East Pond Routed	84.13	11.97	185,438	3	924.45	16,953
5	NRCS Runoff	Pre East Bypass	1.595	11.97	3,236	----		
6	Junction	Pre East Study Pt - Ex	85.72	11.97	188,675	4, 5		
8	NRCS Runoff	Pre East -90% condition	14.47	12.00	33,330	----		
9	Junction	Pre East Study Pt Code	63.05	11.97	147,265	2, 8		
11	NRCS Runoff	Post East Onsite to Pond	36.33	11.95	76,558	----		
12	NRCS Runoff	Post West to West Pond	9.015	11.95	19,190	----		
13	Pond Route	Post West Pond Routed	1.477	12.12	15,061	12	950.92	9,581
14	Junction	Post To East Pond	86.89	11.95	205,555	2, 11, 13		
15	Pond Route	Post East Pond Routed	45.28	12.05	202,883	14	925.18	48,872
16	Junction	Post East Study Pt	46.28	12.03	206,118	5, 15		
18	NRCS Runoff	Pre West - actual	7.573	11.97	15,211	----		
19	NRCS Runoff	Pre West - 90% condition	5.000	11.97	10,145	----		
20	NRCS Runoff	Post West Study Point	2.117	11.97	4,271	----		
22	NRCS Runoff	Pre South - actual	0.875	11.97	1,761	----		
23	NRCS Runoff	Pre South-90% condition	0.560	11.97	1,137	----		
24	NRCS Runoff	Post South Study Point	0.110	11.97	220	----		
26	NRCS Runoff	Pre Downstream with site	19418.2	12.32	99,342,720	----		
27	NRCS Runoff	Downstream w/o site	19381.4	12.32	99,154,370	----		
28	Junction	Post Downstream with site	19410.1	12.32	99,365,690	16, 20, 27		



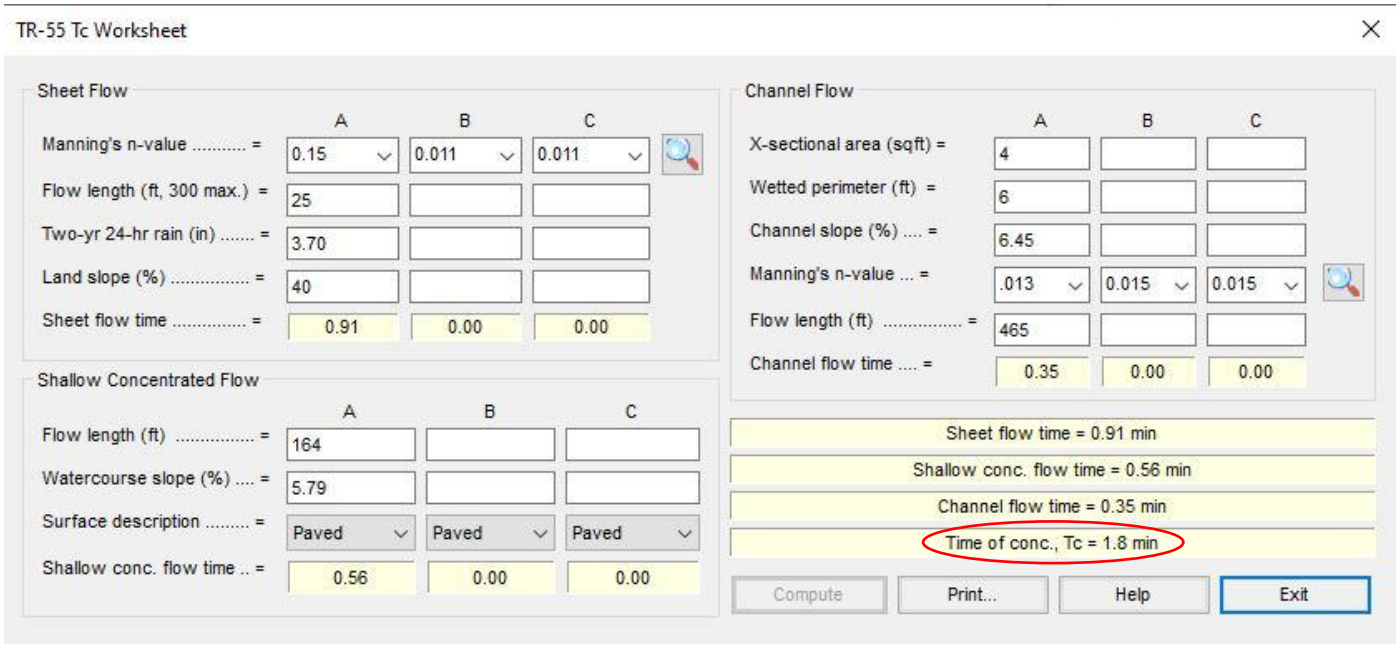
East Basin to Pond
(Pre-construction)
Use min. 5 minutes



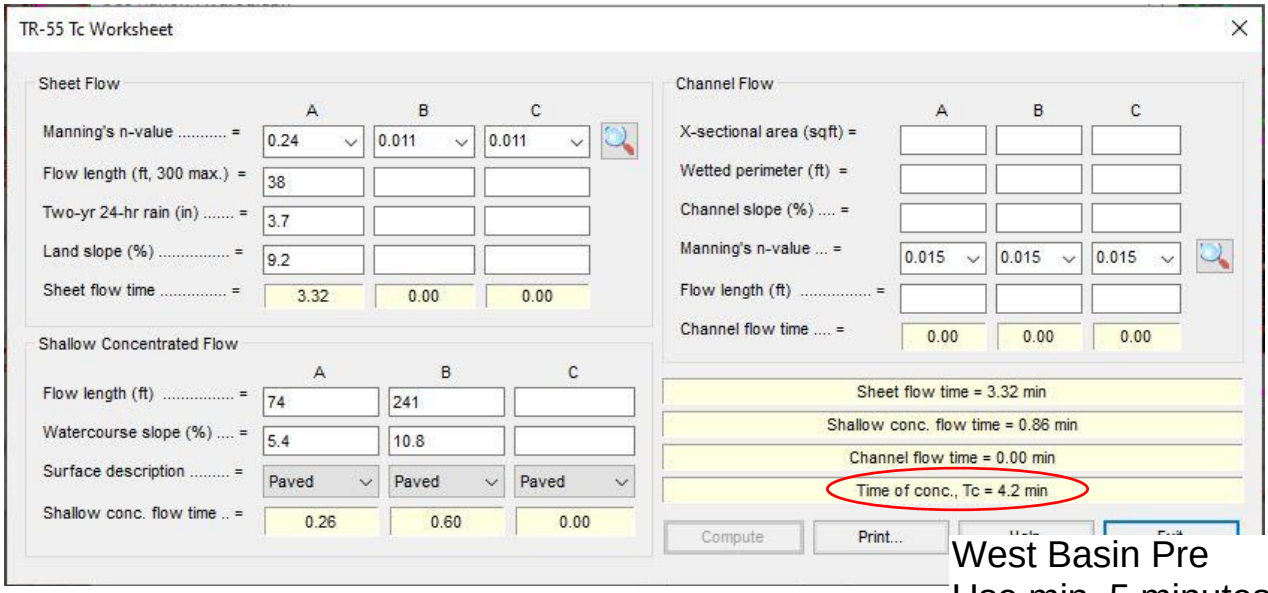
East Basin Bypass
Use min. 5 minutes



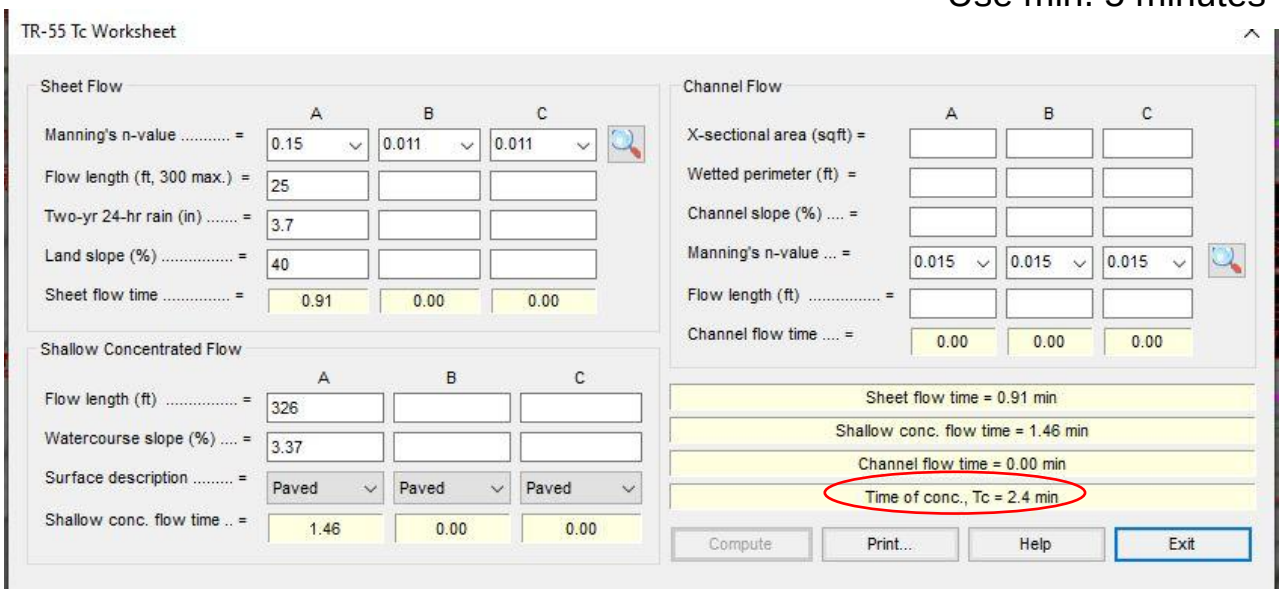
Offsite East Basin
Use min. 5 minutes



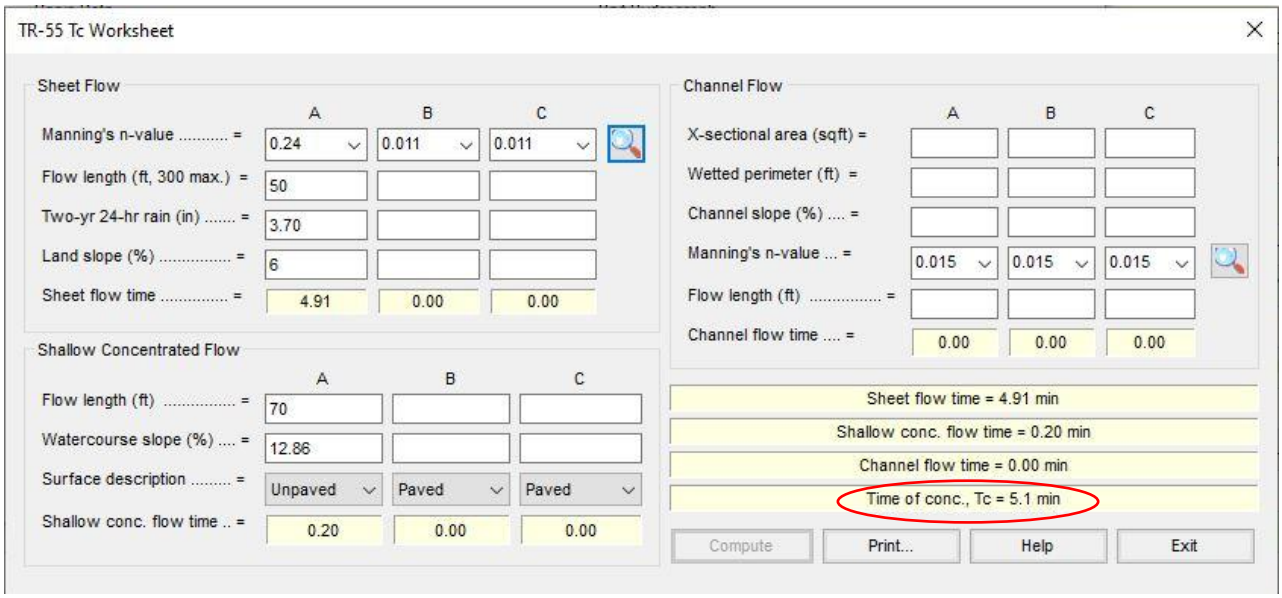
East Basin To Pond Post
Use min. 5 minutes



West Basin Pre
Use min. 5 minutes



West Basin To
Underground Post
Use min. 5 minutes



West Basin To West
Study Point Post

CALCULATION FOR DOWNSTREAM MAP TC - 42.48 min

Sheet Flow - 1.13 min
Assume n= 0.011 for paved parking areas
Assume 100 ft for flow length
Assume 2% slope

Shallow Concentrated Flow - 18.38
Assume unpaved drainage
Assume flow length of 565 ft
Water slope of (1030 elev. - 1015 elev.) / 565 ft= 2.65% slope

Assume paved storm pipe/gutter drainage through residential complex until crossing Old Rockbridge Road
Assume flow Length of 1805 ft.
Water slope (1015'-1000') / 1805 ft = 0.83 % slope
Assume min. 1% slope

Channel Flow - 22.97
Due to large drainage area and unknown creek dimensions, channel design is based on a typical cross section view of a winding vegetated creek crossing within the area. n=0.03
Section 1:
Assume flow length of 7938ft @ 40 ft = 0.5 % slope
Section 2:
Assume flow length of 12753 ft @ 100 ft = 0.8% slope

Image Clip at the intersection of North Fork Peachtree Creek and Pleasantdale Road facing Southwest. Assumed channel creek dimensions 100 ft from bridge to be a width of 50 ft by depth of 10 ft.

Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

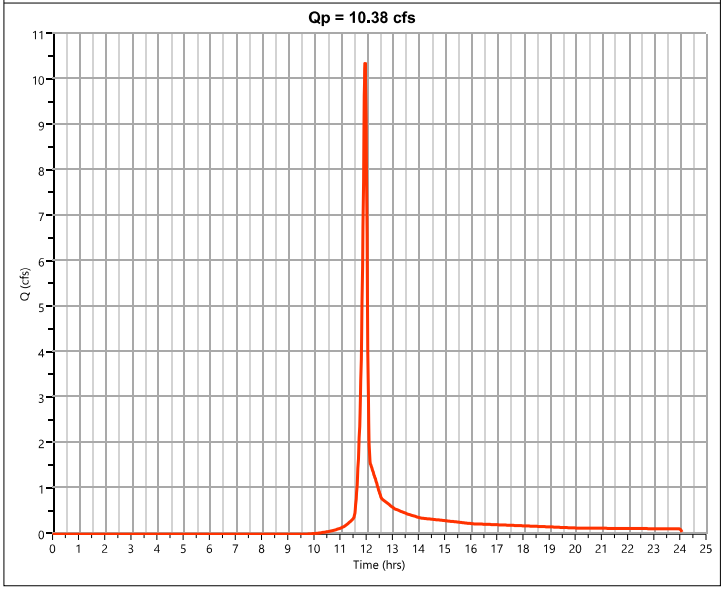
Pre East Onsite Ex Pond

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 10.38 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 20,841 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed



Hydrograph Report

Project Name:

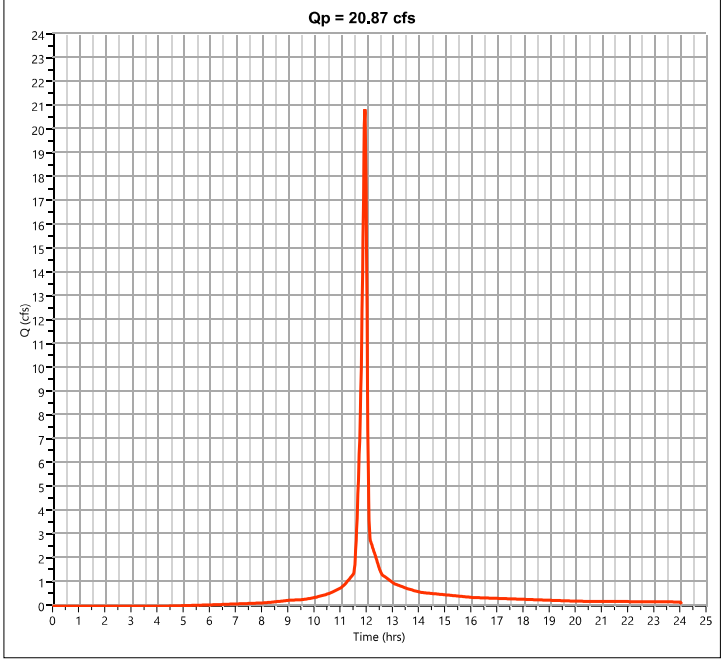
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Offsite

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 20.87 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 44,693 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

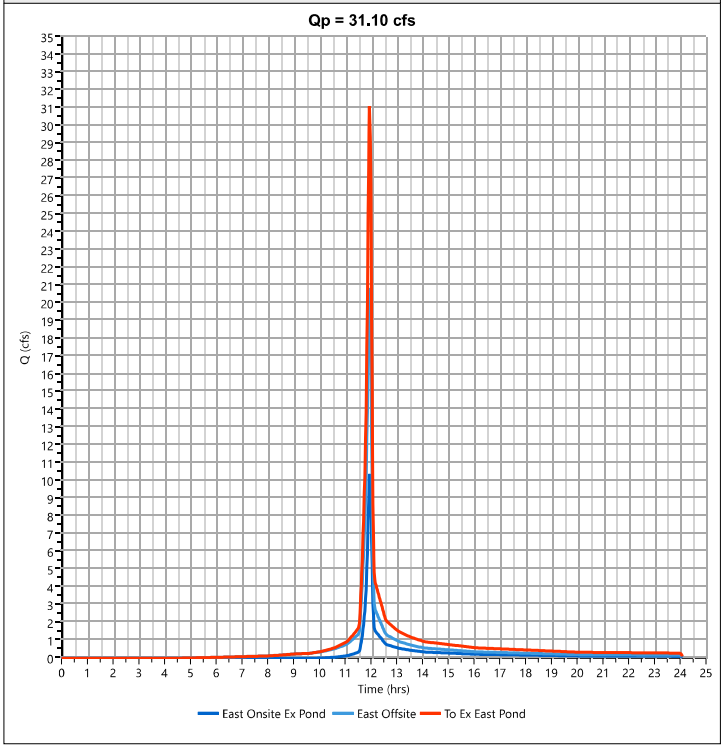
Hydrology Studio v 3.0.0.16

11-12-2020

Pre To Ex East Pond

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 31.10 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 65,534 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

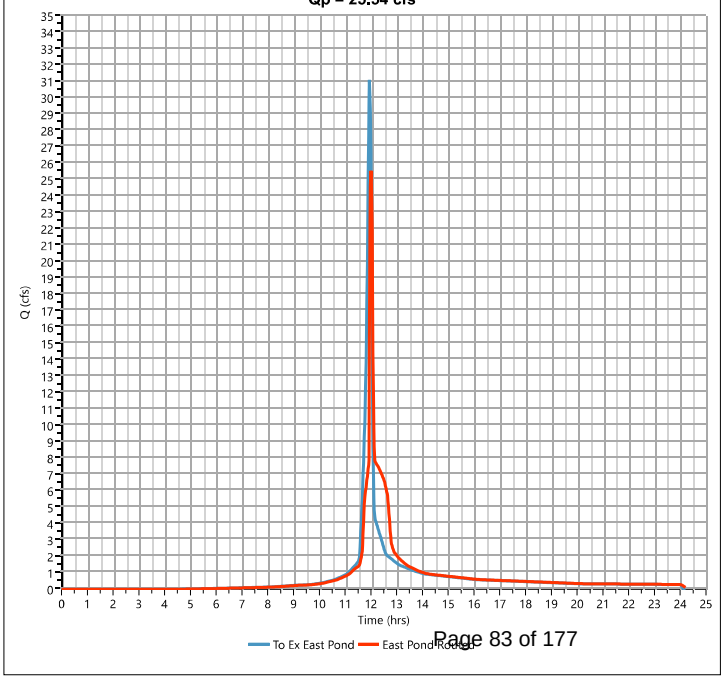
11-12-2020

Pre East Pond Routed

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 25.54 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 65,534 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 923.27 ft
Pond Name	= Ex East Pond	Max. Storage	= 12,302 cuft

Pond Routing by Storage Indication Method *Center of mass detention time = 26 min*



Hydrograph Report

Project Name:

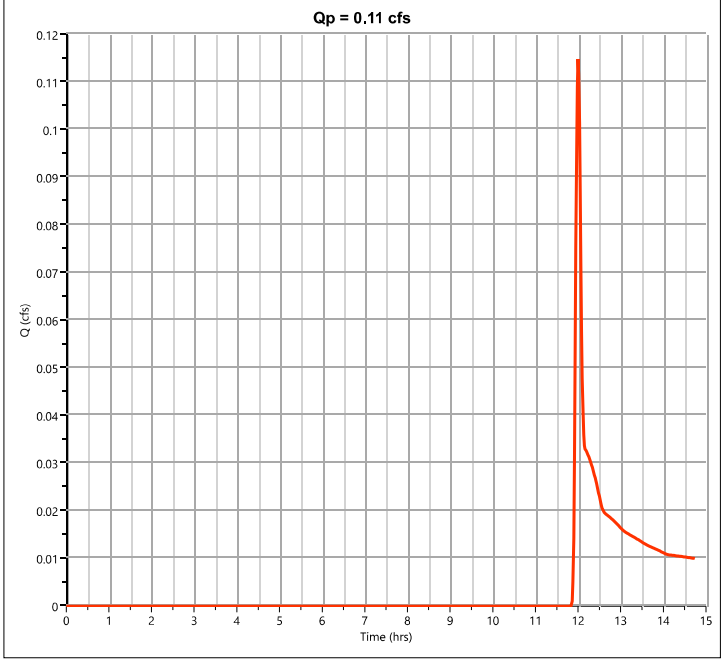
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Bypass

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.115 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 415 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

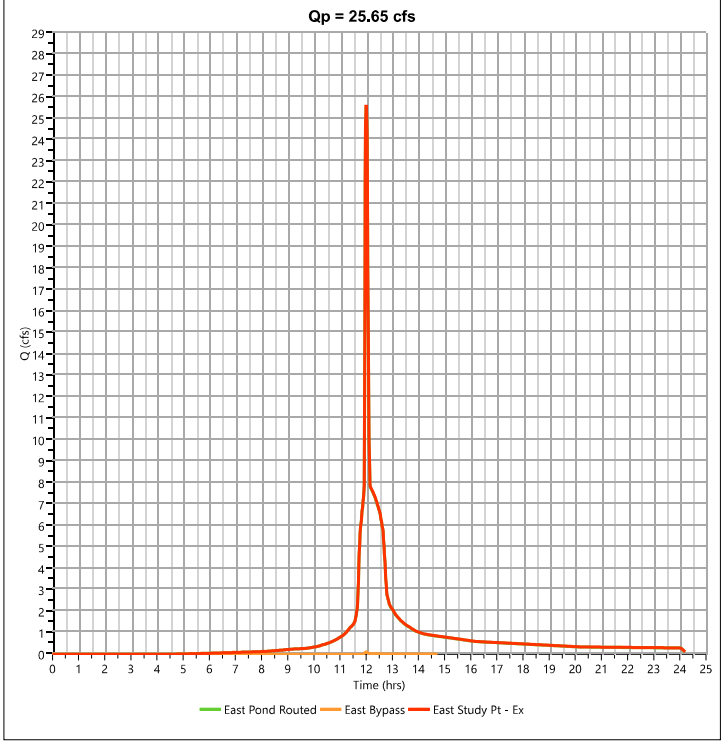
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt - Ex

Hyd. No. 6

Hydrograph Type	= Junction	Peak Flow	= 25.65 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 65,949 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

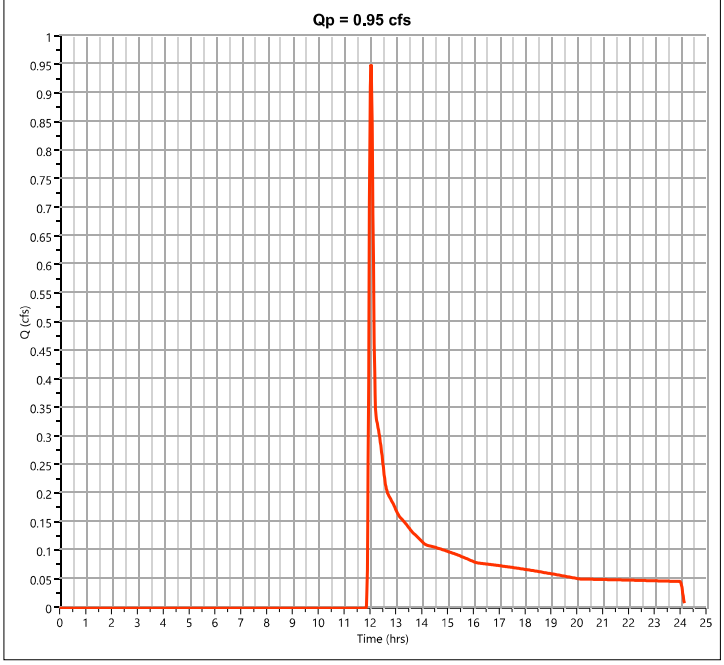
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East -90% condition

Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.951 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 4,278 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

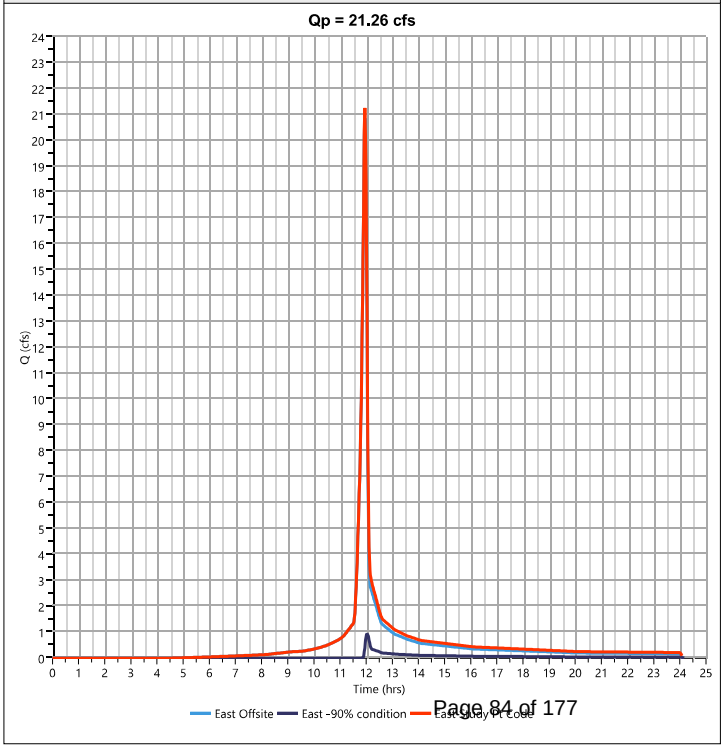
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt Code

Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 21.26 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 48,972 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

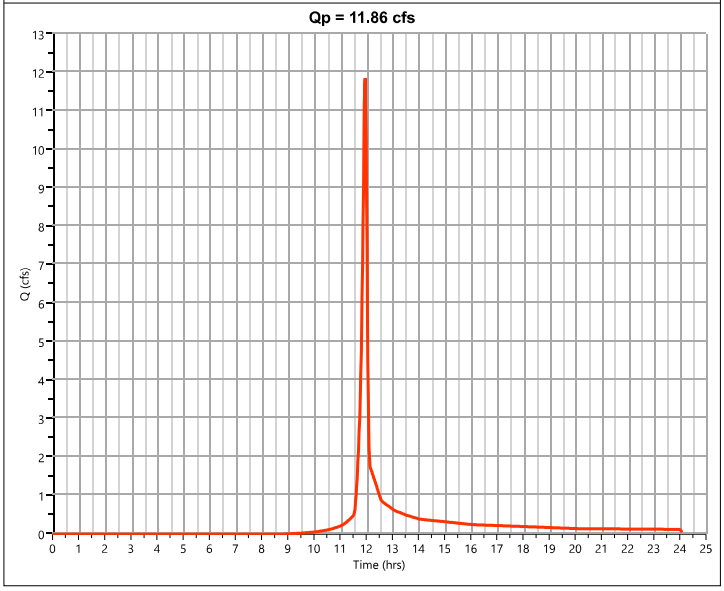
Post East Onsite to Pond

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 11.86 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 23,897 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

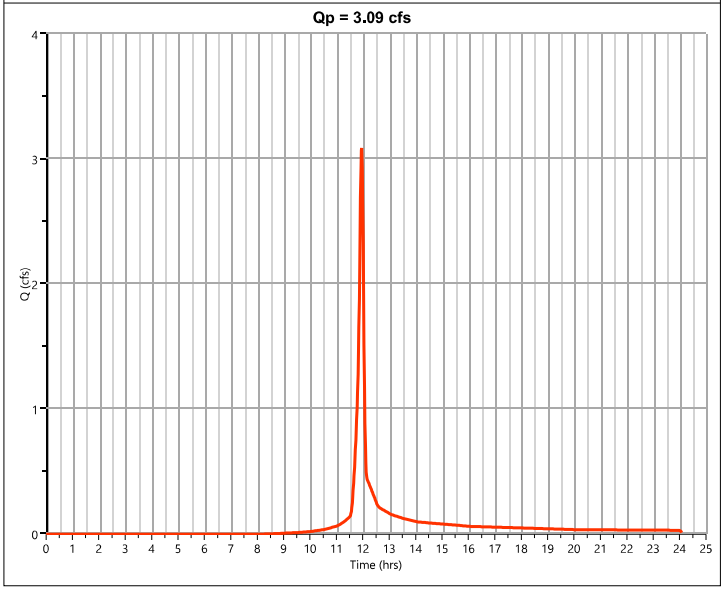
Post West to West Pond

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.090 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 6,258 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

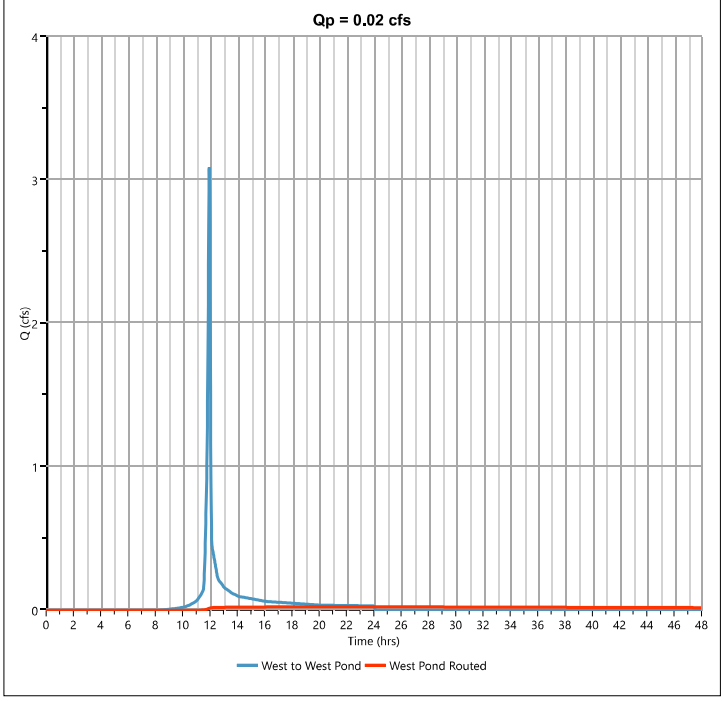
11-12-2020

Post West Pond Routed

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 0.025 cfs
Storm Frequency	= 1-yr	Time to Peak	= 24.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 2,895 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 949.94 ft
Pond Name	= West Pond	Max. Storage	= 4,705 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 15.59 hrs*



Hydrograph Report

Project Name:

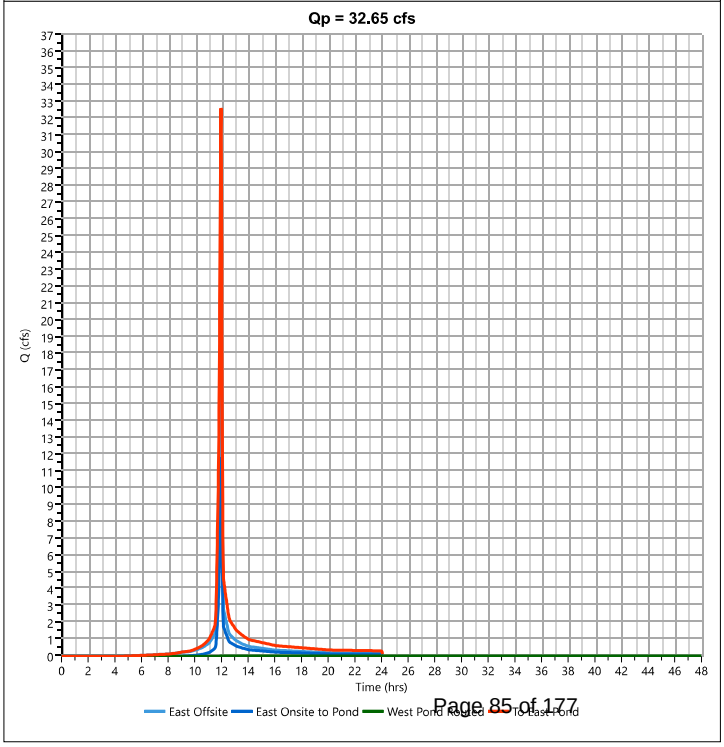
Hydrology Studio v 3.0.0.16

11-12-2020

Post To East Pond

Hyd. No. 14

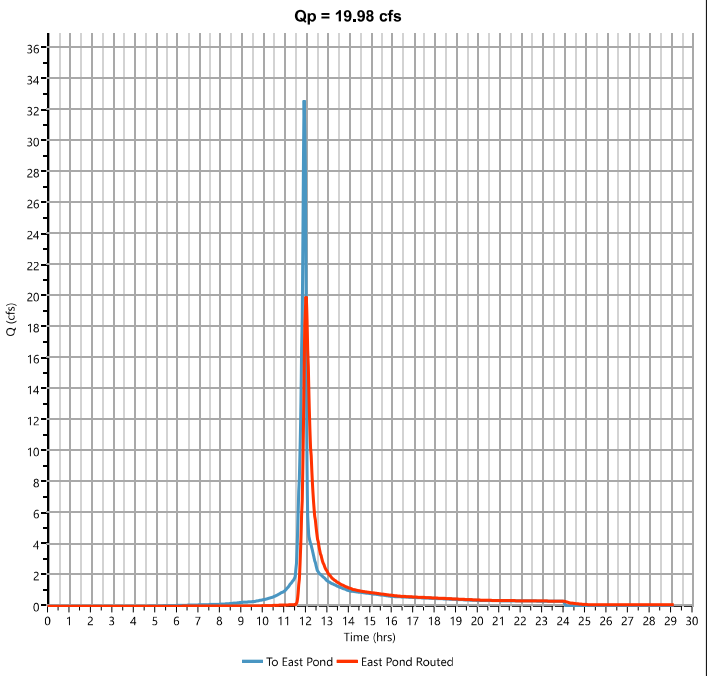
Hydrograph Type	= Junction	Peak Flow	= 32.65 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 71,485 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac



Post East Pond Routed — Hyd. No. 15

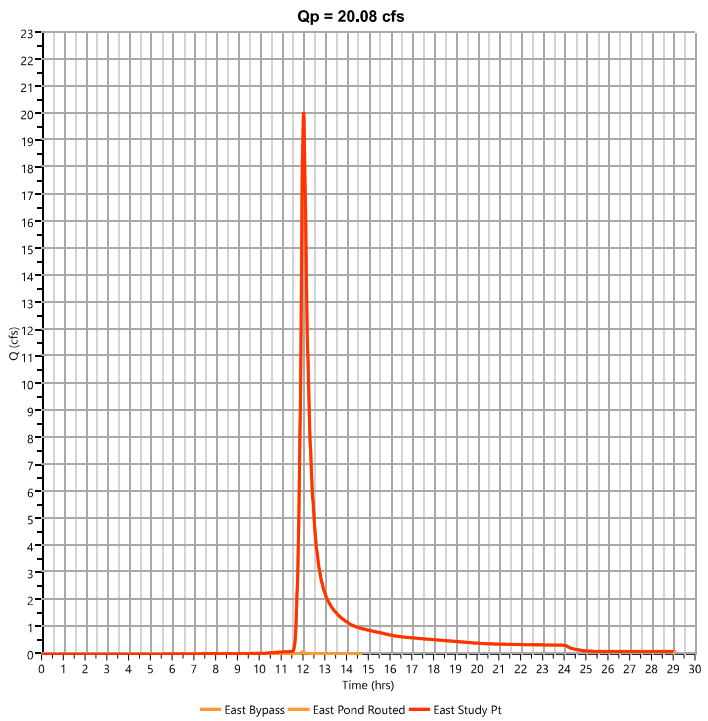
Hydrograph Type	= Pond Route	Peak Flow	= 19.98 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 68,899 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 921.31 ft
Pond Name	= New East Pond	Max. Storage	= 22,016 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 43 min*



Post East Study Pt — Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 20.08 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 69,314 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac

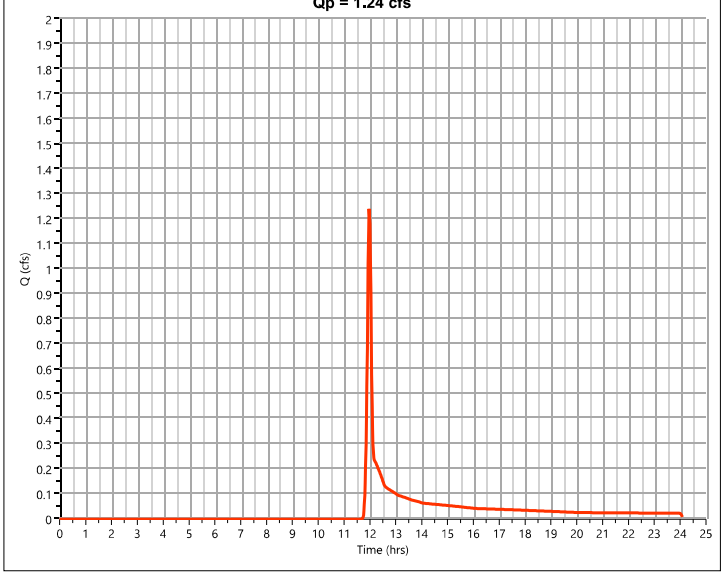


Pre West - actual — Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.242 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 2,862 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

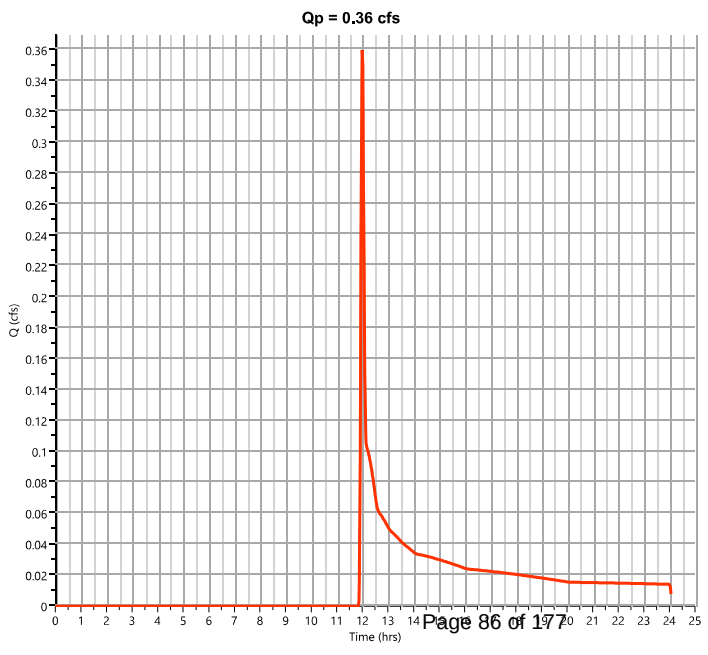
*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Pre West - 90% condition — Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.360 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 1,302 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

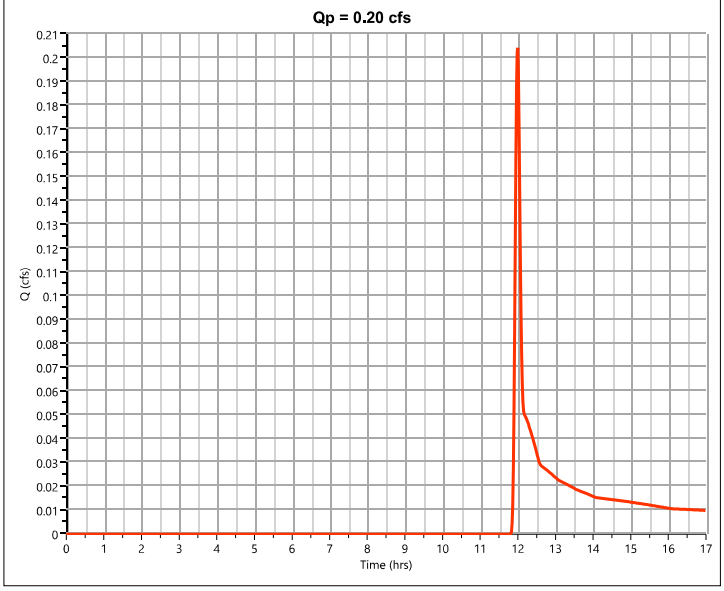
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.204 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 614 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

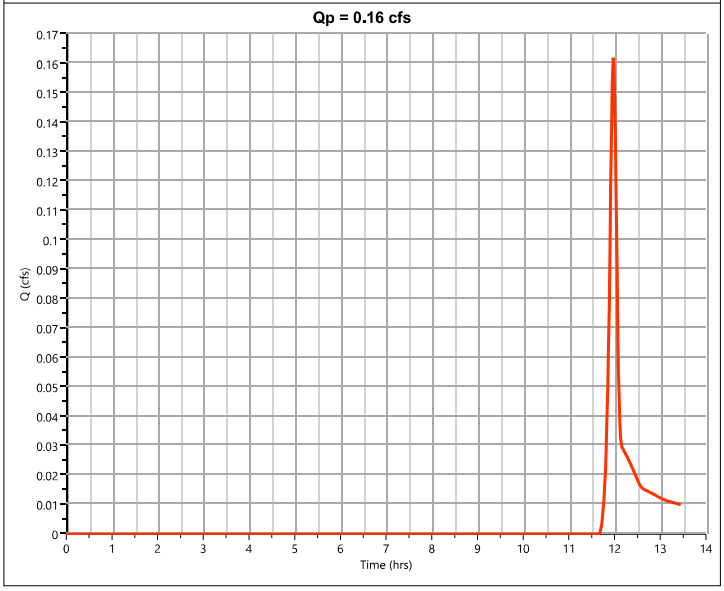
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.162 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 356 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

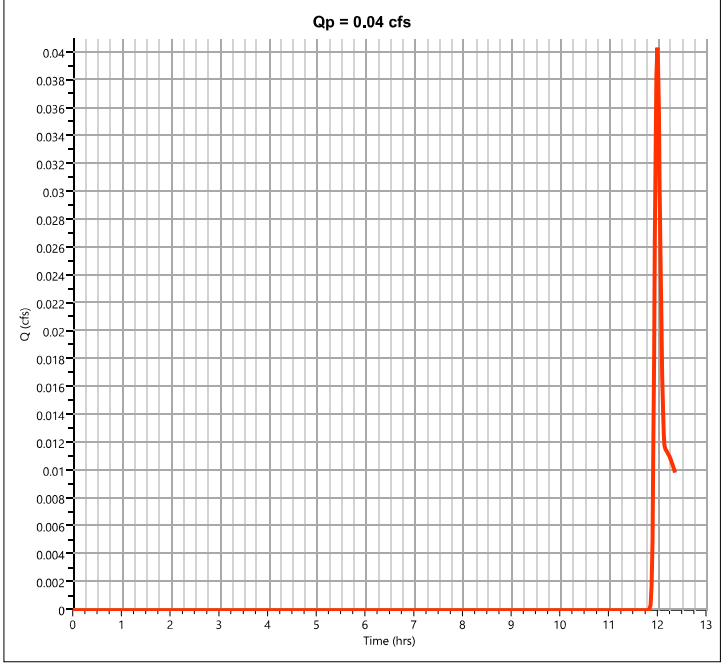
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.040 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 146 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

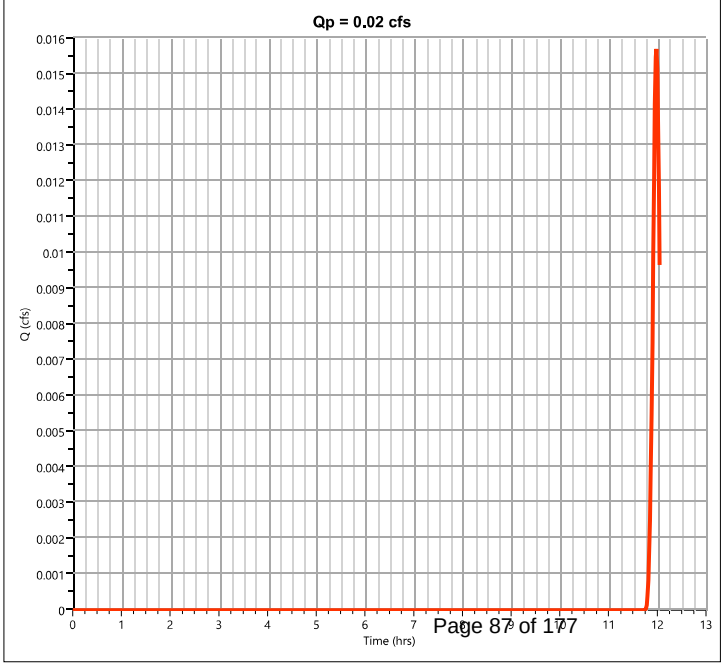
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.016 cfs
Storm Frequency	= 1-yr	Time to Peak	= 11.98 hrs
Time Interval	= 1 min	Runoff Volume	= 38.3 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

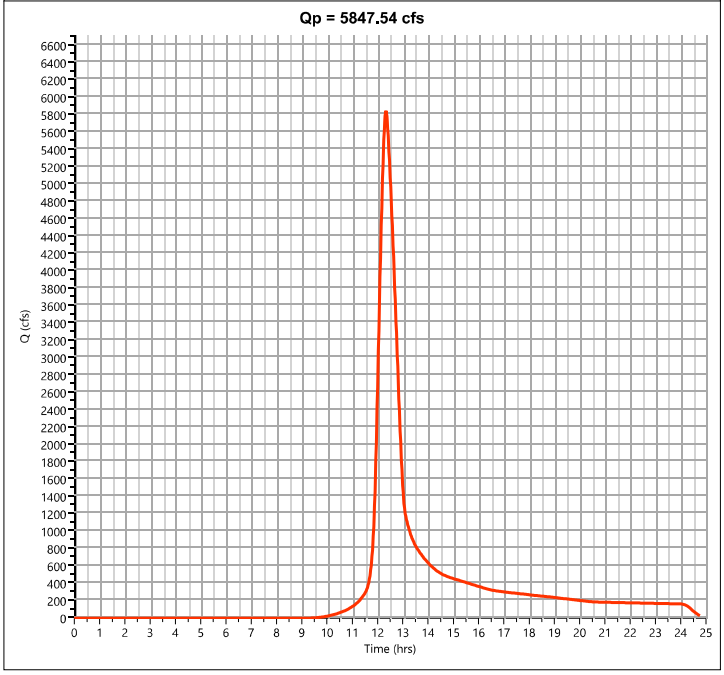
Hydrology Studio v 3.0.0.16

11-12-2020

Pre Downstream with site

Hyd. No. 26

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5847.5 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 30,321,020 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

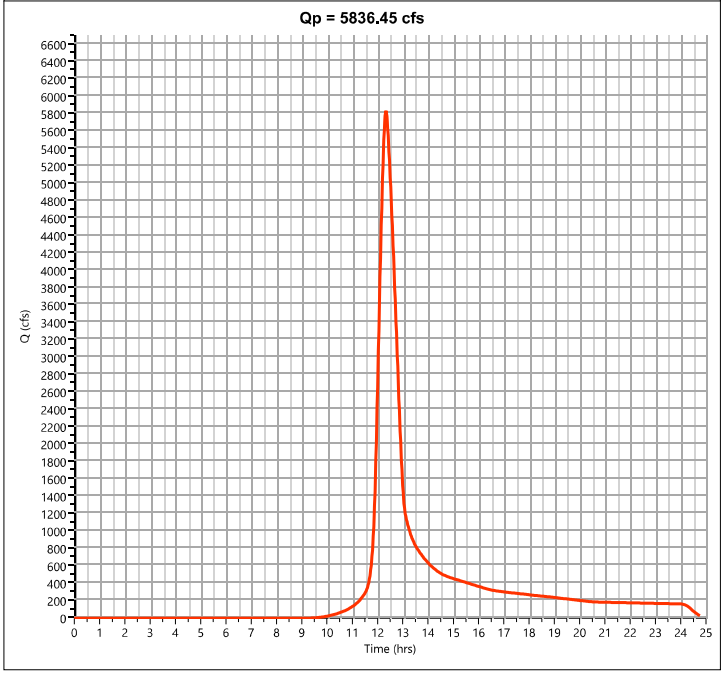
Hydrology Studio v 3.0.0.16

11-12-2020

Downstream w/o site

Hyd. No. 27

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5836.4 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 30,263,520 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 3.36 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

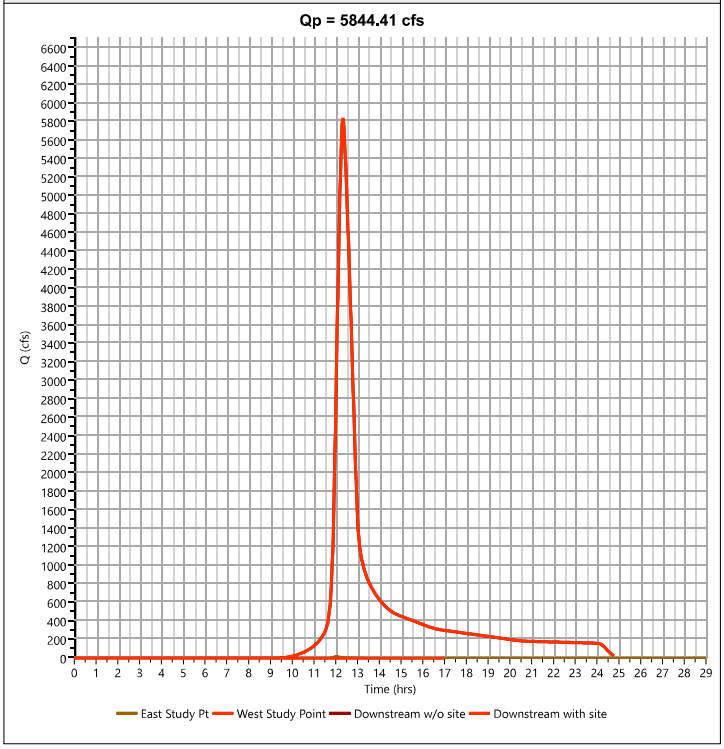
Hydrology Studio v 3.0.0.16

11-12-2020

Post Downstream with site

Hyd. No. 28

Hydrograph Type	= Junction	Peak Flow	= 5844.4 cfs
Storm Frequency	= 1-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Hydrograph Volume	= 30,333,340 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

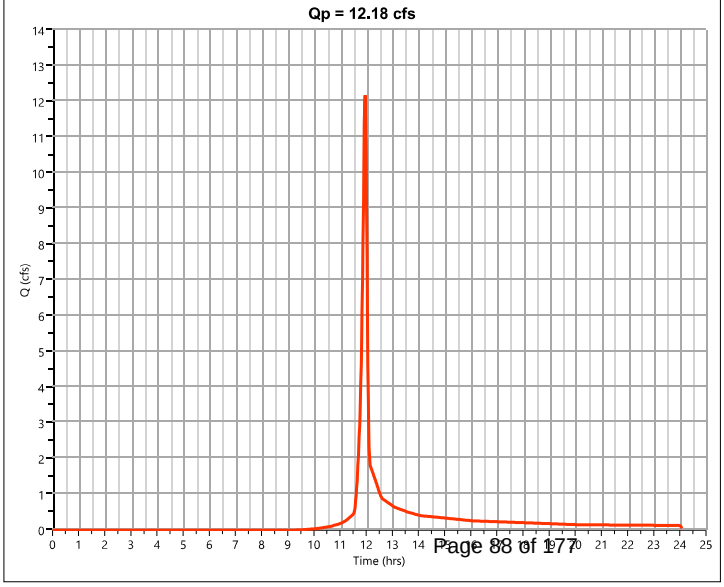
Pre East Onsite Ex Pond

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 12.18 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 24,489 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed



Hydrograph Report

Project Name:

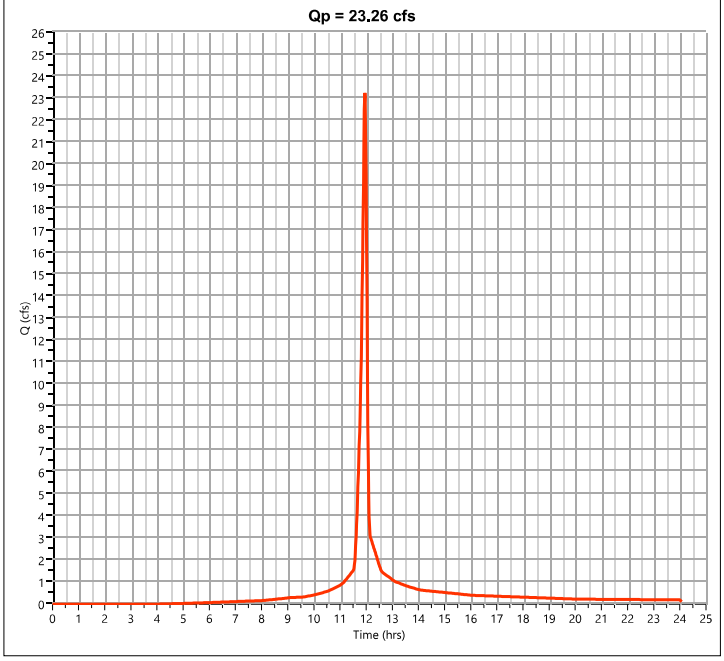
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Offsite

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 23.26 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 50,164 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

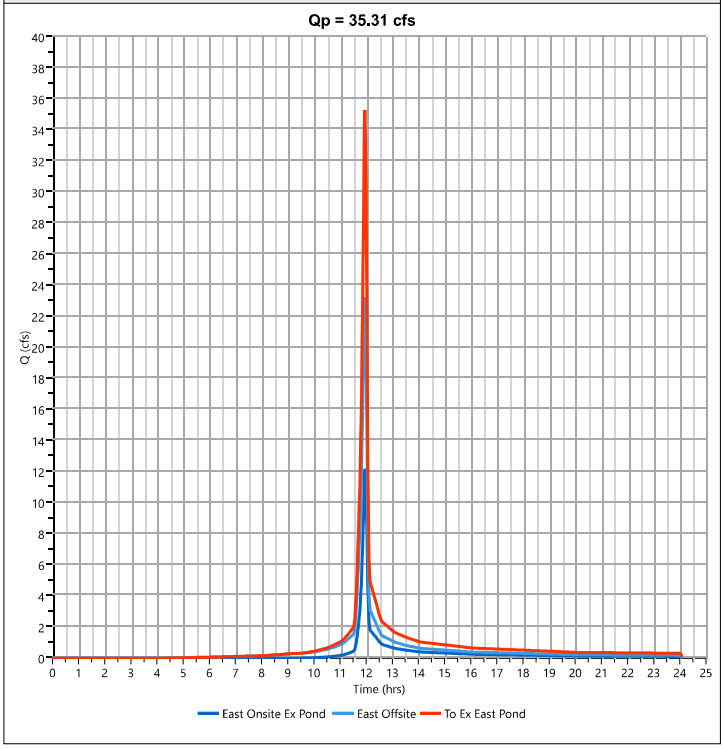
Hydrology Studio v 3.0.0.16

11-12-2020

Pre To Ex East Pond

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 35.31 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 74,653 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

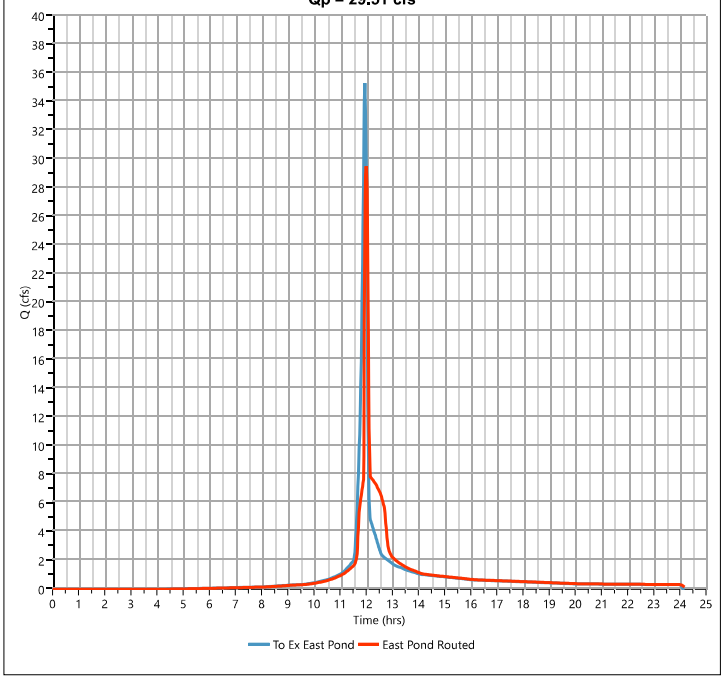
11-12-2020

Pre East Pond Routed

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 29.51 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 74,653 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 923.49 ft
Pond Name	= Ex East Pond	Max. Storage	= 13,192 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 30 min*



Hydrograph Report

Project Name:

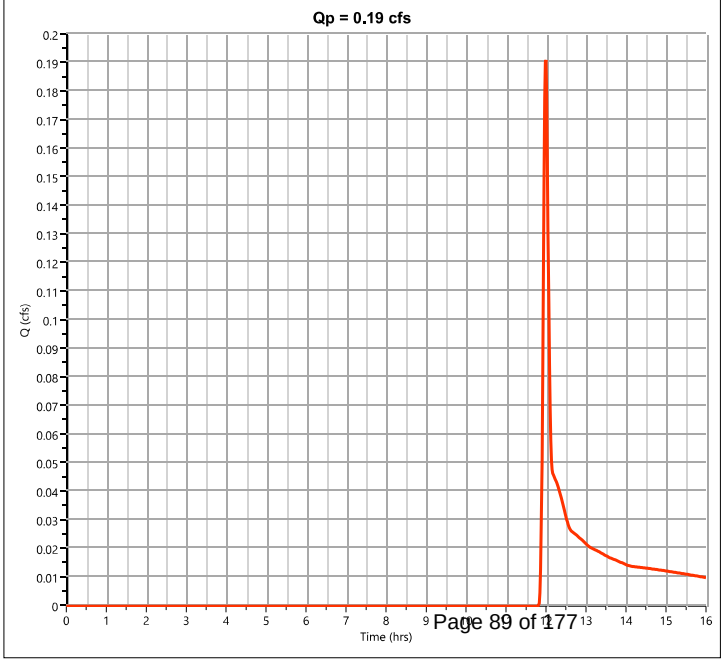
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Bypass

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.191 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 566 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

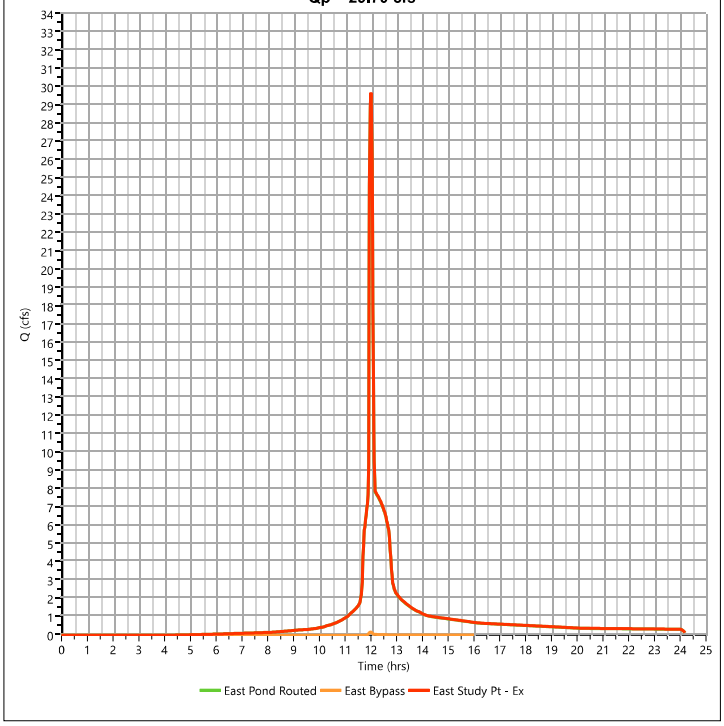
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt - Ex

Hyd. No. 6

Hydrograph Type	= Junction	Peak Flow	= 29.70 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 75,218 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

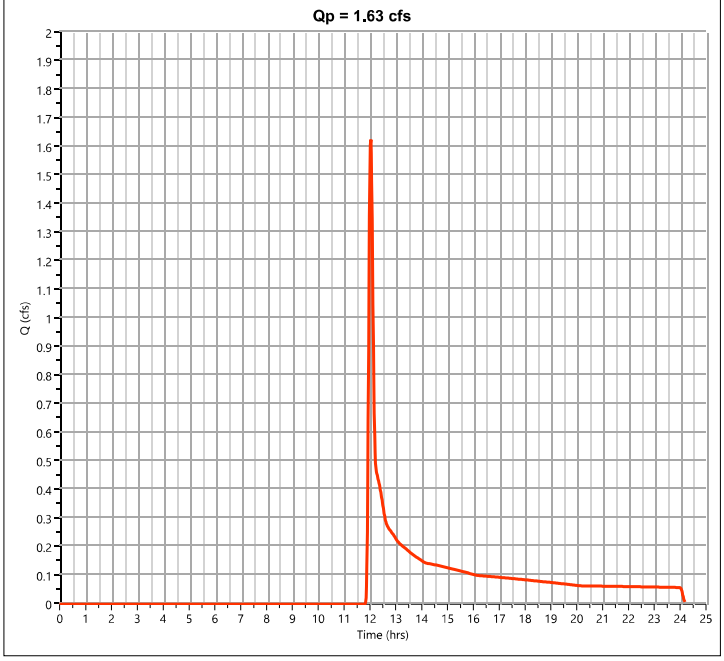
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East -90% condition

Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.626 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Runoff Volume	= 5,826 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

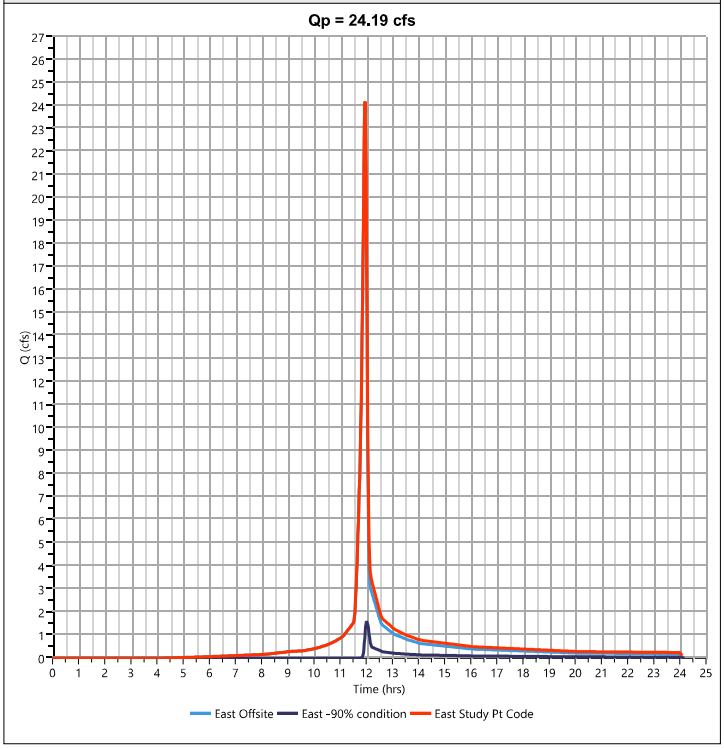
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt Code

Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 24.19 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 55,990 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

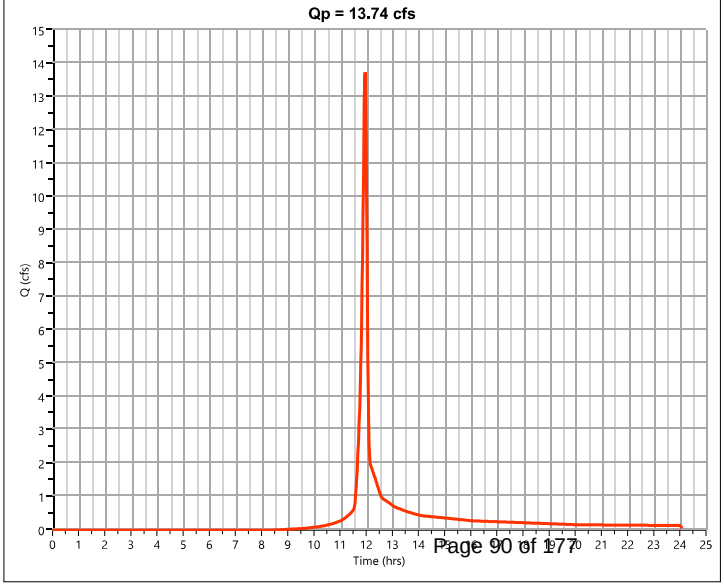
Post East Onsite to Pond

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 13.74 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 27,782 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed



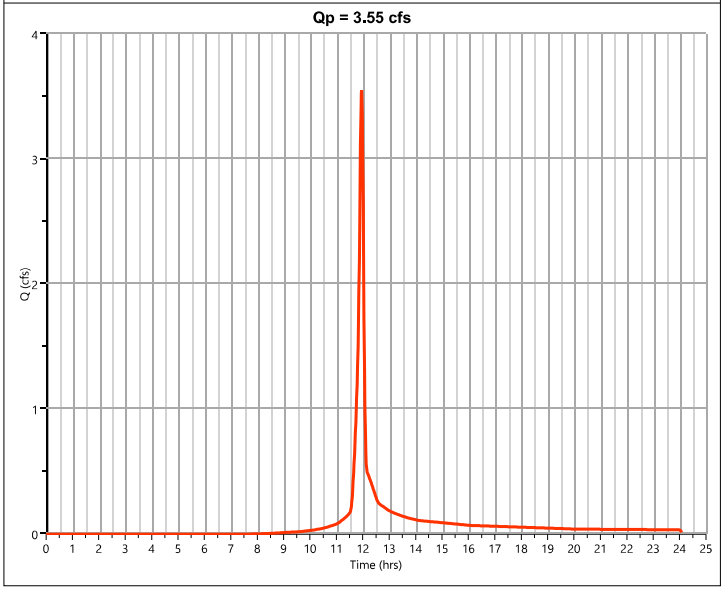
Post West to West Pond

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.551 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 7,227 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed

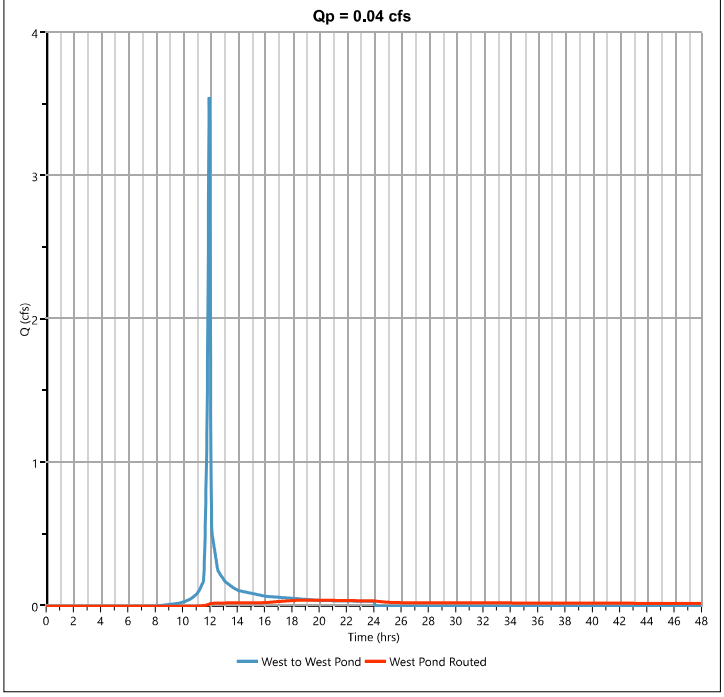


Post West Pond Routed

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 0.043 cfs
Storm Frequency	= 2-yr	Time to Peak	= 19.47 hrs
Time Interval	= 1 min	Hydrograph Volume	= 3,482 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 950.05 ft
Pond Name	= West Pond	Max. Storage	= 5,240 cuft

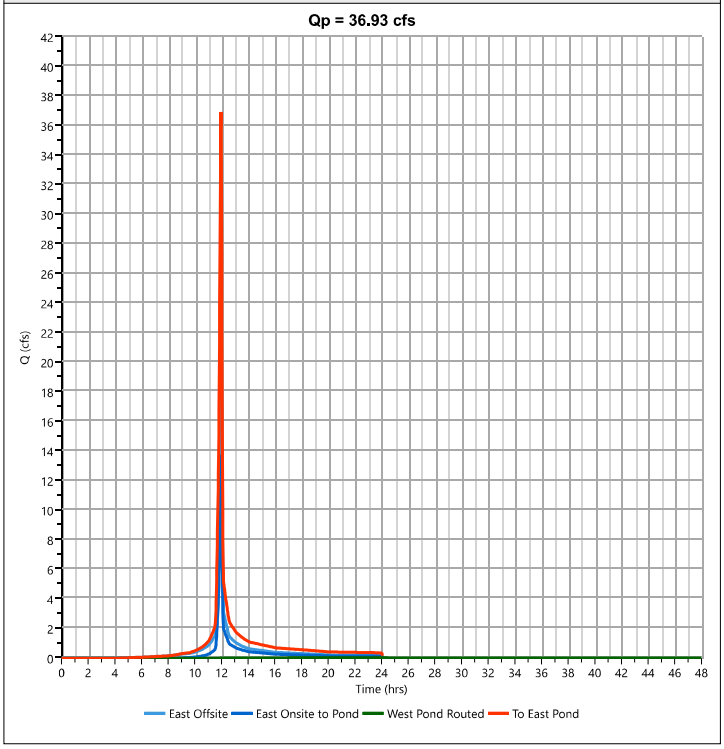
Pond Routing by Storage Indication Method — *Center of mass detention time = 14.67 hrs*



Post To East Pond

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 36.93 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 81,429 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac

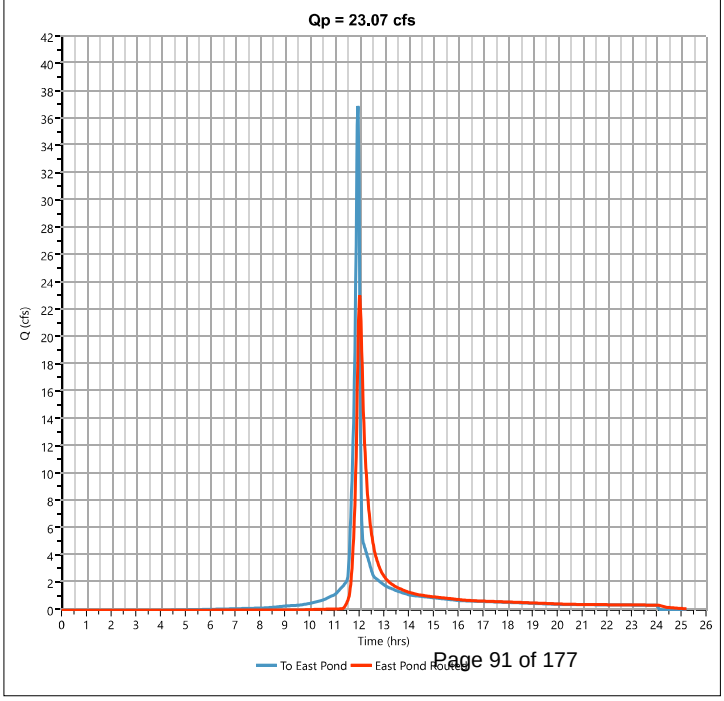


Post East Pond Routed

Hyd. No. 15

Hydrograph Type	= Pond Route	Peak Flow	= 23.07 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 78,801 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 921.65 ft
Pond Name	= New East Pond	Max. Storage	= 23,965 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 38 min*



Hydrograph Report

Project Name:

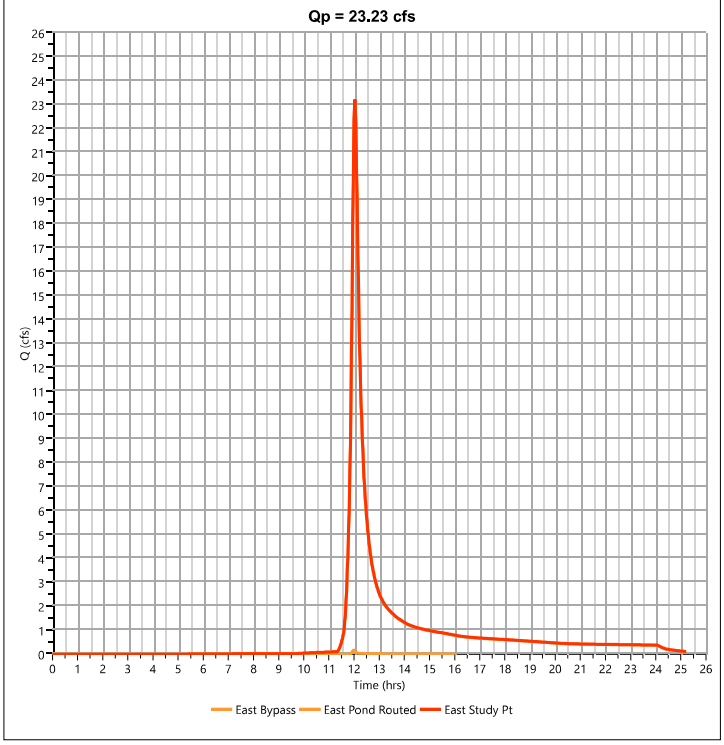
Hydrology Studio v 3.0.0.16

11-12-2020

Post East Study Pt

Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 23.23 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 79,367 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

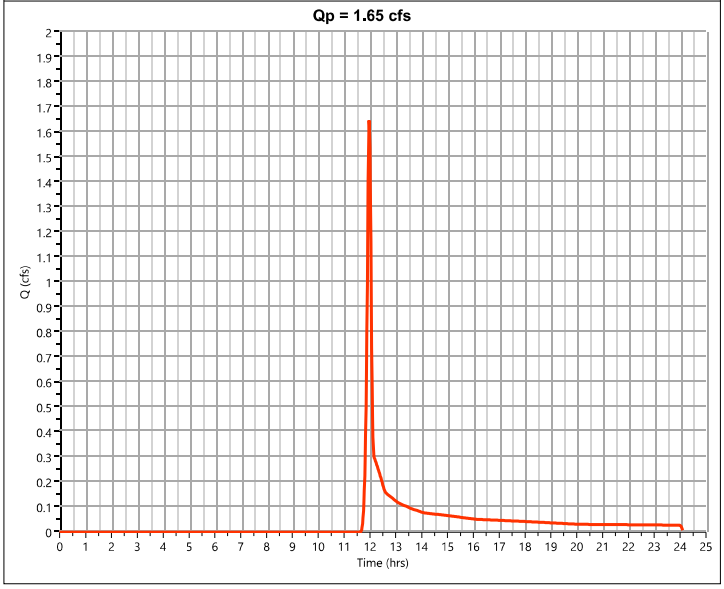
Pre West - actual

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.648 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 3,618 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Hydrograph Report

Project Name:

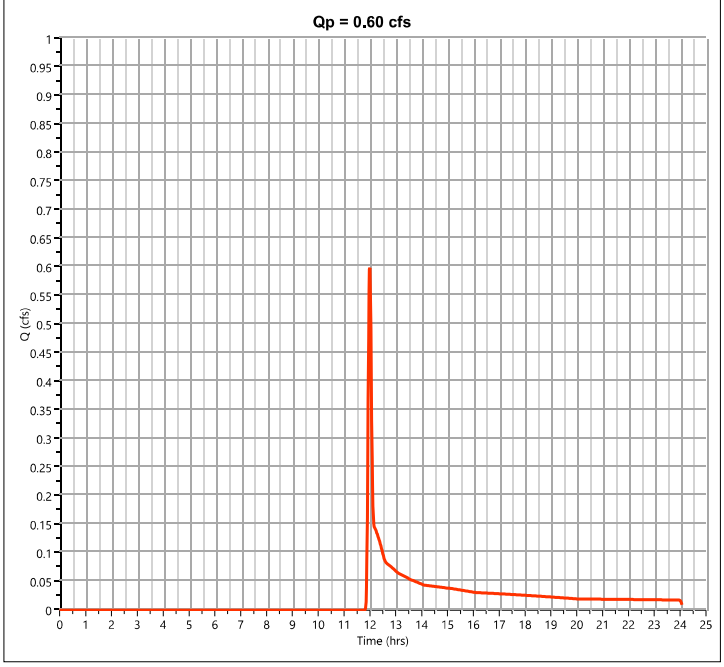
Hydrology Studio v 3.0.0.16

11-12-2020

Pre West - 90% condition

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.599 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 1,773 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

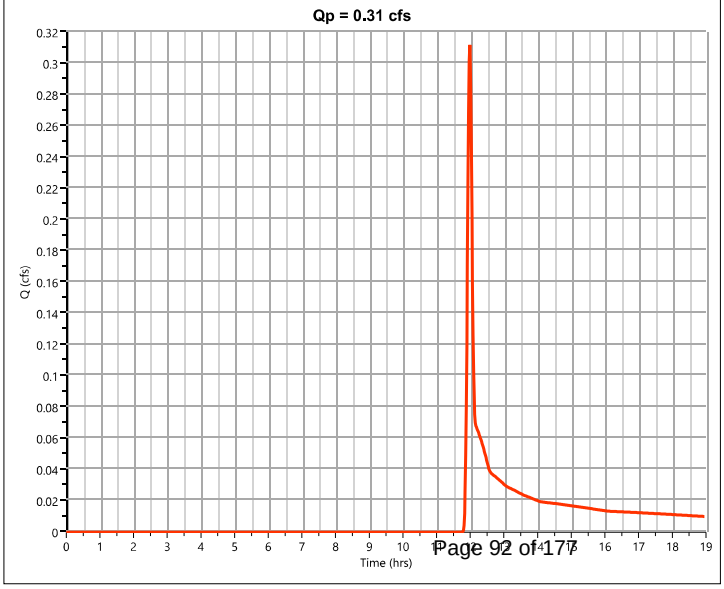
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.312 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.98 hrs
Time Interval	= 1 min	Runoff Volume	= 817 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

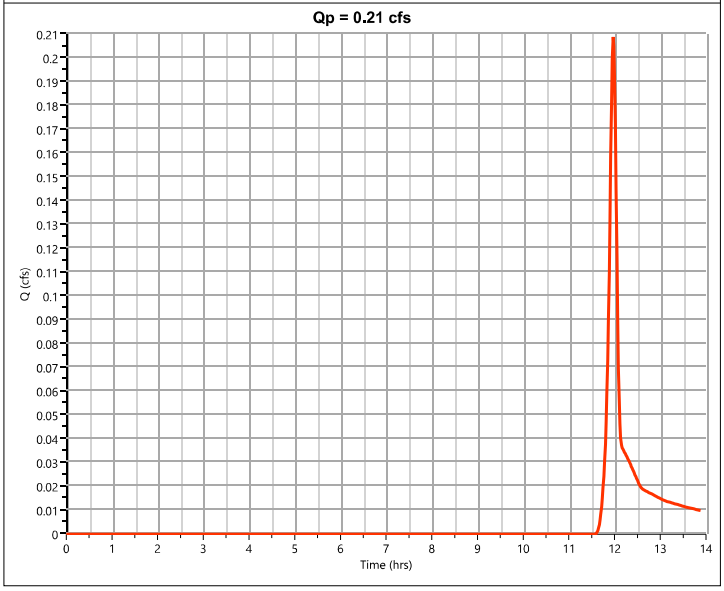
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.209 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 445 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

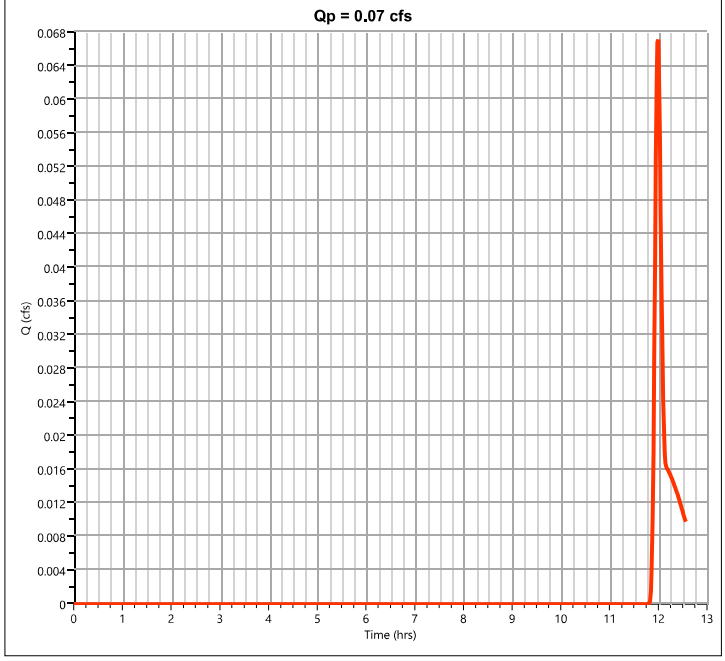
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.067 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 199 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

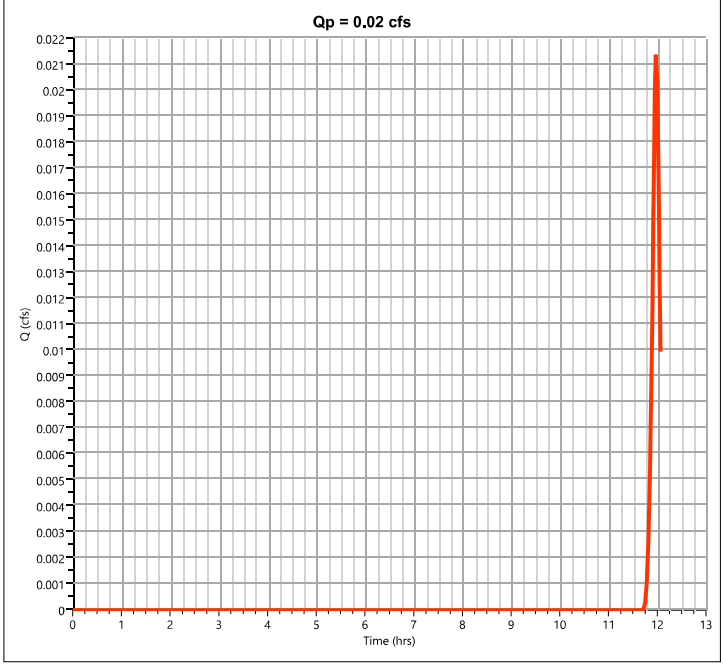
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.021 cfs
Storm Frequency	= 2-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 49.1 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

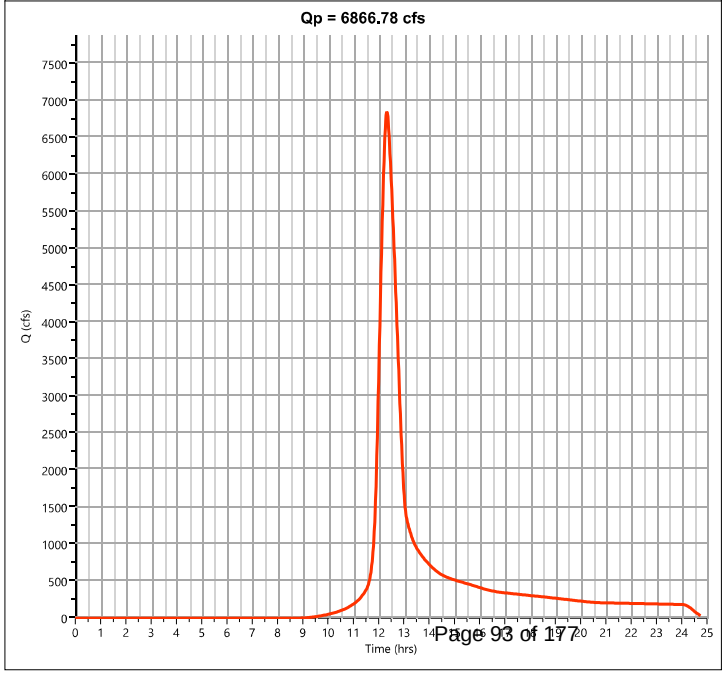
Hydrology Studio v 3.0.0.16

11-12-2020

Pre Downstream with site

Hyd. No. 26

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6866.8 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 35,373,840 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

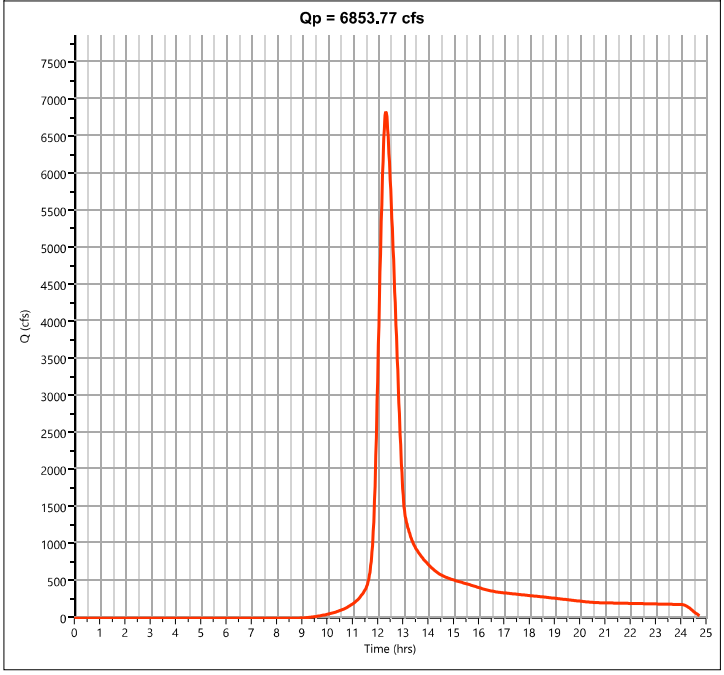
Hydrology Studio v 3.0.0.16

11-12-2020

Downstream w/o site

Hyd. No. 27

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6853.8 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 35,306,750 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 3.68 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

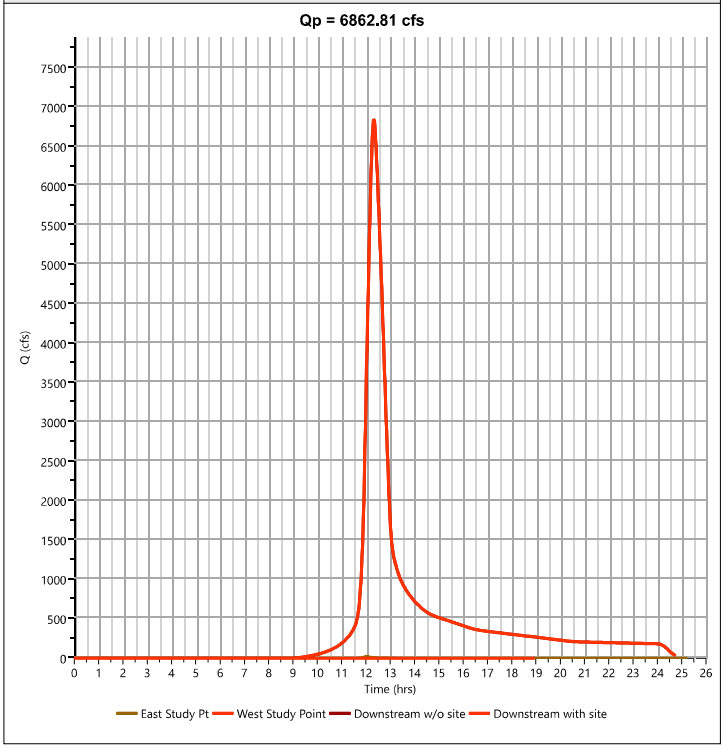
Hydrology Studio v 3.0.0.16

11-12-2020

Post Downstream with site

Hyd. No. 28

Hydrograph Type	= Junction	Peak Flow	= 6862.8 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Hydrograph Volume	= 35,387,200 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

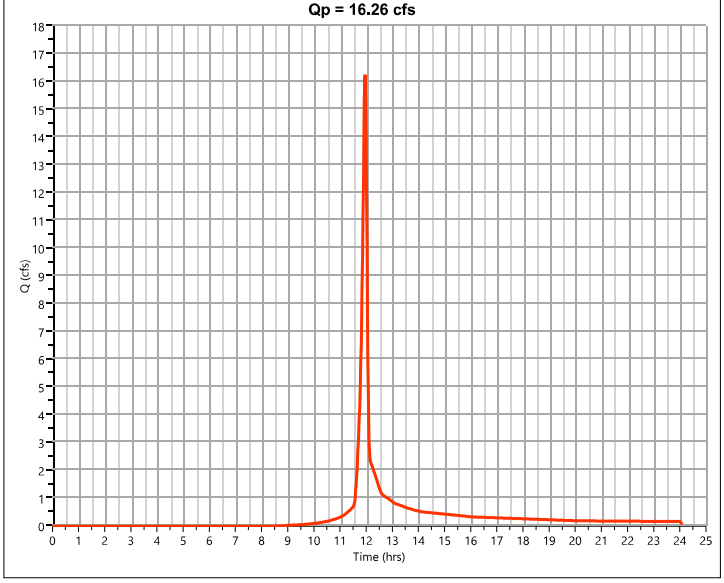
Pre East Onsite Ex Pond

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 16.26 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 32,854 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed



Hydrograph Report

Project Name:

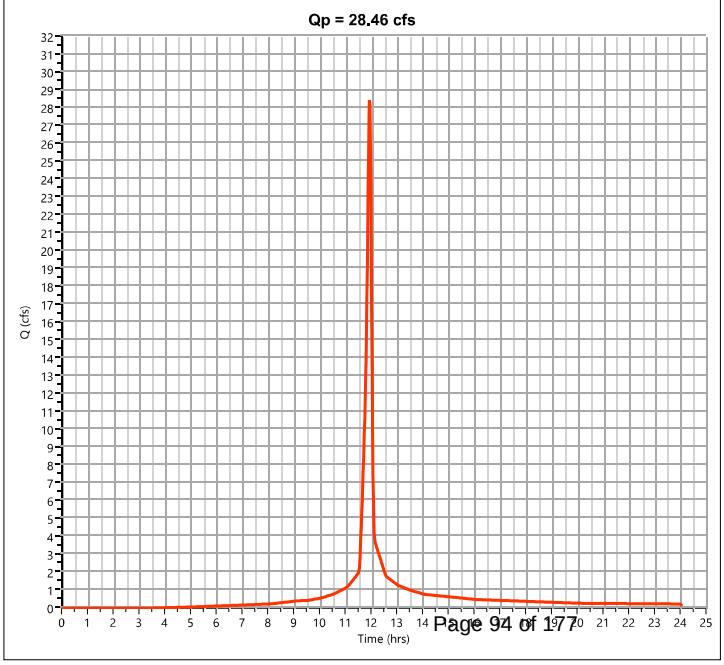
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Offsite

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 28.46 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 62,238 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

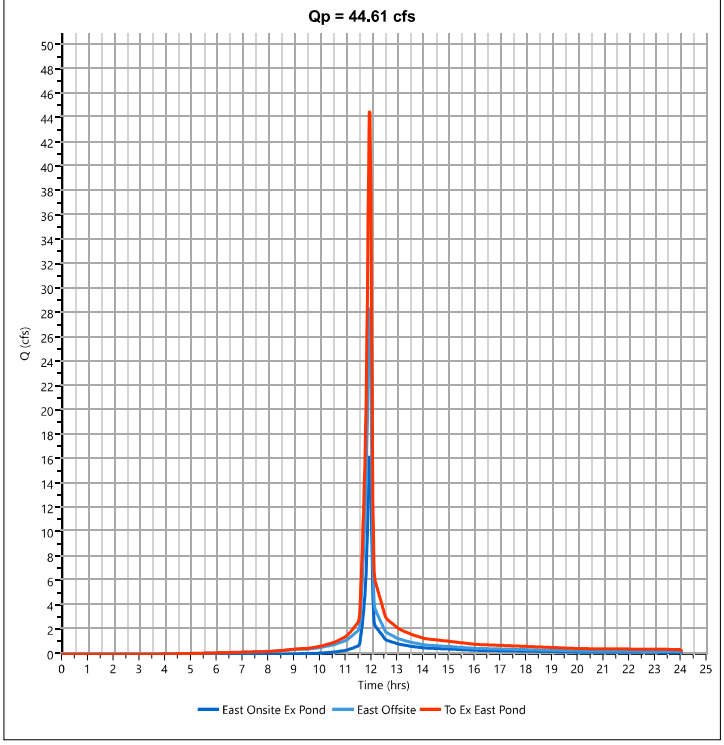
Hydrology Studio v 3.0.0.16

11-12-2020

Pre To Ex East Pond

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 44.61 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 95,092 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

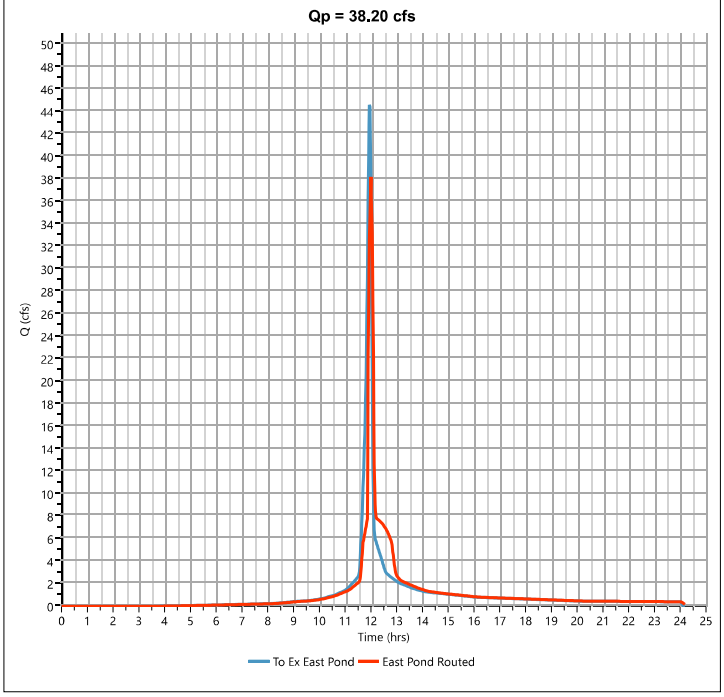
11-12-2020

Pre East Pond Routed

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 38.20 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 95,091 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 924.04 ft
Pond Name	= Ex East Pond	Max. Storage	= 15,348 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 35 min*



Hydrograph Report

Project Name:

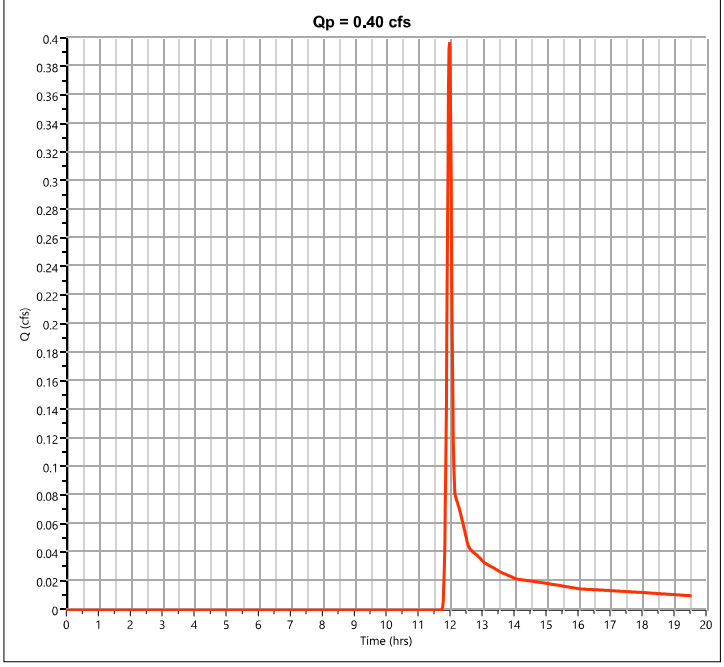
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Bypass

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.397 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.98 hrs
Time Interval	= 1 min	Runoff Volume	= 954 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

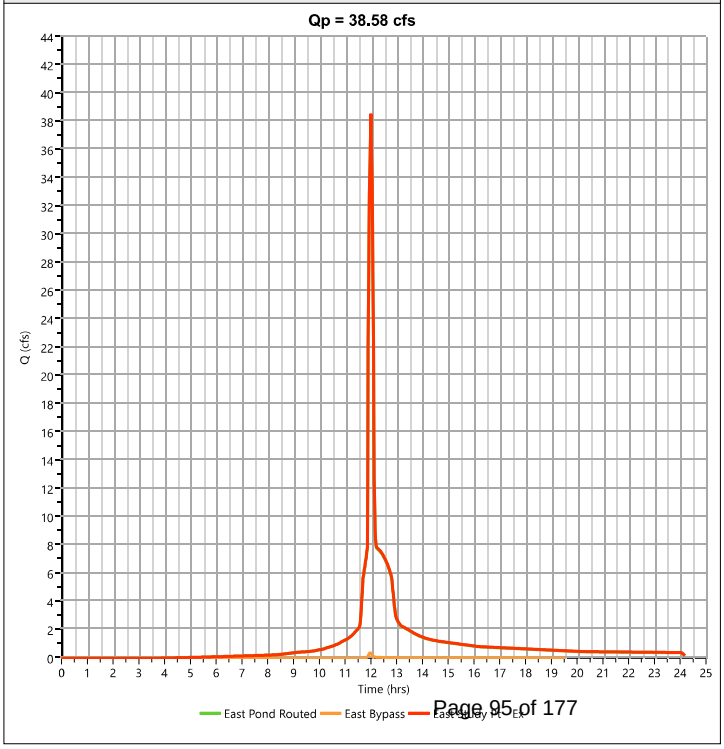
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt - Ex

Hyd. No. 6

Hydrograph Type	= Junction	Peak Flow	= 38.58 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Hydrograph Volume	= 96,046 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

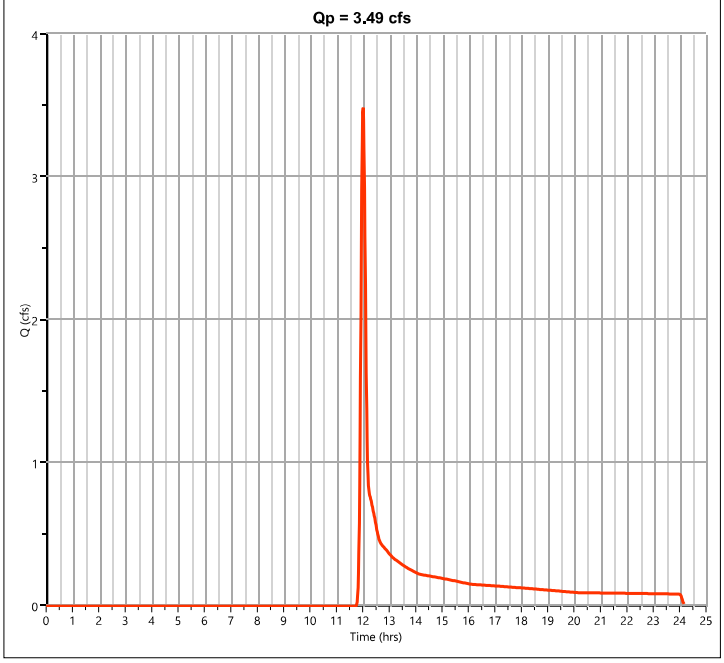
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East -90% condition

Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.490 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.02 hrs
Time Interval	= 1 min	Runoff Volume	= 9,829 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

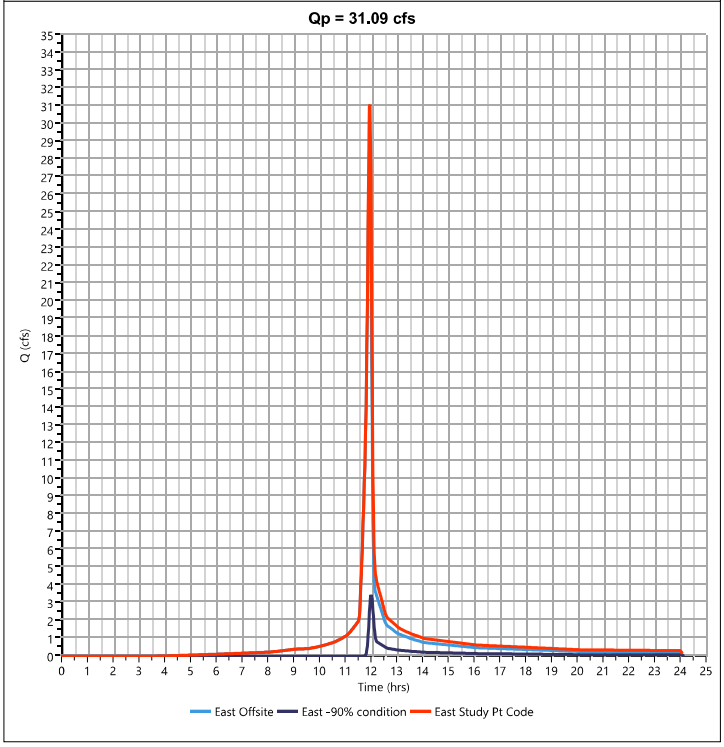
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt Code

Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 31.09 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 72,067 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

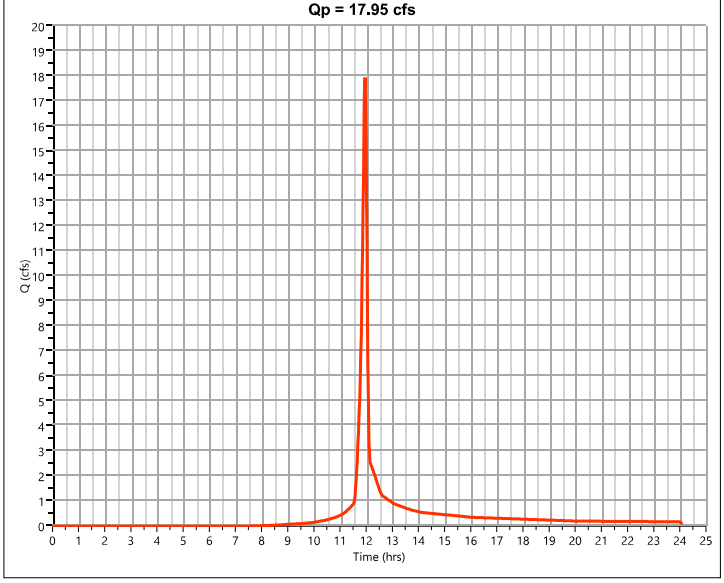
Post East Onsite to Pond

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 17.95 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 36,605 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

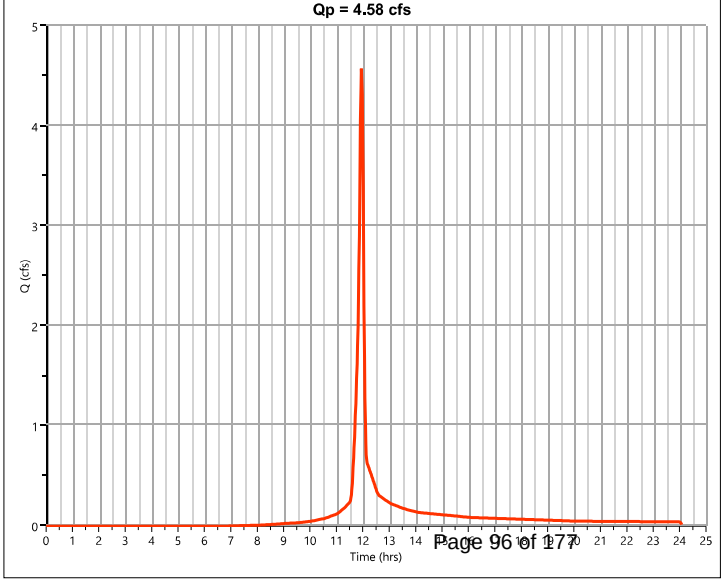
Post West to West Pond

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.575 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 9,413 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

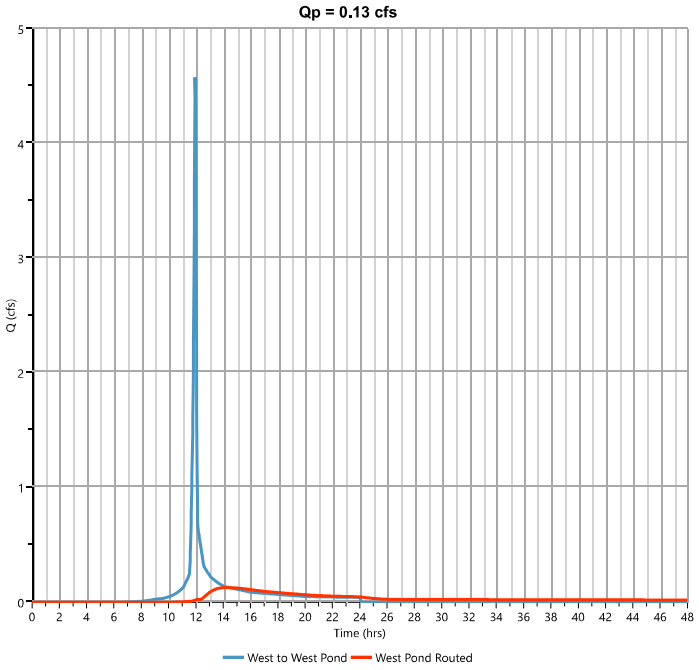
11-12-2020

Post West Pond Routed

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 0.128 cfs
Storm Frequency	= 5-yr	Time to Peak	= 14.27 hrs
Time Interval	= 1 min	Hydrograph Volume	= 5,554 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 950.16 ft
Pond Name	= West Pond	Max. Storage	= 5,778 cuft

Pond Routing by Storage Indication Method *Center of mass detention time = 10.59 hrs*



Hydrograph Report

Project Name:

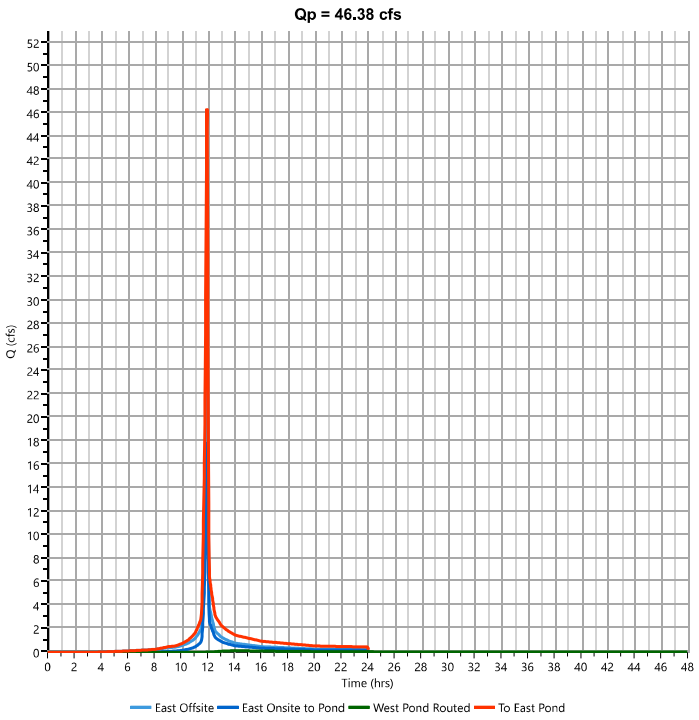
Hydrology Studio v 3.0.0.16

11-12-2020

Post To East Pond

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 46.38 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 104,397 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

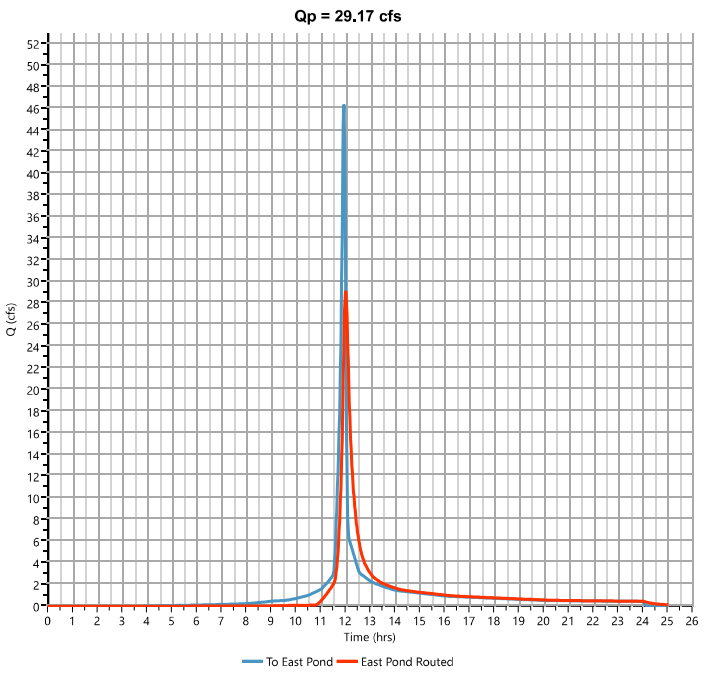
11-12-2020

Post East Pond Routed

Hyd. No. 15

Hydrograph Type	= Pond Route	Peak Flow	= 29.17 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 101,756 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 922.33 ft
Pond Name	= New East Pond	Max. Storage	= 28,073 cuft

Pond Routing by Storage Indication Method *Center of mass detention time = 41 min*



Hydrograph Report

Project Name:

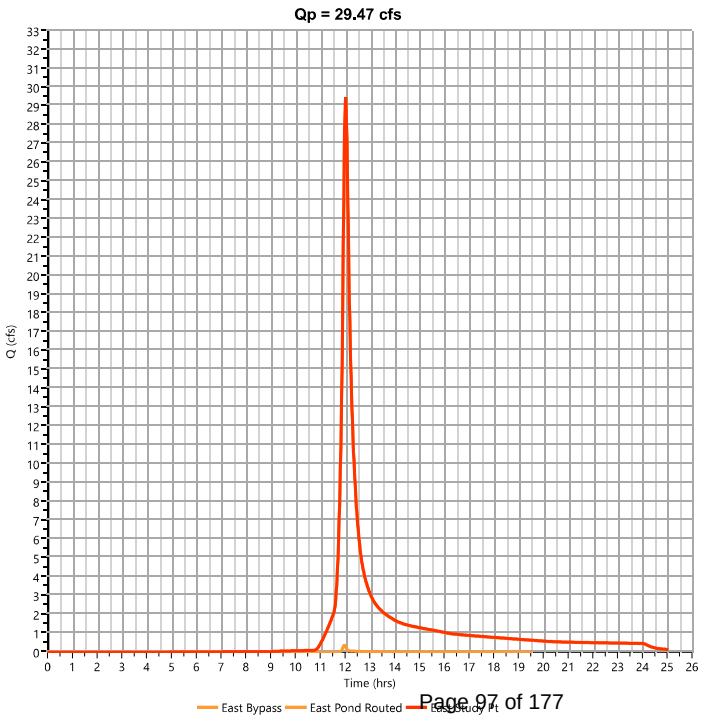
Hydrology Studio v 3.0.0.16

11-12-2020

Post East Study Pt

Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 29.47 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 102,711 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

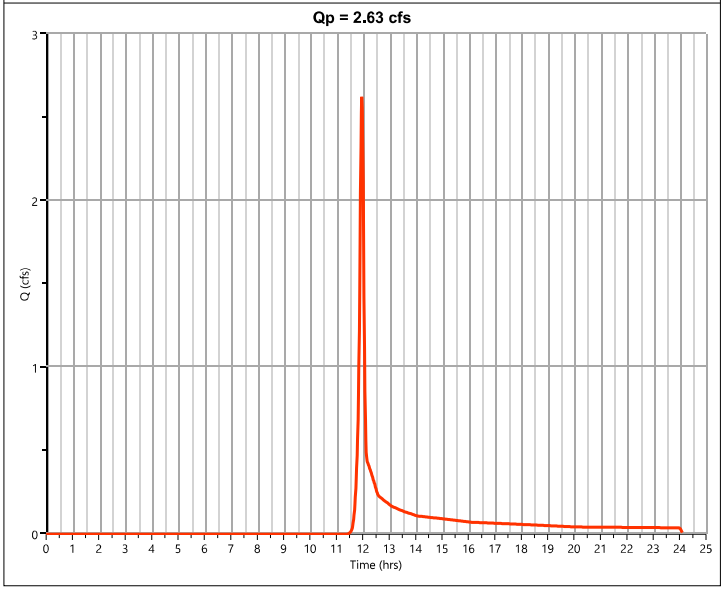
Pre West - actual

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.626 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 5,465 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Hydrograph Report

Project Name:

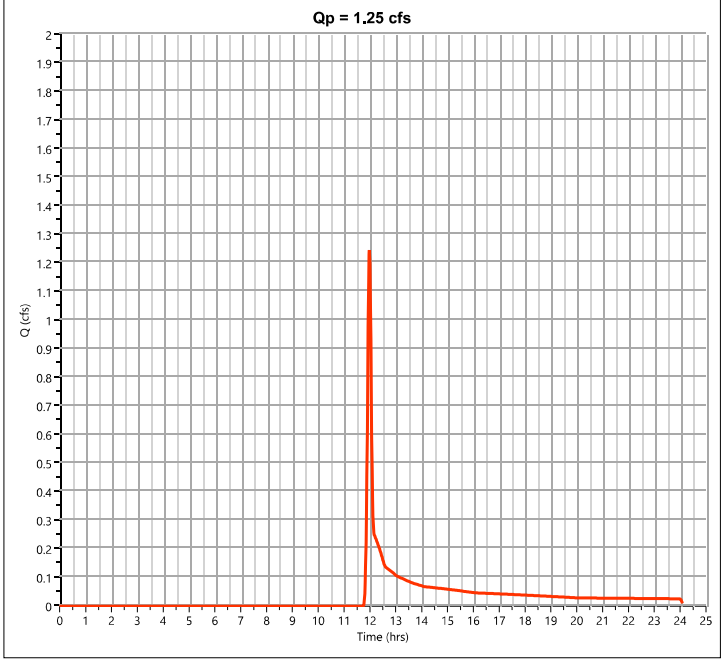
Hydrology Studio v 3.0.0.16

11-12-2020

Pre West - 90% condition

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.246 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.98 hrs
Time Interval	= 1 min	Runoff Volume	= 2,992 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

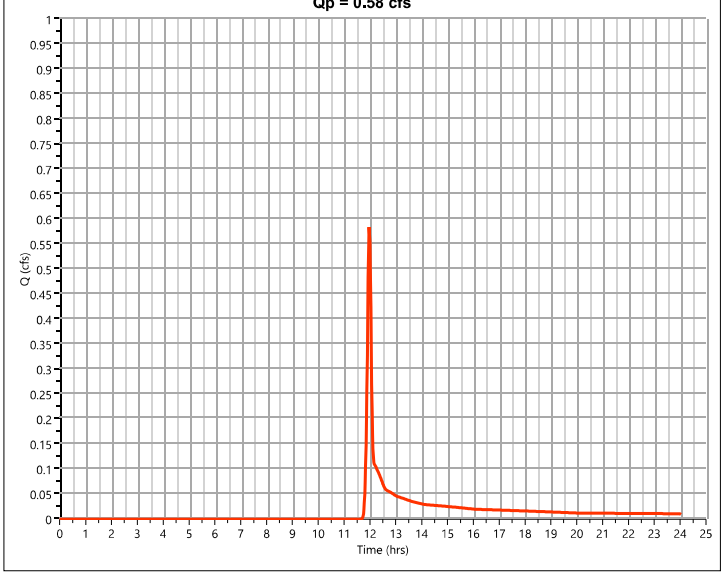
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.584 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,333 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

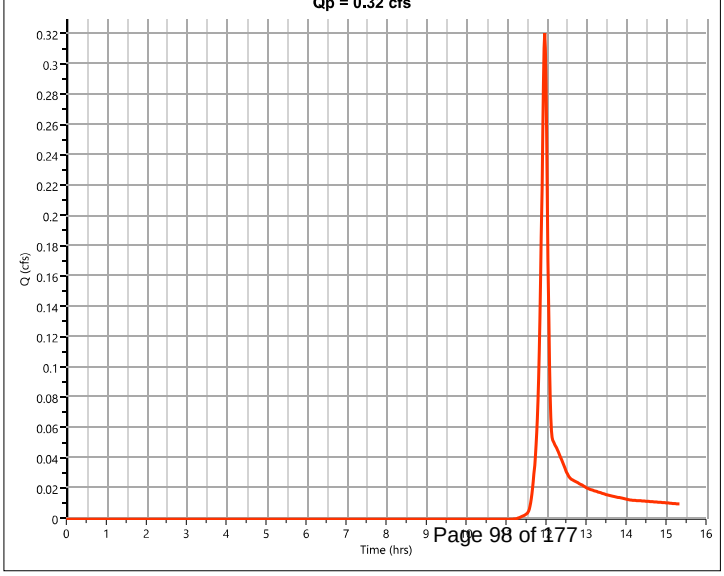
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.321 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 658 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

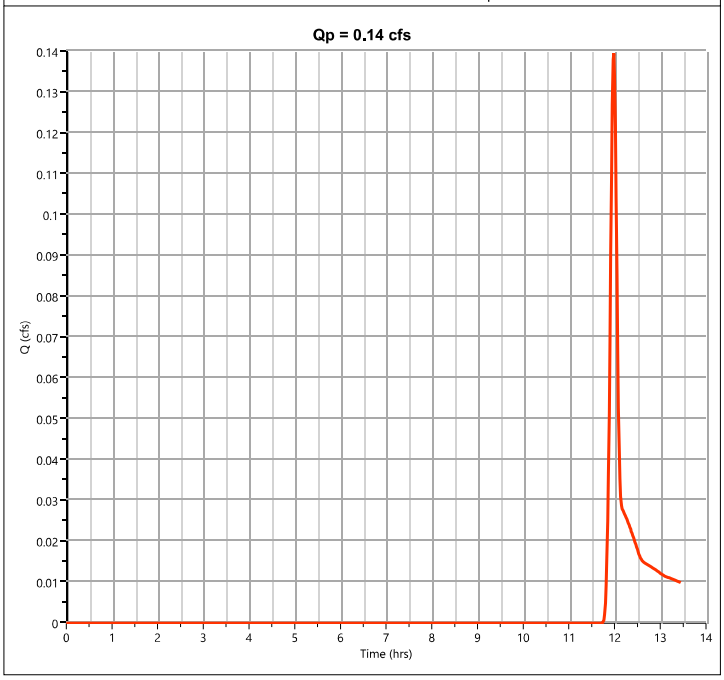
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.140 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.98 hrs
Time Interval	= 1 min	Runoff Volume	= 335 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

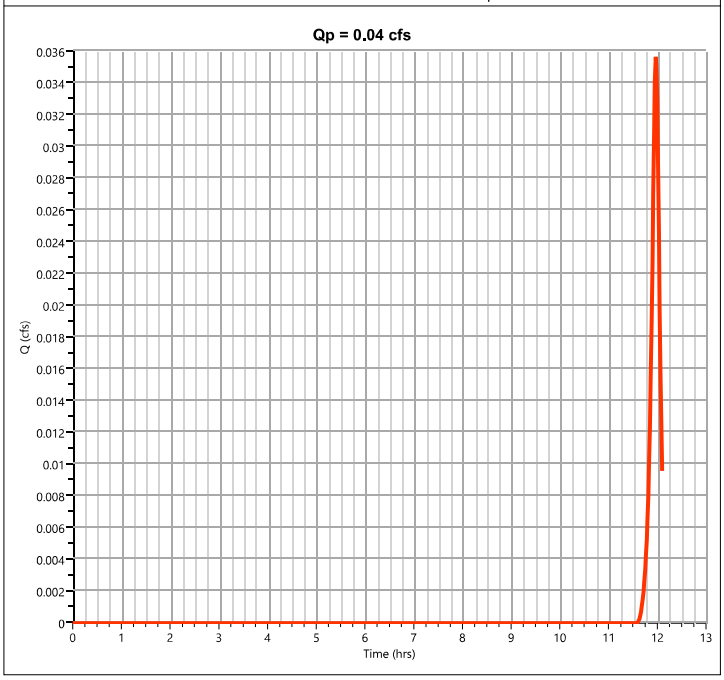
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.036 cfs
Storm Frequency	= 5-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 75.8 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

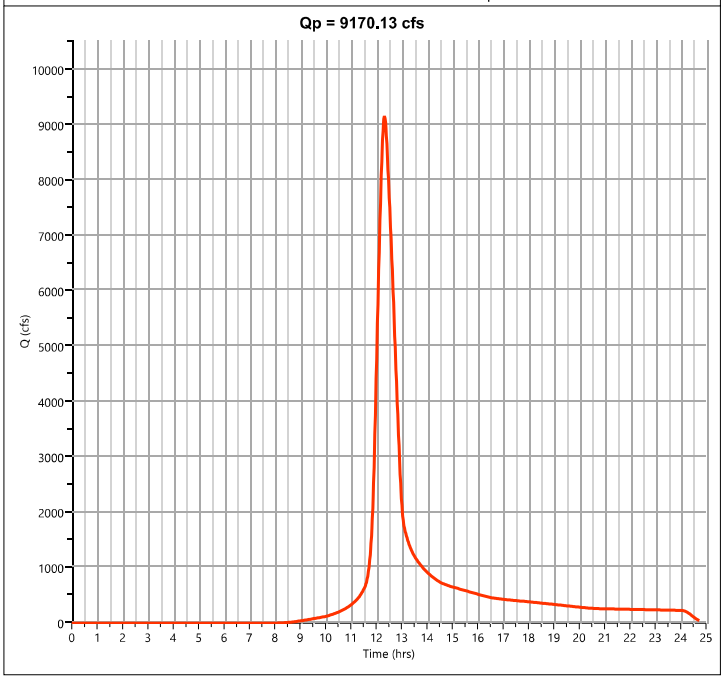
Hydrology Studio v 3.0.0.16

11-12-2020

Pre Downstream with site

Hyd. No. 26

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9170.1 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 46,883,410 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

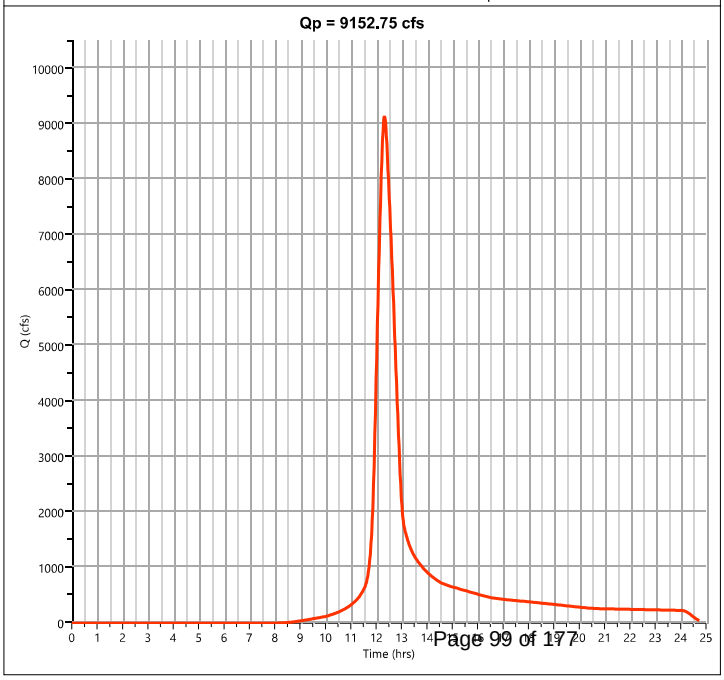
Hydrology Studio v 3.0.0.16

11-12-2020

Downstream w/o site

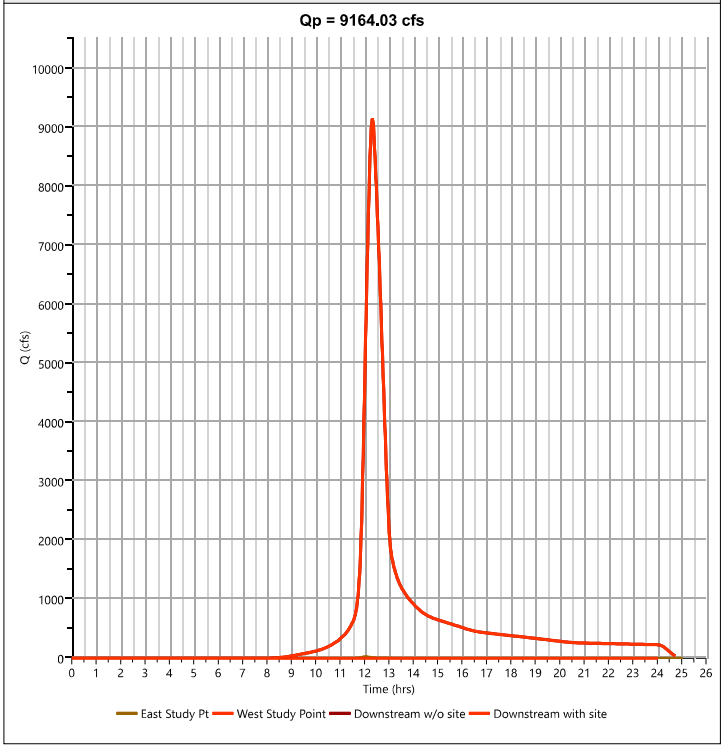
Hyd. No. 27

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9152.7 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Runoff Volume	= 46,794,510 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 4.38 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Post Downstream with site — Hyd. No. 28

Hydrograph Type	= Junction	Peak Flow	= 9164.0 cfs
Storm Frequency	= 5-yr	Time to Peak	= 12.33 hrs
Time Interval	= 1 min	Hydrograph Volume	= 46,898,740 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac

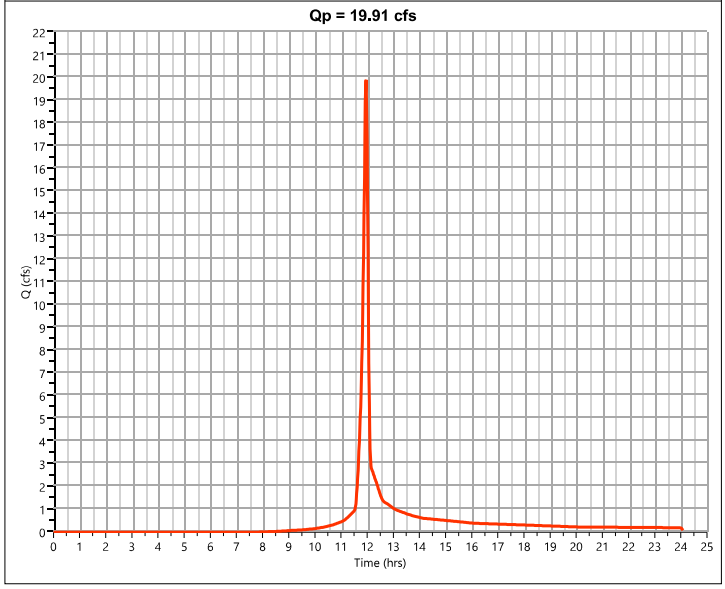


Pre East Onsite Ex Pond — Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 19.91 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 40,477 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

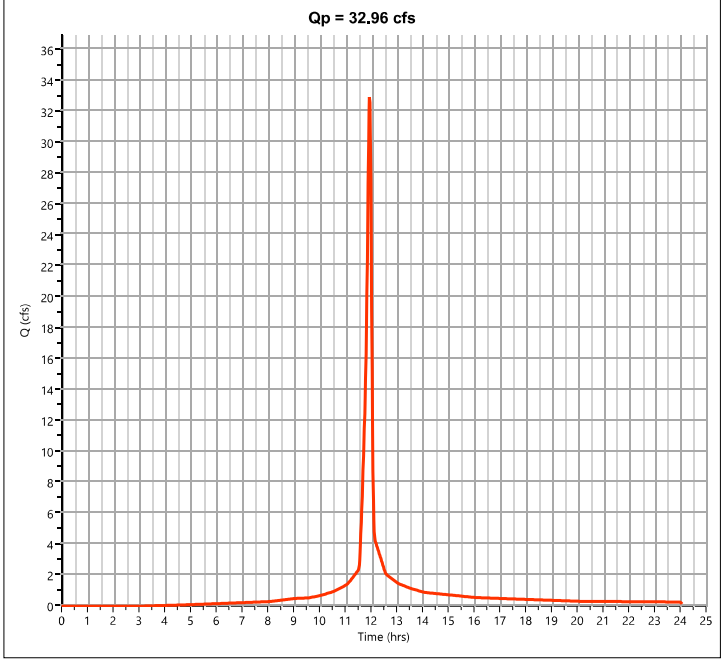
*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed



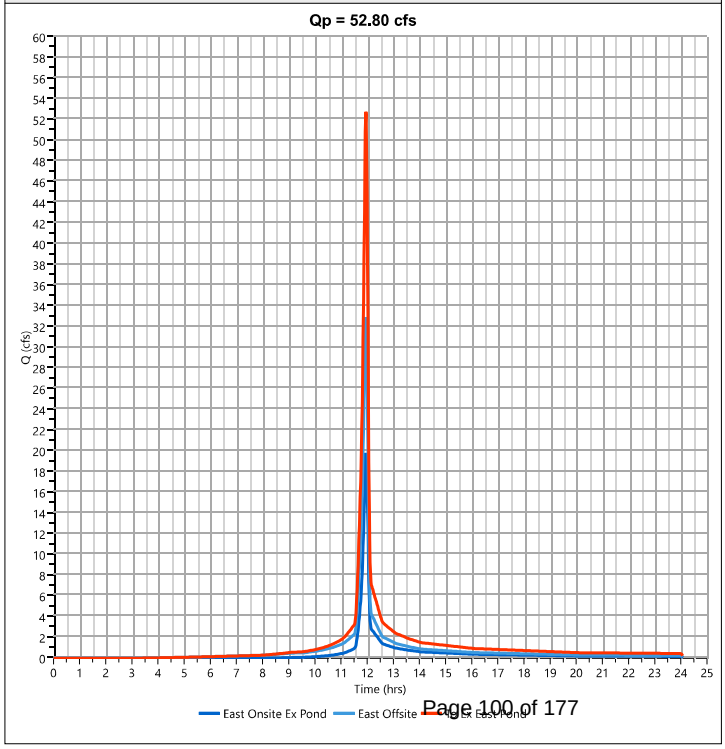
Pre East Offsite — Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 32.96 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 72,845 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Pre To Ex East Pond — Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 52.80 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 113,322 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

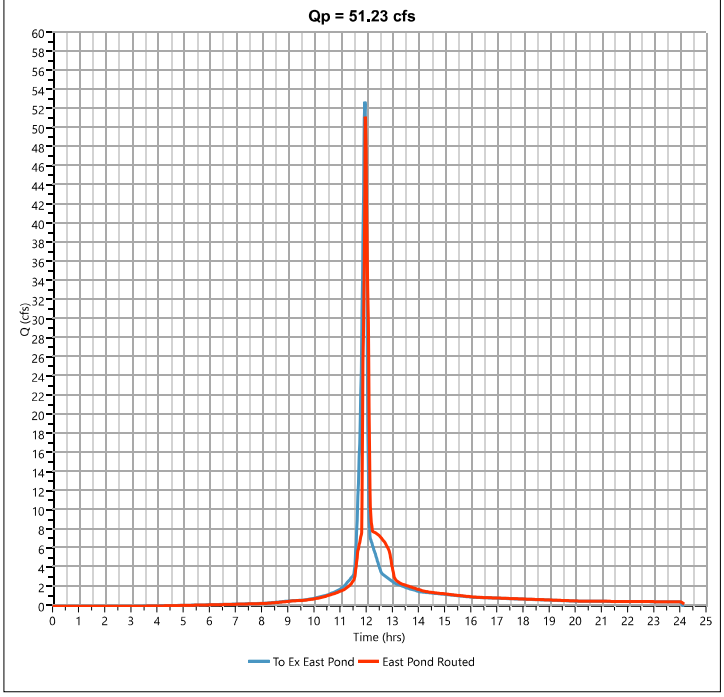
11-12-2020

Pre East Pond Routed

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 51.23 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 113,321 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 924.21 ft
Pond Name	= Ex East Pond	Max. Storage	= 15,982 cuft

Pond Routing by Storage Indication Method *Center of mass detention time = 16 min*



Hydrograph Report

Project Name:

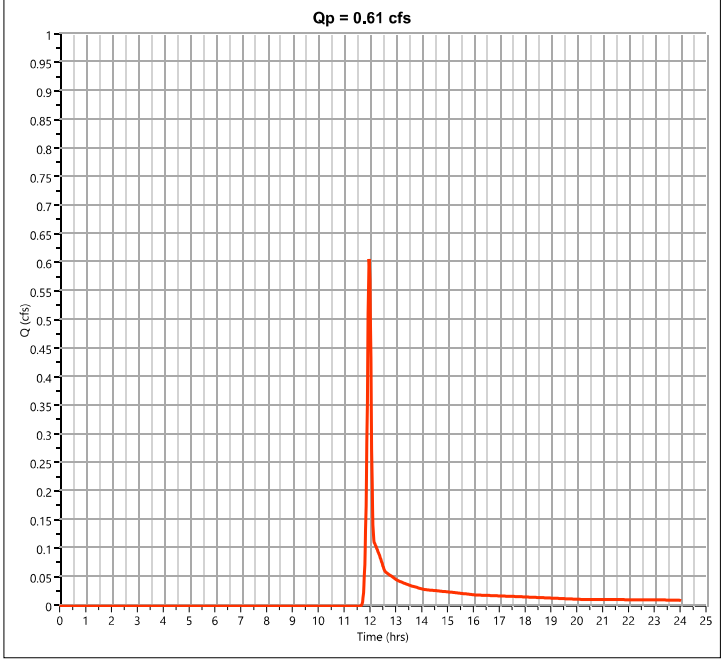
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Bypass

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.608 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,350 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

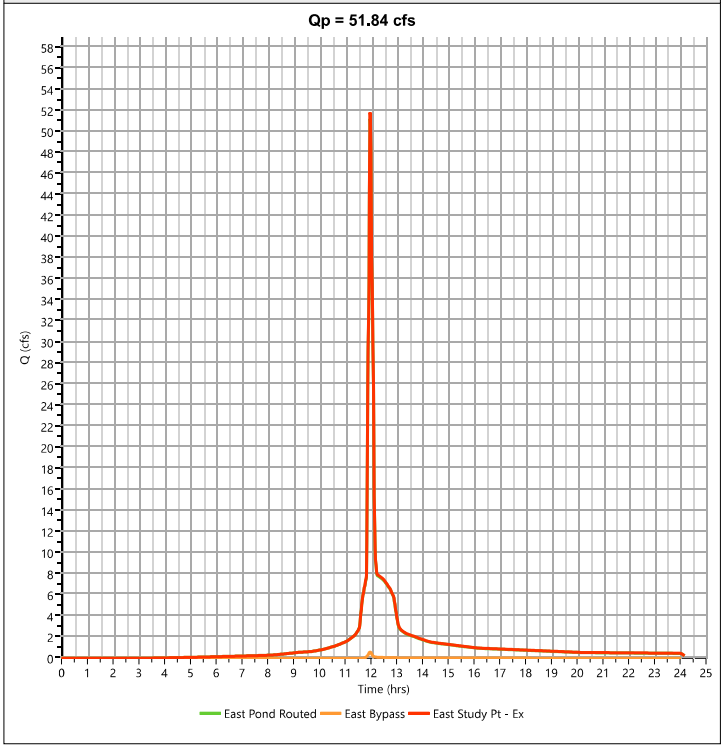
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt - Ex

Hyd. No. 6

Hydrograph Type	= Junction	Peak Flow	= 51.84 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 114,672 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

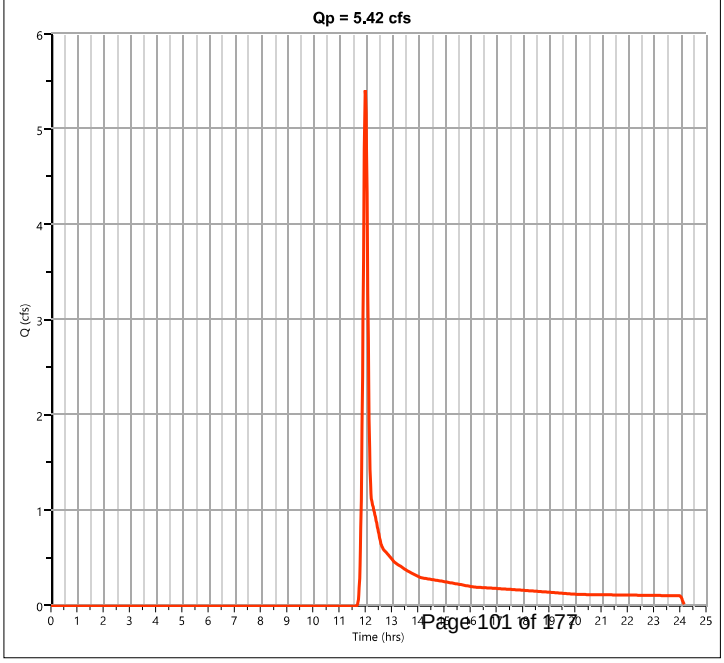
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East -90% condition

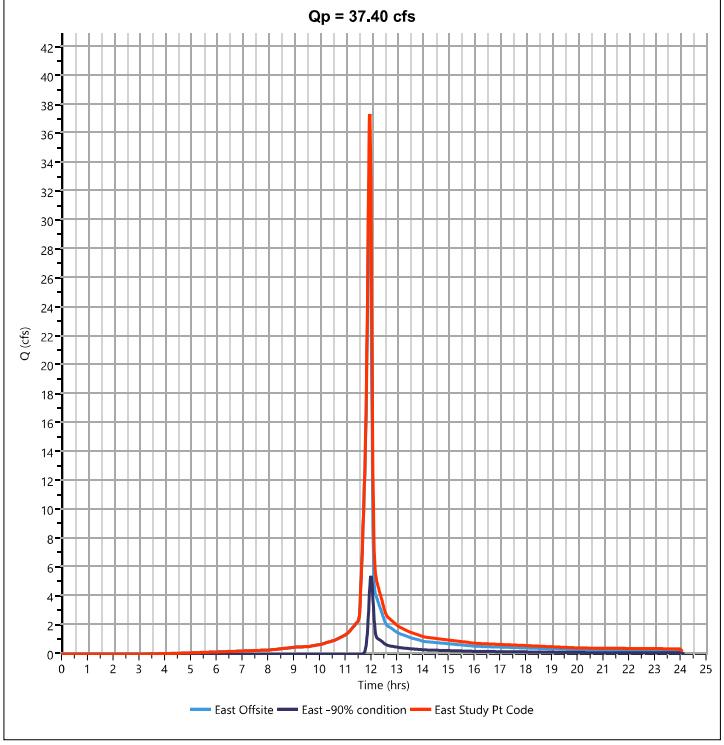
Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.416 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 13,909 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Pre East Study Pt Code — Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 37.40 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 86,754 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac

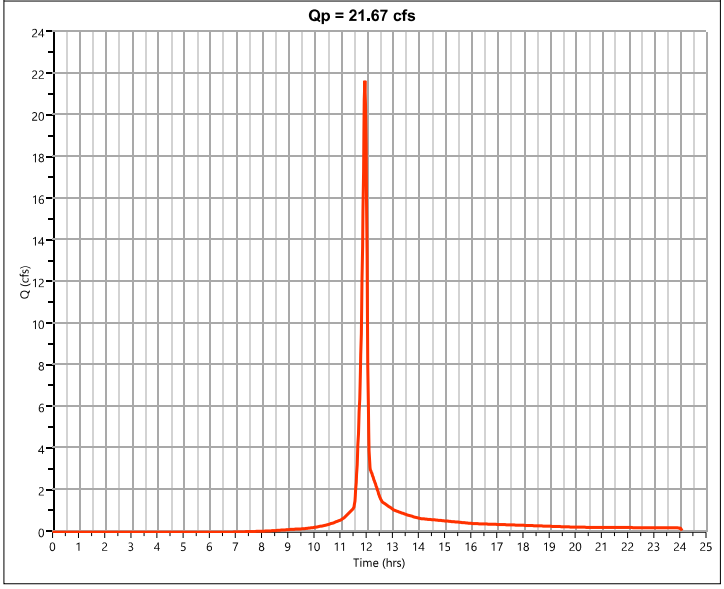


Post East Onsite to Pond — Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 21.67 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 44,569 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed

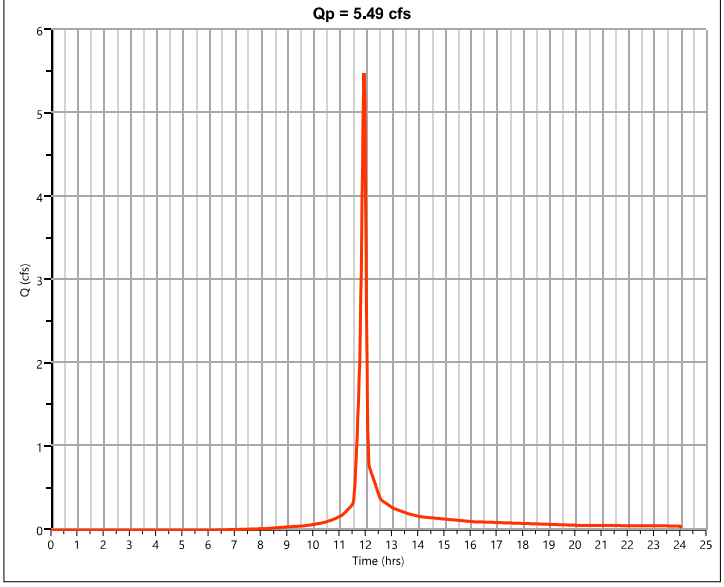


Post West to West Pond — Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.489 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 11,374 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

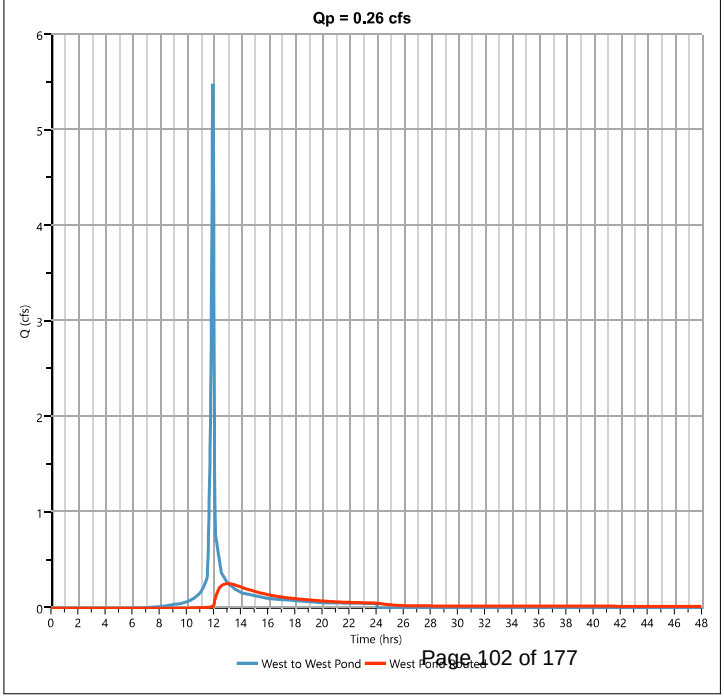
AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed



Post West Pond Routed — Hyd. No. 13

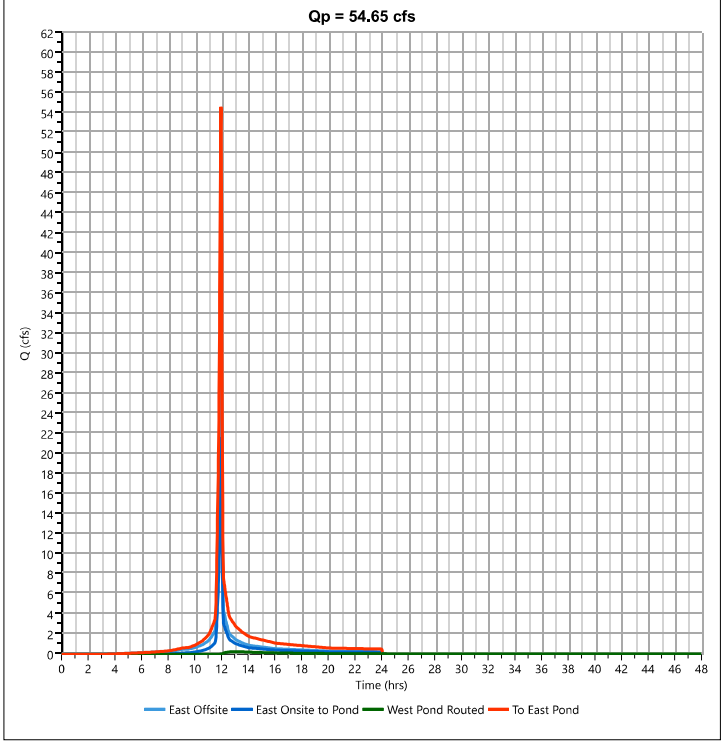
Hydrograph Type	= Pond Route	Peak Flow	= 0.259 cfs
Storm Frequency	= 10-yr	Time to Peak	= 13.05 hrs
Time Interval	= 1 min	Hydrograph Volume	= 7,441 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 950.27 ft
Pond Name	= West Pond	Max. Storage	= 6,354 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 8.50 hrs*



Post To East Pond — Hyd. No. 14

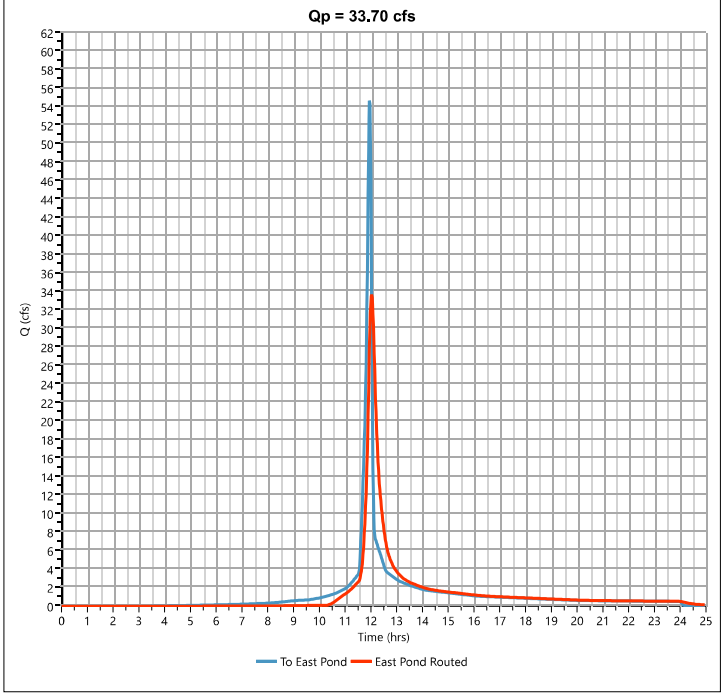
Hydrograph Type	= Junction	Peak Flow	= 54.65 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 124,855 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac



Post East Pond Routed — Hyd. No. 15

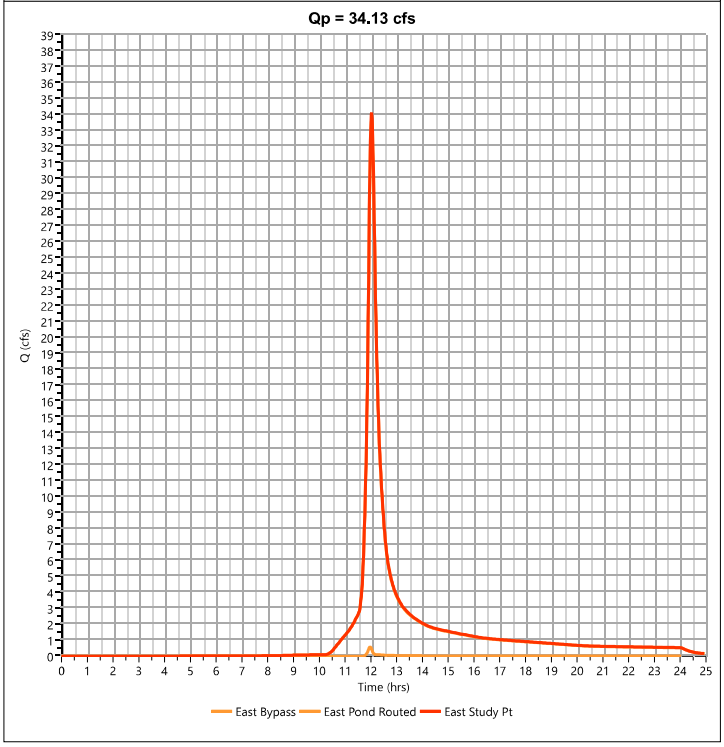
Hydrograph Type	= Pond Route	Peak Flow	= 33.70 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 122,207 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 922.91 ft
Pond Name	= New East Pond	Max. Storage	= 31,794 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 43 min*



Post East Study Pt — Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 34.13 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 123,557 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac

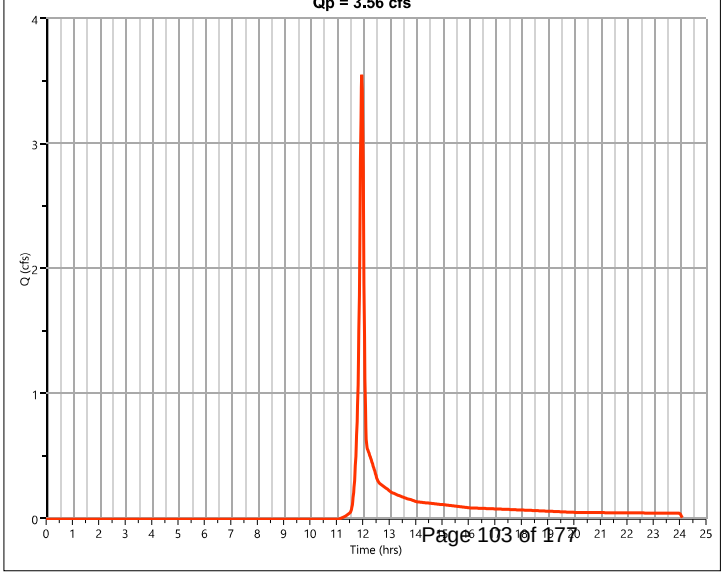


Pre West - actual — Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.557 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 7,256 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Hydrograph Report

Project Name:

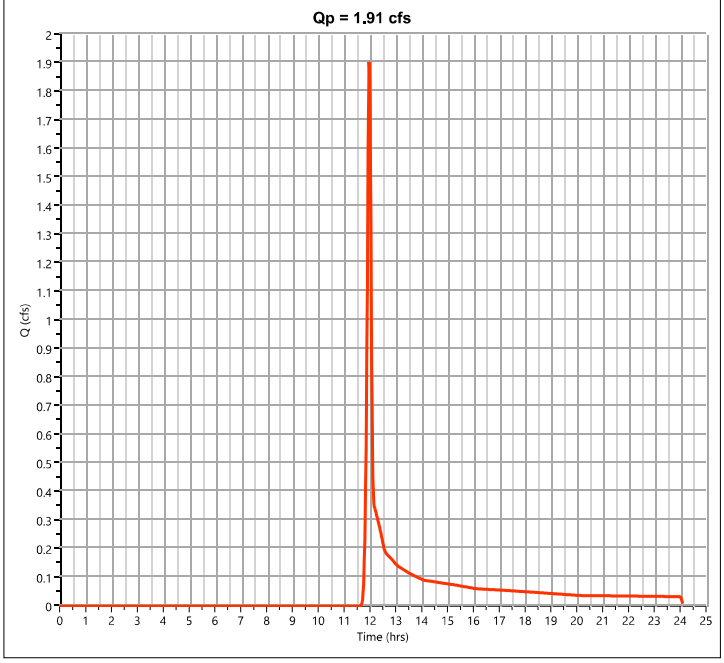
Hydrology Studio v 3.0.0.16

11-12-2020

Pre West - 90% condition

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.905 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 4,234 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

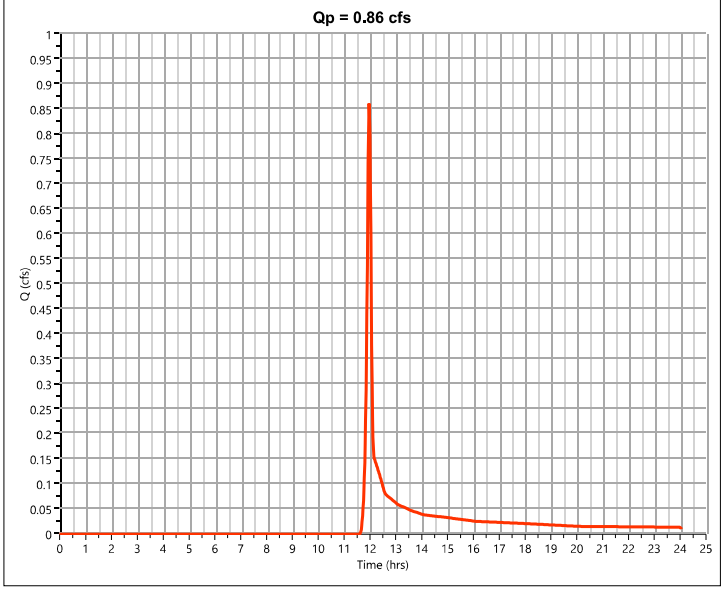
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.862 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,852 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

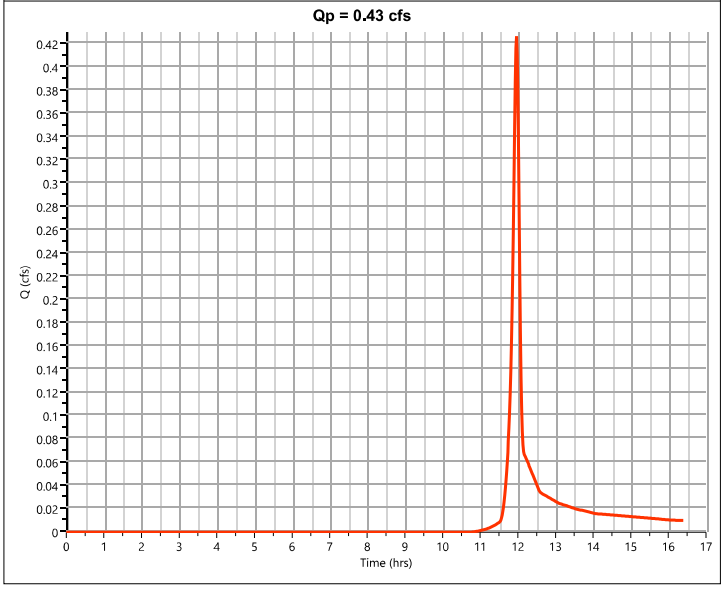
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.426 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 863 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

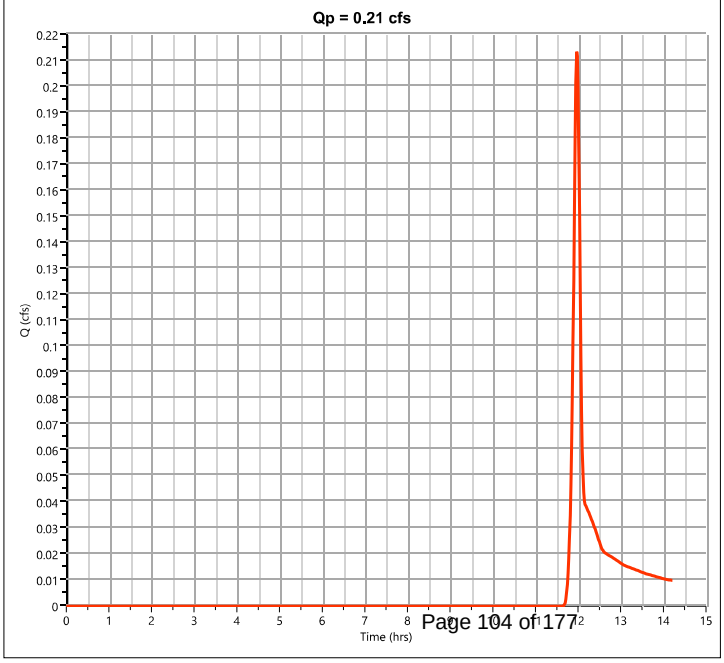
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.213 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 474 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

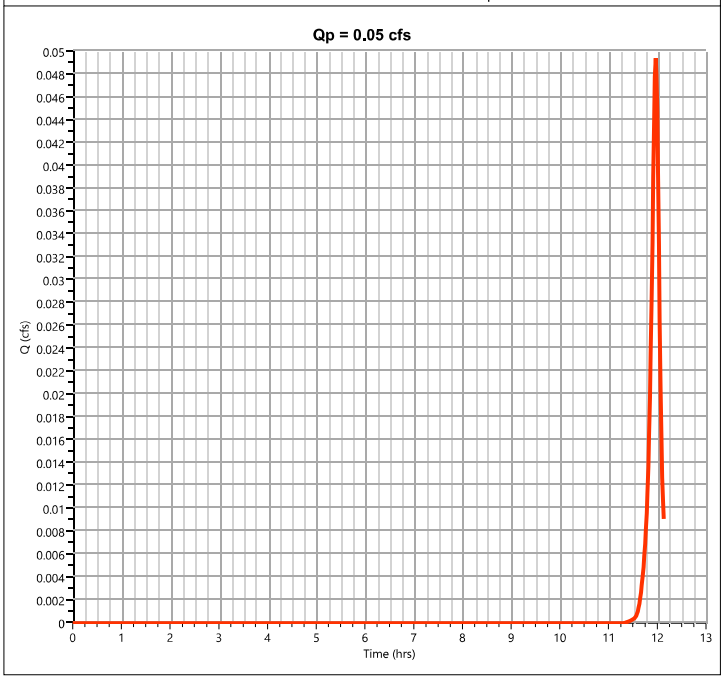
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.049 cfs
Storm Frequency	= 10-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 102 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

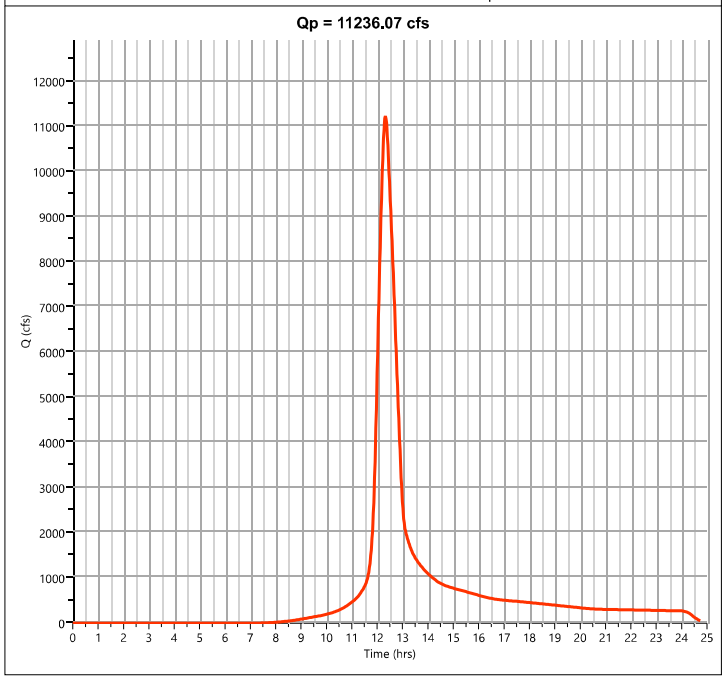
Hydrology Studio v 3.0.0.16

11-12-2020

Pre Downstream with site

Hyd. No. 26

Hydrograph Type	= NRCS Runoff	Peak Flow	= 11236.1 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 57,304,950 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

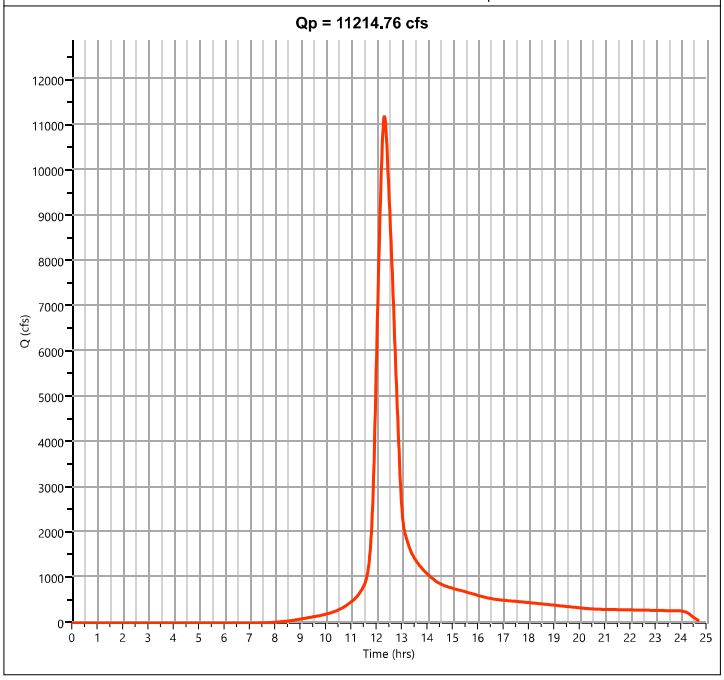
Hydrology Studio v 3.0.0.16

11-12-2020

Downstream w/o site

Hyd. No. 27

Hydrograph Type	= NRCS Runoff	Peak Flow	= 11214.8 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 57,196,260 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 4.99 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

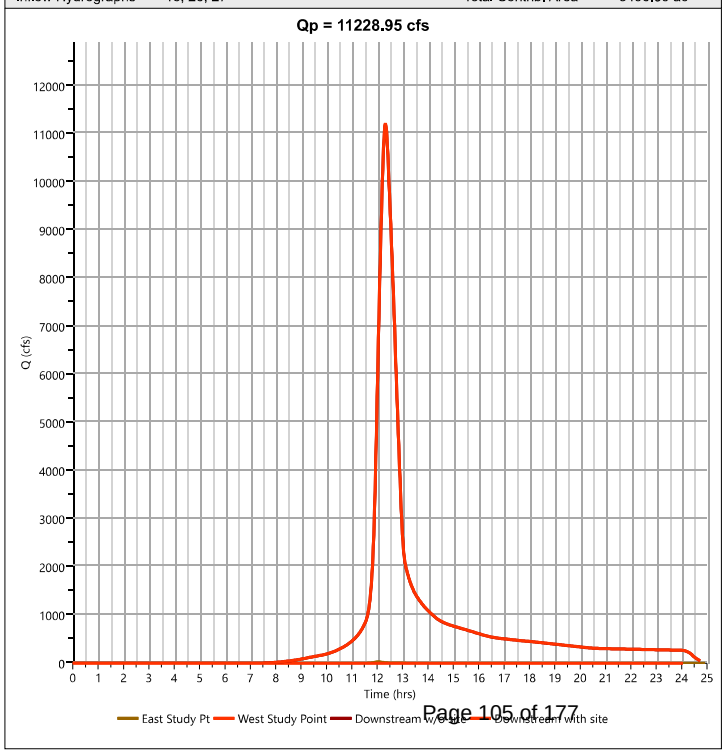
Hydrology Studio v 3.0.0.16

11-12-2020

Post Downstream with site

Hyd. No. 28

Hydrograph Type	= Junction	Peak Flow	= 11229.0 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Hydrograph Volume	= 57,321,870 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

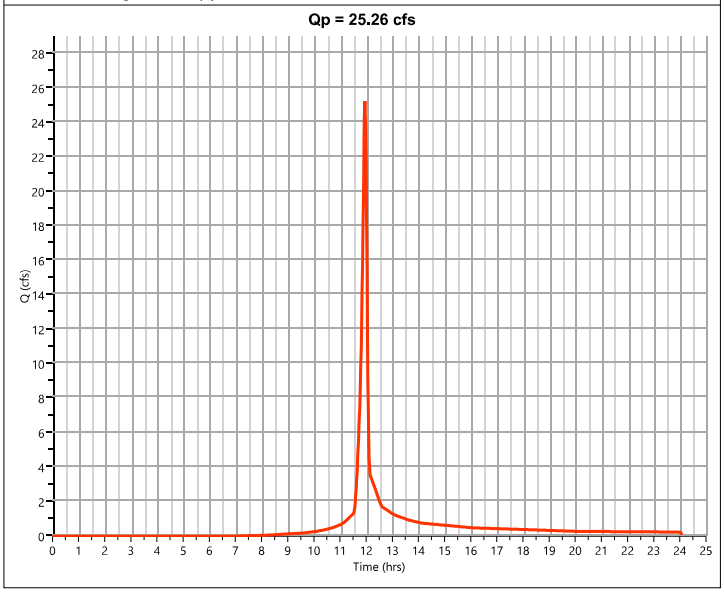
Pre East Onsite Ex Pond

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 25.26 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 51,874 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed



Hydrograph Report

Project Name:

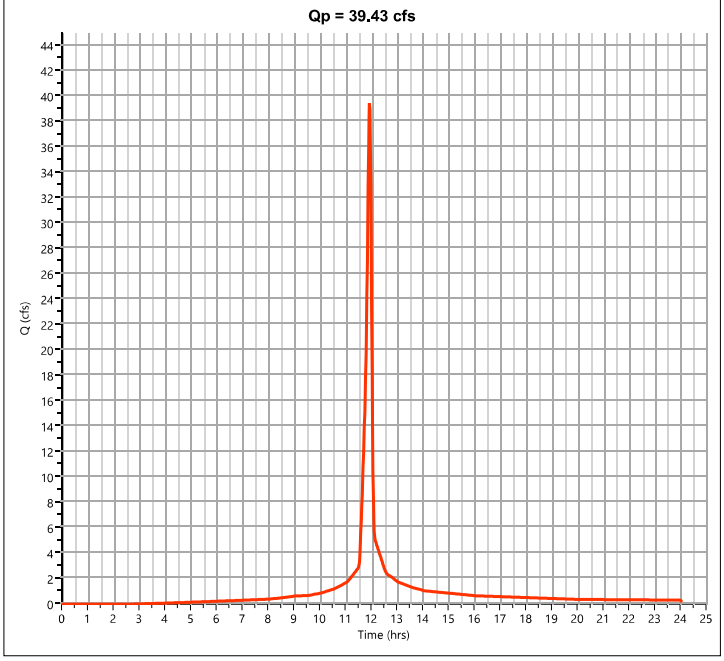
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Offsite

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 39.43 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 88,240 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

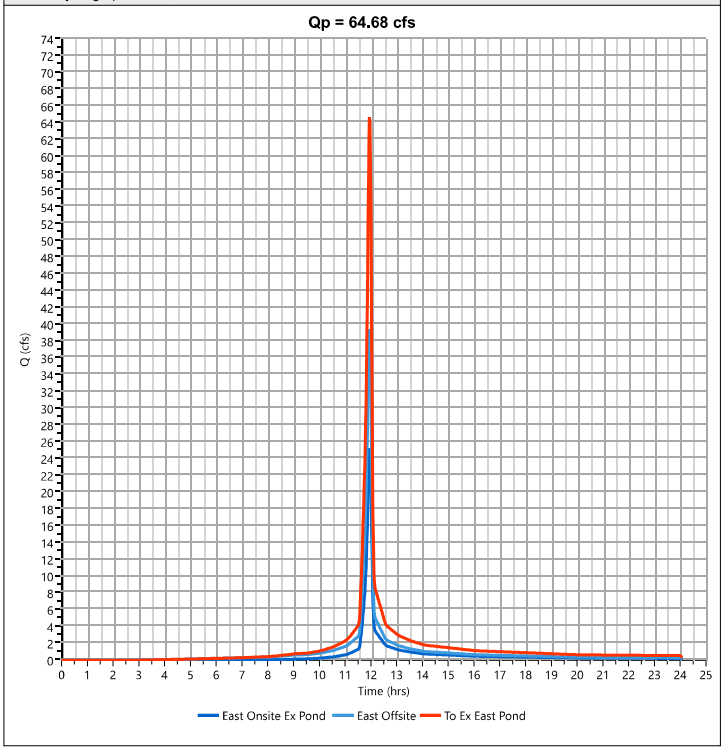
Hydrology Studio v 3.0.0.16

11-12-2020

Pre To Ex East Pond

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 64.68 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 140,114 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

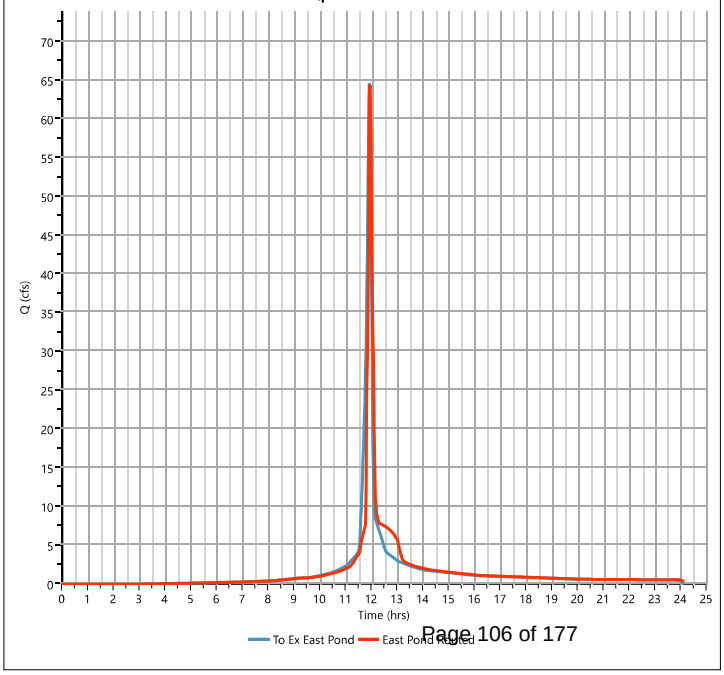
11-12-2020

Pre East Pond Routed

Hyd. No. 4

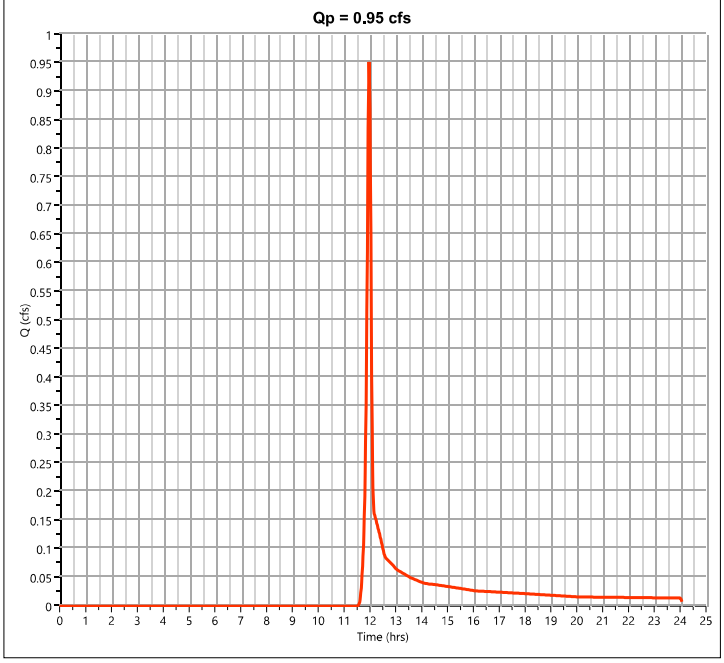
Hydrograph Type	= Pond Route	Peak Flow	= 64.48 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 140,113 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 924.31 ft
Pond Name	= Ex East Pond	Max. Storage	= 16,411 cuft

Pond Routing by Storage Indication Method *Center of mass detention time = 10 min*



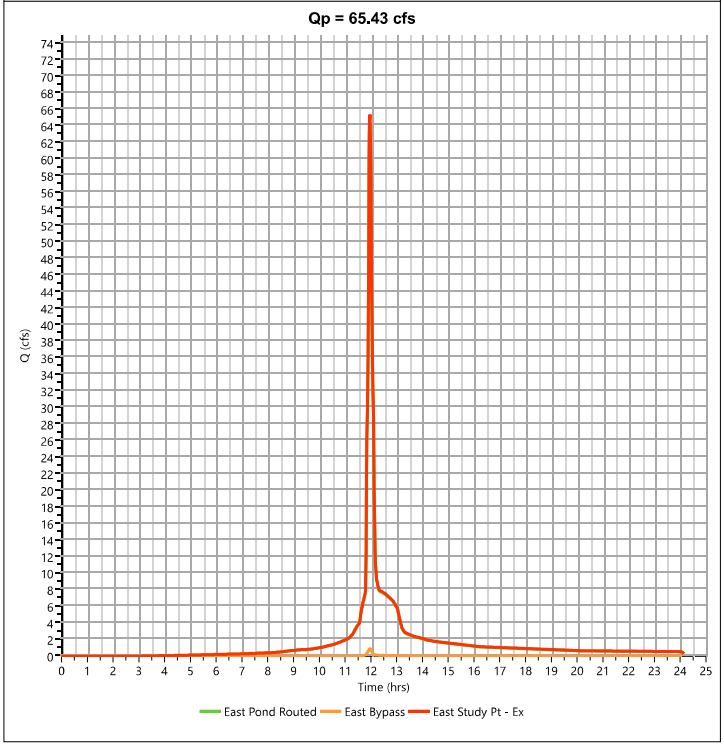
Pre East Bypass — Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.952 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 2,000 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



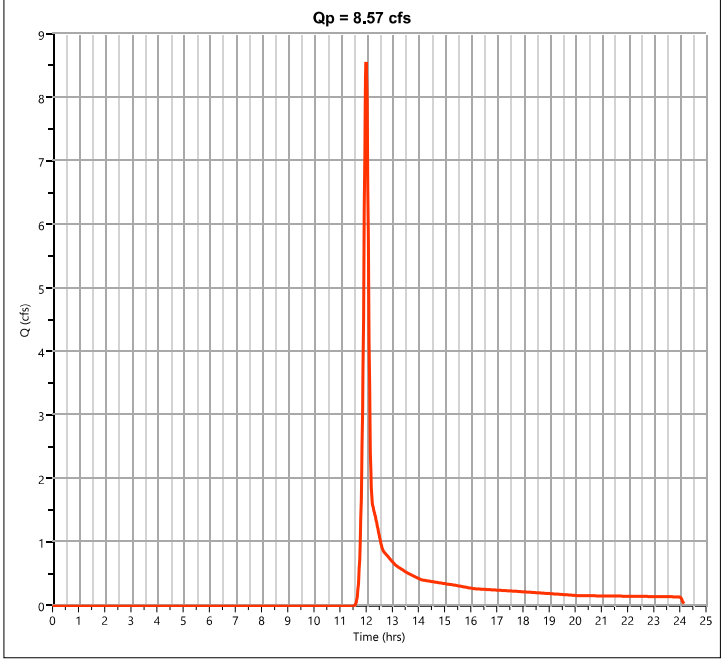
Pre East Study Pt - Ex — Hyd. No. 6

Hydrograph Type	= Junction	Peak Flow	= 65.43 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 142,113 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



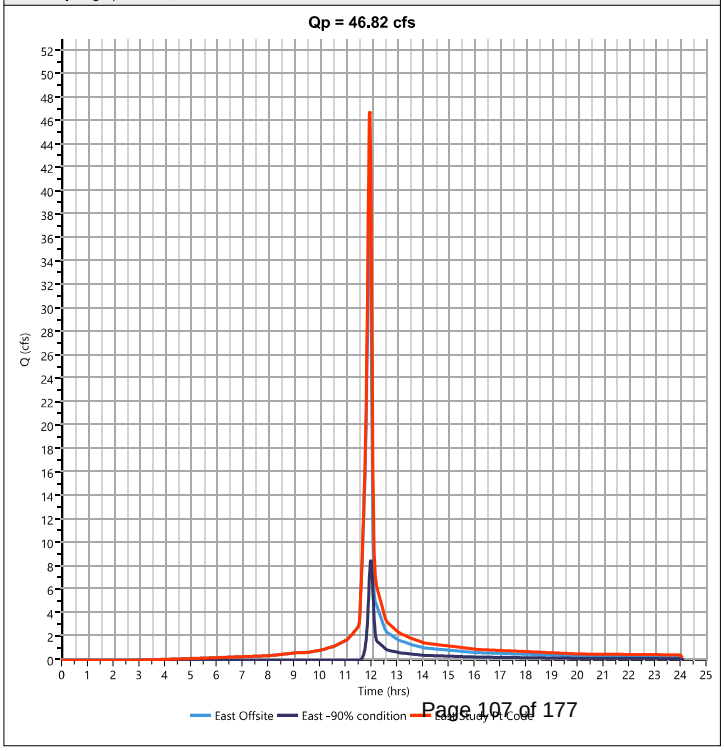
Pre East -90% condition — Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 8.574 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 20,595 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Pre East Study Pt Code — Hyd. No. 9

Hydrograph Type	= Junction	Peak Flow	= 46.82 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 108,835 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

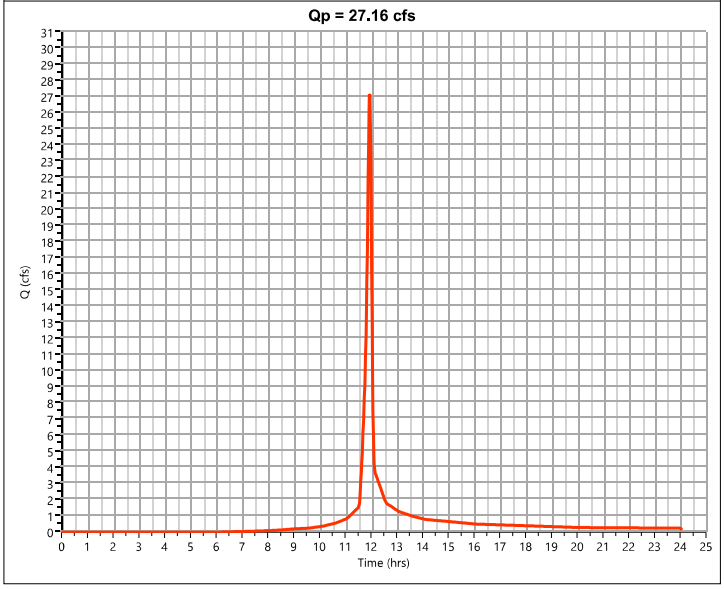
Post East Onsite to Pond

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 27.16 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 56,383 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

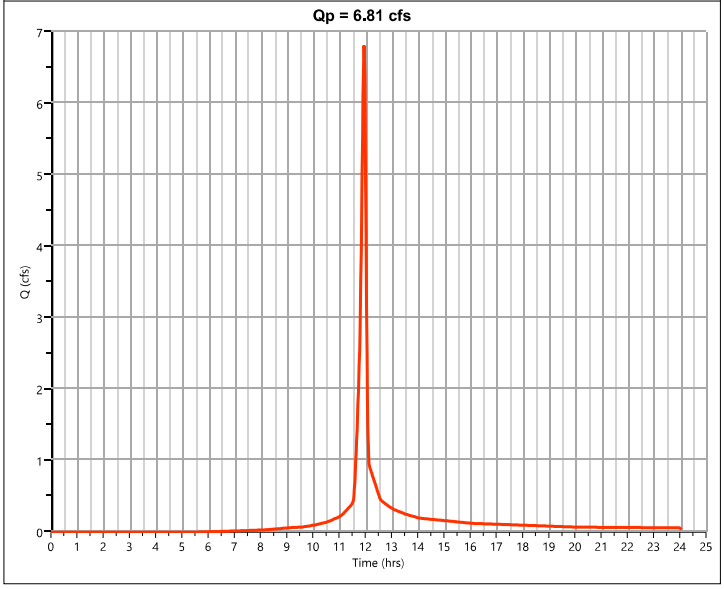
Post West to West Pond

Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.814 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 14,270 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

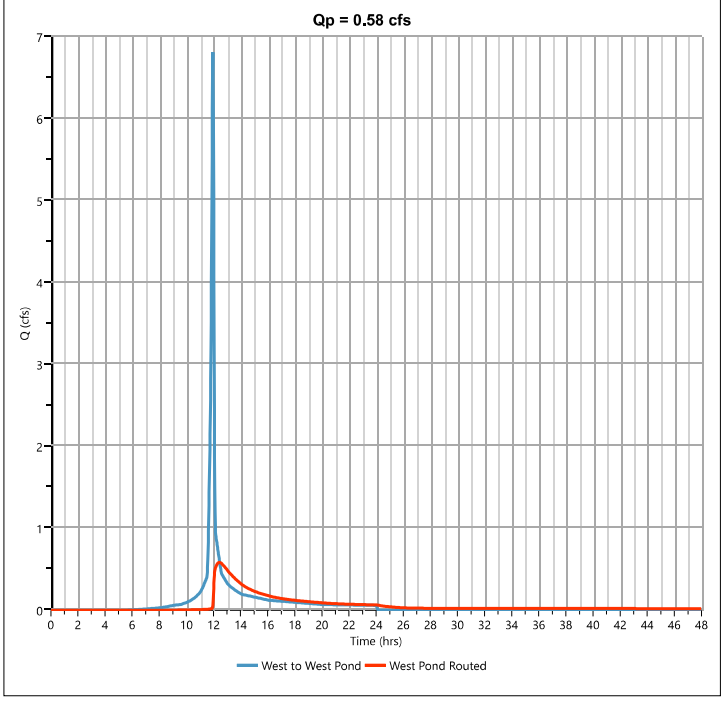
11-12-2020

Post West Pond Routed

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 0.585 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.45 hrs
Time Interval	= 1 min	Hydrograph Volume	= 10,250 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 950.48 ft
Pond Name	= West Pond	Max. Storage	= 7,424 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 6.75 hrs*



Hydrograph Report

Project Name:

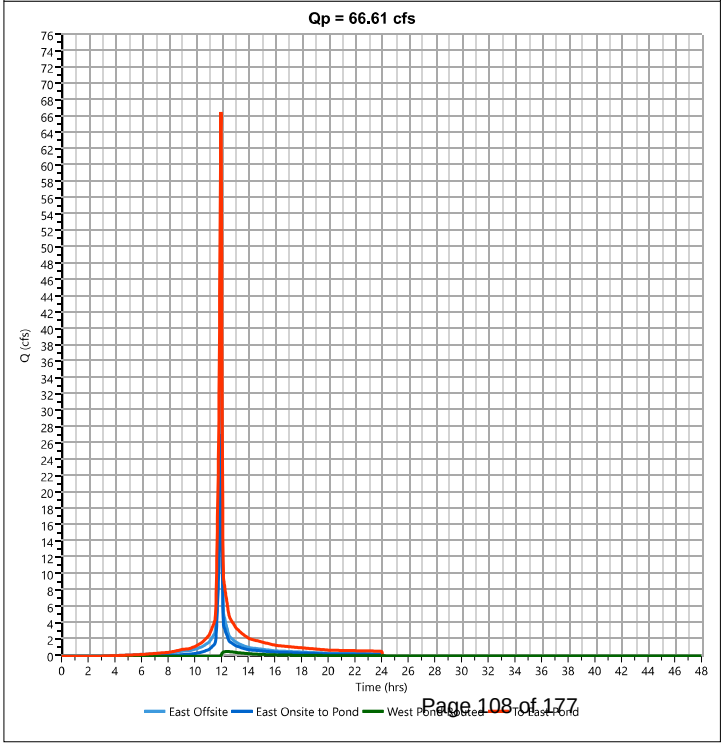
Hydrology Studio v 3.0.0.16

11-12-2020

Post To East Pond

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 66.61 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 154,874 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

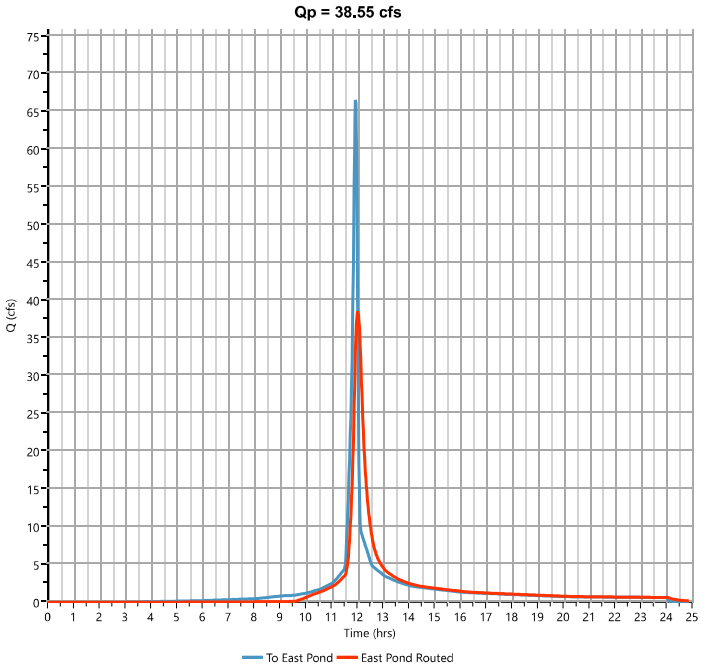
11-12-2020

Post East Pond Routed

Hyd. No. 15

Hydrograph Type	= Pond Route	Peak Flow	= 38.55 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 152,215 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 923.75 ft
Pond Name	= New East Pond	Max. Storage	= 37,689 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 45 min*



Hydrograph Report

Project Name:

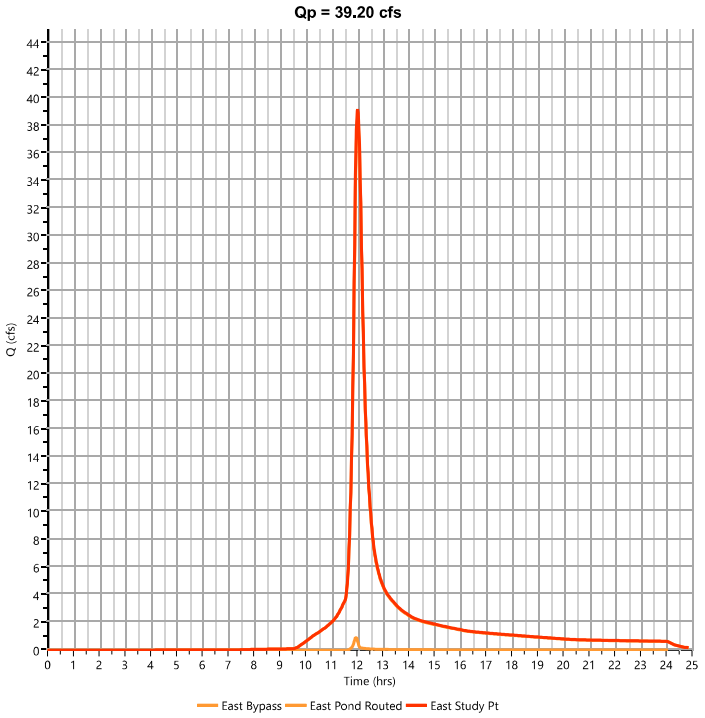
Hydrology Studio v 3.0.0.16

11-12-2020

Post East Study Pt

Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 39.20 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 154,214 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

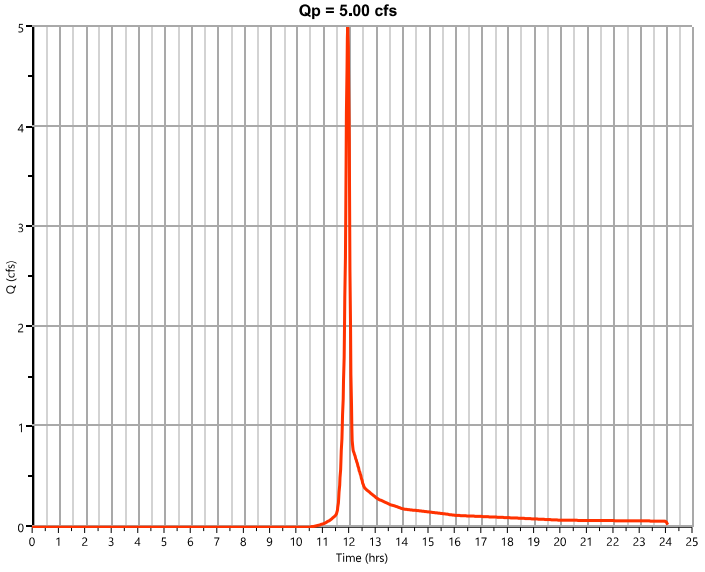
Pre West - actual

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.999 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 10,074 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Hydrograph Report

Project Name:

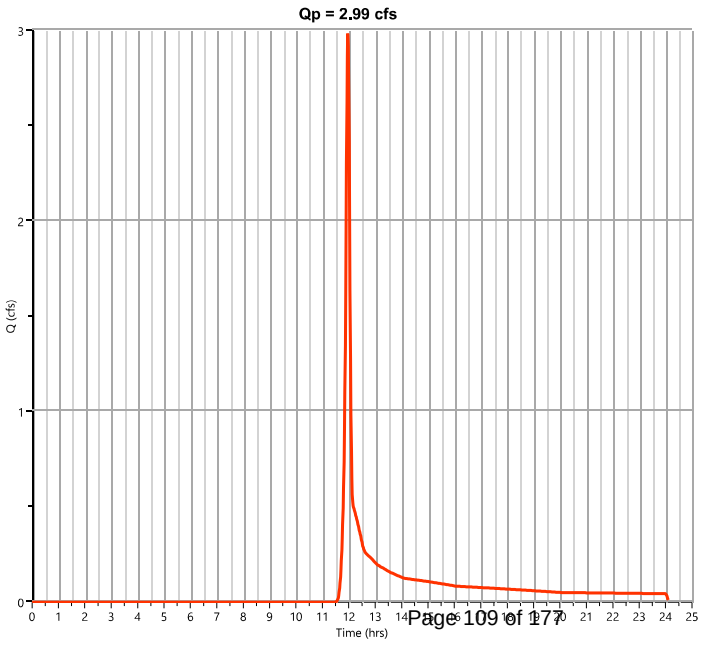
Hydrology Studio v 3.0.0.16

11-12-2020

Pre West - 90% condition

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.986 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 6,269 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

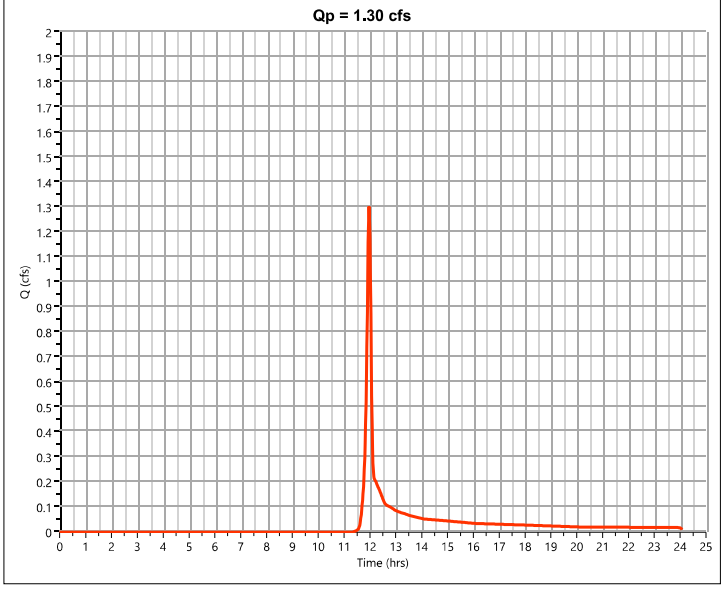
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.303 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 2,691 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

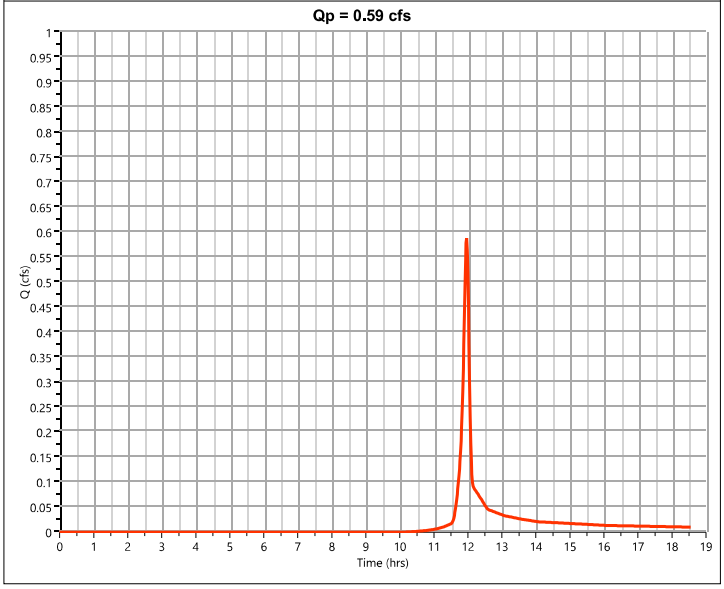
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.589 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,183 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

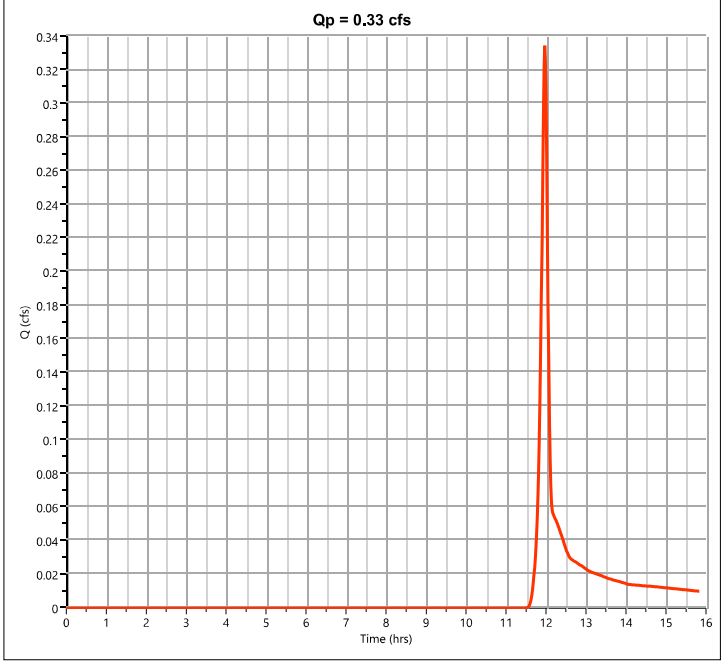
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.335 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 703 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

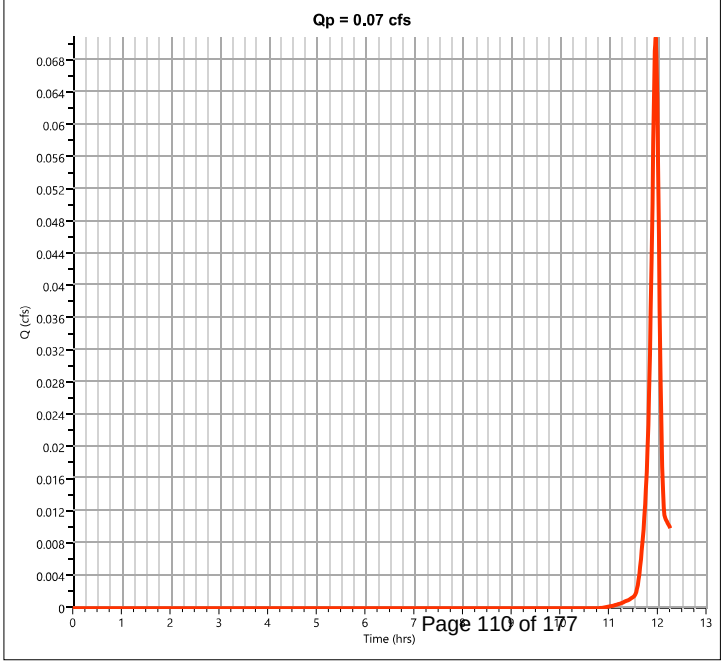
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.071 cfs
Storm Frequency	= 25-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 144 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

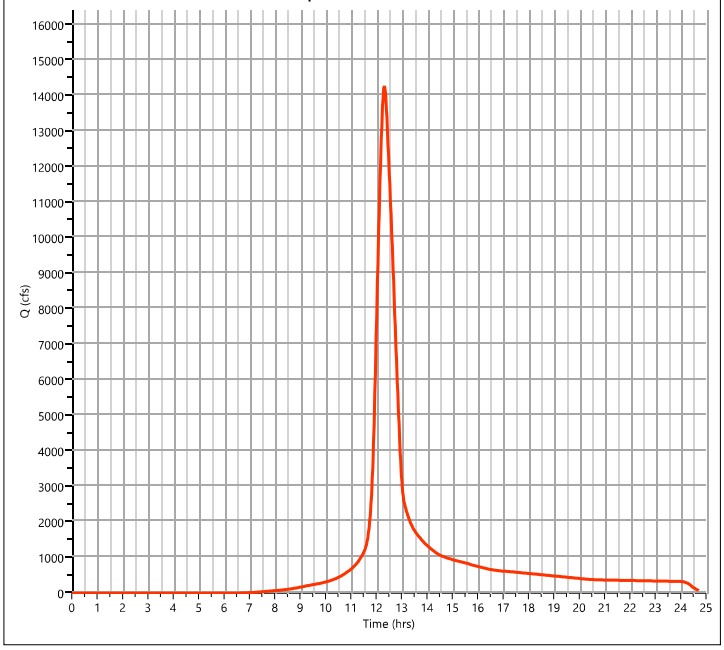
11-12-2020

Pre Downstream with site

Hyd. No. 26

Hydrograph Type	= NRCS Runoff	Peak Flow	= 14283.0 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 72,803,180 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

Qp = 14283.04 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

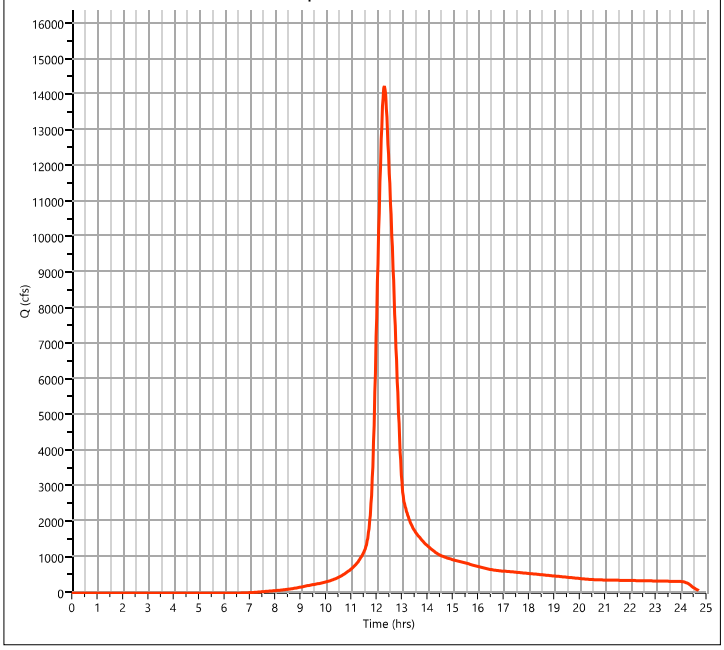
11-12-2020

Downstream w/o site

Hyd. No. 27

Hydrograph Type	= NRCS Runoff	Peak Flow	= 14256.0 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 72,665,090 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 5.87 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

Qp = 14255.96 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

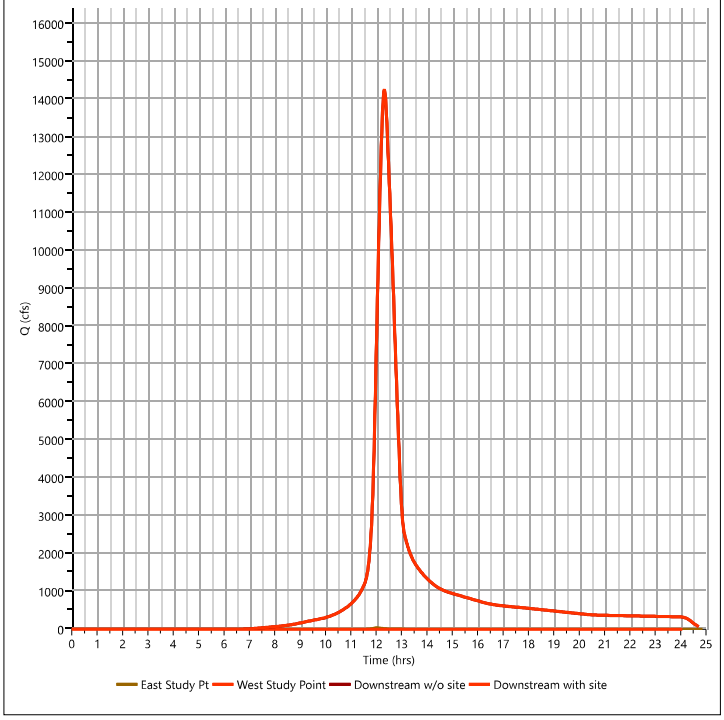
11-12-2020

Post Downstream with site

Hyd. No. 28

Hydrograph Type	= Junction	Peak Flow	= 14274.5 cfs
Storm Frequency	= 25-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Hydrograph Volume	= 72,822,790 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac

Qp = 14274.51 cfs



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Onsite Ex Pond

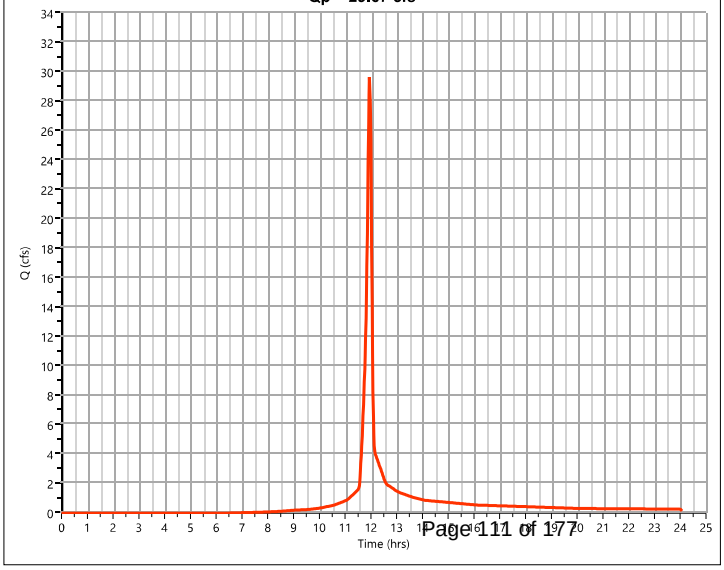
Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 29.67 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 61,328 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed

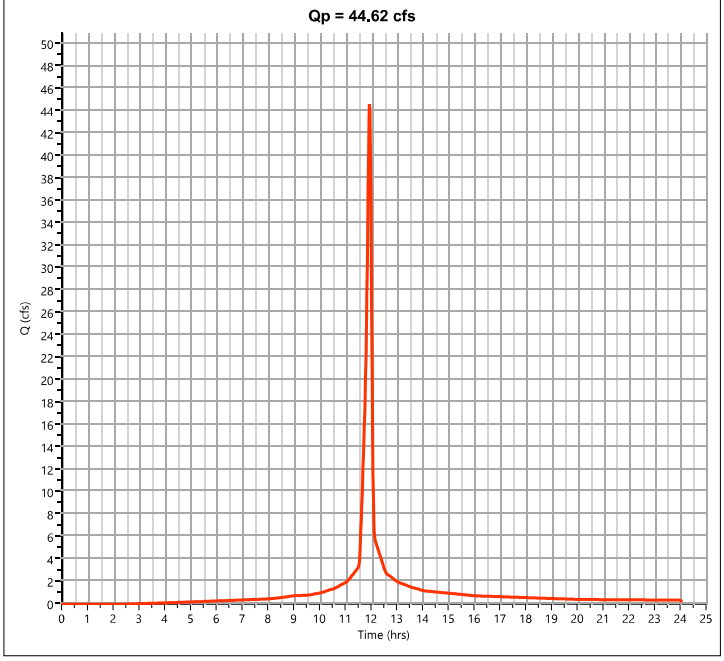
Qp = 29.67 cfs



Pre East Offsite

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 44.62 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 100,717 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

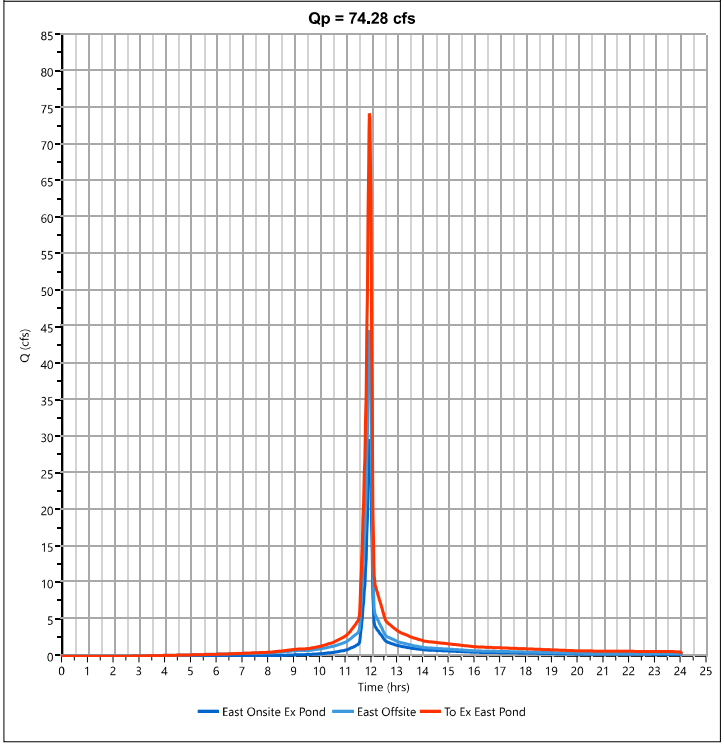


Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
11-12-2020

Pre To Ex East Pond

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 74.28 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 162,045 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



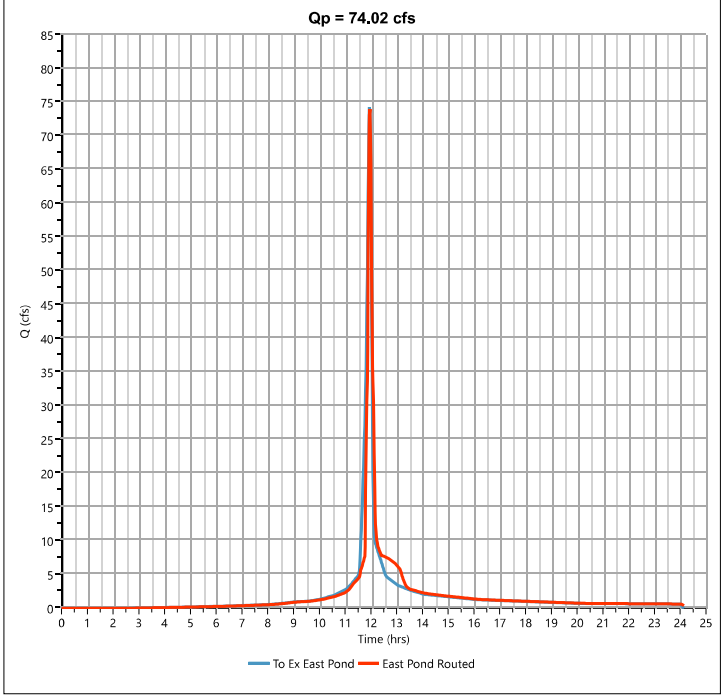
Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
11-12-2020

Pre East Pond Routed

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 74.02 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 162,044 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 924.38 ft
Pond Name	= Ex East Pond	Max. Storage	= 16,683 cuft

Pond Routing by Storage Indication Method *Center of mass detention time = 9 min*

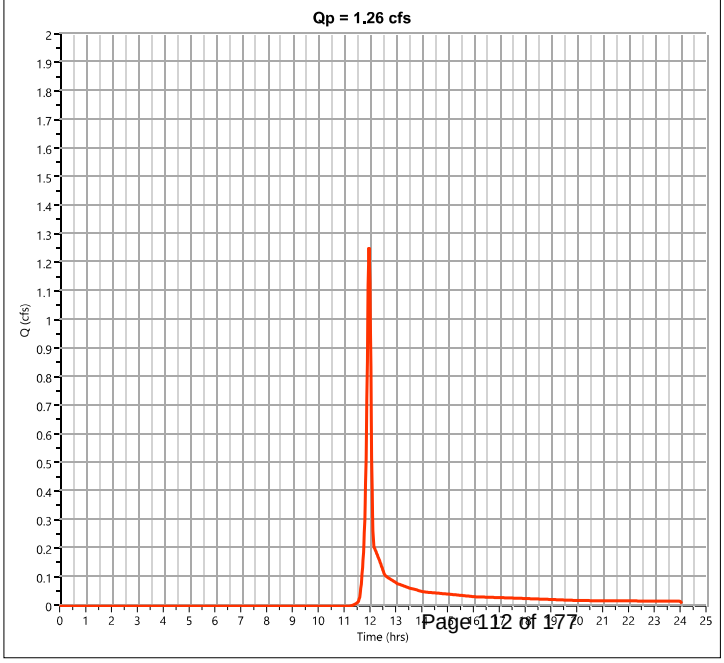


Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
11-12-2020

Pre East Bypass

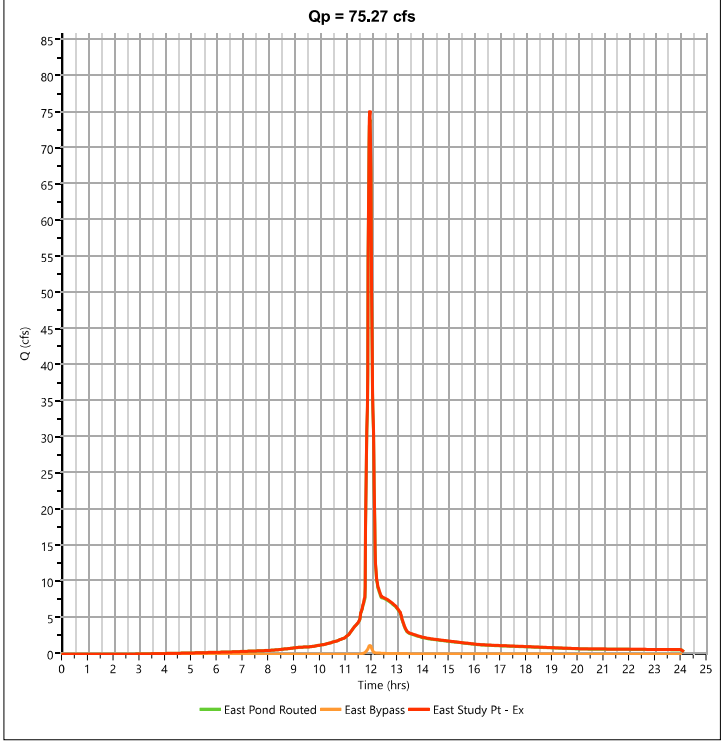
Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.255 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 2,579 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



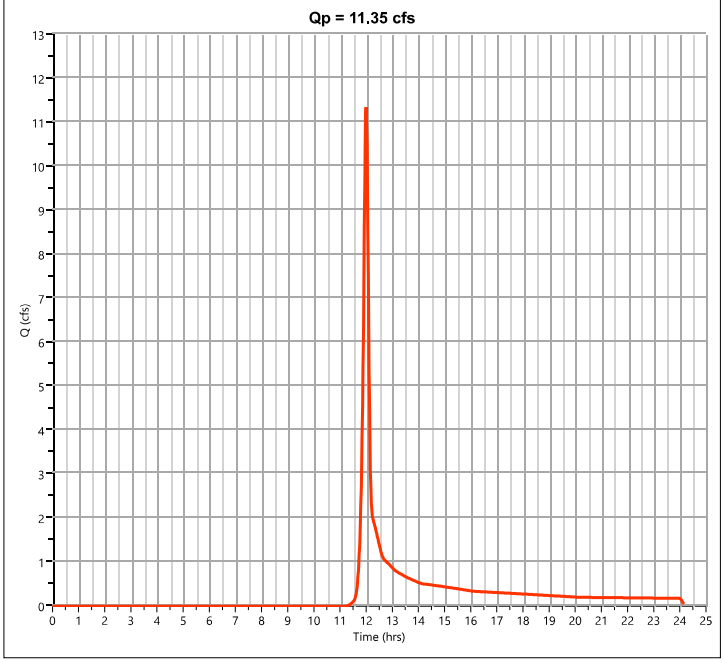
Pre East Study Pt - Ex **Hyd. No. 6**

Hydrograph Type	= Junction	Peak Flow	= 75.27 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 164,623 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



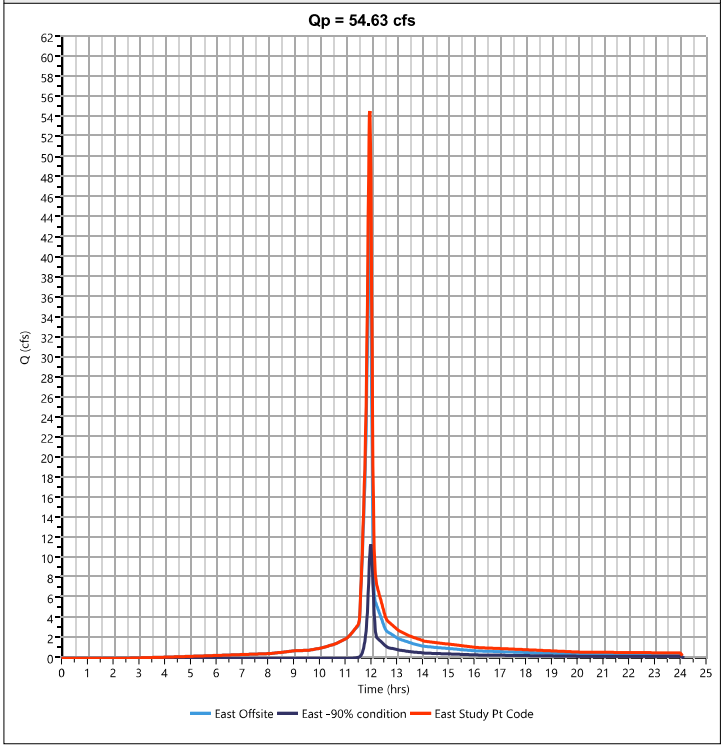
Pre East -90% condition **Hyd. No. 8**

Hydrograph Type	= NRCS Runoff	Peak Flow	= 11.35 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 26,563 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Pre East Study Pt Code **Hyd. No. 9**

Hydrograph Type	= Junction	Peak Flow	= 54.63 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 127,280 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac

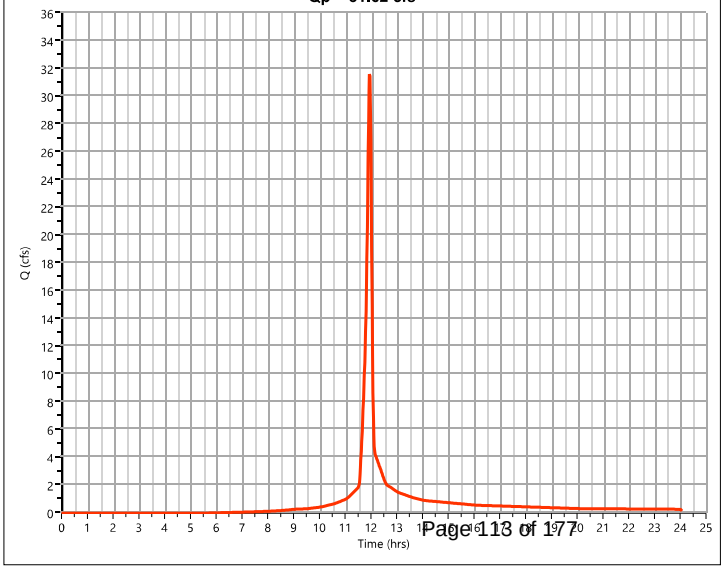


Post East Onsite to Pond **Hyd. No. 11**

Hydrograph Type	= NRCS Runoff	Peak Flow	= 31.62 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 66,122 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed

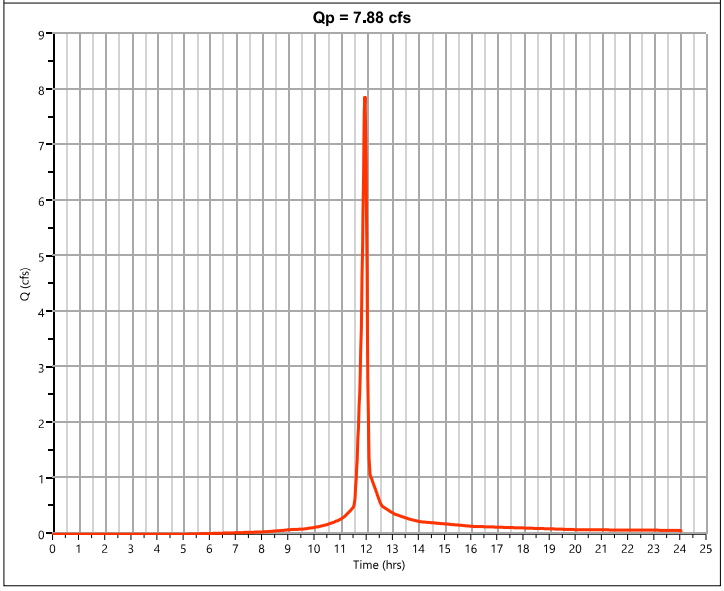


Post West to West Pond — Hyd. No. 12

Hydrograph Type	= NRCS Runoff	Peak Flow	= 7.884 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 16,648 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

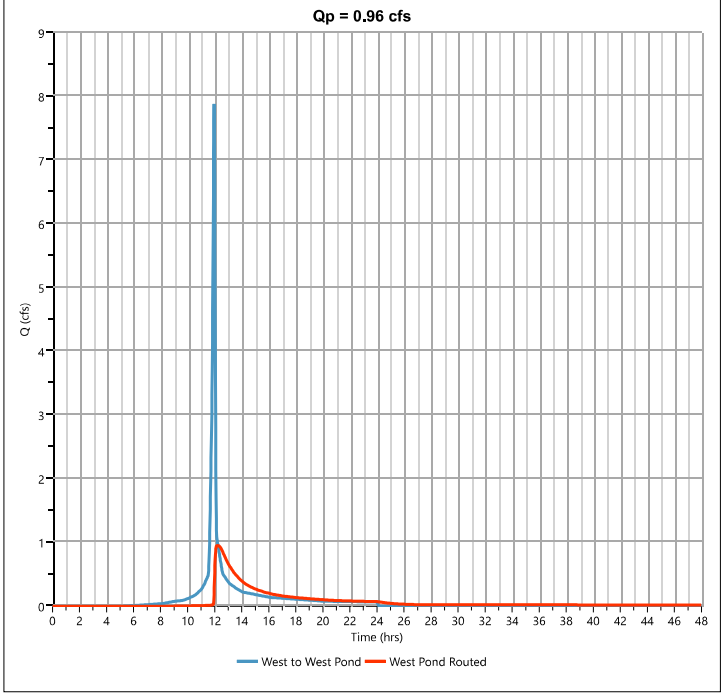
AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed



Post West Pond Routed — Hyd. No. 13

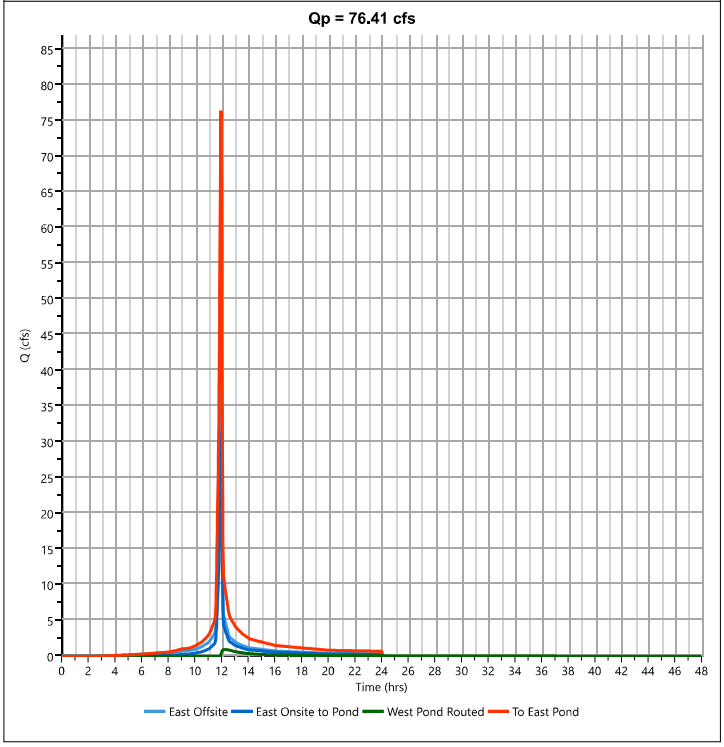
Hydrograph Type	= Pond Route	Peak Flow	= 0.957 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.22 hrs
Time Interval	= 1 min	Hydrograph Volume	= 12,571 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 950.68 ft
Pond Name	= West Pond	Max. Storage	= 8,407 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 5.88 hrs*



Post To East Pond — Hyd. No. 14

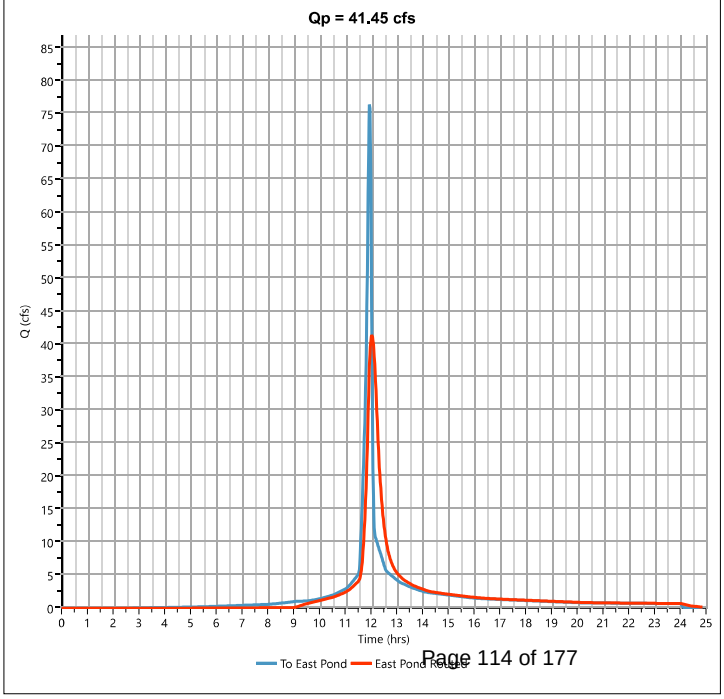
Hydrograph Type	= Junction	Peak Flow	= 76.41 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 179,409 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac



Post East Pond Routed — Hyd. No. 15

Hydrograph Type	= Pond Route	Peak Flow	= 41.45 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 176,744 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 924.45 ft
Pond Name	= New East Pond	Max. Storage	= 42,971 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 46 min*



Hydrograph Report

Project Name:

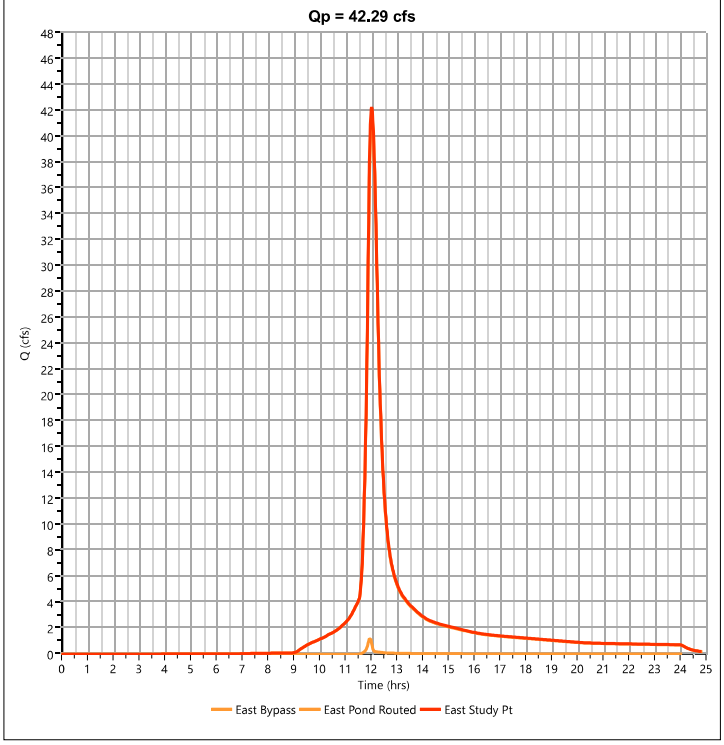
Hydrology Studio v 3.0.0.16

11-12-2020

Post East Study Pt

Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 42.29 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 179,323 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

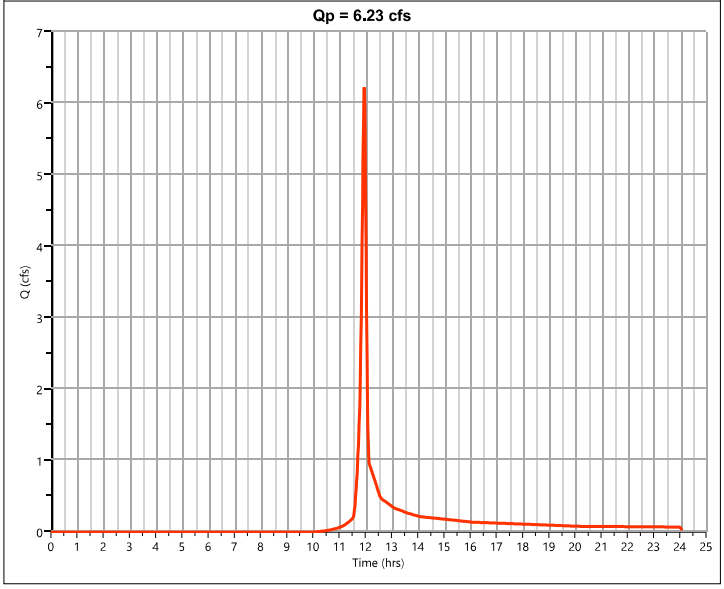
Pre West - actual

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.228 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 12,510 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Hydrograph Report

Project Name:

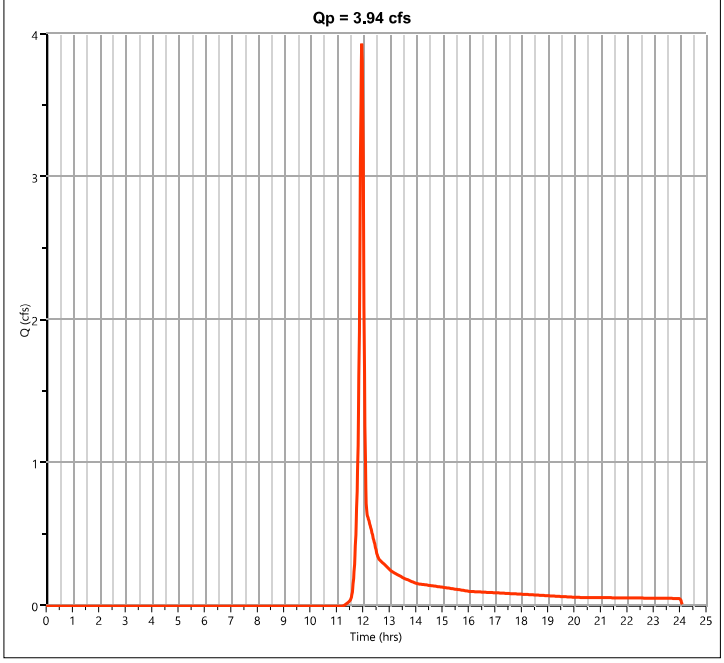
Hydrology Studio v 3.0.0.16

11-12-2020

Pre West - 90% condition

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.936 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 8,086 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

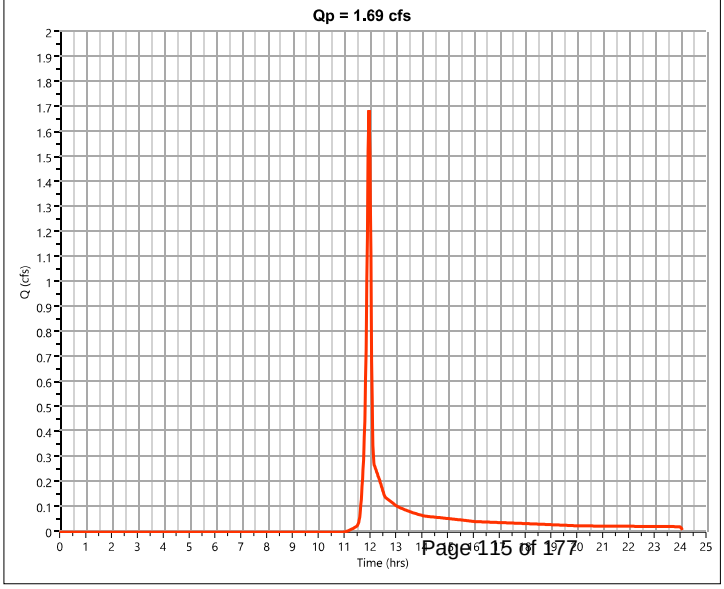
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.688 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 3,434 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

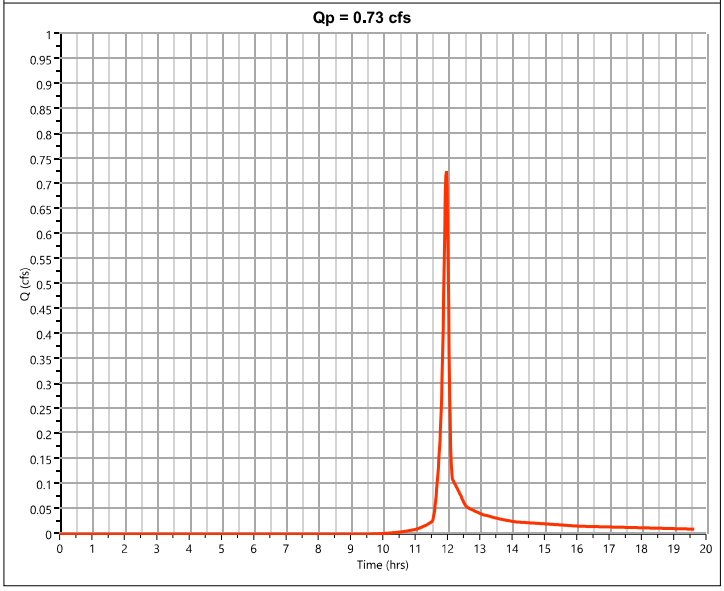
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.726 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,458 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

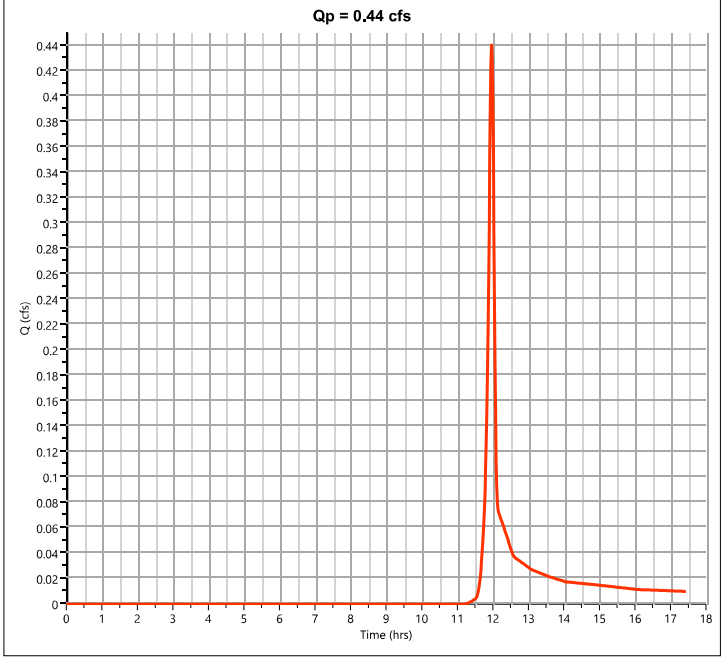
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.441 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 906 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

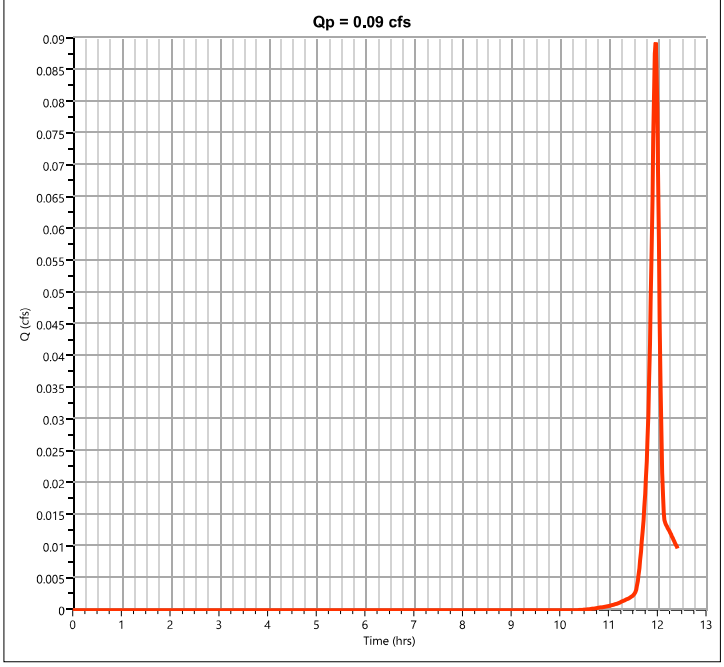
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.089 cfs
Storm Frequency	= 50-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 180 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

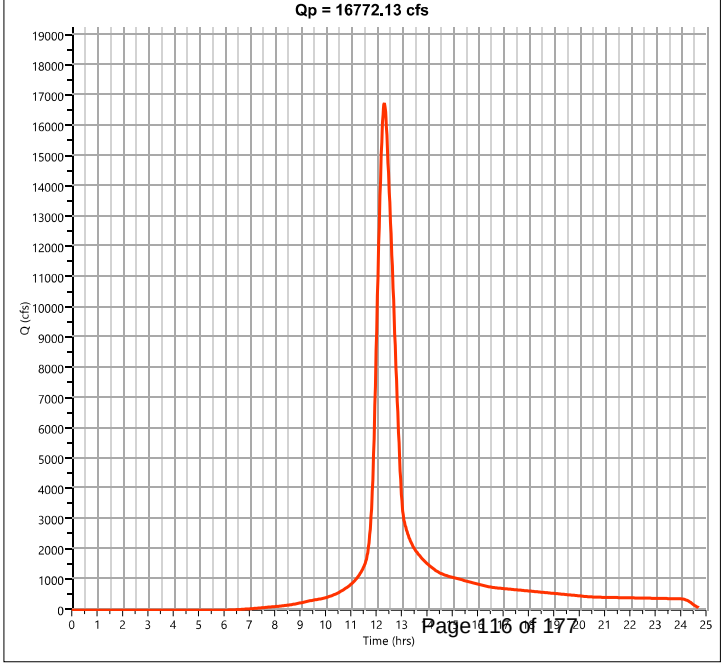
Hydrology Studio v 3.0.0.16

11-12-2020

Pre Downstream with site

Hyd. No. 26

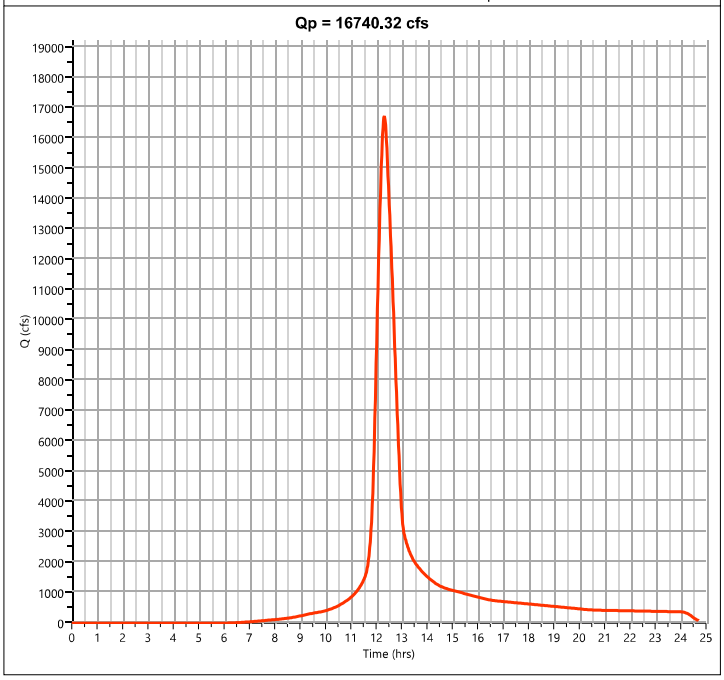
Hydrograph Type	= NRCS Runoff	Peak Flow	= 16772.1 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 85,604,490 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Downstream w/o site

Hyd. No. 27

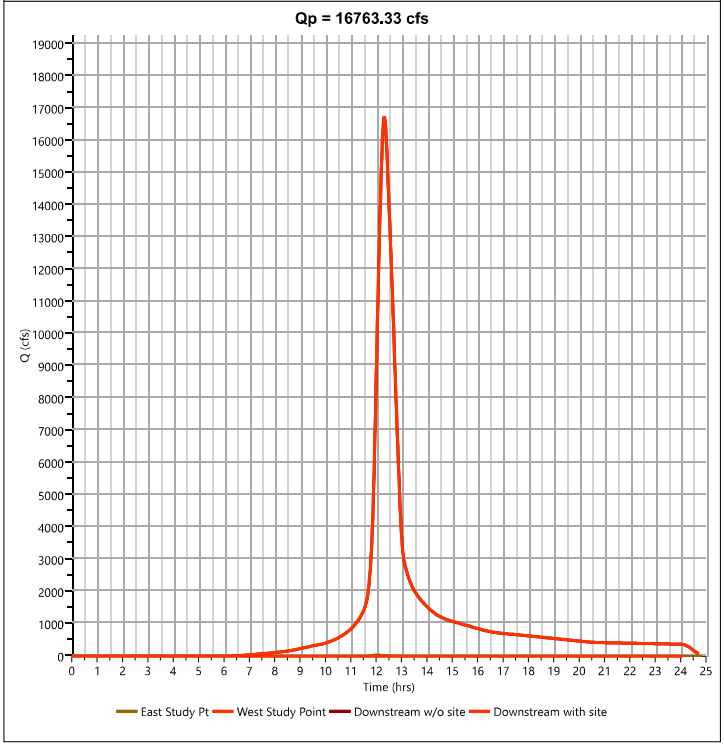
Hydrograph Type	= NRCS Runoff	Peak Flow	= 16740.3 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 85,442,230 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 6.58 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Post Downstream with site

Hyd. No. 28

Hydrograph Type	= Junction	Peak Flow	= 16763.3 cfs
Storm Frequency	= 50-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Hydrograph Volume	= 85,625,520 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac



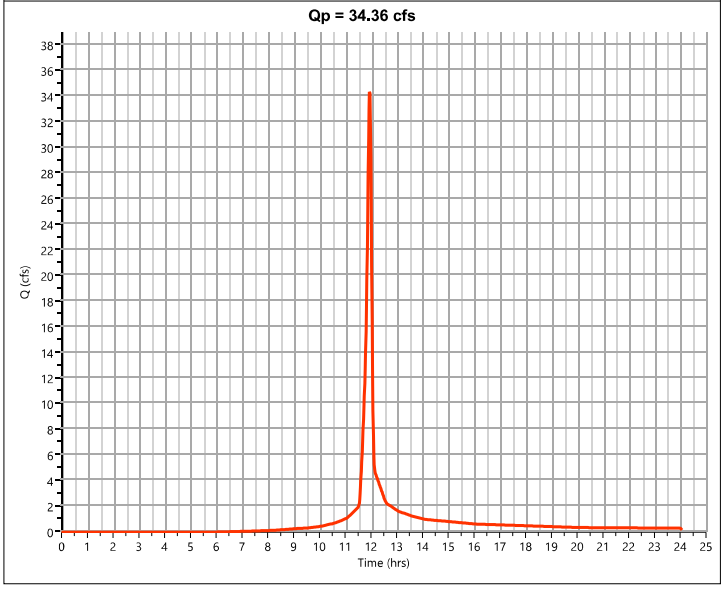
Pre East Onsite Ex Pond

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 34.36 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 71,503 cuft
Drainage Area	= 4.0 ac	Curve Number	= 78*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

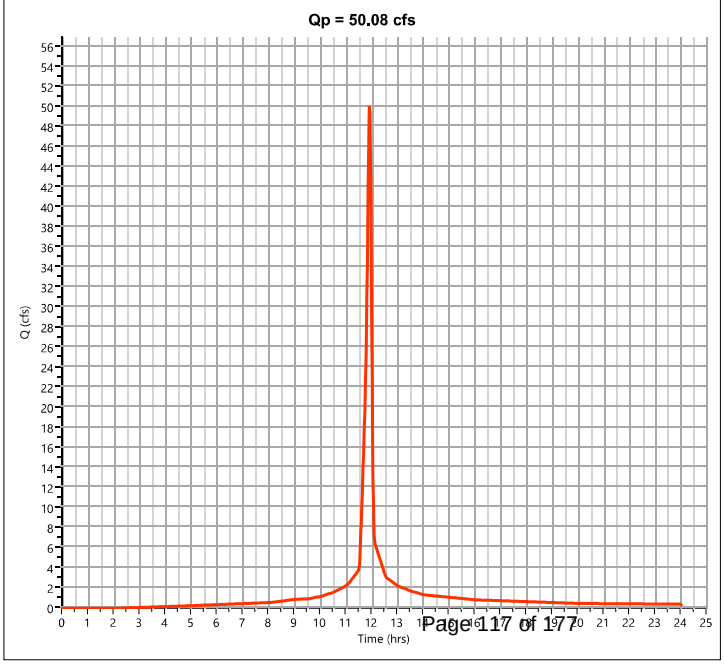
AREA (ac)	CN	DESCRIPTION
2.02	98	Impervious
1.08	61	Landscape
0.9	55	Wooded
4.0	**78**	Weighted CN Method Employed



Pre East Offsite

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 50.08 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 113,936 cuft
Drainage Area	= 4.77 ac	Curve Number	= 92
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

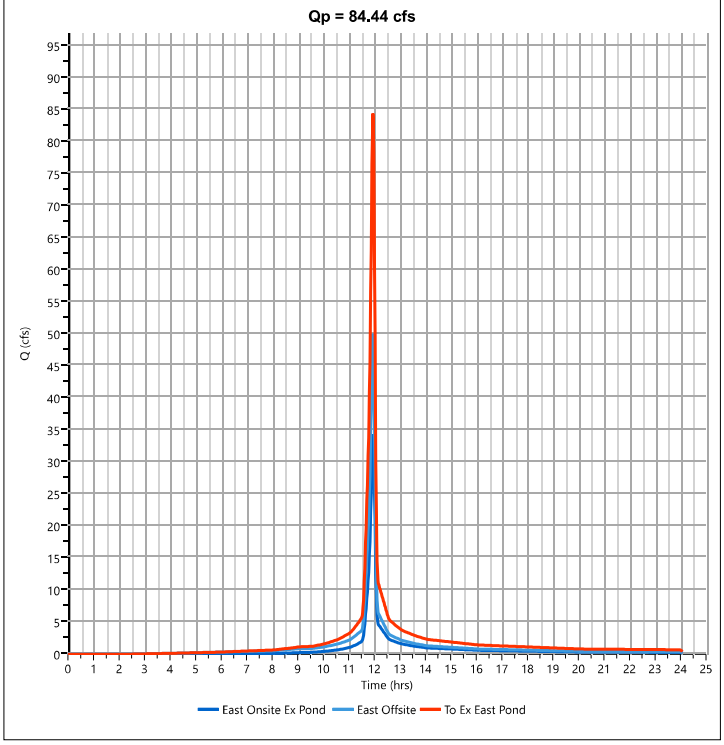
Hydrology Studio v 3.0.0.16

11-12-2020

Pre To Ex East Pond

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 84.44 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 185,439 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 8.77 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

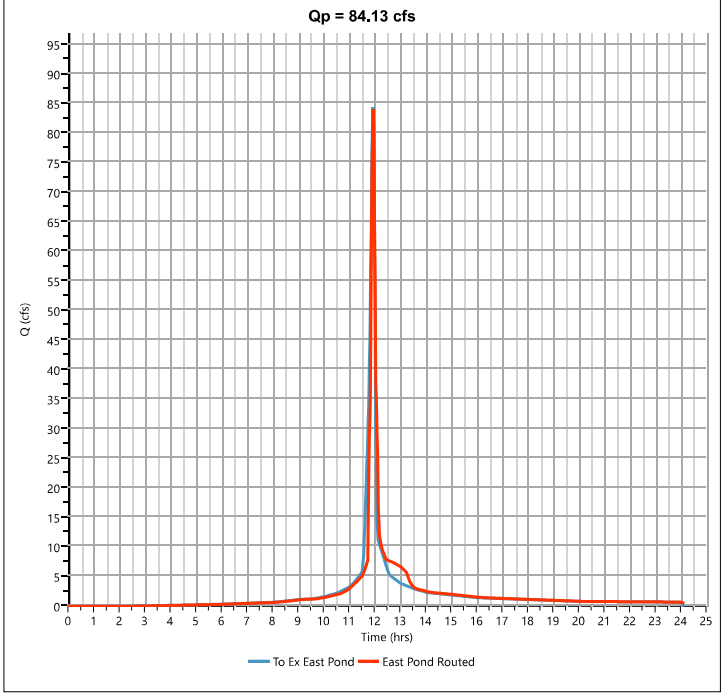
11-12-2020

Pre East Pond Routed

Hyd. No. 4

Hydrograph Type	= Pond Route	Peak Flow	= 84.13 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 185,438 cuft
Inflow Hydrograph	= 3 - To Ex East Pond	Max. Elevation	= 924.45 ft
Pond Name	= Ex East Pond	Max. Storage	= 16,953 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 9 min*



Hydrograph Report

Project Name:

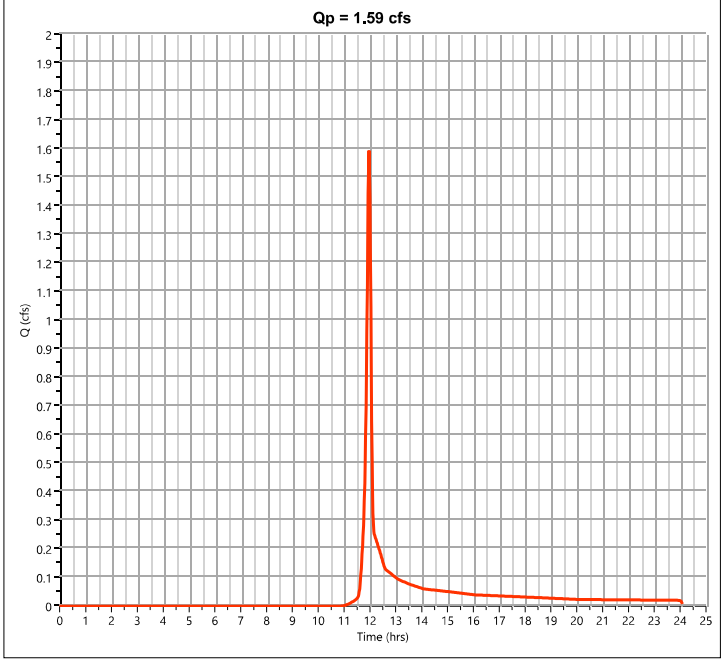
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Bypass

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.595 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 3,236 cuft
Drainage Area	= 0.37 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

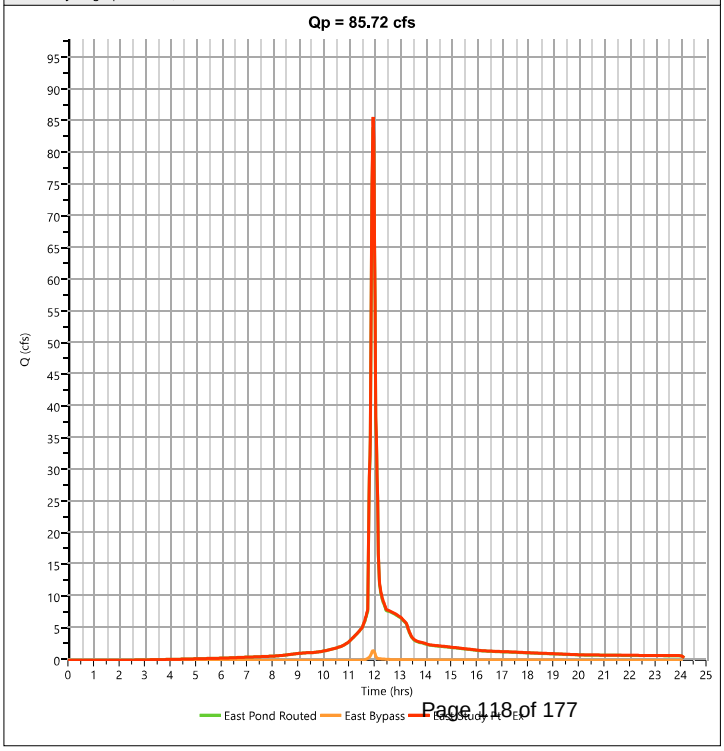
Hydrology Studio v 3.0.0.16

11-12-2020

Pre East Study Pt - Ex

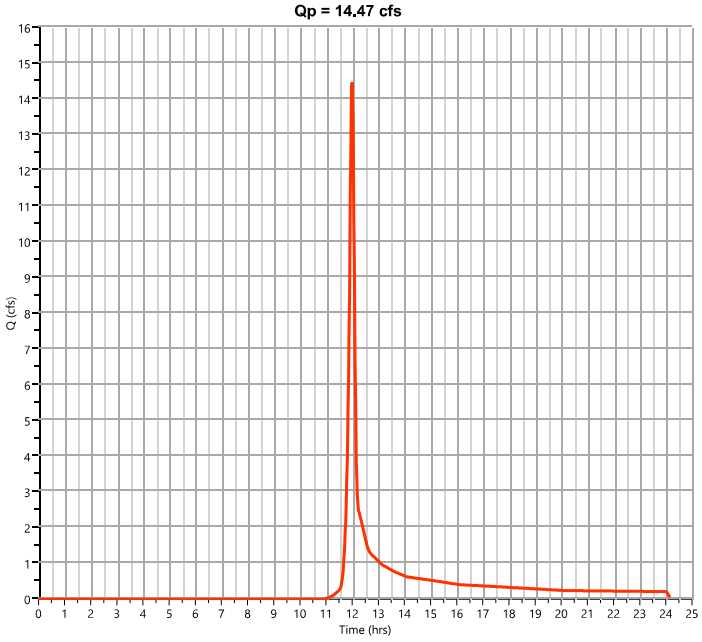
Hyd. No. 6

Hydrograph Type	= Junction	Peak Flow	= 85.72 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 188,675 cuft
Inflow Hydrographs	= 4, 5	Total Contrib. Area	= 0.37 ac



Pre East -90% condition **Hyd. No. 8**

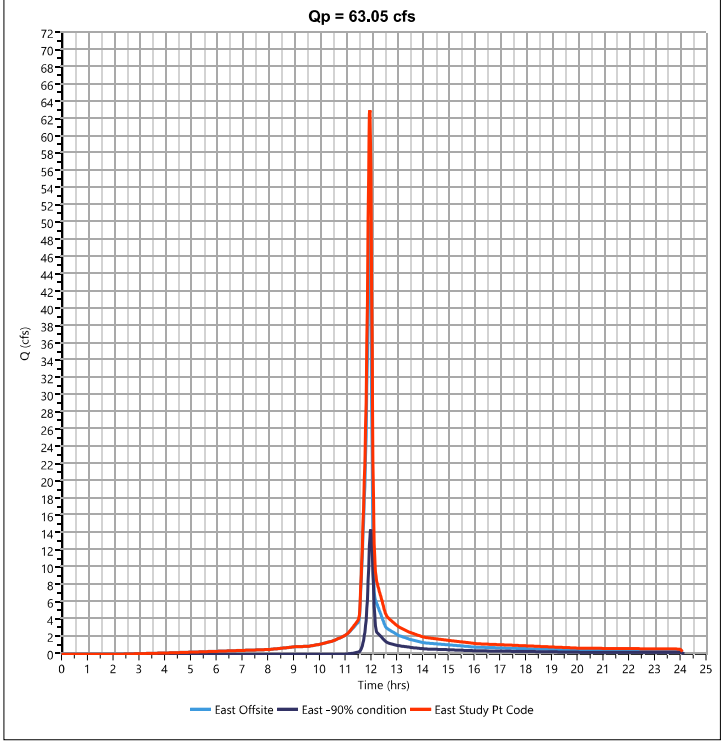
Hydrograph Type	= NRCS Runoff	Peak Flow	= 14.47 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.00 hrs
Time Interval	= 1 min	Runoff Volume	= 33,330 cuft
Drainage Area	= 3.93 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 10.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
11-12-2020

Pre East Study Pt Code **Hyd. No. 9**

Hydrograph Type	= Junction	Peak Flow	= 63.05 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Hydrograph Volume	= 147,265 cuft
Inflow Hydrographs	= 2, 8	Total Contrib. Area	= 8.7 ac



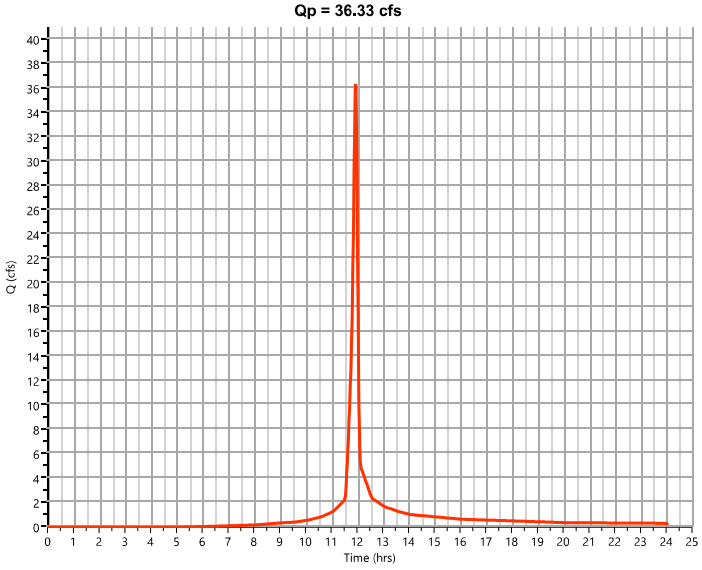
Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
11-12-2020

Post East Onsite to Pond **Hyd. No. 11**

Hydrograph Type	= NRCS Runoff	Peak Flow	= 36.33 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 76,558 cuft
Drainage Area	= 4.0 ac	Curve Number	= 81*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
2.3	98	Impervious
1.0	61	Landscaped
0.7	55	Wooded
4.0	**81**	Weighted CN Method Employed



Hydrograph Report
Project Name:
Hydrology Studio v 3.0.0.16
11-12-2020

Post West to West Pond **Hyd. No. 12**

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9.015 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Runoff Volume	= 19,190 cuft
Drainage Area	= 0.96 ac	Curve Number	= 83*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

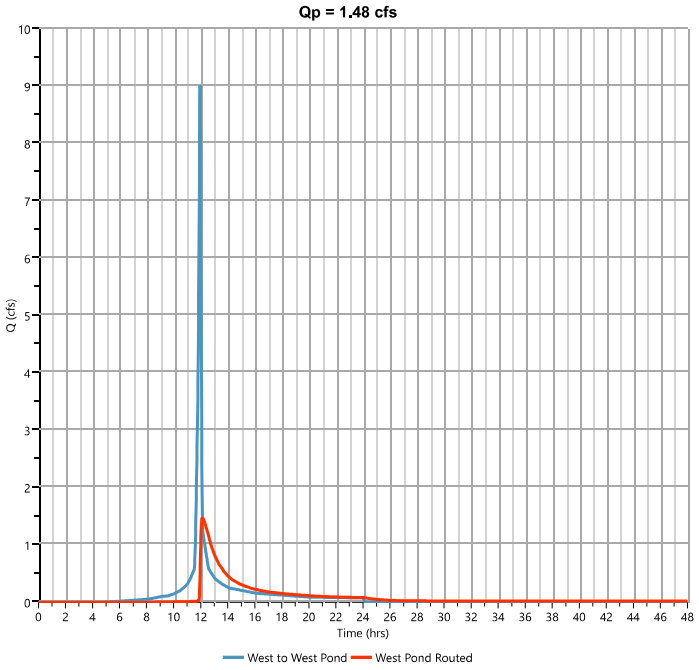
*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.51	98	Impervious
0.26	69	Pervious Paving
0.19	61	Landscape
0.96	**83**	Weighted CN Method Employed

Post West Pond Routed — Hyd. No. 13

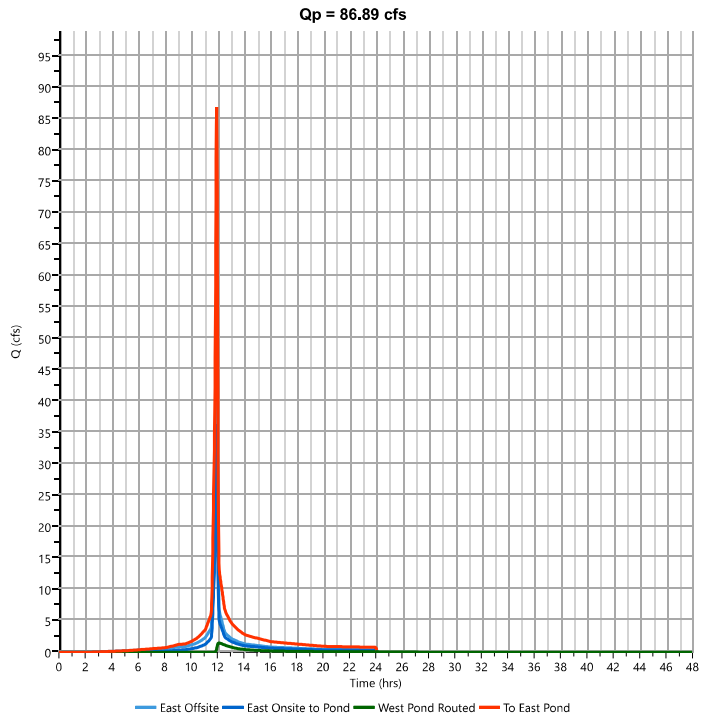
Hydrograph Type	= Pond Route	Peak Flow	= 1.477 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.12 hrs
Time Interval	= 1 min	Hydrograph Volume	= 15,061 cuft
Inflow Hydrograph	= 12 - West to West Pond	Max. Elevation	= 950.92 ft
Pond Name	= West Pond	Max. Storage	= 9,581 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 5.23 hrs*



Post To East Pond — Hyd. No. 14

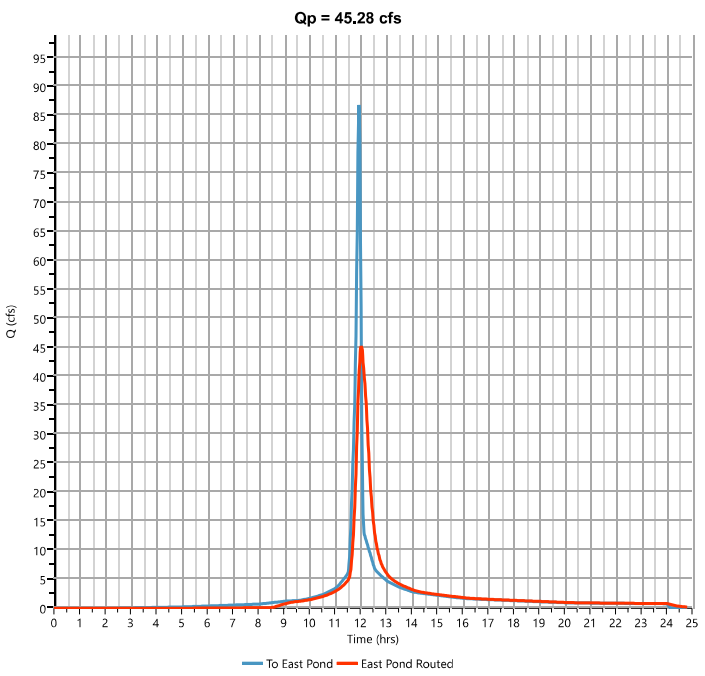
Hydrograph Type	= Junction	Peak Flow	= 86.89 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.95 hrs
Time Interval	= 1 min	Hydrograph Volume	= 205,555 cuft
Inflow Hydrographs	= 2, 11, 13	Total Contrib. Area	= 8.77 ac



Post East Pond Routed — Hyd. No. 15

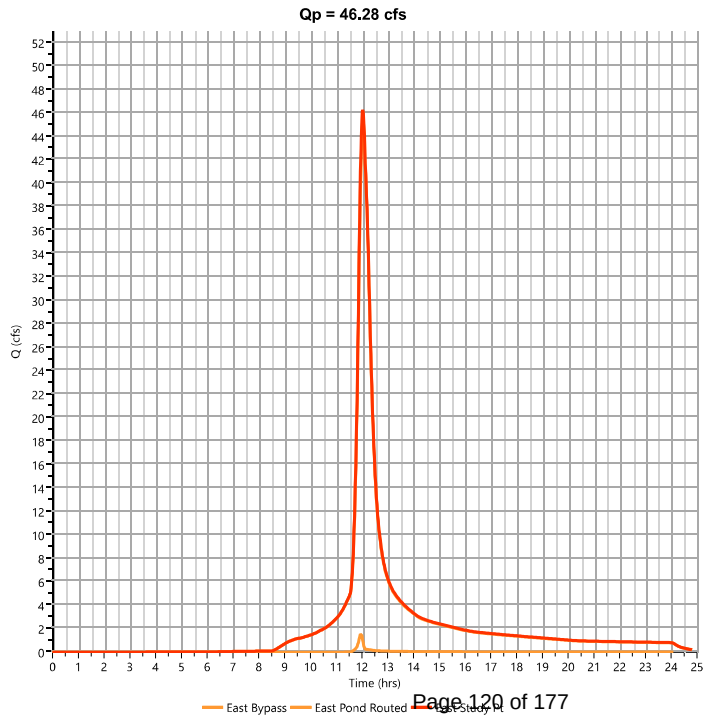
Hydrograph Type	= Pond Route	Peak Flow	= 45.28 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.05 hrs
Time Interval	= 1 min	Hydrograph Volume	= 202,883 cuft
Inflow Hydrograph	= 14 - To East Pond	Max. Elevation	= 925.18 ft
Pond Name	= New East Pond	Max. Storage	= 48,872 cuft

Pond Routing by Storage Indication Method — *Center of mass detention time = 48 min*



Post East Study Pt — Hyd. No. 16

Hydrograph Type	= Junction	Peak Flow	= 46.28 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.03 hrs
Time Interval	= 1 min	Hydrograph Volume	= 206,118 cuft
Inflow Hydrographs	= 5, 15	Total Contrib. Area	= 0.37 ac



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

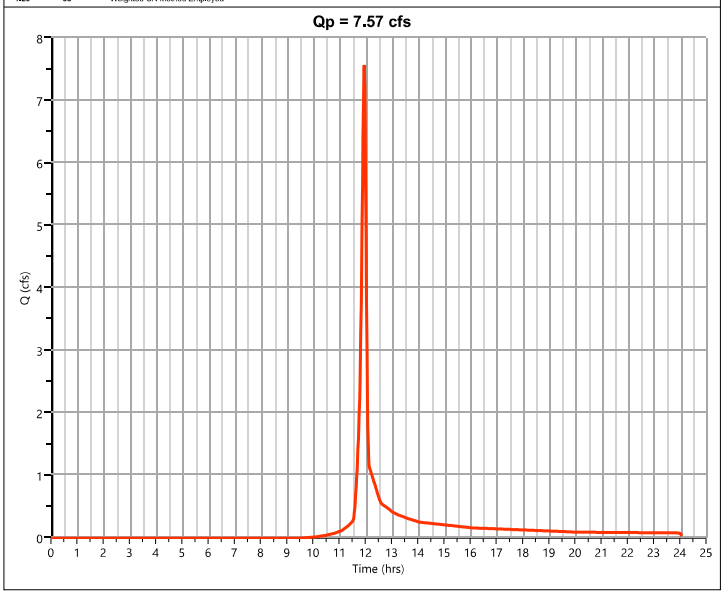
Pre West - actual

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 7.573 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 15,211 cuft
Drainage Area	= 1.29 ac	Curve Number	= 63*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.2	98	Impervious
0.26	61	Landcape
0.83	55	Wooded
1.29	**63**	Weighted CN Method Employed



Hydrograph Report

Project Name:

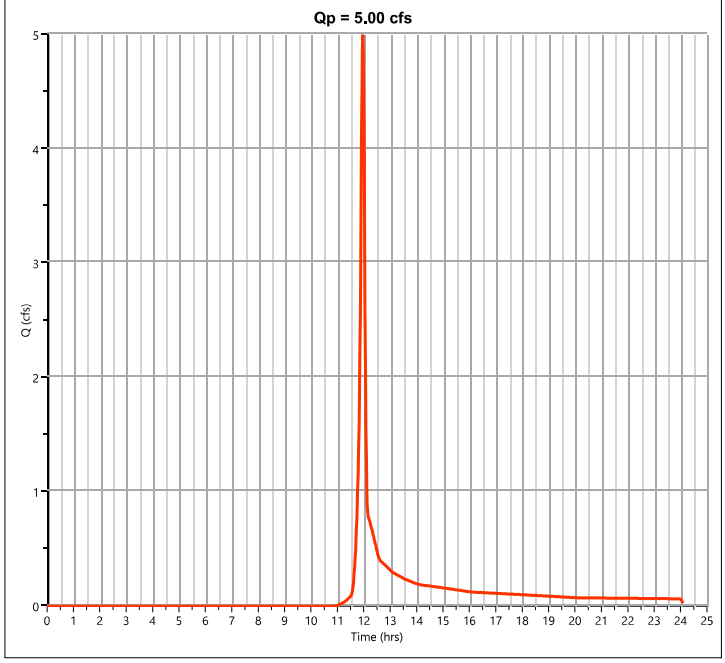
Hydrology Studio v 3.0.0.16

11-12-2020

Pre West - 90% condition

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.000 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 10,145 cuft
Drainage Area	= 1.16 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

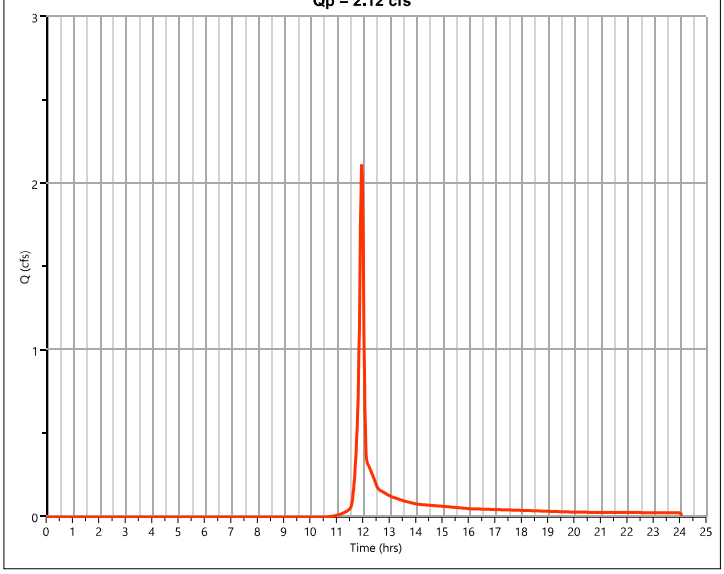
Post West Study Point

Hyd. No. 20

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.117 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 4,271 cuft
Drainage Area	= 0.45 ac	Curve Number	= 57*
Tc Method	= TR55	Time of Conc. (Tc)	= 5.13 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.15	61	Landscaped
0.3	55	Wooded
0.45	**57**	Weighted CN Method Employed



Hydrograph Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

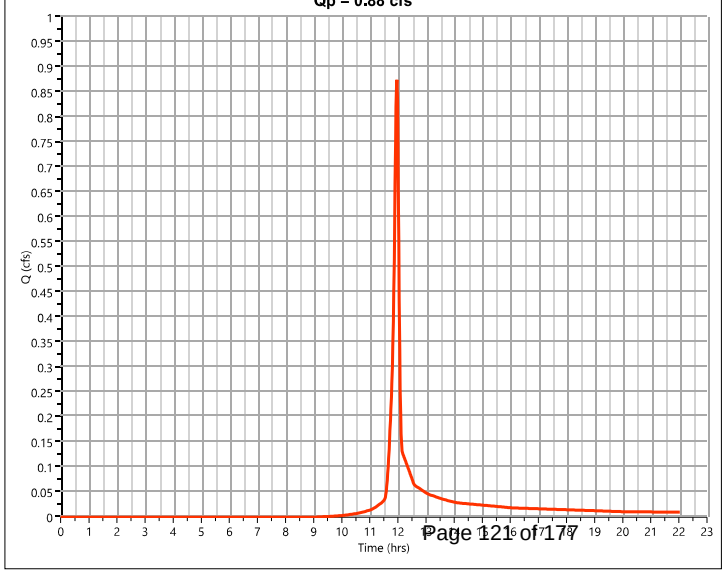
Pre South - actual

Hyd. No. 22

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.875 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,761 cuft
Drainage Area	= 0.14 ac	Curve Number	= 65*
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.03	98	Impervious
0.02	61	Landscape
0.09	55	Wooded
0.14	**65**	Weighted CN Method Employed



Hydrograph Report

Project Name:

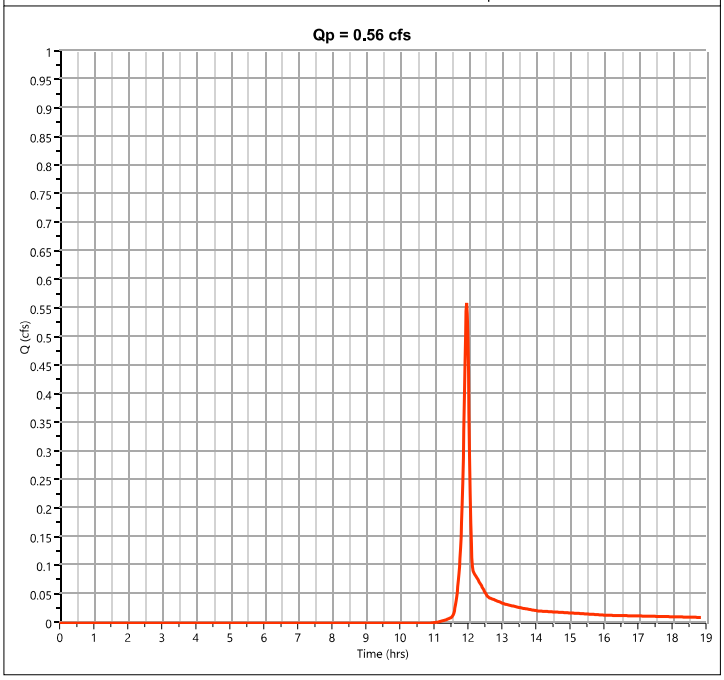
Hydrology Studio v 3.0.0.16

11-12-2020

Pre South-90% condition

Hyd. No. 23

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.560 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 1,137 cuft
Drainage Area	= 0.13 ac	Curve Number	= 55
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

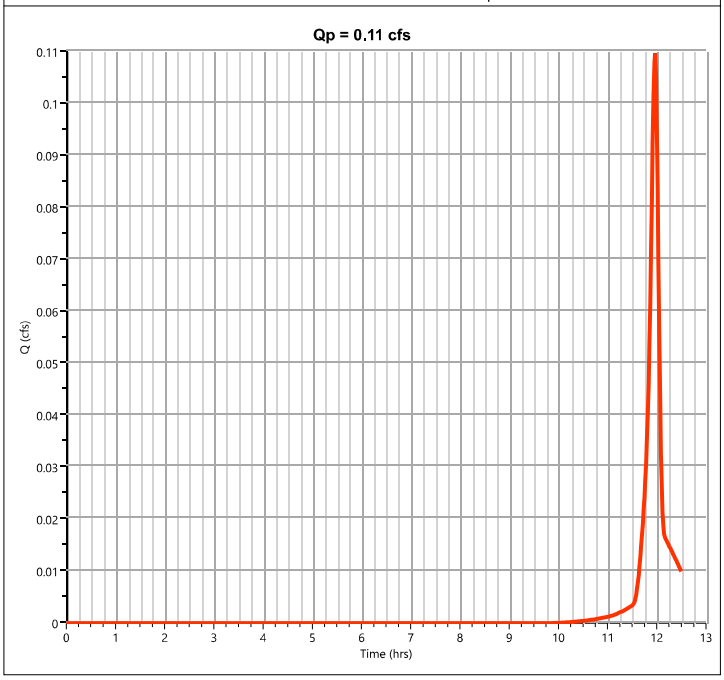
Hydrology Studio v 3.0.0.16

11-12-2020

Post South Study Point

Hyd. No. 24

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.110 cfs
Storm Frequency	= 100-yr	Time to Peak	= 11.97 hrs
Time Interval	= 1 min	Runoff Volume	= 220 cuft
Drainage Area	= 0.02 ac	Curve Number	= 61
Tc Method	= User	Time of Conc. (Tc)	= 5.0 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

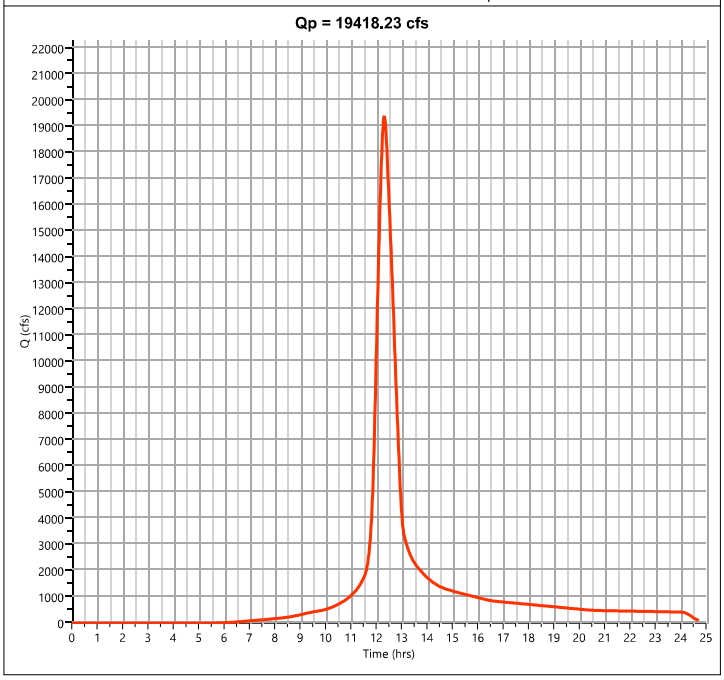
Hydrology Studio v 3.0.0.16

11-12-2020

Pre Downstream with site

Hyd. No. 26

Hydrograph Type	= NRCS Runoff	Peak Flow	= 19418.2 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 99,342,720 cuft
Drainage Area	= 5500.0 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name:

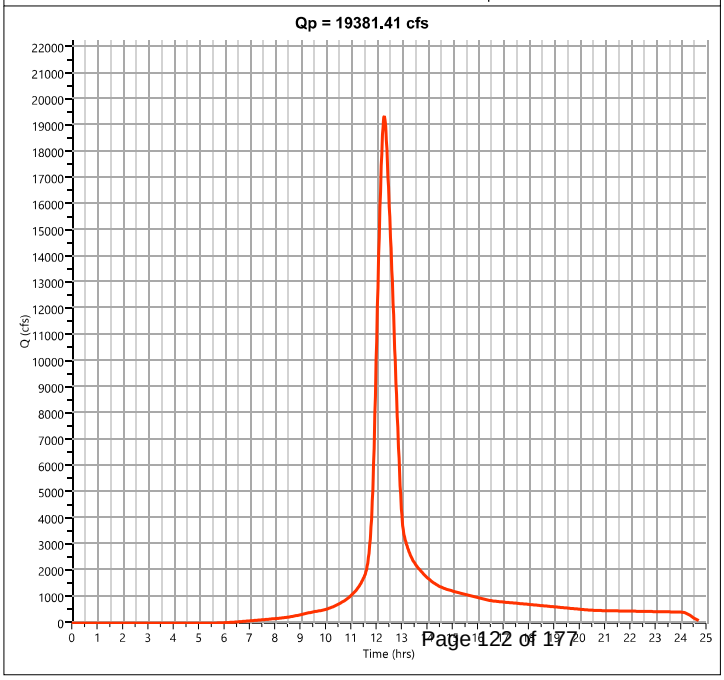
Hydrology Studio v 3.0.0.16

11-12-2020

Downstream w/o site

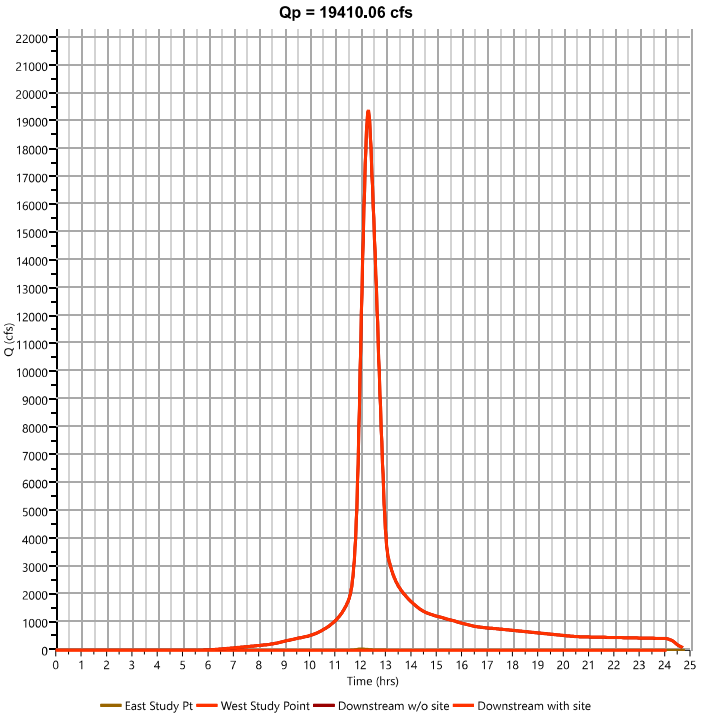
Hyd. No. 27

Hydrograph Type	= NRCS Runoff	Peak Flow	= 19381.4 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Runoff Volume	= 99,154,370 cuft
Drainage Area	= 5489.57 ac	Curve Number	= 80
Tc Method	= TR55	Time of Conc. (Tc)	= 42.48 min
Total Rainfall	= 7.33 in	Design Storm	= Type II
Storm Duration	= 24 hrs	Shape Factor	= 484



Post Downstream with site **Hyd. No. 28**

Hydrograph Type	= Junction	Peak Flow	= 19410.1 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.32 hrs
Time Interval	= 1 min	Hydrograph Volume	= 99,365,690 cuft
Inflow Hydrographs	= 16, 20, 27	Total Contrib. Area	= 5490.39 ac



Appendix F Storm Sewer Computer Model Data

- Storm Sewer Computer Model Results
- Storm Sewer profiles
- Inlet Calculations
- Channel Calculations

Storm Sewer Tabulation

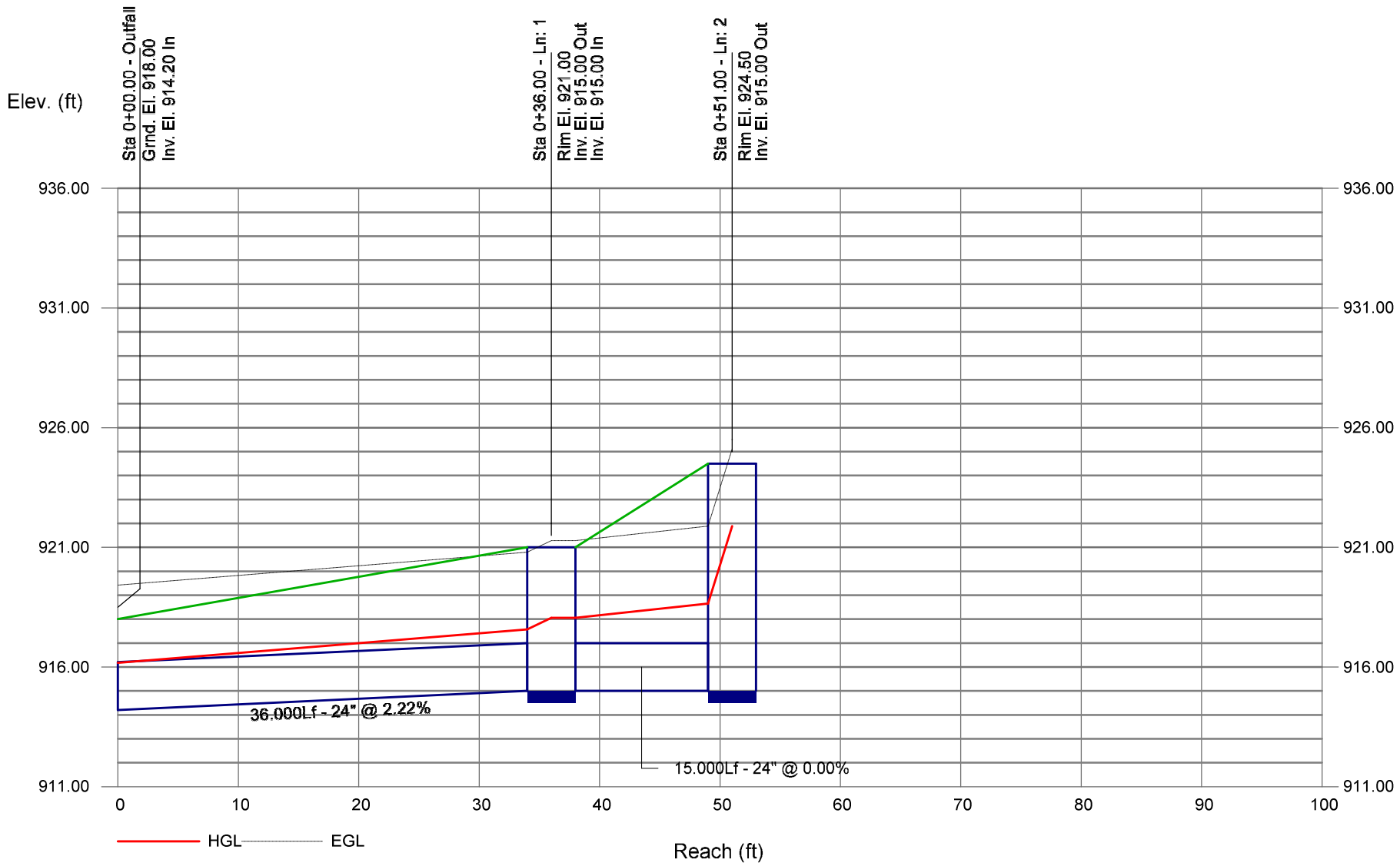
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	36.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	45.28	33.72	14.44	24	2.22	914.20	915.00	916.17	917.57	918.00	921.00	EX-A1
2	1	15.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	45.28	0.00	14.41	24	0.00	915.00	915.00	918.05	918.65	921.00	924.50	A1-A2

Project File: LINE A.stm | Number of lines: 2 | Run Date: 11/10/2020

NOTES:Intensity = 61.16 / (Inlet time + 5.60) ^ 0.70; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: LINE A.stm



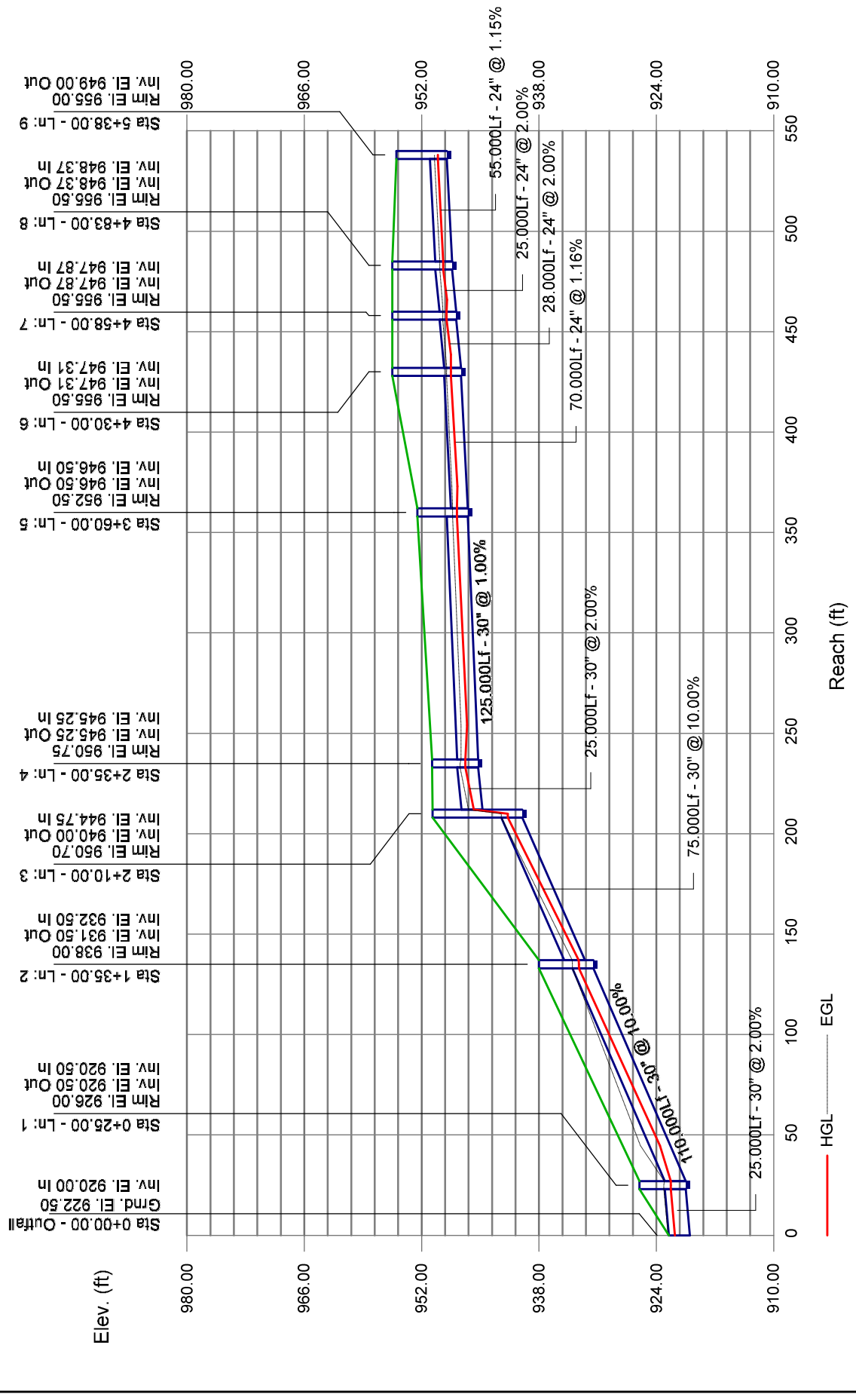
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	25.000	0.19	1.79	0.90	0.17	1.69	5.0	6.1	10.9	27.15	58.00	7.28	30	2.00	920.00	920.50	921.78	922.28	922.50	926.00	B1-B2
2	1	110.000	0.00	1.60	0.00	0.00	1.52	0.0	5.8	11.1	25.56	129.7	6.97	30	10.00	920.50	931.50	922.28	933.22	926.00	938.00	B2-B3
3	2	75.000	0.52	1.60	0.95	0.49	1.52	5.0	5.7	11.1	25.65	129.7	13.82	30	10.00	932.50	940.00	933.25	941.72	938.00	950.70	B3-B4
4	3	25.000	0.53	1.08	0.95	0.50	1.03	5.0	5.7	11.2	20.18	58.00	8.60	30	2.00	944.75	945.25	945.77	946.77	950.70	950.75	B4-B5
5	4	125.000	0.32	0.55	0.95	0.30	0.52	5.0	5.3	11.5	14.71	41.01	5.22	30	1.00	945.25	946.50	946.77	947.79	950.75	952.50	B5-B6
6	5	70.000	0.08	0.23	0.95	0.08	0.22	5.0	5.1	11.6	11.26	24.33	5.48	24	1.16	946.50	947.31	947.79	948.51	952.50	955.50	B6-B7
7	6	28.000	0.15	0.15	0.95	0.14	0.14	5.0	5.0	11.7	10.39	31.99	5.40	24	2.00	947.31	947.87	948.51	949.02	955.50	955.50	B7-B8
8	7	25.000	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	8.72	31.99	4.93	24	2.00	947.87	948.37	949.02	949.42	955.50	955.50	B8-B9
9	8	55.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	8.72	24.21	5.21	24	1.15	948.37	949.00	949.42	950.05	955.50	955.00	B9-B10

Project File: LINE B.stm | Number of lines: 9 | Run Date: 11/10/2020

NOTES:Intensity = 64.60 / (Inlet time + 5.80) ^ 0.72; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Profile



Storm Sewer Tabulation

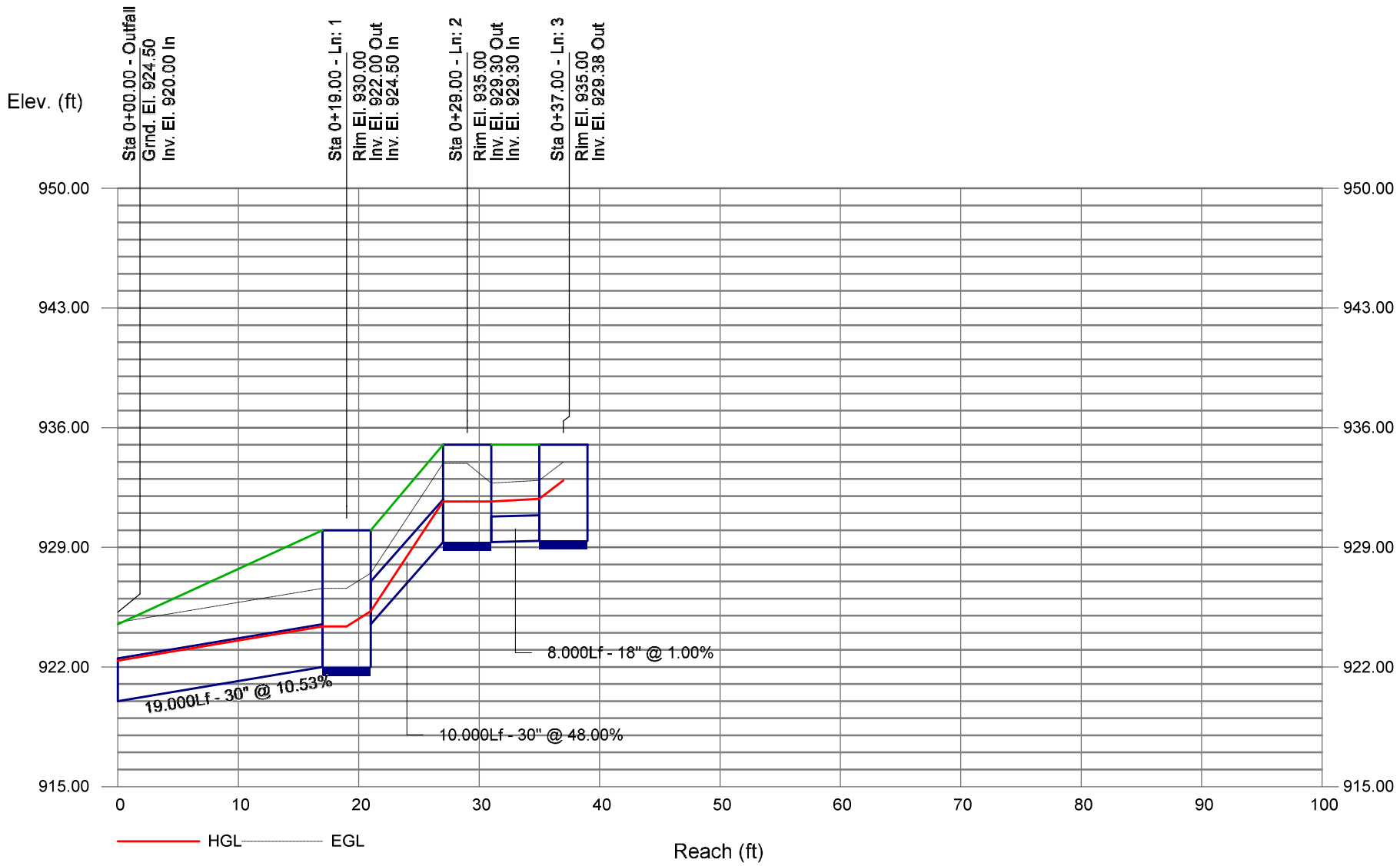
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	19.000	0.00	5.21	0.00	0.00	4.95	0.0	5.0	11.7	57.69	133.1	11.97	30	10.53	920.00	922.00	922.38	924.38	924.50	930.00	C1-C2
2	1	10.000	3.88	5.21	0.95	3.69	4.95	5.0	5.0	11.7	57.72	284.1	28.67	30	48.00	924.50	929.30	925.26	931.68	930.00	935.00	C2-C3
3	2	8.000	1.33	1.33	0.95	1.26	1.26	5.0	5.0	11.7	14.75	10.50	8.35	18	1.00	929.30	929.38	931.68	931.83	935.00	935.00	C3-C4

Project File: LINE C.stm | Number of lines: 3 | Run Date: 11/10/2020

NOTES:Intensity = 61.16 / (Inlet time + 5.60) ^ 0.70; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: LINE C.stm



Channel Report

Downstream Channel 65 ft north of detention pond

Trapezoidal

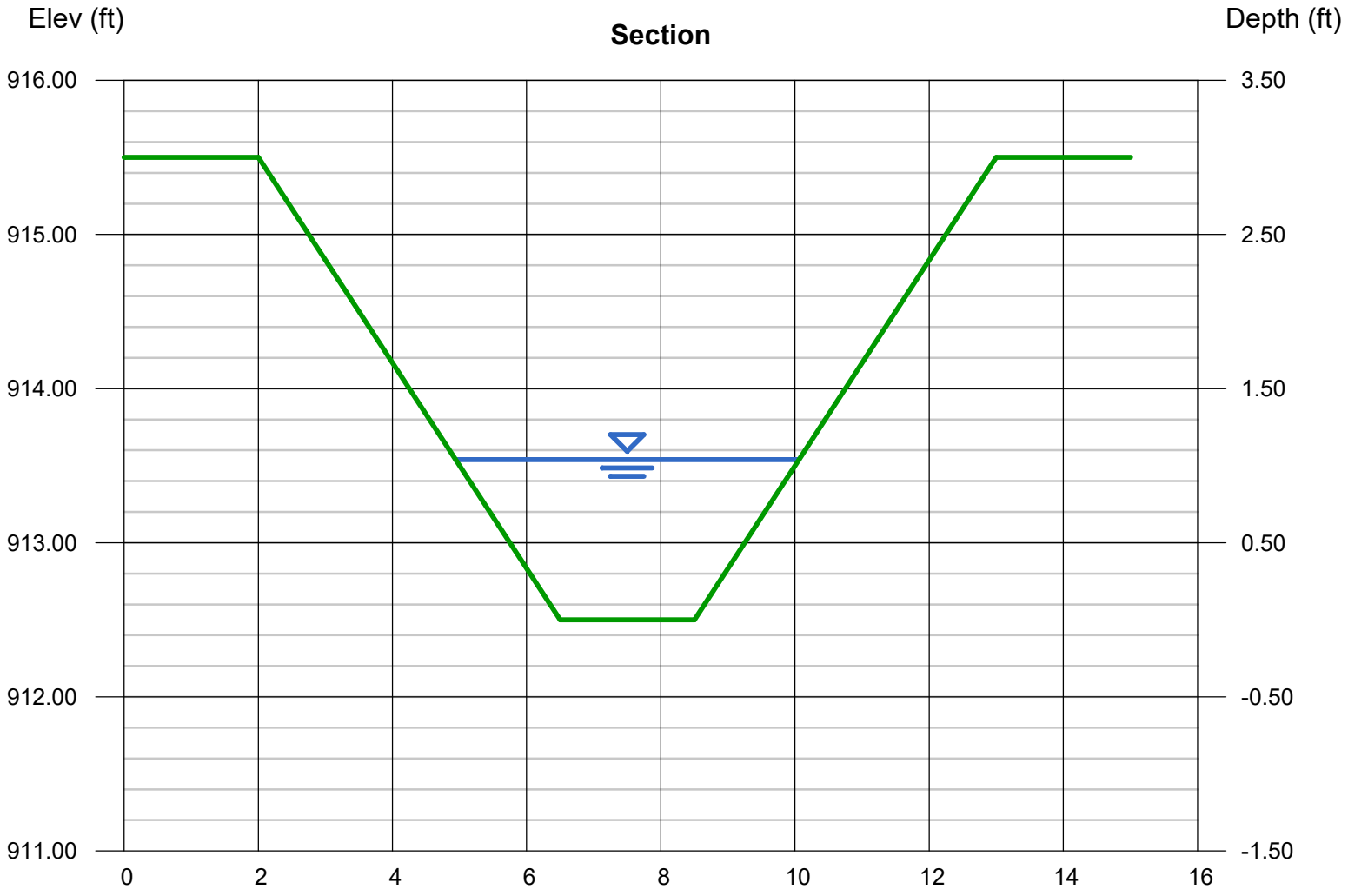
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 1.50, 1.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 912.50
Slope (%)	= 2.50
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 25.65

Highlighted

Depth (ft)	= 1.04
Q (cfs)	= 25.65
Area (sqft)	= 3.70
Velocity (ft/s)	= 6.93
Wetted Perim (ft)	= 5.75
Crit Depth, Yc (ft)	= 1.27
Top Width (ft)	= 5.12
EGL (ft)	= 1.79



Channel Report

Downstream Channel 65 ft north of detention pond

Trapezoidal

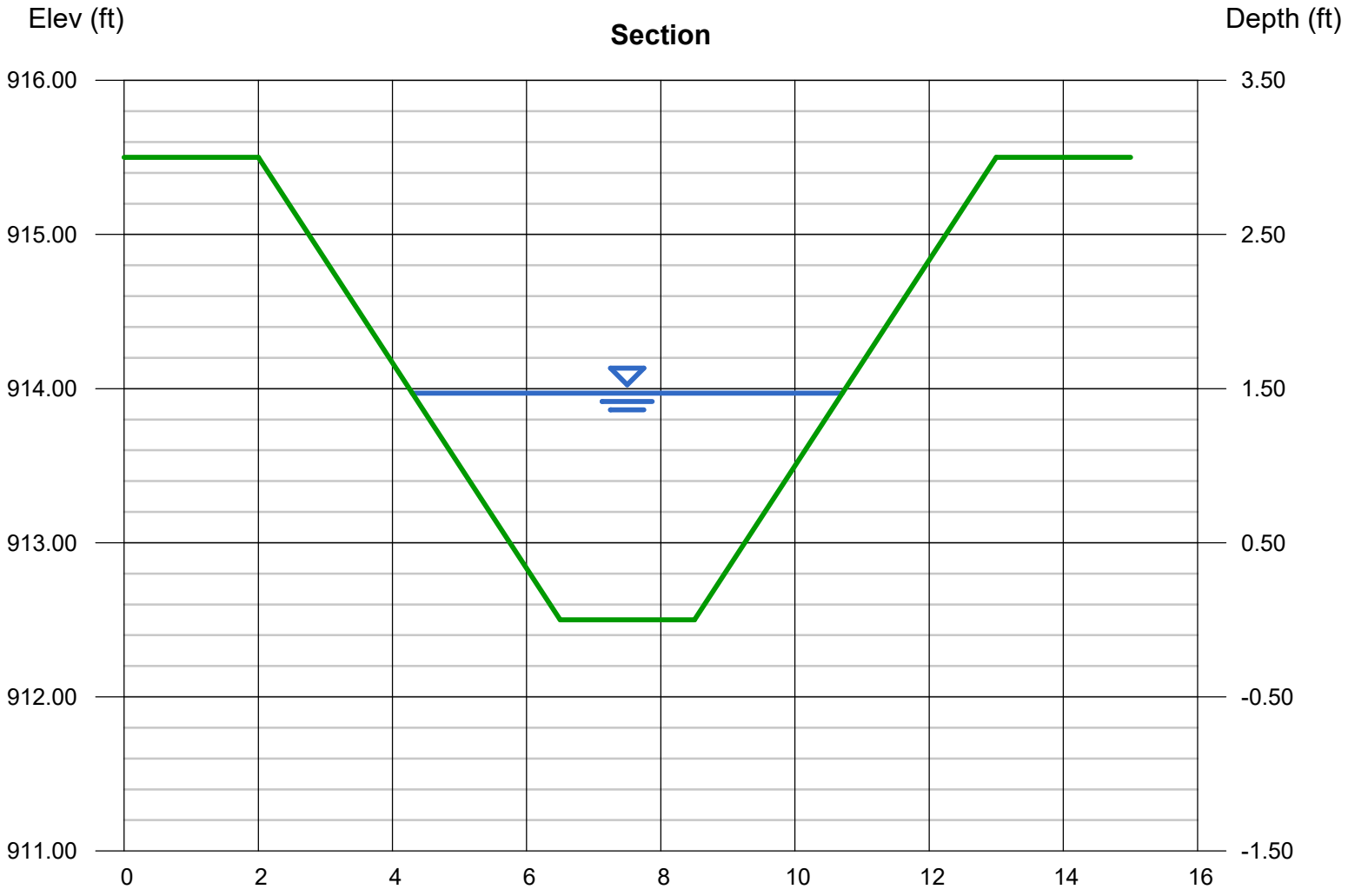
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 1.50, 1.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 912.50
Slope (%)	= 2.50
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 51.84

Highlighted

Depth (ft)	= 1.47
Q (cfs)	= 51.84
Area (sqft)	= 6.18
Velocity (ft/s)	= 8.39
Wetted Perim (ft)	= 7.30
Crit Depth, Yc (ft)	= 1.81
Top Width (ft)	= 6.41
EGL (ft)	= 2.56



Channel Report

Downstream Channel 65 ft north of detention pond

Trapezoidal

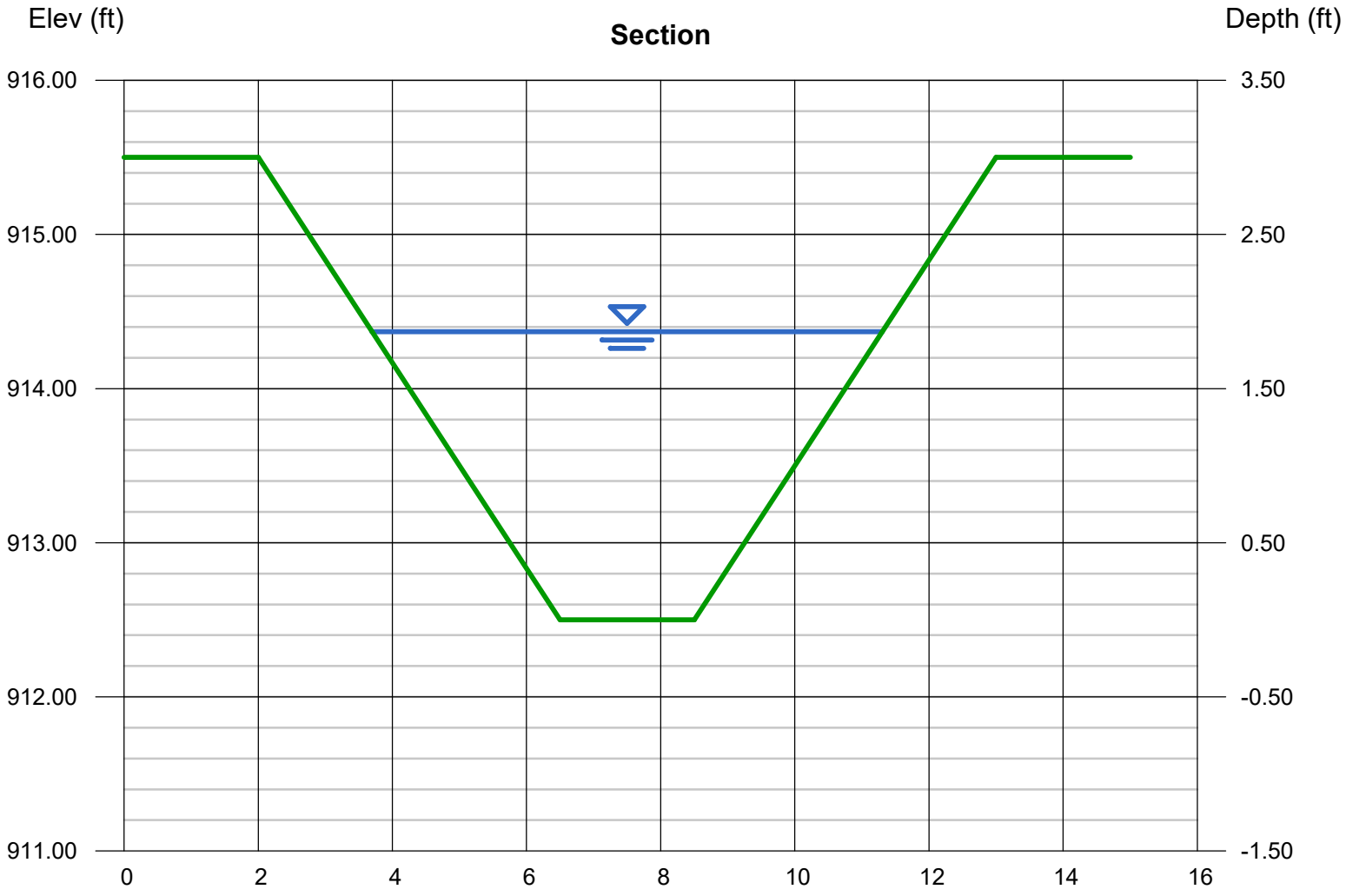
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 1.50, 1.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 912.50
Slope (%)	= 2.50
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 85.72

Highlighted

Depth (ft)	= 1.87
Q (cfs)	= 85.72
Area (sqft)	= 8.99
Velocity (ft/s)	= 9.54
Wetted Perim (ft)	= 8.74
Crit Depth, Yc (ft)	= 2.32
Top Width (ft)	= 7.61
EGL (ft)	= 3.28



Channel Report

Downstream Channel 65 ft north of detention pond

Trapezoidal

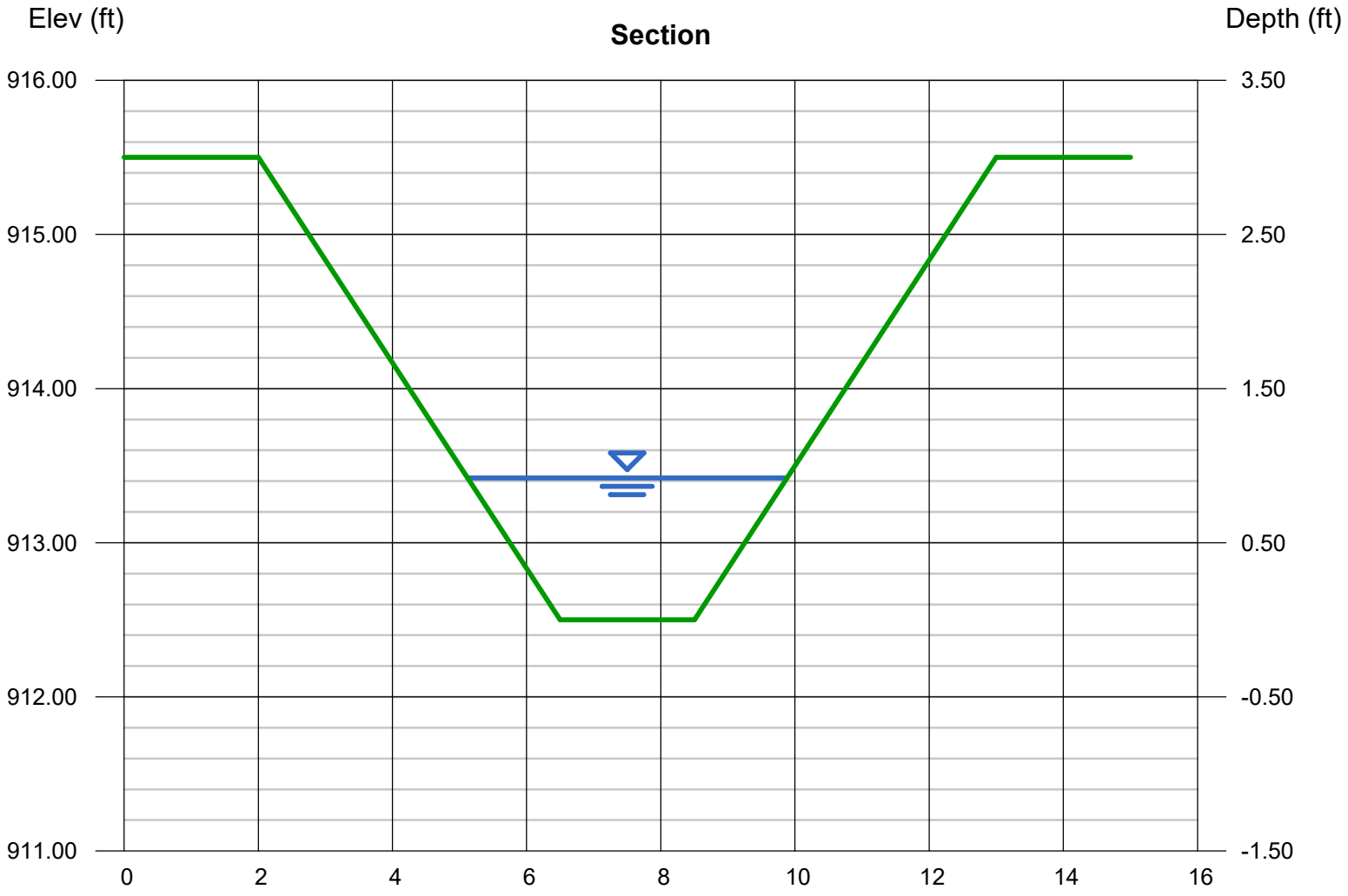
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 1.50, 1.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 912.50
Slope (%)	= 2.50
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 20.08

Highlighted

Depth (ft)	= 0.92
Q (cfs)	= 20.08
Area (sqft)	= 3.11
Velocity (ft/s)	= 6.46
Wetted Perim (ft)	= 5.32
Crit Depth, Yc (ft)	= 1.11
Top Width (ft)	= 4.76
EGL (ft)	= 1.57



Channel Report

Downstream Channel 65 ft north of detention pond

Trapezoidal

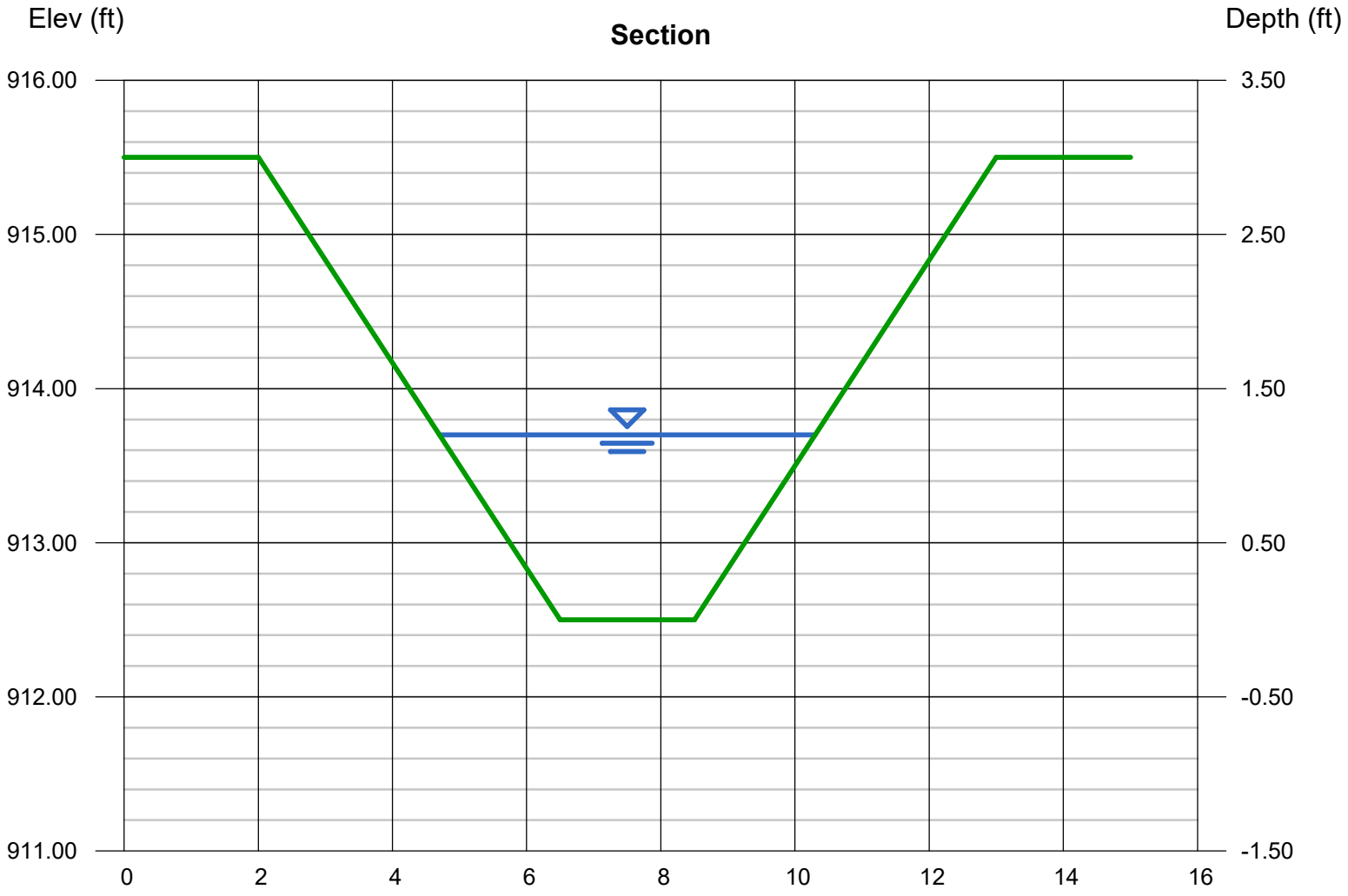
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 1.50, 1.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 912.50
Slope (%)	= 2.50
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 34.13

Highlighted

Depth (ft)	= 1.20
Q (cfs)	= 34.13
Area (sqft)	= 4.56
Velocity (ft/s)	= 7.48
Wetted Perim (ft)	= 6.33
Crit Depth, Yc (ft)	= 1.47
Top Width (ft)	= 5.60
EGL (ft)	= 2.07



Channel Report

Downstream Channel 65 ft north of detention pond

Trapezoidal

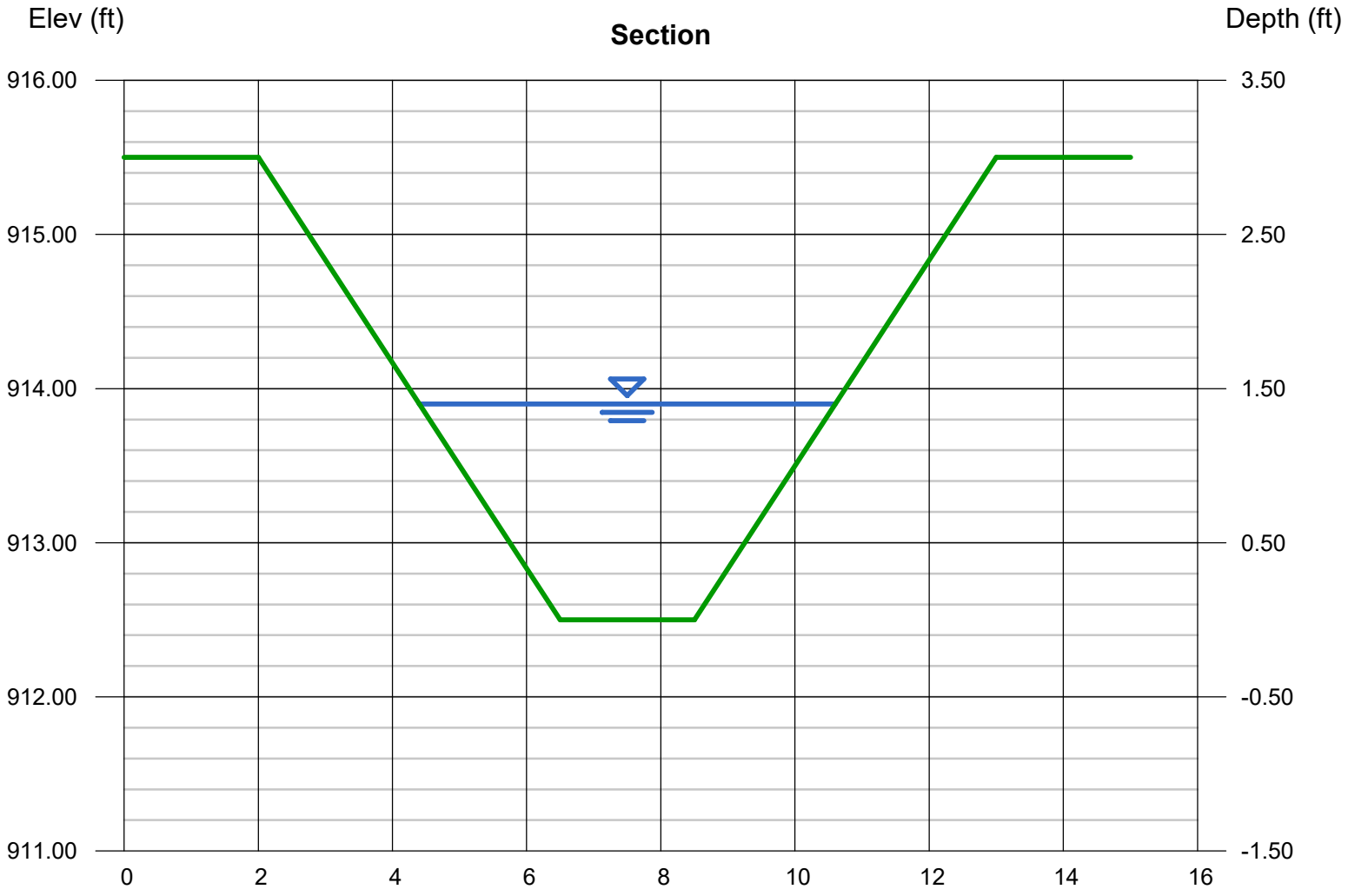
Bottom Width (ft)	= 2.00
Side Slopes (z:1)	= 1.50, 1.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 912.50
Slope (%)	= 2.50
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 46.82

Highlighted

Depth (ft)	= 1.40
Q (cfs)	= 46.82
Area (sqft)	= 5.74
Velocity (ft/s)	= 8.16
Wetted Perim (ft)	= 7.05
Crit Depth, Yc (ft)	= 1.72
Top Width (ft)	= 6.20
EGL (ft)	= 2.43



Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	23.870	1.54	6.60	0.71	1.09	3.75	5.0	5.1	12.1	131.3	87.49	18.60	36	5.87	902.50	903.90	905.46	908.51	905.50	913.07	Z1-Z2
2	1	35.210	1.78	5.06	0.61	1.09	2.66	5.0	5.0	12.2	118.1	92.33	16.71	36	6.53	903.90	906.20	911.19	914.95	913.07	913.36	Z2-Z3
3	2	21.240	3.28	3.28	0.48	1.57	1.57	5.0	5.0	12.2	104.9	24.78	14.84	36	0.47	906.20	906.30	917.12	918.92	913.36	909.30	Z3-Z4

Low capacity due to low slope in this pipe

Headwater elevation at entrance to culvert

Existing Conditions:
100 Year storm sewer model of existing downstream storm sewer line

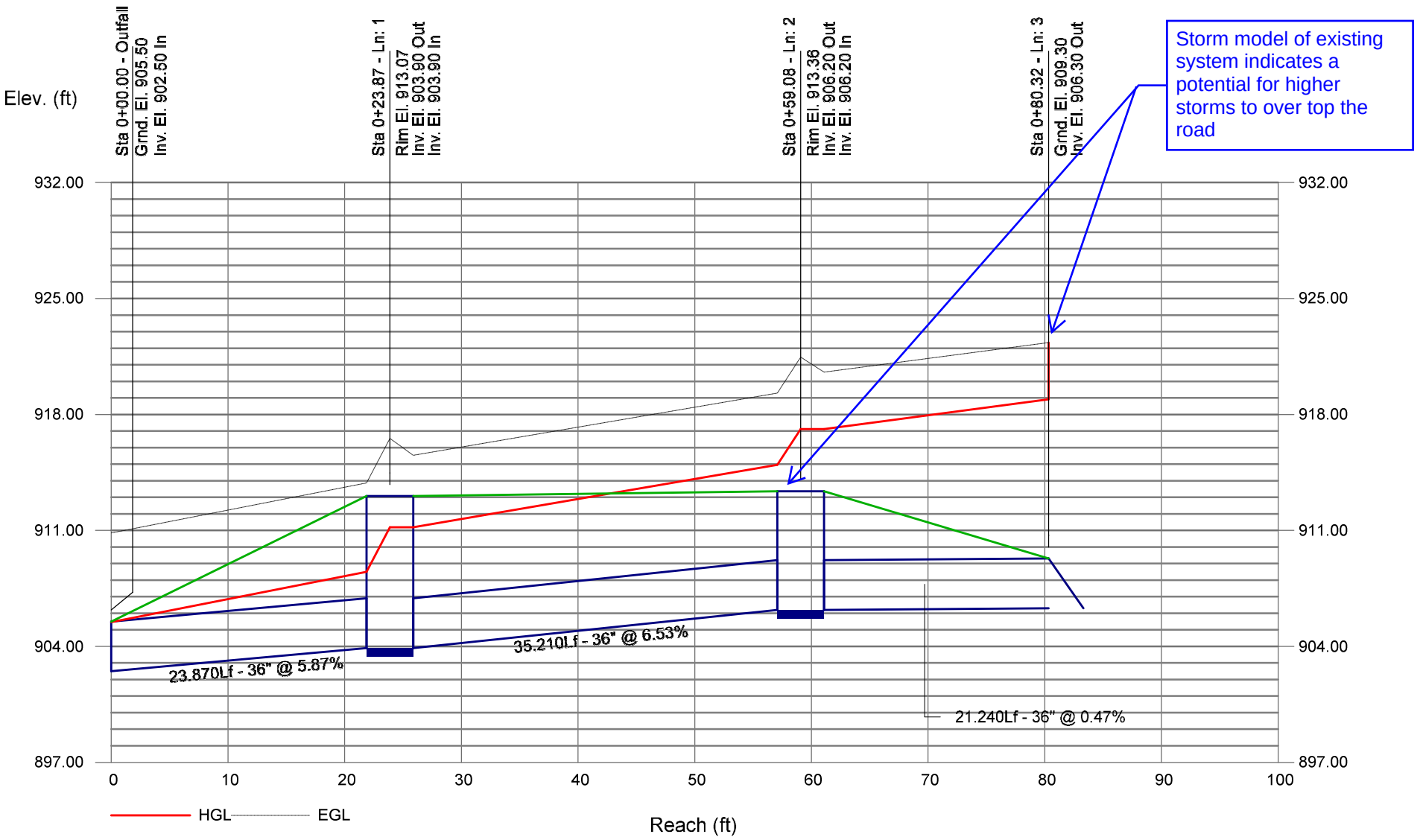
Project File: Existing Z Line - pre.stm

Number of lines: 3

Run Date: 11/12/2020

NOTES:Intensity = 66.91 / (Inlet time + 5.70) ^ 0.72; Return period =Yrs. 100 ; c = cir e = ellip b = box

Existing Conditions:
100 Year storm sewer model of existing downstream storm sewer line



Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	23.870	1.54	6.60	0.71	1.09	3.75	5.0	5.1	11.6	89.84	87.49	12.85	36	5.87	902.50	903.90	905.46	906.74	905.50	913.07	Z1-Z2
2	1	35.210	1.78	5.06	0.61	1.09	2.66	5.0	5.0	11.6	77.25	92.33	11.28	36	6.53	903.90	906.20	906.74	908.94	913.07	913.36	Z2-Z3
3	2	21.240	3.28	3.28	0.48	1.57	1.57	5.0	5.0	11.7	64.66	24.78	9.15	36	0.47	906.20	906.30	909.20	909.88	913.36	909.30	Z3-Z4

Low capacity due to low slope in this pipe

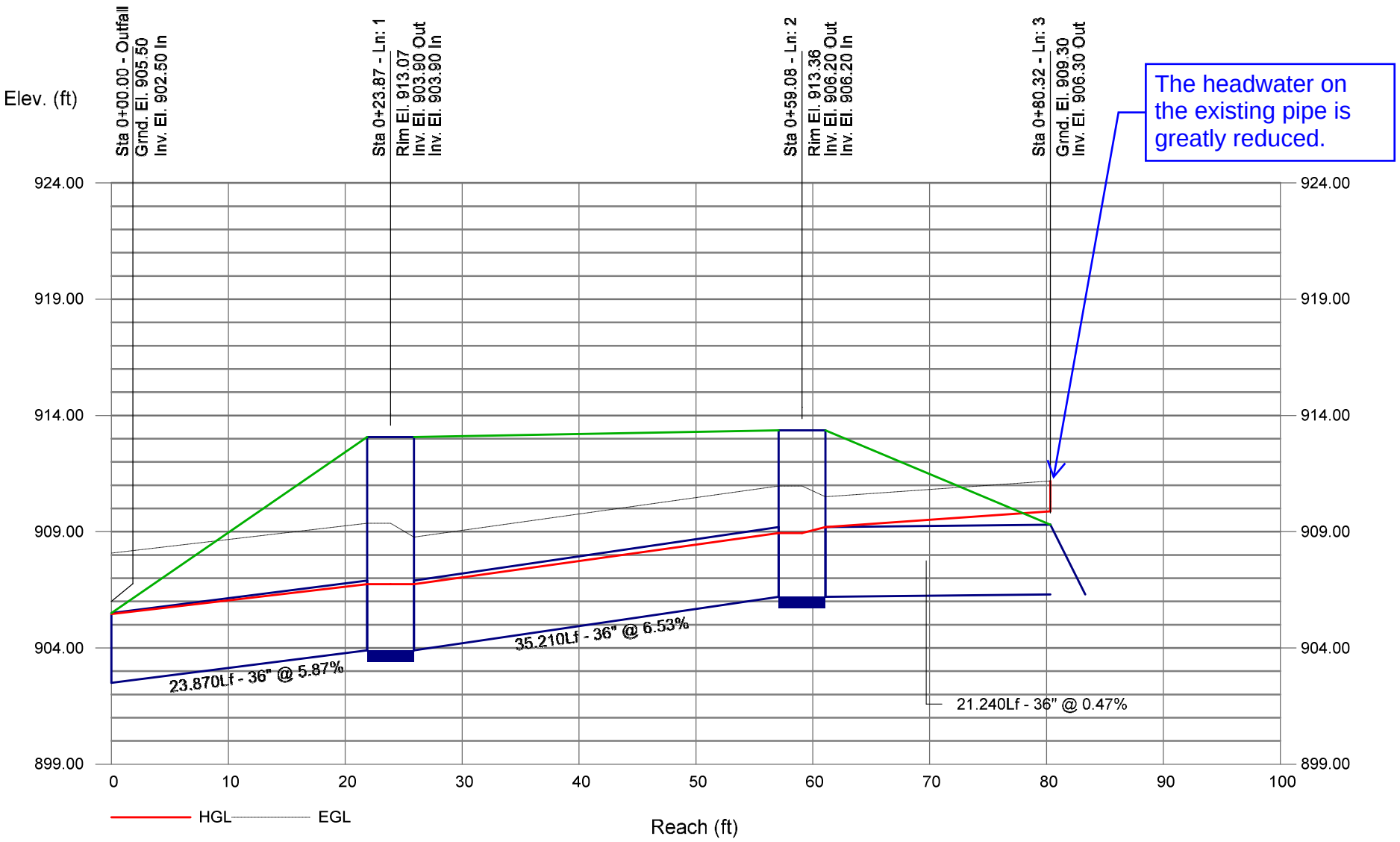
Headwater elevation at entrance to culvert

Proposed Conditions:
100 Year storm sewer model of existing downstream storm sewer line with the proposed detention pond modifications

Project File: Existing Z Line.stm | Number of lines: 3 | Run Date: 11/12/2020

NOTES:Intensity = 61.16 / (Inlet time + 5.60) ^ 0.70; Return period =Yrs. 100 ; c = cir e = ellip b = box

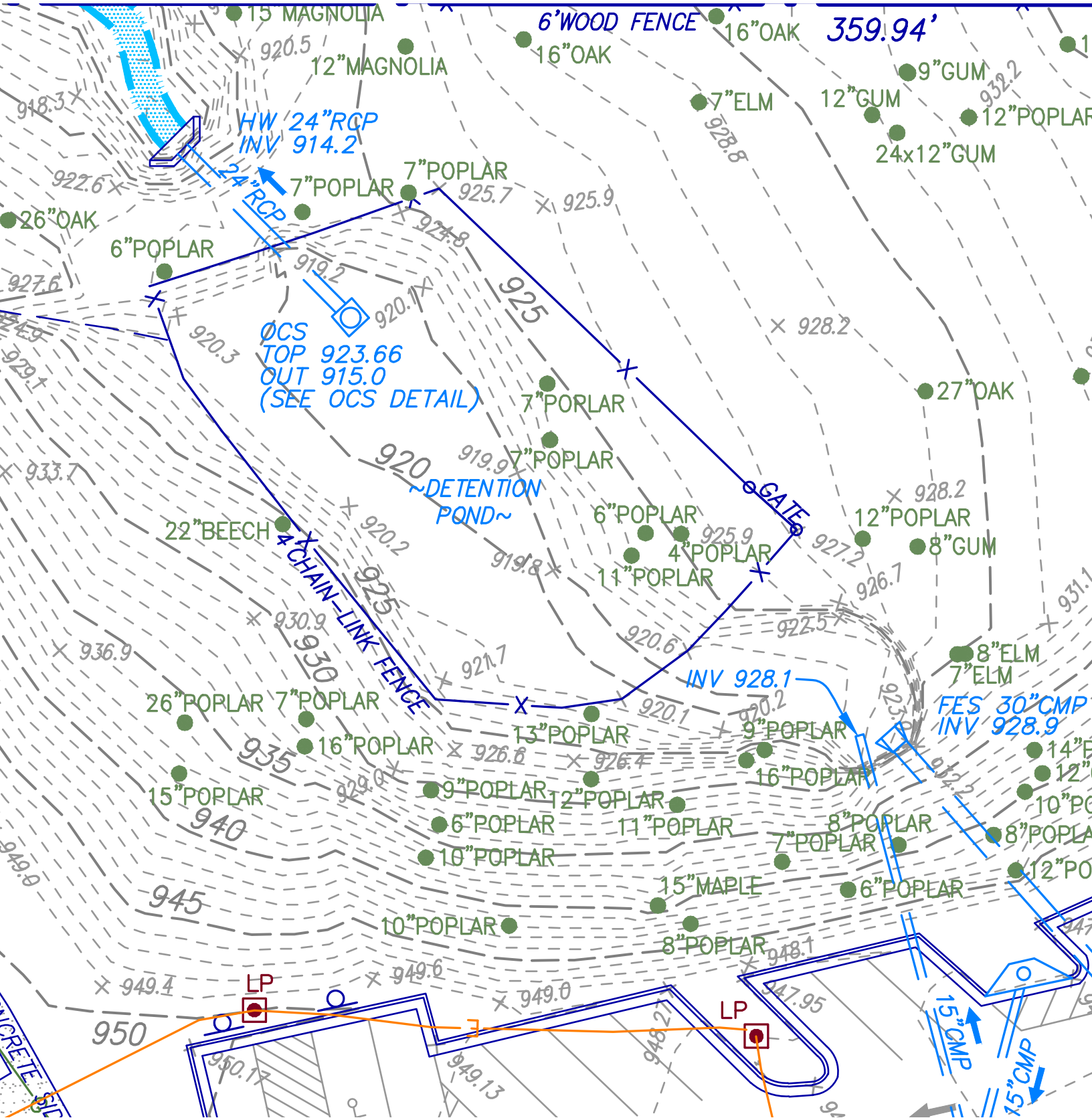
Proposed Conditions:
100 Year storm sewer model of existing downstream storm sewer line with the proposed detention pond modifications



Appendix G Outlet Control Structure Information

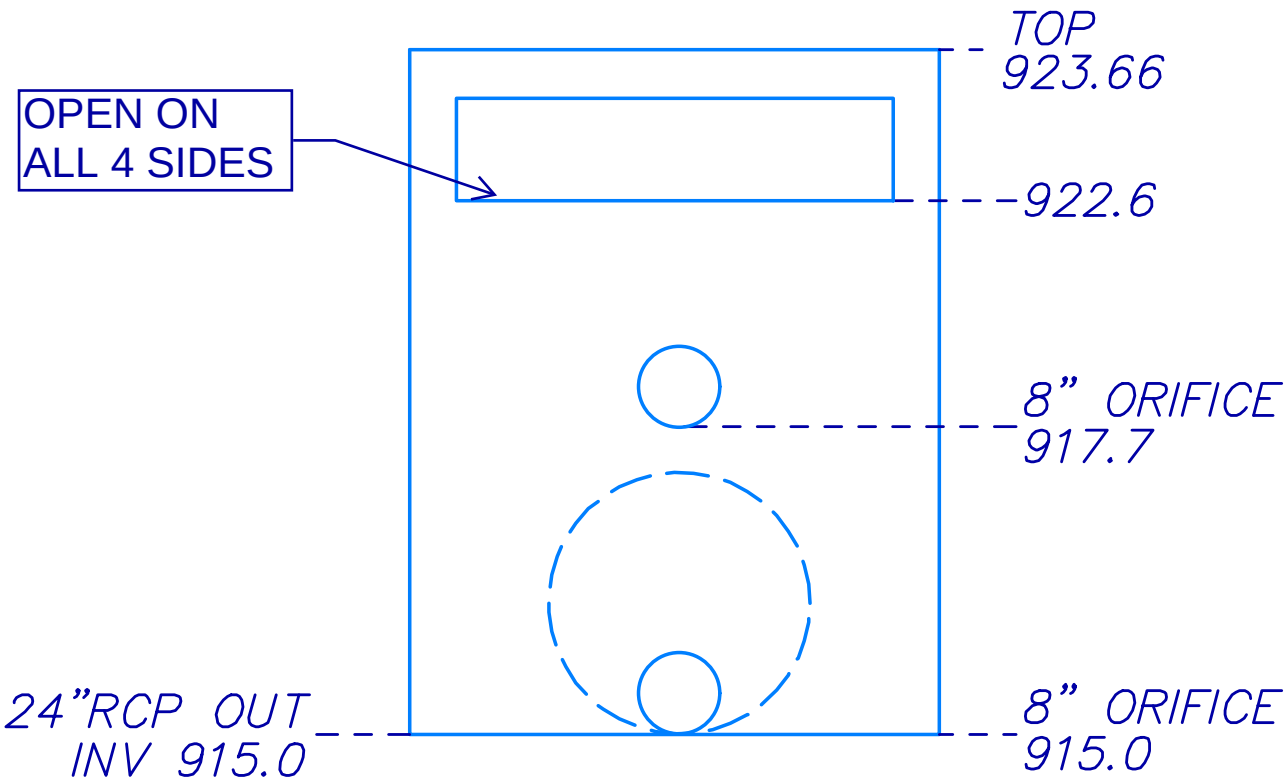
- Pond Model
- OCS Detail
- Water Quality BMP Detail
- Pond Plan

EXISTING DETENTION POND PLAN



Existing East Detention Pond

OCS DETAIL



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-10-2020

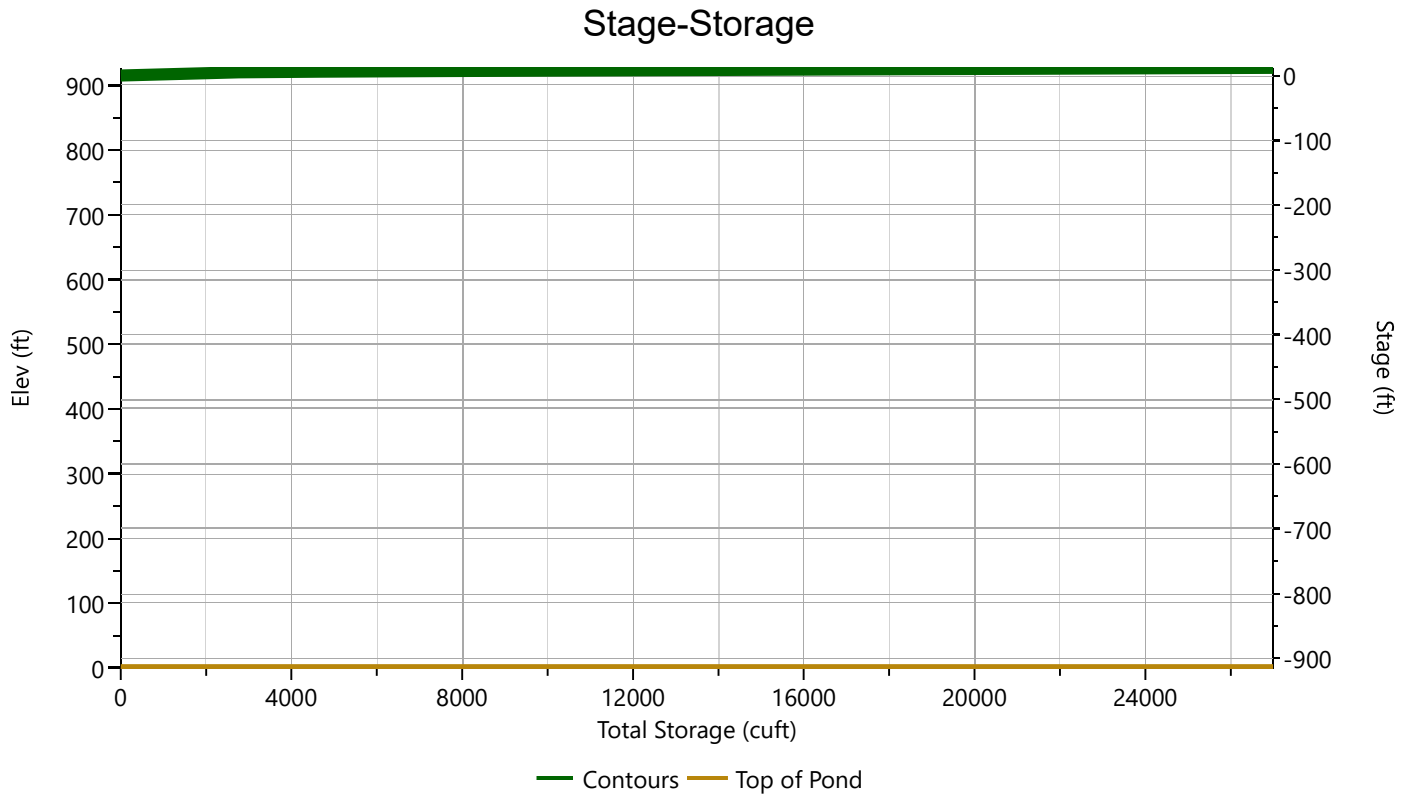
Ex East Pond

Stage-Storage

User Defined Contours	
Description	**Input**
Bottom Elevation, ft	915.00
Voids (%)	100.00
Volume Calc	Ave End Area

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	915.00	1	0.000	0.000
5.00	920.00	1,105	2,765	2,765
6.00	921.00	2,648	1,877	4,642
7.00	922.00	3,349	2,999	7,640
8.00	923.00	3,926	3,638	11,278
9.00	924.00	3,927	3,927	15,204
10.00	925.00	3,928	3,928	19,132
11.00	926.00	3,929	3,929	23,060
12.00	927.00	3,930	3,930	26,990



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-10-2020

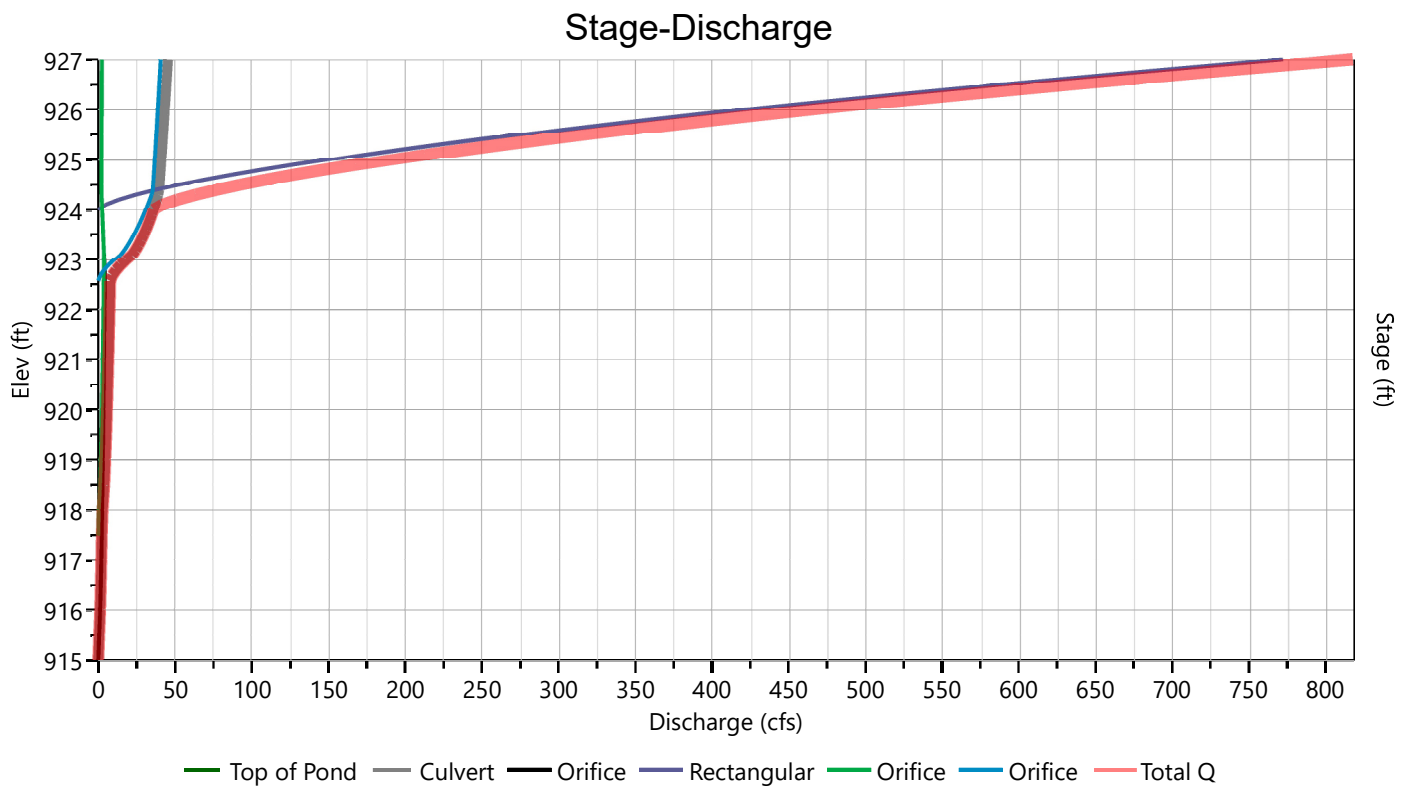
Ex East Pond

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser	
		1*	2*	3*		
Rise, in	24	8	8	6	Hole Diameter, in	
Span, in	24	8	8	36	No. holes	
No. Barrels	1	1	1	4	Invert Elevation, ft	
Invert Elevation, ft	915.00	915.00	917.70	922.60	Height, ft	
Orifice Coefficient, Co	0.60	0.60	0.60	0.60	Orifice Coefficient, Co	
Length, ft	34					
Barrel Slope, %	2.3					
N-Value, n	0.013					

Weirs	Riser*	Weirs			Ancillary	
		1	2	3		
Shape / Type	Circular	Rectangular			Exfiltration, in/hr	
Crest Elevation, ft		924			Tailwater Elevation, ft	
Crest Length, ft		45				
Angle, deg						
Weir Coefficient, Cw		3.3				

Routes through Culvert.



Ex East Pond

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	915.00	0.000	0.000	0.000	0.000	0.000		0.000						0.000
5.00	920.00	2,765	5.705 ic	3.348	2.357	0.000		0.000						5.705
6.00	921.00	4,642	6.605 ic	3.710	2.895	0.000		0.000						6.605
7.00	922.00	7,640	7.393 ic	4.046	3.347	0.000		0.000						7.393
8.00	923.00	11,278	18.05 ic	3.968	3.745	10.34		0.000						18.05
9.00	924.00	15,204	36.09 ic	2.553	2.553	30.98		0.000						36.09
10.00	925.00	19,132	41.08 ic	2.141	2.141	36.80		148.5						189.6
11.00	926.00	23,060	43.30 ic	2.256	2.256	38.79		420.0						463.3
12.00	927.00	26,990	45.42 ic	2.367	2.367	40.68		771.6						817.0

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

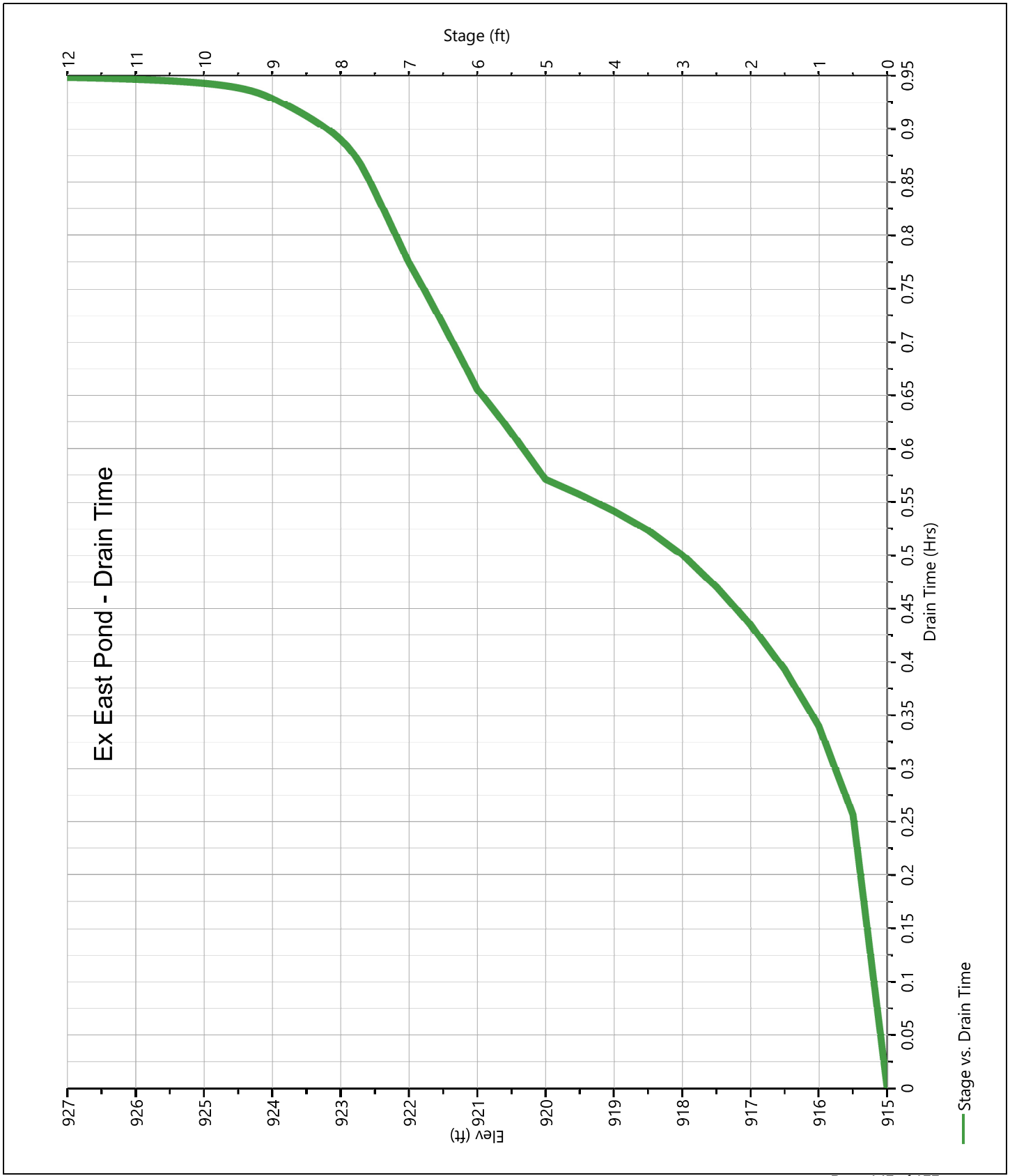
Project Name:

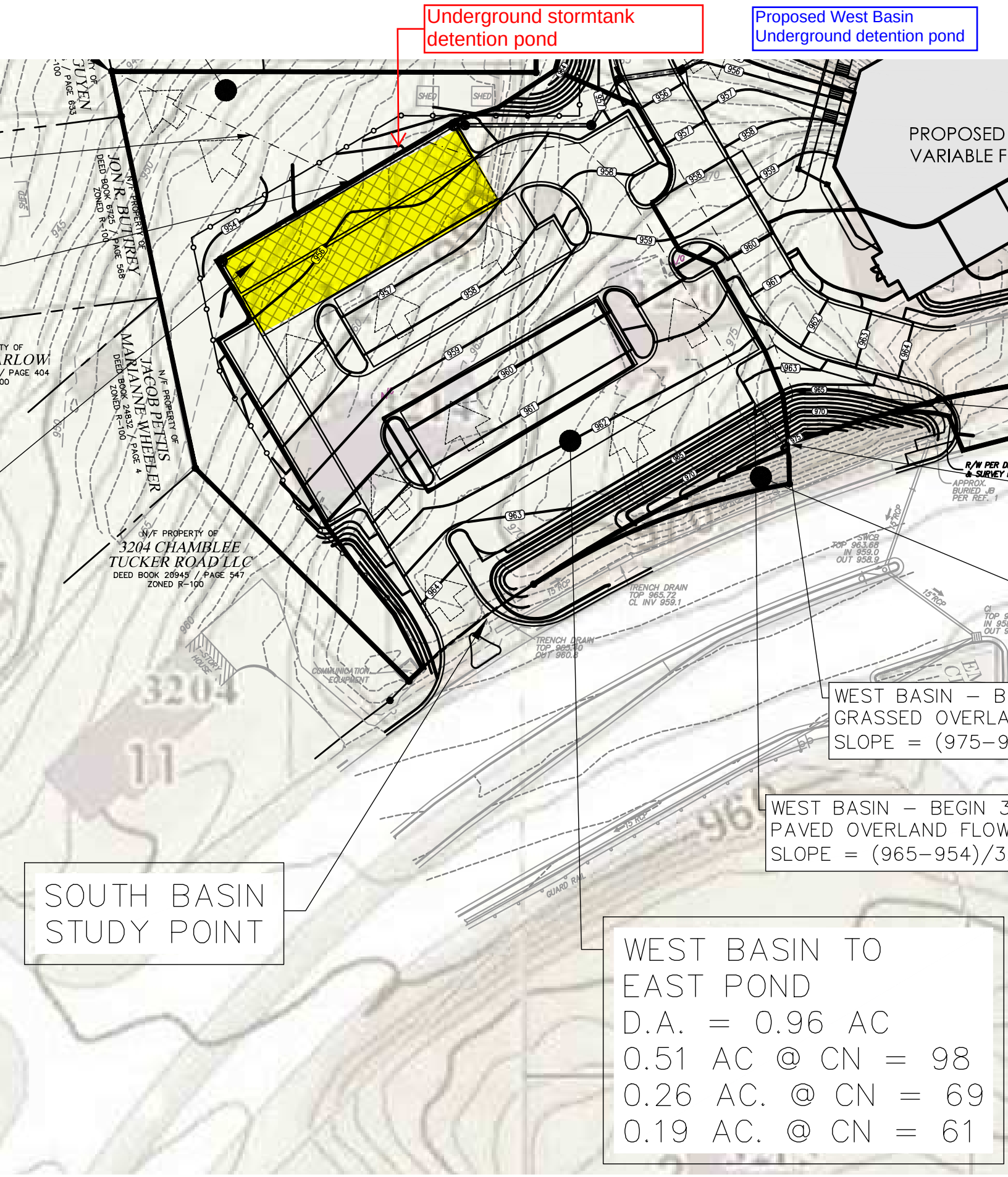
Hydrology Studio v 3.0.0.16

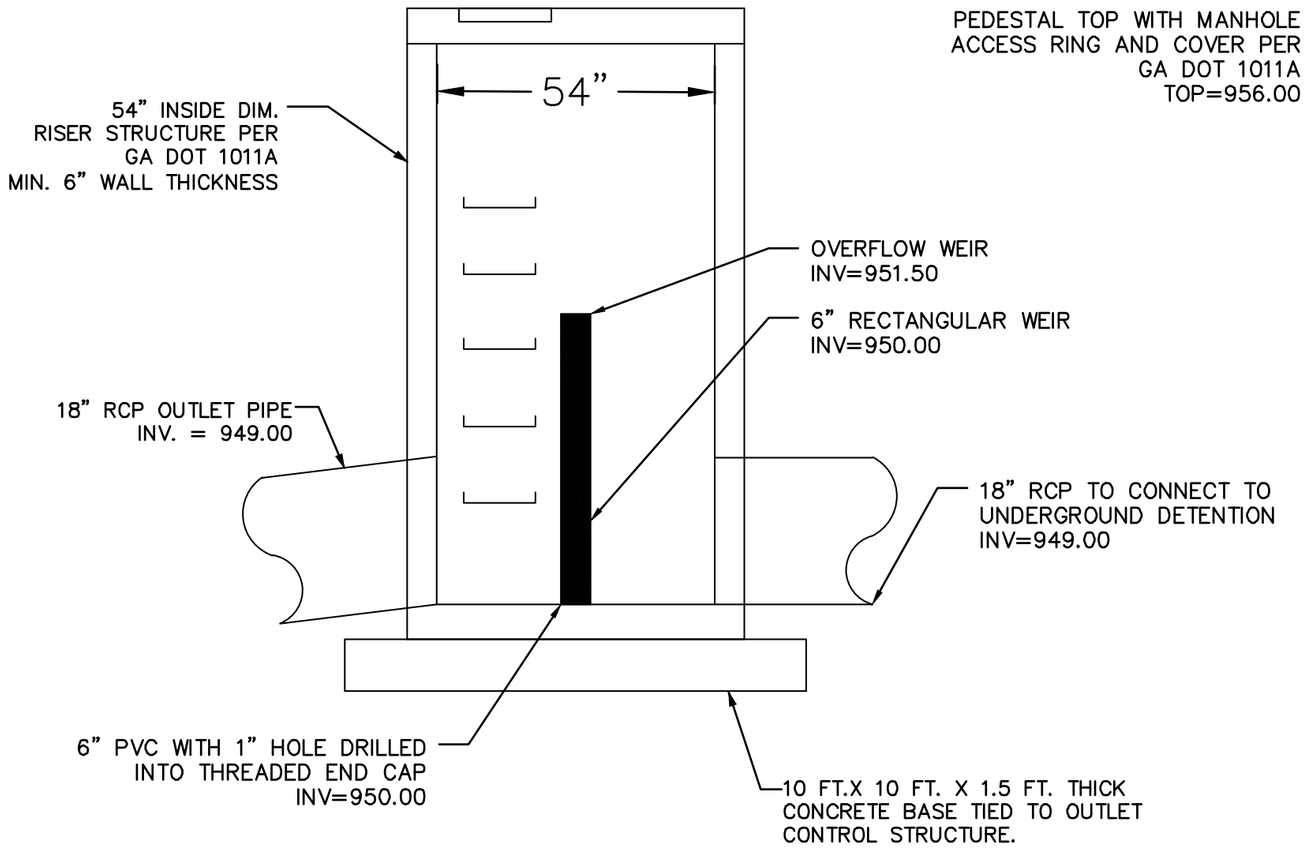
11-10-2020

Ex East Pond

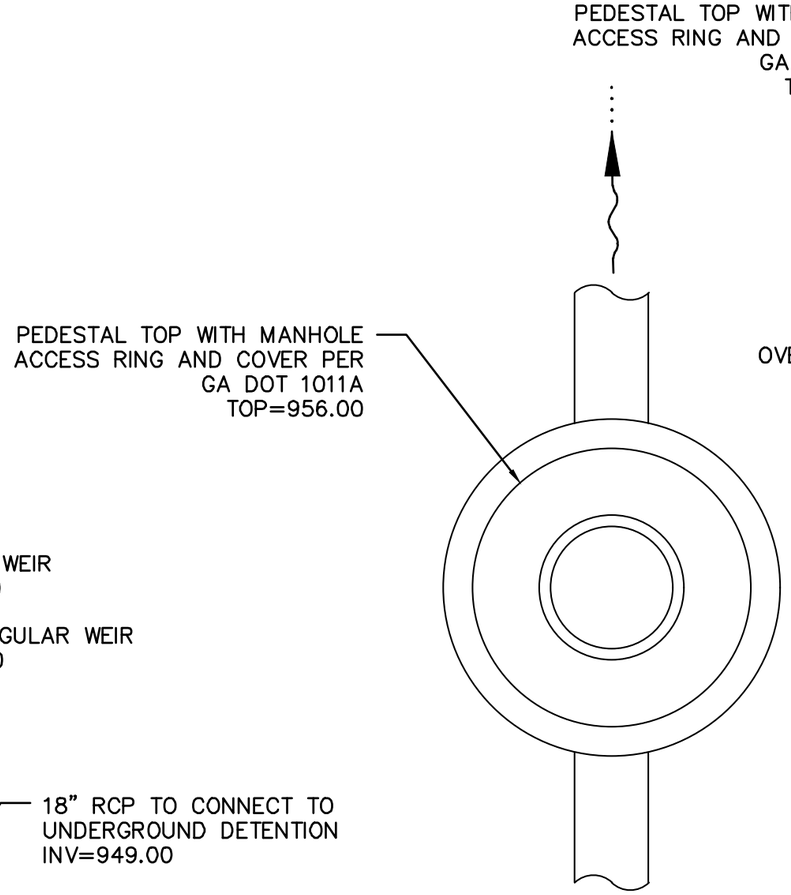
Pond Drawdown



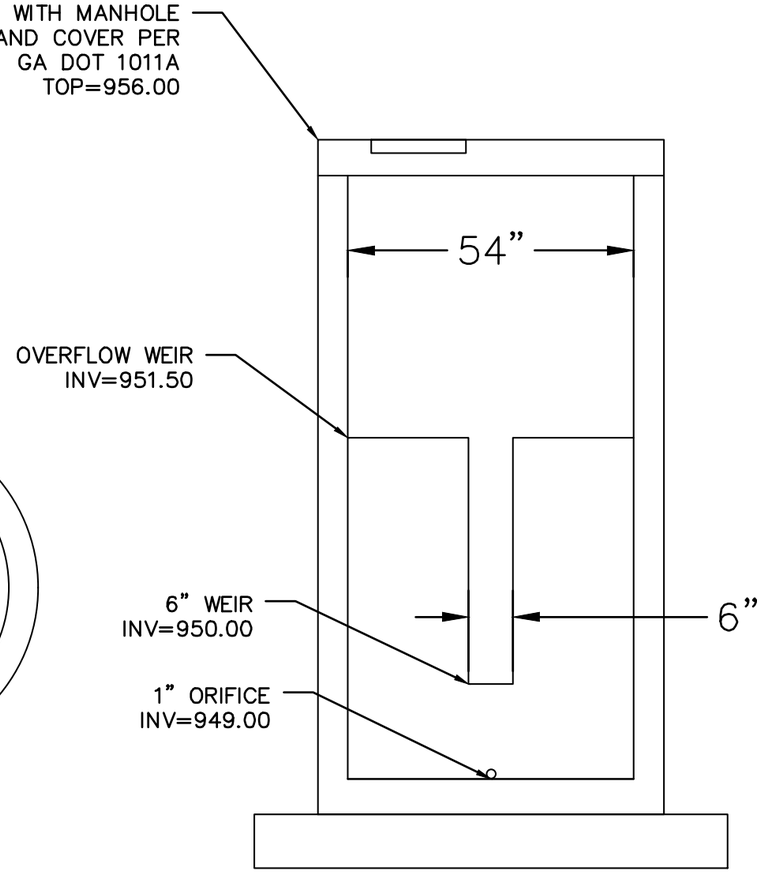

Underground stormtank detention pond
Proposed West Basin Underground detention pond
PROPOSED VARIABLE F
N/F PROPERTY OF JON R. BUTTREY DEED BOOK 6725 / PAGE 568 ZONED R-100
N/F PROPERTY OF MARIANNE WHEELER JACOB PETTIS DEED BOOK 24832 / PAGE 4 ZONED R-100
N/F PROPERTY OF 3204 CHAMBLEE TUCKER ROAD LLC DEED BOOK 20945 / PAGE 547 ZONED R-100
SHED
1-STORY HOUSE
COMMUNICATION EQUIPMENT
TRENCH DRAIN TOP 965.72 CL INV 959.1
TRENCH DRAIN TOP 963.40 OUT 960.8
SWCB TOP 963.68 IN 959.0 OUT 958.9
15"RCP
GUARD RAIL
R/W PER D & SURVEY
APPROX. BURIED JB PER REF. 1
WEST BASIN – B
GRASSED OVERLA
SLOPE = (975–9
WEST BASIN – BEGIN 3
PAVED OVERLAND FLOW
SLOPE = (965–954)/3
SOUTH BASIN STUDY POINT
WEST BASIN TO EAST POND
D.A. = 0.96 AC
0.51 AC @ CN = 98
0.26 AC. @ CN = 69
0.19 AC. @ CN = 61



SECTION



PLAN VIEW



INTERNAL WEIR WALL

NOTE: SUBMIT A SHOP DRAWING OF STRUCTURE TO ENGINEER PRIOR TO CASTING.

OUTLET CONTROL STRUCTURE (B10)

NOT TO SCALE

02
C 506

Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

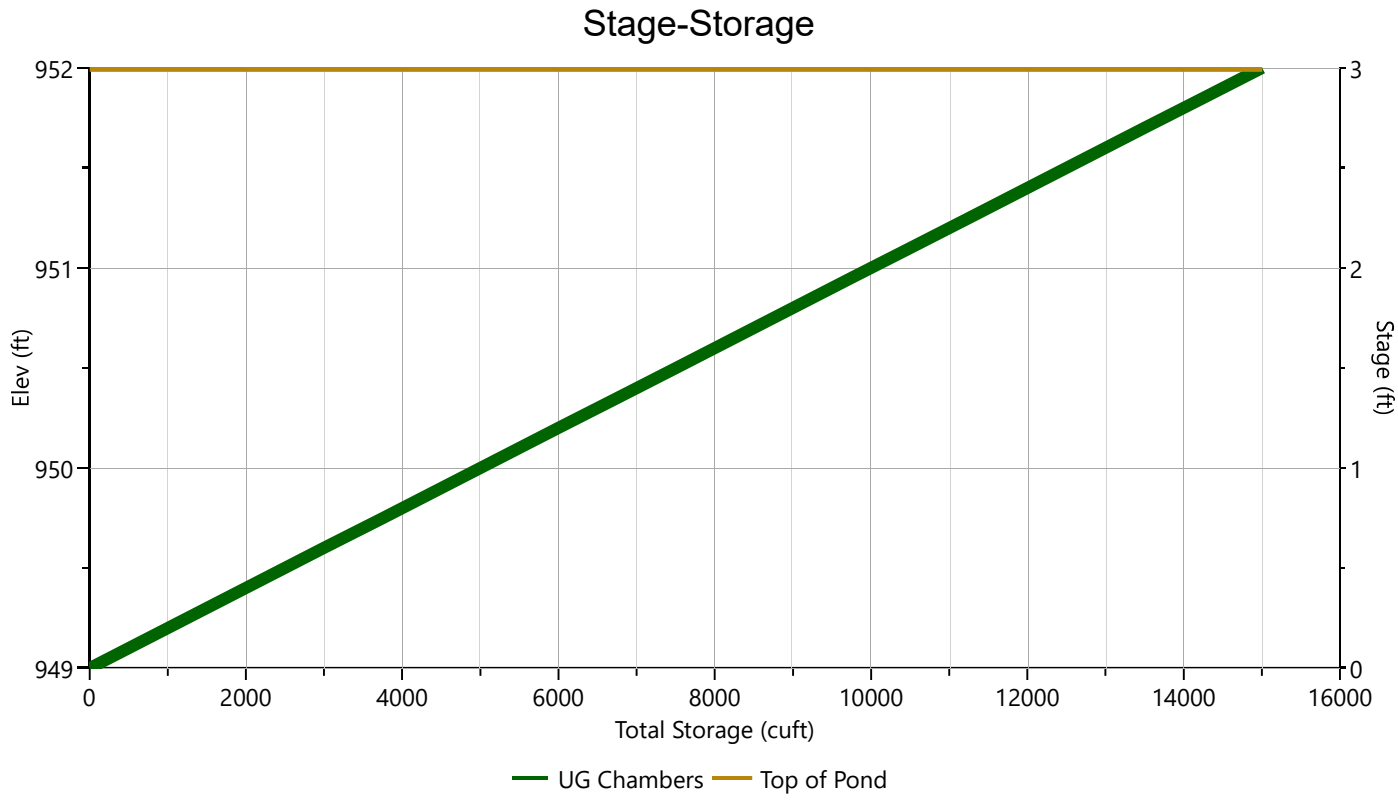
West Pond

Stage-Storage

Underground Chambers	
Description	**Input**
Invert Elev Down, ft	949.00
Chamber Rise, ft	3.00
Chamber Shape	Box
Chamber Span, ft	50.00
Barrel Length, ft	100.00
No. Barrels	1
Barrel Slope, %	0.00
Headers, y/n	No
Stone Encasement, y/n	No
Encasement Bottom Elevation, ft	0.00
Encasement Width per Chamber, ft	1.00
Encasement Depth, ft	0.00
Encasement Voids, %	40.00

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	949.00	n/a	0.000	0.000
0.15	949.15	n/a	750	750
0.30	949.30	n/a	750	1,500
0.45	949.45	n/a	750	2,250
0.60	949.60	n/a	750	3,001
0.75	949.75	n/a	750	3,751
0.90	949.90	n/a	750	4,501
1.05	950.05	n/a	750	5,251
1.20	950.20	n/a	750	6,001
1.35	950.35	n/a	750	6,751
1.50	950.50	n/a	750	7,501
1.65	950.65	n/a	750	8,252
1.80	950.80	n/a	750	9,002
1.95	950.95	n/a	750	9,752
2.10	951.10	n/a	750	10,502
2.25	951.25	n/a	750	11,252
2.40	951.40	n/a	750	12,002
2.55	951.55	n/a	750	12,753
2.70	951.70	n/a	750	13,503
2.85	951.85	n/a	750	14,253
3.00	952.00	n/a	750	15,003



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-12-2020

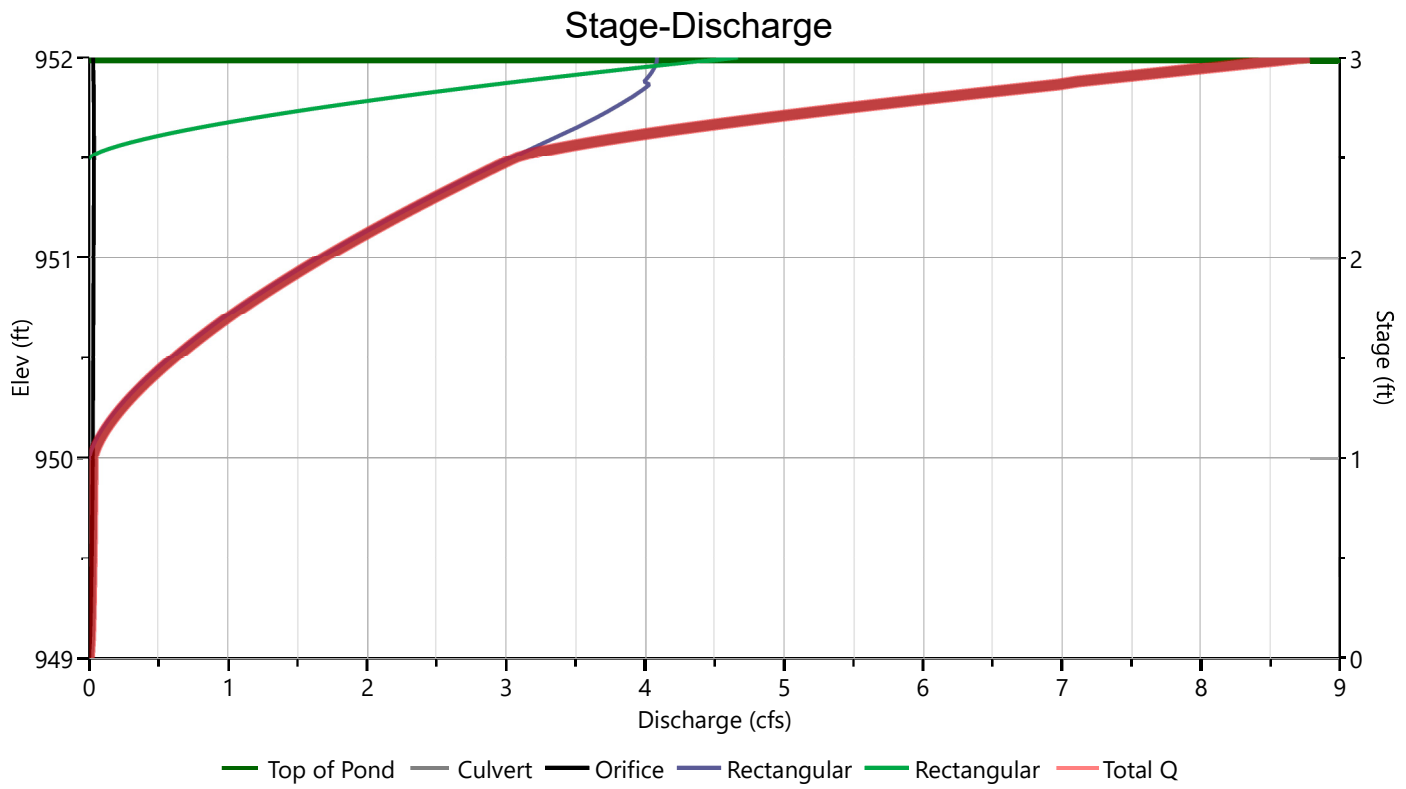
West Pond

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser	
		1*	2	3		
Rise, in	18	1			Hole Diameter, in	
Span, in	18	1			No. holes	
No. Barrels	1	1			Invert Elevation, ft	
Invert Elevation, ft	949.00	949.01			Height, ft	
Orifice Coefficient, Co	0.60	0.60			Orifice Coefficient, Co	
Length, ft	63					
Barrel Slope, %	1					
N-Value, n	0.013					

Weirs	Riser*	Weirs			Ancillary	
		1*	2*	3		
Shape / Type		Rectangular	Rectangular		Exfiltration, in/hr	
Crest Elevation, ft		950	951.5		Tailwater Elevation, ft	
Crest Length, ft		.5	4			
Angle, deg						
Weir Coefficient, Cw		3.3	3.3			

**Routes through Culvert.*



West Pond

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	949.00	0.000	0.000	0.000				0.000	0.000					0.000
0.15	949.15	750	0.008 ic	0.008				0.000	0.000					0.008
0.30	949.30	1,500	0.013 ic	0.013				0.000	0.000					0.013
0.45	949.45	2,250	0.017 ic	0.017				0.000	0.000					0.017
0.60	949.60	3,001	0.019 ic	0.019				0.000	0.000					0.019
0.75	949.75	3,751	0.022 ic	0.022				0.000	0.000					0.022
0.90	949.90	4,501	0.024 ic	0.024				0.000	0.000					0.024
1.05	950.05	5,251	0.044 ic	0.026				0.018	0.000					0.044
1.20	950.20	6,001	0.174 ic	0.027				0.148	0.000					0.174
1.35	950.35	6,751	0.369 ic	0.027				0.342	0.000					0.369
1.50	950.50	7,501	0.612 ic	0.028				0.583	0.000					0.612
1.65	950.65	8,252	0.894 ic	0.029				0.865	0.000					0.894
1.80	950.80	9,002	1.211 ic	0.030				1.181	0.000					1.211
1.95	950.95	9,752	1.559 ic	0.031				1.528	0.000					1.559
2.10	951.10	10,502	1.935 ic	0.032				1.904	0.000					1.935
2.25	951.25	11,252	2.339 ic	0.033				2.306	0.000					2.339
2.40	951.40	12,002	2.767 ic	0.033				2.733	0.000					2.767
2.55	951.55	12,753	3.366 ic	0.034				3.184	0.148					3.366
2.70	951.70	13,503	4.857 ic	0.033				3.643 s	1.181					4.857
2.85	951.85	14,253	6.769 ic	0.032				4.004 s	2.733					6.769
3.00	952.00	15,003	8.779 oc	0.028				4.085 s	4.667					8.779

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

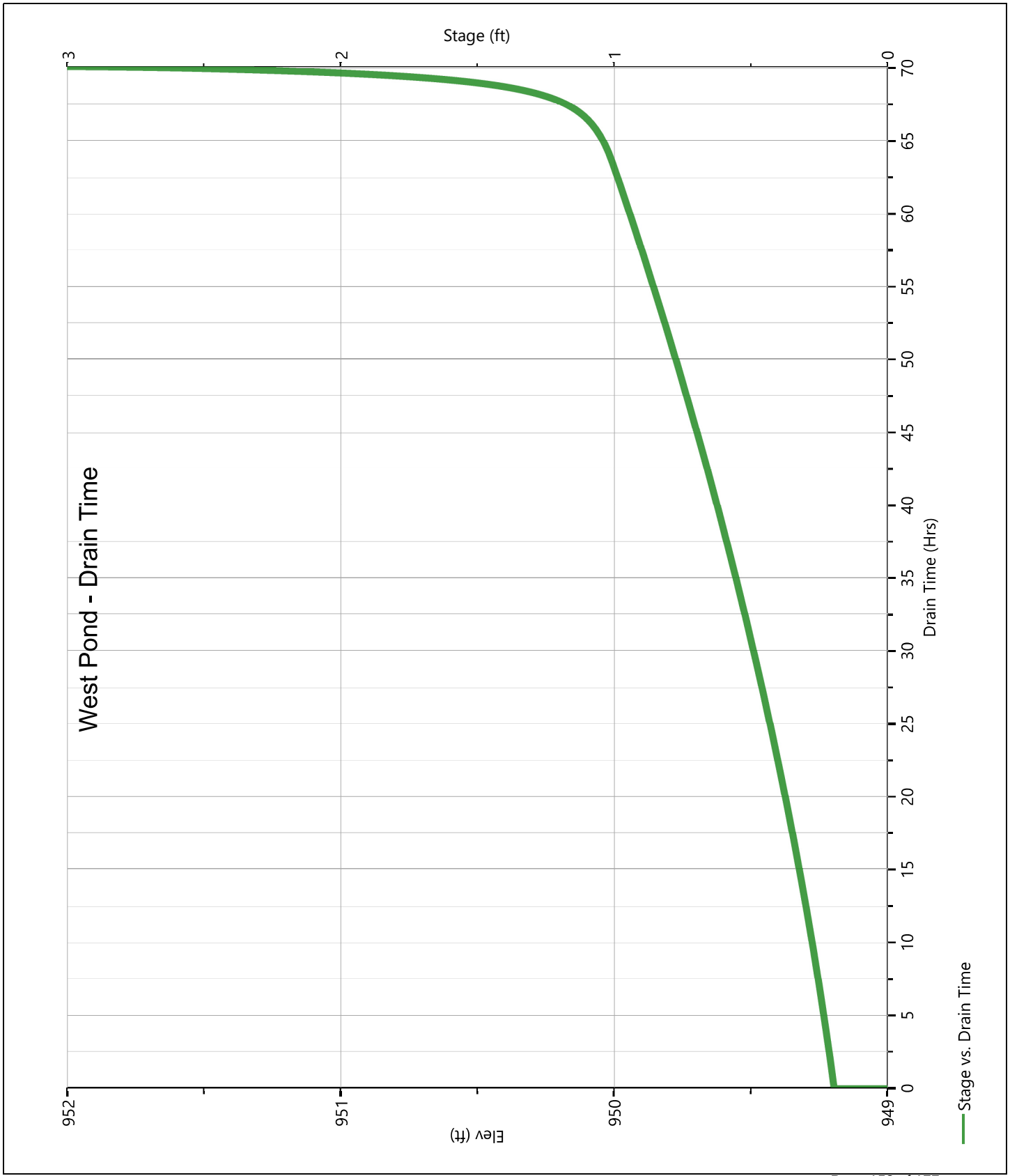
Project Name:

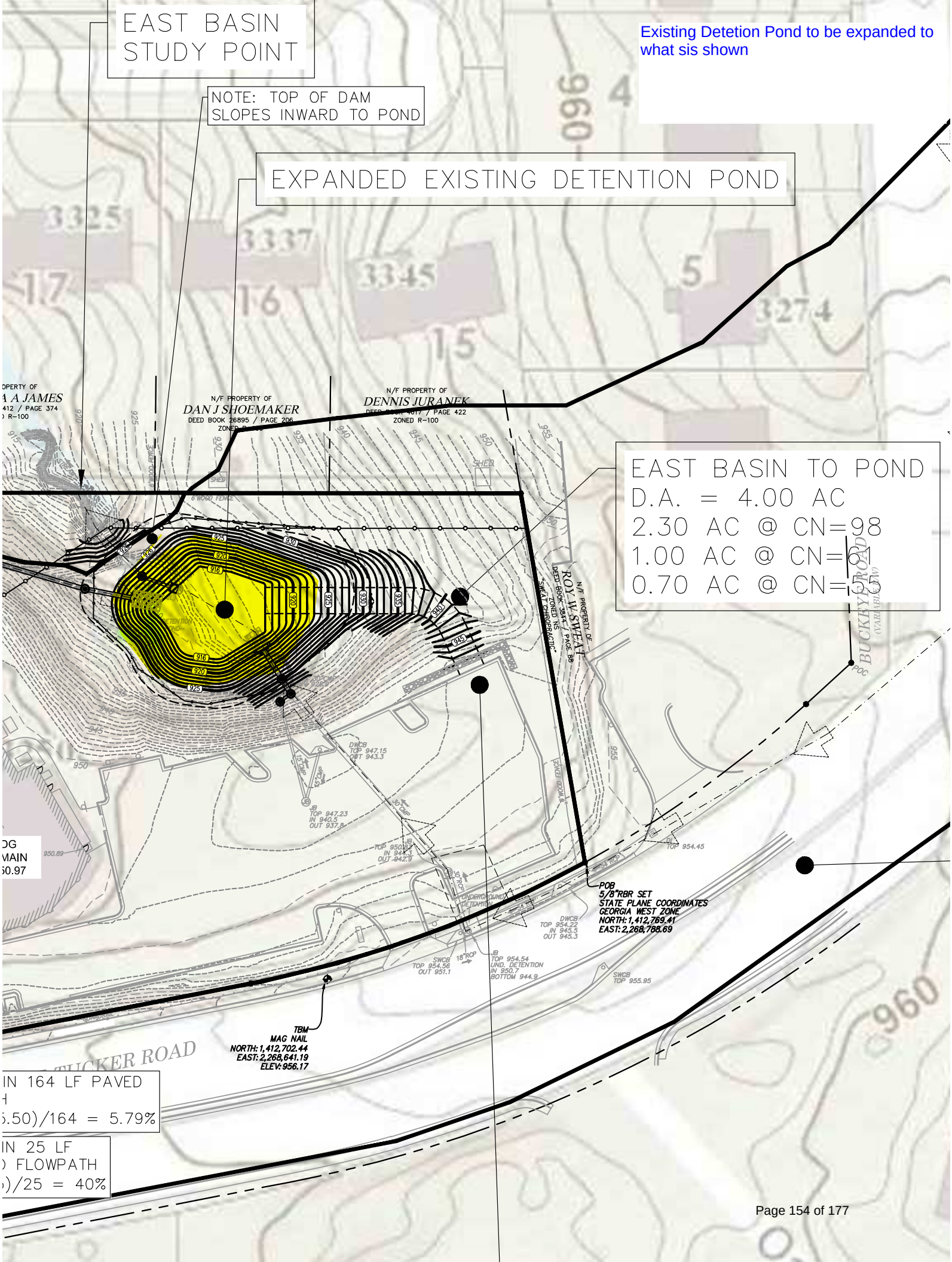
Hydrology Studio v 3.0.0.16

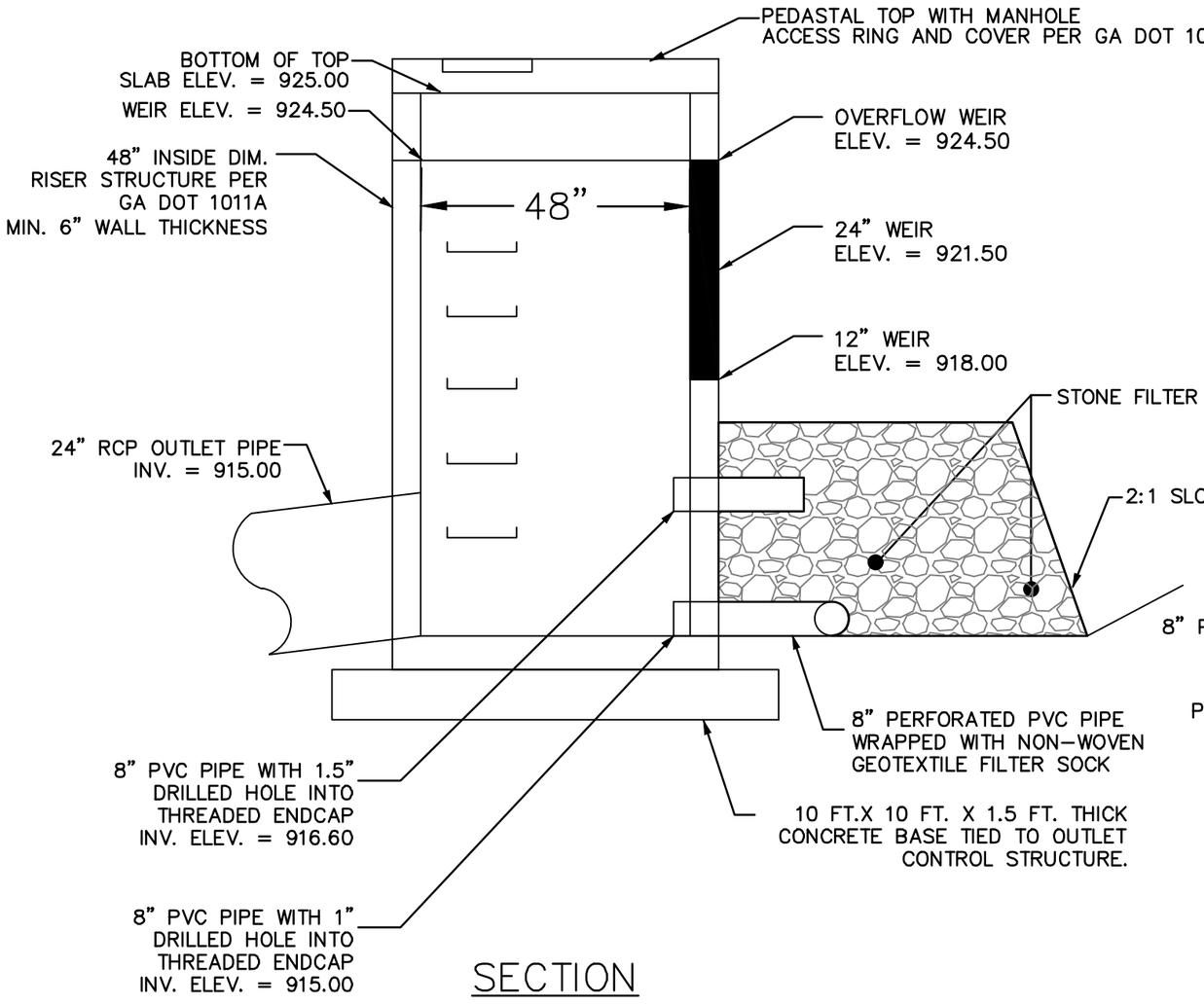
11-12-2020

West Pond

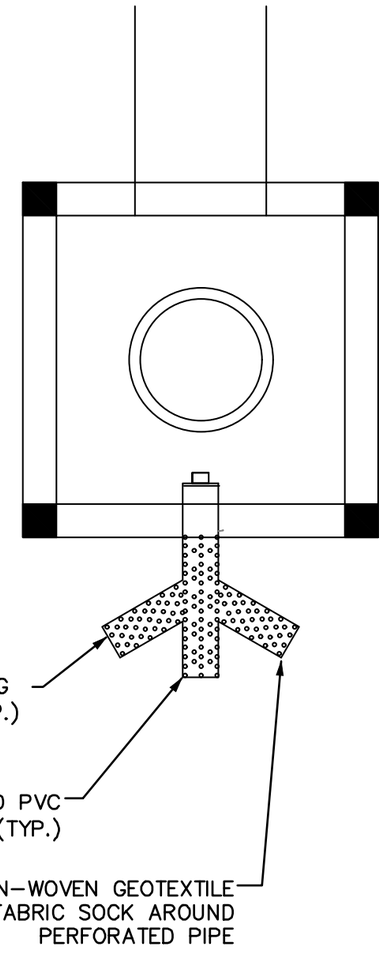
Pond Drawdown



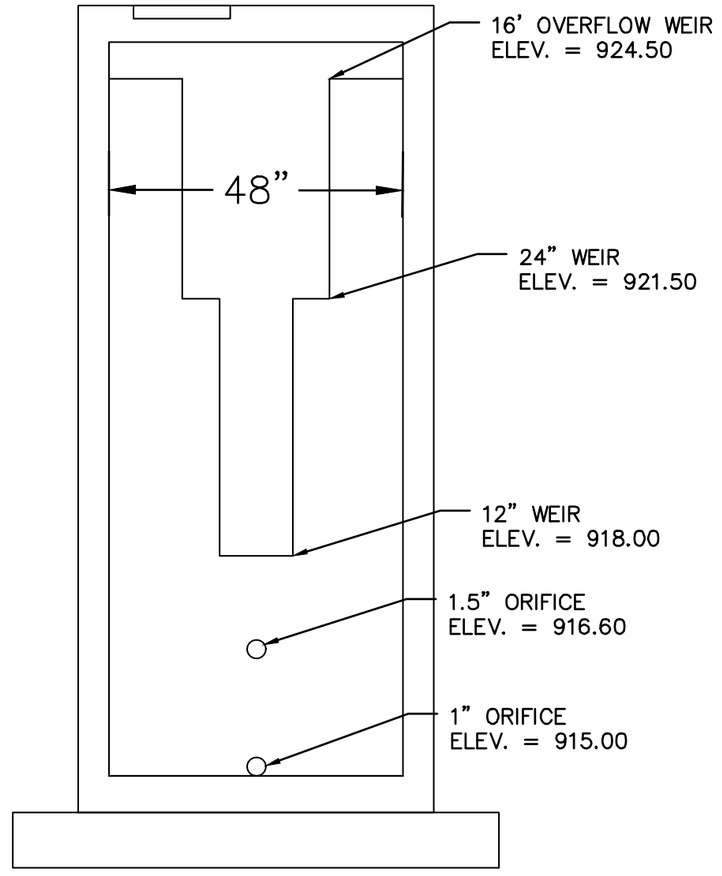

EAST BASIN STUDY POINT
NOTE: TOP OF DAM SLOPES INWARD TO POND
EXPANDED EXISTING DETENTION POND
Existing Detetion Pond to be expanded to what sis shown
EAST BASIN TO POND
D.A. = 4.00 AC
2.30 AC @ CN=98
1.00 AC @ CN=61
0.70 AC @ CN=55
N/F PROPERTY OF
DAN J SHOEMAKER
DEED BOOK 26895 / PAGE 205
N/F PROPERTY OF
DENNIS JURANEK
DEED BOOK 4617 / PAGE 422
ZONED R-100
N/F PROPERTY OF
ROY W. SWEAT
DEED BOOK 3841 / PAGE 88
"SWEAT CHIROPRACTIC"
BUCKHEAD ROAD
(VARIABLE R/W)
TUCKER ROAD
POB
5/8"RBR SET
STATE PLANE COORDINATES
GEORGIA WEST ZONE
NORTH: 1,412,769.41
EAST: 2,268,788.69
TBM
MAG NAIL
NORTH: 1,412,702.44
EAST: 2,268,641.19
ELEV: 956.17
IN 164 LF PAVED
5.50)/164 = 5.79%
IN 25 LF
FLOWPATH
)/25 = 40%



SECTION



PLAN VIEW



FRONT ELEVATION VIEW

NOTE: SUBMIT A SHOP DRAWING OF STRUCTURE TO ENGINEER PRIOR TO CASTING.

OUTLET CONTROL STRUCTURE (A2)

NOT TO SCALE

01
C 506

Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-10-2020

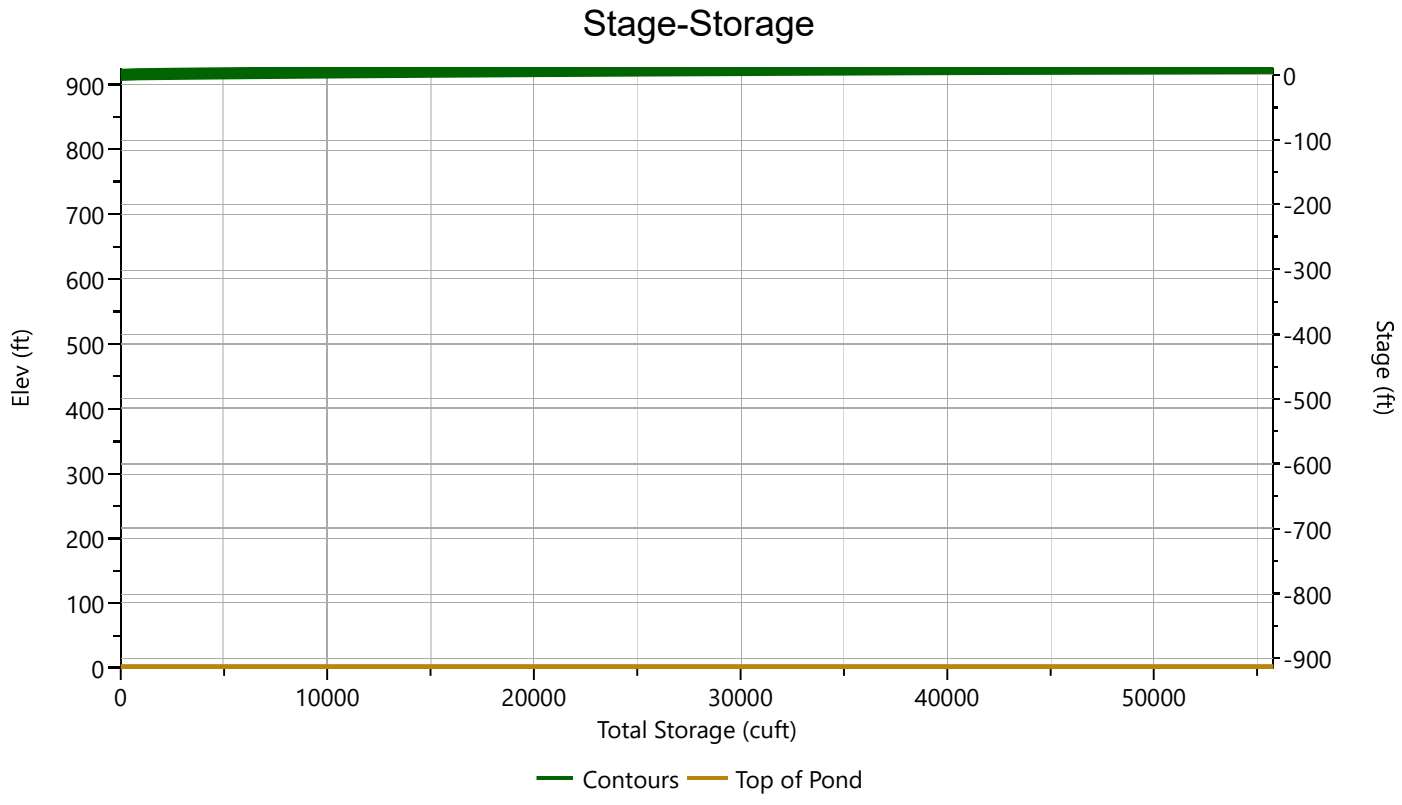
New East Pond

Stage-Storage

User Defined Contours	
Description	**Input**
Bottom Elevation, ft	915.00
Voids (%)	100.00
Volume Calc	Conic

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	915.00	1	0.000	0.000
1.00	916.00	2,556	869	869
2.00	917.00	3,045	2,797	3,666
3.00	918.00	3,566	3,302	6,967
4.00	919.00	4,122	3,840	10,808
5.00	920.00	4,730	4,422	15,230
6.00	921.00	5,373	5,048	20,277
7.00	922.00	6,055	5,710	25,987
8.00	923.00	6,772	6,410	32,397
9.00	924.00	7,528	7,146	39,543
10.00	925.00	8,322	7,921	47,464
11.00	926.00	8,325	8,323	55,786



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-10-2020

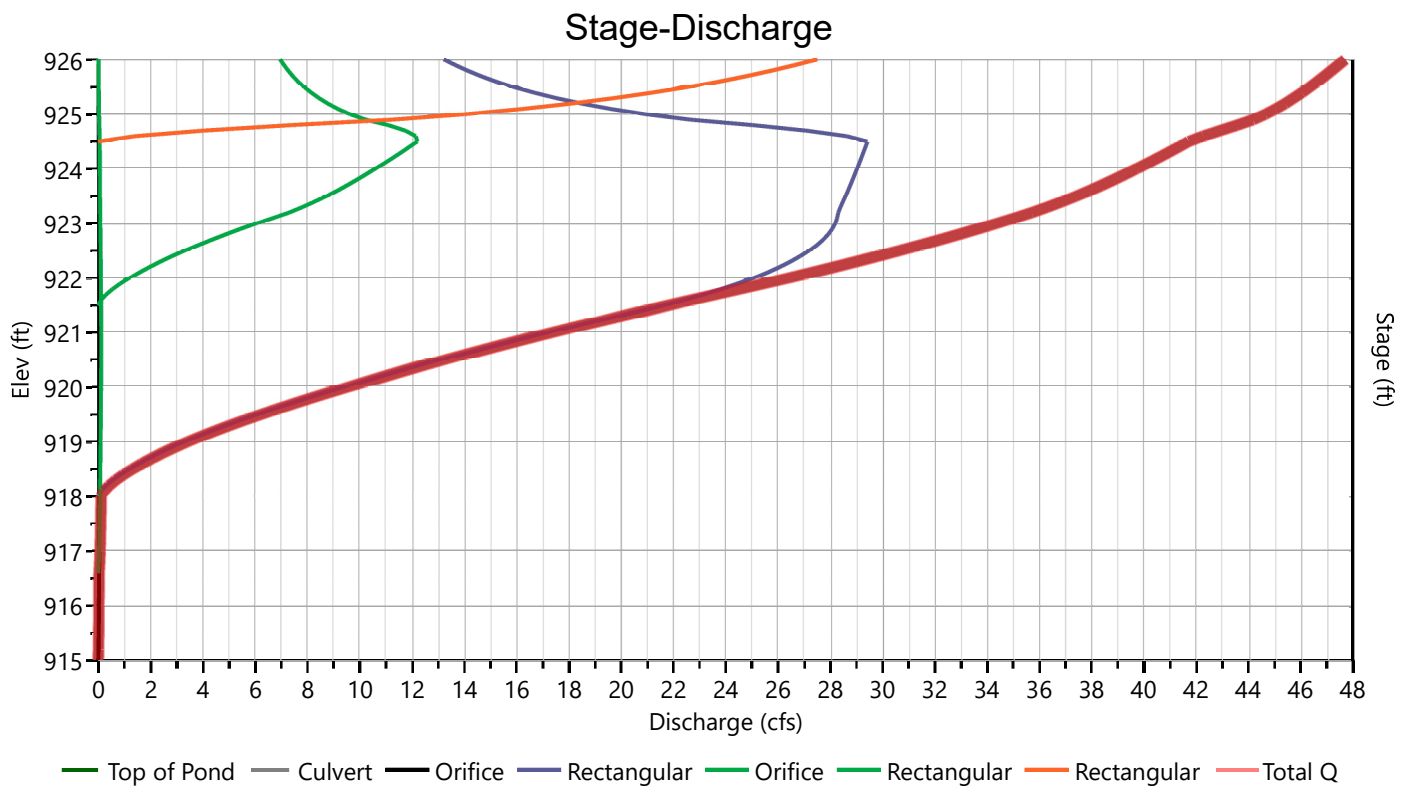
New East Pond

Stage-Discharge

Culvert / Orifices	Culvert	Orifices			Perforated Riser	
		1*	2*	3		
Rise, in	24	1	1.5		Hole Diameter, in	
Span, in	24	1	1.5		No. holes	
No. Barrels	1	1	1		Invert Elevation, ft	
Invert Elevation, ft	915.00	915.00	916.60		Height, ft	
Orifice Coefficient, Co	0.60	0.60	0.60		Orifice Coefficient, Co	
Length, ft	34					
Barrel Slope, %	2.3					
N-Value, n	0.013					

Weirs	Riser*	Weirs			Ancillary	
		1*	2*	3*		
Shape / Type		Rectangular	Rectangular	Rectangular	Exfiltration, in/hr	
Crest Elevation, ft		918	921.5	924.5	Tailwater Elevation, ft	
Crest Length, ft		1	1	13.5		
Angle, deg						
Weir Coefficient, Cw		3.3	3.3	3.3		

*Routes through Culvert.



Pond Report

Project Name:

Hydrology Studio v 3.0.0.16

11-10-2020

New East Pond

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	915.00	0.000	0.000	0.000	0.000			0.000	0.000	0.000				0.000
1.00	916.00	869	0.025 ic	0.025	0.000			0.000	0.000	0.000				0.025
2.00	917.00	3,666	0.070 ic	0.036	0.034			0.000	0.000	0.000				0.070
3.00	918.00	6,967	0.113 ic	0.044	0.068			0.000	0.000	0.000				0.113
4.00	919.00	10,808	3.437 ic	0.047	0.090			3.300	0.000	0.000				3.437
5.00	920.00	15,230	9.492 ic	0.050	0.108			9.334	0.000	0.000				9.492
6.00	921.00	20,277	17.31 ic	0.050	0.113			17.15	0.000	0.000				17.31
7.00	922.00	25,987	26.33 ic	0.045	0.102			25.01 s	1.167	0.000				26.33
8.00	923.00	32,397	34.37 ic	0.036	0.080			28.19 s	6.062	0.000				34.37
9.00	924.00	39,543	39.71 ic	0.028	0.062			29.02 s	10.60 s	0.000				39.71
10.00	925.00	47,464	44.63 ic	0.014	0.032			20.96 s	9.638 s	13.98 s				44.63
11.00	926.00	55,786	47.68 ic	0.006	0.014			13.21 s	6.952 s	27.50 s				47.68

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

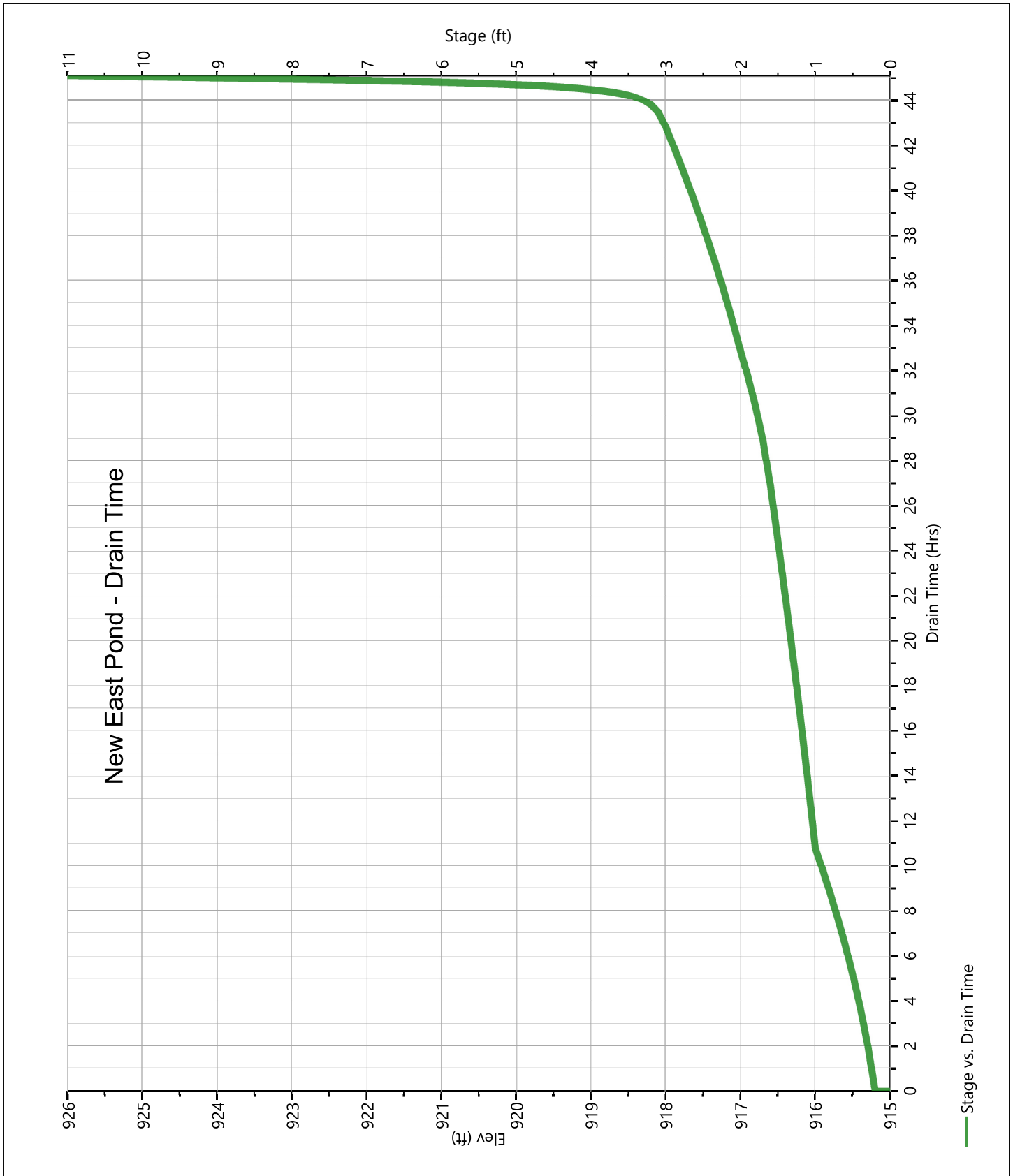
Project Name:

Hydrology Studio v 3.0.0.16

11-10-2020

New East Pond

Pond Drawdown



Outlet Control Structure Stability Check				
Rectanglar OCS				
Outlet Control Structure DATA				
Top Elevation=	925.5			
Weir Top Elevation =	924.5			
Weir Bottom Elevation =	918			
Bottom Elevation =	915			
Base Bottom Elevation =	915			
Outside OCS Dim=	5			
OCS Wall thickness	0.5			
Additional Base Depth				
Additional Base Width				
Additional Base Length				
1. Volume of Water Displaced				
V_{water}	=	H X L X W		
H=	3			
L=	5			
W=	5			
V_{water}	75			
2. Weight of Water				
W_{water}		62.4	LB/CF	
	X	V_{water}		
	=	4680	LBS	
3. Volume of Concrete Provided by OCS				
	V_{base}	0		
+	V_{outer}	75		
-	V_{inner}	48		
+	V_{top}	25		
+	V_{base}	0		
=	$V_{concrete}$	52		
4. Weight of Concrete Provided				
$W_{concrete}$		150	LB/CF	
	X	$V_{concrete}$		
	=	7800	LBS	
5. Comparison between weight of water				
desplacement and weight of concrete provided.				
Factor of safety	$W_{concrete}$	7800		
/	W_{water}	4680		
	=	1.666667		
		NOTE: USE 1.5 OR GREATER		

Appendix H Operation & Maintenance Documents

Underground Detention

Underground detention is detention storage located in underground tanks or vaults designed to provide water quantity control through temporary storage of stormwater runoff. In addition they can improve water quality by removing heavy amounts of sediment.

There are some common problems to be aware of when maintaining an underground detention area. They include, but are not limited to, the following:

- Sediment build-up
- Clogging in the inlet and outlet structure
- Requirement to have Occupational Safety and Health Administration (OSHA) confined space entry training

Routine maintenance should be performed on the underground detention areas to ensure that the structure is properly functioning. Routine maintenance includes the removal of debris from inlet and outlet structures and cleaning sediment built up inside the structure. Because this is an underground system, inspection and maintenance may be difficult to conduct. Generally these underground systems can be inspected by looking in an access opening. Sometimes, however, maintenance requires an individual who is certified in OSHA confined space entry. Should there be a situation where a safety concern arises, the inspection should stop and the safety concern addressed. Once the concern is addressed, the inspection can continue.

Inspect the underground detention area after a large rainstorm. If the underground detention area is not draining properly, check the inlet and outlet structures to make sure they are not clogged.

Sediment should be removed from the practice by either a vacuum or boom. If the system is accepting water that flowed from a hazardous facility, the sediment may need to be disposed of by other means. Check with the local government to identify any additional constraints on the disposal of sediments excavated from underground detention.

The table on the following page shows a schedule for when different maintenance activities should be performed on a submerged gravel wetland.

Underground Detention Typical Routine Maintenance Activities and Schedule

Activity	Schedule
• Remove any trash/debris and sediment buildup in the underground trash racks, vaults or tanks. • Check drainage areas for trash, erosion, and debris. • Clean underground detention if hazardous or foreign substances are spilled in the contributing drainage area. • Perform structural repairs to inlet and outlets.	As needed
• Follow manufacturer's guidelines and develop/adjust plan for the underground detention. • Clean out underground detentions with vacuum or boom trucks. • Clean sediment or oil chambers	Annually

Underground Detention					
Maintenance Item	Condition				Comment
	Good	Marginal	Poor	N/A*	
General Inspection					
Access to the site is adequately maintained for inspection and maintenance.					
Area is clean (trash, debris, grass clippings, etc. removed).					
Inlet Structure and Pretreatment					
Drainage ways (overland flow or pipes) to the practice are free of trash, debris, large branches, etc.					
Inlet structure is in good condition. No signs of cracks or leaks.					
Diversion structure (high flow bypass structure or other) is free of trash, debris, or sediment. Comment on overall condition of diversion structure and list type.					
Inlet pipe fits tightly to the underground detention.					
Inlet has protection to prevent clogging with leaves or other debris and has fine mesh for mosquito control.					
Main Treatment					
Main treatment area is free of trash, debris, and sediment.					
Structure seems to be working properly. No signs of settling, leaking, or cracking. Comment on overall condition of structure.					
Emergency Overflow and Outlet Structure					
Area is free of trash, debris, and sediment.					
Overflow valve appears to be in good condition and show no signs of leaking.					
Results					
Overall condition of Underground Detention:					
Additional Comments					
Notes: *If a specific maintenance item was not checked, please explain why in the appropriate comment box.					

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Stormwater Wetland					
Maintenance Item	Condition				Comment
	Good	Marginal	Poor	N/A*	
General Inspection					
Access to the site is adequately maintained for inspection and maintenance.					
Area is clean (trash, debris, grass clippings, etc. removed).					
Inlet Structure					
Drainage ways (overland flow or pipes) to the practice are free of trash, debris, large branches, etc.					
Area around the inlet structure is mowed and grass clippings are removed.					
No evidence of gullies, rills, or excessive erosion around the inlet structure.					
Inlet pipe is in good condition, and water is going through the structure (i.e. no evidence of water going around the structure).					
Diversion structure (high flow bypass structure or other) is free of trash, debris, or sediment. Comment on overall condition of diversion structure and list type.					
Pretreatment (choose one)					
Forebay – area is free of trash, debris, and sediment. Sediment accumulation in forebay is less than 50% of the storage capacity.					
Filter Strip or Grass Channels – area is free of trash debris and sediment. Area has been mowed and grass clippings are removed. No evidence of erosion.					
Rock Lined Plunge Pools – area is free of trash debris and sediment. Rock thickness in pool is adequate.					
Main Treatment					
Main treatment area is free of trash, debris, and sediment.					
Erosion protection is present on site (i.e. turf reinforcement mats). Comment on types of erosion protection and evaluate condition.					
No algal growth along or within the wetland.					
Native plants were used in the practice according to the planting plan. No undesirable vegetation.					

Stormwater Wetland					
Maintenance Item	Condition				Comment
	Good	Marginal	Poor	N/A*	
Vegetation within and around practice is maintained per landscaping plan. Grass clippings are removed.					
Wetland seems to be working properly. No settling around the practice. Comment on overall condition.					
No significant sediment accumulation within the practice.					
No evidence of use of fertilizer on plants (fertilizer crusting on the surface of the soil, tips of leaves turning brown or yellow, blackened roots, etc.).					
Plants seem to be healthy and in good condition. Comment on condition of plants.					
Emergency Overflow					
Emergency overflow is free of trash, debris, and sediment.					
No evidence of erosion, scour, flooding, or animal activity around the structure. No evidence of seepage on the downstream face.					
No evidence of unwanted vegetation and vegetation is in good condition.					
Outlet Structure					
Outlet structure is free of trash, debris, and sediment.					
No evidence of erosion, scour, or flooding around the structure.					
Outlet structure does not appear to be blocked.					
Results					
Overall condition of Stormwater Wetland:					
Additional Comments					
Notes: * If a specific maintenance item was not checked, please check N/A and explain why in the appropriate comment box.					

Submerged Gravel Wetlands

The submerged gravel wetland system is similar to a regular stormwater wetland; however, it is filled with crushed rock or gravel and designed to allow stormwater to flow through the root zone of the constructed wetland. The outlet from each cell is set at an elevation to keep the rock or gravel submerged. Wetland plants are rooted in the media, where they can directly take up pollutants. In addition, algae and microbes thrive on the surface area of the rocks. Mimicking the pollutant removal ability of nature, this structural control relies on the pollutant-stripping ability of plants and soils to remove pollutants from runoff.

There are some common problems to be aware of when maintaining a submerged gravel wetland. They include, but are not limited to, the following:

- Sediment build-up
- Clogging in the inlet and outlet structure
- Establishing vegetation within the wetland area
- Maintaining the proper pH levels for plants
- Pruning and weeding to maintain appearance
- Mosquitoes breeding in the practice

Routine maintenance should be performed on the submerged gravel wetlands to ensure that the structure is properly functioning. Note that during the first year the submerged gravel wetland is built, maintenance may be required at a higher frequency to ensure the proper establishment of vegetation in the practice. For more information on vegetation in submerged gravel wetlands, see Appendix D: Planting and Soil Guidance. Regular inspection and maintenance is crucial to the success of the wetland as an effective stormwater management practice.

In addition to routine maintenance, submerged gravel wetlands have seasonal and intermittent maintenance requirements. During the winter months, the stormwater pond should be inspected after a snow event (this is specific to northern areas of Georgia) to make sure that the materials used to de-ice the surrounding areas stay out of the practice to avoid further pollution. In addition, planting material should be trimmed during the winter, when the plants are dormant.

Inspect the submerged gravel wetland after large rainstorm events. Keep drainage paths (both to and from the BMP) clean so that the water can properly flow into the submerged gravel wetland. If the submerged gravel wetland is not draining properly, check for clogging in the inflow and outflow

structures. If sediment buildup is preventing flow through the wetland, remove gravel and sediment from cell. Replace with clean gravel and replant vegetation.

If the forebay or submerged gravel wetland has received a significant amount of sediment over a period of time, then the sediment at the bottom of the forebay or gravel wetland may need to be removed. It is important to note that sediment excavated from submerged gravel wetlands that do not receive stormwater runoff from stormwater hotspots are typically not considered toxic and can be safely disposed through either land application or landfilling. Stormwater hotspots are areas that produce higher concentrations of metals, hydrocarbons, or other pollutants than normally found in urban runoff. Examples of operations performed in potential stormwater hotspots include vehicle maintenance and repair, vehicle washing, landscaping/grounds care, and outdoor material and product storage. Check with the local development review authority to identify any additional constraints on the disposal of sediments excavated from submerged gravel wetlands.

In order to keep the water that exits the submerged gravel wetland clean, fertilizers should be used sparingly during the establishment of the practice. Once the vegetation in the practice has been established, fertilizer should not be used. While vegetation in the submerged gravel wetland is important, the primary purpose of a submerged gravel wetland is to act as a water quantity and quality device and introducing fertilizers into the submerged gravel wetland introduces nutrients such as phosphorus and nitrogen that can pollute downstream waters. In addition, submerged gravel wetlands should already be a nutrient rich environment that does not require fertilization. To control animal nuisances and invasive species, pesticides (including herbicides, fungicides, insecticides, or nematode control agents) should be used sparingly and only if necessary.

It is important that the embankment of a submerged gravel wetland be inspected regularly for trees and animal activity. Trees growing on the top or sides of the embankment should be removed. The roots of trees grow into the embankment and will weaken the structure of the embankment by creating passage ways that allow water to flow through the embankment. Trees that are blown over or damaged by storms can loosen or remove soil which weakens the strength of the embankment. In the same way animals can burrow holes weakening the structure of the embankment. These holes act as a passage way for the water to travel through the embankment, increasing the potential for the embankment to fail.

The table below shows a schedule for when different maintenance activities should be performed on a submerged gravel wetland.

Submerged Gravel Wetlands Typical Routine Maintenance Activities and Schedule

Activity	Schedule
• Ensure that inlets and outlets to each submerged gravel wetland cell are free from debris and not clogged. • Remove any accumulated sediment and debris from inlet and outlet structures.	Monthly

Activity	Schedule
• Inspect wetland, side slopes and buffers for erosion. Replace vegetation in eroded areas. • Inspect wetland, side slopes and buffers for dead or dying vegetation. Replace vegetation as needed. • Inspect wetland, side slopes and buffers for invasive vegetation and remove as needed.	Semi-Annually (Quarterly During First Year)
• Inspect for damage to the embankment and inlet/outlet structures. Repair as necessary. • Monitor for sediment accumulation in the facility. • Examine to ensure that inlet and outlet devices are free of sediment and debris and operational. • Inspect side slopes for erosion and undercutting and repair as needed. • Check for signs of eutrophic conditions (e.g., excessive algal growth). • Check for signs of hydrocarbon accumulation and remove appropriately. • Monitor sediment markers for sediment accumulation in forebays and permanent pools. • Check all control gates, valves and other mechanical devices.	Annually
• Water side slopes and buffers to promote plant growth and survival. • Inspect wetland, side slopes, strucutres, and buffers following rainfall events. Plant replacement vegetation in any eroded areas.	As Needed
• Remove sediment, trash, and debris from inlets/forebay.	5 years or after 50% of the total forebay storage capacity has been lost
• Monitor sediment accumulation in the wetland and remove sediment when the permanent pool volume has become reduced significantly, plants are “choked” with sediment, sediment buildup is preventing flow through the wetland, or the wetland becomes eutrophic. Replace with clean gravel and replant vegetation.	10 plus years or after 25% of the wetland storage volume has been lost

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Permeable Bricks/Blocks

Permeable bricks/blocks are pavers with void areas areas between the bricks or blocks that are generally filled with pervious materials such as small pieces of gravel, or top soil if a grid is used. Beneath the bricks/blocks is a base layer of aggregate that acts as a holding area for stormwater runoff while still providing structural support for the road. This practice provides enough structural support so that cars can drive over them or they can be used in parking lots. Permeable brick/blocks are not recommended in areas with high traffic volume or heavy trucks. These systems provide water quality benefits in addition to groundwater recharge and a reduction in stormwater volume.

There are some common problems to be aware of when maintaining permeable bricks/blocks. They include, but are not limited to, the following:

- Sediment build-up and clogging between bricks/blocks
- Settling
- Bricks/blocks cracking or splitting

There are four basic types of permeable bricks/blocks that are used. They are bricks, concrete blocks, concrete grid, and articulated concrete block. The concrete grid can be filled with grass or gravel. Routine maintenance should be performed on the permeable bricks/blocks to ensure that the structure is functioning properly. Permeable bricks/blocks should be cleaned with a street vacuum or low pressure washer to remove debris and sediment monthly, or as needed, and all vegetation between bricks/blocks should be mowed and clippings removed to reduce clogging. Cleaning the bricks will help keep the water permeating through the pavers. After cleaning, the bricks/blocks may need to be filled in with additional aggregate or top soil to replace anything that may have been removed during cleaning.

In addition to routine maintenance, permeable bricks/blocks have seasonal and intermittent maintenance requirements. In the winter months permeable bricks/blocks can be plowed similarly to any other unpaved road by lifting the blade a few inches above the road or by using a beveled plow. Deicing materials such as sand, ash, or salt should be avoided if possible. They can potentially harm the bricks/blocks and may cause clogging. Non-toxic, organic deicers are recommended.

Permeable bricks/blocks should be inspected after a large rainstorm. Keep drainage paths, both to and from the BMP, clean so that the water can properly infiltrate into the ground. Note that it might take longer for the water to permeate into the ground during the winter months and early spring.

If the permeable bricks/blocks are not draining properly, check for clogging between the bricks or blocks or at the upper layer of the aggregate, directly below the bricks/blocks. If clogging occurs, then the stones between the blocks/bricks should be replaced. In addition, the top layer of soil under the bricks/blocks may also need to be cleaned and replaced. Some areas of the blocks/bricks may need additional maintenance due to potential sources of clogging which include unstable soil upstream of the practice, leaves from trees, low points in blocks/bricks, trash, and debris from vehicle traffic. Another reason for the bricks/blocks not draining properly is settling. If major settling occurs, then the bricks/blocks should be removed, cleaned, and replaced.

Permeable bricks/blocks may also include an underdrain. If the practice includes an underdrain, additional maintenance will be required. Periodic testing will need to be done on the system to make sure that the underdrain is not clogged. This is done by pouring water into cleanout and observing how the water exits the practice. The observation well should be checked to make sure water is draining out of the practice.

The table below shows a schedule for when different maintenance activities should be performed on the permeable bricks/blocks.

Permeable Bricks/Blocks Typical Routine Maintenance Activities and Schedule

Activity	Schedule
• Keep the permeable bricks/blocks free of trash, debris, and sediment. • Make sure that there is no standing water in the bricks/blocks between storms. • Remove weeds and grass growing between the bricks/blocks (unless concrete grid pavers are being used). • Mow grass within the bricks/blocks (only for concrete grid with grass) • Mow / trim grass or vegetation near the bricks/blocks and remove clippings from area. • Visually inspect the bricks/blocks after large storms to ensure the overflow drainage system is working. • Inspect the bricks/blocks for damage and repair. • Vacuum sweep permeable brick/block surface to keep free of sediment. • After cleaning, additional aggregate may need to be added between the pavers. Replace aggregate between pavers as necessary.	Monthly during warm weather
• Keep the contributing drainage area and surface of the bricks/blocks clear of debris, trash, and sediment. • Ensure that the areas surrounding the practice are stabilized and mowed, remove grass clippings.	As needed, based on inspection

Activity	Schedule
• If the pavers are installed in an area that is subject to high amounts of sediment, leaves, or low point (i.e. large trucks traveling on the bricks/blocks daily) additional cleaning may be necessary. • Replace any joint material that has eroded or washed away. • Observe the system during a rain event. • Areas should be routinely inspected for settling and loss of water flow through the system.	Semi-annually in Spring and Fall
• Organic deicers may be used to melt ice and snow. • Snow plows may be used when necessary under the following conditions: ○ The edges of the plows are beveled. ○ The blade of the snow plow is raised 1-2 inches. ○ The snow plow is equipped with snow shoes which allow the blade to glide across uneven surfaces.	As needed in winter
• Inspect the surface for deterioration or breaking into fragments. • Flush the underdrain system to check for clogging (if applicable).	Annually
• Remove the permeable bricks/blocks; include the top and base layers of the practice. Clean bricks/blocks and base aggregate, and replace as needed.	Upon failure

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Permeable Bricks/Blocks					
Maintenance Item	Condition				Comment
	Good	Marginal	Poor	N/A*	
General Inspection					
Access to the site is adequately maintained for inspection and maintenance.					
Area is clean (trash, debris, grass clippings, leaves, etc. removed).					
Area around the practice is mowed and grass clippings are removed. No signs of bare or dead grass.					
No evidence of gullies, rills, or erosion around the practice.					
Water is permeating the bricks/blocks (i.e. no evidence of water going around the practice).					
Bricks/blocks are structurally sound. No signs of cracks or splitting.					
Aggregate between the bricks/blocks is reasonable.					
No evidence of long-term ponding or standing water in the practice.					
Grass in the concrete grid is healthy, no dead grass or bare spots.					
Grass in the concrete grid is mowed and grass clippings are removed.					
Structure seems to be working properly. No signs of the bricks/blocks settling. Comment on overall condition of bricks/blocks.					
Vegetation within and around practice is maintained. Grass clippings are removed.					
No exposed soil near the bricks/blocks that could cause sediment accumulation within the practice.					
Cleanout caps are present and not missing (if applicable).					
The underdrain system has been flushed properly and there is no sign of clogging (if applicable).					
Results					
Overall condition of Permeable Bricks/Blocks:					

Permeable Bricks/Blocks					
Maintenance Item	Condition				Comment
	Good	Marginal	Poor	N/A*	
Additional Comments					
Notes: * If a specific maintenance item was not checked, please check N/A and explain why in the appropriate comment box.					