

BIBBO ASSOCIATES, L.L.P.

Consulting Engineers

Timothy S. Allen, P.E.
Nicholas Gaboury, P.E.
Matthew J. Gironda, P.E.

June 27, 2022

Town of North Castle
Planning Board
17 Bedford Road
Armonk, NY 10504-1898

ATTN: Mr. Christopher Carthy, Chairman

RE: Site Plan
IREP-CG East Lane, LLC
Turet Subdivision – East Lane

Dear Members of the Board:

Please find attached the following materials in support of the Site Plan Application for the above referenced project:

- 1 copy – Site Plan Application (w/ scan of application fee & escrow checks)
- 1 copy – Site Plan (6 Sheets), dated 6-6-2022
- 1 copy – Stormwater Pollution Prevention Plan, dated 6-6-2022
- 1 copy – House Plans (w/ Gross Floor Area Worksheet)
- 1 copy – Gross Land Coverage Worksheet
- 1 copy – Short Environmental Assessment Form (EAF)
- 1 copy – Aerial Map
- 1 copy – Construction Cost Estimates, last revised 6-6-2022

IREP-CG East Lane, LLC is in contract with the owner of the Turet Subdivision to purchase and develop the approved subdivision located on East Lane. The application provided herewith proposes to construct the East Lane improvements, construct the common driveway serving Lot #2 & #3, and construct a new single family residence on Lot #1. Associated stormwater management systems and wetland mitigation plantings will be installed as part of the site development.

The Turet Subdivision was approved by the Planning Board in December of 2019 and includes four residential building lots accessed by East Lane. As part of the approval East Lane is to be regraded and widened to Town Road specifications and offered to the Town. Attached are updated construction cost estimates for the Town Engineer's review. Please note, a New York State Department of Transportation (NYSDOT) Highway Work Permit was obtained for the proposed East Lane improvements within the North Greenwich Road (NYS Route 433) right-of-way and our office is currently working on updating those permit approvals for the new applicant.

Site Design • Environmental

Mill Pond Offices • 293 Route 100 • Suite 203 • Somers, New York 10589
Phone: 914.277.5805 • Fax: 914.277.8210
Website: www.bibboassociates.com • E-mail: bibbo@bibboassociates.com

The construction of Lot #1 includes the demolition of the existing two bedroom residence and construction of a new five bedroom residence. Lot #1 construction also includes a new paved driveway, new in-ground pool, and associated patios/walkways. The existing sewage disposal system and onsite drilled well are to be abandoned. Our office is currently working towards Westchester County Department of Health (WCDH) approval for a new sewage disposal system and a new drilled well serving the proposed five bedroom residence.

Stormwater management for the proposed improvements will be provided by the practices approved during the subdivision review. A pocket pond is proposed at the end of East Lane to manage stormwater runoff from the proposed roadway and Lot #1. Additionally, a bed of infiltrators is proposed on Lot #3 to manage runoff from the common driveway area. Minor updates to the stormwater practice designs have been made to accommodate the recent plan changes. A copy of the Stormwater Pollution Prevention Plan (SWPPP) has been provided herewith and a new 25-year post-development storm analysis has been included which demonstrates that the proposed subdivision improvements will result in a reduced peak flow rate leaving the site. Please note, the project site is not located on the New York City watershed and the NYSDEC requires a SWPPP which only includes Erosion and Sedimentation Control Measures.

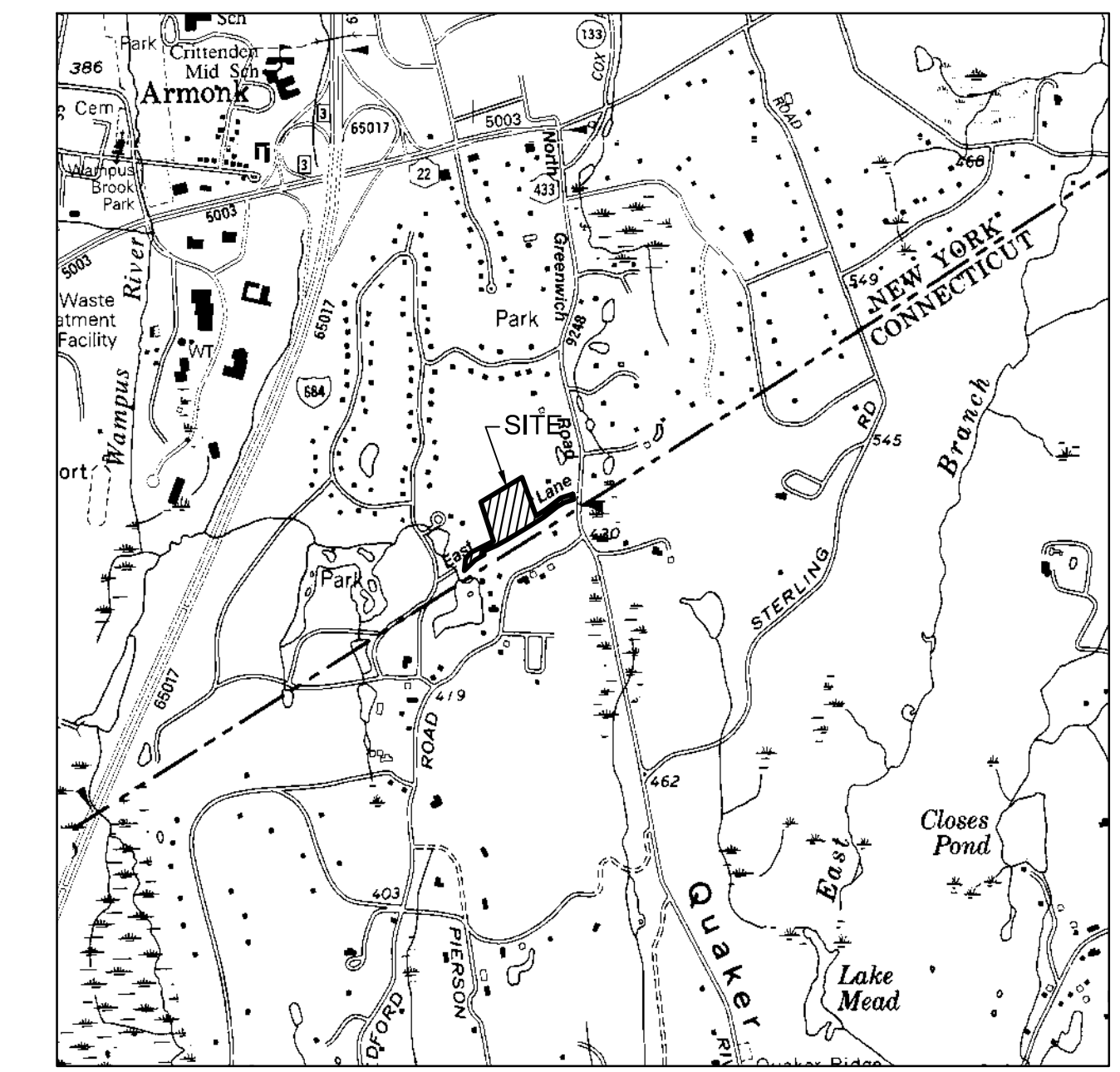
We respectfully request this matter be placed on your next available meeting agenda for your review. Please feel free to contact us with any questions or comments you may have.

Very truly yours,

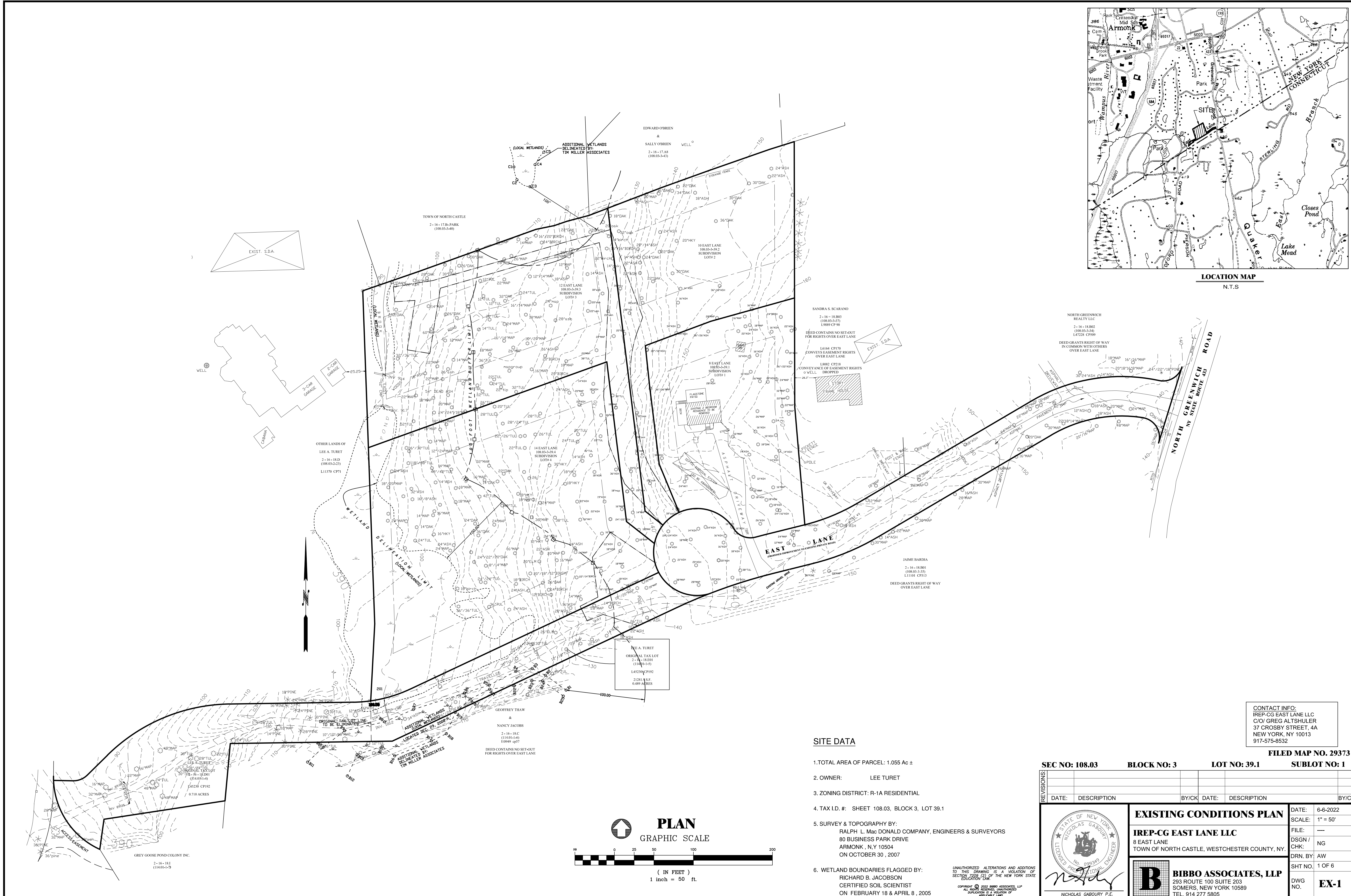


Nicholas Gaboury, P.E.

cc: L. Turet, owner
G. Altshuler, applicant

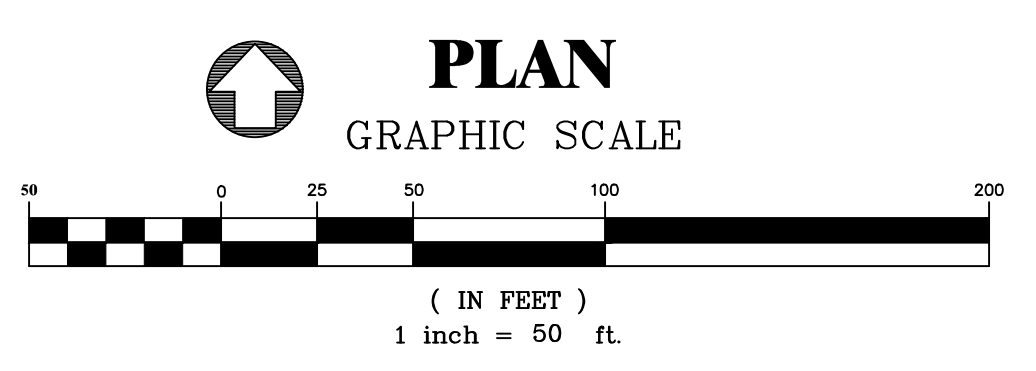


LOCATION MAP
N.T.S



SITE DATA

- TOTAL AREA OF PARCEL: 1.055 Ac ±
- OWNER: LEE TURET
- ZONING DISTRICT: R-1A RESIDENTIAL
- TAX I.D. #: SHEET 108.03, BLOCK 3, LOT 39.1
- SURVEY & TOPOGRAPHY BY:
RALPH L. Mac DONALD COMPANY, ENGINEERS & SURVEYORS
80 BUSINESS PARK DRIVE
ARMONK, N.Y. 10504
ON OCTOBER 30, 2007
- WETLAND BOUNDARIES FLAGGED BY:
RICHARD B. JACOBSON
CERTIFIED SOIL SCIENTIST
ON FEBRUARY 18 & APRIL 8, 2005

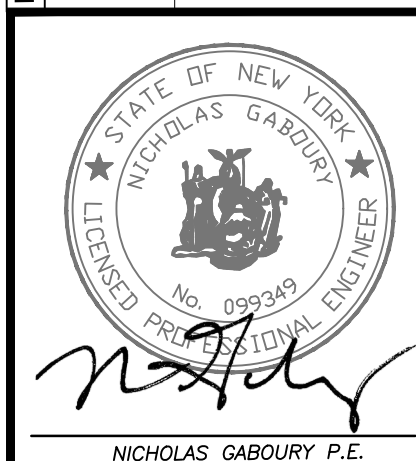


CONTACT INFO:
IREP-CG EAST LANE LLC
C/O GREG ALTSHULER
37 CROSBY STREET, 4A
NEW YORK, NY 10013
917-575-8532

FILED MAP NO. 29373

SEC NO: 108.03 BLOCK NO: 3 LOT NO: 39.1 SUBLT NO: 1

DATE:	DESCRIPTION	BY/CK:	DATE:	DESCRIPTION	BY/CK:
6-6-2022	EXISTING CONDITIONS PLAN				
1" = 50'	IREP-CG EAST LANE LLC				
---	8 EAST LANE				
NG	TOWN OF NORTH CASTLE, WESTCHESTER COUNTY, NY.				
AW					
1 OF 6					
EX-1					



BIBBO ASSOCIATES, LLP
293 ROUTE 100 SUITE 203
SOMERS, NEW YORK 10589
TEL. 914 277 5805

UNAUTHORIZED ALTERATIONS AND ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 2209 (2) OF THE NEW YORK STATE EDUCATION LAW.
COPYRIGHT © 2022 BIBBO ASSOCIATES, LLP ALL RIGHTS RESERVED. UNAUTHORIZED DUPLICATION IS A VIOLATION OF APPLICABLE LAW.

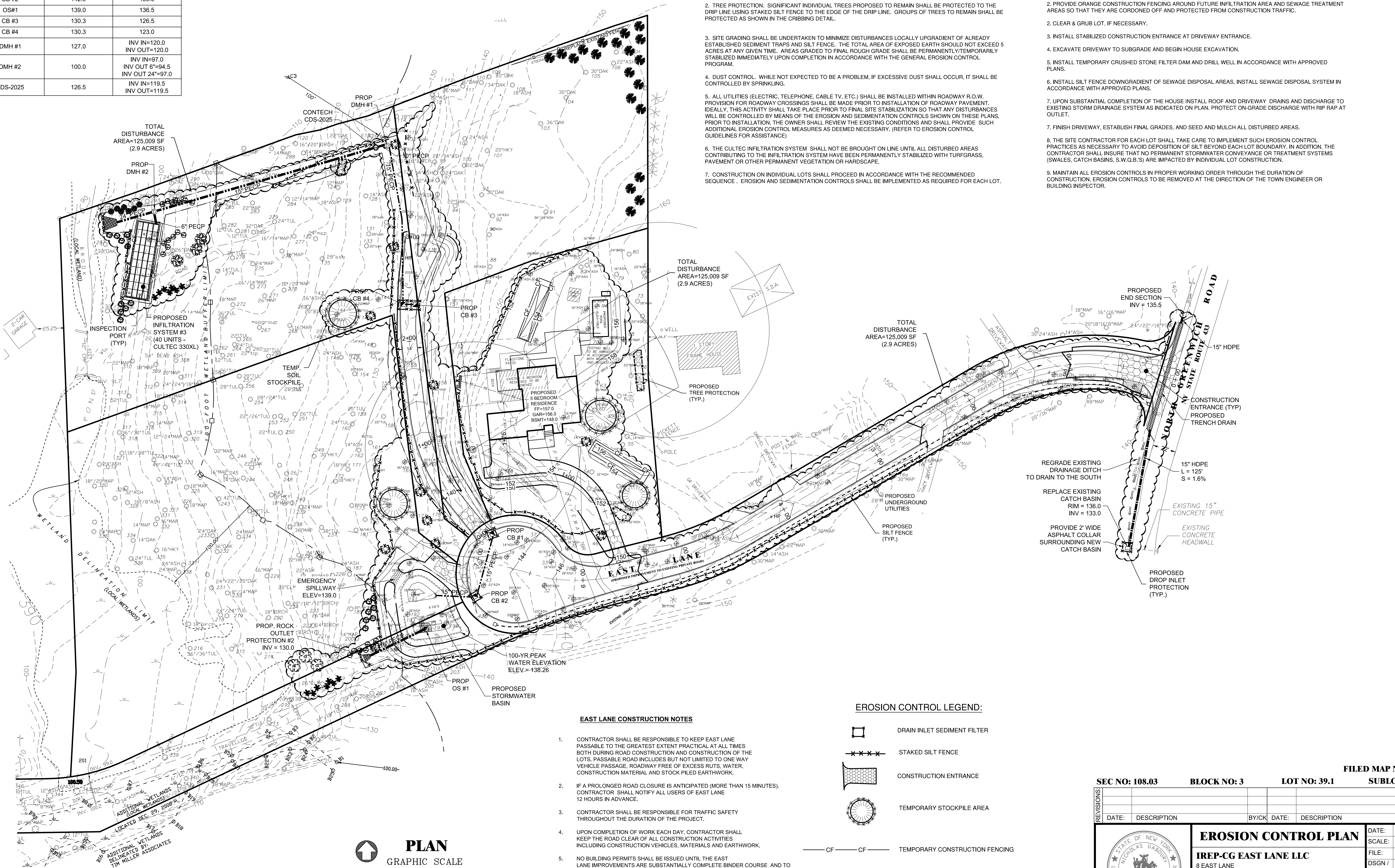
DRAINAGE STRUCTURE SCHEDULE		
STRUCTURE	RIM EL	INVERTS
CB #1	142.0	139.5
CB #2	142.0	139.0
OS#1	139.0	136.5
CB #3	130.3	126.5
CB #4	130.3	123.0
DMH #1	127.0	INV IN=120.0 INV OUT=120.0
DMH #2	100.0	INV IN=97.0 INV OUT 6"=94.5 INV OUT 24"=97.0
CDS-2025	126.5	INV IN=119.5 INV OUT=119.5

GENERAL NOTES

- SILT FENCE SHALL BE INSTALLED IN ACCORDANCE WITH THE PLANS SPECIFICALLY 5-FEET FROM THE TOE OF FILL SLOPES. THE FILTER FABRIC SHALL BE BURIED AT THE BASE. ALL SILT FENCING INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS.
- TREE PROTECTION. SIGNIFICANT INDIVIDUAL TREES PROPOSED TO REMAIN SHALL BE PROTECTED TO THE DRIP LINE USING STAKED SILT FENCE TO THE EDGE OF THE DRIP LINE. GROUPS OF TREES TO REMAIN SHALL BE PROTECTED AS SHOWN IN THE CRIBBING DETAIL.
- SITE GRADING SHALL BE UNDERTAKEN TO MINIMIZE DISTURBANCES LOCALLY UPGRADIENT OF ALREADY ESTABLISHED SEDIMENT TRAPS AND SILT FENCE. THE TOTAL AREA OF EXPOSED EARTH SHOULD NOT EXCEED 5 ACRES AT ANY GIVEN TIME. AREAS GRADED TO FINAL ROUGH GRADE SHALL BE PERMANENTLY TEMPORARILY STABILIZED IMMEDIATELY UPON COMPLETION IN ACCORDANCE WITH THE GENERAL EROSION CONTROL PROGRAM.
- DUST CONTROL. WHILE NOT EXPECTED TO BE A PROBLEM, IF EXCESSIVE DUST SHALL OCCUR, IT SHALL BE CONTROLLED BY SPRINKLING.
- ALL UTILITIES (ELECTRIC, TELEPHONE, CABLE TV, ETC.) SHALL BE INSTALLED WITHIN ROADWAY R.O.W. PROVISION FOR ROADWAY CROSSINGS SHALL BE MADE PRIOR TO INSTALLATION OF ROADWAY PAVEMENT. IDEALLY, THIS ACTIVITY SHALL TAKE PLACE PRIOR TO FINAL SITE STABILIZATION SO THAT ANY DISTURBANCES WILL BE CONTROLLED BY MEANS OF THE EROSION AND SEDIMENTATION CONTROLS SHOWN ON THESE PLANS. PRIOR TO INSTALLATION, THE OWNER SHALL REVIEW THE EXISTING CONDITIONS AND SHALL PROVIDE SUCH ADDITIONAL EROSION CONTROL MEASURES AS DEEMED NECESSARY. (REFER TO EROSION CONTROL GUIDELINES FOR ASSISTANCE)
- THE CULTEC INFILTRATION SYSTEM SHALL NOT BE BROUGHT ON LINE UNTIL ALL DISTURBED AREAS CONTRIBUTING TO THE INFILTRATION SYSTEM HAVE BEEN PERMANENTLY STABILIZED WITH TURFGRASS, PAVEMENT OR OTHER PERMANENT VEGETATION OR HARDSCAPE.
- CONSTRUCTION ON INDIVIDUAL LOTS SHALL PROCEED IN ACCORDANCE WITH THE RECOMMENDED SEQUENCE. EROSION AND SEDIMENTATION CONTROLS SHALL BE IMPLEMENTED AS REQUIRED FOR EACH LOT.

CONSTRUCTION SEQUENCE INDIVIDUAL LOTS

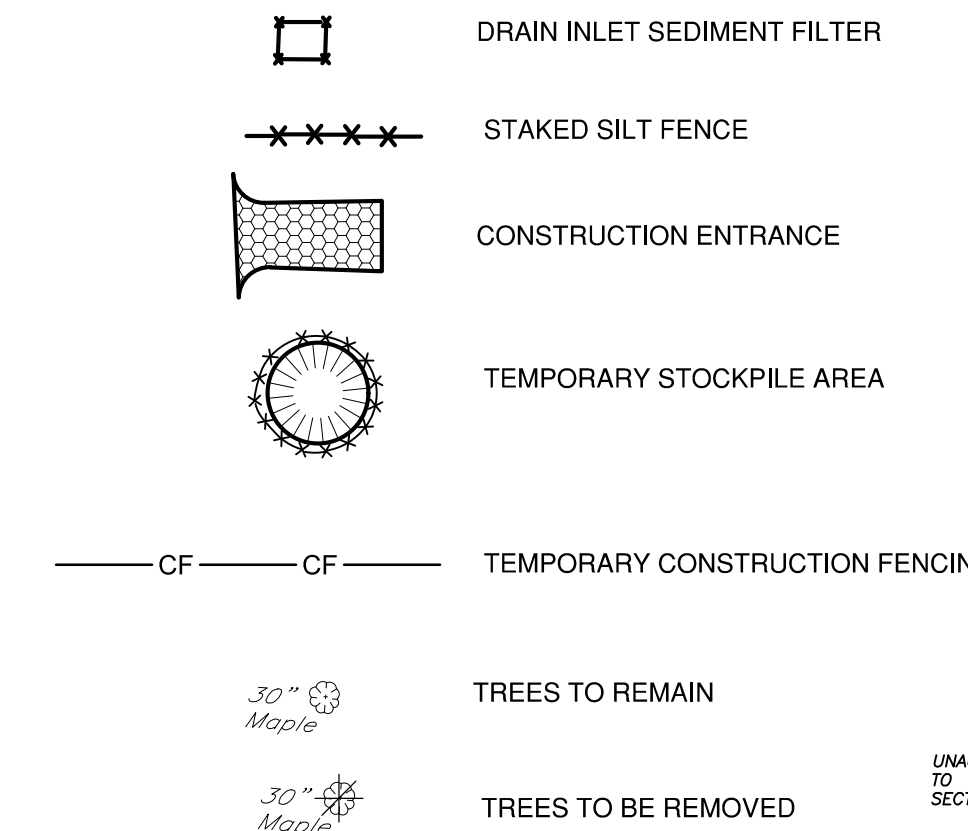
- INSTALL SILT FENCE FOR HOUSE & DRIVEWAY CONSTRUCTION. INSTALL SEDIMENT TRAPS ON LOTS 3 & 4.
- PROVIDE ORANGE CONSTRUCTION FENCING AROUND FUTURE INFILTRATION AREA AND SEWAGE TREATMENT AREAS SO THAT THEY ARE CORDONED OFF AND PROTECTED FROM CONSTRUCTION TRAFFIC.
- CLEAR & GRUB LOT, IF NECESSARY.
- INSTALL STABILIZED CONSTRUCTION ENTRANCE AT DRIVEWAY ENTRANCE.
- EXCAVATE DRIVEWAY TO SUBGRADE AND BEGIN HOUSE EXCAVATION.
- INSTALL TEMPORARY CRUSHED STONE FILTER DAM AND DRILL WELL IN ACCORDANCE WITH APPROVED PLANS.
- UPON SUBSTANTIAL COMPLETION OF THE HOUSE INSTALL ROOF AND DRIVEWAY DRAINS AND DISCHARGE TO EXISTING STORM DRAINAGE SYSTEM AS INDICATED ON PLAN. PROTECT ON-GRADE DISCHARGE WITH RIP RAP AT OUTLET.
- FINISH DRIVEWAY, ESTABLISH FINAL GRADES, AND SEED AND MULCH ALL DISTURBED AREAS.
- THE SITE CONTRACTOR FOR EACH LOT SHALL TAKE CARE TO IMPLEMENT SUCH EROSION CONTROL PRACTICES AS NECESSARY TO AVOID DEPOSITION OF SILT BEYOND EACH LOT BOUNDARY. IN ADDITION, THE CONTRACTOR SHALL INSURE THAT NO PERMANENT STORMWATER CONVEYANCE OR TREATMENT SYSTEMS (SWALES, CATCH BASINS, S.W.Q.B.S) ARE IMPACTED BY INDIVIDUAL LOT CONSTRUCTION.
- MAINTAIN ALL EROSION CONTROLS IN PROPER WORKING ORDER THROUGHOUT THE DURATION OF CONSTRUCTION. EROSION CONTROLS TO BE REMOVED AT THE DIRECTION OF THE TOWN ENGINEER OR BUILDING INSPECTOR.



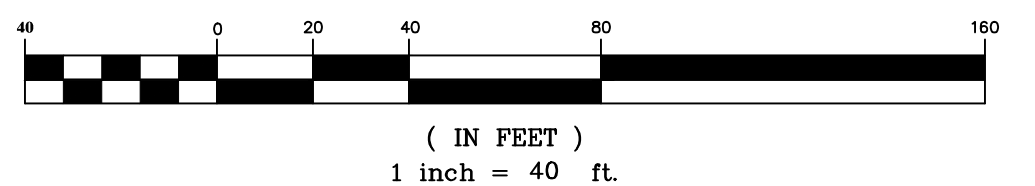
EAST LANE CONSTRUCTION NOTES

- CONTRACTOR SHALL BE RESPONSIBLE TO KEEP EAST LANE PASSABLE TO THE GREATEST EXTENT PRACTICAL AT ALL TIMES BOTH DURING ROAD CONSTRUCTION AND CONSTRUCTION OF THE LOTS. PASSABLE ROAD INCLUDES BUT NOT LIMITED TO ONE WAY VEHICLE PASSAGE, ROADWAY FREE OF EXCESS RUTS, WATER, CONSTRUCTION MATERIAL AND STOCK PILED EARTHWORK.
- IF A PROLONGED ROAD CLOSURE IS ANTICIPATED (MORE THAN 15 MINUTES), CONTRACTOR SHALL NOTIFY ALL USERS OF EAST LANE 12 HOURS IN ADVANCE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC SAFETY THROUGHOUT THE DURATION OF THE PROJECT.
- UPON COMPLETION OF WORK EACH DAY, CONTRACTOR SHALL KEEP THE ROAD CLEAR OF ALL CONSTRUCTION ACTIVITIES INCLUDING CONSTRUCTION VEHICLES, MATERIALS AND EARTHWORK.
- NO BUILDING PERMITS SHALL BE ISSUED UNTIL THE EAST LANE IMPROVEMENTS ARE SUBSTANTIALLY COMPLETE BINDER COURSE AND TO THE SATISFACTION OF THE TOWN ENGINEER.
- ALL IMPROVEMENTS SHOW ON THE PLANS BE INSTALLED IN ACCORDANCE WITH THE CONSTRUCTION STANDARDS AND SPECIFICATION OF THE TOWN.
- CONSTRUCTION ACTIVITY SHALL BE LIMITED FROM 7:00 A.M. TO 6:00 P.M. AND THAT NO CONSTRUCTION ACTIVITY SHALL OCCUR ON SUNDAYS OR LEGAL NEW YORK STATE HOLIDAYS.

EROSION CONTROL LEGEND:



PLAN GRAPHIC SCALE



CONTACT INFO:
GREG ALTSHULER
37 CROSBY STREET, 4A
NEW YORK, NY 10013
917-575-8532

FILED MAP NO. 29373
SEC NO: 108.03 BLOCK NO: 3 LOT NO: 39.1 SUBLT NO: 1

DATE	DESCRIPTION	BY/CK	DATE	DESCRIPTION	BY/CK

	EROSION CONTROL PLAN	DATE: 6-6-2022
	IREP-CG EAST LANE LLC	SCALE: 1" = 40'
	8 EAST LANE TOWN OF NORTH CASTLE, WESTCHESTER COUNTY, NY.	FILE: ---
		DSGN / CHK: NG
		DRN. BY: AW
		SHT NO. 2 OF 6
		DWG NO. EC-1

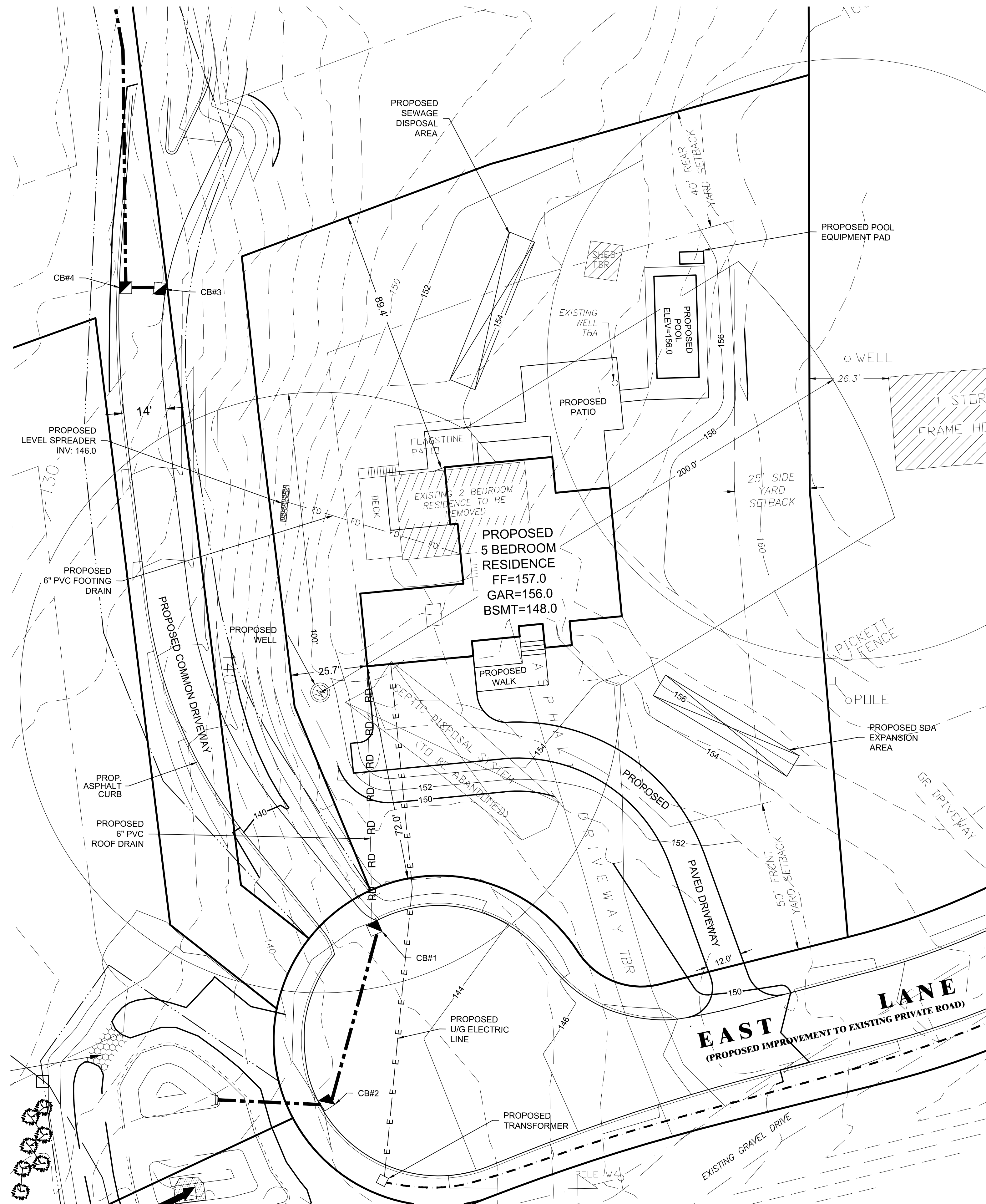
	BIBBO ASSOCIATES, LLP 293 ROUTE 100 SUITE 203 SOMERS, NEW YORK 10589 TEL. 914 277 5805
--	--

P:\Projects\Trest, Leasing\Nicholas\Altschuler Lot 1 CURRENT - 5-17-22.dwg, 6/7/2022, 9:41:44 AM, AWBrownsky, 11

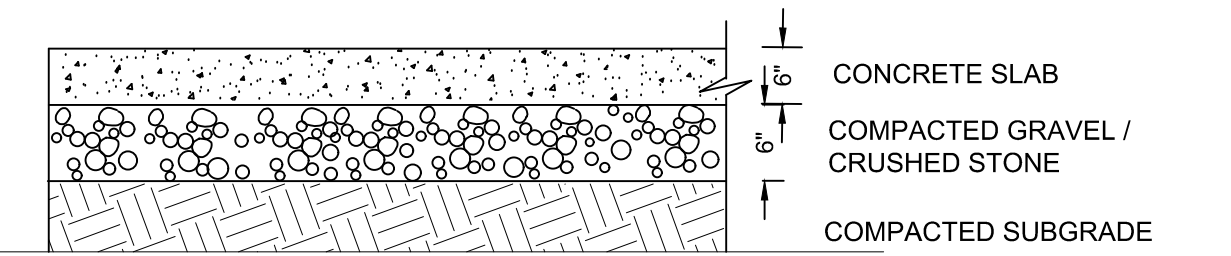
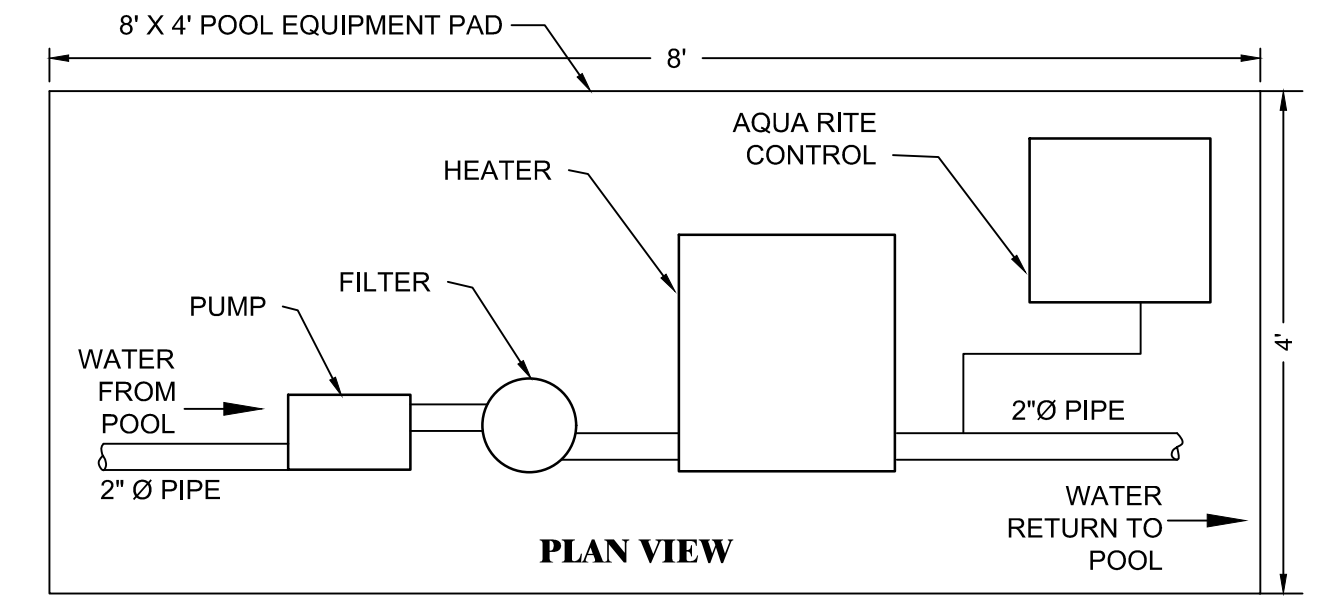
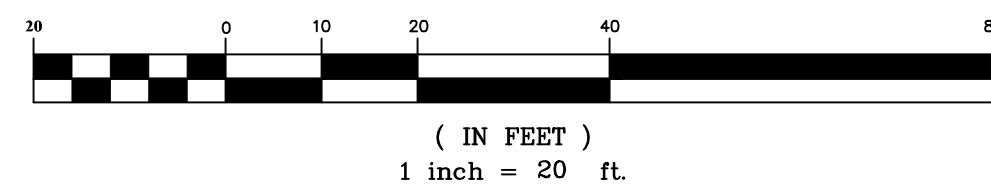
GENERALIZED CONSTRUCTION SEQUENCE

CONSTRUCTION FENCING SHALL BE LOCATED AND INSTALLED ALONG THE CLEARING AND GRADING LIMIT LINES PRIOR TO THE START OF ANY CONSTRUCTION.

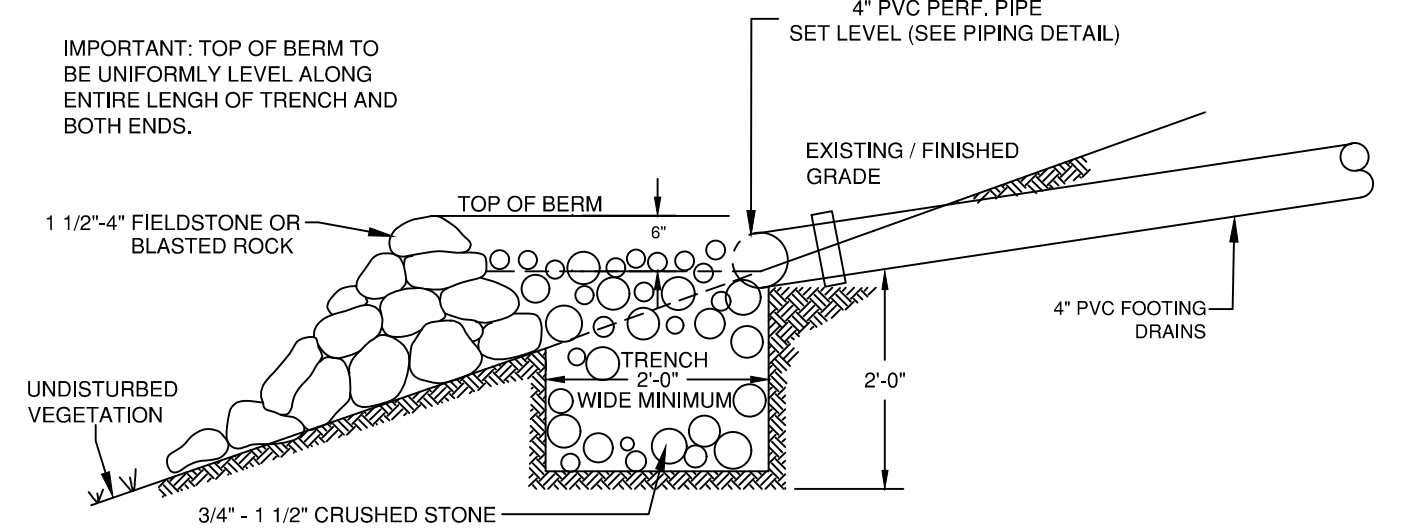
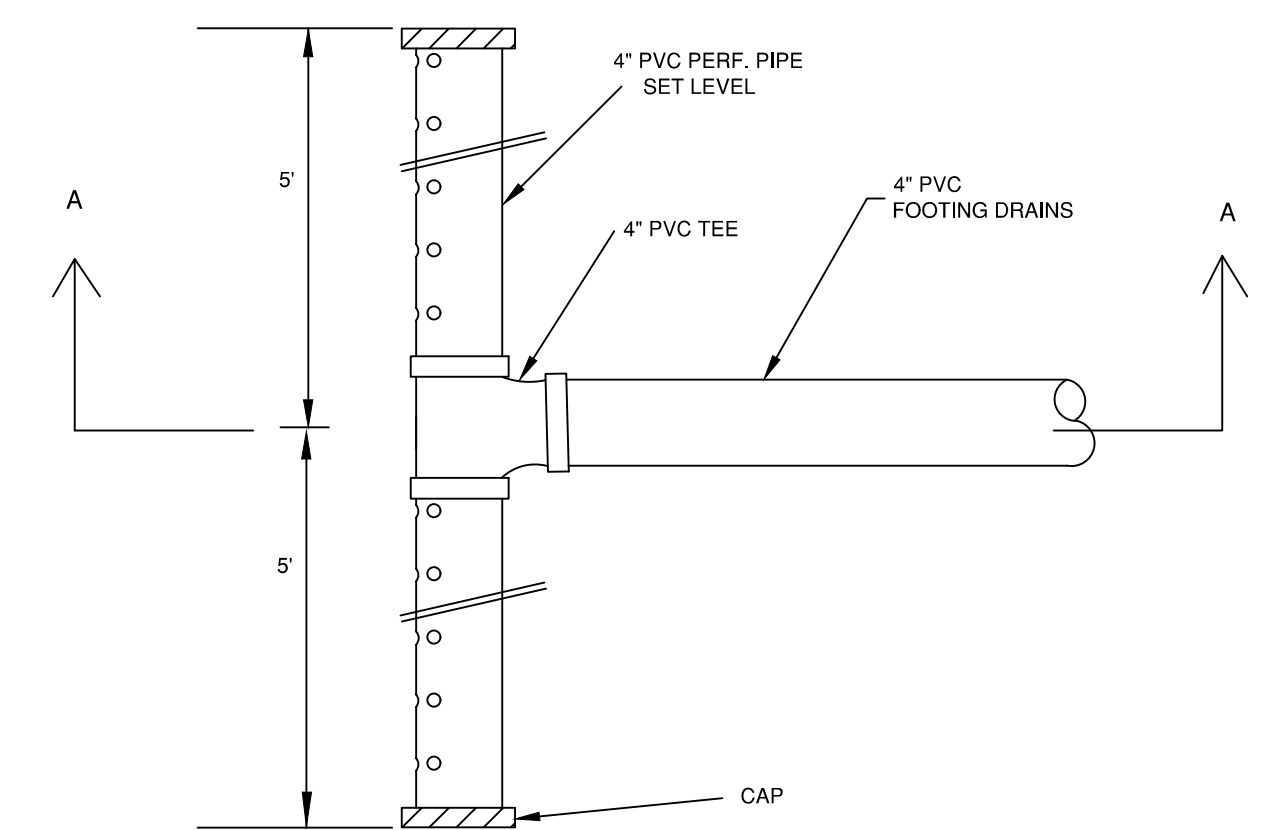
- ROADS, STORM DRAINAGE COLLECTION AND TREATMENT FACILITIES SHALL BE STAKED OUT BY SURVEYORS.
- APPROPRIATE EROSION AND SEDIMENTATION CONTROLS SHALL BE IN PLACE PRIOR TO ANY SITE DISTURBANCE.
- INSTALL STABILIZED CONSTRUCTION ENTRANCE WHERE INDICATED ON PLAN.
- CLEAR TREES FROM R.O.W. LIMITS, EXCAVATE TREE STUMPS AND REMOVE FROM SITE.
- STRIP TOPSOIL AND STOCKPILE AREA OR AREAS AS TYPICALLY DESIGNATED.
- CONSTRUCTION SHOULD PROCEED SO THAT DISTURBED AREAS SHALL NOT EXCEED 5 ACRES WITHOUT VEGETATING AND STABILIZING PREVIOUSLY DISTURBED AREAS.
- EXCAVATE S.W.Q.B. TO REQUIRED MINIMUM VOLUMES AS INDICATED ON PLAN. CONSTRUCT BASIN OUTLET STRUCTURES. PROVIDE TEMPORARY CRUSHED STONE FILTER DAMS AROUND OUTLETS TO CONTAIN SILT WITHIN BASIN. PLACE TOPSOIL ON BERMS AND EMBANKMENTS AND SPREAD SEED AND MULCH.
- EXCAVATE AND PLACE COMPACTED FILL AS REQUIRED TO BRING ROAD TO SUBGRADE.
- INSTALL DRAINAGE SYSTEM IN THE ROAD. INSTALL EROSION CONTROLS AT CATCH BASIN INLETS. IMMEDIATELY FINISH GRADE AND SPREAD SEED AND MULCH IN DRAINAGE EASEMENT.
- FINE GRADE AND COMPACT ROAD SUBGRADE.
- INSTALL R.O.B. SAND AND GRAVEL SUBBASE ON ROAD SUBGRADE AND COMPACT.
- SET CATCH BASIN AND MANHOLE FRAMES TO FINISH GRADE.
- INSTALL BASE COURSE OF ROAD PAVEMENT AND CURB.
- FINISH GRADE ROAD SHOULDERS AND EMBANKMENTS. PLACE TOPSOIL AND SPREAD SEED AND MULCH.
- CLEAN S.W.Q.B. OF ACCUMULATED SEDIMENT, RESHAPE BASINS TO FINISHED GRADE ON PLANS, AND INSTALL PERMANENT OUTLET STRUCTURES.
- COMPLETE INSTALLATION OF PLANTINGS AT S.W.Q.B. AS INDICATED ON THE PLANS.
- MAINTAIN ALL SILT FENCING AND REPAIR ANY AREAS OF EROSION IN DRAINAGE EASEMENTS UNTIL A FIRM STAND OF VEGETATION IS ESTABLISHED.
- ONCE ALL LOTS HAVE BEEN CONSTRUCTED, INSTALL FINAL ASPHALT TOP COURSE FOR THE TOWN ROAD.



PLAN
GRAPHIC SCALE



POOL EQUIPMENT & CONC. PAD DETAIL
N.T.S.



TRENCH SHALL REMAIN UNFILLED (SEE NOTE 1) UNTIL COMPLETION OF SITE STABILIZATION WITH SUITABLE VEGETATIVE COVER, AS DIRECTED BY ENGINEER. SILT DEPOSITED DURING CONSTRUCTION SHALL BE REMOVED AND TRENCH FILLED AS SHOWN

* EXCEPT AT PIPE DISCHARGE POINT: A PILE OF FIELDSTONE SHALL BE PLACED IN TRENCH AS A "SPLASH PLATE" TO MINIMIZE SCOURING.

SEC. A-A

LEVEL SPREADER
N.T.S.

ZONING DATA			
TAX MAP DESIGNATION	SECTION 108.03, BLOCK 3, LOT 39.1		
ZONING DISTRICT	R-1A - RESIDENTIAL		
	MINIMUM REQUIREMENTS	PROVIDED	
LOT AREA (ACRES)	1.0	1.055 (45,954 sf)	
WIDTH (FT)	125	174	
DEPTH (FT)	150	256	
FRONT YARD (FT)	50	72.0	
SIDE YARD (FT)	25	25.7 / 65.9	
REAR YARD (FT)	40	89.4	
MAXIMUM BLDG. COVERAGE (%)	12%	7.9%	
MAX. GROSS LAND COV.	9,566 S.F.	9,455 S.F.	

CONTACT INFO:
GREG ALTSHULER
37 CROSBY STREET, 4A
NEW YORK, NY 10013
917-575-8532

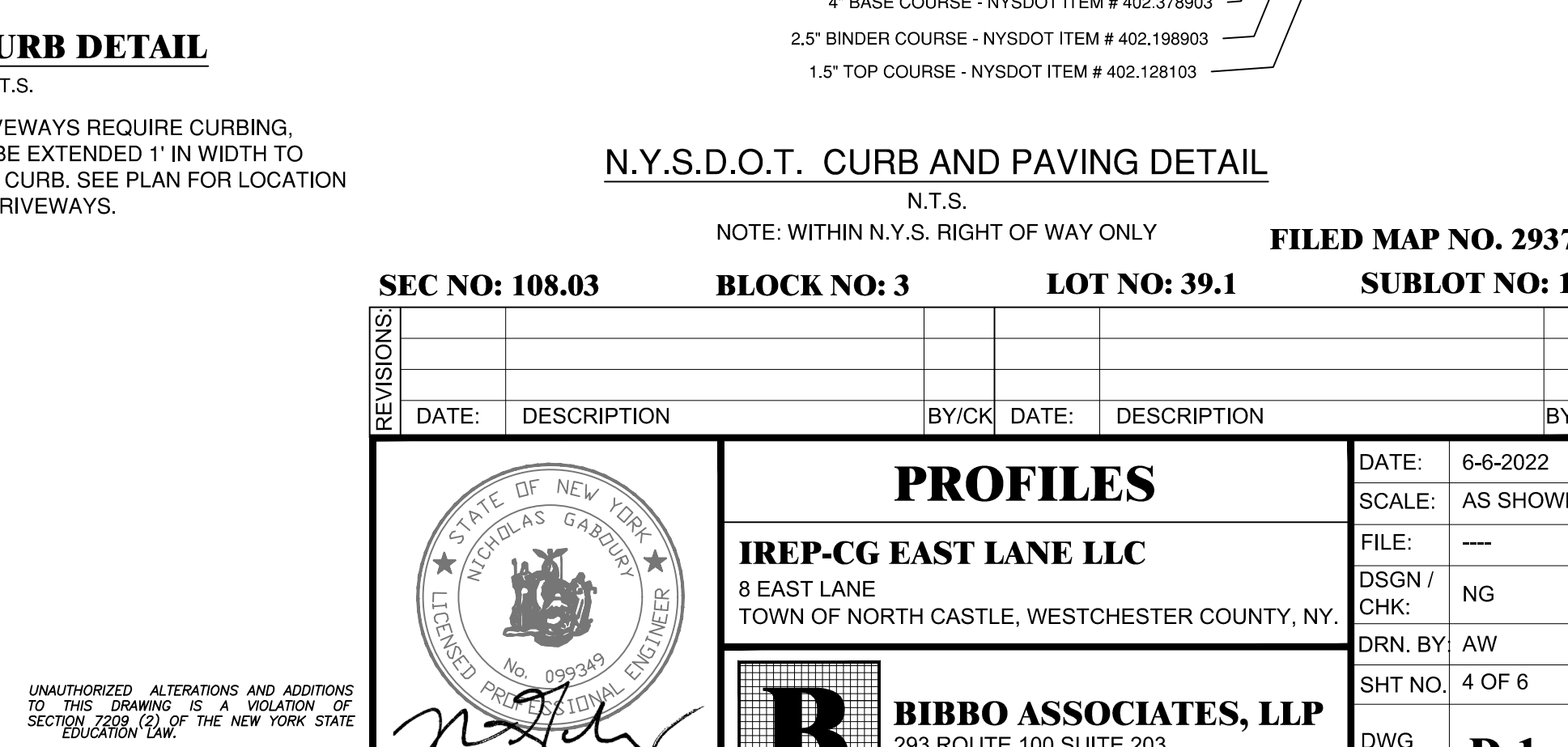
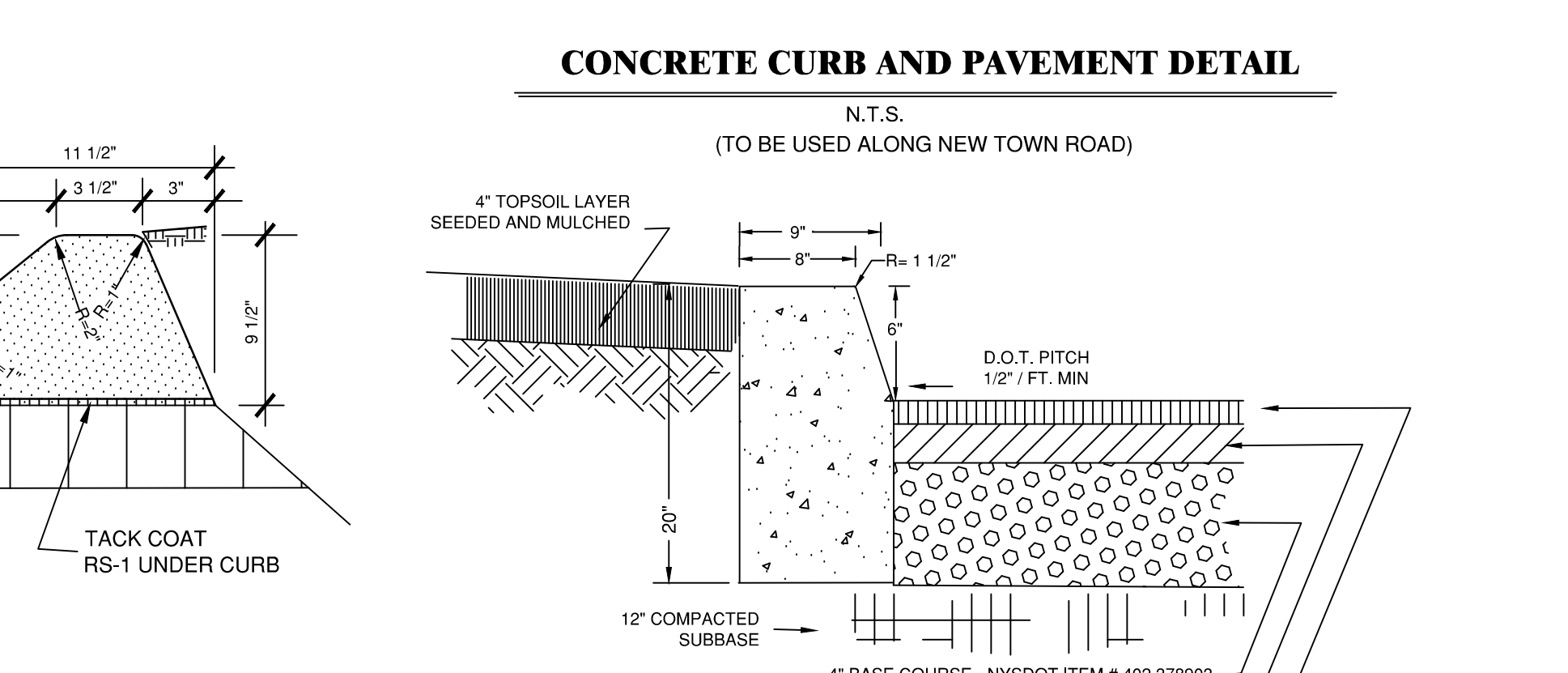
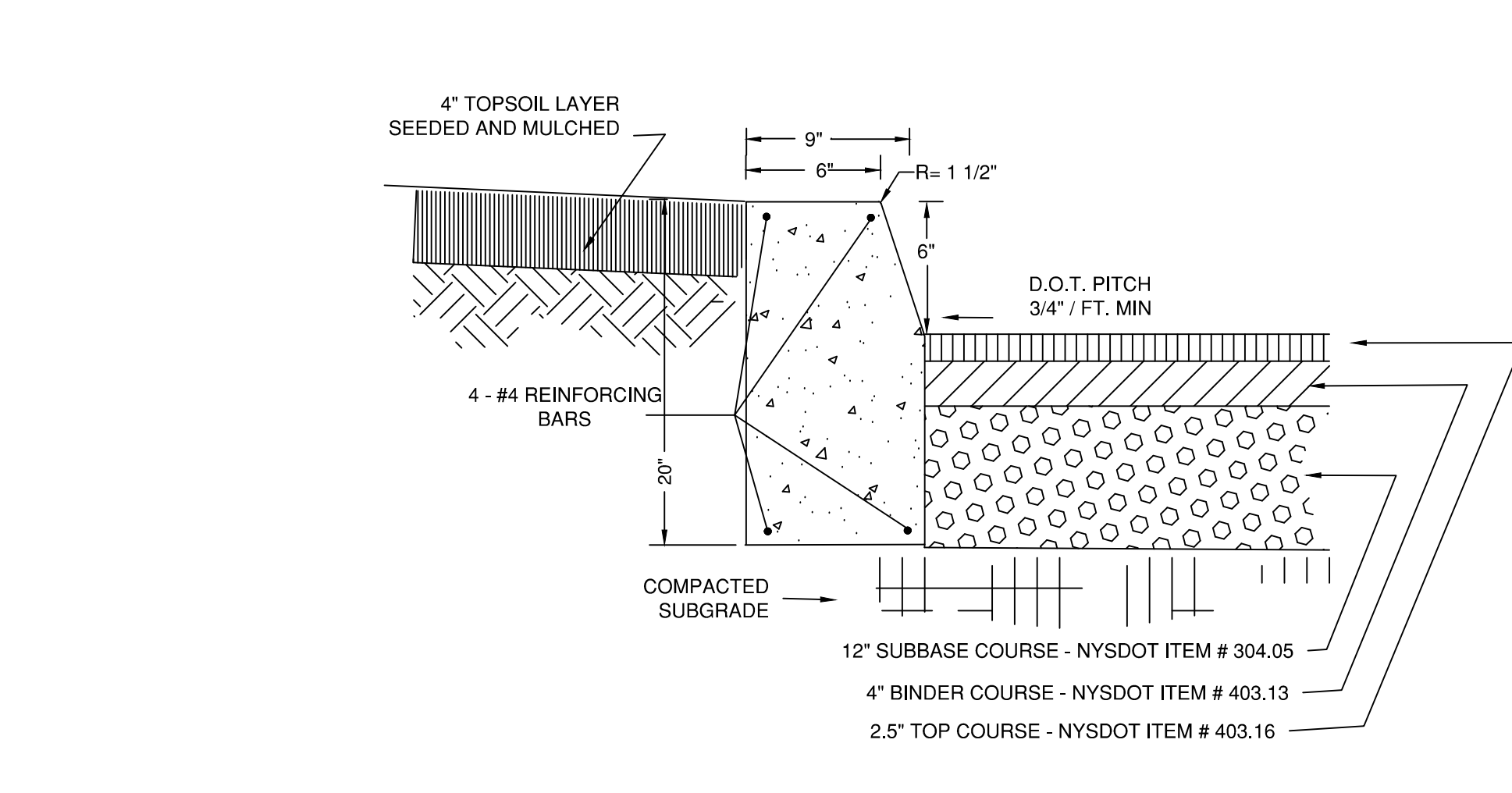
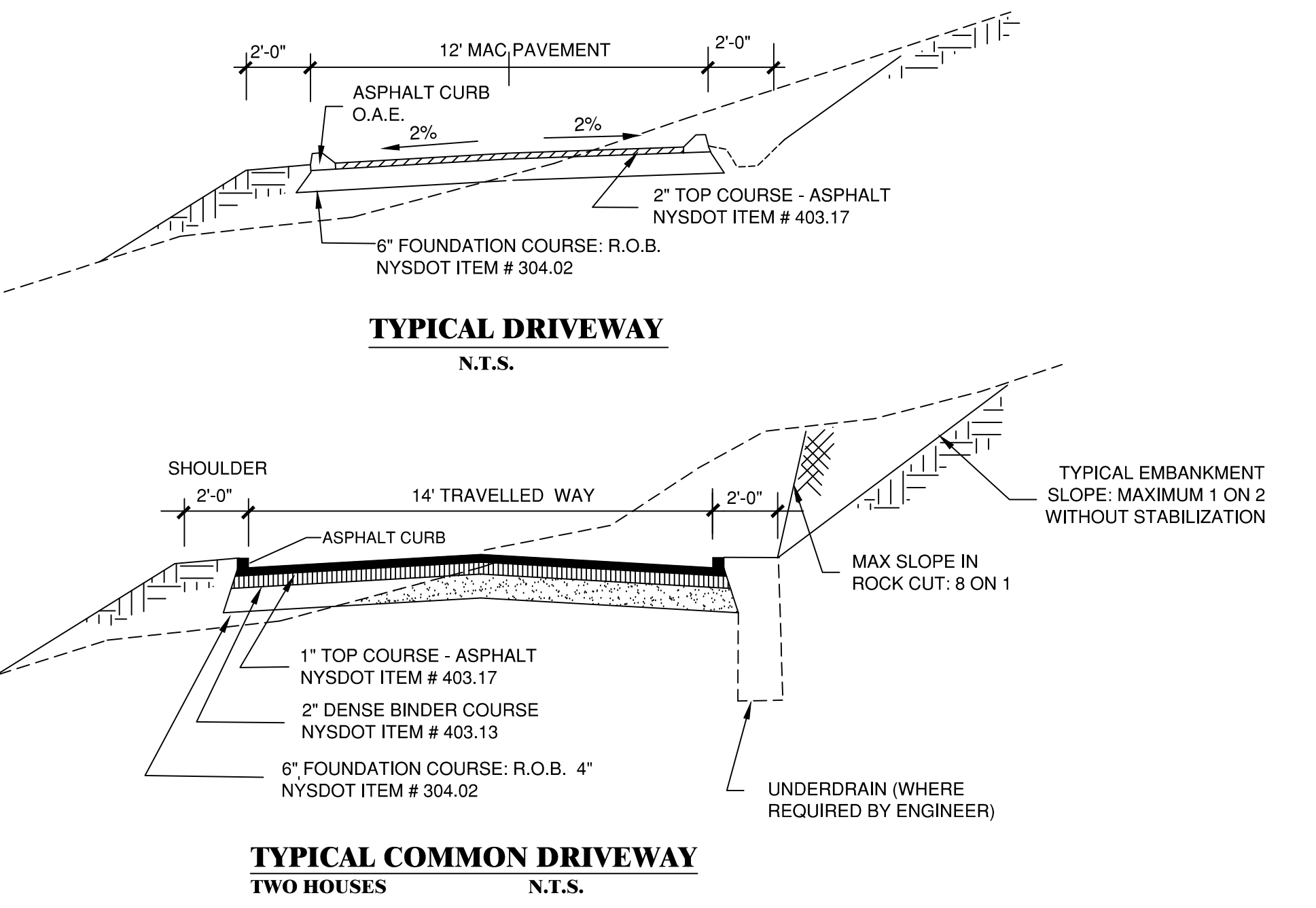
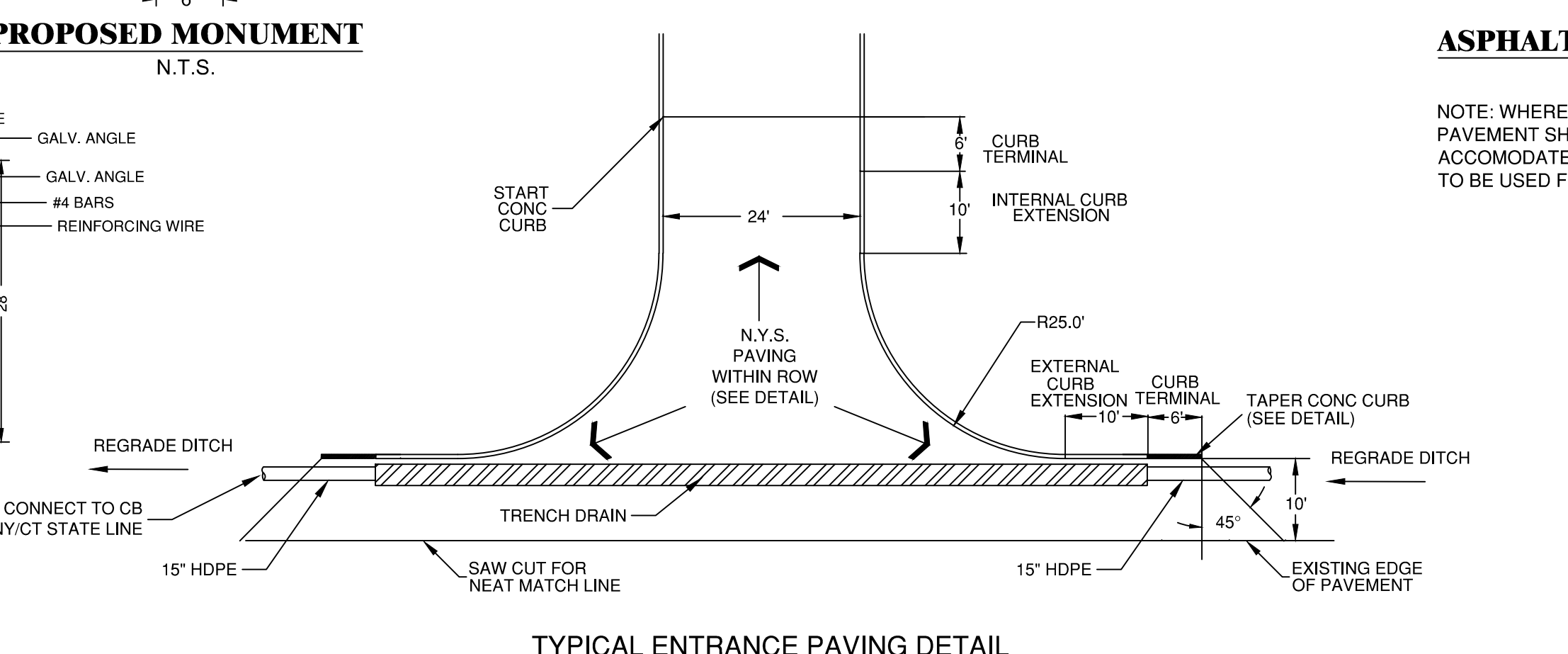
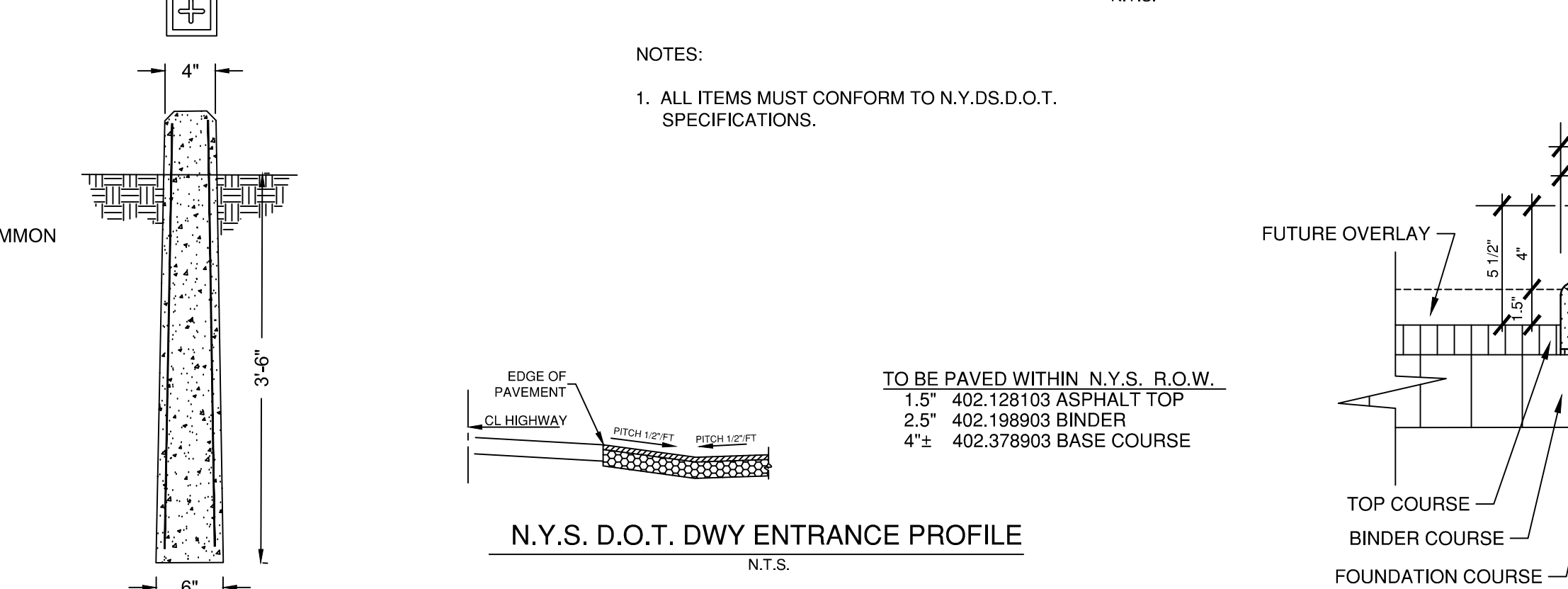
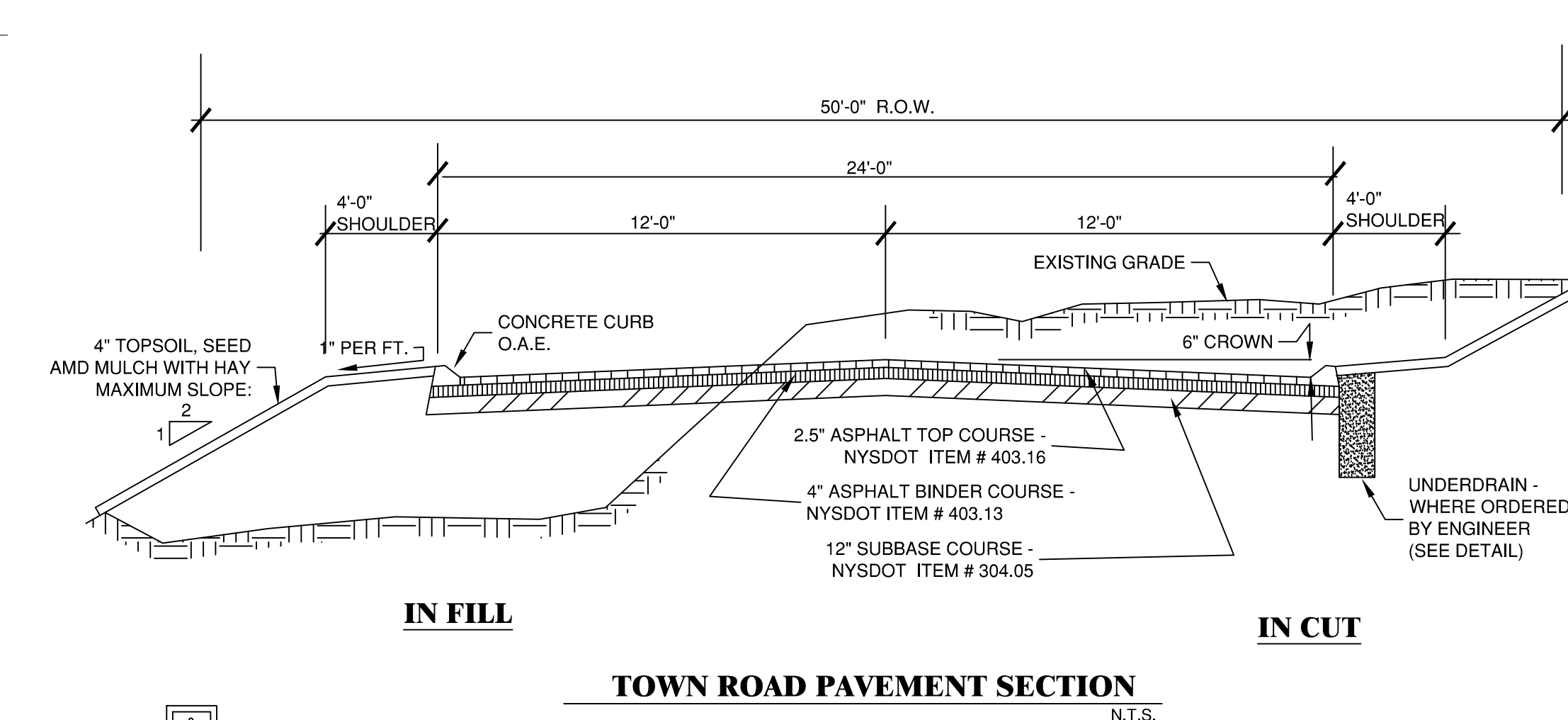
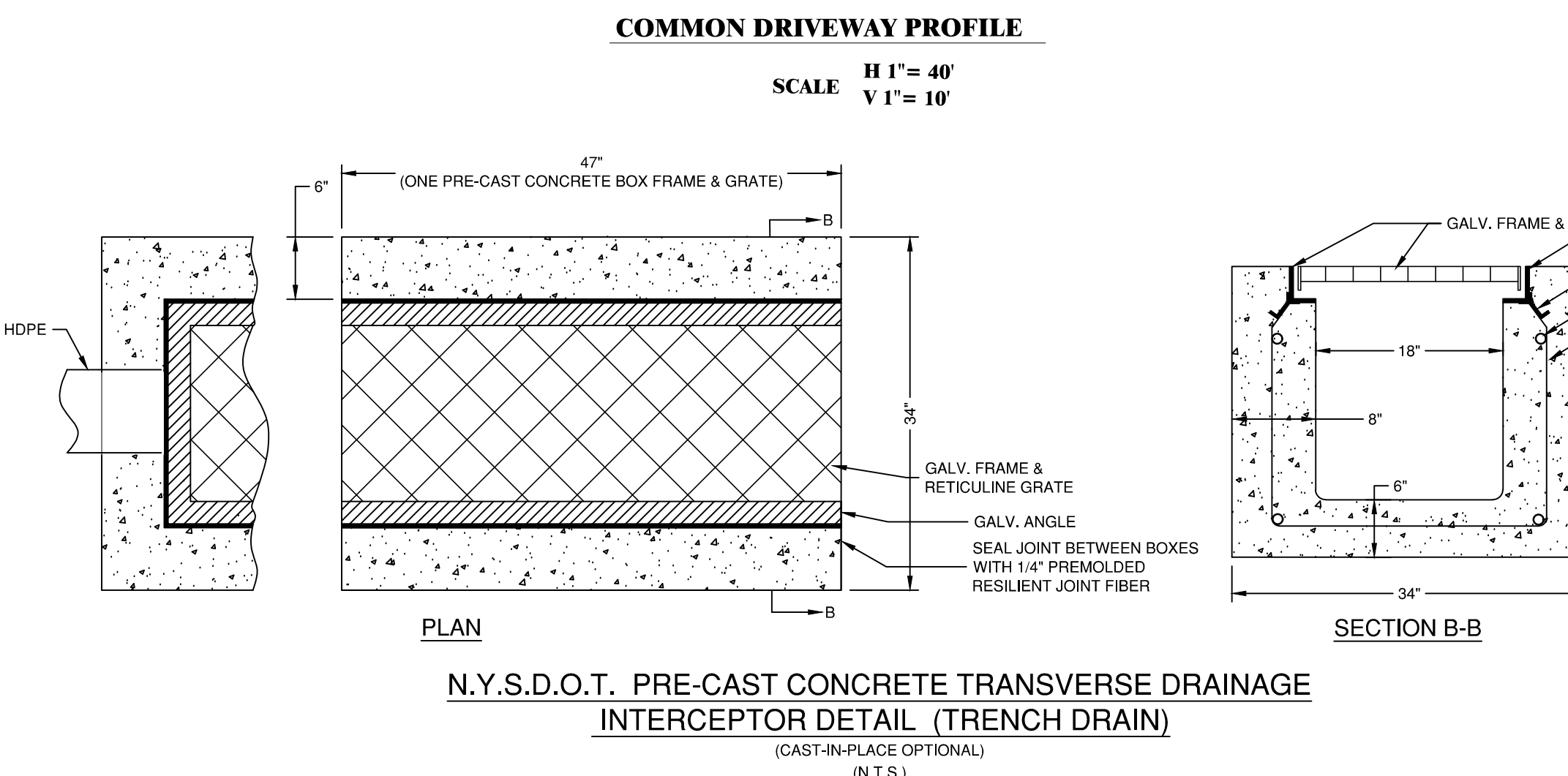
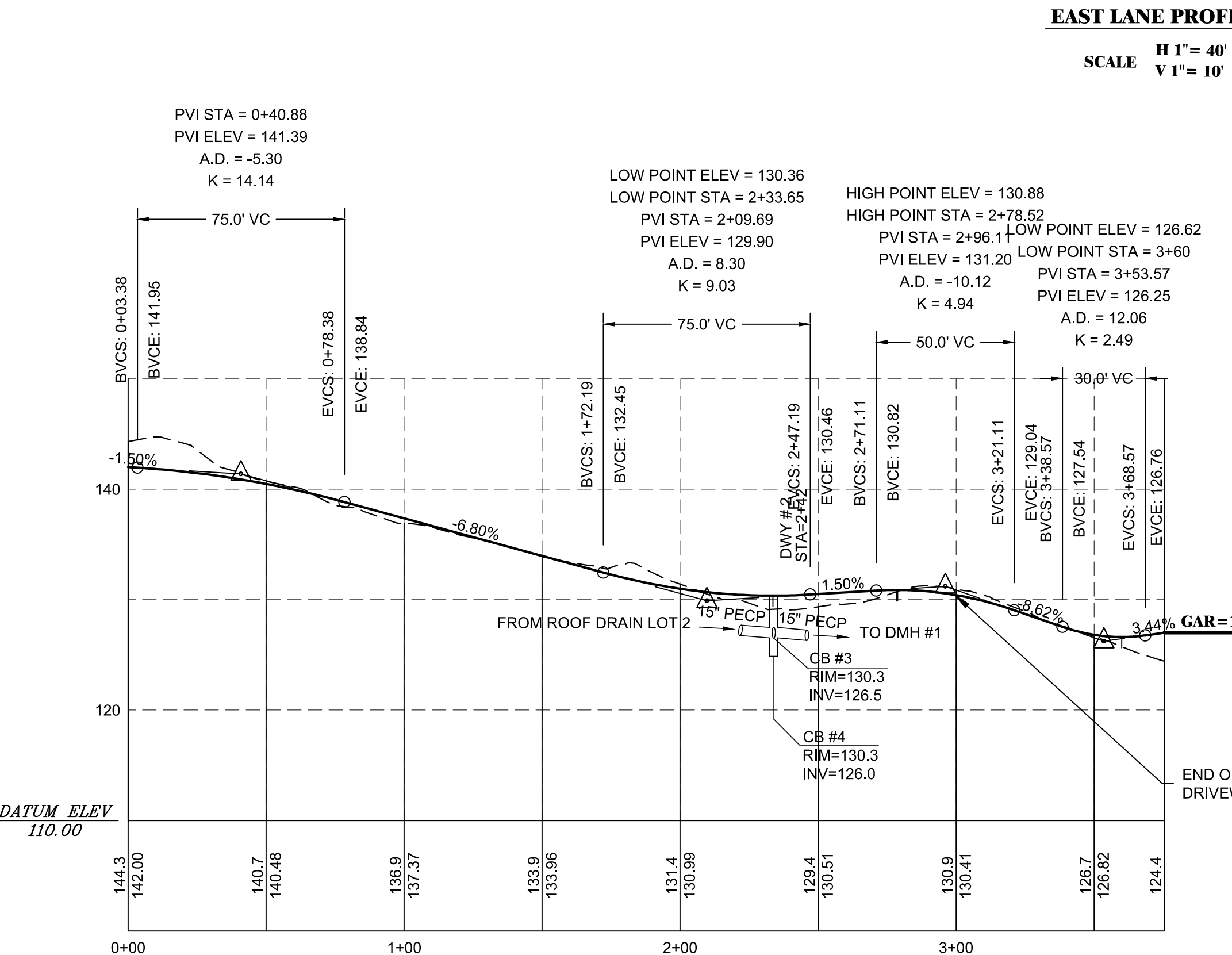
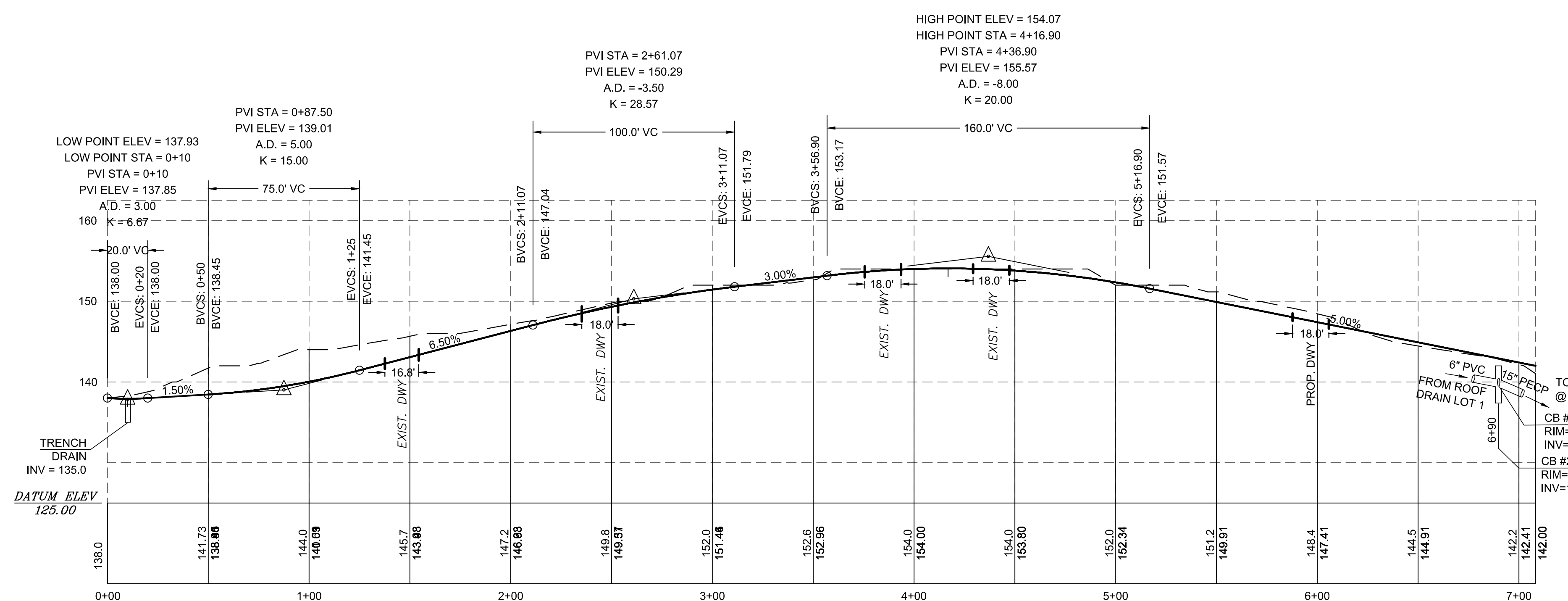
FILED MAP NO. 29373

SEC NO: 108.03 BLOCK NO: 3 LOT NO: 39.1 SUBLT NO: 1

DATE	DESCRIPTION	BY/CK	DATE	DESCRIPTION	BY/CK

	<p>SITE PLAN</p> <p>IREP-CG EAST LANE LLC</p> <p>8 EAST LANE TOWN OF NORTH CASTLE, WESTCHESTER COUNTY, NY.</p>	<p>DATE: 6-6-2022</p> <p>SCALE: 1" = 20'</p> <p>FILE: ---</p> <p>DSGN / CHK: NG</p> <p>DRN. BY: AW</p> <p>SHT NO. 3 OF 6</p> <p>DWG NO. SP-1</p>
	<p>BIBBO ASSOCIATES, LLP</p> <p>293 ROUTE 100 SUITE 203 SOMERS, NEW YORK 10589 TEL. 914 277 5805</p>	<p>NICHOLAS GABOURY P.E.</p>

UNAUTHORIZED ALTERATIONS AND ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 2209 (2) OF THE NEW YORK STATE EDUCATION LAW.
COPYRIGHT © 2022 BIBBO ASSOCIATES, LLP ALL RIGHTS RESERVED. UNAUTHORIZED DUPLICATION IS A VIOLATION OF APPLICABLE LAW.



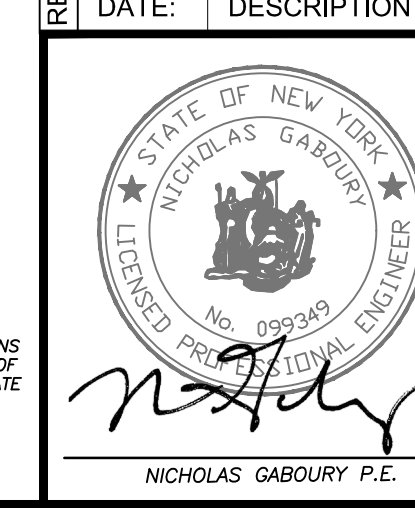
NOTES:
 1. ALL ITEMS MUST CONFORM TO N.Y.DS.D.O.T. SPECIFICATIONS.

NOTE: WHERE DRIVEWAYS REQUIRE CURBING, PAVEMENT SHALL BE EXTENDED 1' IN WIDTH TO ACCOMMODATE THE CURB. SEE PLAN FOR LOCATION TO BE USED FOR DRIVEWAYS.

NOTE: WITHIN N.Y.S. RIGHT OF WAY ONLY
FILED MAP NO. 29373

SEC NO: 108.03 **BLOCK NO: 3** **LOT NO: 39.1** **SUBLOT NO: 1**

DATE	DESCRIPTION	BY/CK	DATE	DESCRIPTION	BY/CK



PROFILES

IREP-CG EAST LANE LLC
 8 EAST LANE
 TOWN OF NORTH CASTLE, WESTCHESTER COUNTY, NY.

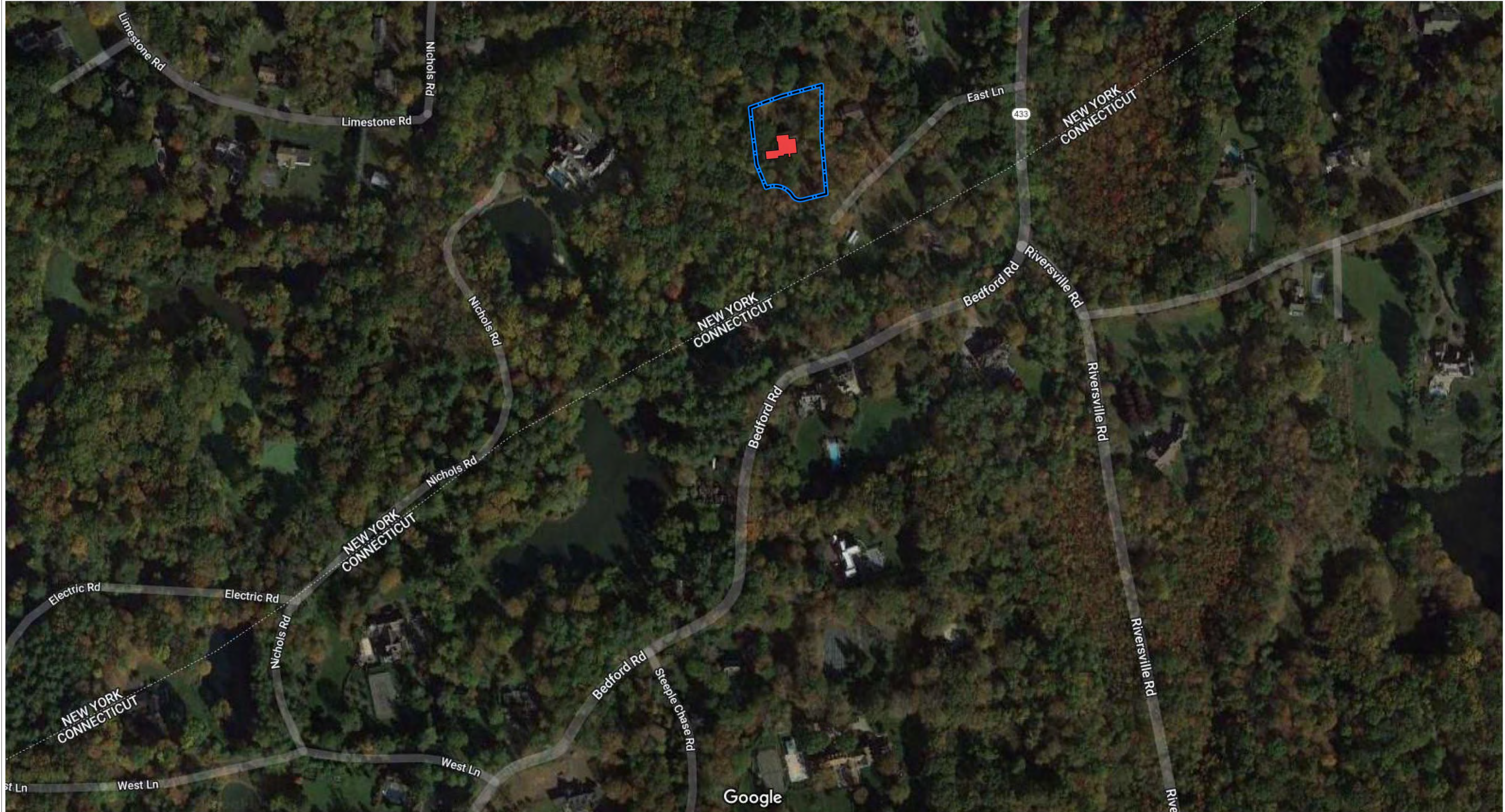
BIBBO ASSOCIATES, LLP
 293 ROUTE 100 SUITE 203
 SOMERS, NEW YORK 10589
 TEL. 914 277 5805

DATE: 6-6-2022
 SCALE: AS SHOWN
 FILE: ---
 DSGN / CHK: NG
 DRN. BY: AW
 SHT NO. 4 OF 6
 DWG NO. **D-1**

UNAUTHORIZED ALTERATIONS AND ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 2309 (2) OF THE NEW YORK STATE EDUCATION LAW.
 COPYRIGHT © 2022 BIBBO ASSOCIATES, LLP ALL RIGHTS RESERVED. UNAUTHORIZED DUPLICATION IS A VIOLATION OF APPLICABLE LAW.



MICHAEL A PICCIRILLO, AIA
 345 KEAR STREET, SUITE 203
 YORKTOWN HEIGHTS, NY 10598
 TELEPHONE: 914-368-9838
 FACSIMILE: 914-368-9839
 michael@mpiccirilloarchitect.com
 www.mpiccirilloarchitect.com



**NEW ONE FAMILY
 RESIDENCE
 8 EAST LANE,
 ARMONK NY**

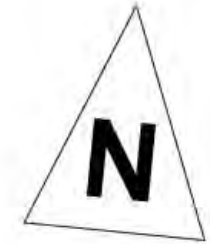
1	7/1/30	ISSUED

MARK	DATE	DESCRIPTION
------	------	-------------

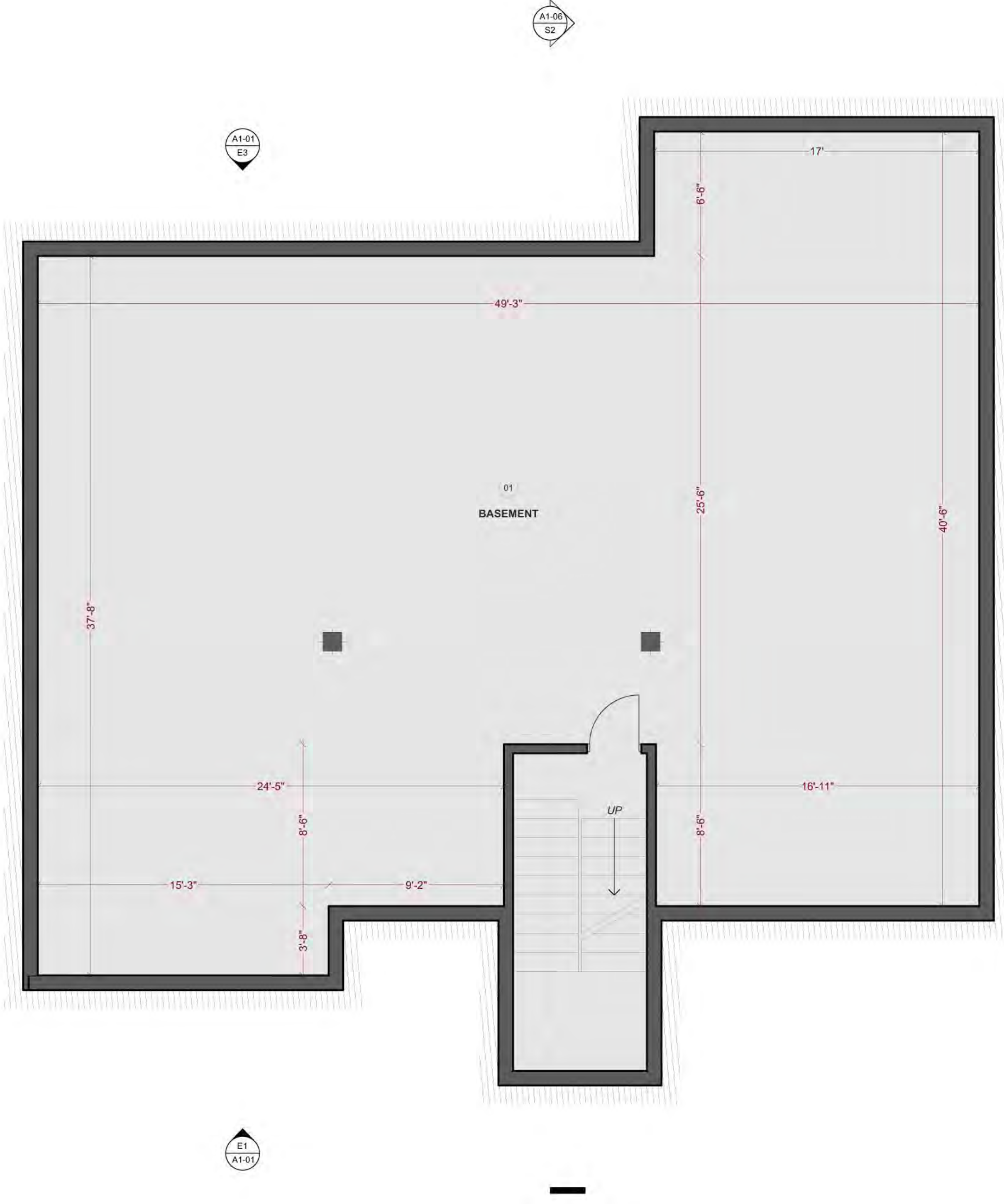
ISSUE:
 PROJECT NO:
 CAD FILE:
 DATE:
 DRAWN BY:
 CHECKED BY:
 COPYRIGHT:

SHEET
 TITLE:
 GOOGLE MAP

DRAWING SHEET
 NO:
 A0-1

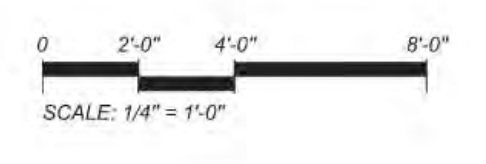


NUMBER	NAME	AREA
01	BASEMENT	1 896
		1 896 sq ft



Living space 4 593 ft sq
-1st floor 2 135 ft sq
-2nd floor 2 458 ft sq

Garage 782 ft sq
Basement 1 896 ft sq



MICHAEL A PICCIRILLO, AIA
345 KEAR STREET, SUITE 203
YORKTOWN HEIGHTS, NY 10598
TELEPHONE: 914-368-9838
FACSIMILE: 914-368-9839
michael@mpiccirilloarchitect.com
www.mpiccirilloarchitect.com



NEW ONE FAMILY RESIDENCE
8 EAST LANE, ARMONK NY

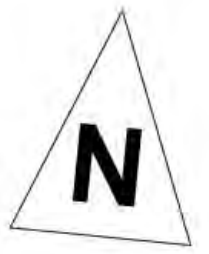
1	7/1/30	ISSUED

MARK DATE DESCRIPTION

ISSUE:

PROJECT NO:
CAD FILE:
DATE:
DRAWN BY:
CHECKED BY:
COPYRIGHT:
SHEET TITLE:
BASEMENT PLAN

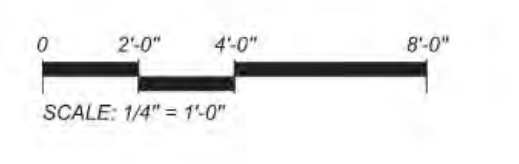
DRAWING SHEET NO:
A1-03



NUMBER	NAME	AREA
21	PLAY ROOM	641
22	CORRIDOR	82
23	MASTER BATHROOM	148
24	TOILET	24
25	HER	98
26	HIS	93
27	MASTER BEDROOM	270
34	LAUNDRY	25
35	CLOSET	53
36	BATHROOM	40
37	BEDROOM 1	216
38	CLOSET	75
39	BATHROOM	40
40	BEDROOM 2	250
41	CORRIDOR	41
42	CLOSET	72
43	BATHROOM	40
44	BEDROOM 3	250
	Total	2 458 sq ft



Living space 4 593 ft sq
 -1st floor 2 135 ft sq
 -2nd floor 2 458 ft sq
 Garage 782 ft sq
 Basement 1 896 ft sq



MICHAEL A PICCIRILLO, AIA
 345 KEAR STREET, SUITE 203
 YORKTOWN HEIGHTS, NY 10598
 TELEPHONE: 914-368-9838
 FACSIMILE: 914-368-9839
 michael@mpiccirilloarchitect.com
 www.mpiccirilloarchitect.com



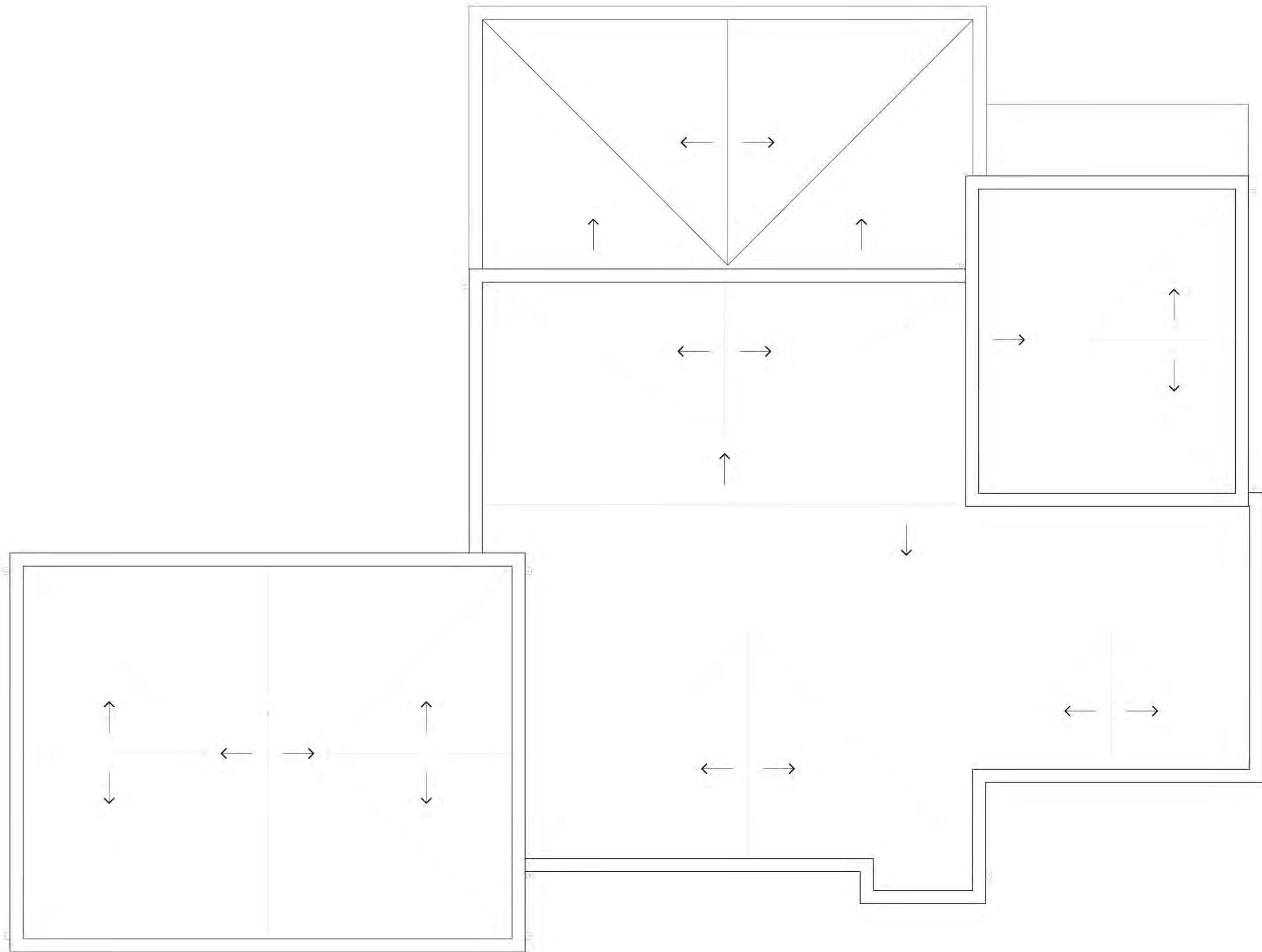
NEW ONE FAMILY
 RESIDENCE
 8 EAST LANE,
 ARMONK NY

1	7/1/30	ISSUED
---	--------	--------

MARK	DATE	DESCRIPTION

ISSUE:
 PROJECT NO:
 CAD FILE:
 DATE:
 DRAWN BY:
 CHECKED BY:
 COPYRIGHT:

SHEET
 TITLE:
 2ND FLOOR PLAN
 DRAWING SHEET
 NO:
 A1-05



MICHAEL A PICCIRILLO, AIA
345 KEAR STREET, SUITE 203
YORKTOWN HEIGHTS, NY 10598
TELEPHONE: 914-368-9838
FACSIMILE: 914-368-9839
michael@mpiccirilloarchitect.com
www.mpiccirilloarchitect.com



**NEW ONE FAMILY
RESIDENCE
8 EAST LANE,
ARMONK NY**

1	7/1/30	ISSUED
---	--------	--------

MARK	DATE	DESCRIPTION
------	------	-------------

ISSUE:

PROJECT NO:

CAD FILE:

DATE:

DRAWN BY:

CHECKED BY:

COPYRIGHT:

SHEET

TITLE:

ROOF PLAN

DRAWING SHEET

NO:

A1-06



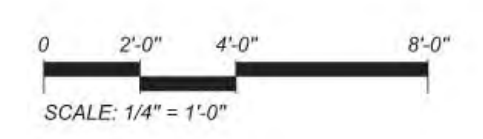
E1 FRONT ELEVATION



E3 REAR ELEVATION



- Elevation materials**
- Wood clapboard
 - Wood clapboard
 - Fiber cement



NEW ONE FAMILY RESIDENCE
8 EAST LANE, ARMONK NY

MARK	DATE	DESCRIPTION
1	7/1/30	ISSUED

ISSUE:
 PROJECT NO:
 CAD FILE:
 DATE:
 DRAWN BY:
 CHECKED BY:
 COPYRIGHT:
 SHEET TITLE:
ELEVATION
 DRAWING SHEET NO:
A1-01

MICHAEL A PICCIRILLO, AIA
345 KEAR STREET, SUITE 203
YORKTOWN HEIGHTS, NY 10598
TELEPHONE: 914-368-9838
FACSIMILE: 914-368-9839
michael@mpiccirilloarchitect.com
www.mpiccirilloarchitect.com



NEW ONE FAMILY
RESIDENCE
8 EAST LANE,
ARMONK NY

1 7/1/30 ISSUED

MARK DATE DESCRIPTION

ISSUE:

PROJECT NO:

CAD FILE:

DATE:

DRAWN BY:

CHECKED BY:

COPYRIGHT:

SHEET
TITLE:

VISUALIZATION

DRAWING SHEET
NO:

A1-08

MICHAEL A PICCIRILLO, AIA
 345 KEAR STREET, SUITE 203
 YORKTOWN HEIGHTS, NY 10598
 TELEPHONE: 914-368-9838
 FACSIMILE: 914-368-9839
 michael@mpiccirilloarchitect.com
 www.mpiccirilloarchitect.com



**NEW ONE FAMILY
 RESIDENCE
 8 EAST LANE,
 ARMONK NY**

1	7/1/30	ISSUED
---	--------	--------

MARK	DATE	DESCRIPTION
------	------	-------------

ISSUE:

PROJECT NO:

CAD FILE:

DATE:

DRAWN BY:

CHECKED BY:

COPYRIGHT:

SHEET

TITLE:

VISUALIZATION

DRAWING SHEET

NO:

A1-09



TOWN OF NORTH CASTLE
WESTCHESTER COUNTY
17 Bedford Road
Armonk, New York 10504-1898

PLANNING DEPARTMENT
Adam R. Kaufman, AICP
Director of Planning

Telephone: (914) 273-3542
Fax: (914) 273-3554
www.northcastleny.com

Application for Site Development Plan Approval

Application Name

IREP-CG EAST LANE LLC - 8 EAST LANE



TOWN OF NORTH CASTLE
WESTCHESTER COUNTY
17 Bedford Road
Armonk, New York 10504-1898

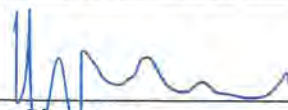
PLANNING DEPARTMENT
Adam R. Kaufman, AICP
Director of Planning


Telephone: (914) 273-3542
Fax: (914) 273-3554
www.northcastleny.com

PLANNING BOARD SCHEDULE OF ESCROW ACCOUNT DEPOSITS

<u>Type of Application Deposit*</u>	<u>Amount of Initial Escrow Account</u>
Concept Study	\$500.00
Site Plan Waiver for Change of Use	\$500.00
Site Development Plan for:	
Multifamily Developments	\$3,000.00 plus \$100.00 per proposed dwelling unit
Commercial Developments	\$3,000.00 plus \$50.00 for each required parking space
1 or 2 Family Projects	\$2,000.00
Special Use Permit	\$2,000.00 plus \$50.00 for each required parking space
Subdivision:	
Lot Line Change resulting in no new lots	\$1,500.00
All Others	\$3,000.00 plus \$200.00 per proposed new lot in excess of two (2)
Preparation or Review of Environmental Impact Statement	\$15,000.00

* If a proposed action involves multiple approvals, a single escrow account will be established. The total amount of the initial deposit shall be the sum of the individual amounts indicated. When the balance in such escrow account is reduced to one-third (1/3) of its initial amount, the applicant shall deposit additional funds into such account to restore its balance to the amount of the initial deposit.


Applicant Signature


Date:

I. IDENTIFICATION OF PROPERTY OWNER, APPLICANT AND PROFESSIONAL REPRESENTATIVES

Name of Property Owner: LEE TURET
Mailing Address: 14 WEST LANE, GREENWICH, CT 06831-2632
Telephone: 914-260-7409 Fax: _____ e-mail mturet@gmail.com

Name of Applicant (if different): GREG ALTSHULER
Address of Applicant: 37 CROSBY STREET, 4A, NEW YORK, NY 10019
Telephone: 917- 575-8532 Fax: _____ e-mail greg.altshuler@gmail.com
Interest of Applicant, if other than Property Owner:
Contract Vendee

Is the Applicant (if different from the property owner) a Contract Vendee?
Yes No
If yes, please submit affidavit stating such. If no, application cannot be reviewed by Planning Board

Name of Professional Preparing Site Plan:
BIBBO ASSOCIATES, LLP
Address: 293 ROUTE 100, SUITE 203, SOMERS, NY 10589
Telephone: 914-277-5805 Fax: 917-277-8210 e-mail ngaboury@bibboassociates.com

Name of Other Professional: _____
Address: _____
Telephone: _____ Fax: _____ e-mail _____

Name of Attorney (if any): _____
Address: _____
Telephone: _____ Fax: _____ e-mail _____

Applicant Acknowledgement

By making this application, the undersigned Applicant agrees to permit Town officials and their designated representatives to conduct on-site inspections in connection with the review of this application.

The Applicant also agrees to pay all expenses for the cost of professional review services required for this application.

It is further acknowledged by the Applicant that all bills for the professional review services shall be mailed to the Applicant, unless the Town is notified in writing by the Applicant at the time of initial submission of the application that such mailings should be sent to a designated representative instead.

Signature of Applicant: _____ Date: 6/21/22
Signature of Property Owner: _____ Date: 6/23/22

MUST HAVE BOTH SIGNATURES

II. IDENTIFICATION OF SUBJECT PROPERTY

Street Address: 8 EAST LANE

Location (in relation to nearest intersecting street):

NORTH feet (north, south, east or west) of EAST LANE

Abutting Street(s): NORTH GREENWICH ROAD

Tax Map Designation (NEW): Section 108.03 Block 3 Lot 39.1

Tax Map Designation (OLD): Section ---- Block ---- Lot ----

Zoning District: R-1A Total Land Area 1.055 AC +/-

Land Area in North Castle Only (if different)

Fire District(s) ARMONK FD School District(s) BRYAM HILLS

Is any portion of subject property abutting or located within five hundred (500) feet of the following:

The boundary of any city, town or village?
No Yes (adjacent) Yes (within 500 feet) X
If yes, please identify name(s): GREENWICH, CT

The boundary of any existing or proposed County or State park or any other recreation area?
No X Yes (adjacent) Yes (within 500 feet)

The right-of-way of any existing or proposed County or State parkway, thruway, expressway, road or highway?
No Yes (adjacent) Yes (within 500 feet) X

The existing or proposed right-of-way of any stream or drainage channel owned by the County or for which the County has established channel lines?
No X Yes (adjacent) Yes (within 500 feet)

The existing or proposed boundary of any county or State owned land on which a public building or institution is situated?
No X Yes (adjacent) Yes (within 500 feet)

The boundary of a farm operation located in an agricultural district?
No X Yes (adjacent) Yes (within 500 feet)

Does the Property Owner or Applicant have an interest in any abutting property?
No Yes X

If yes, please identify the tax map designation of that property:

108.03-2-23

II. IDENTIFICATION OF SUBJECT PROPERTY

Street Address: 10 EAST LANE

Location (in relation to nearest intersecting street):

250 feet (north, south, east or west) of EAST LANE

Abutting Street(s): NORTH GREENWICH ROAD

Tax Map Designation (NEW): Section 108.03 Block 3 Lot 39.2

Tax Map Designation (OLD): Section ---- Block ---- Lot ----

Zoning District: R-1A Total Land Area 1.138 AC +/-

Land Area in North Castle Only (if different) _____

Fire District(s) ARMONK FD School District(s) BRYAM HILLS

Is any portion of subject property abutting or located within five hundred (500) feet of the following:

The boundary of any city, town or village?
No _____ Yes (adjacent) _____ Yes (within 500 feet) X
If yes, please identify name(s): GREENWICH, CT

The boundary of any existing or proposed County or State park or any other recreation area?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

The right-of-way of any existing or proposed County or State parkway, thruway, expressway, road or highway?
No _____ Yes (adjacent) _____ Yes (within 500 feet) X

The existing or proposed right-of-way of any stream or drainage channel owned by the County or for which the County has established channel lines?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

The existing or proposed boundary of any county or State owned land on which a public building or institution is situated?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

The boundary of a farm operation located in an agricultural district?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

Does the Property Owner or Applicant have an interest in any abutting property?
No _____ Yes X

If yes, please identify the tax map designation of that property:

108.03-2-23

II. IDENTIFICATION OF SUBJECT PROPERTY

Street Address: 12 EAST LANE

Location (in relation to nearest intersecting street):

250 feet (north, south, east or west) of EAST LANE

Abutting Street(s): NORTH GREENWICH ROAD

Tax Map Designation (NEW): Section 108.03 Block 3 Lot 39.3

Tax Map Designation (OLD): Section ---- Block ---- Lot ----

Zoning District: R-1A Total Land Area 1.586 AC +/-

Land Area in North Castle Only (if different)

Fire District(s) ARMONK FD School District(s) BRYAM HILLS

Is any portion of subject property abutting or located within five hundred (500) feet of the following:

The boundary of any city, town or village?
No Yes (adjacent) Yes (within 500 feet) X
If yes, please identify name(s): GREENWICH, CT

The boundary of any existing or proposed County or State park or any other recreation area?
No X Yes (adjacent) Yes (within 500 feet)

The right-of-way of any existing or proposed County or State parkway, thruway, expressway, road or highway?
No Yes (adjacent) Yes (within 500 feet) X

The existing or proposed right-of-way of any stream or drainage channel owned by the County or for which the County has established channel lines?
No X Yes (adjacent) Yes (within 500 feet)

The existing or proposed boundary of any county or State owned land on which a public building or institution is situated?
No X Yes (adjacent) Yes (within 500 feet)

The boundary of a farm operation located in an agricultural district?
No X Yes (adjacent) Yes (within 500 feet)

Does the Property Owner or Applicant have an interest in any abutting property?
No Yes X

If yes, please identify the tax map designation of that property:

108.03-2-23

II. IDENTIFICATION OF SUBJECT PROPERTY

Street Address: 14 EAST LANE

Location (in relation to nearest intersecting street):

0 feet (north, south, east or west) of EAST LANE

Abutting Street(s): NORTH GREENWICH ROAD

Tax Map Designation (NEW): Section 108.03 Block 3 Lot 39.4

Tax Map Designation (OLD): Section ---- Block ---- Lot ----

Zoning District: R-1A Total Land Area 2.295 AC +/-

Land Area in North Castle Only (if different)

Fire District(s) ARMONK FD School District(s) BRYAM HILLS

Is any portion of subject property abutting or located within five hundred (500) feet of the following:

The boundary of any city, town or village?

No Yes (adjacent) Yes (within 500 feet) X

If yes, please identify name(s): GREENWICH, CT

The boundary of any existing or proposed County or State park or any other recreation area?

No X Yes (adjacent) Yes (within 500 feet)

The right-of-way of any existing or proposed County or State parkway, thruway, expressway, road or highway?

No Yes (adjacent) Yes (within 500 feet) X

The existing or proposed right-of-way of any stream or drainage channel owned by the County or for which the County has established channel lines?

No X Yes (adjacent) Yes (within 500 feet)

The existing or proposed boundary of any county or State owned land on which a public building or institution is situated?

No X Yes (adjacent) Yes (within 500 feet)

The boundary of a farm operation located in an agricultural district?

No X Yes (adjacent) Yes (within 500 feet)

Does the Property Owner or Applicant have an interest in any abutting property?

No Yes X

If yes, please identify the tax map designation of that property:

108.03-2-23

II. IDENTIFICATION OF SUBJECT PROPERTY

Street Address: EAST LANE

Location (in relation to nearest intersecting street):

0 feet (north, south, east or west) of EAST LANE

Abutting Street(s): NORTH GREENWICH ROAD

Tax Map Designation (NEW): Section 114.01 Block 1 Lot 5

Tax Map Designation (OLD): Section 2 Block 16 Lot 18.E01

Zoning District: R-1a Total Land Area 0.489 AC +/-

Land Area in North Castle Only (if different) _____

Fire District(s) ARMONK FD School District(s) BRYAM HILLS

Is any portion of subject property abutting or located within five hundred (500) feet of the following:

The boundary of any city, town or village?
No _____ Yes (adjacent) _____ Yes (within 500 feet) X
If yes, please identify name(s): GREENWICH, CT

The boundary of any existing or proposed County or State park or any other recreation area?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

The right-of-way of any existing or proposed County or State parkway, thruway, expressway, road or highway?
No _____ Yes (adjacent) _____ Yes (within 500 feet) X

The existing or proposed right-of-way of any stream or drainage channel owned by the County or for which the County has established channel lines?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

The existing or proposed boundary of any county or State owned land on which a public building or institution is situated?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

The boundary of a farm operation located in an agricultural district?
No X Yes (adjacent) _____ Yes (within 500 feet) _____

Does the Property Owner or Applicant have an interest in any abutting property?
No _____ Yes X

If yes, please identify the tax map designation of that property:

108.03-2-23

III. DESCRIPTION OF PROPOSED DEVELOPMENT

Proposed Use: SINGLE-FAMILY RESIDENCE

Gross Floor Area: Existing 2,500 +/- S.F. Proposed 7,491 S.F.

Proposed Floor Area Breakdown:

Retail --- S.F.; Office --- S.F.;

Industrial --- S.F.; Institutional --- S.F.;

Other Nonresidential --- S.F.; Residential 7,491 S.F.;

Number of Dwelling Units: 1

Number of Parking Spaces: Existing --- Required --- Proposed ---

Number of Loading Spaces: Existing --- Required --- Proposed ---

Earthwork Balance: Cut 1,600 C.Y. Fill 600 C.Y.

Will Development on the subject property involve any of the following:

Areas of special flood hazard? No X Yes ---

(If yes, application for a Development Permit pursuant to Chapter 177 of the North Castle Town Code may also be required)

Trees with a diameter at breast height (DBH) of 8" or greater?

No --- Yes X

(If yes, application for a Tree Removal Permit pursuant to Chapter 308 of the North Castle Town Code may also be required.)

Town-regulated wetlands? No --- Yes X

(If yes, application for a Town Wetlands Permit pursuant to Chapter 340 of the North Castle Town Code may also be required.)

State-regulated wetlands? No X Yes ---

(If yes, application for a State Wetlands Permit may also be required.)

IV. SUBMISSION REQUIREMENTS

The site development plan application package shall include all materials submitted in support of the application, including but not limited to the application form, plans, reports, letters and SEQR Environmental Assessment Form. **Submission of the following shall be required:**

- One (1) set of the site development plan application package (for distribution to the Town Planner for preliminary review purposes).
- Once a completed preliminary site plan checklist has been received from the Planning Department, eight (8) additional sets of the site development plan application package (for distribution to Planning Board, Town Engineer, Town Attorney, Town Planner, Planning Board Secretary, police, fire department and ambulance corps).
- One (1) additional reduced sized set (11" x 17") of the site development plan application package if any portion of the subject property abuts or is located within five hundred (500) feet of the features identified in Section II of this application form (for distribution to Westchester County Planning Board).
- A check for the required application fee and a check for the required Escrow Account, both made payable to "Town of North Castle" in the amount specified on the "Schedule of Application Fees."

(continued next page)

V. INFORMATION TO BE INCLUDED ON SITE DEVELOPMENT PLAN

The following checklist is provided to enable the Applicant to determine if he/she has provided enough information on the site development plan for the Planning Board to review his/her proposal. Applicants are advised to review ARTICLE VIII, Site Development Plan of the North Castle Town Code for a complete enumeration of pertinent requirements and standards prior to making application for site development plan approval.

The application for site development plan approval will not be accepted for Planning Board review unless all items identified below are supplied and **so indicated with a check mark in the blank line provided**. If a particular item is not relevant to the subject property or the development proposal, **the letters "NA" should be entered instead**. In addition, the project will not be scheduled on a Planning Board agenda until the Applicant receives an initialed "site plan checklist" from the Planning Department.

The information to be included on a site development plan shall include:

Legal Data:

- X Name of the application or other identifying title.
- X Name and address of the Property Owner and the Applicant, (if different).
- X Name, address and telephone number of the architect, engineer or other legally qualified professional who prepared the plan.
- X Names and locations of all owners of record of properties abutting and directly across any and all adjoining streets from the subject property, including the tax map designation of the subject property and abutting and adjoining properties, as shown on the latest tax records.
- X Existing zoning, fire, school, special district and municipal boundaries.
- X Size of the property to be developed, as well as property boundaries showing dimensions and bearings as determined by a current survey; dimensions of yards along all property lines; name and width of existing streets; and lines of existing lots, reservations, easements and areas dedicated to public use.
- X Reference to the location and conditions of any covenants, easements or deed restrictions that cover all or any part of the property, as well as identification of the document where such covenants, easements or deed restrictions are legally established.
- X Schedule of minimum zoning requirements, as well as the plan's proposed compliance with those requirements, including lot area, frontage, lot width, lot depth, lot coverage, yards, off-street parking, off-street loading and other pertinent requirements.
- X Locator map, at a convenient scale, showing the Applicant's entire property in relation to surrounding properties, streets, etc., within five hundred (500) feet of the site.
- X North arrow, written and graphic scales, and the date of the original plan and all revisions, with notation identifying the revisions.
- X A signature block for Planning Board endorsement of approval.

Existing Conditions Data:

- X Location of existing use and design of buildings, identifying first floor elevation, and other structures.
- X Location of existing parking and truck loading areas, with access and egress drives thereto.
- X Location of existing facilities for water supply, sanitary sewage disposal, storm water drainage, and gas and electric service, with pipe sizes, grades, rim and inverts, direction of flow, etc. indicated.
- X Location of all other existing site improvements, including pavement, walks, curbing, retaining walls and fences.
- X Location, size and design of existing signs.
- X Location, type, direction, power and time of use of existing outdoor lighting.
- X Location of existing outdoor storage, if any.
- X Existing topographical contours with a vertical interval of two (2) feet or less.
- X Location of existing floodplains, wetlands, slopes of 15% or greater, wooded areas, landscaped areas, single trees with a DBH of 8" or greater, rock outcrops, stone walls and any other significant existing natural or cultural features.

Proposed Development Data:

- X Proposed location of lots, streets, and public areas, and property to be affected by proposed easements, deed restrictions and covenants.
- X Proposed location, use and architectural design of all buildings, including proposed floor elevations and the proposed division of buildings into units of separate occupancy.
- X Proposed means of vehicular and pedestrian access to and egress from the site onto adjacent streets.
- X Proposed sight distance at all points of vehicular access.
- X Proposed number of employees for which buildings are designed
- X Proposed streets, with profiles indicating grading and cross-sections showing the width of the roadway; the location and width of sidewalks; and the location and size of utility lines.
- X Proposed location and design of any pedestrian circulation on the site and off-street parking and loading areas, including handicapped parking and ramps, and including details of construction, surface materials, pavement markings and directional signage.
- X Proposed location and design of facilities for water supply, sanitary sewage disposal, storm water drainage, and gas and electric service, with pipe sizes, grades, rim and inverts, direction of flow, etc. indicated.

- Proposed location of all structures and other uses of land, such as walks, retaining walls, fences, designated open space and/or recreation areas and including details of design and construction.
- Location, size and design of all proposed signs.
- Location, type, direction, power and time of use of proposed outdoor lighting.
- Location and design of proposed outdoor garbage enclosure.
- Location of proposed outdoor storage, if any.
- Location of proposed landscaping and buffer screening areas, including the type (scientific and common names), size and amount of plantings.
- Type of power to be used for any manufacturing
- Type of wastes or by-products to be produced and disposal method
- In multi-family districts, floor plans, elevations and cross sections
- The proposed location, size, design and use of all temporary structures and storage areas to be used during the course of construction.
- Proposed grade elevations, clearly indicating how such grades will meet existing grades of adjacent properties or the street.
- Proposed soil erosion and sedimentation control measures.
- For all proposed site development plans containing land within an area of special flood hazard, the data required to ensure compliance with Chapter 177 of the North Castle Town Code.
- For all proposed site development plans involving clearing or removal of trees with a DBH of 8" or greater, the data required to ensure compliance with Chapter 308 of the North Castle Town Code.
- For all proposed site development plans involving disturbance to Town-regulated wetlands, the data required to ensure compliance with Chapter 340 of the North Castle Town Code.



TOWN OF NORTH CASTLE
WESTCHESTER COUNTY
17 Bedford Road
Armonk, New York 10504-1898

PLANNING DEPARTMENT
Adam R. Kaufman, AICP
Director of Planning

Telephone: (914) 273-3542
Fax: (914) 273-3554
www.northcastleny.com

GROSS LAND COVERAGE CALCULATIONS WORKSHEET

Application Name or Identifying Title: IREP-CG EAST LANE LLC Date: 6-27-22
Tax Map Designation or Proposed Lot No.: 108.03-3-39.1

Gross Lot Coverage

- | | | |
|-----------|--|---------------|
| 1. | Total lot Area (Net Lot Area for Lots Created After 12/13/06): | <u>44,182</u> |
| 2. | Maximum permitted gross land coverage (per Section 355-26.C(1)(b)): | <u>9,406</u> |
| 3. | BONUS maximum gross land cover (per Section 355-26.C(1)(b)): | |
| | Distance principal home is beyond minimum front yard setback | |
| <u>16</u> | x 10 = <u>160</u> | |
| 4. | TOTAL Maximum Permitted gross land coverage = Sum of lines 2 and 3 | <u>9,566</u> |
| 5. | Amount of lot area covered by principal building : | |
| | <u>1,238</u> TBR existing + <u>3,640</u> proposed = | <u>3,640</u> |
| 6. | Amount of lot area covered by accessory buildings : | |
| | <u>132</u> TBR existing + <u>0</u> proposed = | <u>0</u> |
| 7. | Amount of lot area covered by decks : | |
| | <u>319</u> TBR existing + <u>0</u> proposed = | <u>0</u> |
| 8. | Amount of lot area covered by porches : | |
| | <u>452</u> TBR existing + <u>2,125</u> proposed = | <u>2,125</u> |
| 9. | Amount of lot area covered by driveway, parking areas and walkways : | |
| | <u>2,672</u> TBR existing + <u>3,182</u> proposed = | <u>3,182</u> |
| 10. | Amount of lot area covered by terraces : | |
| | <u>0</u> existing + <u>0</u> proposed = | <u>0</u> |
| 11. | Amount of lot area covered by tennis court, pool and mechanical equip : | |
| | <u>0</u> existing + <u>508</u> proposed = | <u>508</u> |
| 12. | Amount of lot area covered by all other structures : | |
| | <u>0</u> existing + <u>0</u> proposed = | <u>0</u> |
| 13. | Proposed gross land coverage : Total of Lines 5 – 12 = | <u>9,455</u> |

If Line 13 is less than or equal to Line 4, your proposal **complies** with the Town's maximum gross land coverage regulations and the project may proceed to the Residential Project Review Committee for review. If Line 13 is greater than Line 4 your proposal does not comply with the Town's regulations.

Signature and Seal of Professional Planning Worksheet



Date 6/27/2022



TOWN OF NORTH CASTLE
 WESTCHESTER COUNTY
 17 Bedford Road
 Armonk, New York 10504-1898

PLANNING DEPARTMENT
 Adam R. Kaufman, AICP
 Director of Planning

January 29, 2019
 Telephone: (914) 273-3542
 Fax: (914) 273-3554
www.northcastleny.com

FLOOR AREA CALCULATIONS WORKSHEET

Application Name or Identifying Title: IREP-CG EAST LANE LLC Date: 6-27-22

Tax Map Designation or Proposed Lot No.: 108.03-3-39.1

Floor Area

1.	Total Lot Area (Net Lot Area for Lots Created After 12/13/06):	<u>44,182</u>
2.	Maximum permitted floor area (per Section 355-26.B(4)):	<u>7,764</u>
3.	Amount of floor area contained within first floor: <u>TBR</u> existing + <u>2,135</u> proposed =	<u>2,135</u>
4.	Amount of floor area contained within second floor: <u>TBR</u> existing + <u>2,458</u> proposed =	<u>2,458</u>
5.	Amount of floor area contained within garage: <u>TBR</u> existing + <u>782</u> proposed =	<u>782</u>
6.	Amount of floor area contained within porches capable of being enclosed: <u>TBR</u> existing + <u>220</u> proposed =	<u>220</u>
7.	Amount of floor area contained within basement (if applicable – see definition): <u>TBR</u> existing + <u>1,896</u> proposed =	<u>1,896</u>
8.	Amount of floor area contained within attic (if applicable – see definition): <u>TBR</u> existing + <u>0</u> proposed =	<u>0</u>
9.	Amount of floor area contained within all accessory buildings: <u>0</u> existing + <u>0</u> proposed =	<u>0</u>
10.	Proposed floor area: Total of Lines 3 – 9 =	<u>7,491</u>

If Line 10 is less than or equal to Line 2, your proposal **complies** with the Town's maximum floor area regulations and the project may proceed to the Residential Project Review Committee for review. If Line 10 is greater than Line 2 your proposal does not comply with the Town's regulations.

Signature and Seal of Professional Preparing Worksheet







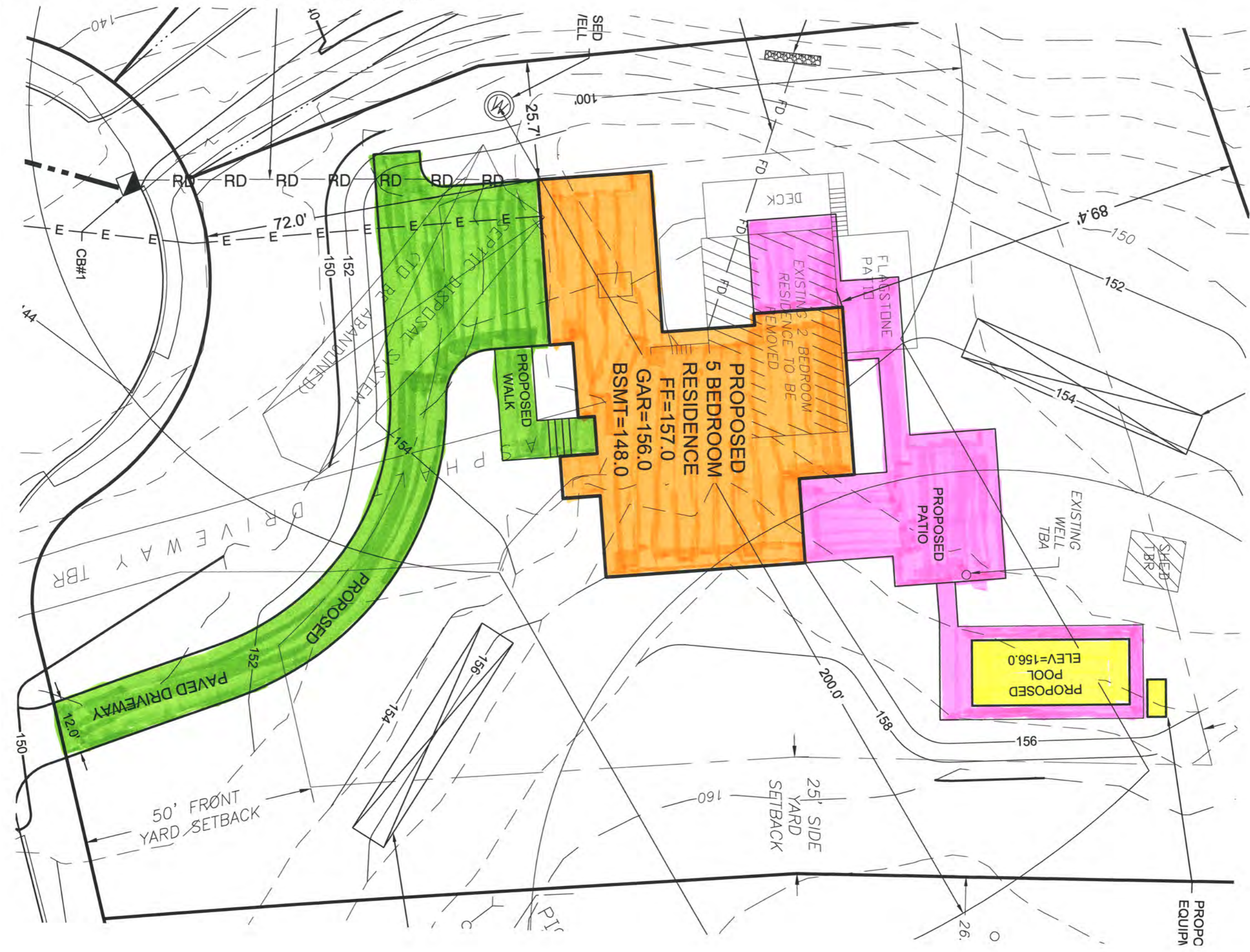
6/27/2022
 Date



Project IREP-CG EAST LANE LLC - 8 EAST LANE

Gross Land Coverage Breakdown

Legend		Area (SF)
	Principal Building	3640
	Terraces and Porches	2125
	Driveway and Walkway	3182
	Pool and Equipment Pad	508
	All Other Structures	0
	Total	9455





Stormwater Pollution Prevention Plan

IREP-CG East Lane, LLC

(formerly Lee Turet)

8 East Lane

North Castle (T)

Prepared By:



Nicholas Gaboury, P.E.
N.Y.S. License #: 099349

6/6/22

1/18/17

12/2/16

08/30/16

Rev: 10/5/09

Date: 01/30/09



Project Information:

Project Title: IREP-CG East Lane, LLC (Turet Subdivision)
Project Address: 8 East Lane, North Castle, N.Y. 10504
Tax Map Number: Sheet 108.03, Block 3, Lots 39.1, 39.2, 39.3, 39.4,
Project Area: 8.19 +/- Acres

Applicant/Owner Information:

Applicant Name: IREP-CG East Lane, LLC c/o Greg Altshuler
Applicant Address: 37 Crosby Street, 4A, New York, NY 10013
Applicant Phone: (917) 575-8532
Applicant Email Address: greg.altshuler@gmail.com

SWPPP Prepared By:

Nicholas Gaboury, P.E.
Bibbo Associates, LLP
293 Rt. 100, Suite 203
Somers, N.Y. 10589
Tel: 914-277-5805
Fax: 914-277-8210
ngaboury@bibboassociates.com

Short-Term Responsible Party for SWPPP Implementation:

Short term responsible parties for SWPPP Implementation will be the General Contractor.

Long-Term Responsible Party for SWPPP Implementation:

Long term responsible parties for SWPPP Implementation will be the Owner.

Potential Party Responsible for Inspections as Required Under SPDES Permit:

Timothy S. Allen, P.E.
Bibbo Associates, LLP
293 Rt. 100, Suite 203
Somers, N.Y. 10589
Tel: 914-277-5805
Fax: 914-277-8210
ngaboury@bibboassociates.com



Table of Contents:

1.0	Introduction:	Page 3
1.1	Existing Site Conditions:	Page 3
1.2	Methodology	Page 3
1.3	Proposed Site Conditions:	Page 4
2.0	Stormwater Analyses and Design:	Page 6
2.1	NYSDEC Requirements	
2.1.1	Water Quality Volume	Page 8
2.1.2	Stream Channel Protection Volume	Page 8
2.1.3	Overbank & Extreme Flood Control	Page 9
2.2	Town of North Castle Requirements	Page 10
3.0	Erosion & Sediment Control:	Page 10
3.1	Temporary Erosion & Sediment Control Practices	Page 10
3.2	Permanent Erosion & Sediment Control Practices	Page 12
4.0	Maintenance & Inspection Requirements	Page 13
4.1	Short Term Maintenance & Inspection Requirements	Page 13
4.2	Long Term Maintenance & Inspection Requirements	Page 14
5.0	Outstanding violations or Enforcement Actions	Page 15
6.0	Conclusion	Page 15
7.0	SWPPP 2022 Update	Page 16
	Appendix A: Stormwater Analysis (HydroCAD output)	
	Appendix B: Water Quality Volume Calculation	
	Appendix C: Maintenance & Inspection Checklists	
	Appendix D: Rock Outlet Protection Sizing	
	Appendix E: Field Testing Results	
	Appendix F: Contech CDS Pretreatment Chamber Information	
	Appendix G: Updated 2022 HydroCAD Output Report	
	Figure 1: Predevelopment Drainage Basin Plan	
	Figure 2: Post development Drainage Basin Plan	
	Figure 3: Soil Boundary Map	



1.0 Introduction:

IREP-CG East Lane, LLC is proposing to begin development at the approved Turet Subdivision and build a new, single-family, five-bedroom residence, construct the approved common driveway, and construct the common drainage features. The proposal also includes improvements for East Lane. The proposed area of disturbance is 2.9 acres. The project is located within the Byram River Watershed. The proposed impervious surfaces will be captured and treated by a proposed stormwater management system designed in accordance with the New York State Department of Environmental Conservation Stormwater Management Design Manual.

1.1 Existing Site Conditions:

The 8.19 acre site currently has a single family residence with an asphalt driveway which is accessed by East Lane, an asphalt roadway which transitions to a gravel traveled way. The remainder of the site is undeveloped woodlands. A system of local wetlands is located along the western boundary of the project site. NRCS soil boundaries identified onsite and within the boundaries of the analysis consist of Charlton Chatfield, Paxton, and Leicester Loam. The Charlton Chatfield belongs to hydrologic group “B”. The Paxton and Leicester Loam belong to the hydrologic group “C”.

Currently there is no stormwater management system at the site.

1.2 Methodology

Stormwater management computations provided in this report are based upon the Soil Conservation Service (SCS), TR-20. Pre-development and post-development rates of stormwater runoff have been computed for comparison for the 1, 10, 25, and 100 year storm frequencies and using Type III, 24 hour rainfall events. Computer software entitled “HydroCAD Version 10.0” by Applied Microcomputer Systems has been utilized to determine the runoff rates, high



water elevations and the required detention storage for the proposed infiltrators and stormwater basin.

1.3 Proposed Site Conditions:

Full build out of the entire subdivision consisting of the houses, pools, and driveways will result in the conversion of approximately 42,669 square feet of existing woods and lawn to impervious surface. The site improvements will also result in the conversion of approximately 42,065 square feet of woods to lawn area.

The runoff from the proposed impervious surfaces will be captured and treated in a stormwater management system.

The proposed sequence of construction for the project is as follows:

Generalized Construction Sequence

(Construction fencing shall be located and installed along the clearing and grading limit lines prior the start of any construction.)

1. Roads, storm drainage collection and treatment facilities shall be staked out by surveyors.
2. Appropriate erosion and sedimentation controls shall be in place prior to any site disturbance.
3. Install stabilized construction entrance where indicated on plan.
4. Clear trees from right-of-way limits, excavate tree stumps and remove from site.
5. Strip topsoil and stockpile area or areas as typically designated.
6. Construction should proceed so that disturbed areas shall not exceed 5 acres without vegetating and stabilizing previously disturbed areas.
7. Excavate S.W.Q.B. to required minimum volumes as indicated on plan. Construct basin outlet structures. Provide temporary crushed stone filter dams around outlets to contain silt within basin. Place topsoil on berms and embankments and spread seed and mulch.



8. Excavate and place compacted fill as required to bring road to subgrade. Direct runoff from subgrade to sediment traps.
9. Install drainage system in the road. Install erosion controls at catch basin inlets. Immediately finish grade and spread seed and mulch in drainage easement.
10. Fine grade and compact road subgrade.
11. Install run-of-bank sand & gravel subbase on road subgrade and compact.
12. Set catch basin and manhole frames to finish grade.
13. Install base course of road pavement and curb.
14. Finish grade road shoulders and embankments. Place topsoil and spread seed and mulch.
15. Clean S.W.Q.B. of accumulated sediment, reshape basins to finished grade on plans, and install permanent outlet structures.
16. Complete installation of plantings at S.W.Q.B. as indicated on the plans.
17. Maintain all silt fencing and repair any areas of erosion in drainage easements until a firm stand of vegetation is established.
18. Once all lots have been constructed, install final asphalt top course for the town road.

Construction Sequence Individual Lots

1. Install silt fence for house & driveway construction. Install sediment traps on lots 3 & 4.
2. Provide orange construction fencing around future infiltration area and sewage treatment areas so that they are cordoned off and protected from construction traffic.
2. Clear & grub lot, if necessary.
3. Install stabilized construction entrance at driveway entrance.
4. Excavate driveway to subgrade and begin house excavation.
5. Install temporary crushed stone filter dam and drill well in accordance with approved plans.



6. Install silt fence downgradient of sewage disposal areas, install sewage disposal system in accordance with approved plans.
7. Upon substantial completion of the house install roof and driveway drains and discharge to storm drainage system as indicated on plan. Protect on-grade discharge with rip rap at outlet.
7. Finish driveway, establish final grades, and seed and mulch all disturbed areas.
8. The site contractor for each lot shall take care to implement such erosion control practices as necessary to avoid deposition of silt beyond each lot boundary. In addition, the contractor shall insure that no permanent stormwater conveyance or treatment systems (swales, catch basins, S.W.Q.B.'s) are impacted by individual lot construction.
9. Maintain all erosion controls in proper working order through the duration of construction. Erosion controls to be removed at the direction of the town engineer or building inspector.

2.0 Stormwater Analysis & Design

The proposed stormwater management system for this site will consist of an underground infiltration system (Design I-4) and a pocket pond (P-5). The underground infiltration systems will consist of Cultec Recharger 330XL infiltration chambers situated in gravel beds. The pocket pond has been utilized to treat the roadway runoff and has been sized in accordance with the New York State Stormwater Management Design Manual (Design Manual). The pocket pond consists of a forebay located at the inlet and a micropool at the outlet structure.

The infiltration systems meet the required 3' separation distance to groundwater or bedrock layer as verified by test pits witnessed by Bibbo Associates LLP., on June 25, 2009. The results of the field testing can be found in Appendix "E".

Required pretreatment preceding the infiltration system will be accomplished using a subsurface Contech CDS (Model No. 2025) hydrodynamic separator unit prior to the infiltration system. The pretreatment practice has been sized based on the peak flow generated by the one year design storm. The



hydrodynamic separator meets the requirements of propriety treatment systems set forth in the NYSDEC Stormwater Design Manual. Please see Appendix “F” for the New Jersey DEP certification for the Contech CDS unit. Additional information about the capacity, installation, and maintenance for the pretreatment chamber can also be found in Appendix “F”.

The hydrologic model for this project consists (2) drainage basins. The pre-development analysis consists of (2) subcatchments, basin “A” drains to a small brook, design point “A”, and basin “B” drains to design line “B”. There are (6) subcatchments in the post development analysis. Basin “B1” drains to design line “B”. The other (5) subcatchments drain to design point “A”. Pre-development subcatchments “A” and “B” are currently untreated. Post development subcatchments “A5” and “B1” represent areas that will remain untreated. Post development subcatchments “A1”, “A2”, “A3”, and “A4” represent the areas tributary to the stormwater treatment practices. Subcatchment “A5” is treated by a natural wooded filter strip to the west. All subcatchments were used in conjunction with HydroCAD, a computer model program based upon TR-20, to generate peak flows, stormwater basins’ highwater elevations, hydrographs, and volumes for the various storm events.

The stormwater systems are proposed for the quantitative and qualitative management of stormwater runoff from the site. As the site falls under the requirements of the State SPDES program, all stormwater facilities employed for this site have been designed to meet NYSDEC requirements for water quality volume, stream channel protection volume, overbank flood control, and extreme flood control.

Please note, the previous version of the SWPPP was submitted and reviewed for preliminary subdivision approval using the 2010 version of the Design Manual. As per the NYSDEC transition policy, the current SWPPP has also been prepared using the 2010 version of the Design Manual. A significant amount of planning and design work was put into the stormwater management system for the project and it was based on the rainfall totals and treatment requirements from the previous Design Manual. The NYSDEC acknowledges



that in this type of situation, the owner may obtain SPDES General Permit Coverage with a final SWPPP designed in accordance with the 2010 version of the Design Manual.

2.1 NYSDEC Requirements:

2.1.1 Water Quality Volume (WQv):

The “WQv” is the volume of runoff generated by the 90% rainfall event. In this region of the state the rainfall event associated with this volume is 1.30” of rain within a 24 hour period. As per NYSDEC design standards, each infiltration practice provided must be able to capture and store the “WQv” generated by its tributary area as determined by formulation outlined in the New York State Stormwater Management Design Manual. A summary table illustrating the required water quality volume versus provided water quality volume for each best management practice is provided below. Calculations for the required water quality volume can be found in the Appendix “B” of this report.

Infiltration System #	WQv Required (ft ³)	WQv Provided (ft ³)
3	2782	2782
Stormwater Basin	1831	1831

Note: The WQv volumes are met by storing and infiltrating the entire WQv within the infiltration practice. The stormwater basin provides 24 extended detention of the entire WQv.

2.1.2 Stream Channel Protection Volume:

Stream channel protection volume is designed to protect down stream channels from erosion, and is obtained by providing 24-hour (1440 min) extended detention of the one-year, twenty-four hour storm event. The infiltration practice has been designed to capture and infiltrate the 24-hour extended detention



volume. The stormwater basin has been sized to provide extended detention of the one year storm event.

2.1.3 Overbank & Extreme Flood Control:

Overbank Flood Control is intended to mitigate the frequency and magnitude of out-of-bank flooding due to new development. Overbank Flood Control is achieved through the attenuation of the post development 24-hour peak discharge from the 10-year storm to predevelopment rates.

Extreme Flood Control is achieved through the attenuation of the post development 24-hour peak discharge from the 100-year storm to predevelopment rates. The purpose of Extreme Flood Control is to prevent the risk of flood damage from large storm events, maintain the predevelopment 100-year flood plain boundary, and to physically protect the stormwater management practices at the site.

This goal has been achieved for the site. The minimal increases in peak flows generated by the proposed development were offset by the provision of the stormwater treatment systems. A table summarizing the pre versus post development peak flows for the 1, 10, 25, and 100 year design storm events is provided below.

Design Point	1 year storm event			Overbank - 10 year storm event			25 year storm event			Extreme Flood - 100 year storm event		
	Pre (cfs)	Post (cfs)	% Change	Pre (cfs)	Post (cfs)	% Change	Pre (cfs)	Post (cfs)	% Change	Pre (cfs)	Post (cfs)	% Change
A	2.99	2.61	-12.7%	15.90	15.78	-0.8%	23.22	23.25	0.1%	35.14	35.29	0.4%

Design Line	1 year storm event			Overbank - 10 year storm event			25 year storm event			Extreme Flood - 100 year storm event		
	Pre (cfs)	Post (cfs)	% Change	Pre (cfs)	Post (cfs)	% Change	Pre (cfs)	Post (cfs)	% Change	Pre (cfs)	Post (cfs)	% Change
B	0.06	0.02	-66.7%	0.78	0.35	-55.1%	1.29	0.60	-53.5%	2.16	1.01	-53.2%

Note: Table shows previously approved Pre-Development vs. Post-Development comparison. See Section 7.0 and Appendix “G” for updated stormwater analysis.



2.2 Town of North Castle Requirements

The Subdivision of Land section of the North Castle Town Code states further requirements for drainage improvements. Since the upstream watershed is under 200 acres in area, drainage facilities shall be designed to accommodate potential runoff from such upstream drainage area, whether inside or outside the subdivision, based on the twenty-five-year storm and assuming conditions of maximum potential development within the watershed.

The entire watersheds which drain to the two design points have been included in this analysis and the watersheds are currently fully developed with single family residences surrounding the Lee Turet Subdivision site. The town requirement is met by maintaining the same discharge rate for predevelopment and post development, at Design Point A and reducing the discharge rates at Design Line B for the twenty five year storm event.

3.0 Erosion & Sediment Control:

The plans provide for specific erosion and sediment controls to be employed during construction. It is the intent to provide effective erosion control by minimizing land disturbance at one given time, containing sediment from disturbed areas, treating runoff where possible, and stabilizing disturbed soils as soon as possible. The directives specified on the plans and in this report serve as a minimum for erosion and sediment control. All erosion and sediment control practices specified for this site shall be in conformance with the New York Standards & Specifications for Erosion & Sediment Control.

3.1 Temporary Erosion & Sediment Control Practices:

Listed below are the Temporary Erosion & Sediment Control Practices specified on the Details Plan. All practices shall be installed and maintained in conformance with the New York Standards & Specifications for Erosion & Sediment Control:

- Stabilized Construction Entrance



- Silt Fence
- Drop Inlet Protection
- Temporary Sediment Traps
- Soil Stockpile
- Debris Control

A stabilized construction entrance should be installed at the driveway entrance. The construction entrance is designed to prevent outgoing trucks from tracking soil onto the road. Construction details specifying installation requirements can be found on the plan.

Silt fence for the site will consist of a geotextile fabric installed at the toe of all disturbed slopes, and parallel to the contours. The silt fence is intended to reduce runoff velocity, and intercept sediment-laden runoff. Construction details specifying the proposed installation and type of permissible silt fence can be found on the plans.

Drop inlet protect for the site will consist of silt fencing surrounding the catch basins. The purpose of the staked silt fence is to prevent water with large amounts of sediment to enter the drainage system through the inlets.

Temporary sediment traps are proposed to control sediment laden runoff and store the accumulated sediment for proper disposal. The sediment traps have been designed to meet the standards of the New York Standards & Specifications for Erosion & Sediment Control. Construction details specifying installation and sizing requirements can be found on the plan. *Please note, sediment traps are only required during full buildout of Lot #3 and Lot #4.*

Soil stockpiles are to be stabilized with vegetation and surrounded with silt fencing. This will ensure the topsoil that is stripped from the site during construction will be protected for use during final grading and that no sediment from the stockpiles will be deposited downstream.

Construction debris, such as sheet metal and wood scrap, paper and insulation products, styrofoam cups and paper wrappers which could become windblown litter over and off the site if neglected. Suitable and ample refuse



containers shall be provided on the site and emptied when full. Any scattered debris shall be picked up and placed in containers on a continuous basis.

3.2 Permanent Erosion & Sediment Control Practices:

The intent of the permanent erosion and sediment control practices is to permanently stabilize the ground surface via vegetative and structural practices, while controlling and reducing runoff velocities. The following permanent erosion & sediment, control practices are proposed for the site:

- Rock Outlet Protection
- Level Spreader
- Land Grading
- Vegetation

Rock outlet protection is proposed at the outfalls of the infiltration system and stormwater basin. The intent of the rock outlet protection is to reduce the depth, velocity, and energy of water to prevent downstream erosion. The rock outlet protection was designed in accordance with the New York Standards & Specifications for Erosion & Sediment Control. Details specifying dimensions of the rock outlet protection have been included on the plans and calculations can be found in Appendix “D”.

Level spreaders are proposed at the outfalls of the footing drains of the buildings. The purpose of the level spreaders is to convert a concentrated flow and disperse it uniformly across a slope. Details of the level spreader have been provided on the plans.

Land grading is the reshaping of the existing land surface in accordance with the grading plan. Proper land grading is an essential component of the erosion control plan, as well as the stormwater pollution prevention plan. Proper grading will ensure the intended drainage areas are directed to the stormwater management practices.

Vegetation will be provided on all disturbed soils not covered by the proposed building, driveway, and parking area. Permanent vegetation will reduce runoff velocities, filter stormwater runoff, and minimize soil erosion. Optimum



times for planting are the early spring and fall; however, plantings can be started in the summer provided adequate mulch and moisture is supplied.

4.0 Maintenance & Inspection Requirements:

Maintenance and inspections are required in order to ensure the stormwater and erosion & sediment control practices are acting as designed. Inspections will be performed once a week by a Qualified Inspector during construction. Upon completion of construction and the subsequent filing of the Notice of Termination, maintenance and inspections are expected to be minimal. Temporary and permanent maintenance and inspection requirements are further discussed below. Proper maintenance and inspections will ensure the longevity and effectiveness of the stormwater pollution prevention plan, and erosion and sediment control plan.

4.1 Short Term Maintenance and Inspection Requirements:

Inspections performed during construction should verify all practices are functioning properly, correctly maintained, and accumulated sediment is removed from all control structures. The inspector must also examine the site for any evidence of soil erosion, the potential for pollutants to enter the storm drain system, turbid discharge at all outfalls, and the potential for soil and mud to be transported on the public roadway at the site entrance. In addition to these general guidelines, the project plans will provide more specific erosion control guidelines, as well as a construction sequence to guide the contractor through the construction process. Discussed below are specific maintenance and inspection requirements for the temporary practices to be employed at the site.

During construction, the silt fence should be inspected to ensure correct installation. In addition, any accumulated sediment resulting in “bulges” in the silt fence should be removed and mixed with onsite soil. Any damaged or torn silt fence should be replaced.



The construction entrance should be checked to ensure no sediment is being deposited onto the public roadway. Should sediment be observed, it should be removed from the street, and the stone in the construction entrance replaced.

All temporary sediment traps, water breaks, drainage structures, and stormwater basin shall be inspected weekly and after heavy rains. Excess sedimentation should be removed to stockpile areas. The stormwater basin shall be cleaned to original depth when sediment has accumulated to within 6" of the low level outlet in order to insure proper hydraulic functioning. All other drainage structures shall be cleaned when filled to ½ of the intended capacity.

Prior to the issuance of any certificate of occupancy for dwellings taking access from the common driveway, all drainage structures and facilities shall be brought to their proper function and cleaned to the line and grade shown on these drawings for the common driveway.in

Once construction is completed and the site has been stabilized, a Notice of Termination shall be filed. At this point limited maintenance requirements are anticipated.

4.2 Long Term Maintenance and Inspection Requirements:

A copy of the Maintenance & Inspection Checklists from Appendix G of the New York State Stormwater Management Design Manual are included in the Appendix of this report to serve as a guide for maintaining and inspecting the infiltration facilities and stormwater basin. A homeowners association shall be created to maintain infiltration system #3 and the stormwater basin in good working condition and in accordance with the long term inspection and maintenance requirements outlined in this report.

Inspections of the following items should be performed at a minimum every six months and following significant rainstorm events. Inspections and maintenance should be scheduled following the winter months (March or April) and during the fall (October or November). The inspection and maintenance of the facilities should include the following:



Infiltrators:

- Inspection of the infiltrator units to ensure accumulated water is infiltrating into the soil, and debris has not entered the infiltration units. Any debris should be removed. Once debris is removed, if stormwater is still not infiltrating contact a professional engineer licensed in the State of New York to examine the system.
- Inspect rock outlet protection pad (if applicable). Replace any rocks that have been displaced by scour.
- Inspection of the outlet of the outflow pipe to ensure it is not plugged or clogged.

Stormwater Basin:

- Inspect basin for build up of trash or debris. Remove any trash to prevent clogging of outlet structure.
- Inspection of basin for accumulation of sediment. Accumulated sediment should be removed immediately.
- Inspection of the outlet of the outflow pipe to ensure it is not plugged or clogged.

Catch Basins and Drainage Manholes:

- Inspect monthly and after heavy rain storms $> \frac{1}{2}$ " in 24 hours for sediment accumulation in sump. Accumulated sediment should be removed immediately.

Contech CDS Hydrodynamic Separator:

- Inspection of the treatment unit for sediment accumulation. Any debris and sediment should be removed.
- Refer to Appendix "F" of this report for additional inspection and maintenance information.

5.0 Outstanding Violations or Enforcement Actions:

There are no known outstanding violations or enforcement actions against this property, the owner or the applicant.

6.0 Conclusion:

IREP-CG East Lane, LLC is proposing to develop the existing lots and build a new, single-family, five-bedroom residence on Lot #1 of the subdivision. The proposal includes improvements to East Lane, construction of a common



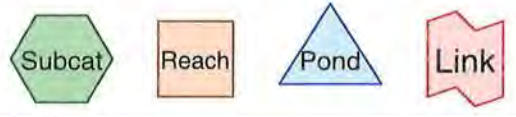
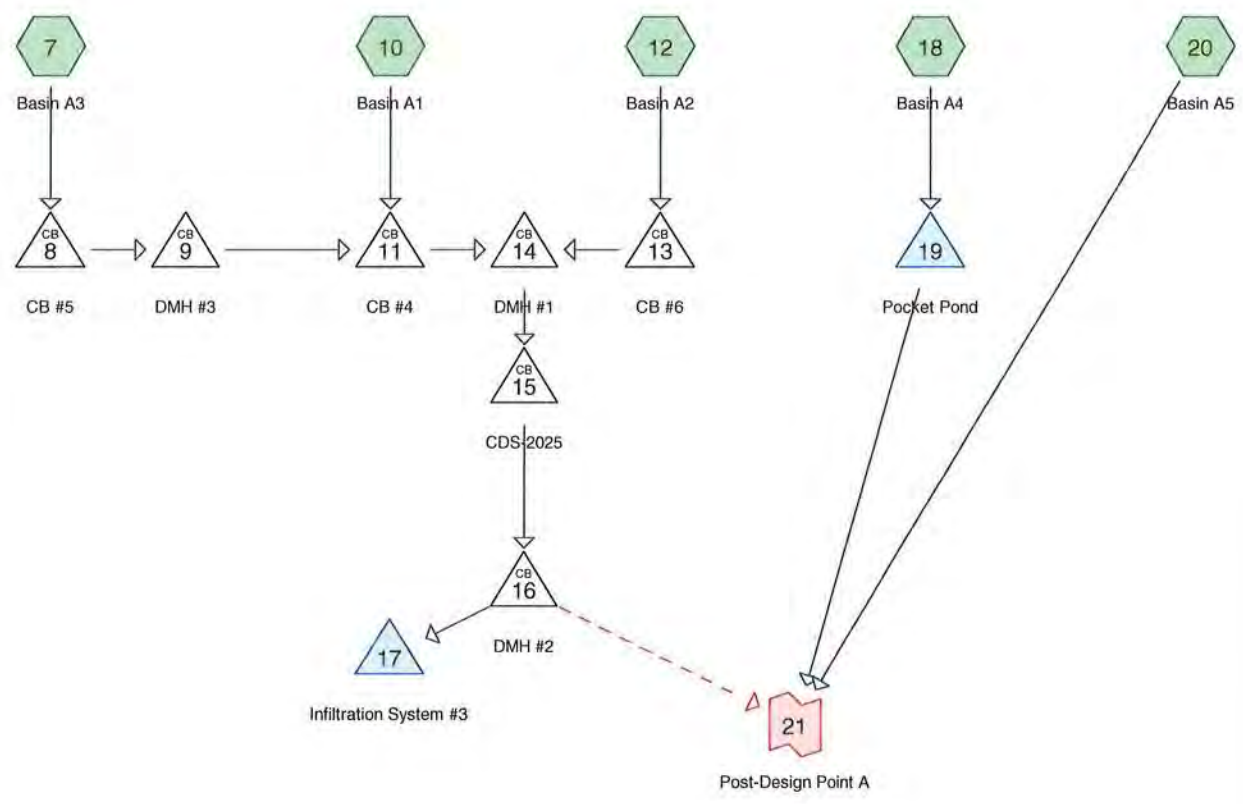
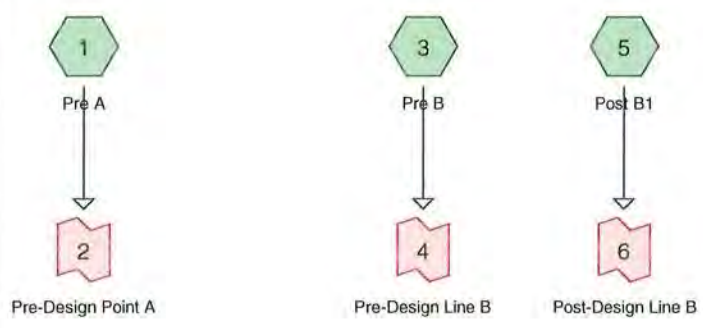
driveway and construction of common stormwater management systems. The proposed area of disturbance is 2.9 acres. As part of the construction, a stormwater management system will be installed to treat the runoff from all proposed impervious surfaces. The stormwater management system was designed in accordance with the New York State Stormwater Management Design Manual, and shall result in improved stormwater quality, as well as a reduction in peak flow discharge rates.

7.0 SWPPP 2022 Update:

IREP-CG East Lane, LLC is currently in contract with the owner of the Turet Subdivision to purchase the subdivision and begin development. IREP-CG East Lane, LLC is proposing to alter the approved plan for Lot #1 by demolishing the existing residence and construct a new house. (The original approval showed the existing residence to remain with a proposed addition.) Since the proposed impervious areas have changed, updated 25-year post-development stormwater analysis has been performed for the site and has been provided in Appendix “G” of this report. The storm analysis uses the same design point as the approved subdivision and only Design Point “A” is affected by the Lot #1 changes. The land areas and curve numbers (CN) used in the analysis represent the anticipated post-development buildout of the site including the updated Lot #1 layout, buildout of the other three lots, and the improved East Lane roadway. Due to the site layout changes, the approved infiltration system on Lot #3 has been revised to include four (4) additional Cultec chambers. There are no design changes required for the proposed pocket pond as shown in the HydroCAD Output Report. The updated storm analysis shows that the proposed development will result in a peak flow rate of 23.13 cfs leaving the project site at Design Point “A” during the 25-year storm event which is slightly smaller than the pre-development flow rate of 23.22 cfs. Therefore, the Town of North Castle stormwater requirement has been achieved for the project site.



Appendix A:
HydroCAD Output



Routing Diagram for Overall Watershed Analysis 10-28-16
 Prepared by Bibbo Associates, LLP, Printed 12/5/2016
 HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-360.00 hrs, dt=0.01 hrs, 36001 points

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

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Pre A	Runoff Area=633,814 sf 9.36% Impervious Runoff Depth=0.01" Flow Length=1,375' Tc=26.8 min CN=65 Runoff=0.02 cfs 469 cf
Link 2: Pre-Design Point A	Inflow=0.02 cfs 469 cf Primary=0.02 cfs 469 cf
Subcatchment 3: Pre B	Runoff Area=42,827 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=397' Tc=16.0 min CN=57 Runoff=0.00 cfs 0 cf
Link 4: Pre-Design Line B	Inflow=0.00 cfs 0 cf Primary=0.00 cfs 0 cf
Subcatchment 5: Post B1	Runoff Area=21,058 sf 0.00% Impervious Runoff Depth=0.00" Flow Length=397' Tc=16.0 min CN=56 Runoff=0.00 cfs 0 cf
Link 6: Post-Design Line B	Inflow=0.00 cfs 0 cf Primary=0.00 cfs 0 cf
Subcatchment 7: Basin A3	Runoff Area=13,647 sf 53.42% Impervious Runoff Depth=0.36" Flow Length=169' Tc=5.8 min CN=86 Runoff=0.12 cfs 415 cf
Pond 8: CB #5	Peak Elev=126.17' Inflow=0.12 cfs 415 cf 12.0" Round Culvert n=0.013 L=24.3' S=0.0412 '/ Outflow=0.12 cfs 415 cf
Pond 9: DMH #3	Peak Elev=125.16' Inflow=0.12 cfs 415 cf 15.0" Round Culvert n=0.013 L=187.8' S=0.0106 '/ Outflow=0.12 cfs 415 cf
Subcatchment 10: Basin A1	Runoff Area=86,602 sf 16.91% Impervious Runoff Depth=0.01" Flow Length=579' Tc=9.5 min CN=65 Runoff=0.00 cfs 64 cf
Pond 11: CB #4	Peak Elev=123.16' Inflow=0.12 cfs 479 cf 15.0" Round Culvert n=0.013 L=145.0' S=0.0207 '/ Outflow=0.12 cfs 479 cf
Subcatchment 12: Basin A2	Runoff Area=8,077 sf 62.54% Impervious Runoff Depth=0.27" Flow Length=235' Tc=4.6 min CN=83 Runoff=0.05 cfs 182 cf
Pond 13: CB #6	Peak Elev=123.61' Inflow=0.05 cfs 182 cf 10.0" Round Culvert n=0.013 L=9.3' S=0.3763 '/ Outflow=0.05 cfs 182 cf
Pond 14: DMH #1	Peak Elev=120.19' Inflow=0.17 cfs 661 cf 15.0" Round Culvert n=0.013 L=6.0' S=0.0833 '/ Outflow=0.17 cfs 661 cf
Pond 15: CDS-2025	Peak Elev=119.69' Inflow=0.17 cfs 661 cf 15.0" Round Culvert n=0.013 L=209.4' S=0.1074 '/ Outflow=0.17 cfs 661 cf
Pond 16: DMH #2	Peak Elev=94.84' Inflow=0.17 cfs 661 cf Primary=0.17 cfs 661 cf Secondary=0.00 cfs 0 cf Outflow=0.17 cfs 661 cf

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Pond 17: Infiltration System #3

Peak Elev=94.01' Storage=5 cf Inflow=0.17 cfs 661 cf
Outflow=0.15 cfs 661 cf

Subcatchment 18: Basin A4

Runoff Area=53,734 sf 29.43% Impervious Runoff Depth=0.05"
Flow Length=486' Tc=7.3 min CN=71 Runoff=0.01 cfs 229 cf

Pond 19: Pocket Pond

Peak Elev=136.60' Storage=1,414 cf Inflow=0.01 cfs 229 cf
Outflow=0.00 cfs 228 cf

Subcatchment 20: Basin A5

Runoff Area=486,806 sf 11.60% Impervious Runoff Depth=0.01"
Flow Length=1,375' Tc=26.8 min CN=66 Runoff=0.02 cfs 544 cf

Link 21: Post-Design Point A

Inflow=0.02 cfs 772 cf
Primary=0.02 cfs 772 cf

**Total Runoff Area = 1,346,565 sf Runoff Volume = 1,902 cf Average Runoff Depth = 0.02"
88.22% Pervious = 1,187,960 sf 11.78% Impervious = 158,605 sf**

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: Pre A

Runoff = 0.02 cfs @ 17.48 hrs, Volume= 469 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
153,576	70	Woods, Good, HSG C
280,022	55	Woods, Good, HSG B
116,063	61	>75% Grass cover, Good, HSG B
11,498	74	>75% Grass cover, Good, HSG C
9,346	85	Gravel roads, HSG B
1,614	89	Gravel roads, HSG C
59,355	98	Paved parking & roofs
2,340	87	Dirt roads, HSG C
633,814	65	Weighted Average
574,459		90.64% Pervious Area
59,355		9.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Bot.W=10.00' D=1.50' Z= 1.0 ' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

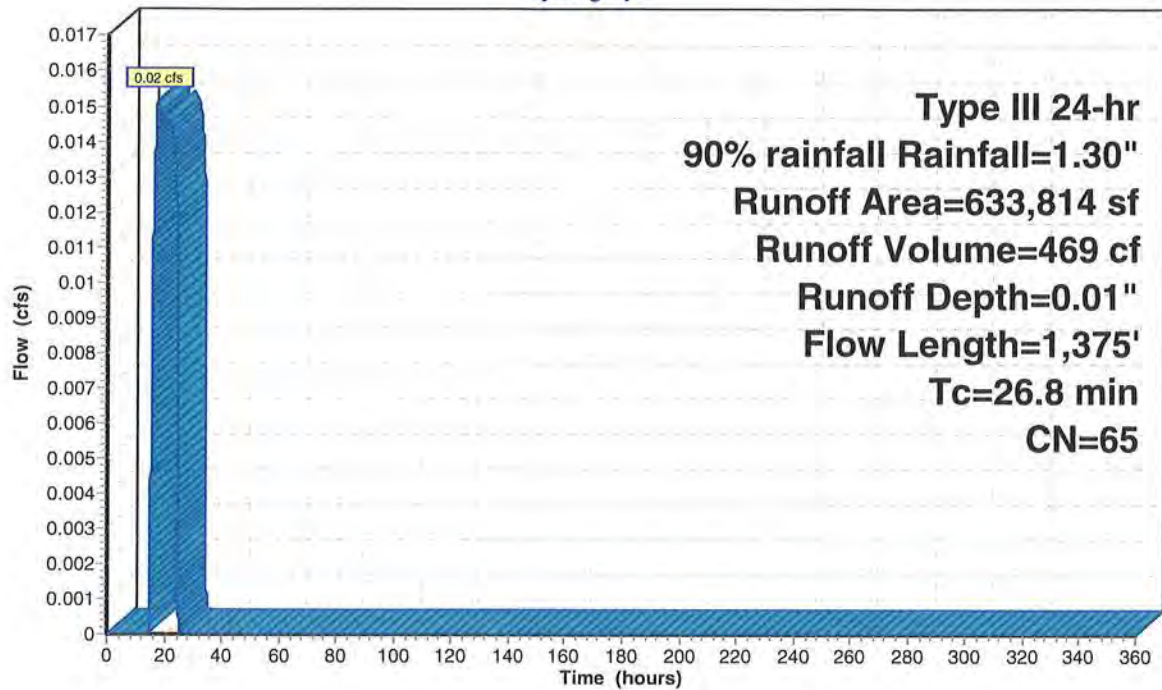
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 1: Pre A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

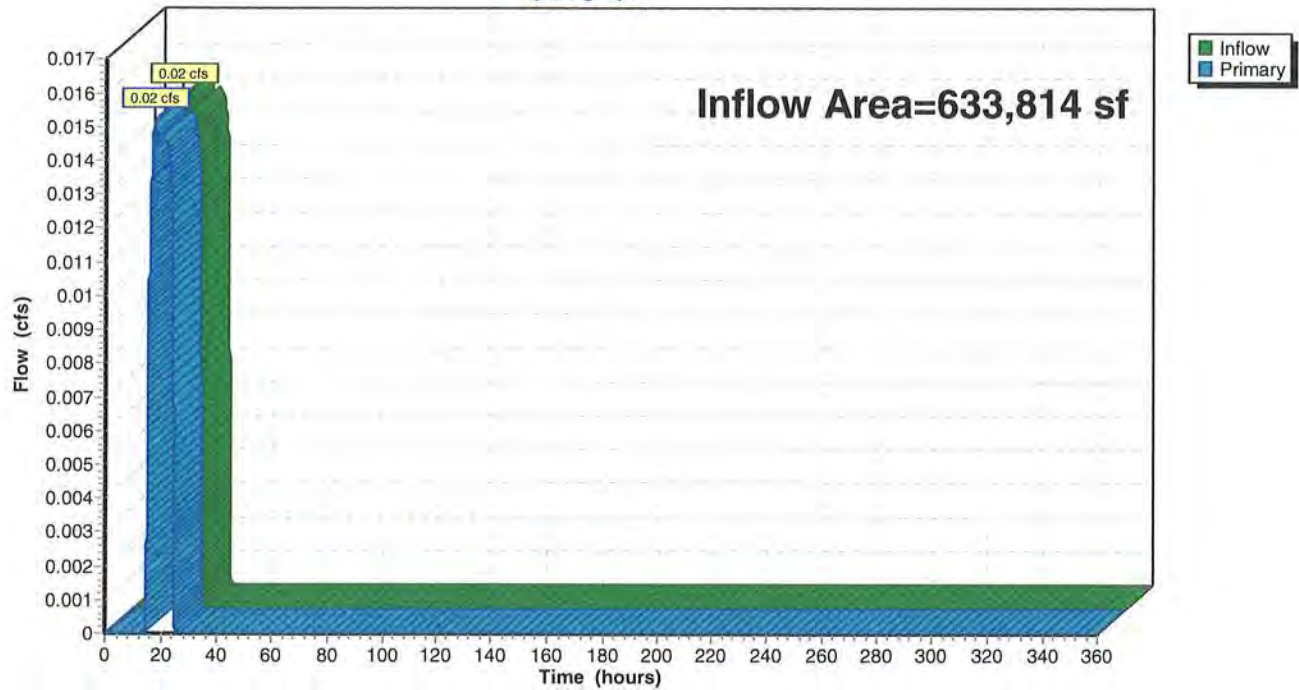
Summary for Link 2: Pre-Design Point A

Inflow Area = 633,814 sf, 9.36% Impervious, Inflow Depth = 0.01" for 90% rainfall event
Inflow = 0.02 cfs @ 17.48 hrs, Volume= 469 cf
Primary = 0.02 cfs @ 17.48 hrs, Volume= 469 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 2: Pre-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 3: Pre B

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

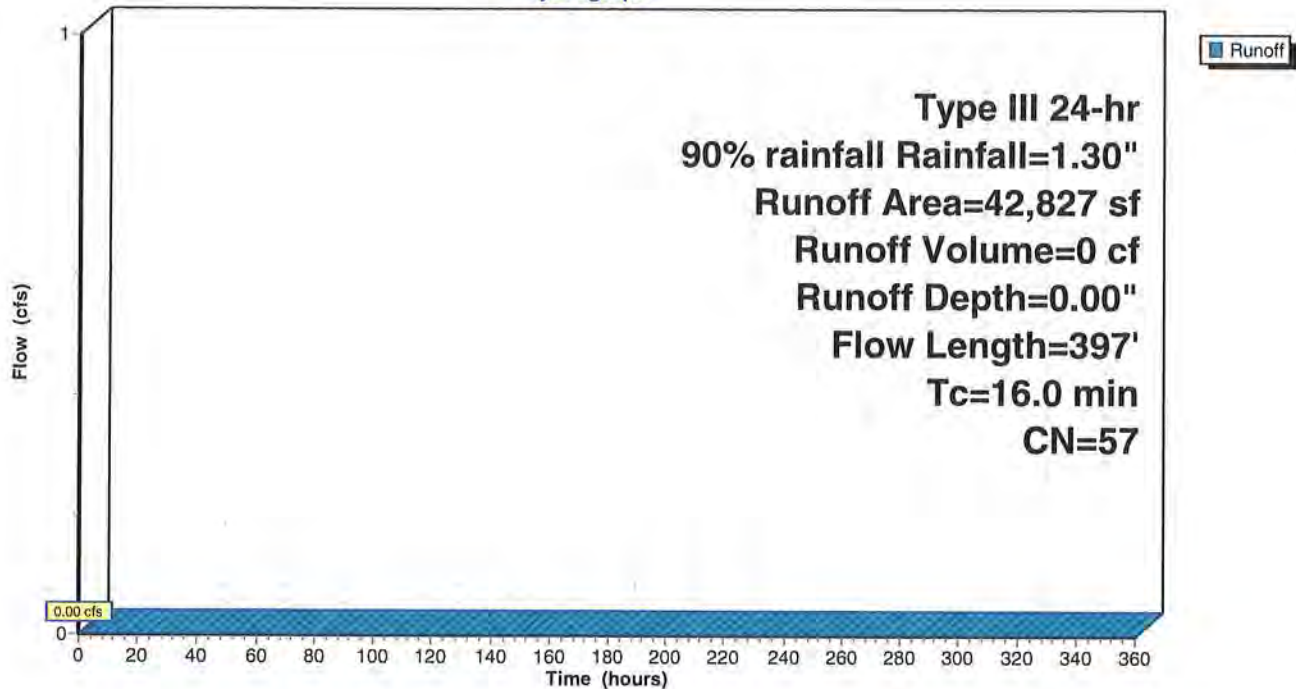
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
30,675	55	Woods, Good, HSG B
12,152	61	>75% Grass cover, Good, HSG B
42,827	57	Weighted Average
42,827		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 3: Pre B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

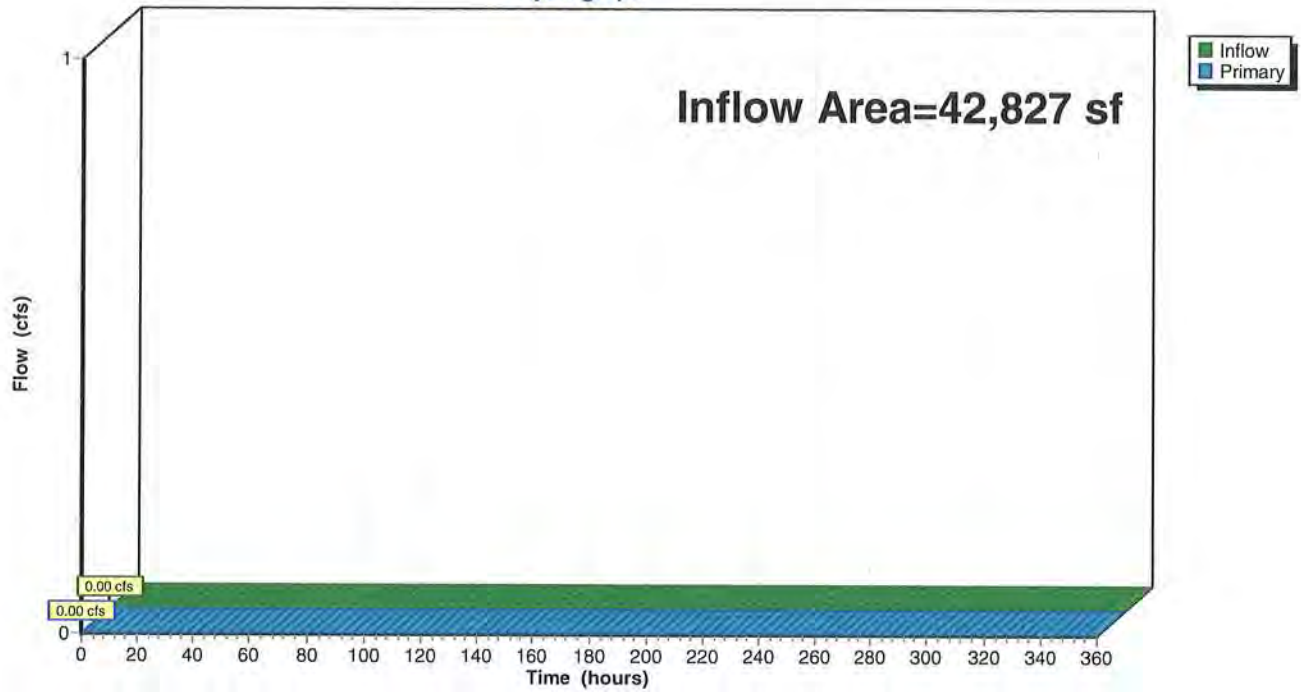
Summary for Link 4: Pre-Design Line B

Inflow Area = 42,827 sf, 0.00% Impervious, Inflow Depth = 0.00" for 90% rainfall event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 4: Pre-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 5: Post B1

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

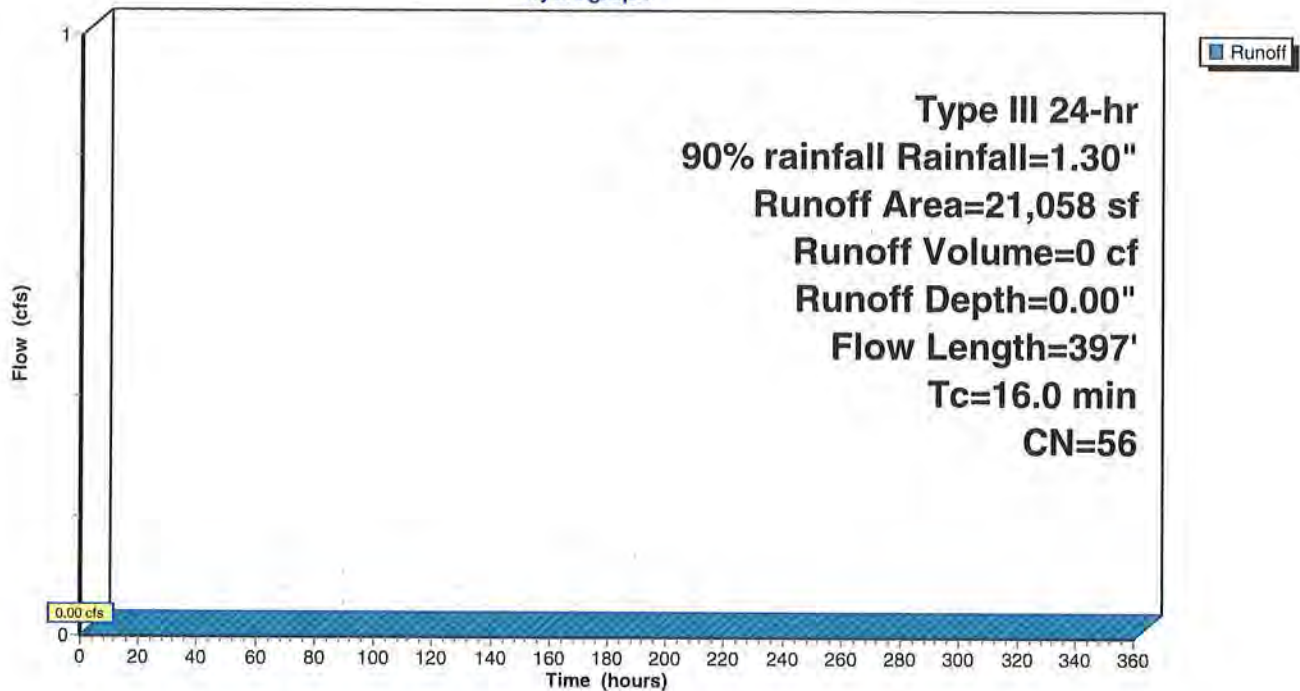
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
18,999	55	Woods, Good, HSG B
2,059	61	>75% Grass cover, Good, HSG B
21,058	56	Weighted Average
21,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 5: Post B1

Hydrograph



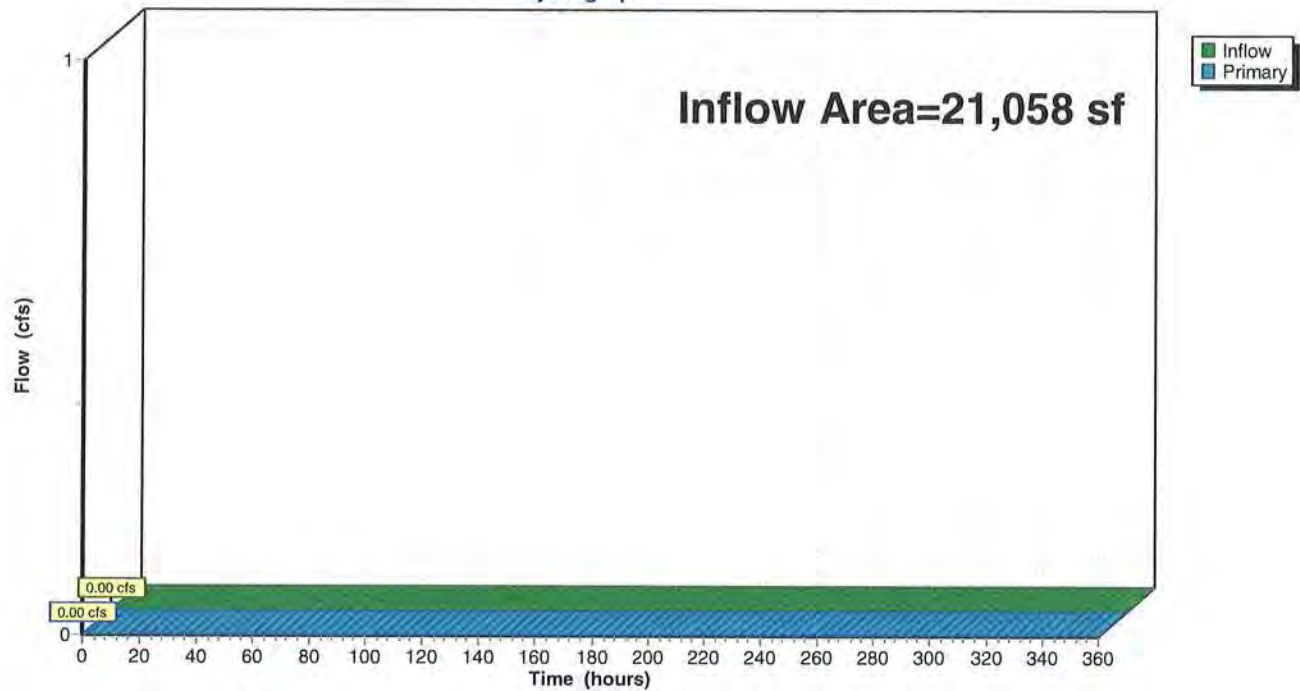
Summary for Link 6: Post-Design Line B

Inflow Area = 21,058 sf, 0.00% Impervious, Inflow Depth = 0.00" for 90% rainfall event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 6: Post-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 7: Basin A3

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 415 cf, Depth= 0.36"

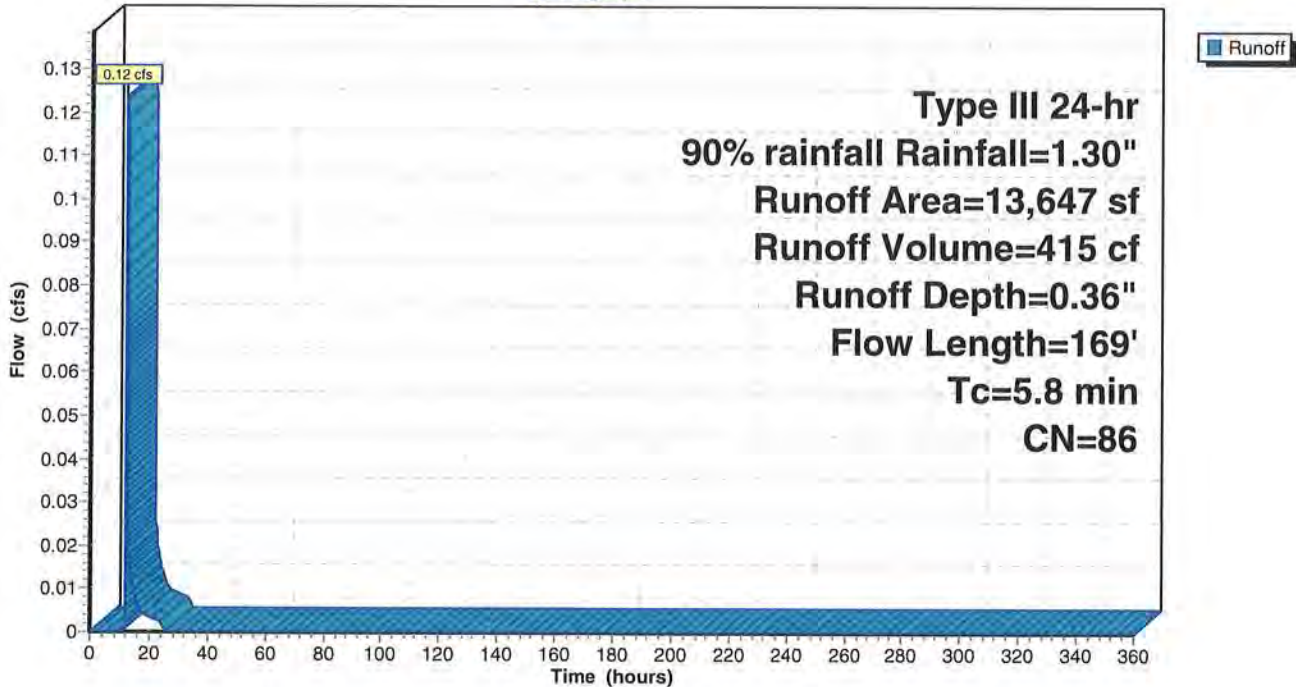
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
7,290	98	Paved parking & roofs
5,560	74	>75% Grass cover, Good, HSG C
797	61	>75% Grass cover, Good, HSG B
13,647	86	Weighted Average
6,357		46.58% Pervious Area
7,290		53.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0775	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.1	5	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0379	3.95		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.8	169	Total			

Subcatchment 7: Basin A3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 8: CB #5

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 0.36" for 90% rainfall event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 415 cf
Outflow = 0.12 cfs @ 12.10 hrs, Volume= 415 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.10 hrs, Volume= 415 cf

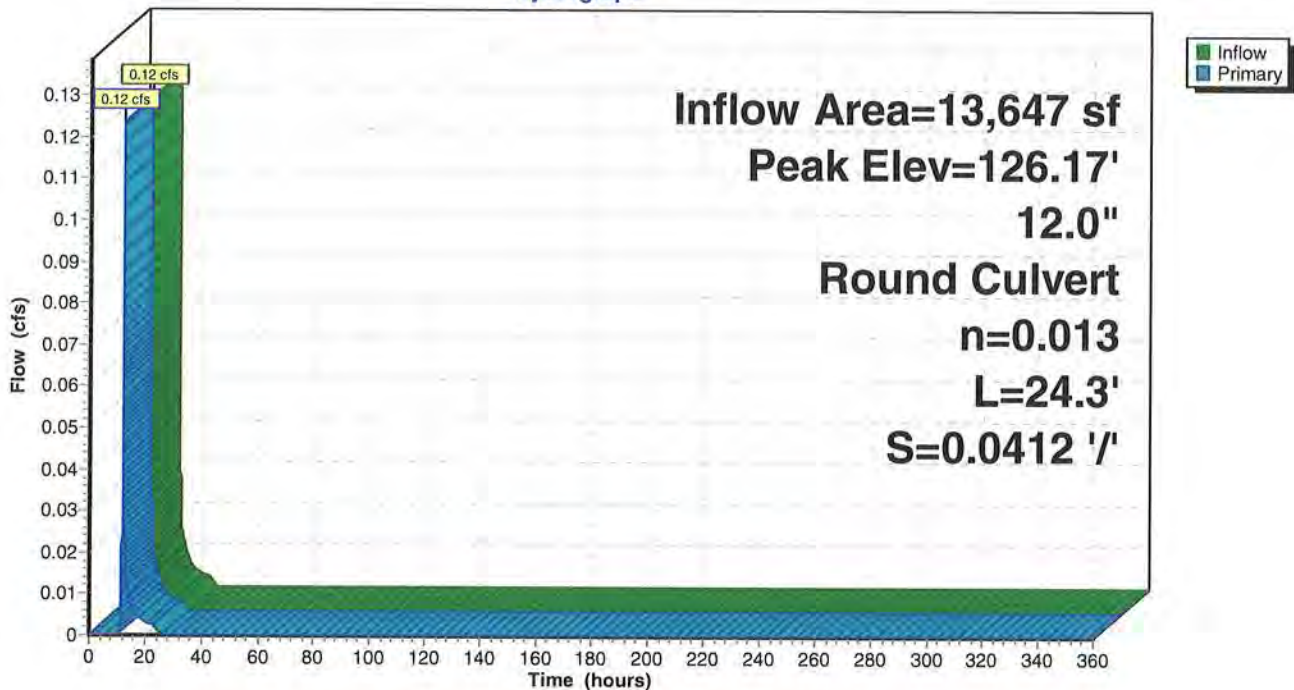
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 126.17' @ 12.10 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	126.00'	12.0" Round Culvert L= 24.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 126.00' / 125.00' S= 0.0412 1/1 Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.12 cfs @ 12.10 hrs HW=126.17' TW=125.16' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.12 cfs @ 1.40 fps)

Pond 8: CB #5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 9: DMH #3

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 0.36" for 90% rainfall event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 415 cf
Outflow = 0.12 cfs @ 12.10 hrs, Volume= 415 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.10 hrs, Volume= 415 cf

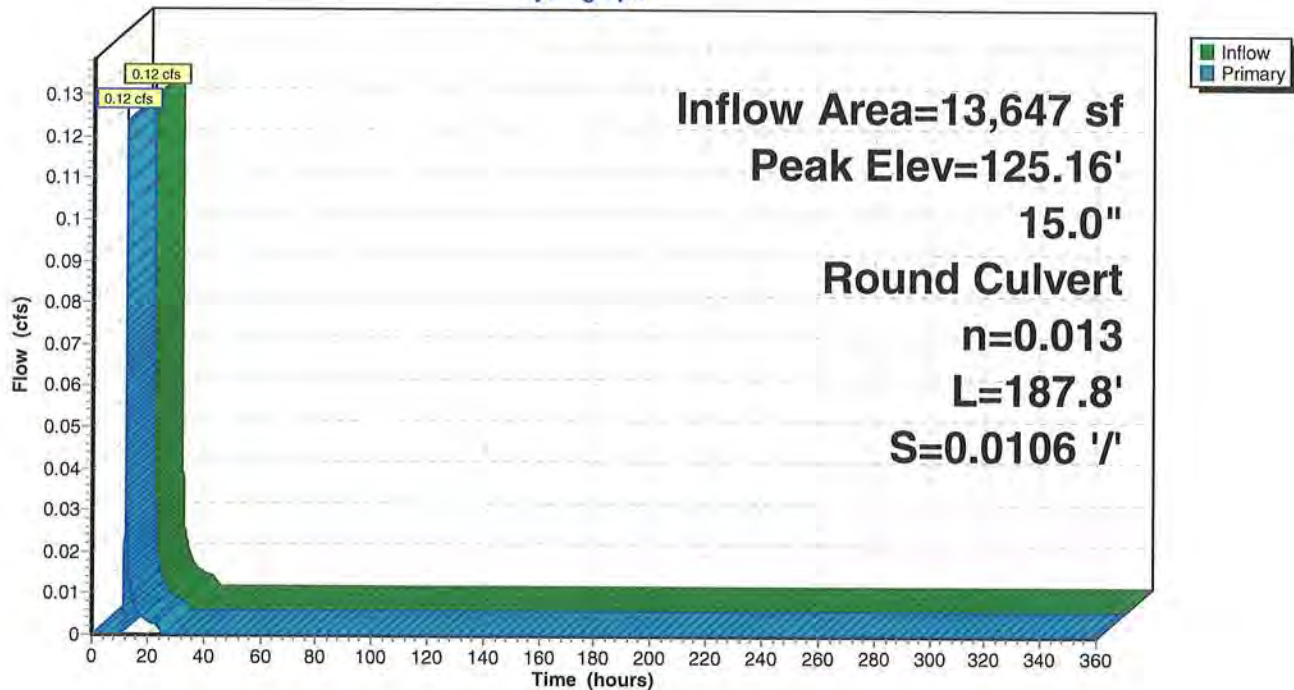
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.16' @ 12.10 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	15.0" Round Culvert L= 187.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 125.00' / 123.00' S= 0.0106 1/ S= 0.0106 1/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.12 cfs @ 12.10 hrs HW=125.16' TW=123.16' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.12 cfs @ 2.06 fps)

Pond 9: DMH #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 10: Basin A1

Runoff = 0.00 cfs @ 17.24 hrs, Volume= 64 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
2,285	70	Woods, Good, HSG C
34,674	55	Woods, Good, HSG B
34,997	61	>75% Grass cover, Good, HSG B
13,046	98	Paved parking & roofs
1,600	98	Water Surface
86,602	65	Weighted Average
71,956		83.09% Pervious Area
14,646		16.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0500	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	61	0.0570	1.67		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	66	0.1590	1.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	89	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	78	0.0630	3.76		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	145	0.0448	11.14	13.67	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
9.5	579	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

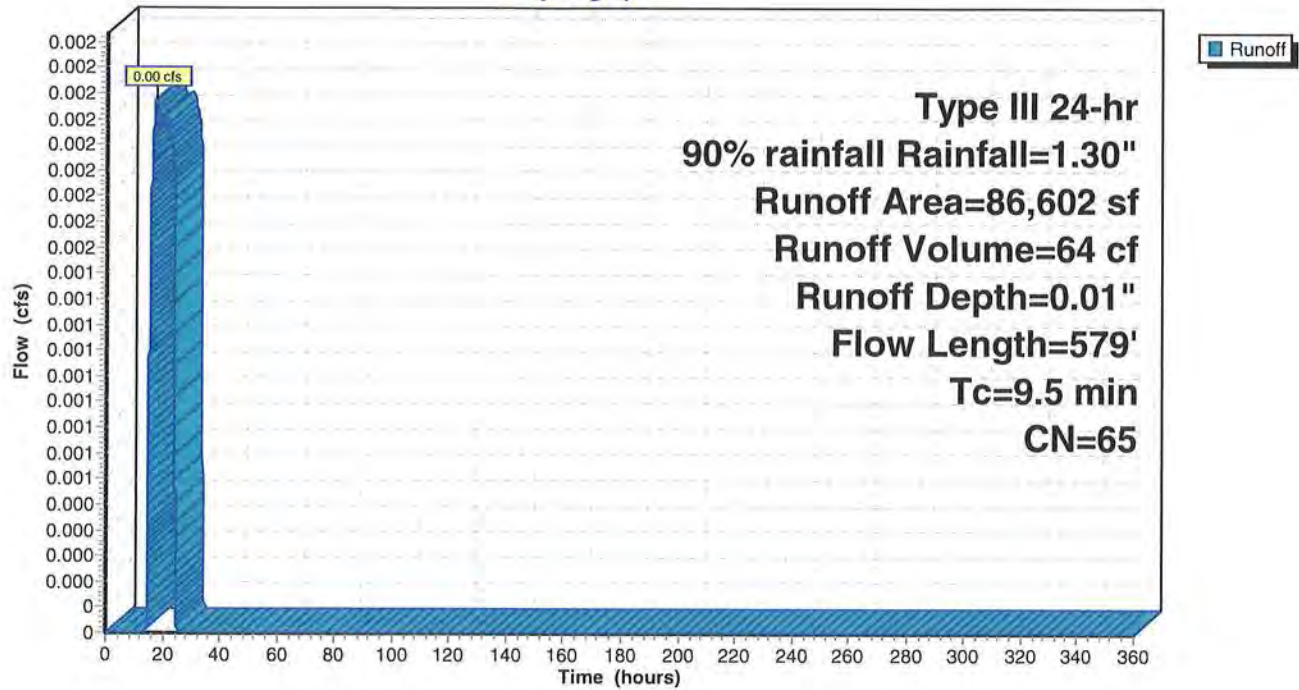
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 90% rainfall Rainfall=1.30"

Printed 12/5/2016

Subcatchment 10: Basin A1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 11: CB #4

Inflow Area = 100,249 sf, 21.88% Impervious, Inflow Depth = 0.06" for 90% rainfall event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 479 cf
Outflow = 0.12 cfs @ 12.10 hrs, Volume= 479 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 12.10 hrs, Volume= 479 cf

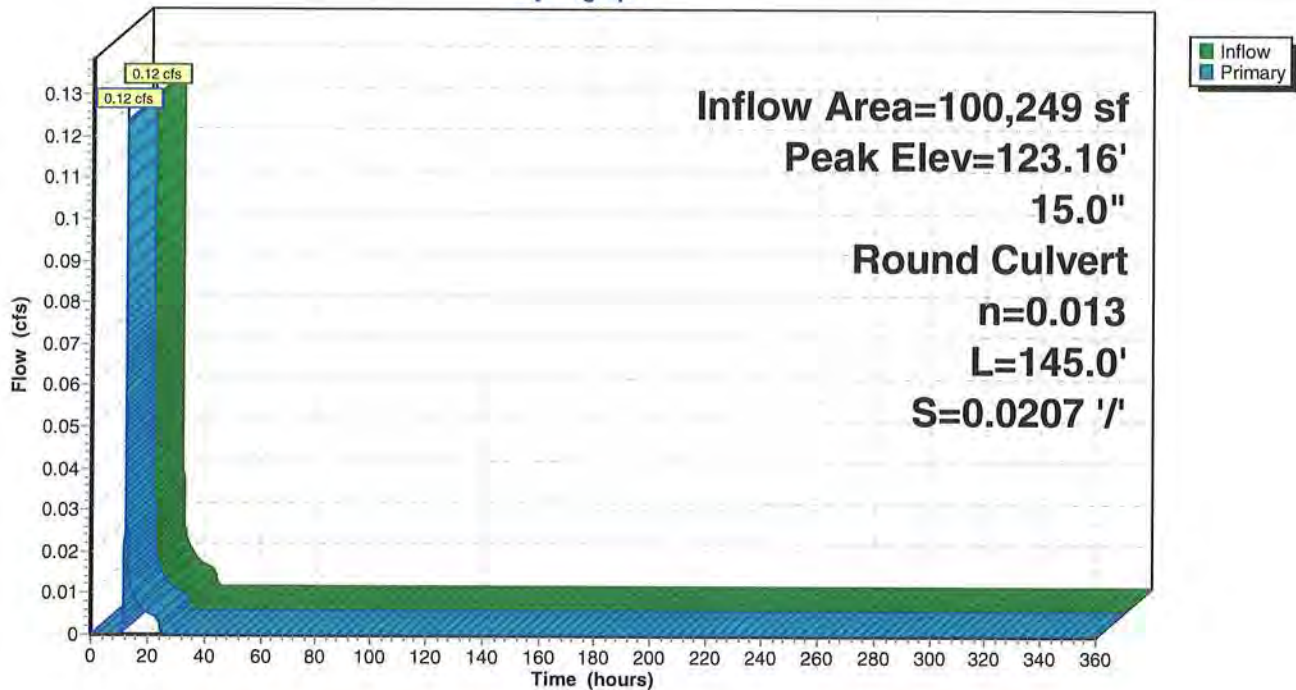
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 123.16' @ 12.10 hrs
Flood Elev= 130.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.00'	15.0" Round Culvert L= 145.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 120.00' S= 0.0207 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.12 cfs @ 12.10 hrs HW=123.16' TW=120.19' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.12 cfs @ 1.36 fps)

Pond 11: CB #4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 12: Basin A2

Runoff = 0.05 cfs @ 12.08 hrs, Volume= 182 cf, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
1,667	55	Woods, Good, HSG B
1,089	61	>75% Grass cover, Good, HSG B
270	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking & roofs
2,871	98	Roofs, HSG B
8,077	83	Weighted Average
3,026		37.46% Pervious Area
5,051		62.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	30	0.5000	0.51		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
3.0	28	0.1984	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	177	0.0085	4.85	5.96	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
4.6	235	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

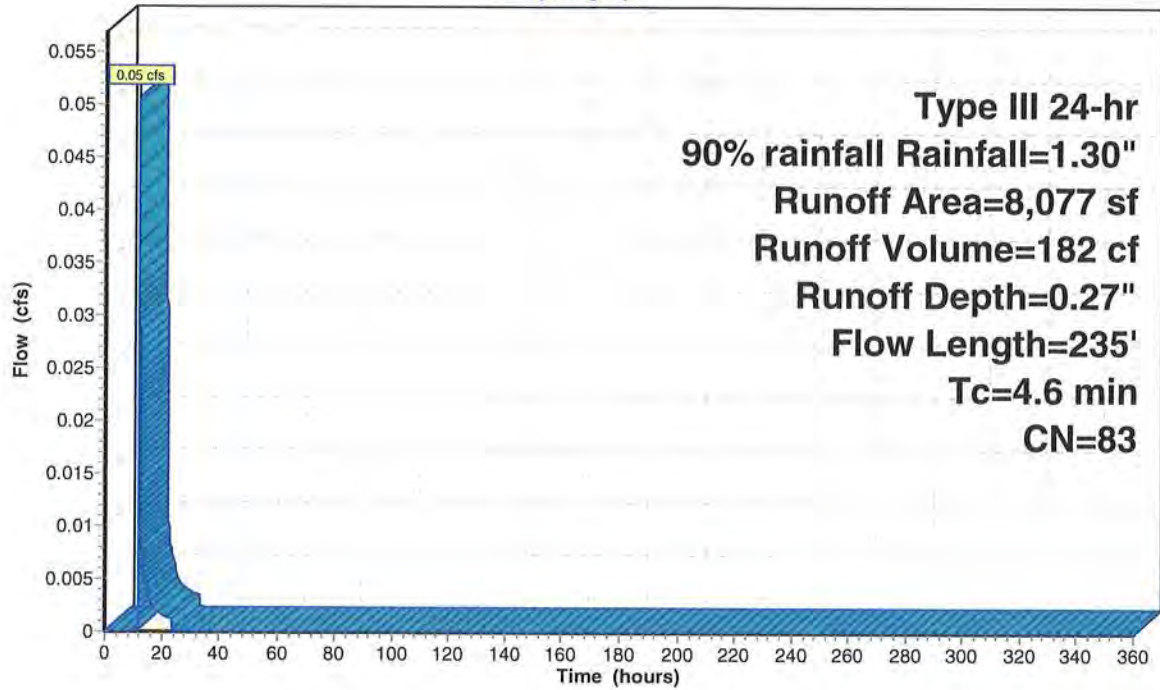
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 90% rainfall Rainfall=1.30"

Printed 12/5/2016

Subcatchment 12: Basin A2

Hydrograph



**Type III 24-hr
90% rainfall Rainfall=1.30"
Runoff Area=8,077 sf
Runoff Volume=182 cf
Runoff Depth=0.27"
Flow Length=235'
Tc=4.6 min
CN=83**

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 13: CB #6

Inflow Area = 8,077 sf, 62.54% Impervious, Inflow Depth = 0.27" for 90% rainfall event
Inflow = 0.05 cfs @ 12.08 hrs, Volume= 182 cf
Outflow = 0.05 cfs @ 12.08 hrs, Volume= 182 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.08 hrs, Volume= 182 cf

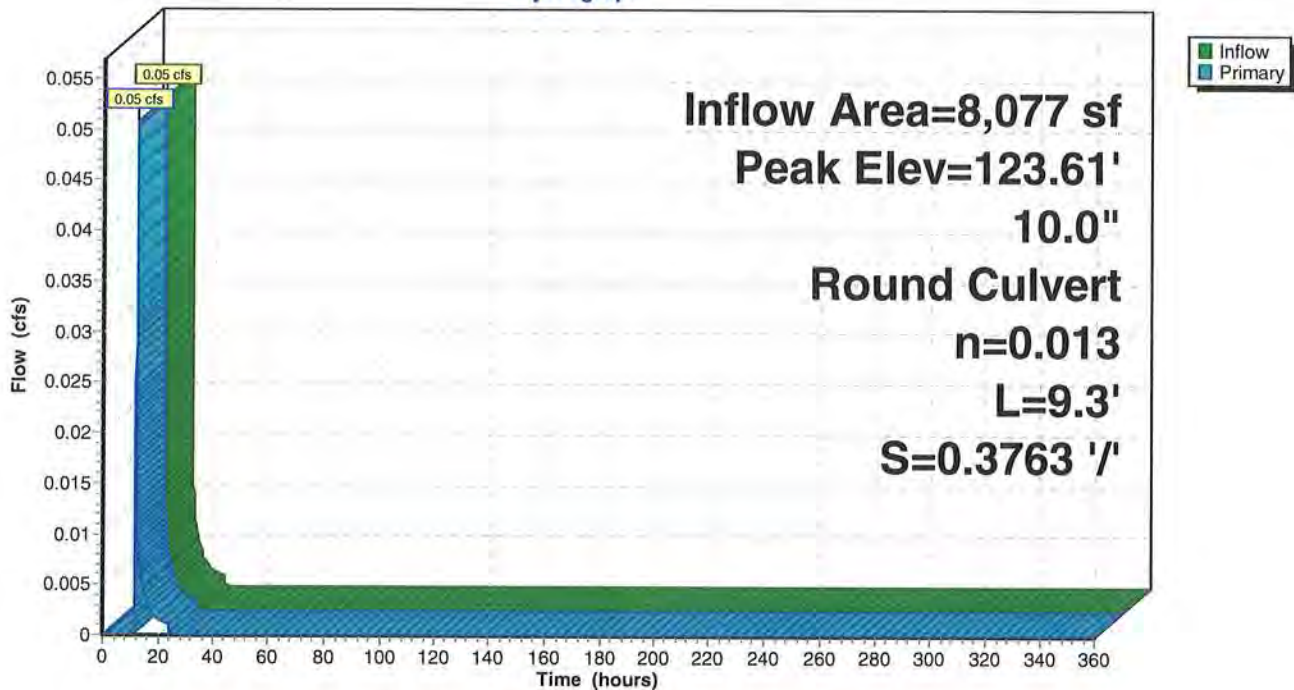
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 123.61' @ 12.08 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.50'	10.0" Round Culvert L= 9.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.50' / 120.00' S= 0.3763 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.05 cfs @ 12.08 hrs HW=123.61' TW=120.19' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.05 cfs @ 1.14 fps)

Pond 13: CB #6

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 14: DMH #1

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.07" for 90% rainfall event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 12.09 hrs, Volume= 661 cf

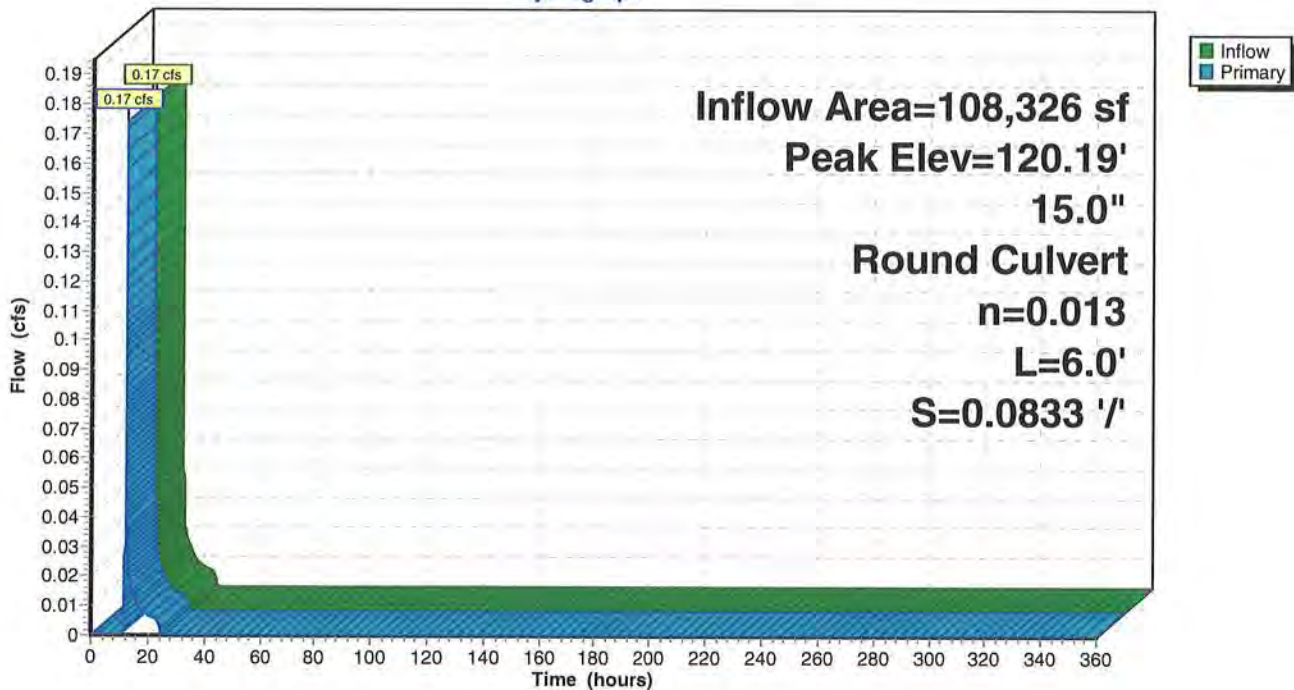
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 120.19' @ 12.09 hrs
Flood Elev= 127.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	15.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.50' S= 0.0833 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=120.19' TW=119.69' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 0.17 cfs @ 1.48 fps)

Pond 14: DMH #1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 15: CDS-2025

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.07" for 90% rainfall event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 12.09 hrs, Volume= 661 cf

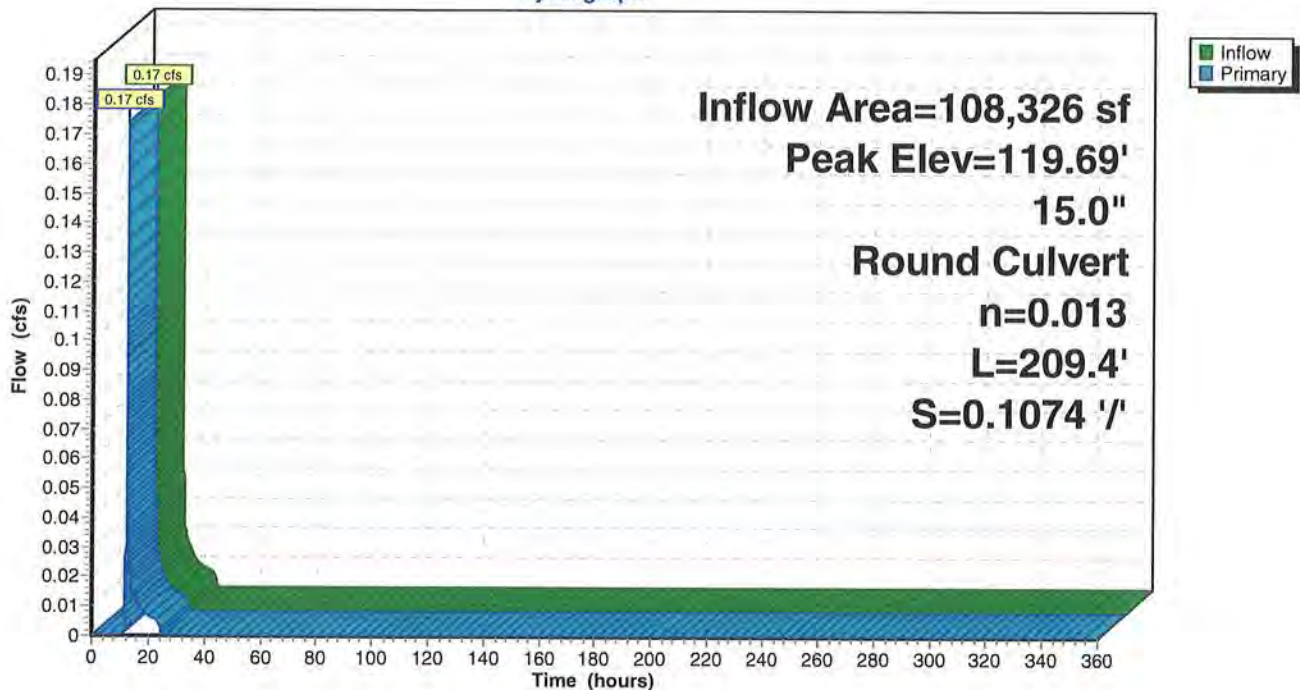
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 119.69' @ 12.09 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	15.0" Round Culvert L= 209.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.50' / 97.00' S= 0.1074 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=119.69' TW=94.84' (Dynamic Tailwater)
↑=Culvert (Inlet Controls 0.17 cfs @ 1.48 fps)

Pond 15: CDS-2025

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 16: DMH #2

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.07" for 90% rainfall event
 Inflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf
 Outflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.17 cfs @ 12.09 hrs, Volume= 661 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.84' @ 12.09 hrs
 Flood Elev= 100.00'

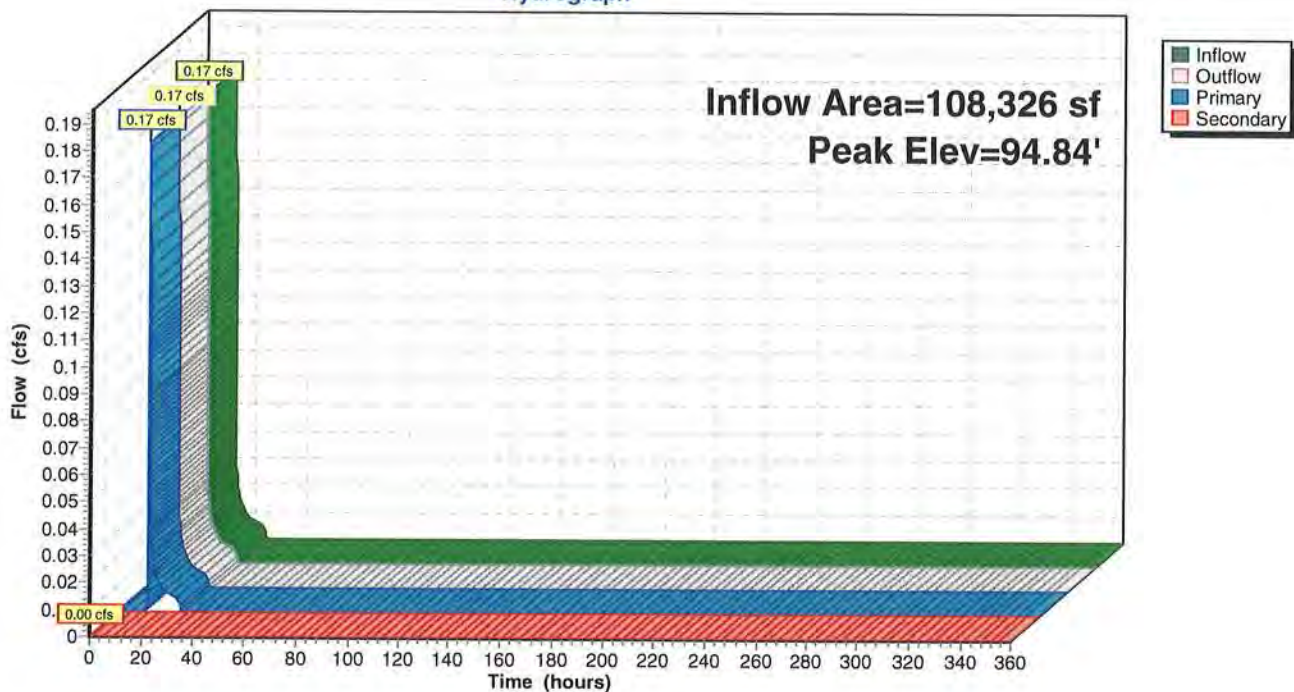
Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0" Round Culvert L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 94.50' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	97.00'	24.0" Round Culvert L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.00' / 94.00' S= 0.0370 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=94.84' TW=94.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Barrel Controls 0.17 cfs @ 1.74 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.50' TW=0.00' (Dynamic Tailwater)
 ↳ **2=Culvert** (Controls 0.00 cfs)

Pond 16: DMH #2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 17: Infiltration System #3

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.07" for 90% rainfall event
 Inflow = 0.17 cfs @ 12.09 hrs, Volume= 661 cf
 Outflow = 0.15 cfs @ 12.09 hrs, Volume= 661 cf, Atten= 13%, Lag= 0.0 min
 Discarded = 0.15 cfs @ 12.09 hrs, Volume= 661 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 94.01' @ 12.14 hrs Surf.Area= 1,398 sf Storage= 5 cf
 Flood Elev= 98.00' Surf.Area= 1,398 sf Storage= 3,363 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.1 min (904.8 - 904.7)

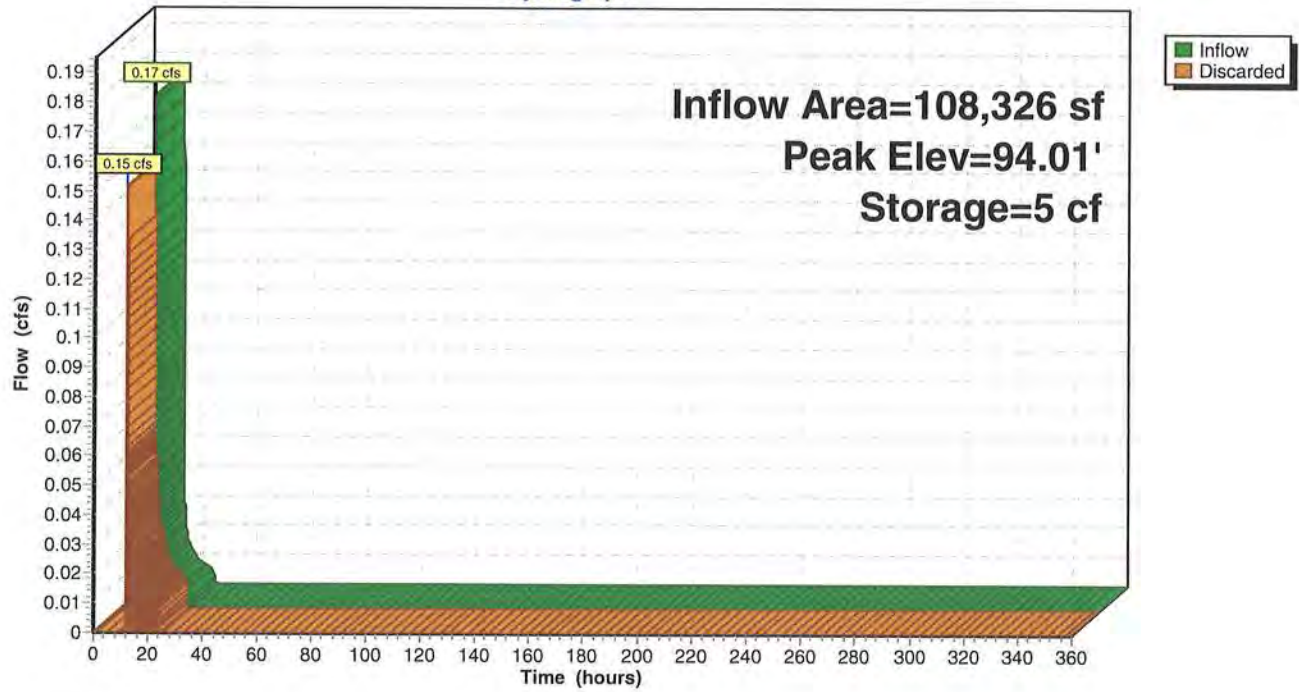
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	1,485 cf	21.50'W x 65.00'L x 4.00'H Prismaoid 5,590 cf Overall - 1,878 cf Embedded = 3,712 cf x 40.0% Voids
#2	94.50'	1,878 cf	Cultec R-330XLHD x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		3,363 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	4.680 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.15 cfs @ 12.09 hrs HW=94.00' (Free Discharge)
 ↑-1=Exfiltration (Exfiltration Controls 0.15 cfs)

Pond 17: Infiltration System #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 18: Basin A4

Runoff = 0.01 cfs @ 12.50 hrs, Volume= 229 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
17,045	55	Woods, Good, HSG B
15,813	98	Paved parking & roofs
17,689	61	>75% Grass cover, Good, HSG B
3,187	85	Gravel roads, HSG B
53,734	71	Weighted Average
37,921		70.57% Pervious Area
15,813		29.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.0850	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.4	14	0.0357	0.56		Sheet Flow, Gravel n= 0.029 P2= 3.50"
2.8	46	0.0870	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.5	46	0.0435	1.46		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	247	0.0486	4.48		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	93	0.0161	6.68	8.20	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
7.3	486	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

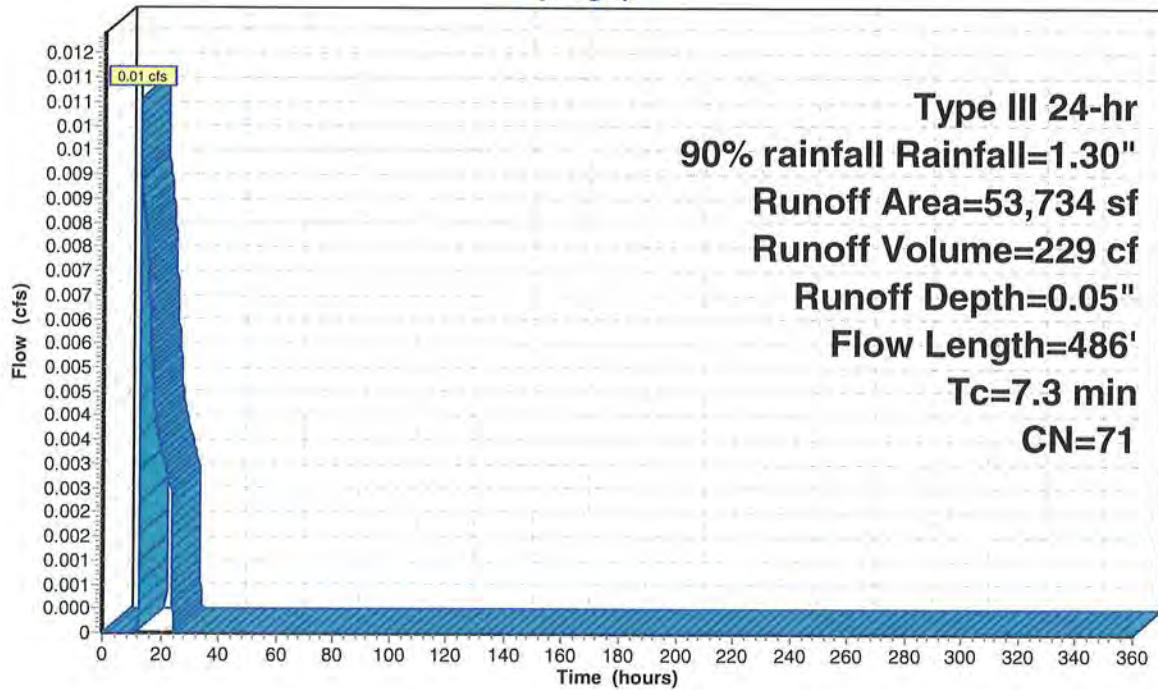
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 18: Basin A4

Hydrograph



**Type III 24-hr
90% rainfall Rainfall=1.30"
Runoff Area=53,734 sf
Runoff Volume=229 cf
Runoff Depth=0.05"
Flow Length=486'
Tc=7.3 min
CN=71**

Runoff

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 19: Pocket Pond

Inflow Area = 53,734 sf, 29.43% Impervious, Inflow Depth = 0.05" for 90% rainfall event
 Inflow = 0.01 cfs @ 12.50 hrs, Volume= 229 cf
 Outflow = 0.00 cfs @ 21.78 hrs, Volume= 228 cf, Atten= 69%, Lag= 556.8 min
 Primary = 0.00 cfs @ 21.78 hrs, Volume= 228 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Starting Elev= 136.50' Surf.Area= 1,107 sf Storage= 1,300 cf
 Peak Elev= 136.60' @ 21.78 hrs Surf.Area= 1,173 sf Storage= 1,414 cf (113 cf above start)
 Flood Elev= 140.00' Surf.Area= 2,857 sf Storage= 6,364 cf (5,064 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 686.4 min (1,699.5 - 1,013.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	134.00'	6,364 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
134.00	95	71.9	0	0	95	
135.00	386	122.6	224	224	886	
136.00	829	172.5	594	818	2,067	
136.50	1,107	197.3	482	1,300	2,802	
137.00	1,455	224.9	639	1,939	3,736	
137.50	1,803	238.1	813	2,752	4,236	
137.60	2,049	177.8	192	2,944	6,231	
138.00	2,268	186.3	863	3,807	6,488	
139.00	2,857	206.5	2,557	6,364	7,150	

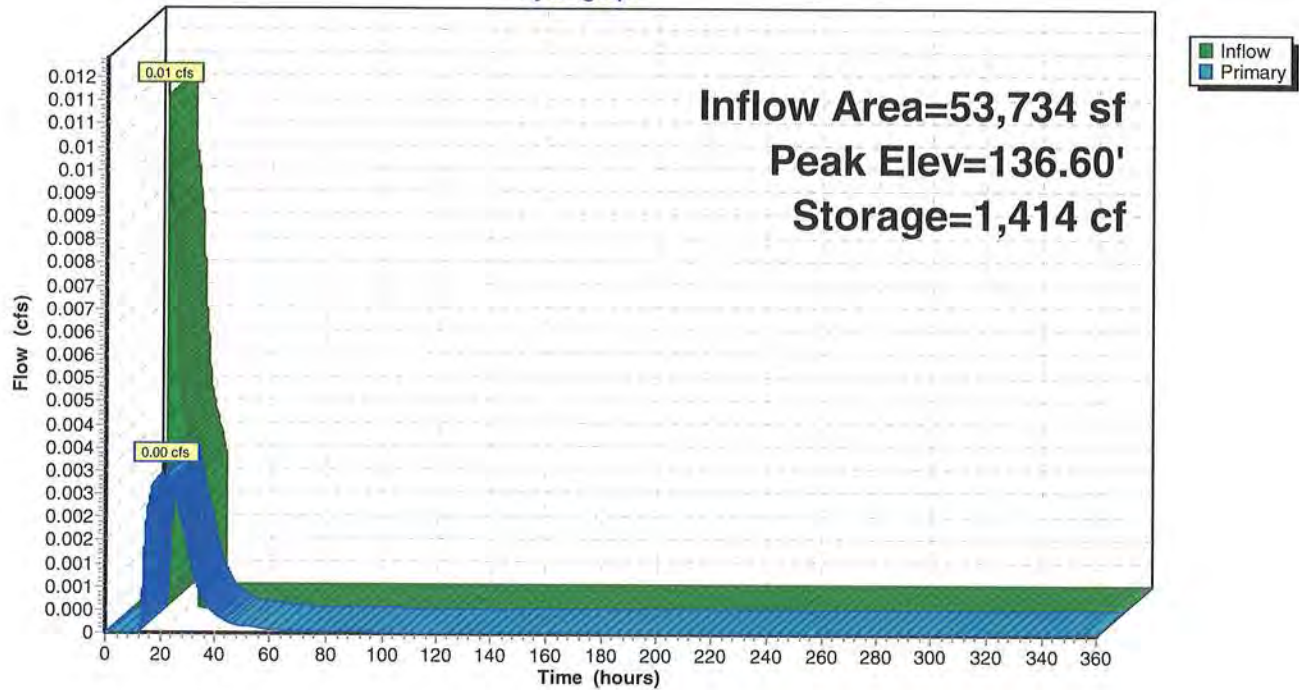
Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	15.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.50' / 134.00' S= 0.0373 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	136.50'	0.7" Vert. Orifice/Grate C= 0.600
#3	Device 1	138.00'	48.0" x 30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 21.78 hrs HW=136.60' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.00 cfs of 0.05 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.00 cfs @ 1.28 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 19: Pocket Pond

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 20: Basin A5

Runoff = 0.02 cfs @ 15.99 hrs, Volume= 544 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 90% rainfall Rainfall=1.30"

Area (sf)	CN	Description
95,873	70	Woods, Good, HSG C
217,255	55	Woods, Good, HSG B
43,293	74	>75% Grass cover, Good, HSG C
69,274	61	>75% Grass cover, Good, HSG B
1,614	89	Gravel roads, HSG C
1,432	85	Gravel roads, HSG B
1,615	87	Dirt roads, HSG C
54,850	98	Paved parking & roofs
1,600	98	Water Surface
486,806	66	Weighted Average
430,356		88.40% Pervious Area
56,450		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Brook Bot.W=10.00' D=1.50' Z= 1.0 ' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

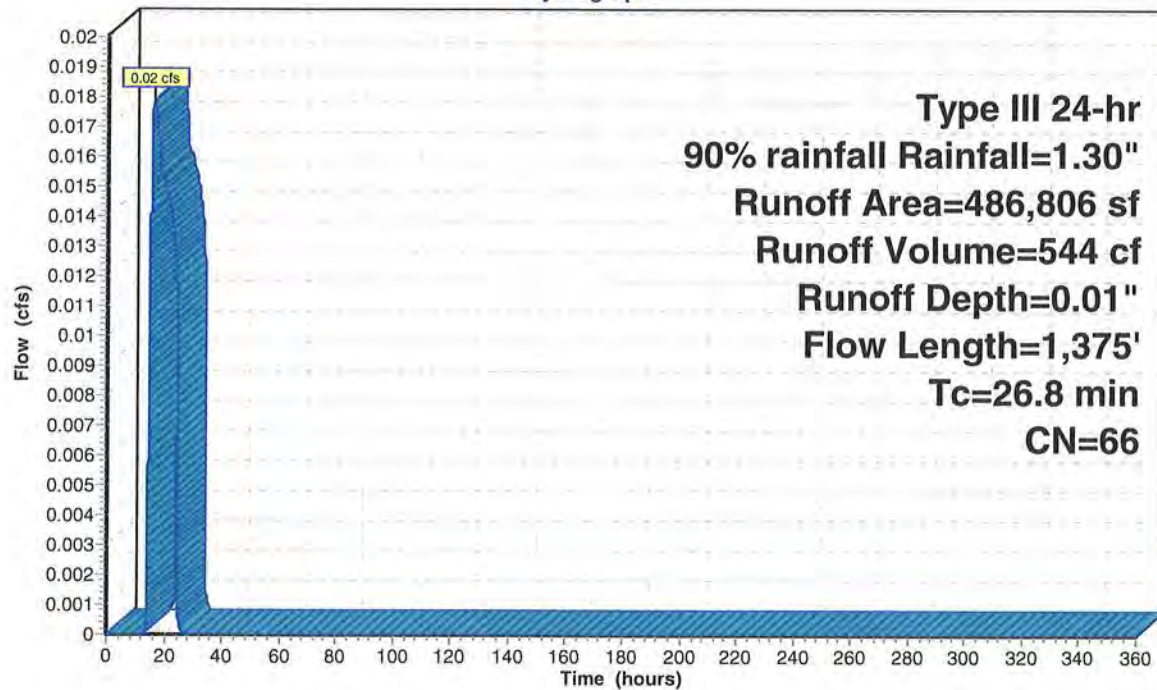
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 20: Basin A5

Hydrograph



Type III 24-hr
90% rainfall Rainfall=1.30"
Runoff Area=486,806 sf
Runoff Volume=544 cf
Runoff Depth=0.01"
Flow Length=1,375'
Tc=26.8 min
CN=66

Runoff

Overall Watershed Analysis 10-28-16

Type III 24-hr 90% rainfall Rainfall=1.30"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

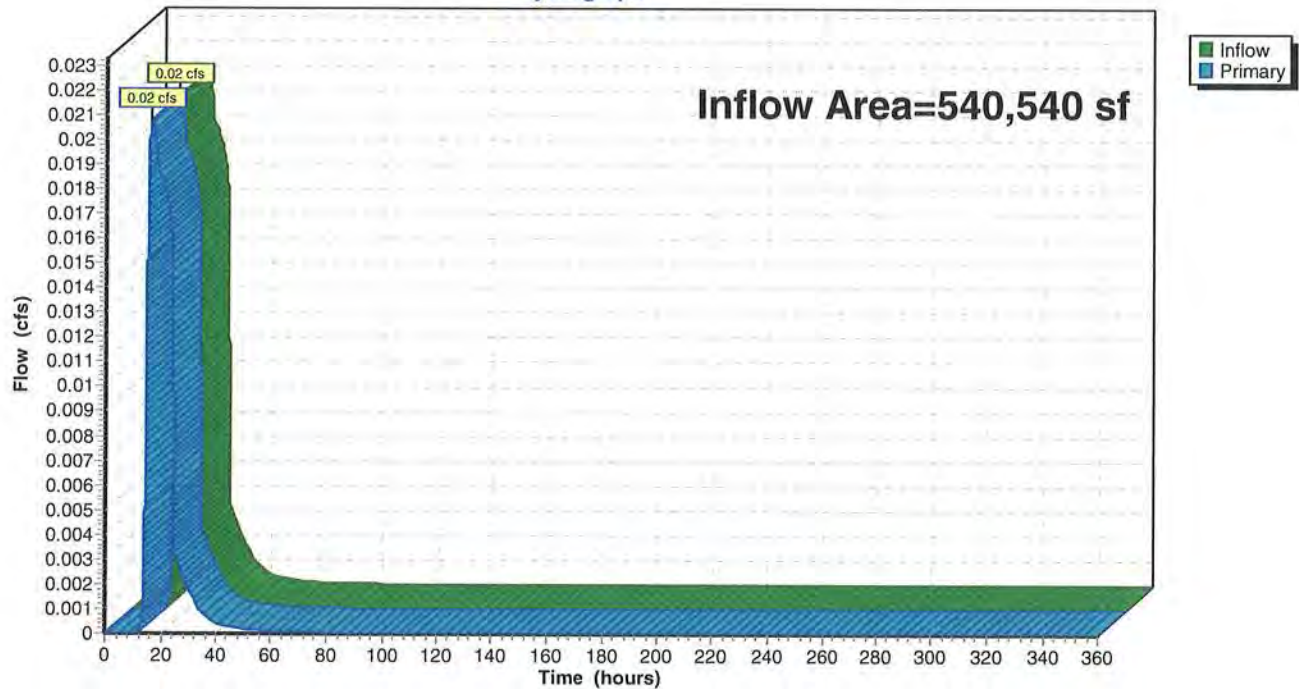
Summary for Link 21: Post-Design Point A

Inflow Area = 540,540 sf, 13.37% Impervious, Inflow Depth = 0.02" for 90% rainfall event
Inflow = 0.02 cfs @ 16.05 hrs, Volume= 772 cf
Primary = 0.02 cfs @ 16.05 hrs, Volume= 772 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 21: Post-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-360.00 hrs, dt=0.01 hrs, 36001 points

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

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Pre ARunoff Area=633,814 sf 9.36% Impervious Runoff Depth=0.42"
Flow Length=1,375' Tc=26.8 min CN=65 Runoff=2.99 cfs 22,063 cf**Link 2: Pre-Design Point A**Inflow=2.99 cfs 22,063 cf
Primary=2.99 cfs 22,063 cf**Subcatchment 3: Pre B**Runoff Area=42,827 sf 0.00% Impervious Runoff Depth=0.19"
Flow Length=397' Tc=16.0 min CN=57 Runoff=0.06 cfs 673 cf**Link 4: Pre-Design Line B**Inflow=0.06 cfs 673 cf
Primary=0.06 cfs 673 cf**Subcatchment 5: Post B1**Runoff Area=21,058 sf 0.00% Impervious Runoff Depth=0.17"
Flow Length=397' Tc=16.0 min CN=56 Runoff=0.02 cfs 292 cf**Link 6: Post-Design Line B**Inflow=0.02 cfs 292 cf
Primary=0.02 cfs 292 cf**Subcatchment 7: Basin A3**Runoff Area=13,647 sf 53.42% Impervious Runoff Depth=1.49"
Flow Length=169' Tc=5.8 min CN=86 Runoff=0.55 cfs 1,697 cf**Pond 8: CB #5**Peak Elev=126.37' Inflow=0.55 cfs 1,697 cf
12.0" Round Culvert n=0.013 L=24.3' S=0.0412 1/1' Outflow=0.55 cfs 1,697 cf**Pond 9: DMH #3**Peak Elev=125.35' Inflow=0.55 cfs 1,697 cf
15.0" Round Culvert n=0.013 L=187.8' S=0.0106 1/1' Outflow=0.55 cfs 1,697 cf**Subcatchment 10: Basin A1**Runoff Area=86,602 sf 16.91% Impervious Runoff Depth=0.42"
Flow Length=579' Tc=9.5 min CN=65 Runoff=0.57 cfs 3,015 cf**Pond 11: CB #4**Peak Elev=123.47' Inflow=1.00 cfs 4,712 cf
15.0" Round Culvert n=0.013 L=145.0' S=0.0207 1/1' Outflow=1.00 cfs 4,712 cf**Subcatchment 12: Basin A2**Runoff Area=8,077 sf 62.54% Impervious Runoff Depth=1.29"
Flow Length=235' Tc=4.6 min CN=83 Runoff=0.29 cfs 866 cf**Pond 13: CB #6**Peak Elev=123.78' Inflow=0.29 cfs 866 cf
10.0" Round Culvert n=0.013 L=9.3' S=0.3763 1/1' Outflow=0.29 cfs 866 cf**Pond 14: DMH #1**Peak Elev=120.53' Inflow=1.24 cfs 5,578 cf
15.0" Round Culvert n=0.013 L=6.0' S=0.0833 1/1' Outflow=1.24 cfs 5,578 cf**Pond 15: CDS-2025**Peak Elev=120.03' Inflow=1.24 cfs 5,578 cf
15.0" Round Culvert n=0.013 L=209.4' S=0.1074 1/1' Outflow=1.24 cfs 5,578 cf**Pond 16: DMH #2**Peak Elev=96.48' Inflow=1.24 cfs 5,578 cf
Primary=1.24 cfs 5,578 cf Secondary=0.00 cfs 0 cf Outflow=1.24 cfs 5,578 cf

Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Pond 17: Infiltration System #3

Peak Elev=95.87' Storage=1,818 cf Inflow=1.24 cfs 5,578 cf
Outflow=0.15 cfs 5,580 cf

Subcatchment 18: Basin A4

Runoff Area=53,734 sf 29.43% Impervious Runoff Depth=0.65"
Flow Length=486' Tc=7.3 min CN=71 Runoff=0.77 cfs 2,902 cf

Pond 19: Pocket Pond

Peak Elev=137.90' Storage=3,587 cf Inflow=0.77 cfs 2,902 cf
Outflow=0.02 cfs 2,901 cf

Subcatchment 20: Basin A5

Runoff Area=486,806 sf 11.60% Impervious Runoff Depth=0.45"
Flow Length=1,375' Tc=26.8 min CN=66 Runoff=2.60 cfs 18,357 cf

Link 21: Post-Design Point A

Inflow=2.61 cfs 21,258 cf
Primary=2.61 cfs 21,258 cf

**Total Runoff Area = 1,346,565 sf Runoff Volume = 49,865 cf Average Runoff Depth = 0.44"
88.22% Pervious = 1,187,960 sf 11.78% Impervious = 158,605 sf**

Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: Pre A

Runoff = 2.99 cfs @ 12.50 hrs, Volume= 22,063 cf, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
153,576	70	Woods, Good, HSG C
280,022	55	Woods, Good, HSG B
116,063	61	>75% Grass cover, Good, HSG B
11,498	74	>75% Grass cover, Good, HSG C
9,346	85	Gravel roads, HSG B
1,614	89	Gravel roads, HSG C
59,355	98	Paved parking & roofs
2,340	87	Dirt roads, HSG C
633,814	65	Weighted Average
574,459		90.64% Pervious Area
59,355		9.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Bot.W=10.00' D=1.50' Z= 1.0 ' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

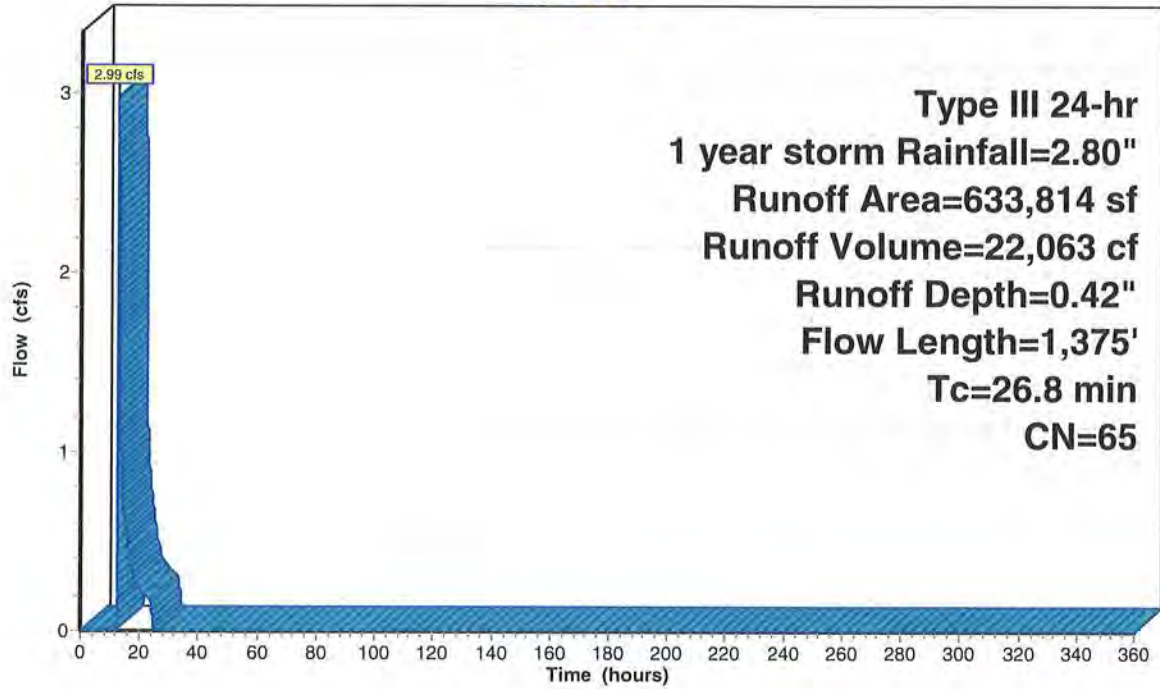
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 1 year storm Rainfall=2.80"

Printed 12/5/2016

Subcatchment 1: Pre A

Hydrograph



Runoff

**Type III 24-hr
1 year storm Rainfall=2.80"
Runoff Area=633,814 sf
Runoff Volume=22,063 cf
Runoff Depth=0.42"
Flow Length=1,375'
Tc=26.8 min
CN=65**

Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

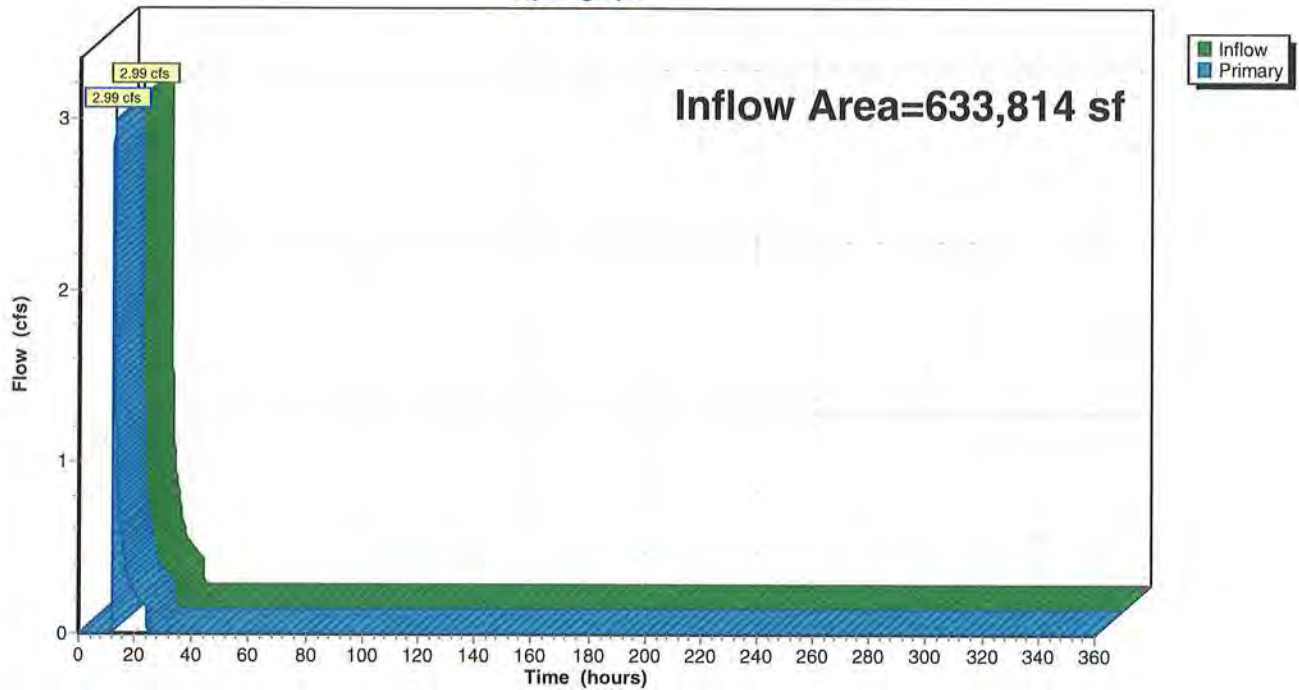
Summary for Link 2: Pre-Design Point A

Inflow Area = 633,814 sf, 9.36% Impervious, Inflow Depth = 0.42" for 1 year storm event
Inflow = 2.99 cfs @ 12.50 hrs, Volume= 22,063 cf
Primary = 2.99 cfs @ 12.50 hrs, Volume= 22,063 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 2: Pre-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 3: Pre B

Runoff = 0.06 cfs @ 12.52 hrs, Volume= 673 cf, Depth= 0.19"

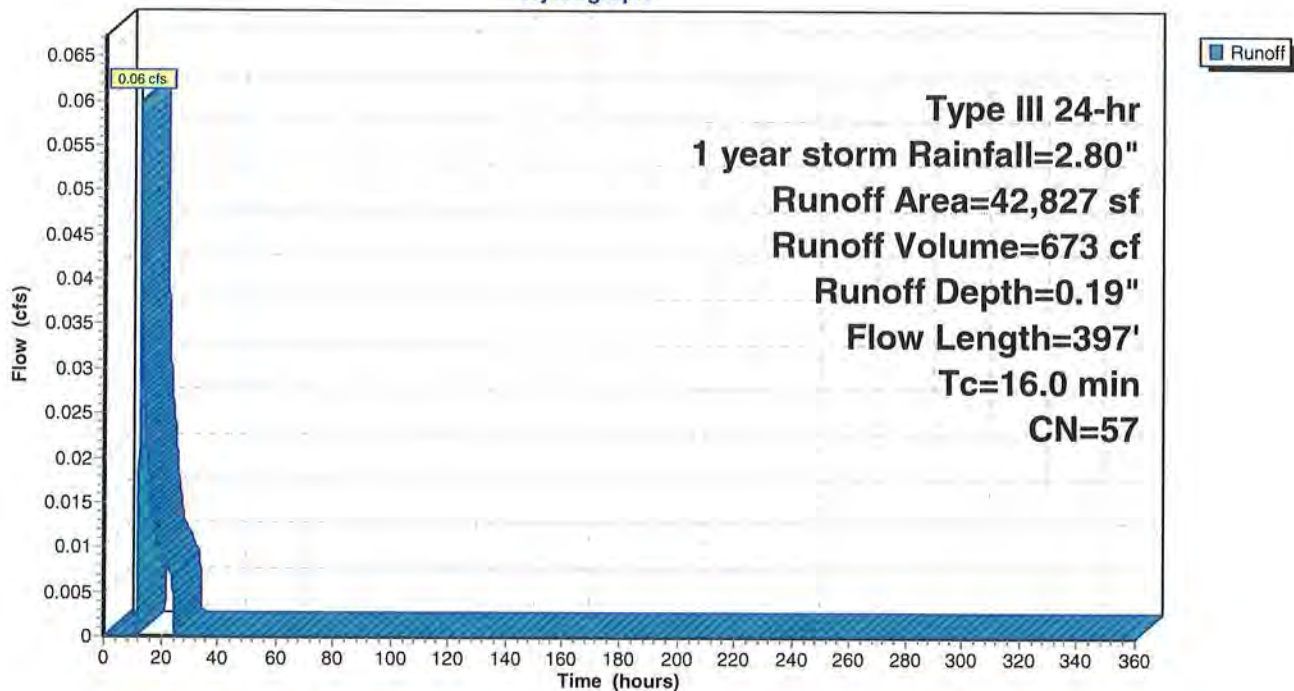
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
30,675	55	Woods, Good, HSG B
12,152	61	>75% Grass cover, Good, HSG B
42,827	57	Weighted Average
42,827		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 3: Pre B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

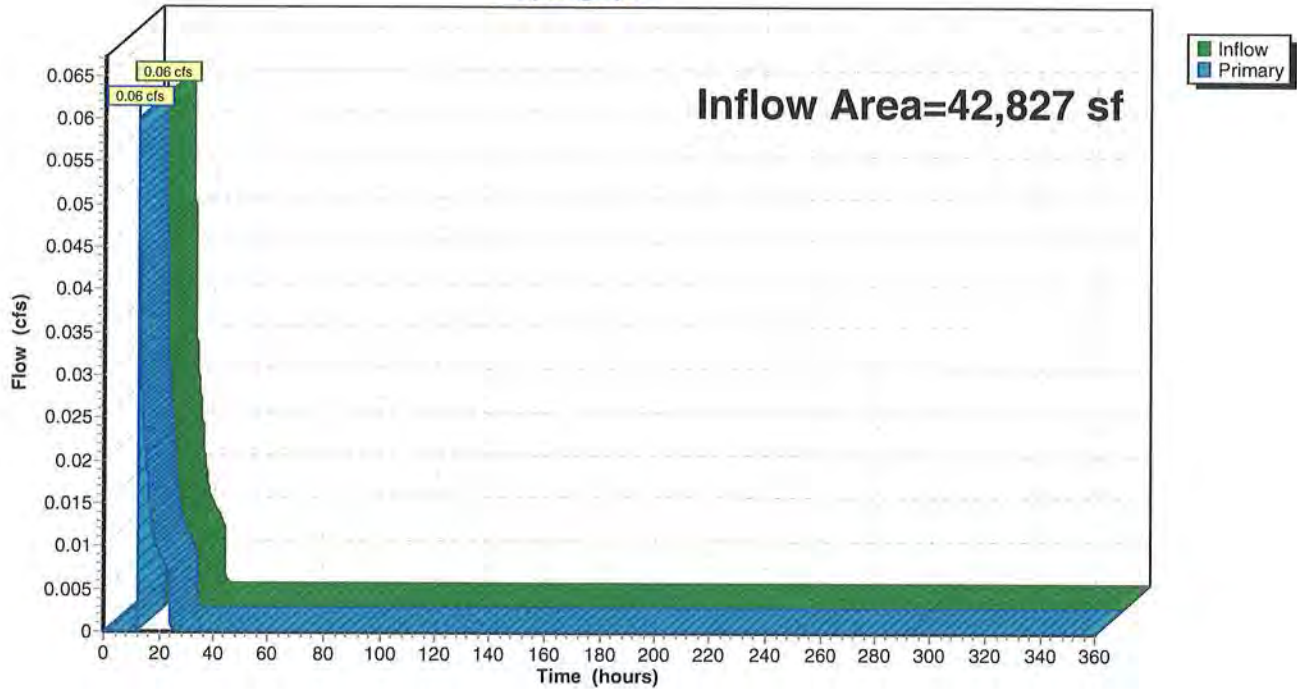
Summary for Link 4: Pre-Design Line B

Inflow Area = 42,827 sf, 0.00% Impervious, Inflow Depth = 0.19" for 1 year storm event
Inflow = 0.06 cfs @ 12.52 hrs, Volume= 673 cf
Primary = 0.06 cfs @ 12.52 hrs, Volume= 673 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 4: Pre-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 5: Post B1

Runoff = 0.02 cfs @ 12.54 hrs, Volume= 292 cf, Depth= 0.17"

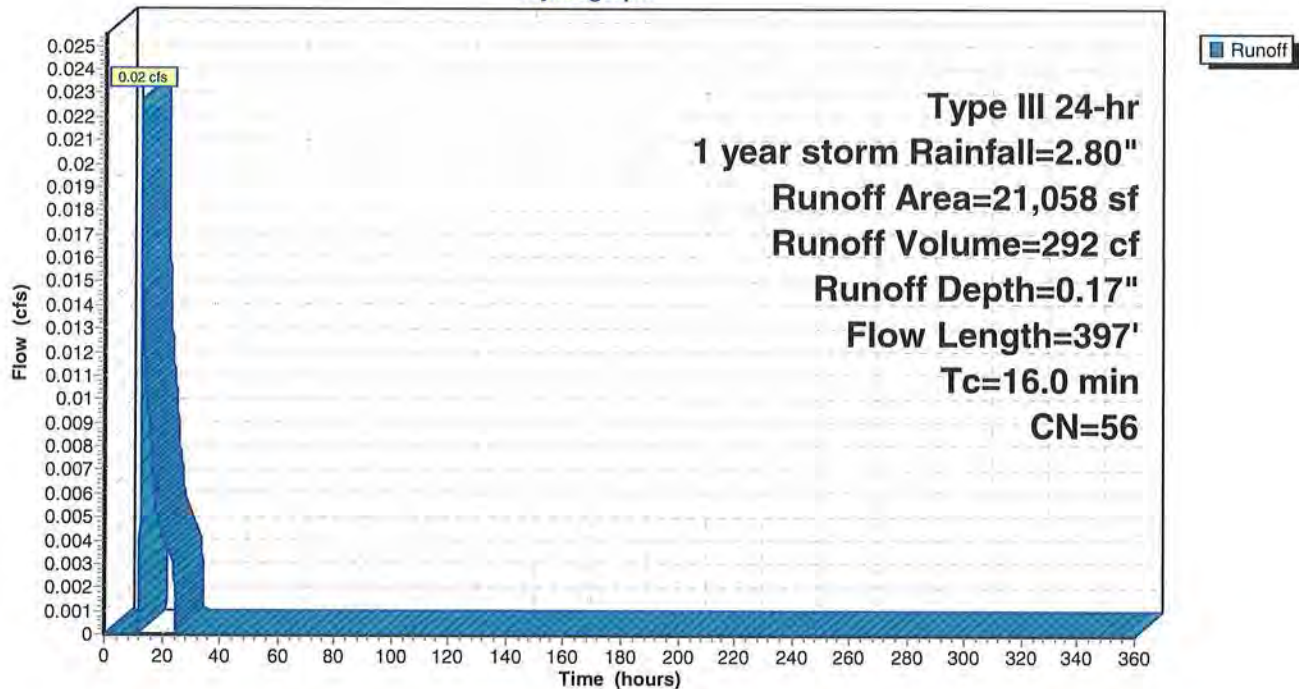
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
18,999	55	Woods, Good, HSG B
2,059	61	>75% Grass cover, Good, HSG B
21,058	56	Weighted Average
21,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 5: Post B1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

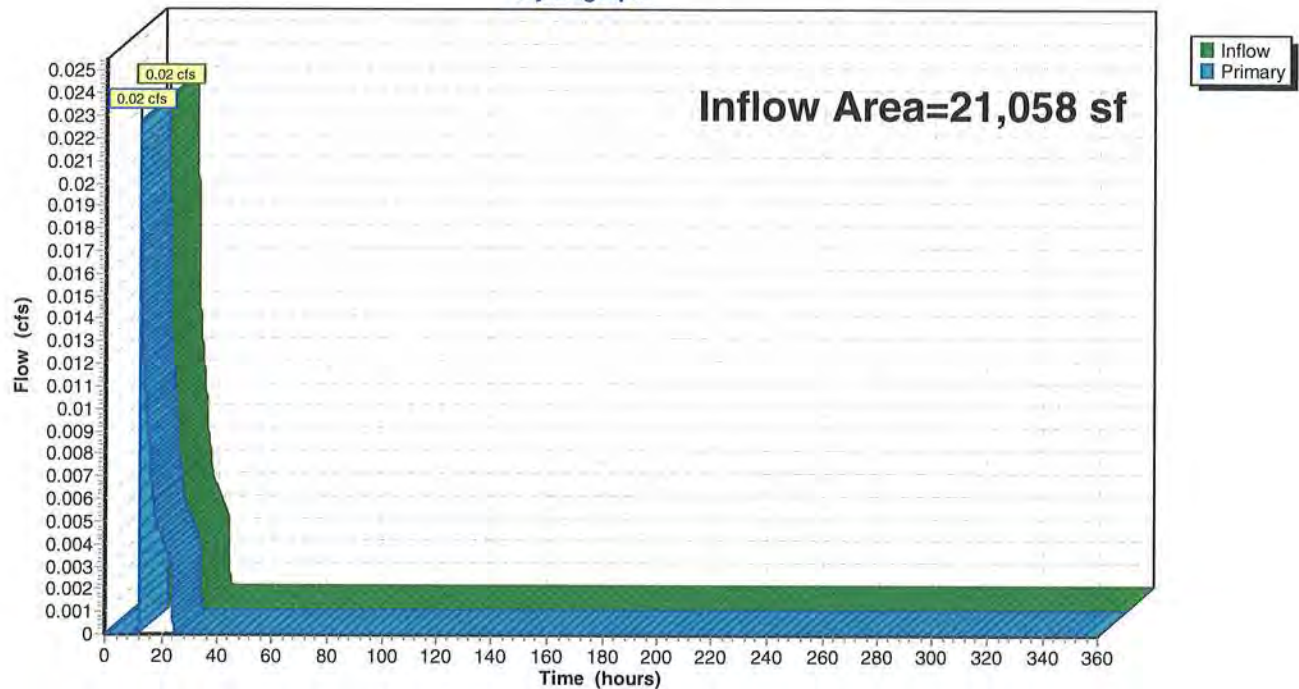
Summary for Link 6: Post-Design Line B

Inflow Area = 21,058 sf, 0.00% Impervious, Inflow Depth = 0.17" for 1 year storm event
Inflow = 0.02 cfs @ 12.54 hrs, Volume= 292 cf
Primary = 0.02 cfs @ 12.54 hrs, Volume= 292 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 6: Post-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 7: Basin A3

Runoff = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf, Depth= 1.49"

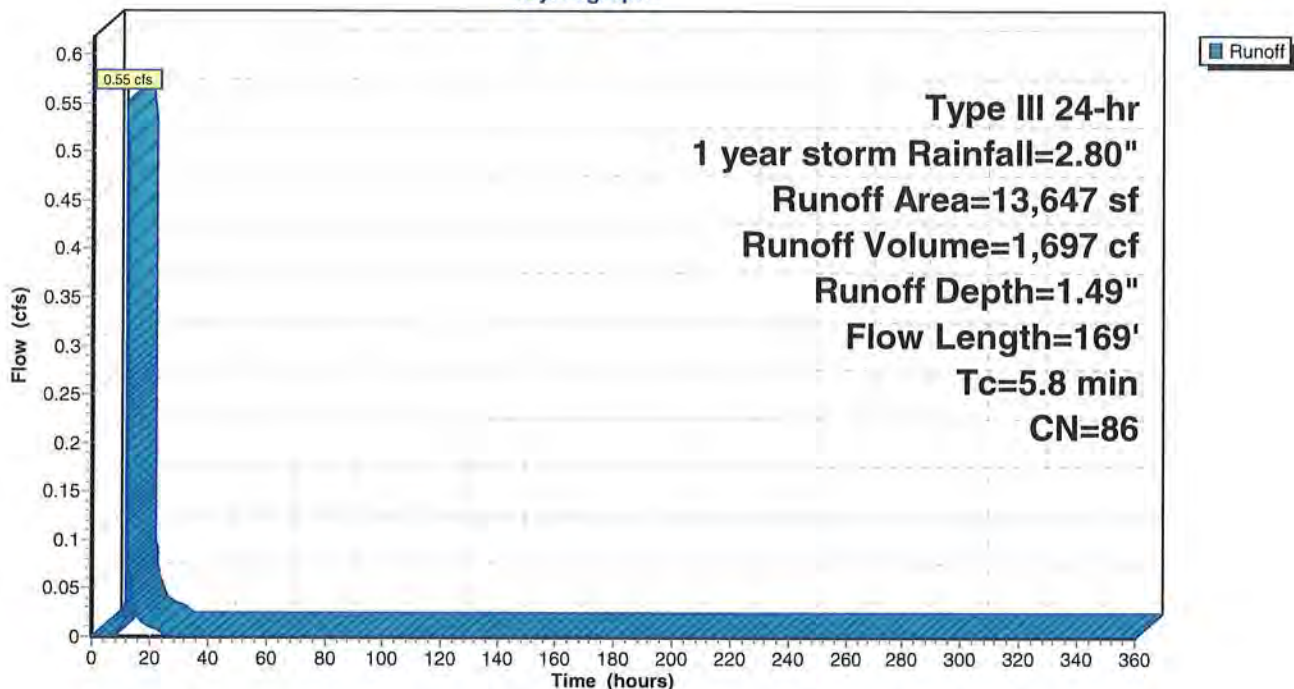
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
7,290	98	Paved parking & roofs
5,560	74	>75% Grass cover, Good, HSG C
797	61	>75% Grass cover, Good, HSG B
13,647	86	Weighted Average
6,357		46.58% Pervious Area
7,290		53.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0775	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.1	5	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0379	3.95		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.8	169	Total			

Subcatchment 7: Basin A3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 8: CB #5

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 1.49" for 1 year storm event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf
Outflow = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf

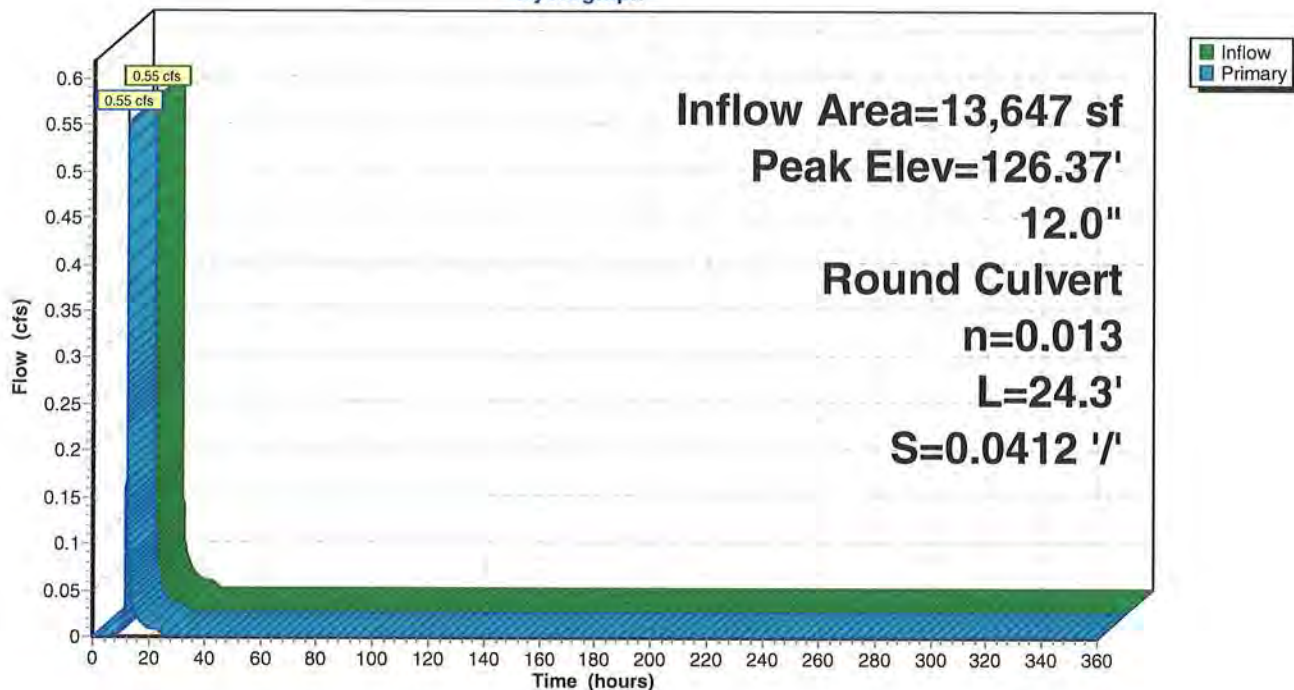
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 126.37' @ 12.09 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	126.00'	12.0" Round Culvert L= 24.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 126.00' / 125.00' S= 0.0412 1/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 12.09 hrs HW=126.37' TW=125.34' (Dynamic Tailwater)
↑=Culvert (Inlet Controls 0.55 cfs @ 2.08 fps)

Pond 8: CB #5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 9: DMH #3

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 1.49" for 1 year storm event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf
Outflow = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 12.09 hrs, Volume= 1,697 cf

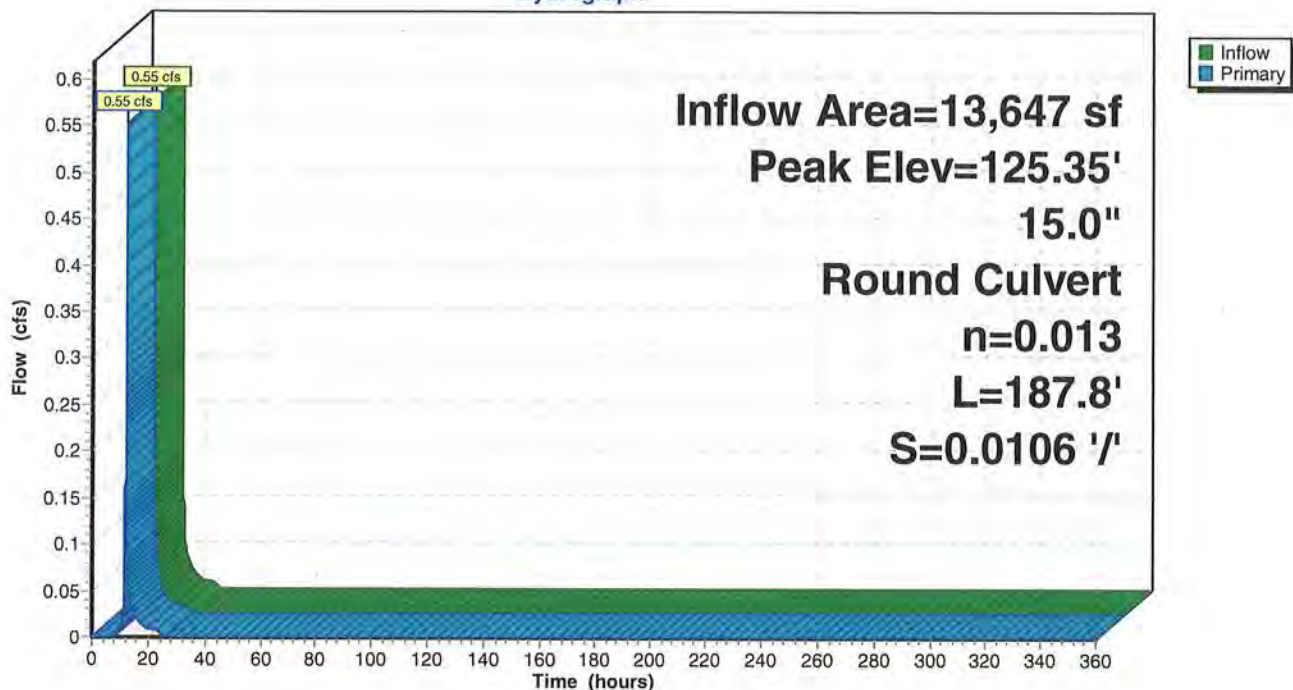
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.35' @ 12.09 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	15.0" Round Culvert L= 187.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 125.00' / 123.00' S= 0.0106 1/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.55 cfs @ 12.09 hrs HW=125.34' TW=123.45' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.55 cfs @ 2.00 fps)

Pond 9: DMH #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 10: Basin A1

Runoff = 0.57 cfs @ 12.17 hrs, Volume= 3,015 cf, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
2,285	70	Woods, Good, HSG C
34,674	55	Woods, Good, HSG B
34,997	61	>75% Grass cover, Good, HSG B
13,046	98	Paved parking & roofs
1,600	98	Water Surface
86,602	65	Weighted Average
71,956		83.09% Pervious Area
14,646		16.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0500	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	61	0.0570	1.67		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	66	0.1590	1.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	89	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	78	0.0630	3.76		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	145	0.0448	11.14	13.67	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
9.5	579	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

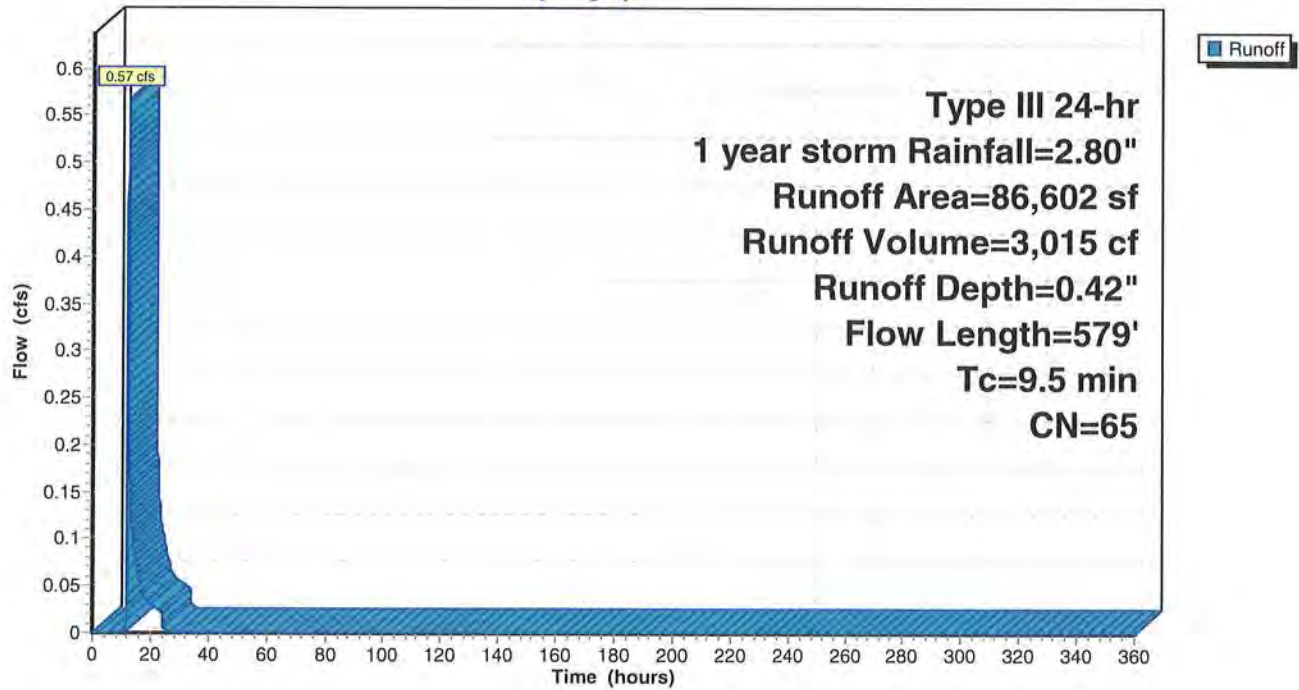
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 1 year storm Rainfall=2.80"

Printed 12/5/2016

Subcatchment 10: Basin A1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 11: CB #4

Inflow Area = 100,249 sf, 21.88% Impervious, Inflow Depth = 0.56" for 1 year storm event
 Inflow = 1.00 cfs @ 12.13 hrs, Volume= 4,712 cf
 Outflow = 1.00 cfs @ 12.13 hrs, Volume= 4,712 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.00 cfs @ 12.13 hrs, Volume= 4,712 cf

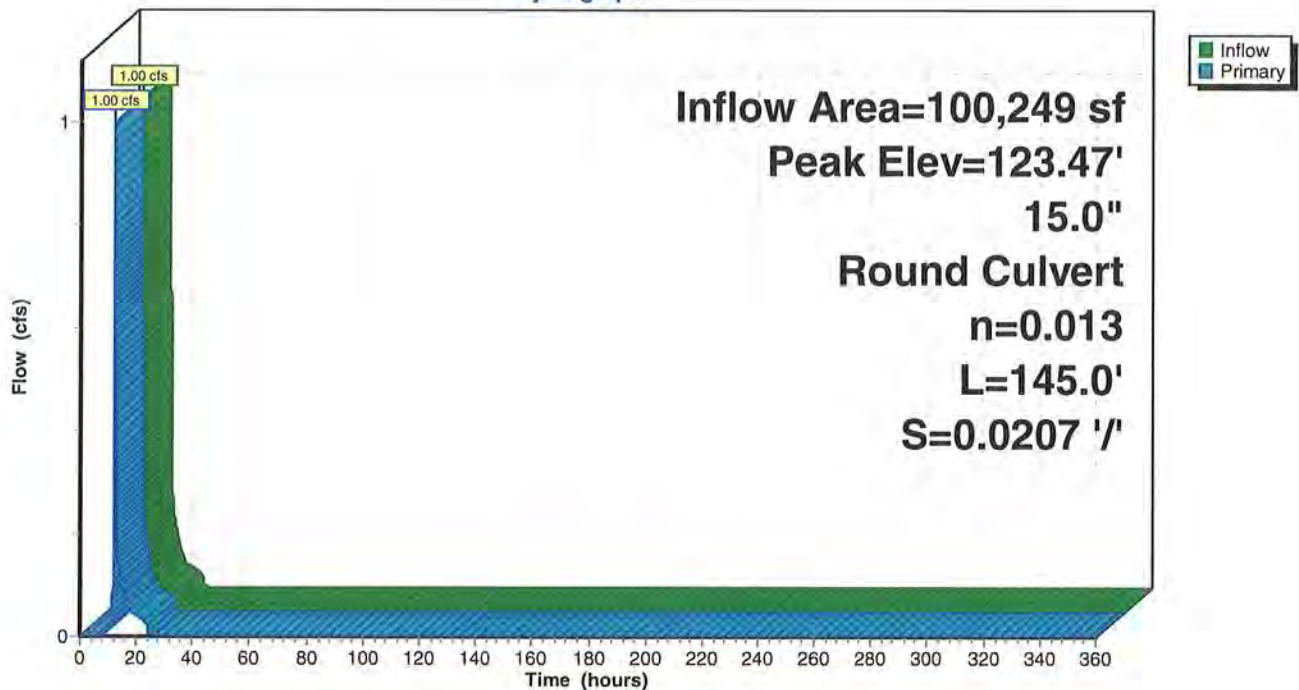
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 123.47' @ 12.13 hrs
 Flood Elev= 130.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.00'	15.0" Round Culvert L= 145.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 120.00' S= 0.0207 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.00 cfs @ 12.13 hrs HW=123.47' TW=120.53' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 1.00 cfs @ 2.34 fps)

Pond 11: CB #4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 12: Basin A2

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 866 cf, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
1,667	55	Woods, Good, HSG B
1,089	61	>75% Grass cover, Good, HSG B
270	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking & roofs
2,871	98	Roofs, HSG B
8,077	83	Weighted Average
3,026		37.46% Pervious Area
5,051		62.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	30	0.5000	0.51		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
3.0	28	0.1984	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	177	0.0085	4.85	5.96	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
4.6	235	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

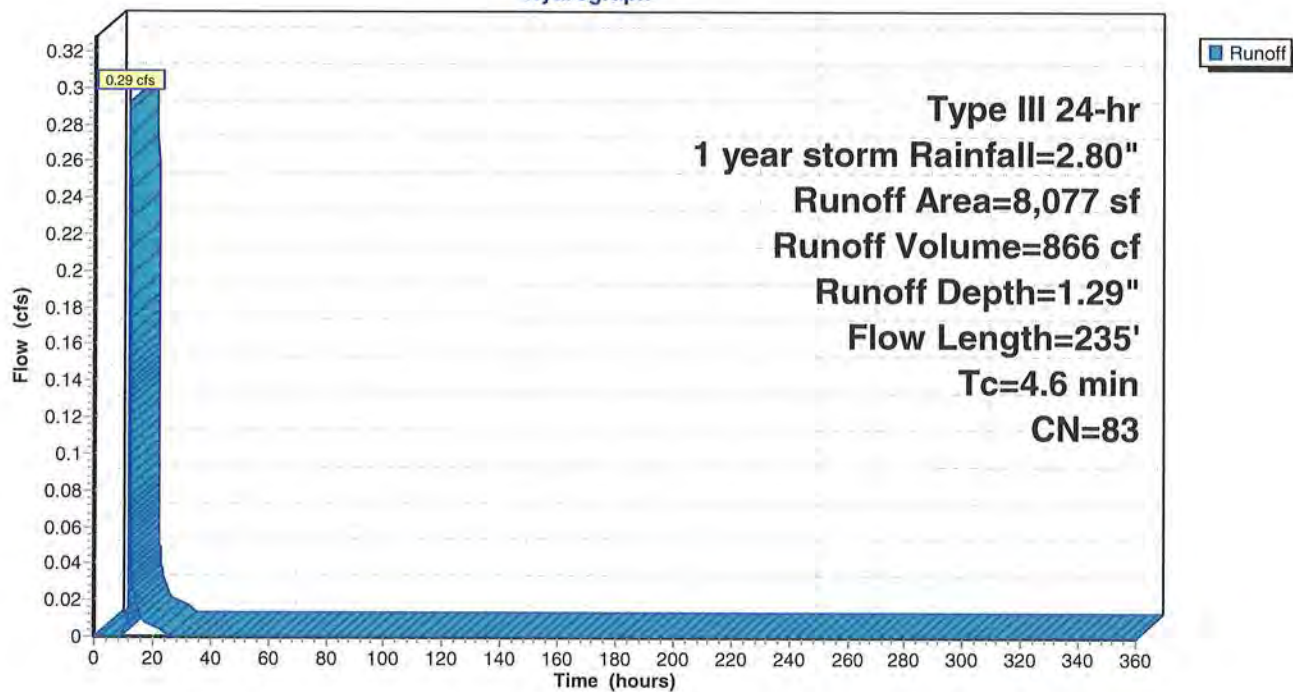
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 12: Basin A2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 13: CB #6

Inflow Area = 8,077 sf, 62.54% Impervious, Inflow Depth = 1.29" for 1 year storm event
Inflow = 0.29 cfs @ 12.07 hrs, Volume= 866 cf
Outflow = 0.29 cfs @ 12.07 hrs, Volume= 866 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.07 hrs, Volume= 866 cf

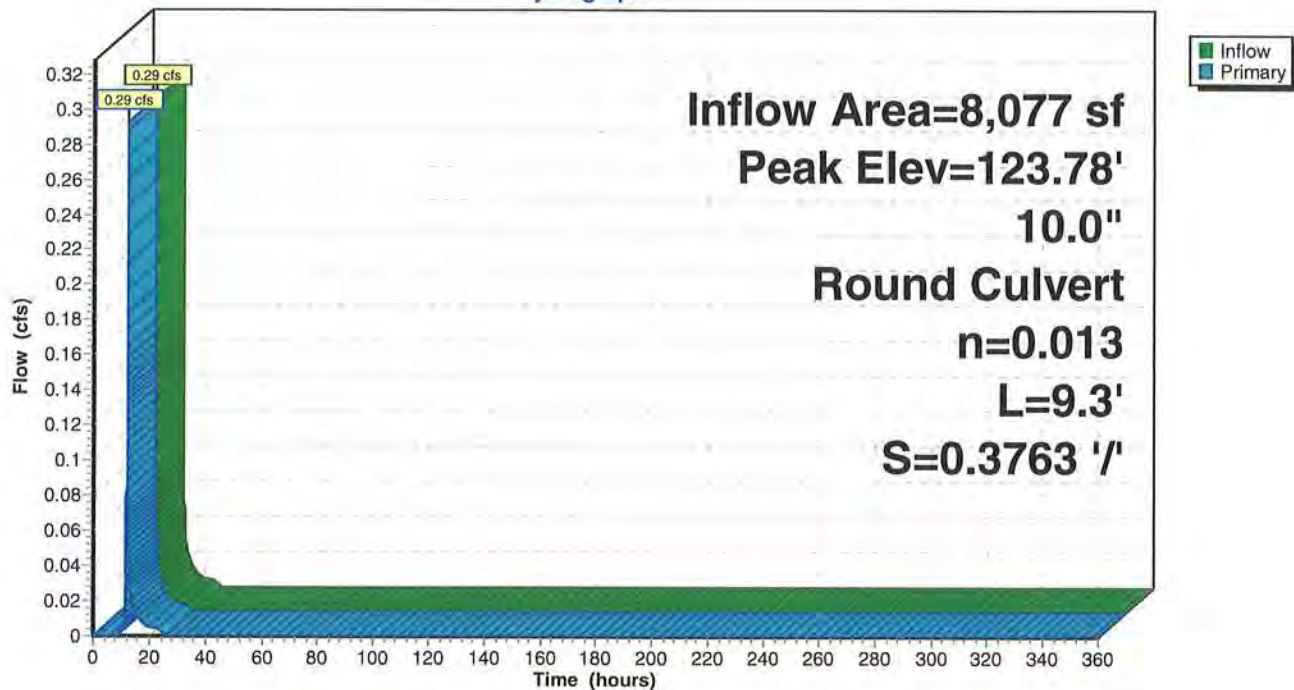
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 123.78' @ 12.07 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.50'	10.0" Round Culvert L= 9.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.50' / 120.00' S= 0.3763 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.29 cfs @ 12.07 hrs HW=123.78' TW=120.51' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 0.29 cfs @ 1.81 fps)

Pond 13: CB #6

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 14: DMH #1

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.62" for 1 year storm event
Inflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf
Outflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf

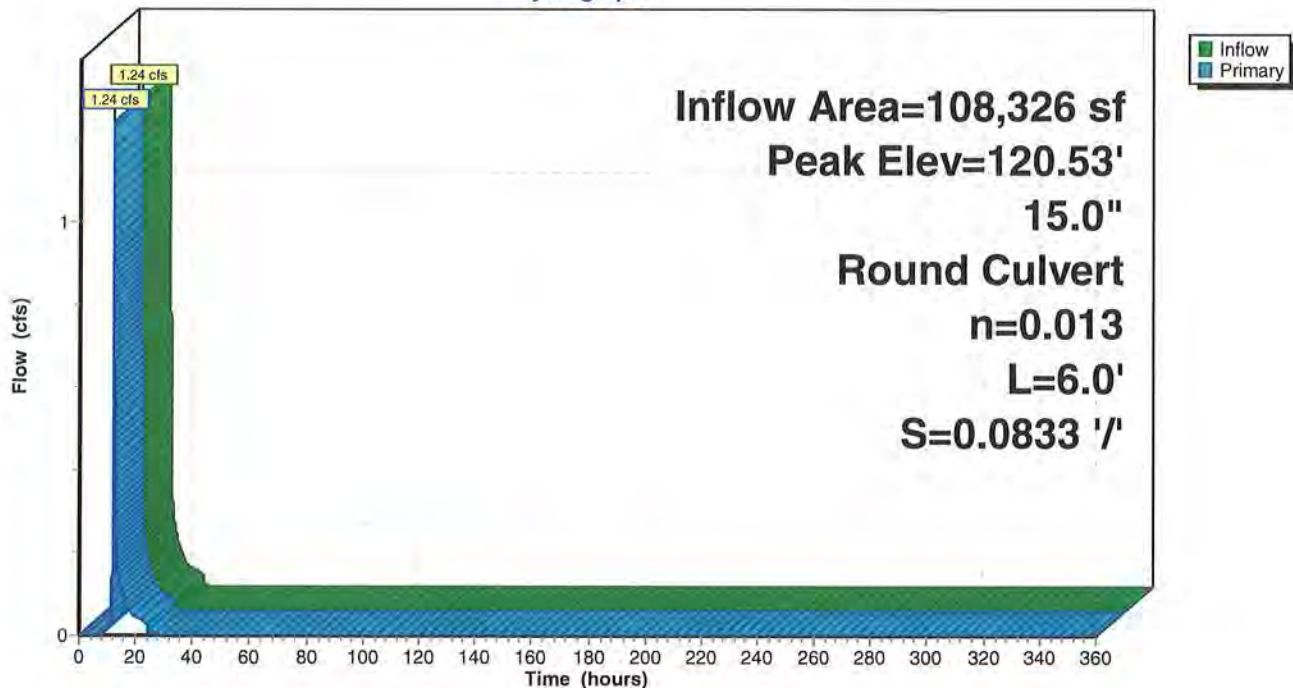
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 120.53' @ 12.11 hrs
Flood Elev= 127.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	15.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.50' S= 0.0833 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.24 cfs @ 12.11 hrs HW=120.53' TW=120.03' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 1.24 cfs @ 2.49 fps)

Pond 14: DMH #1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 15: CDS-2025

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.62" for 1 year storm event
 Inflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf
 Outflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf

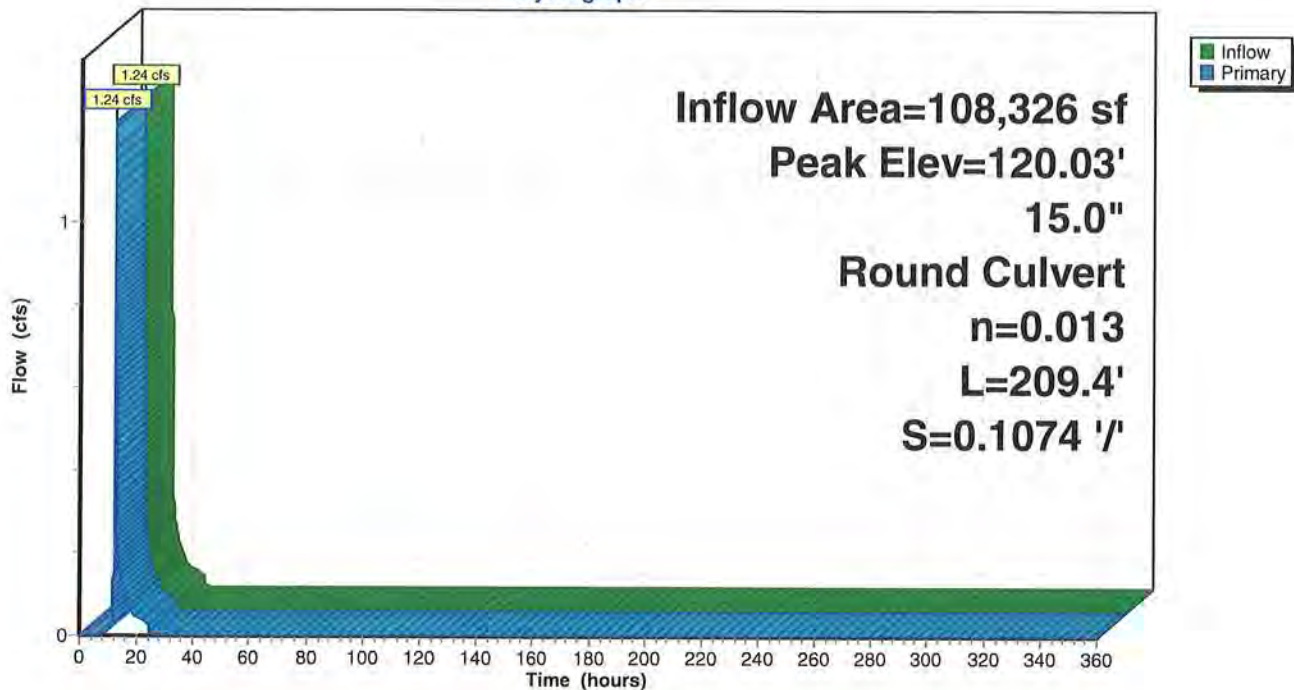
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 120.03' @ 12.11 hrs
 Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	15.0" Round Culvert L= 209.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.50' / 97.00' S= 0.1074 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.24 cfs @ 12.11 hrs HW=120.03' TW=96.48' (Dynamic Tailwater)
 ←**1=Culvert** (Inlet Controls 1.24 cfs @ 2.49 fps)

Pond 15: CDS-2025

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 16: DMH #2

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.62" for 1 year storm event
Inflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf
Outflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Peak Elev= 96.48' @ 12.11 hrs

Flood Elev= 100.00'

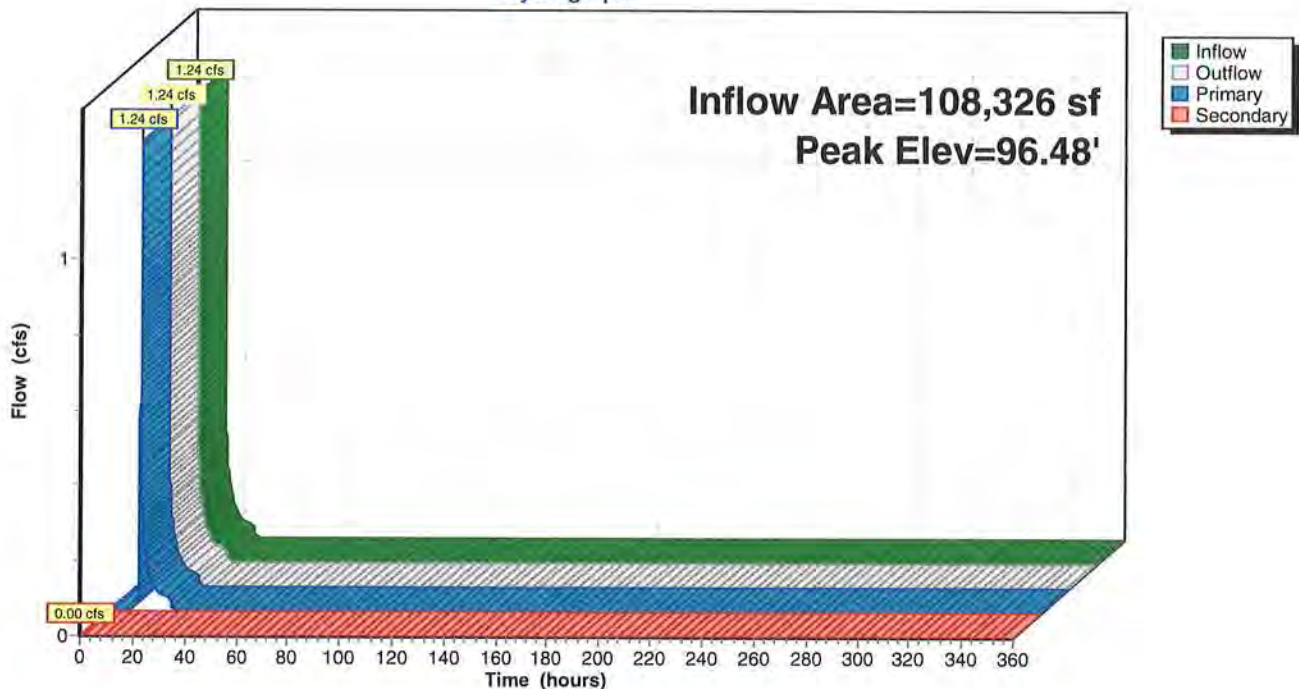
Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0" Round Culvert L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 94.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	97.00'	24.0" Round Culvert L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.00' / 94.00' S= 0.0370 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.24 cfs @ 12.11 hrs HW=96.48' TW=94.65' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.24 cfs @ 6.33 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.50' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Controls 0.00 cfs)

Pond 16: DMH #2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 17: Infiltration System #3

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 0.62" for 1 year storm event
 Inflow = 1.24 cfs @ 12.11 hrs, Volume= 5,578 cf
 Outflow = 0.15 cfs @ 11.87 hrs, Volume= 5,580 cf, Atten= 88%, Lag= 0.0 min
 Discarded = 0.15 cfs @ 11.87 hrs, Volume= 5,580 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 95.87' @ 13.99 hrs Surf.Area= 1,398 sf Storage= 1,818 cf
 Flood Elev= 98.00' Surf.Area= 1,398 sf Storage= 3,363 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 113.0 min (988.7 - 875.7)

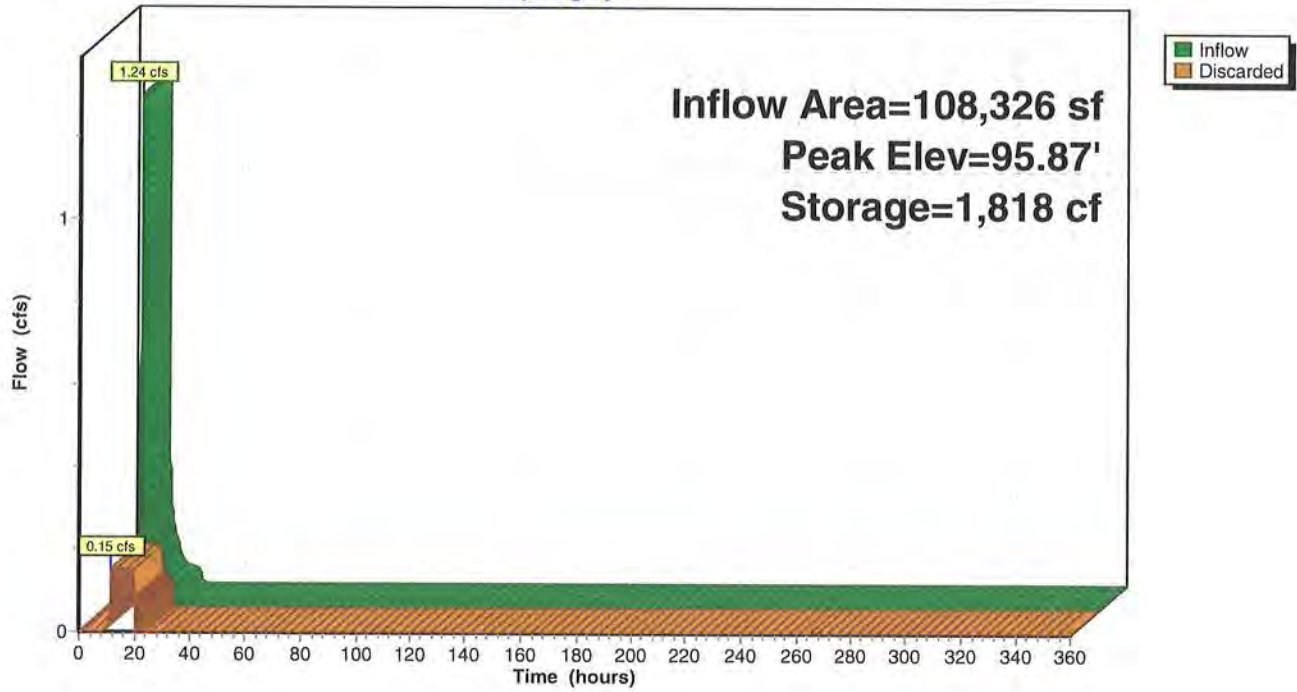
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	1,485 cf	21.50'W x 65.00'L x 4.00'H Prismaoid 5,590 cf Overall - 1,878 cf Embedded = 3,712 cf x 40.0% Voids
#2	94.50'	1,878 cf	Cultec R-330XLHD x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		3,363 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	4.680 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.15 cfs @ 11.87 hrs HW=94.04' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Pond 17: Infiltration System #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 18: Basin A4

Runoff = 0.77 cfs @ 12.12 hrs, Volume= 2,902 cf, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
17,045	55	Woods, Good, HSG B
15,813	98	Paved parking & roofs
17,689	61	>75% Grass cover, Good, HSG B
3,187	85	Gravel roads, HSG B
53,734	71	Weighted Average
37,921		70.57% Pervious Area
15,813		29.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.0850	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.4	14	0.0357	0.56		Sheet Flow, Gravel n= 0.029 P2= 3.50"
2.8	46	0.0870	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.5	46	0.0435	1.46		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	247	0.0486	4.48		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	93	0.0161	6.68	8.20	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
7.3	486	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

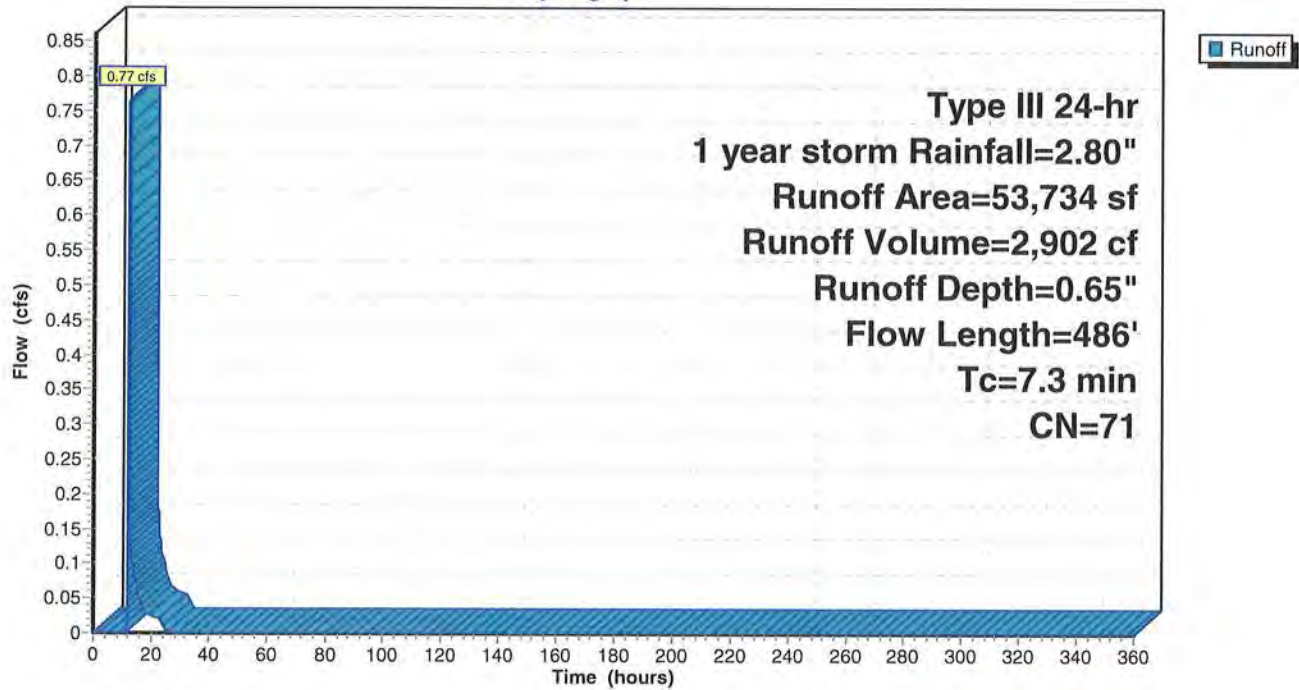
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 1 year storm Rainfall=2.80"

Printed 12/5/2016

Subcatchment 18: Basin A4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 19: Pocket Pond

Inflow Area = 53,734 sf, 29.43% Impervious, Inflow Depth = 0.65" for 1 year storm event
 Inflow = 0.77 cfs @ 12.12 hrs, Volume= 2,902 cf
 Outflow = 0.02 cfs @ 24.05 hrs, Volume= 2,901 cf, Atten= 98%, Lag= 715.7 min
 Primary = 0.02 cfs @ 24.05 hrs, Volume= 2,901 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Starting Elev= 136.50' Surf.Area= 1,107 sf Storage= 1,300 cf
 Peak Elev= 137.90' @ 24.05 hrs Surf.Area= 2,213 sf Storage= 3,587 cf (2,287 cf above start)
 Flood Elev= 140.00' Surf.Area= 2,857 sf Storage= 6,364 cf (5,064 cf above start)

Plug-Flow detention time= 2,839.2 min calculated for 1,601 cf (55% of inflow)
 Center-of-Mass det. time= 1,765.0 min (2,648.6 - 883.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	134.00'	6,364 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
134.00	95	71.9	0	0	95
135.00	386	122.6	224	224	886
136.00	829	172.5	594	818	2,067
136.50	1,107	197.3	482	1,300	2,802
137.00	1,455	224.9	639	1,939	3,736
137.50	1,803	238.1	813	2,752	4,236
137.60	2,049	177.8	192	2,944	6,231
138.00	2,268	186.3	863	3,807	6,488
139.00	2,857	206.5	2,557	6,364	7,150

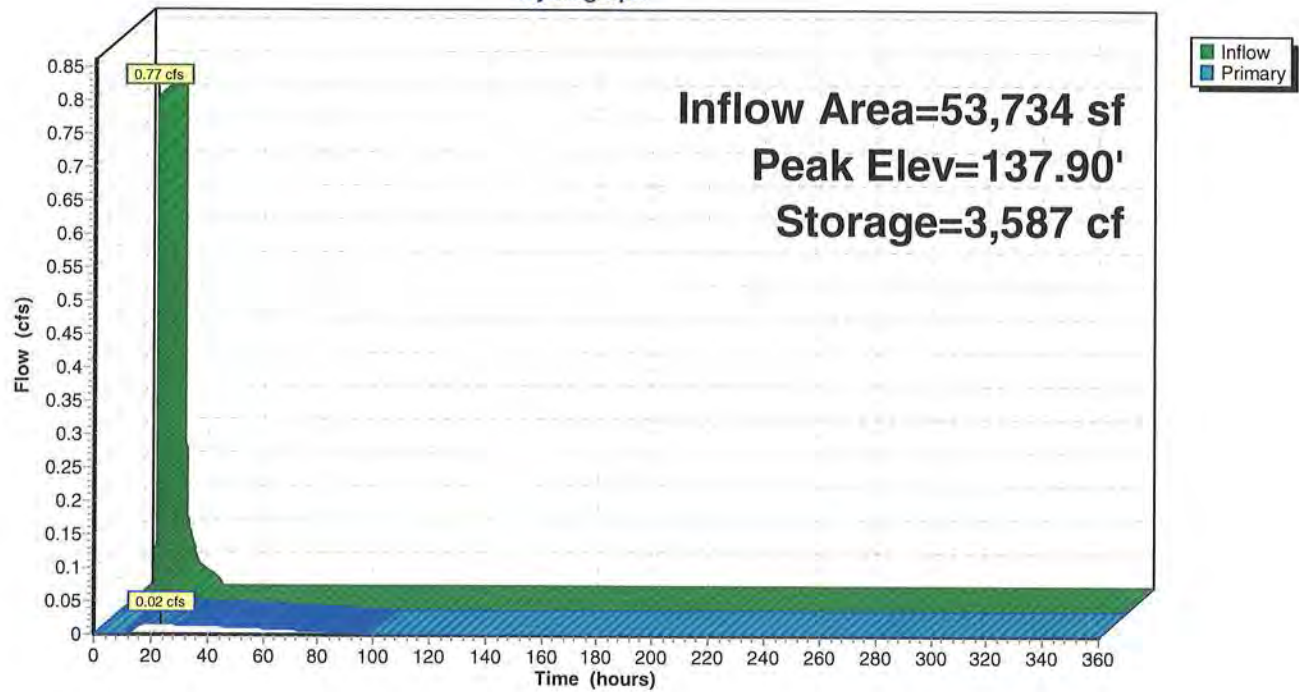
Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	15.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.50' / 134.00' S= 0.0373 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	136.50'	0.7" Vert. Orifice/Grate C= 0.600
#3	Device 1	138.00'	48.0" x 30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 24.05 hrs HW=137.90' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.02 cfs of 5.21 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.02 cfs @ 5.64 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 19: Pocket Pond

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 20: Basin A5

Runoff = 2.60 cfs @ 12.48 hrs, Volume= 18,357 cf, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 year storm Rainfall=2.80"

Area (sf)	CN	Description
95,873	70	Woods, Good, HSG C
217,255	55	Woods, Good, HSG B
43,293	74	>75% Grass cover, Good, HSG C
69,274	61	>75% Grass cover, Good, HSG B
1,614	89	Gravel roads, HSG C
1,432	85	Gravel roads, HSG B
1,615	87	Dirt roads, HSG C
54,850	98	Paved parking & roofs
1,600	98	Water Surface
486,806	66	Weighted Average
430,356		88.40% Pervious Area
56,450		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Brook Bot.W=10.00' D=1.50' Z= 1.0 ' /' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

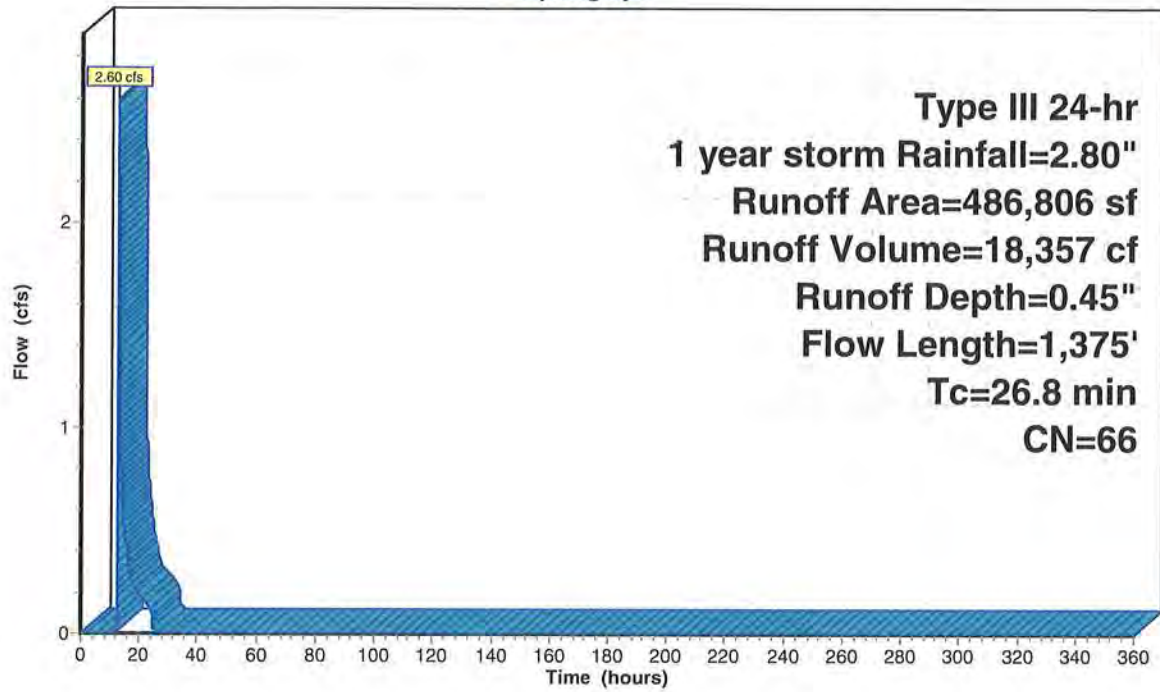
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 1 year storm Rainfall=2.80"

Printed 12/5/2016

Subcatchment 20: Basin A5

Hydrograph



Runoff

**Type III 24-hr
1 year storm Rainfall=2.80"
Runoff Area=486,806 sf
Runoff Volume=18,357 cf
Runoff Depth=0.45"
Flow Length=1,375'
Tc=26.8 min
CN=66**

Overall Watershed Analysis 10-28-16

Type III 24-hr 1 year storm Rainfall=2.80"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

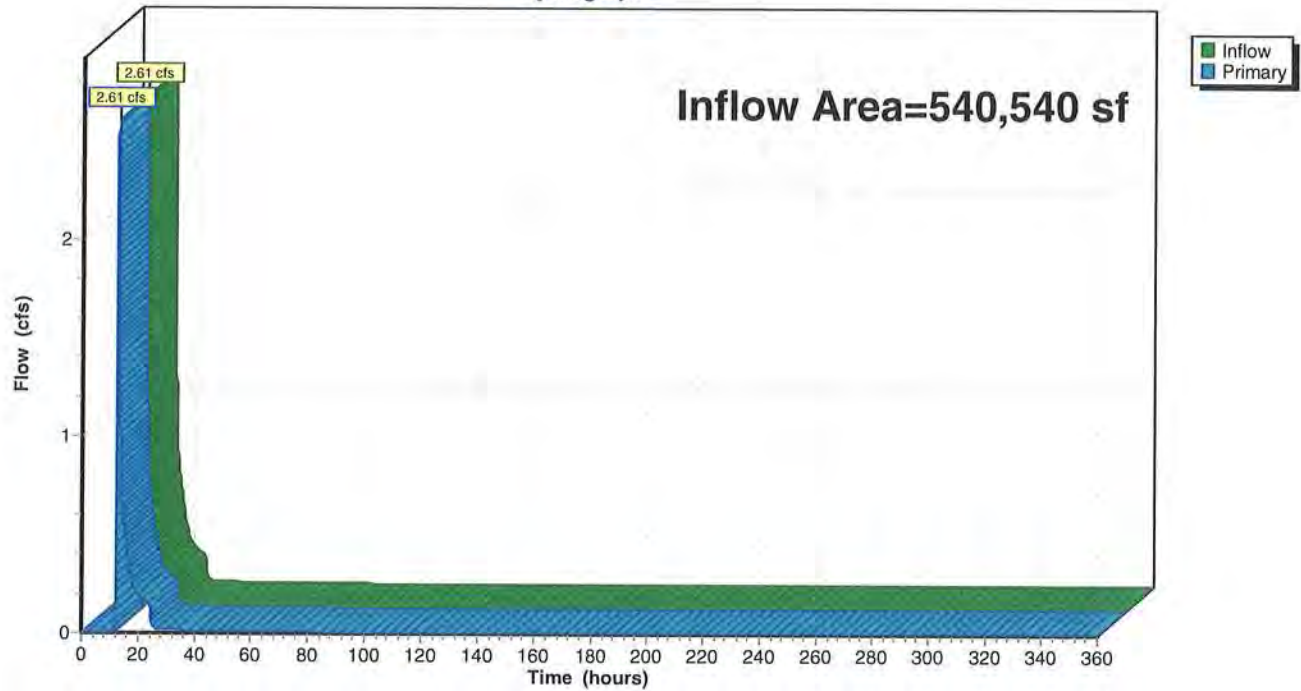
Summary for Link 21: Post-Design Point A

Inflow Area = 540,540 sf, 13.37% Impervious, Inflow Depth = 0.47" for 1 year storm event
Inflow = 2.61 cfs @ 12.48 hrs, Volume= 21,258 cf
Primary = 2.61 cfs @ 12.48 hrs, Volume= 21,258 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 21: Post-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-360.00 hrs, dt=0.01 hrs, 36001 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Pre A Runoff Area=633,814 sf 9.36% Impervious Runoff Depth=1.65"
 Flow Length=1,375' Tc=26.8 min CN=65 Runoff=15.90 cfs 87,336 cf

Link 2: Pre-Design Point A Inflow=15.90 cfs 87,336 cf
 Primary=15.90 cfs 87,336 cf

Subcatchment 3: Pre B Runoff Area=42,827 sf 0.00% Impervious Runoff Depth=1.10"
 Flow Length=397' Tc=16.0 min CN=57 Runoff=0.78 cfs 3,942 cf

Link 4: Pre-Design Line B Inflow=0.78 cfs 3,942 cf
 Primary=0.78 cfs 3,942 cf

Subcatchment 5: Post B1 Runoff Area=21,058 sf 0.00% Impervious Runoff Depth=1.04"
 Flow Length=397' Tc=16.0 min CN=56 Runoff=0.35 cfs 1,828 cf

Link 6: Post-Design Line B Inflow=0.35 cfs 1,828 cf
 Primary=0.35 cfs 1,828 cf

Subcatchment 7: Basin A3 Runoff Area=13,647 sf 53.42% Impervious Runoff Depth=3.47"
 Flow Length=169' Tc=5.8 min CN=86 Runoff=1.27 cfs 3,943 cf

Pond 8: CB #5 Peak Elev=126.59' Inflow=1.27 cfs 3,943 cf
 12.0" Round Culvert n=0.013 L=24.3' S=0.0412 '/ Outflow=1.27 cfs 3,943 cf

Pond 9: DMH #3 Peak Elev=125.56' Inflow=1.27 cfs 3,943 cf
 15.0" Round Culvert n=0.013 L=187.8' S=0.0106 '/ Outflow=1.27 cfs 3,943 cf

Subcatchment 10: Basin A1 Runoff Area=86,602 sf 16.91% Impervious Runoff Depth=1.65"
 Flow Length=579' Tc=9.5 min CN=65 Runoff=3.24 cfs 11,933 cf

Pond 11: CB #4 Peak Elev=124.15' Inflow=4.31 cfs 15,876 cf
 15.0" Round Culvert n=0.013 L=145.0' S=0.0207 '/ Outflow=4.31 cfs 15,876 cf

Subcatchment 12: Basin A2 Runoff Area=8,077 sf 62.54% Impervious Runoff Depth=3.17"
 Flow Length=235' Tc=4.6 min CN=83 Runoff=0.72 cfs 2,136 cf

Pond 13: CB #6 Peak Elev=123.96' Inflow=0.72 cfs 2,136 cf
 10.0" Round Culvert n=0.013 L=9.3' S=0.3763 '/ Outflow=0.72 cfs 2,136 cf

Pond 14: DMH #1 Peak Elev=121.50' Inflow=4.90 cfs 18,013 cf
 15.0" Round Culvert n=0.013 L=6.0' S=0.0833 '/ Outflow=4.90 cfs 18,013 cf

Pond 15: CDS-2025 Peak Elev=120.81' Inflow=4.90 cfs 18,013 cf
 15.0" Round Culvert n=0.013 L=209.4' S=0.1074 '/ Outflow=4.90 cfs 18,013 cf

Pond 16: DMH #2 Peak Elev=97.80' Inflow=4.90 cfs 18,013 cf
 Primary=1.38 cfs 9,508 cf Secondary=3.58 cfs 8,505 cf Outflow=4.90 cfs 18,013 cf

Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Pond 17: Infiltration System #3

Peak Elev=97.35' Storage=2,997 cf Inflow=1.38 cfs 9,508 cf
Outflow=0.15 cfs 9,509 cf

Subcatchment 18: Basin A4

Runoff Area=53,734 sf 29.43% Impervious Runoff Depth=2.12"
Flow Length=486' Tc=7.3 min CN=71 Runoff=2.88 cfs 9,477 cf

Pond 19: Pocket Pond

Peak Elev=138.12' Storage=4,093 cf Inflow=2.88 cfs 9,477 cf
Outflow=1.88 cfs 9,476 cf

Subcatchment 20: Basin A5

Runoff Area=486,806 sf 11.60% Impervious Runoff Depth=1.73"
Flow Length=1,375' Tc=26.8 min CN=66 Runoff=12.86 cfs 70,087 cf

Link 21: Post-Design Point A

Inflow=15.78 cfs 88,068 cf
Primary=15.78 cfs 88,068 cf

**Total Runoff Area = 1,346,565 sf Runoff Volume = 190,682 cf Average Runoff Depth = 1.70"
88.22% Pervious = 1,187,960 sf 11.78% Impervious = 158,605 sf**

Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: Pre A

Runoff = 15.90 cfs @ 12.41 hrs, Volume= 87,336 cf, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
153,576	70	Woods, Good, HSG C
280,022	55	Woods, Good, HSG B
116,063	61	>75% Grass cover, Good, HSG B
11,498	74	>75% Grass cover, Good, HSG C
9,346	85	Gravel roads, HSG B
1,614	89	Gravel roads, HSG C
59,355	98	Paved parking & roofs
2,340	87	Dirt roads, HSG C
633,814	65	Weighted Average
574,459		90.64% Pervious Area
59,355		9.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Bot.W=10.00' D=1.50' Z= 1.0 '/' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

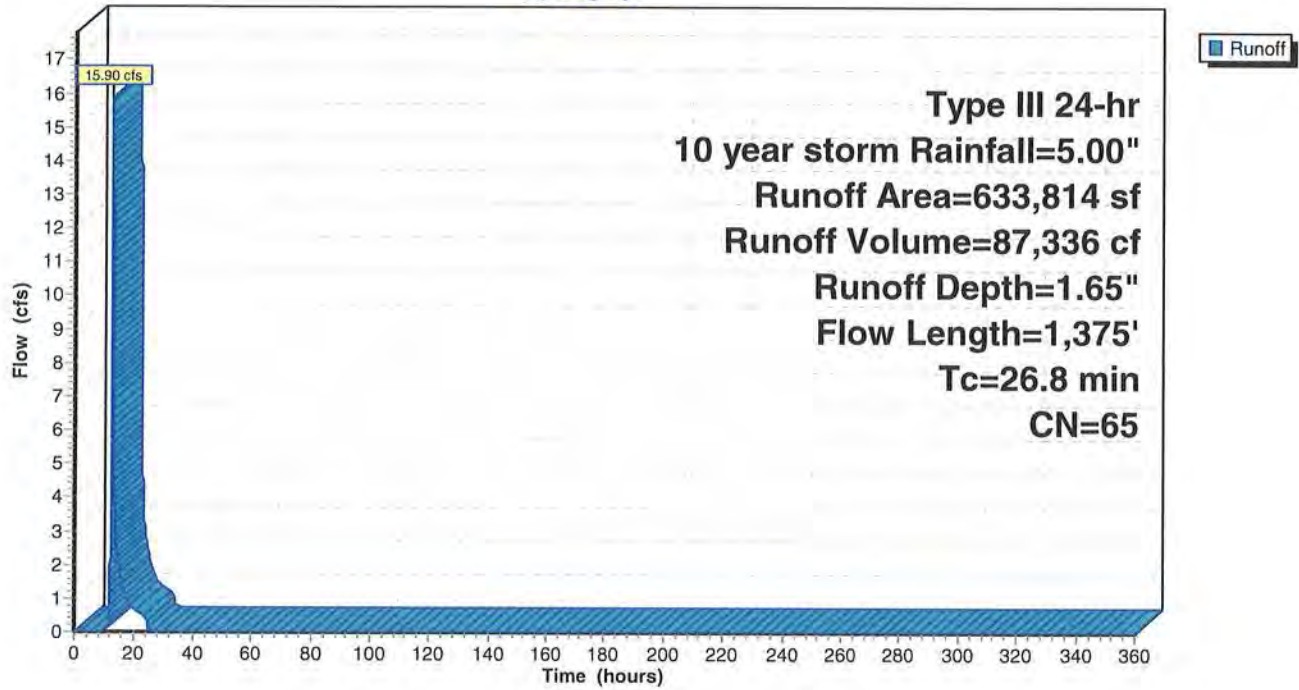
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 10 year storm Rainfall=5.00"

Printed 12/5/2016

Subcatchment 1: Pre A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

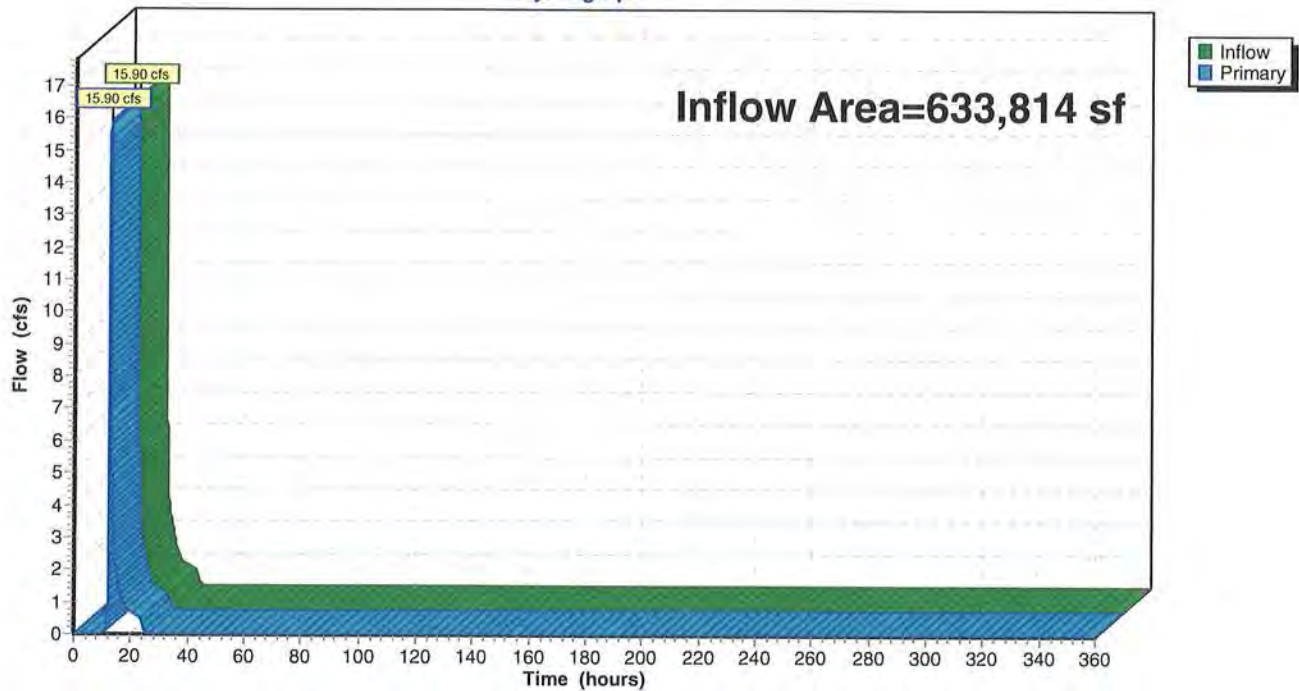
Summary for Link 2: Pre-Design Point A

Inflow Area = 633,814 sf, 9.36% Impervious, Inflow Depth = 1.65" for 10 year storm event
Inflow = 15.90 cfs @ 12.41 hrs, Volume= 87,336 cf
Primary = 15.90 cfs @ 12.41 hrs, Volume= 87,336 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 2: Pre-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 3: Pre B

Runoff = 0.78 cfs @ 12.25 hrs, Volume= 3,942 cf, Depth= 1.10"

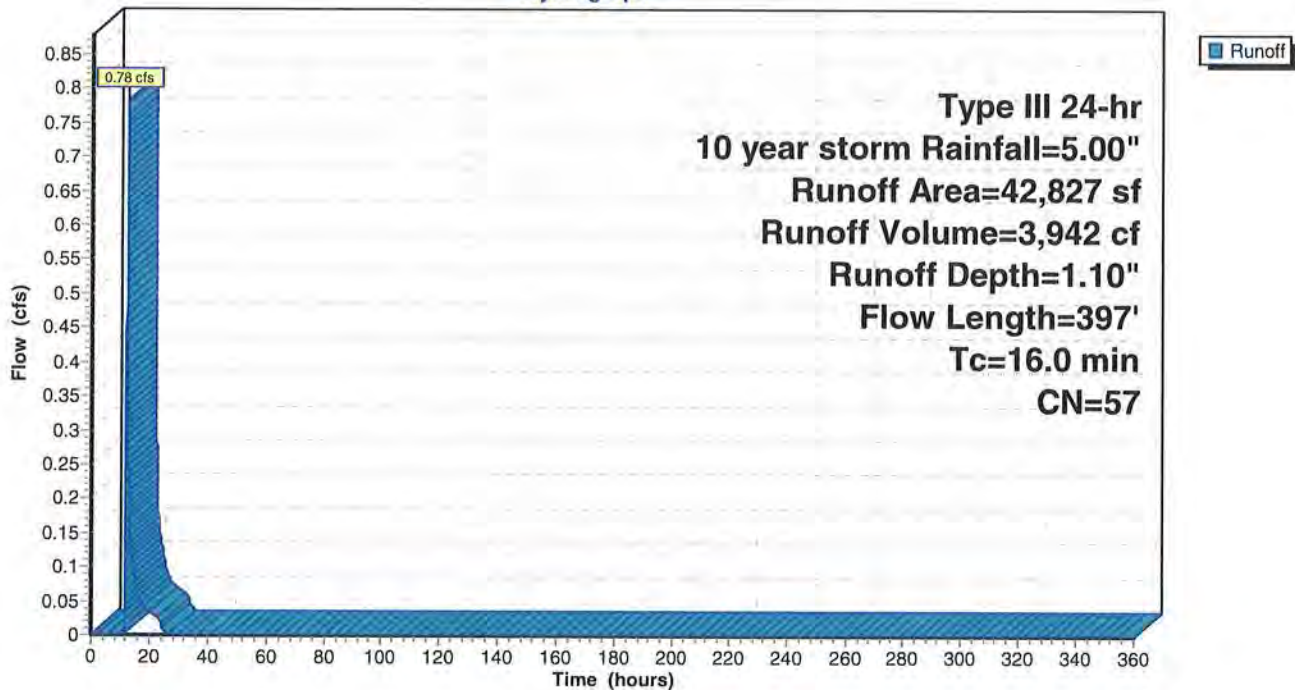
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
30,675	55	Woods, Good, HSG B
12,152	61	>75% Grass cover, Good, HSG B
42,827	57	Weighted Average
42,827		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 3: Pre B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

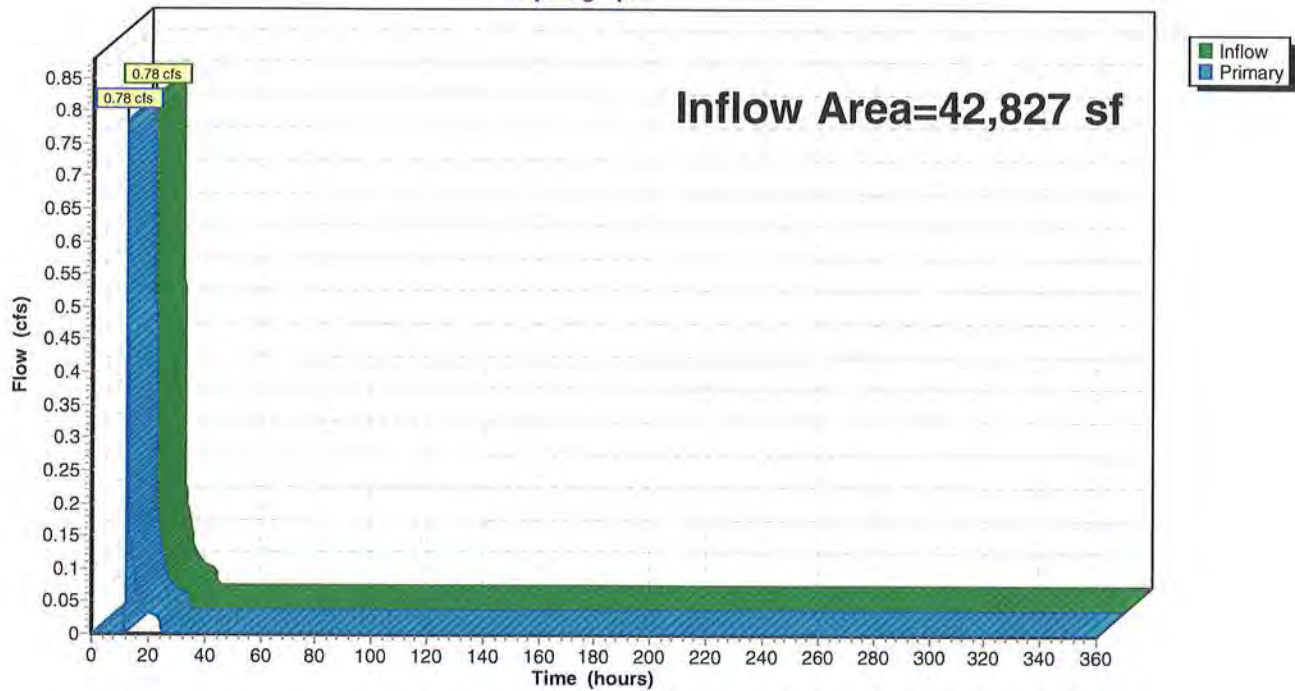
Summary for Link 4: Pre-Design Line B

Inflow Area = 42,827 sf, 0.00% Impervious, Inflow Depth = 1.10" for 10 year storm event
Inflow = 0.78 cfs @ 12.25 hrs, Volume= 3,942 cf
Primary = 0.78 cfs @ 12.25 hrs, Volume= 3,942 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 4: Pre-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 5: Post B1

Runoff = 0.35 cfs @ 12.26 hrs, Volume= 1,828 cf, Depth= 1.04"

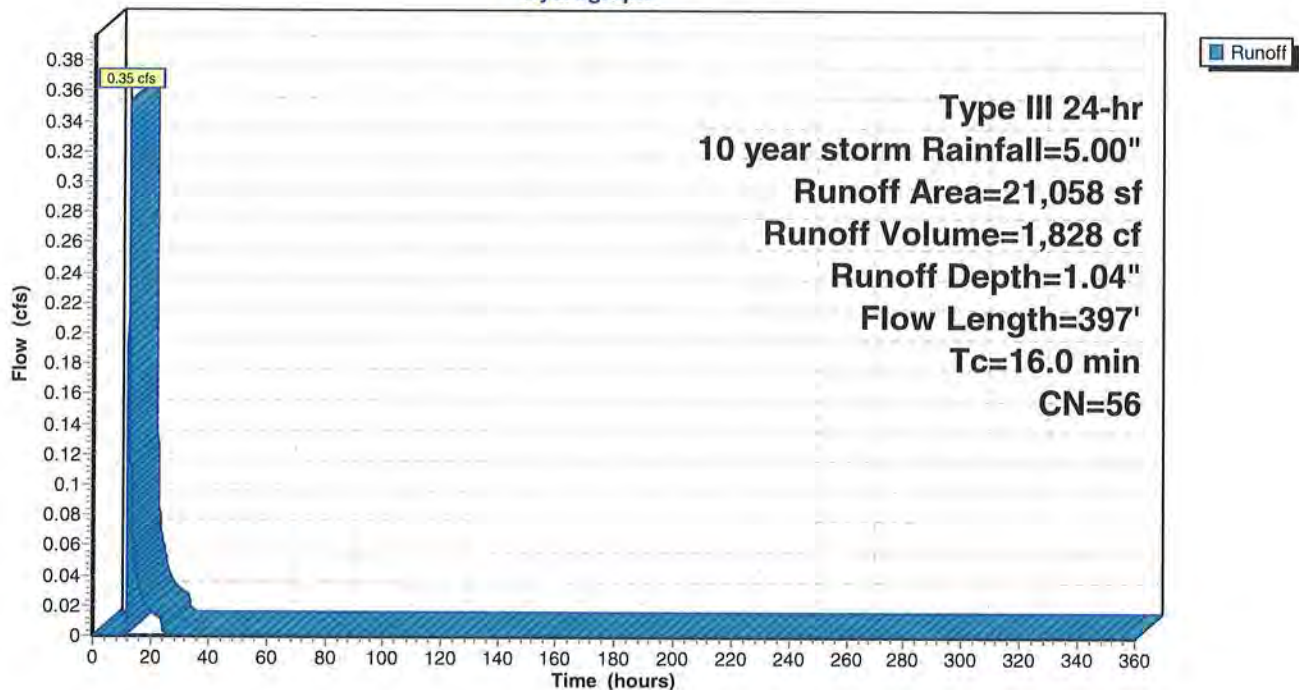
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
18,999	55	Woods, Good, HSG B
2,059	61	>75% Grass cover, Good, HSG B
21,058	56	Weighted Average
21,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 5: Post B1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

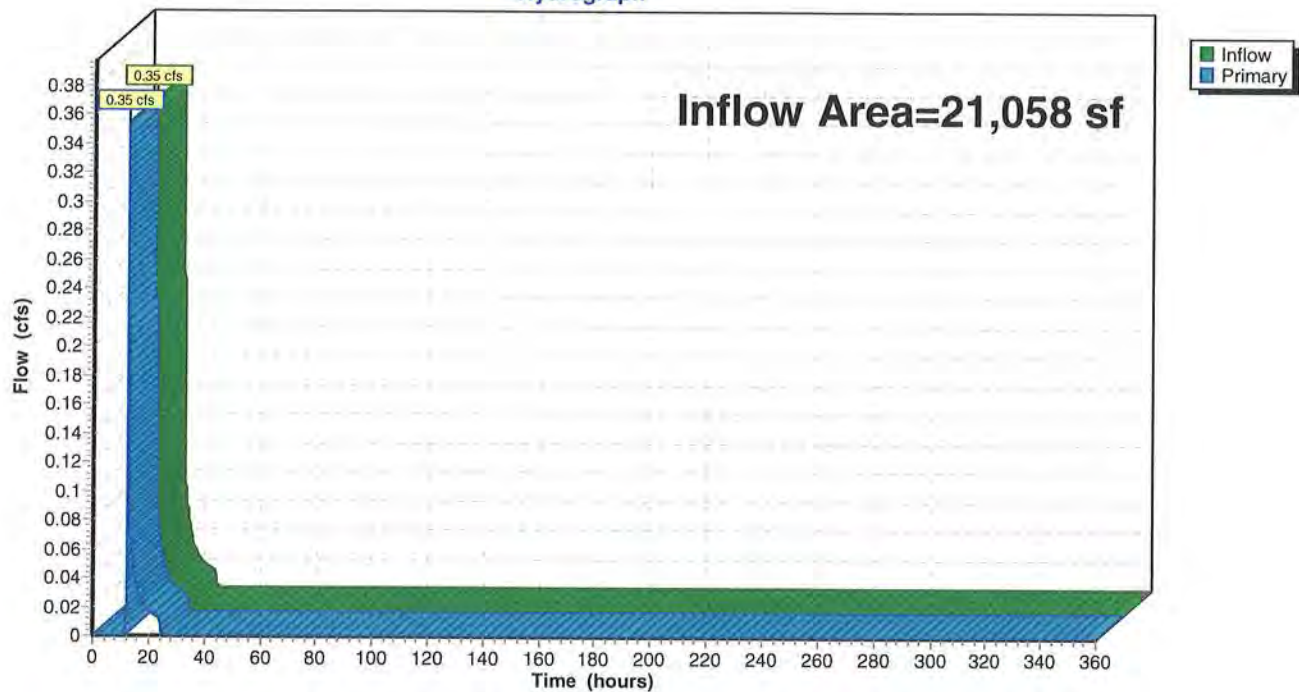
Summary for Link 6: Post-Design Line B

Inflow Area = 21,058 sf, 0.00% Impervious, Inflow Depth = 1.04" for 10 year storm event
Inflow = 0.35 cfs @ 12.26 hrs, Volume= 1,828 cf
Primary = 0.35 cfs @ 12.26 hrs, Volume= 1,828 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 6: Post-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 7: Basin A3

Runoff = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf, Depth= 3.47"

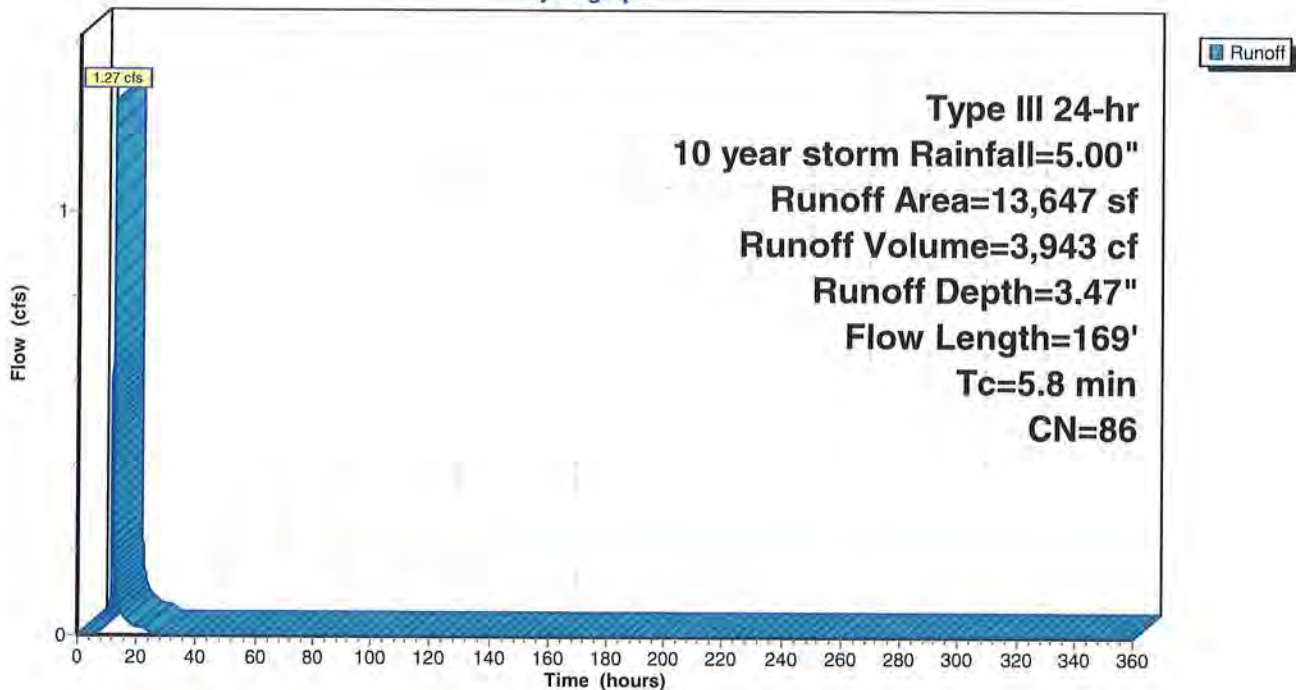
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
7,290	98	Paved parking & roofs
5,560	74	>75% Grass cover, Good, HSG C
797	61	>75% Grass cover, Good, HSG B
13,647	86	Weighted Average
6,357		46.58% Pervious Area
7,290		53.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0775	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.1	5	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0379	3.95		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.8	169	Total			

Subcatchment 7: Basin A3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 8: CB #5

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 3.47" for 10 year storm event
 Inflow = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf
 Outflow = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf

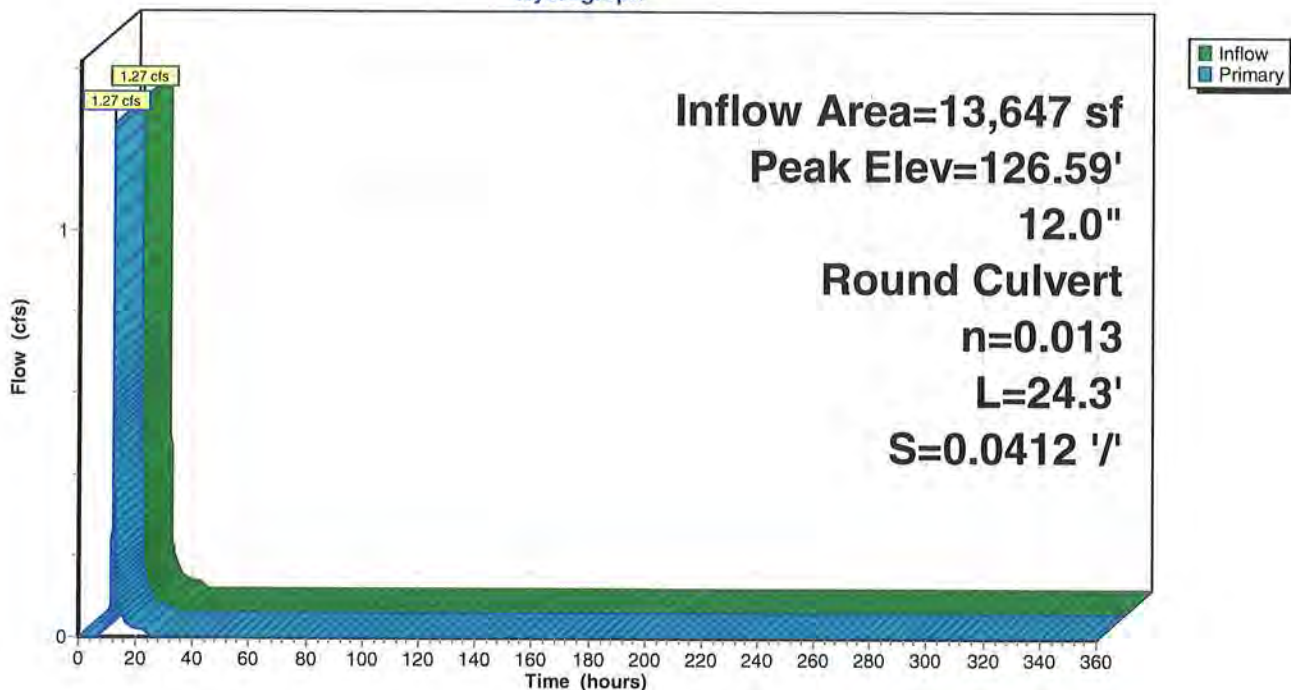
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 126.59' @ 12.08 hrs
 Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	126.00'	12.0" Round Culvert L= 24.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 126.00' / 125.00' S= 0.0412 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.26 cfs @ 12.08 hrs HW=126.59' TW=125.56' (Dynamic Tailwater)
 ↳ **1=Culvert** (Inlet Controls 1.26 cfs @ 2.62 fps)

Pond 8: CB #5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 9: DMH #3

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 3.47" for 10 year storm event
Inflow = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf
Outflow = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.27 cfs @ 12.08 hrs, Volume= 3,943 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Peak Elev= 125.56' @ 12.09 hrs

Flood Elev= 130.50'

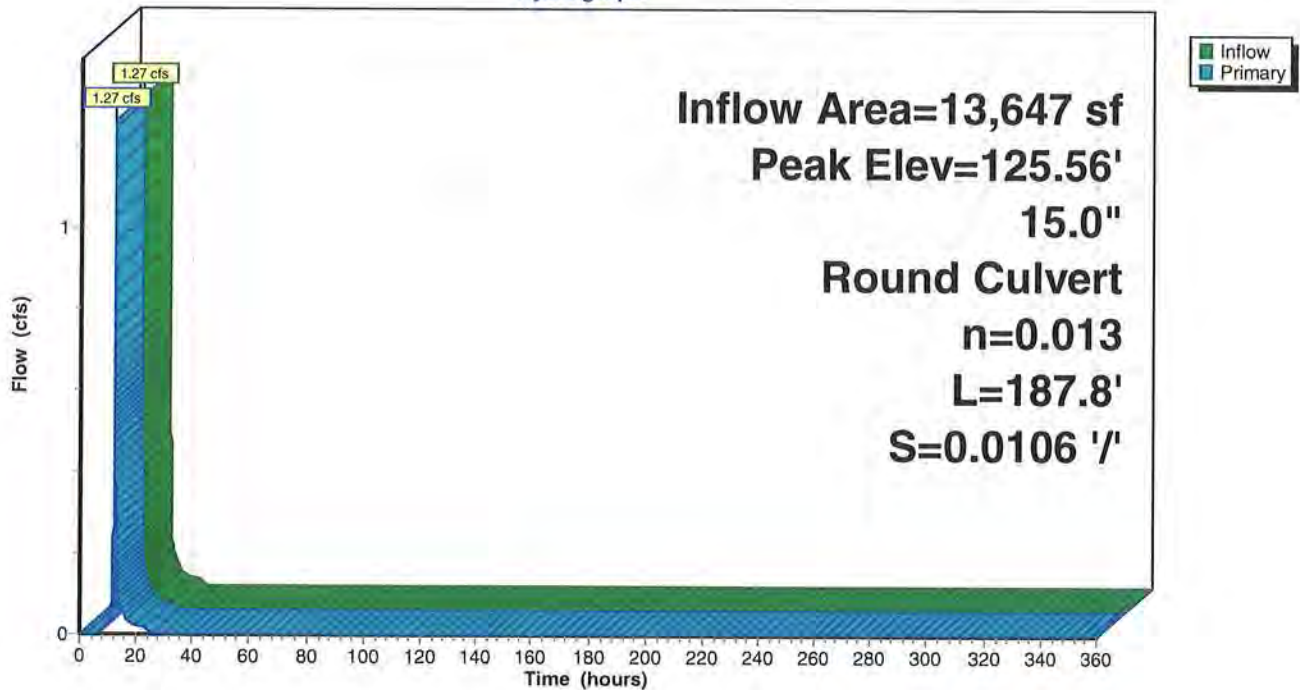
Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	15.0" Round Culvert L= 187.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 125.00' / 123.00' S= 0.0106 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.25 cfs @ 12.08 hrs HW=125.56' TW=124.07' (Dynamic Tailwater)

↑ **1=Culvert** (Outlet Controls 1.25 cfs @ 3.47 fps)

Pond 9: DMH #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 10: Basin A1

Runoff = 3.24 cfs @ 12.14 hrs, Volume= 11,933 cf, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
2,285	70	Woods, Good, HSG C
34,674	55	Woods, Good, HSG B
34,997	61	>75% Grass cover, Good, HSG B
13,046	98	Paved parking & roofs
1,600	98	Water Surface
86,602	65	Weighted Average
71,956		83.09% Pervious Area
14,646		16.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0500	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	61	0.0570	1.67		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	66	0.1590	1.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	89	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	78	0.0630	3.76		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	145	0.0448	11.14	13.67	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
9.5	579	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

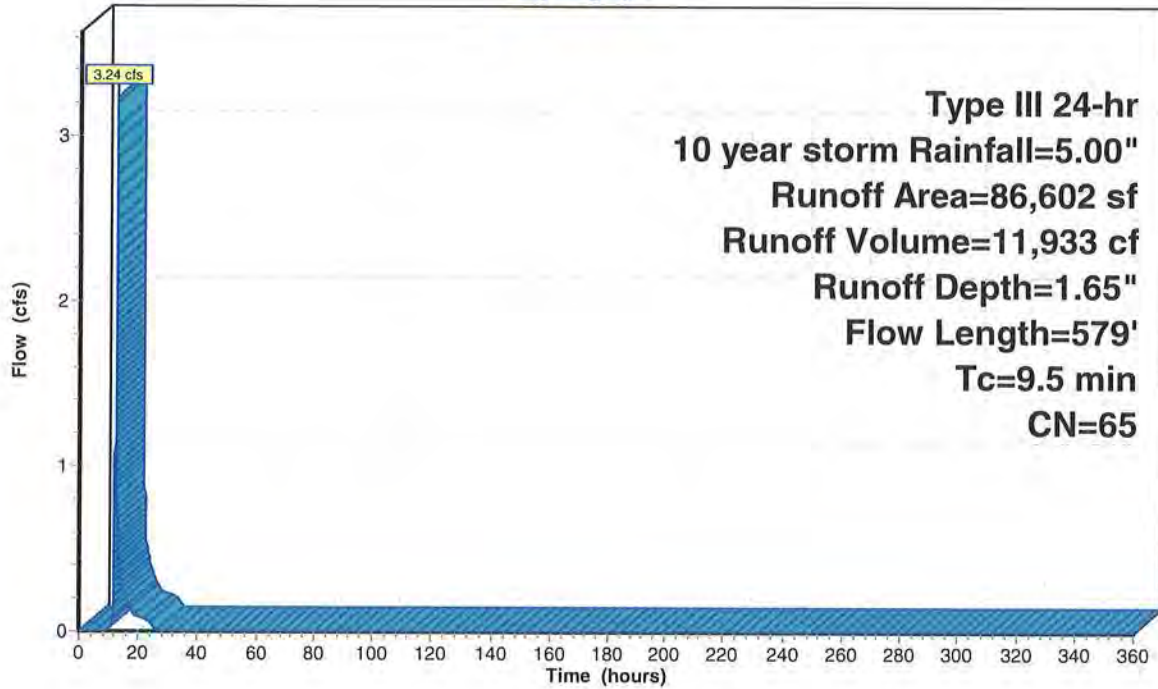
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 10 year storm Rainfall=5.00"

Printed 12/5/2016

Subcatchment 10: Basin A1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 11: CB #4

Inflow Area = 100,249 sf, 21.88% Impervious, Inflow Depth = 1.90" for 10 year storm event
 Inflow = 4.31 cfs @ 12.13 hrs, Volume= 15,876 cf
 Outflow = 4.31 cfs @ 12.13 hrs, Volume= 15,876 cf, Atten= 0%, Lag= 0.0 min
 Primary = 4.31 cfs @ 12.13 hrs, Volume= 15,876 cf

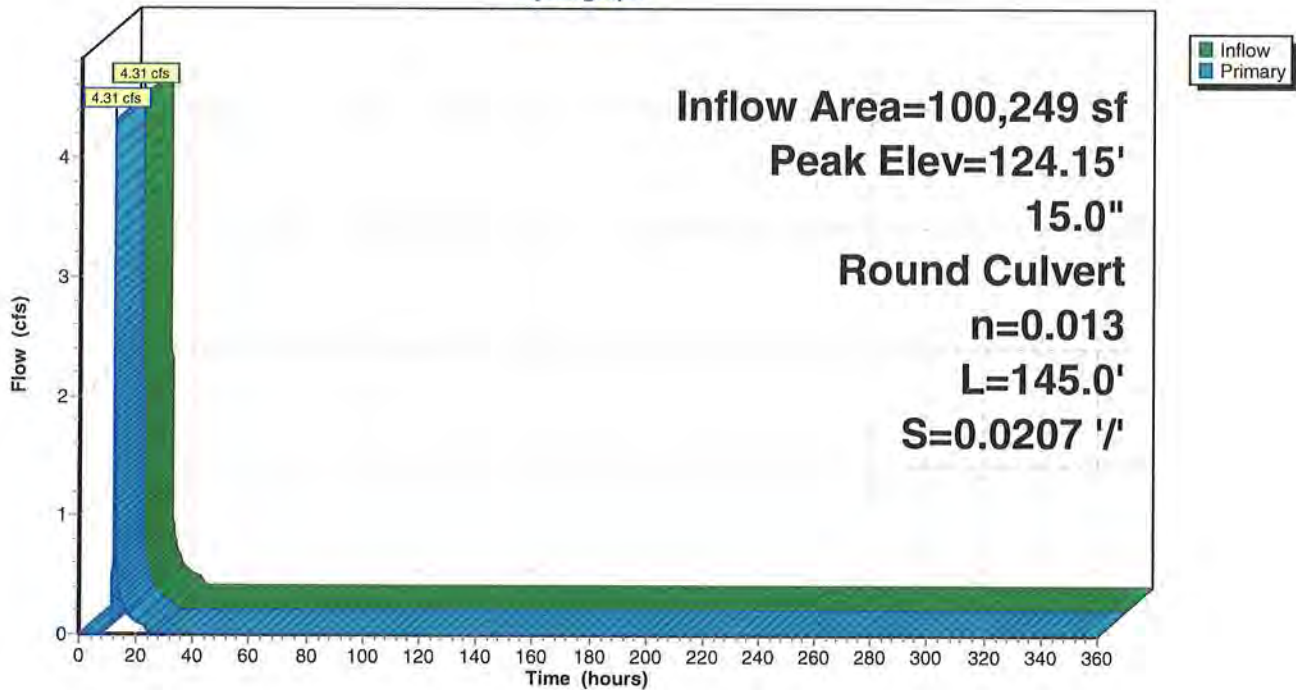
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 124.15' @ 12.13 hrs
 Flood Elev= 130.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.00'	15.0" Round Culvert L= 145.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 120.00' S= 0.0207 1/ S= 0.0207 1/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.31 cfs @ 12.13 hrs HW=124.15' TW=121.49' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 4.31 cfs @ 3.65 fps)

Pond 11: CB #4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 12: Basin A2

Runoff = 0.72 cfs @ 12.07 hrs, Volume= 2,136 cf, Depth= 3.17"

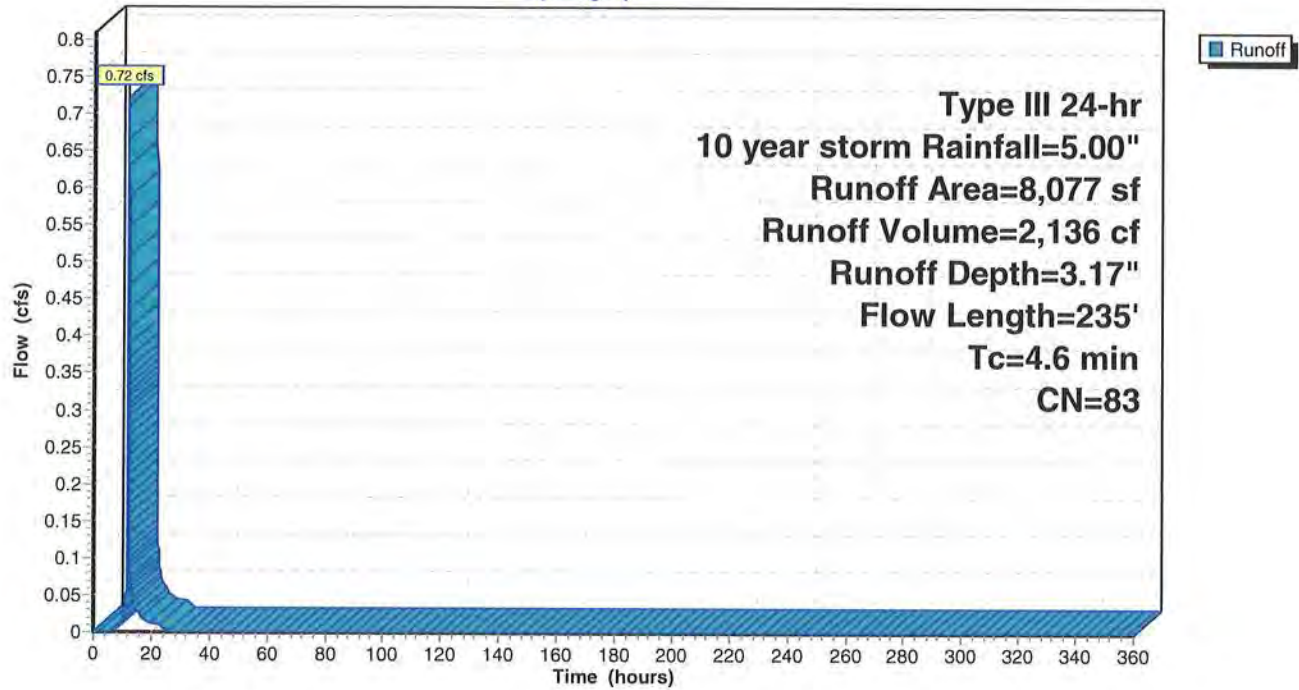
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
1,667	55	Woods, Good, HSG B
1,089	61	>75% Grass cover, Good, HSG B
270	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking & roofs
2,871	98	Roofs, HSG B
8,077	83	Weighted Average
3,026		37.46% Pervious Area
5,051		62.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	30	0.5000	0.51		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
3.0	28	0.1984	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	177	0.0085	4.85	5.96	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
4.6	235	Total			

Subcatchment 12: Basin A2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 13: CB #6

Inflow Area = 8,077 sf, 62.54% Impervious, Inflow Depth = 3.17" for 10 year storm event
Inflow = 0.72 cfs @ 12.07 hrs, Volume= 2,136 cf
Outflow = 0.72 cfs @ 12.07 hrs, Volume= 2,136 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.72 cfs @ 12.07 hrs, Volume= 2,136 cf

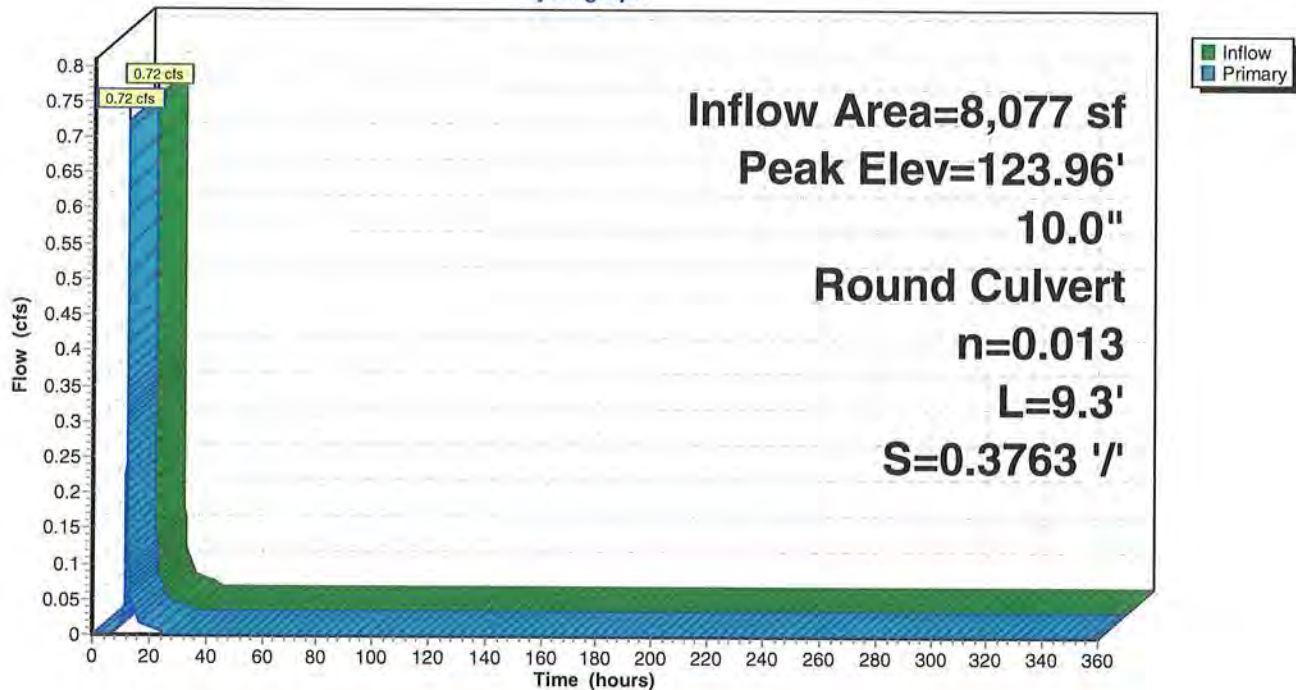
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 123.96' @ 12.07 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.50'	10.0" Round Culvert L= 9.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.50' / 120.00' S= 0.3763 1/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.72 cfs @ 12.07 hrs HW=123.96' TW=121.18' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.72 cfs @ 2.32 fps)

Pond 13: CB #6

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 14: DMH #1

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 2.00" for 10 year storm event
Inflow = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf
Outflow = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf

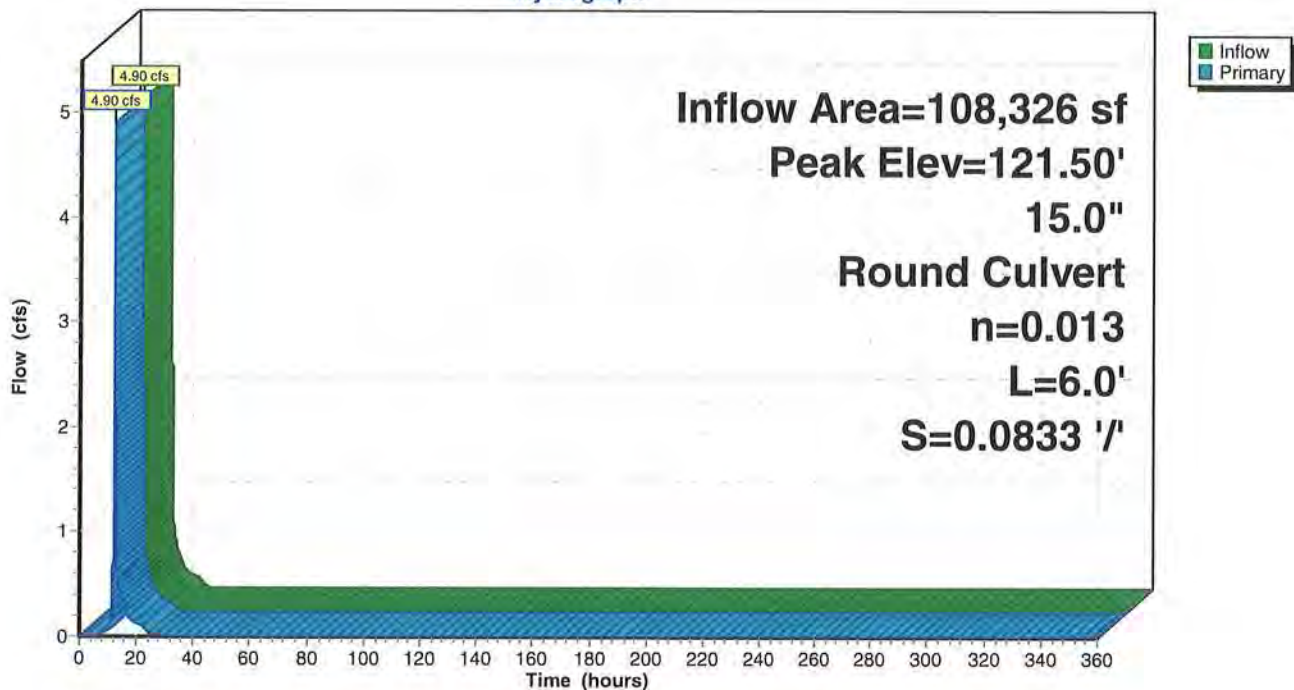
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 121.50' @ 12.12 hrs
Flood Elev= 127.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	15.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.50' S= 0.0833 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.87 cfs @ 12.11 hrs HW=121.49' TW=120.81' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 4.87 cfs @ 3.97 fps)

Pond 14: DMH #1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 15: CDS-2025

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 2.00" for 10 year storm event
Inflow = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf
Outflow = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf

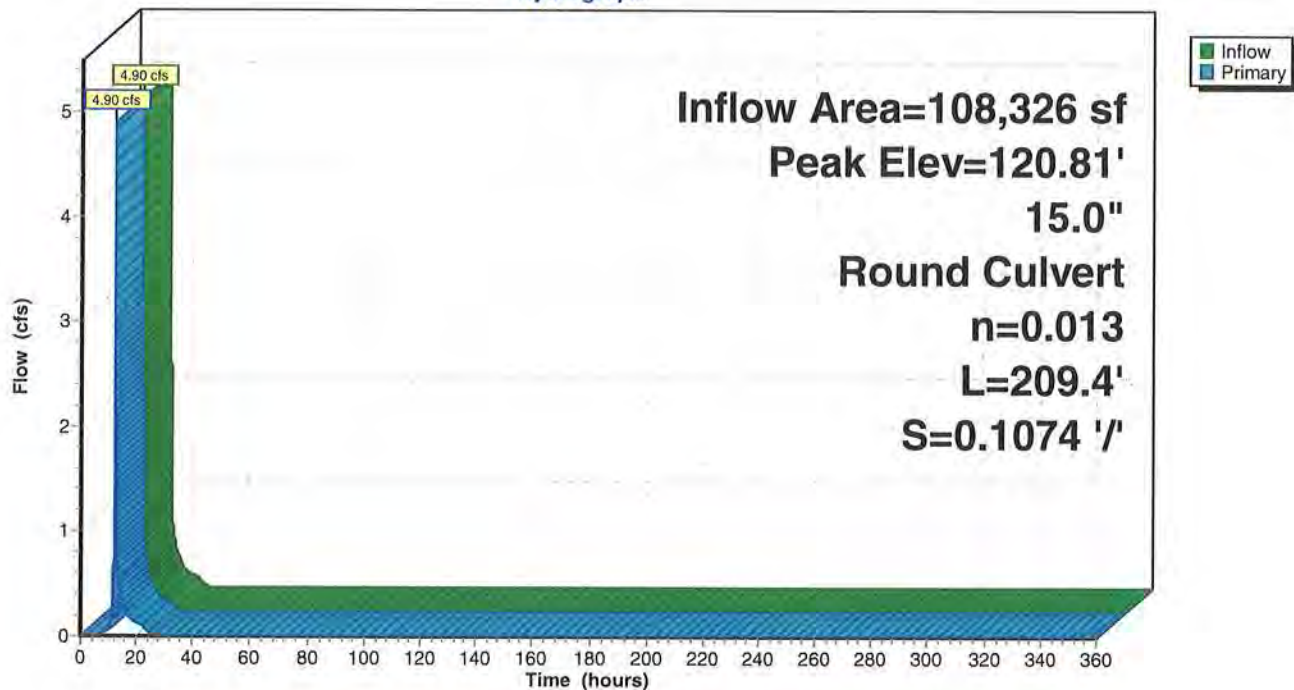
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 120.81' @ 12.11 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	15.0" Round Culvert L= 209.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.50' / 97.00' S= 0.1074 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.90 cfs @ 12.11 hrs HW=120.81' TW=97.80' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 4.90 cfs @ 3.99 fps)

Pond 15: CDS-2025

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 16: DMH #2

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 2.00" for 10 year storm event
 Inflow = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf
 Outflow = 4.90 cfs @ 12.11 hrs, Volume= 18,013 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.38 cfs @ 11.89 hrs, Volume= 9,508 cf
 Secondary = 3.58 cfs @ 12.12 hrs, Volume= 8,505 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Peak Elev= 97.80' @ 12.12 hrs

Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0" Round Culvert L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 94.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	97.00'	24.0" Round Culvert L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.00' / 94.00' S= 0.0370 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.37 cfs @ 11.89 hrs HW=97.11' TW=95.02' (Dynamic Tailwater)

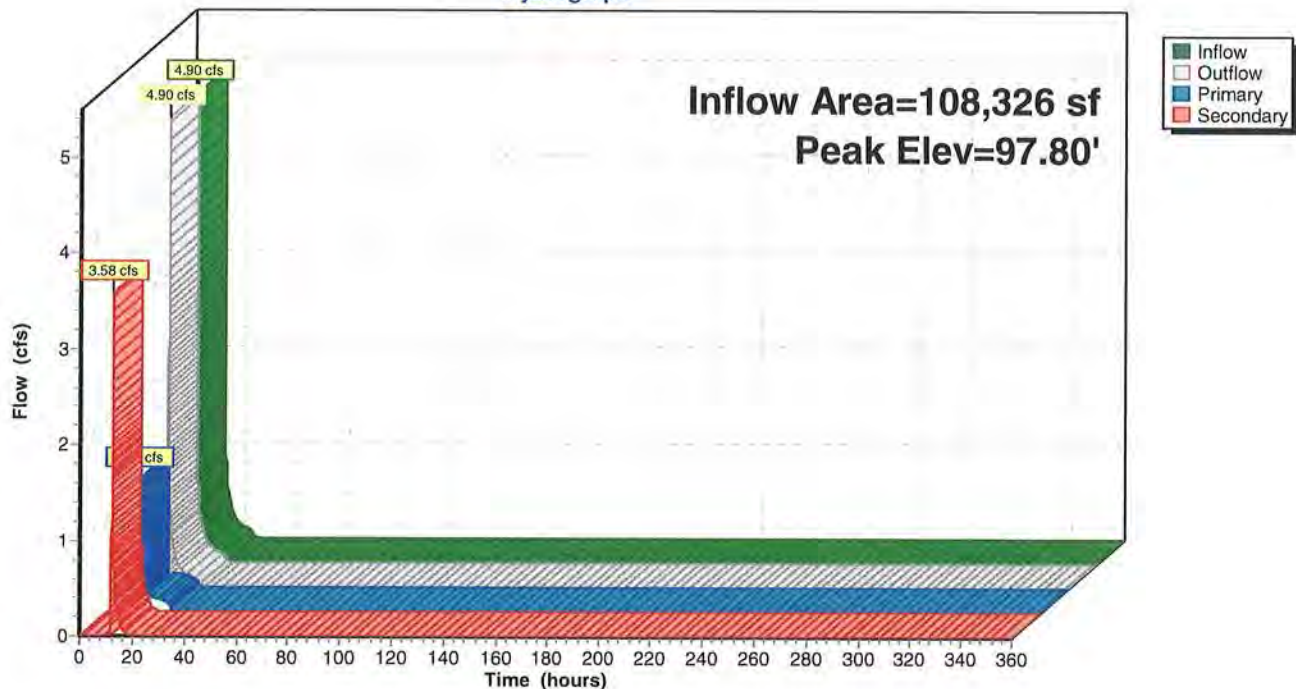
↑**1=Culvert** (Inlet Controls 1.37 cfs @ 6.96 fps)

Secondary OutFlow Max=3.58 cfs @ 12.12 hrs HW=97.80' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 3.58 cfs @ 3.05 fps)

Pond 16: DMH #2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 17: Infiltration System #3

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 1.05" for 10 year storm event
 Inflow = 1.38 cfs @ 11.89 hrs, Volume= 9,508 cf
 Outflow = 0.15 cfs @ 11.32 hrs, Volume= 9,509 cf, Atten= 89%, Lag= 0.0 min
 Discarded = 0.15 cfs @ 11.32 hrs, Volume= 9,509 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.35' @ 12.65 hrs Surf.Area= 1,398 sf Storage= 2,997 cf
 Flood Elev= 98.00' Surf.Area= 1,398 sf Storage= 3,363 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 222.1 min (1,122.7 - 900.5)

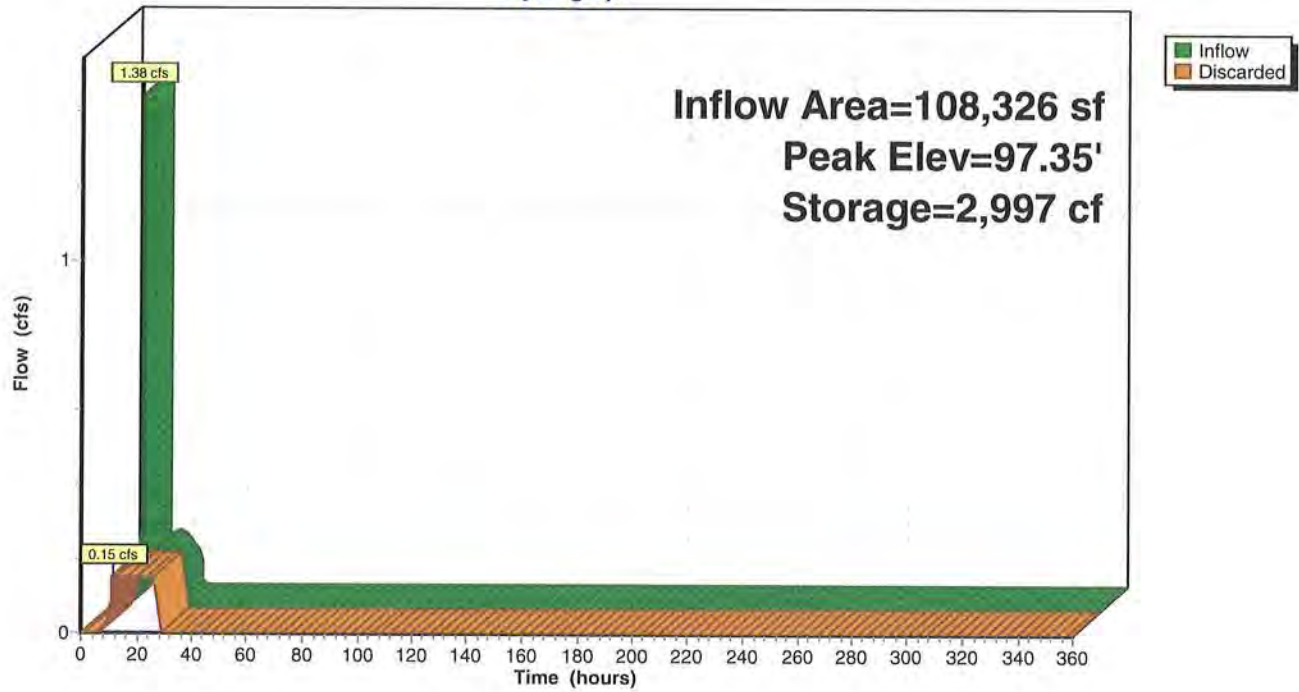
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	1,485 cf	21.50'W x 65.00'L x 4.00'H Prismaoid 5,590 cf Overall - 1,878 cf Embedded = 3,712 cf x 40.0% Voids
#2	94.50'	1,878 cf	Cultec R-330XLHD x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		3,363 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	4.680 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.15 cfs @ 11.32 hrs HW=94.04' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Pond 17: Infiltration System #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 18: Basin A4

Runoff = 2.88 cfs @ 12.11 hrs, Volume= 9,477 cf, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
17,045	55	Woods, Good, HSG B
15,813	98	Paved parking & roofs
17,689	61	>75% Grass cover, Good, HSG B
3,187	85	Gravel roads, HSG B
53,734	71	Weighted Average
37,921		70.57% Pervious Area
15,813		29.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.0850	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.4	14	0.0357	0.56		Sheet Flow, Gravel n= 0.029 P2= 3.50"
2.8	46	0.0870	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.5	46	0.0435	1.46		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	247	0.0486	4.48		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	93	0.0161	6.68	8.20	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
7.3	486	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

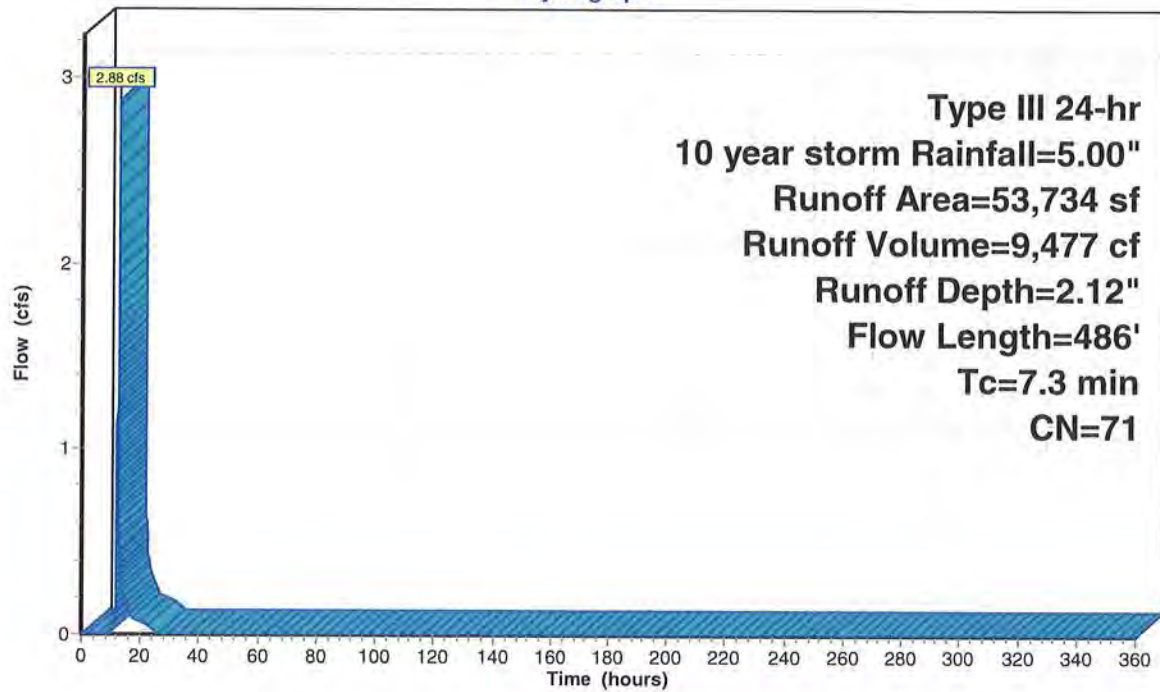
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 10 year storm Rainfall=5.00"

Printed 12/5/2016

Subcatchment 18: Basin A4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 19: Pocket Pond

Inflow Area = 53,734 sf, 29.43% Impervious, Inflow Depth = 2.12" for 10 year storm event
 Inflow = 2.88 cfs @ 12.11 hrs, Volume= 9,477 cf
 Outflow = 1.88 cfs @ 12.22 hrs, Volume= 9,476 cf, Atten= 35%, Lag= 6.8 min
 Primary = 1.88 cfs @ 12.22 hrs, Volume= 9,476 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Starting Elev= 136.50' Surf.Area= 1,107 sf Storage= 1,300 cf
 Peak Elev= 138.12' @ 12.22 hrs Surf.Area= 2,338 sf Storage= 4,093 cf (2,793 cf above start)
 Flood Elev= 140.00' Surf.Area= 2,857 sf Storage= 6,364 cf (5,064 cf above start)

Plug-Flow detention time= 834.9 min calculated for 8,176 cf (86% of inflow)
 Center-of-Mass det. time= 652.0 min (1,498.3 - 846.3)

Volume	Invert	Avail.Storage	Storage Description			
#1	134.00'	6,364 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
134.00	95	71.9	0	0	95	
135.00	386	122.6	224	224	886	
136.00	829	172.5	594	818	2,067	
136.50	1,107	197.3	482	1,300	2,802	
137.00	1,455	224.9	639	1,939	3,736	
137.50	1,803	238.1	813	2,752	4,236	
137.60	2,049	177.8	192	2,944	6,231	
138.00	2,268	186.3	863	3,807	6,488	
139.00	2,857	206.5	2,557	6,364	7,150	

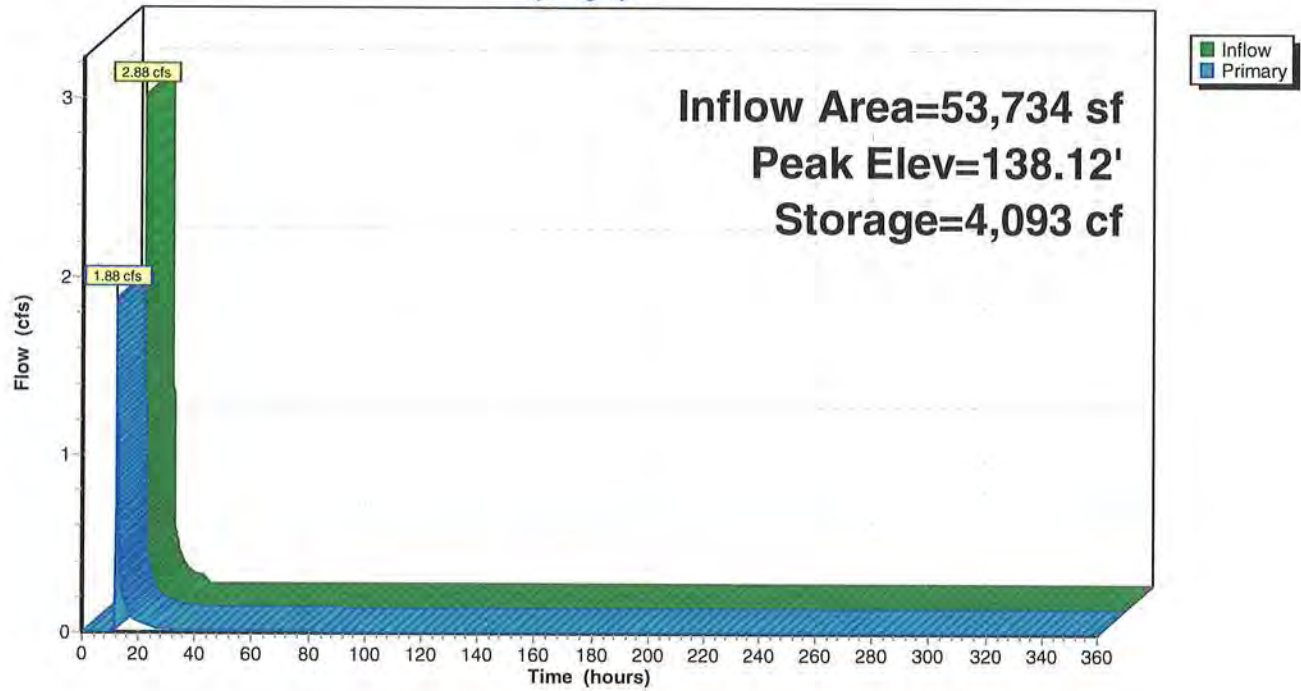
Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	15.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.50' / 134.00' S= 0.0373 1/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	136.50'	0.7" Vert. Orifice/Grate C= 0.600
#3	Device 1	138.00'	48.0" x 30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.88 cfs @ 12.22 hrs HW=138.12' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 1.88 cfs of 5.91 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.08 fps)
- 3=Orifice/Grate (Weir Controls 1.86 cfs @ 1.15 fps)

Pond 19: Pocket Pond

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 20: Basin A5

Runoff = 12.86 cfs @ 12.41 hrs, Volume= 70,087 cf, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 year storm Rainfall=5.00"

Area (sf)	CN	Description
95,873	70	Woods, Good, HSG C
217,255	55	Woods, Good, HSG B
43,293	74	>75% Grass cover, Good, HSG C
69,274	61	>75% Grass cover, Good, HSG B
1,614	89	Gravel roads, HSG C
1,432	85	Gravel roads, HSG B
1,615	87	Dirt roads, HSG C
54,850	98	Paved parking & roofs
1,600	98	Water Surface
486,806	66	Weighted Average
430,356		88.40% Pervious Area
56,450		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Brook Bot.W=10.00' D=1.50' Z= 1.0 '/' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

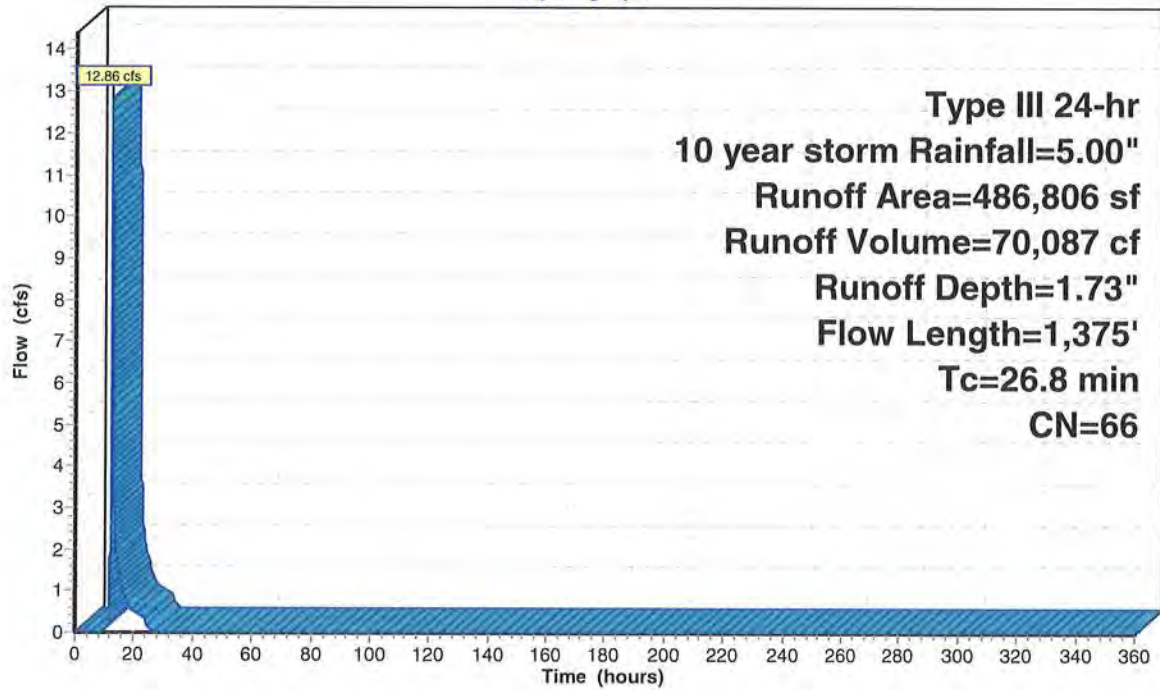
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 20: Basin A5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 10 year storm Rainfall=5.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

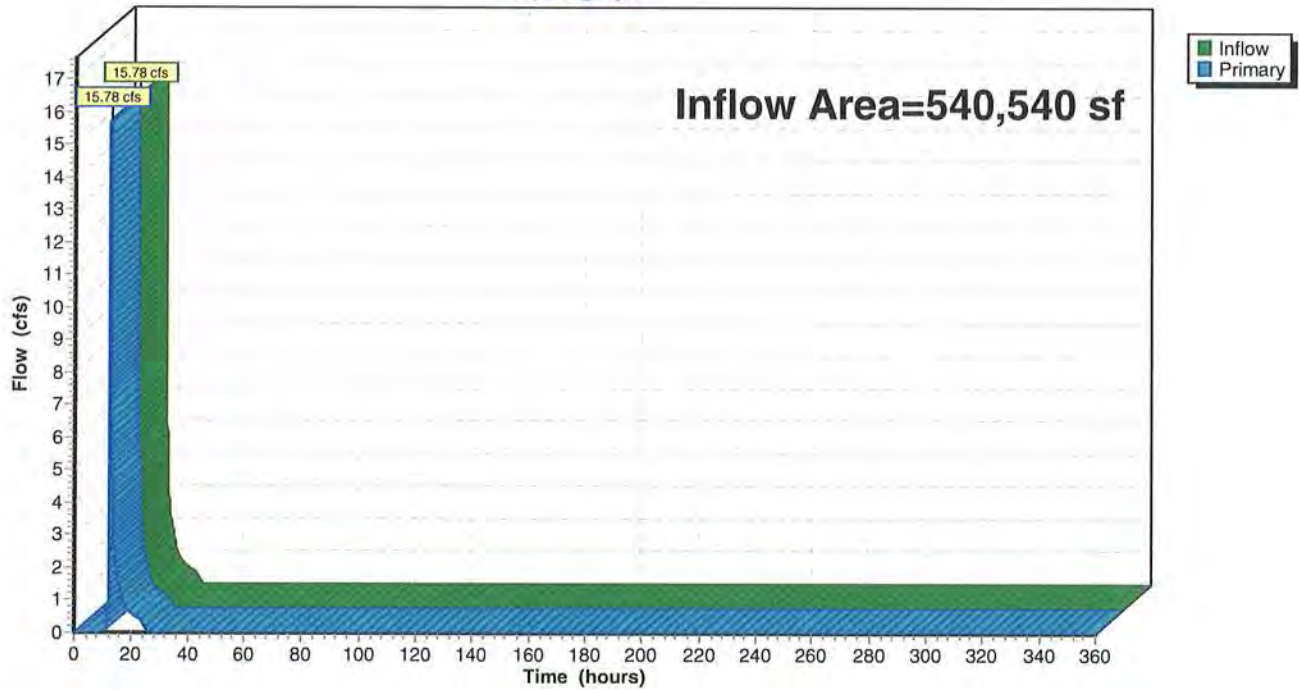
Summary for Link 21: Post-Design Point A

Inflow Area = 540,540 sf, 13.37% Impervious, Inflow Depth = 1.96" for 10 year storm event
Inflow = 15.78 cfs @ 12.36 hrs, Volume= 88,068 cf
Primary = 15.78 cfs @ 12.36 hrs, Volume= 88,068 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 21: Post-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-360.00 hrs, dt=0.01 hrs, 36001 points

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

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Pre ARunoff Area=633,814 sf 9.36% Impervious Runoff Depth=2.35"
Flow Length=1,375' Tc=26.8 min CN=65 Runoff=23.22 cfs 124,192 cf**Link 2: Pre-Design Point A**Inflow=23.22 cfs 124,192 cf
Primary=23.22 cfs 124,192 cf**Subcatchment 3: Pre B**Runoff Area=42,827 sf 0.00% Impervious Runoff Depth=1.68"
Flow Length=397' Tc=16.0 min CN=57 Runoff=1.29 cfs 5,982 cf**Link 4: Pre-Design Line B**Inflow=1.29 cfs 5,982 cf
Primary=1.29 cfs 5,982 cf**Subcatchment 5: Post B1**Runoff Area=21,058 sf 0.00% Impervious Runoff Depth=1.60"
Flow Length=397' Tc=16.0 min CN=56 Runoff=0.60 cfs 2,801 cf**Link 6: Post-Design Line B**Inflow=0.60 cfs 2,801 cf
Primary=0.60 cfs 2,801 cf**Subcatchment 7: Basin A3**Runoff Area=13,647 sf 53.42% Impervious Runoff Depth=4.41"
Flow Length=169' Tc=5.8 min CN=86 Runoff=1.59 cfs 5,015 cf**Pond 8: CB #5**Peak Elev=126.68' Inflow=1.59 cfs 5,015 cf
12.0" Round Culvert n=0.013 L=24.3' S=0.0412 '/ Outflow=1.59 cfs 5,015 cf**Pond 9: DMH #3**Peak Elev=125.69' Inflow=1.59 cfs 5,015 cf
15.0" Round Culvert n=0.013 L=187.8' S=0.0106 '/ Outflow=1.59 cfs 5,015 cf**Subcatchment 10: Basin A1**Runoff Area=86,602 sf 16.91% Impervious Runoff Depth=2.35"
Flow Length=579' Tc=9.5 min CN=65 Runoff=4.74 cfs 16,969 cf**Pond 11: CB #4**Peak Elev=124.69' Inflow=6.10 cfs 21,984 cf
15.0" Round Culvert n=0.013 L=145.0' S=0.0207 '/ Outflow=6.10 cfs 21,984 cf**Subcatchment 12: Basin A2**Runoff Area=8,077 sf 62.54% Impervious Runoff Depth=4.09"
Flow Length=235' Tc=4.6 min CN=83 Runoff=0.92 cfs 2,754 cf**Pond 13: CB #6**Peak Elev=124.04' Inflow=0.92 cfs 2,754 cf
10.0" Round Culvert n=0.013 L=9.3' S=0.3763 '/ Outflow=0.92 cfs 2,754 cf**Pond 14: DMH #1**Peak Elev=122.81' Inflow=6.85 cfs 24,738 cf
15.0" Round Culvert n=0.013 L=6.0' S=0.0833 '/ Outflow=6.85 cfs 24,738 cf**Pond 15: CDS-2025**Peak Elev=121.47' Inflow=6.85 cfs 24,738 cf
15.0" Round Culvert n=0.013 L=209.4' S=0.1074 '/ Outflow=6.85 cfs 24,738 cf**Pond 16: DMH #2**Peak Elev=98.03' Inflow=6.85 cfs 24,738 cf
Primary=1.33 cfs 10,431 cf Secondary=5.65 cfs 14,306 cf Outflow=6.85 cfs 24,738 cf

Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Pond 17: Infiltration System #3

Peak Elev=97.59' Storage=3,131 cf Inflow=1.33 cfs 10,431 cf
Outflow=0.15 cfs 10,431 cf

Subcatchment 18: Basin A4

Runoff Area=53,734 sf 29.43% Impervious Runoff Depth=2.90"
Flow Length=486' Tc=7.3 min CN=71 Runoff=3.99 cfs 12,980 cf

Pond 19: Pocket Pond

Peak Elev=138.20' Storage=4,266 cf Inflow=3.99 cfs 12,980 cf
Outflow=3.74 cfs 12,979 cf

Subcatchment 20: Basin A5

Runoff Area=486,806 sf 11.60% Impervious Runoff Depth=2.44"
Flow Length=1,375' Tc=26.8 min CN=66 Runoff=18.60 cfs 98,992 cf

Link 21: Post-Design Point A

Inflow=23.25 cfs 126,278 cf
Primary=23.25 cfs 126,278 cf

**Total Runoff Area = 1,346,565 sf Runoff Volume = 269,685 cf Average Runoff Depth = 2.40"
88.22% Pervious = 1,187,960 sf 11.78% Impervious = 158,605 sf**

Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: Pre A

Runoff = 23.22 cfs @ 12.39 hrs, Volume= 124,192 cf, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
153,576	70	Woods, Good, HSG C
280,022	55	Woods, Good, HSG B
116,063	61	>75% Grass cover, Good, HSG B
11,498	74	>75% Grass cover, Good, HSG C
9,346	85	Gravel roads, HSG B
1,614	89	Gravel roads, HSG C
59,355	98	Paved parking & roofs
2,340	87	Dirt roads, HSG C
633,814	65	Weighted Average
574,459		90.64% Pervious Area
59,355		9.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Bot.W=10.00' D=1.50' Z= 1.0 ' / ' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

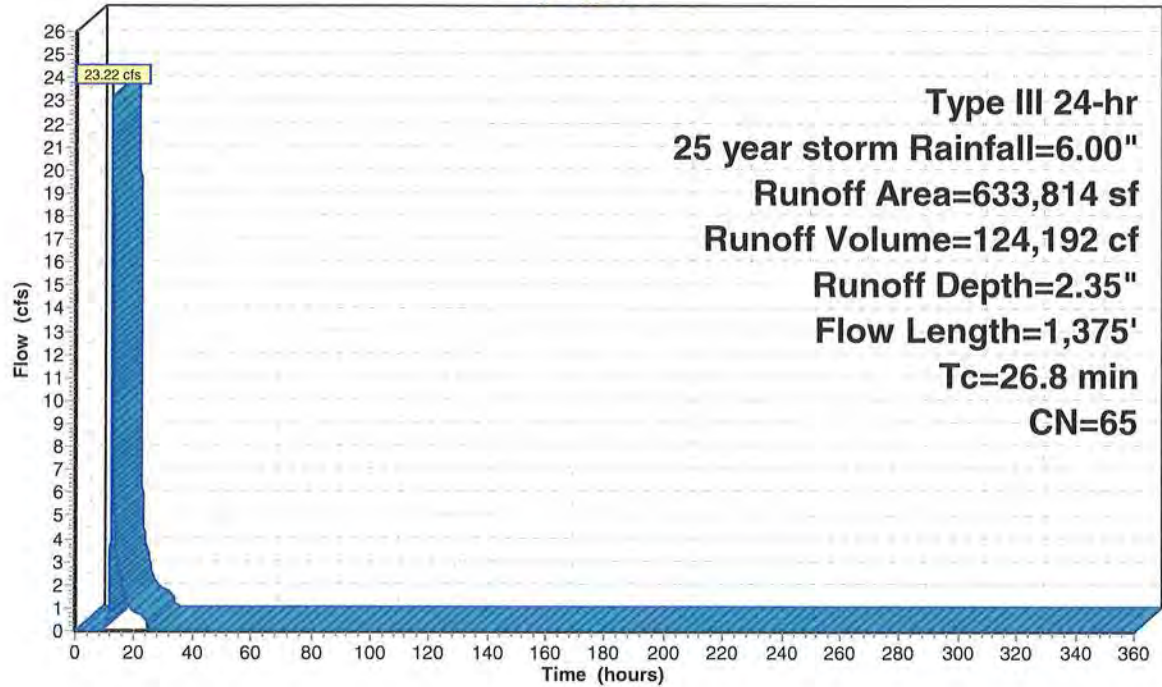
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 1: Pre A

Hydrograph



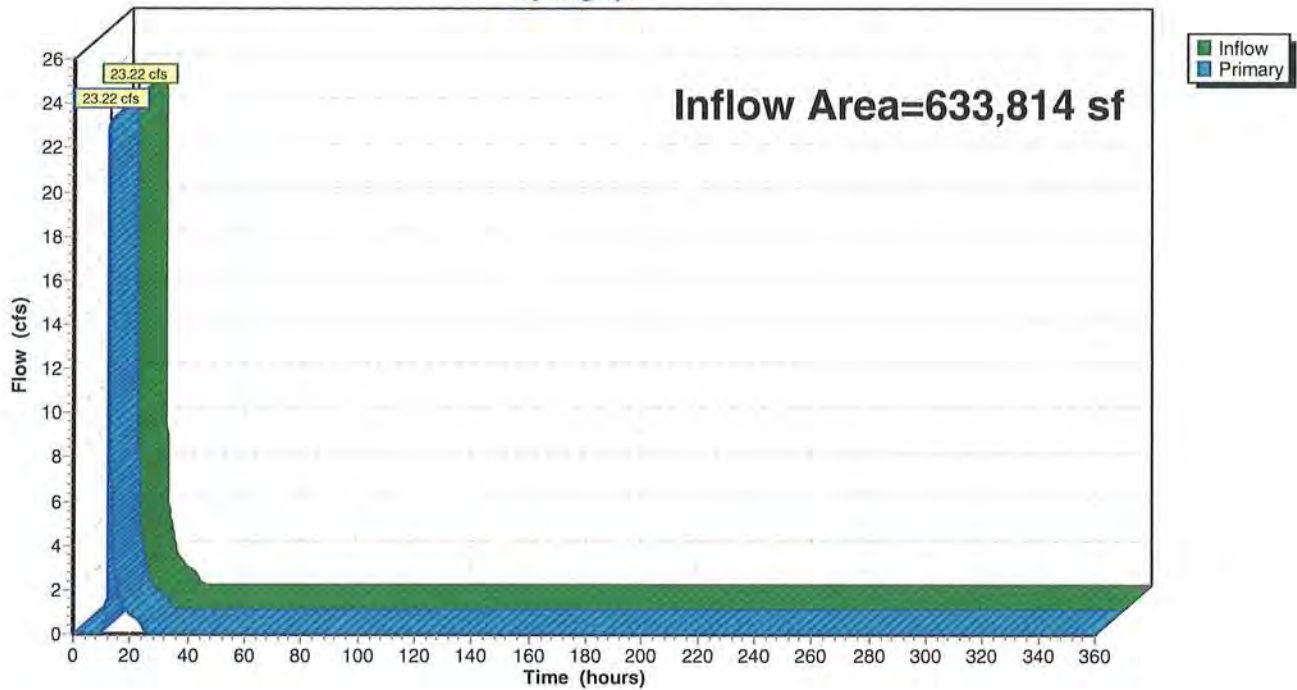
Summary for Link 2: Pre-Design Point A

Inflow Area = 633,814 sf, 9.36% Impervious, Inflow Depth = 2.35" for 25 year storm event
Inflow = 23.22 cfs @ 12.39 hrs, Volume= 124,192 cf
Primary = 23.22 cfs @ 12.39 hrs, Volume= 124,192 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 2: Pre-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 3: Pre B

Runoff = 1.29 cfs @ 12.25 hrs, Volume= 5,982 cf, Depth= 1.68"

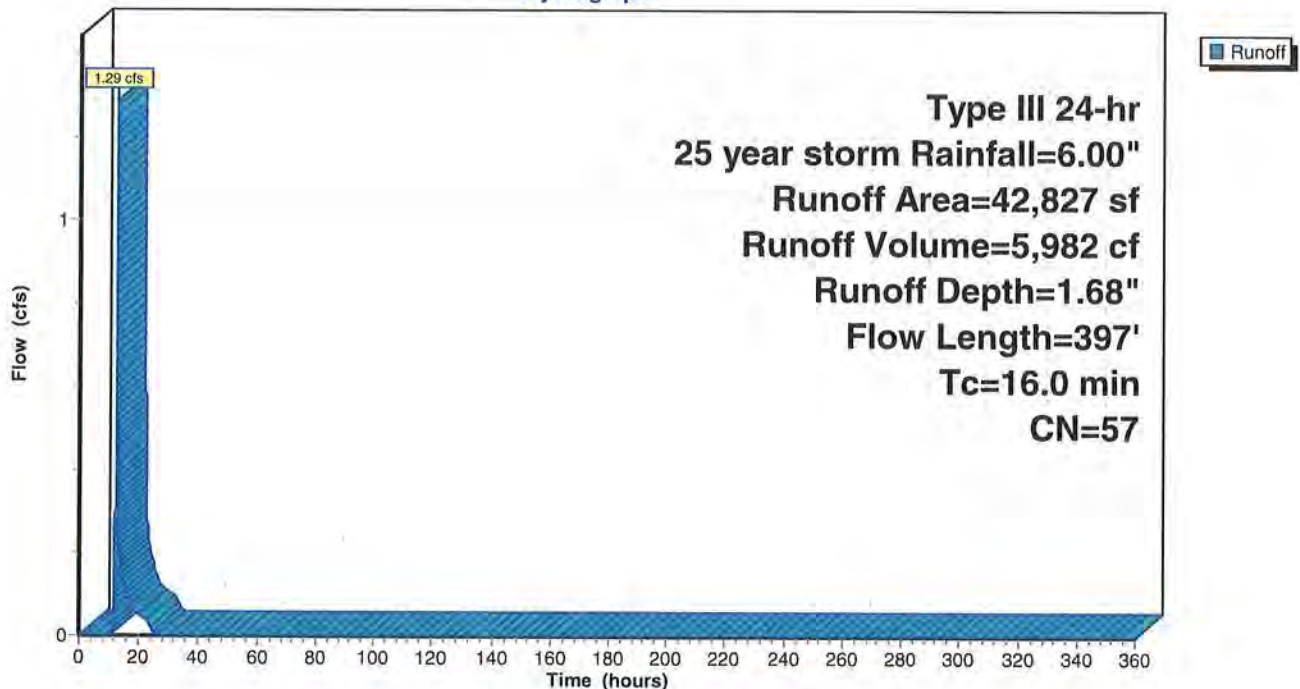
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
30,675	55	Woods, Good, HSG B
12,152	61	>75% Grass cover, Good, HSG B
42,827	57	Weighted Average
42,827		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 3: Pre B

Hydrograph



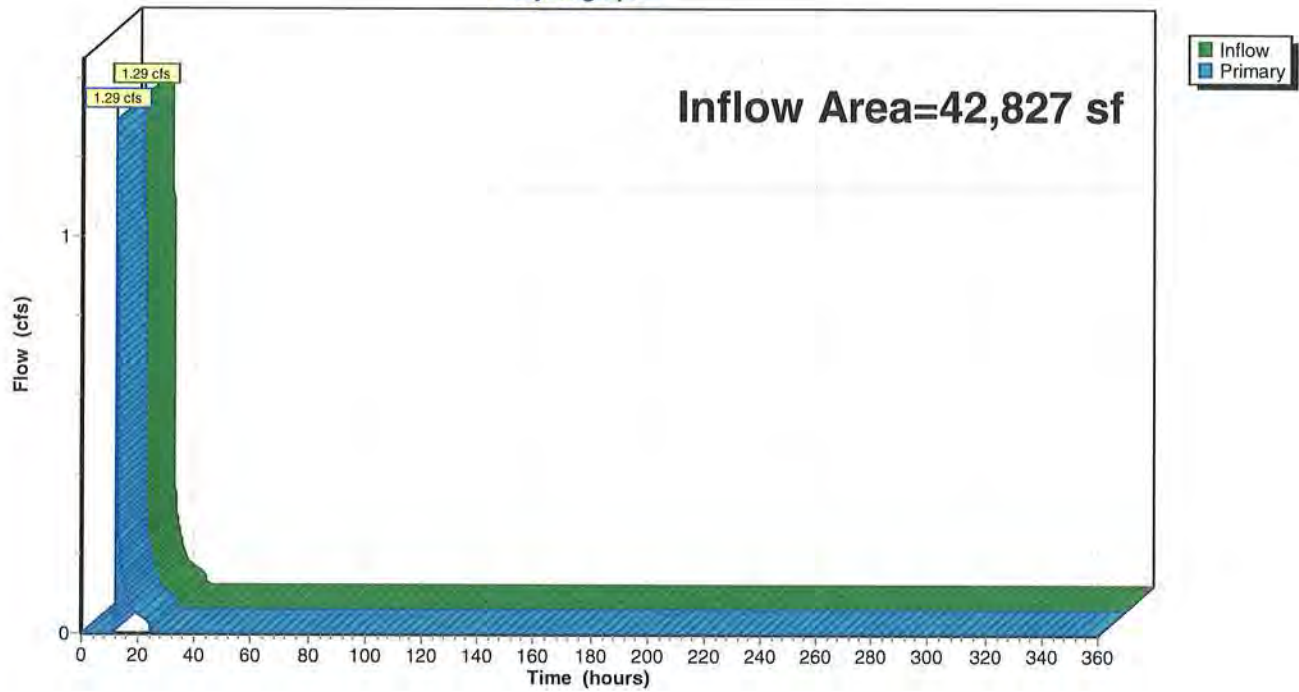
Summary for Link 4: Pre-Design Line B

Inflow Area = 42,827 sf, 0.00% Impervious, Inflow Depth = 1.68" for 25 year storm event
Inflow = 1.29 cfs @ 12.25 hrs, Volume= 5,982 cf
Primary = 1.29 cfs @ 12.25 hrs, Volume= 5,982 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 4: Pre-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 5: Post B1

Runoff = 0.60 cfs @ 12.25 hrs, Volume= 2,801 cf, Depth= 1.60"

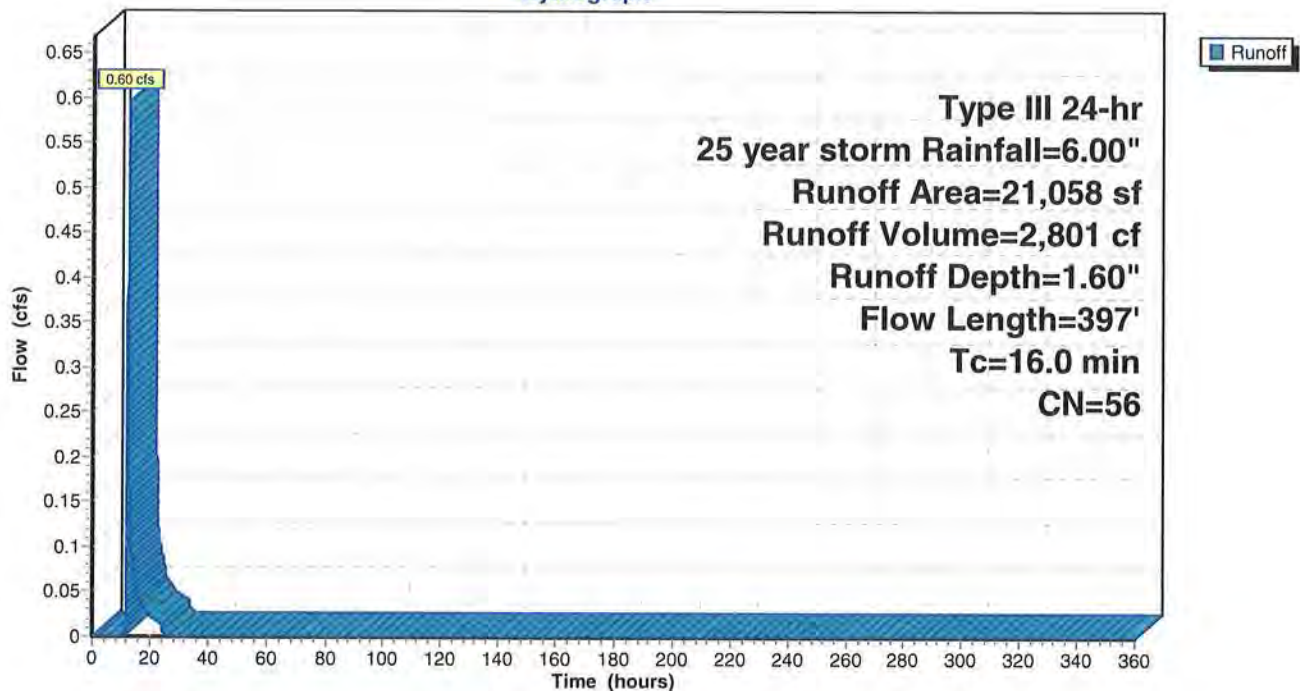
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
18,999	55	Woods, Good, HSG B
2,059	61	>75% Grass cover, Good, HSG B
21,058	56	Weighted Average
21,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 5: Post B1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

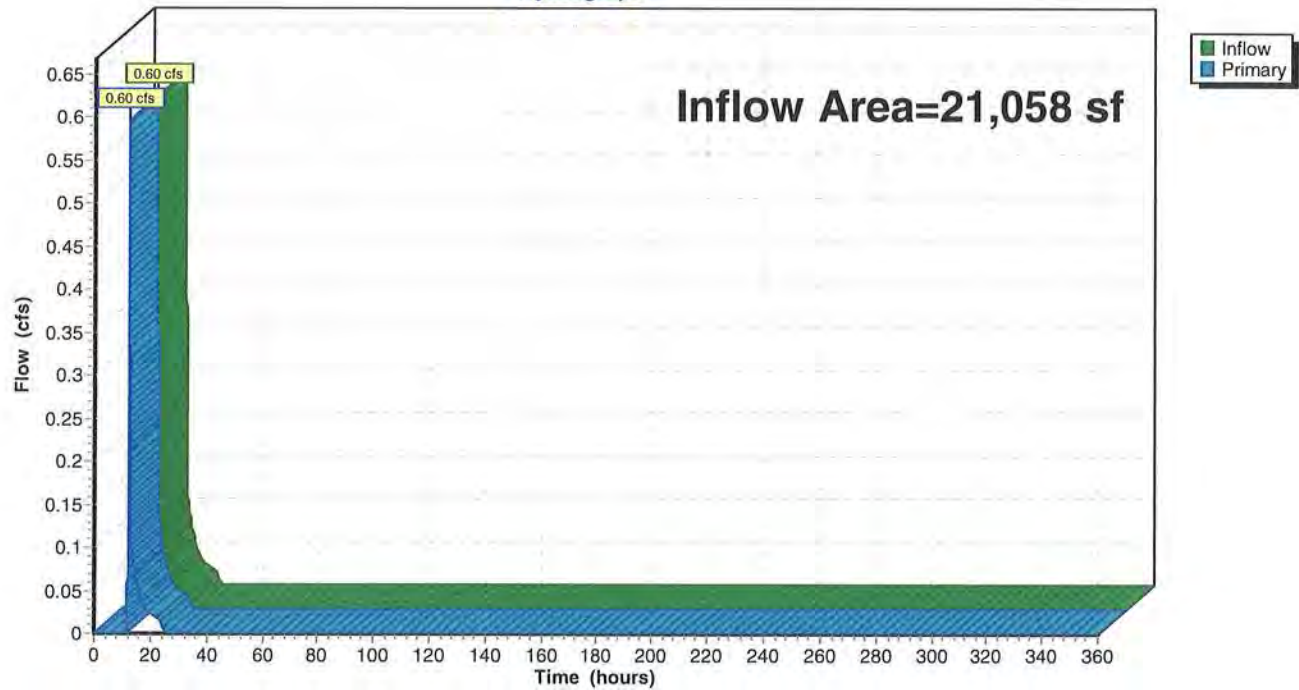
Summary for Link 6: Post-Design Line B

Inflow Area = 21,058 sf, 0.00% Impervious, Inflow Depth = 1.60" for 25 year storm event
Inflow = 0.60 cfs @ 12.25 hrs, Volume= 2,801 cf
Primary = 0.60 cfs @ 12.25 hrs, Volume= 2,801 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 6: Post-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 25 year storm Rainfall=6.00"

Printed 12/5/2016

Summary for Subcatchment 7: Basin A3

Runoff = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf, Depth= 4.41"

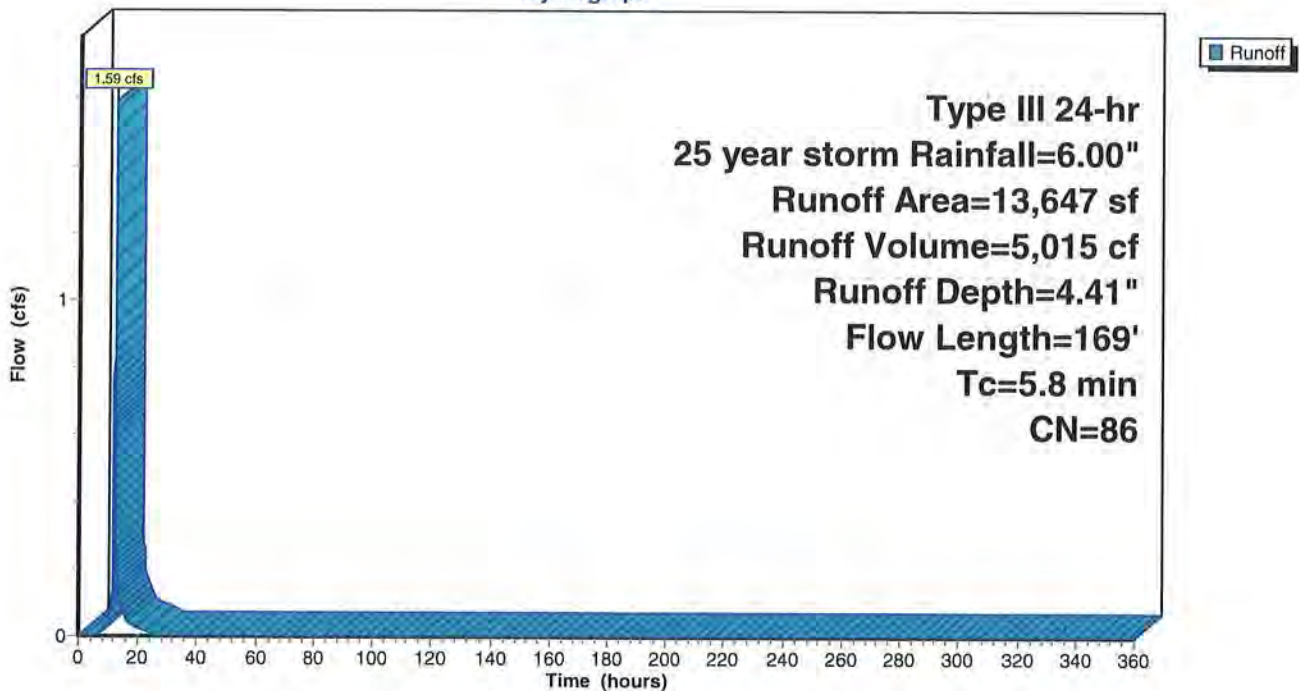
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
7,290	98	Paved parking & roofs
5,560	74	>75% Grass cover, Good, HSG C
797	61	>75% Grass cover, Good, HSG B
13,647	86	Weighted Average
6,357		46.58% Pervious Area
7,290		53.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0775	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.1	5	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0379	3.95		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.8	169	Total			

Subcatchment 7: Basin A3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 8: CB #5

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 4.41" for 25 year storm event
Inflow = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf
Outflow = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf

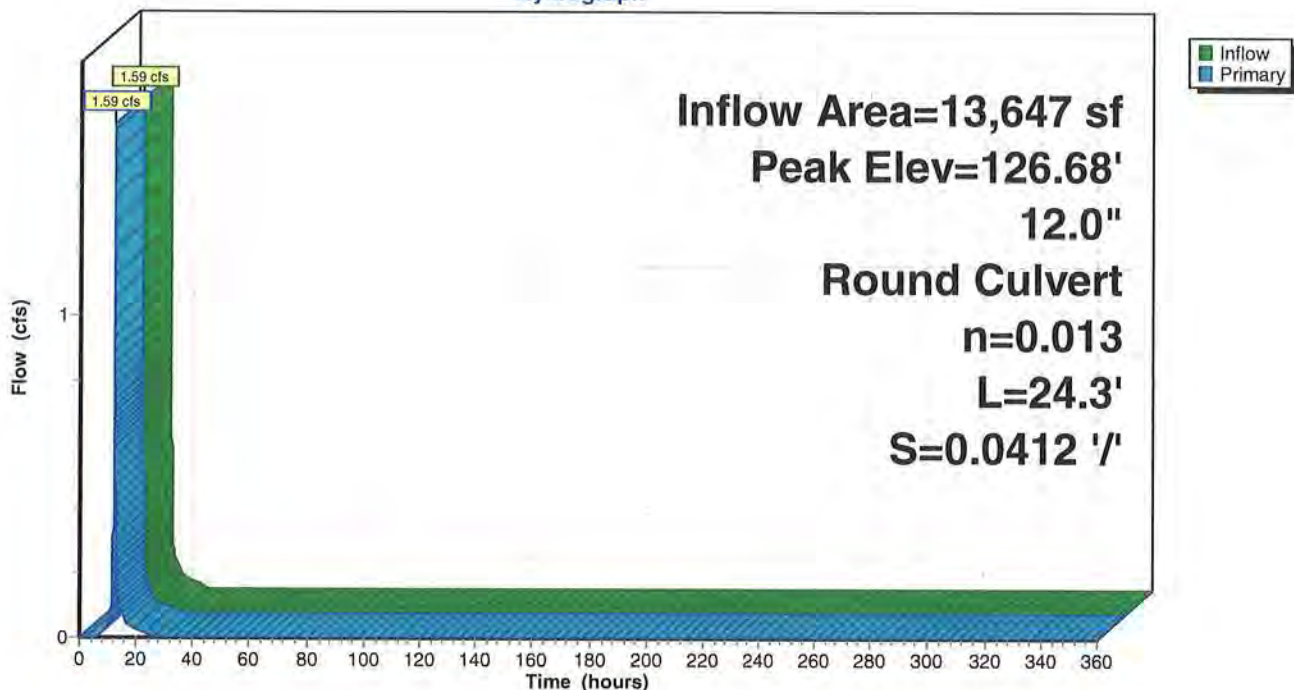
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 126.68' @ 12.08 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	126.00'	12.0" Round Culvert L= 24.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 126.00' / 125.00' S= 0.0412 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.59 cfs @ 12.08 hrs HW=126.68' TW=125.67' (Dynamic Tailwater)
↑=Culvert (Inlet Controls 1.59 cfs @ 2.80 fps)

Pond 8: CB #5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 9: DMH #3

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 4.41" for 25 year storm event
Inflow = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf
Outflow = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.08 hrs, Volume= 5,015 cf

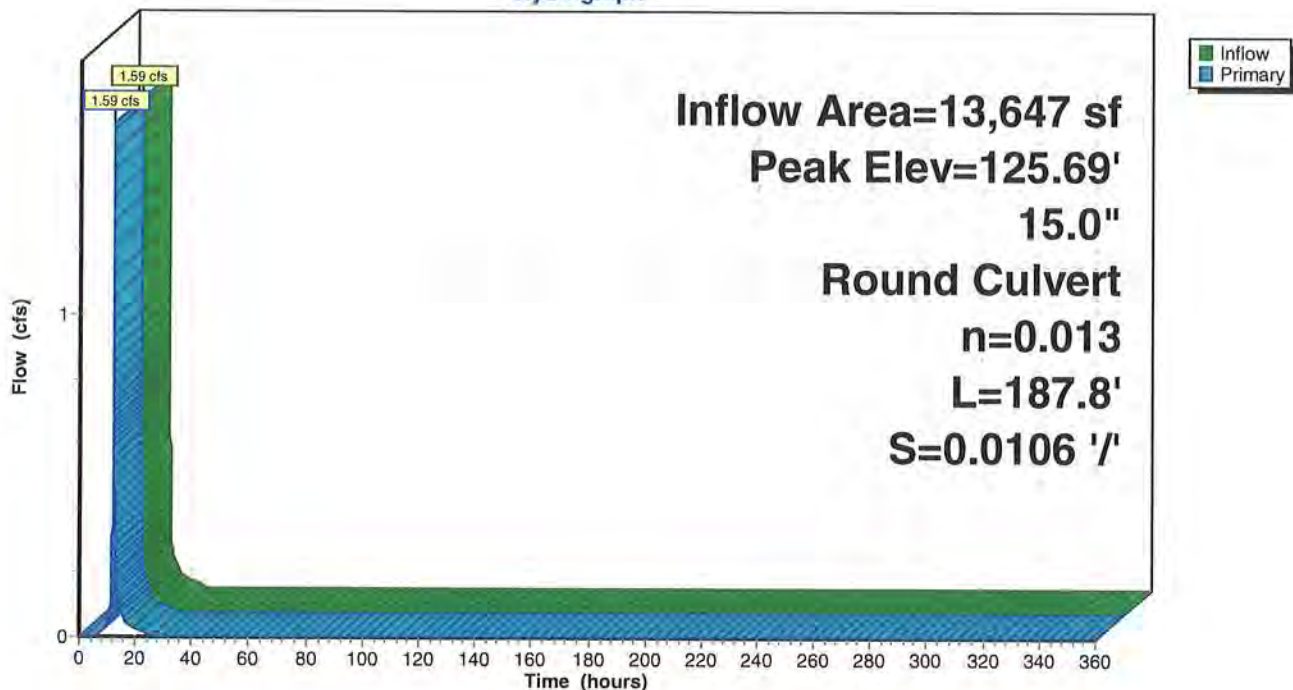
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.69' @ 12.10 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	15.0" Round Culvert L= 187.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 125.00' / 123.00' S= 0.0106 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.54 cfs @ 12.08 hrs HW=125.67' TW=124.52' (Dynamic Tailwater)
↑=Culvert (Outlet Controls 1.54 cfs @ 3.31 fps)

Pond 9: DMH #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 10: Basin A1

Runoff = 4.74 cfs @ 12.14 hrs, Volume= 16,969 cf, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
2,285	70	Woods, Good, HSG C
34,674	55	Woods, Good, HSG B
34,997	61	>75% Grass cover, Good, HSG B
13,046	98	Paved parking & roofs
1,600	98	Water Surface
86,602	65	Weighted Average
71,956		83.09% Pervious Area
14,646		16.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0500	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	61	0.0570	1.67		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	66	0.1590	1.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	89	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	78	0.0630	3.76		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	145	0.0448	11.14	13.67	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
9.5	579	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

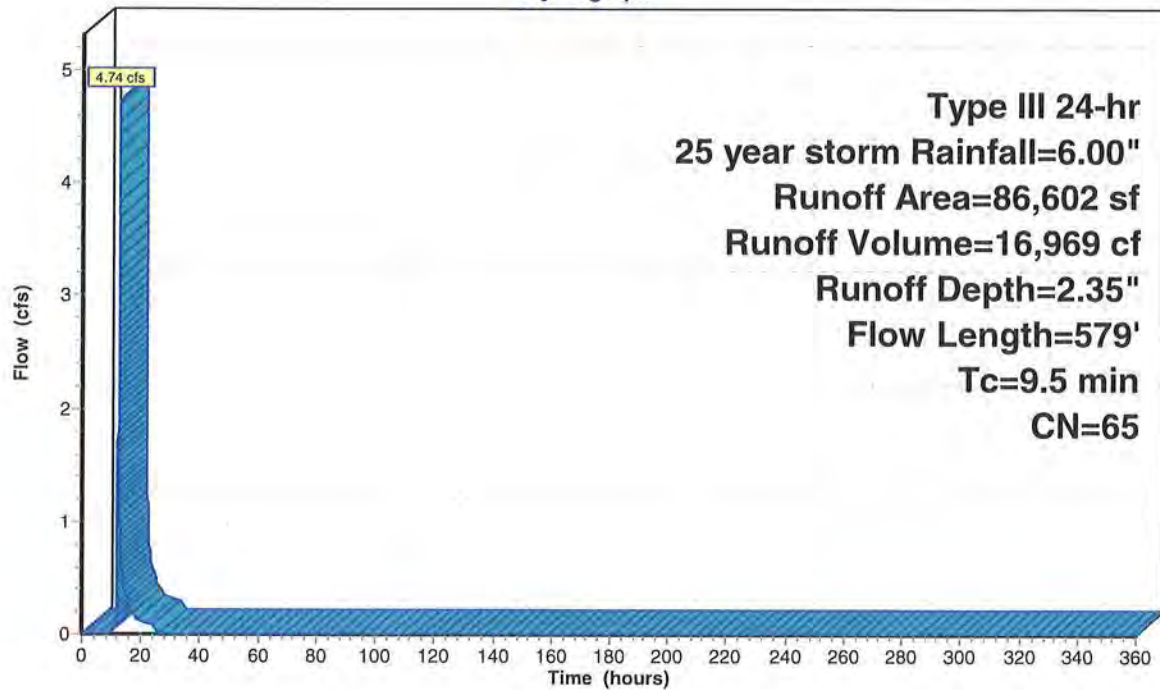
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 25 year storm Rainfall=6.00"

Printed 12/5/2016

Subcatchment 10: Basin A1

Hydrograph



Runoff

Type III 24-hr
25 year storm Rainfall=6.00"
Runoff Area=86,602 sf
Runoff Volume=16,969 cf
Runoff Depth=2.35"
Flow Length=579'
Tc=9.5 min
CN=65

Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 11: CB #4

Inflow Area = 100,249 sf, 21.88% Impervious, Inflow Depth = 2.63" for 25 year storm event
Inflow = 6.10 cfs @ 12.12 hrs, Volume= 21,984 cf
Outflow = 6.10 cfs @ 12.12 hrs, Volume= 21,984 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.10 cfs @ 12.12 hrs, Volume= 21,984 cf

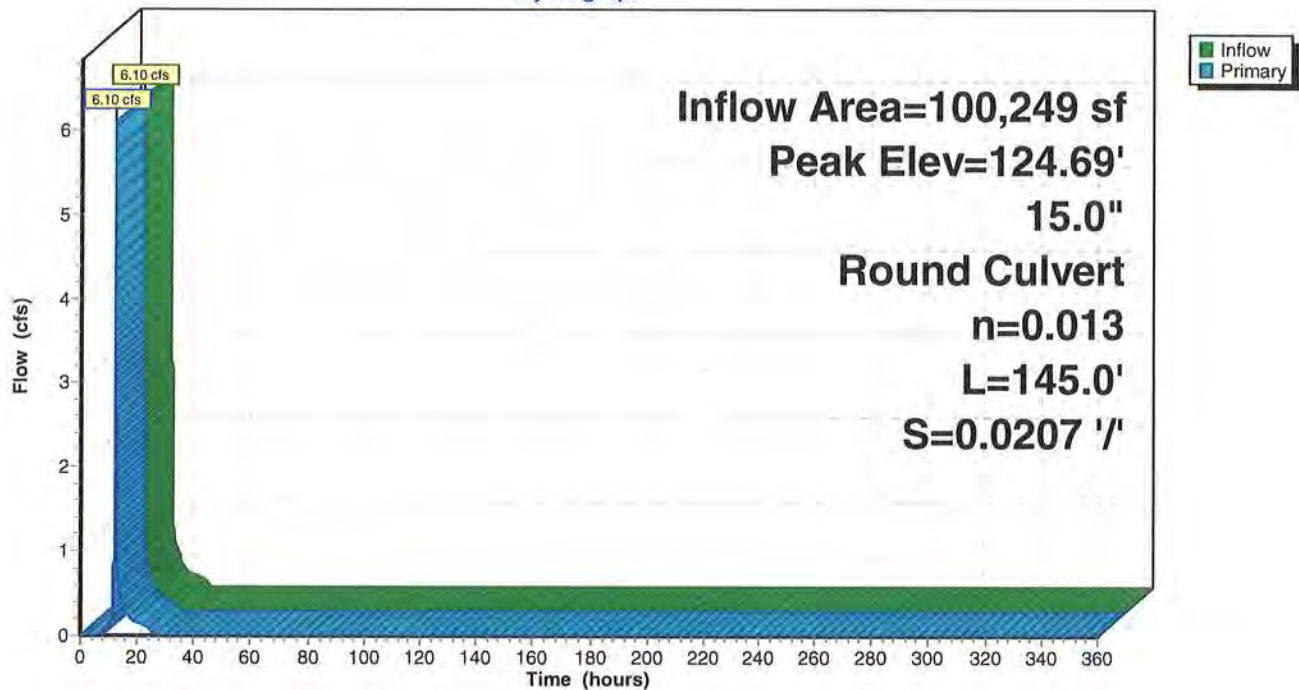
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 124.69' @ 12.12 hrs
Flood Elev= 130.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.00'	15.0" Round Culvert L= 145.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 120.00' S= 0.0207 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.09 cfs @ 12.12 hrs HW=124.69' TW=122.80' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 6.09 cfs @ 4.97 fps)

Pond 11: CB #4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 12: Basin A2

Runoff = 0.92 cfs @ 12.07 hrs, Volume= 2,754 cf, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
1,667	55	Woods, Good, HSG B
1,089	61	>75% Grass cover, Good, HSG B
270	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking & roofs
2,871	98	Roofs, HSG B
8,077	83	Weighted Average
3,026		37.46% Pervious Area
5,051		62.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	30	0.5000	0.51		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
3.0	28	0.1984	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	177	0.0085	4.85	5.96	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
4.6	235	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

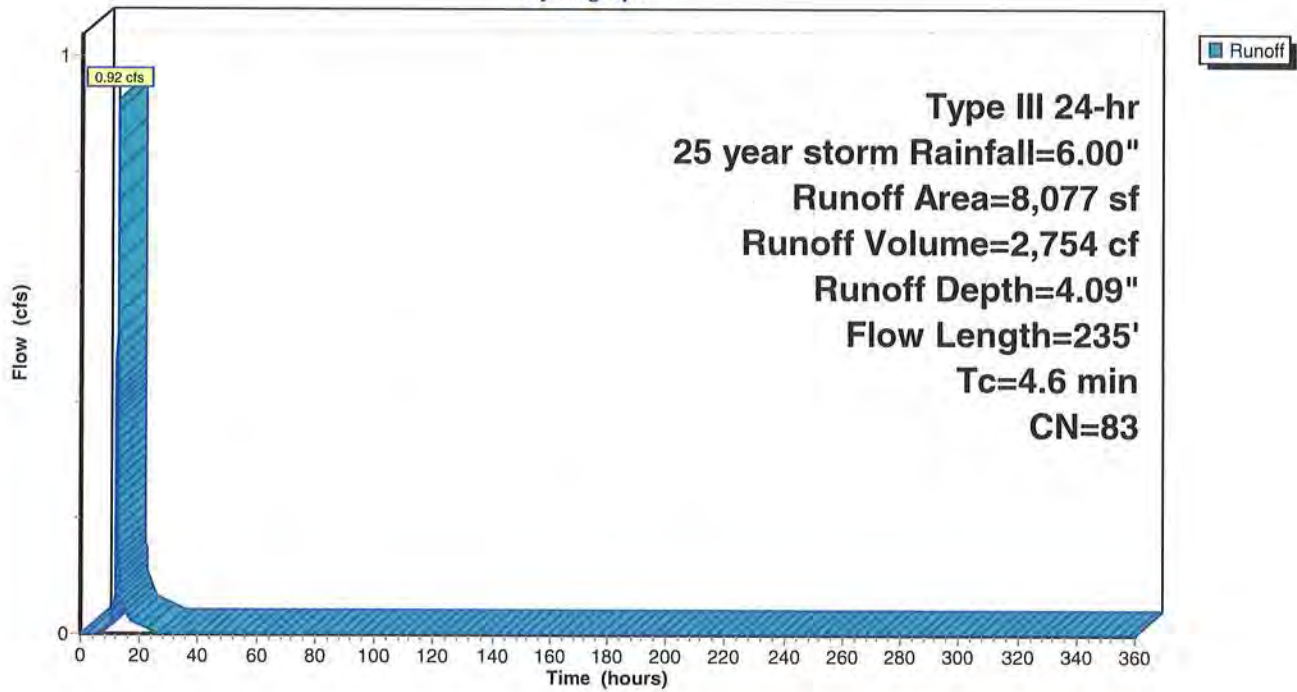
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 25 year storm Rainfall=6.00"

Printed 12/5/2016

Subcatchment 12: Basin A2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 13: CB #6

Inflow Area = 8,077 sf, 62.54% Impervious, Inflow Depth = 4.09" for 25 year storm event
 Inflow = 0.92 cfs @ 12.07 hrs, Volume= 2,754 cf
 Outflow = 0.92 cfs @ 12.07 hrs, Volume= 2,754 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.92 cfs @ 12.07 hrs, Volume= 2,754 cf

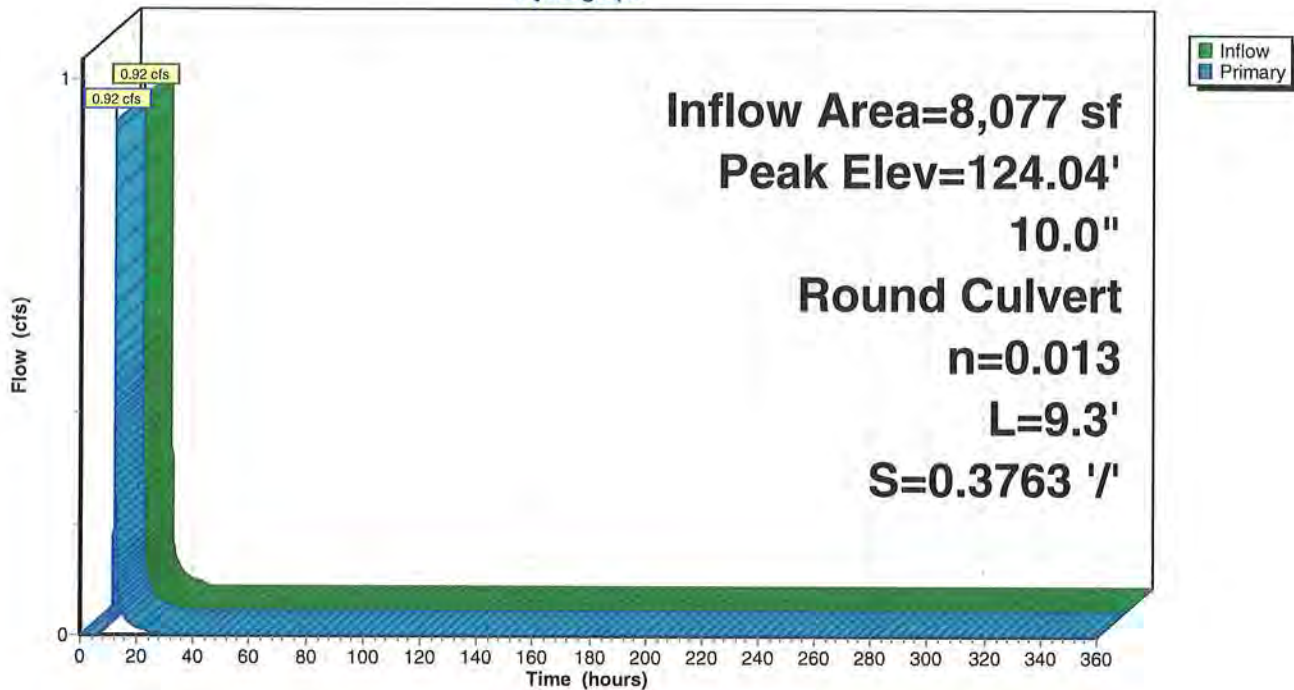
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 124.04' @ 12.07 hrs
 Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.50'	10.0" Round Culvert L= 9.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.50' / 120.00' S= 0.3763 1/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.92 cfs @ 12.07 hrs HW=124.04' TW=122.13' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.92 cfs @ 2.49 fps)

Pond 13: CB #6

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 14: DMH #1

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 2.74" for 25 year storm event
Inflow = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf
Outflow = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf

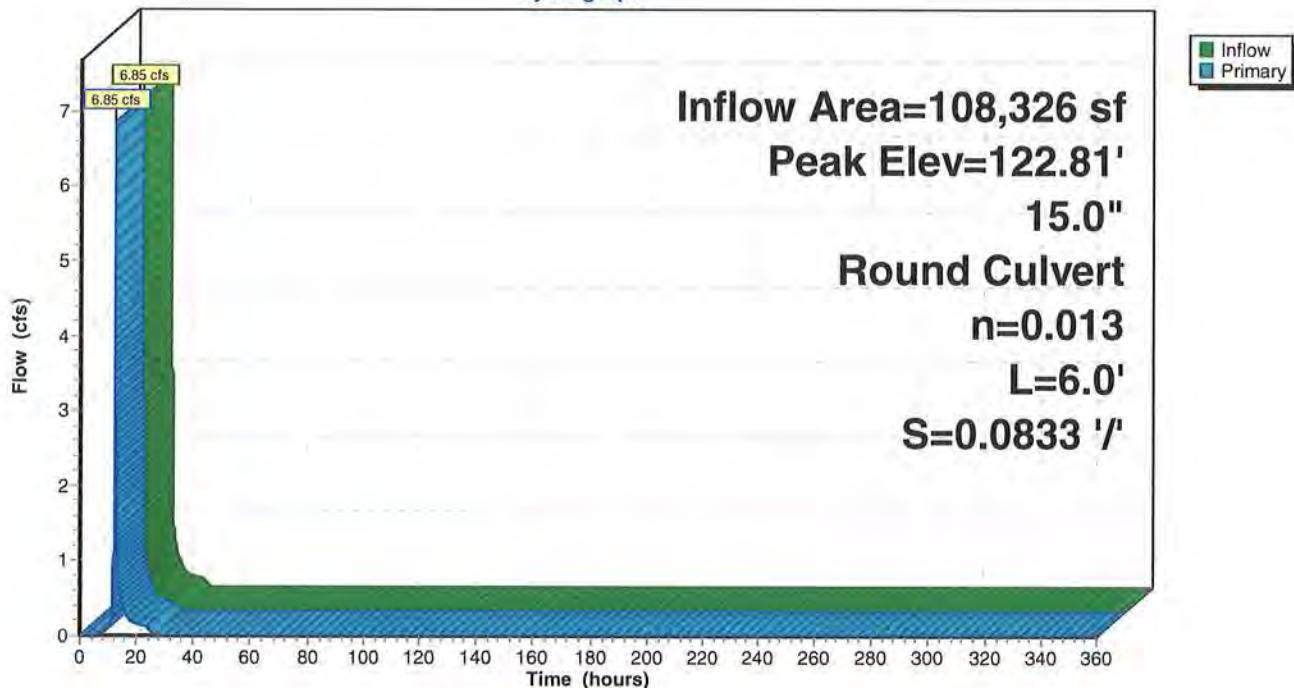
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 122.81' @ 12.12 hrs
Flood Elev= 127.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	15.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.50' S= 0.0833 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.81 cfs @ 12.11 hrs HW=122.79' TW=121.47' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 6.81 cfs @ 5.55 fps)

Pond 14: DMH #1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 15: CDS-2025

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 2.74" for 25 year storm event
Inflow = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf
Outflow = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf

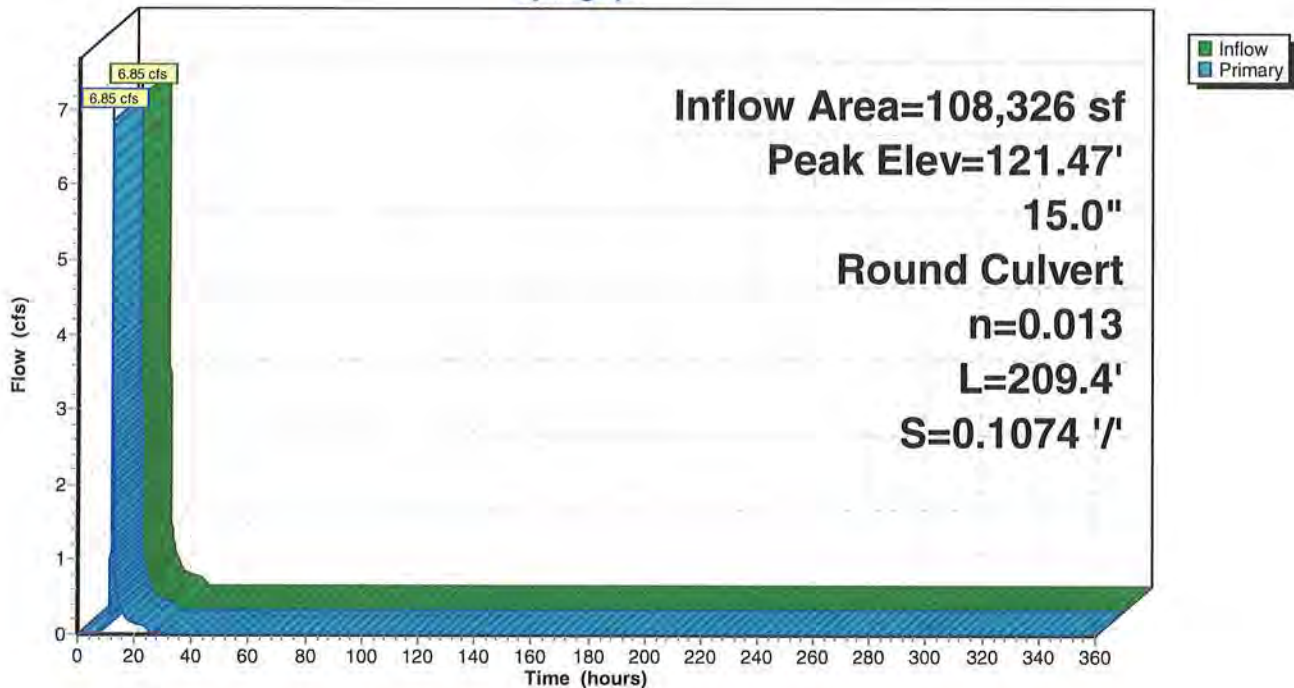
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 121.47' @ 12.11 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	15.0" Round Culvert L= 209.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.50' / 97.00' S= 0.1074 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.84 cfs @ 12.11 hrs HW=121.47' TW=98.03' (Dynamic Tailwater)
←**1=Culvert** (Inlet Controls 6.84 cfs @ 5.58 fps)

Pond 15: CDS-2025

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 16: DMH #2

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 2.74" for 25 year storm event
 Inflow = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf
 Outflow = 6.85 cfs @ 12.11 hrs, Volume= 24,738 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.33 cfs @ 11.79 hrs, Volume= 10,431 cf
 Secondary = 5.65 cfs @ 12.12 hrs, Volume= 14,306 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Peak Elev= 98.03' @ 12.12 hrs

Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0" Round Culvert L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 94.50' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	97.00'	24.0" Round Culvert L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.00' / 94.00' S= 0.0370 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.31 cfs @ 11.79 hrs HW=97.13' TW=95.19' (Dynamic Tailwater)

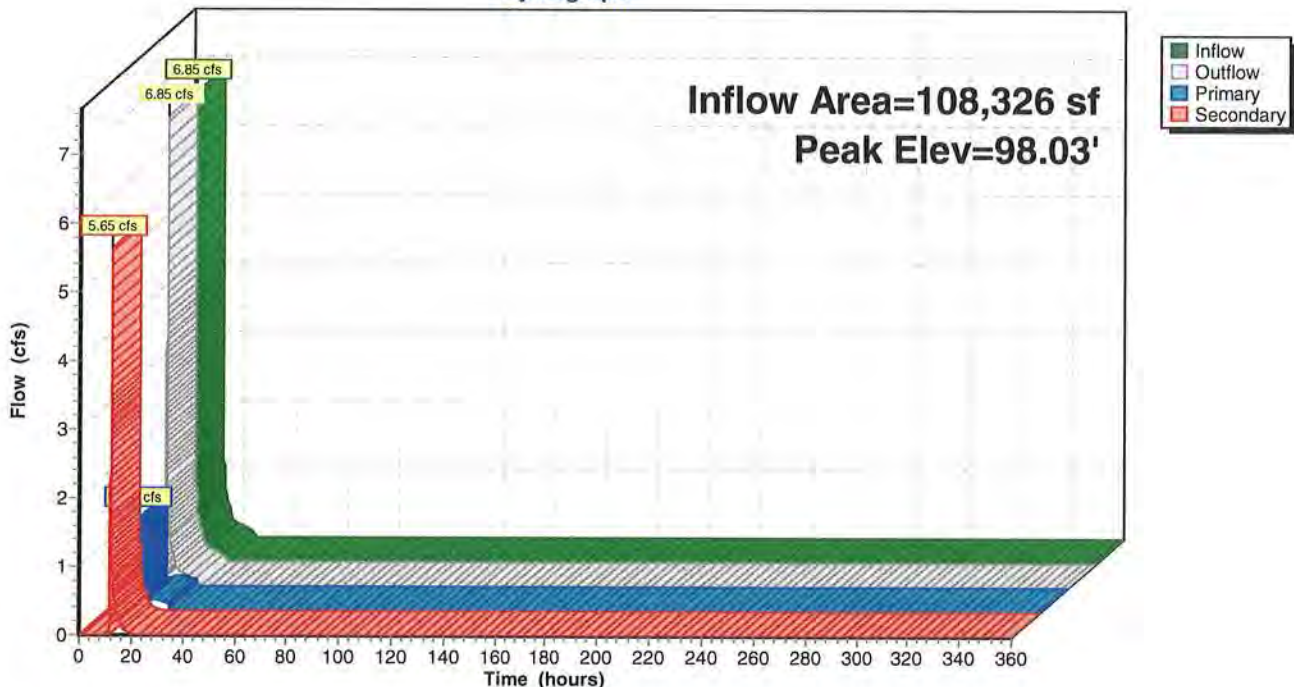
↑**1=Culvert** (Inlet Controls 1.31 cfs @ 6.70 fps)

Secondary OutFlow Max=5.64 cfs @ 12.12 hrs HW=98.03' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Inlet Controls 5.64 cfs @ 3.46 fps)

Pond 16: DMH #2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 17: Infiltration System #3

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 1.16" for 25 year storm event
 Inflow = 1.33 cfs @ 11.79 hrs, Volume= 10,431 cf
 Outflow = 0.15 cfs @ 10.83 hrs, Volume= 10,431 cf, Atten= 89%, Lag= 0.0 min
 Discarded = 0.15 cfs @ 10.83 hrs, Volume= 10,431 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.59' @ 12.49 hrs Surf.Area= 1,398 sf Storage= 3,131 cf
 Flood Elev= 98.00' Surf.Area= 1,398 sf Storage= 3,363 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 229.6 min (1,135.5 - 905.8)

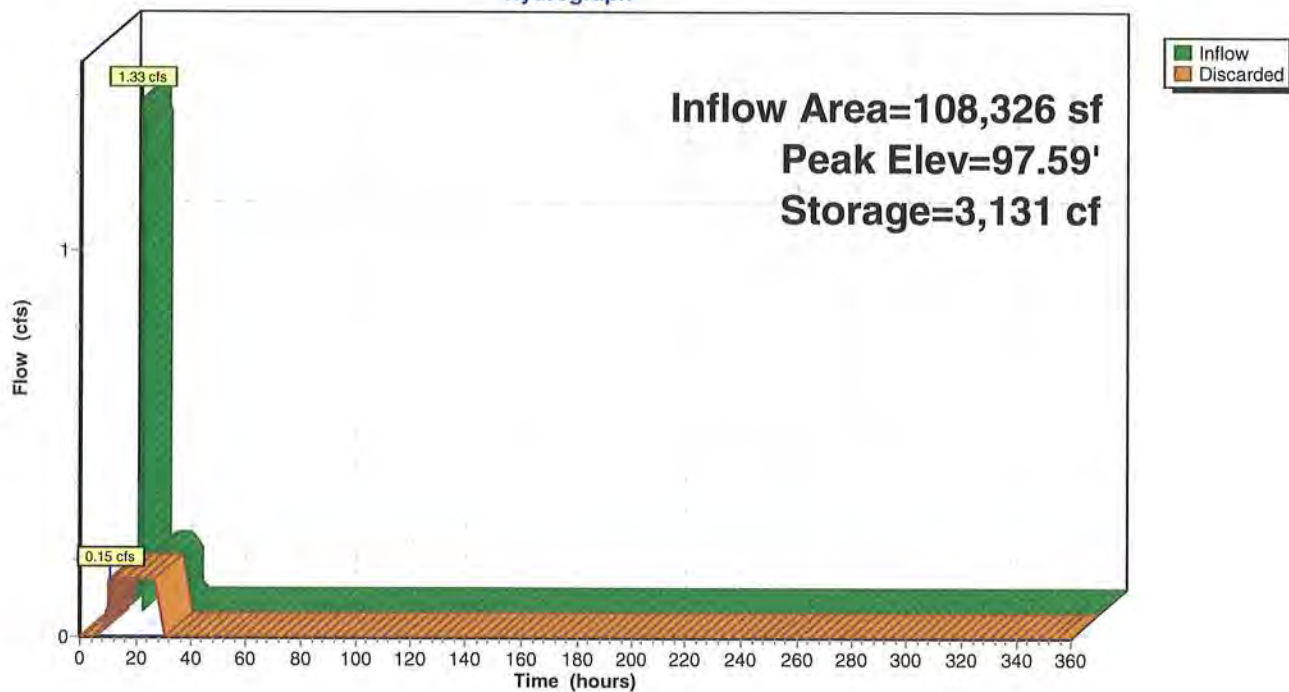
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	1,485 cf	21.50'W x 65.00'L x 4.00'H Prismatic 5,590 cf Overall - 1,878 cf Embedded = 3,712 cf x 40.0% Voids
#2	94.50'	1,878 cf	Cultec R-330XLHD x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		3,363 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	4.680 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.15 cfs @ 10.83 hrs HW=94.04' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Pond 17: Infiltration System #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 18: Basin A4

Runoff = 3.99 cfs @ 12.11 hrs, Volume= 12,980 cf, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
17,045	55	Woods, Good, HSG B
15,813	98	Paved parking & roofs
17,689	61	>75% Grass cover, Good, HSG B
3,187	85	Gravel roads, HSG B
53,734	71	Weighted Average
37,921		70.57% Pervious Area
15,813		29.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.0850	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.4	14	0.0357	0.56		Sheet Flow, Gravel n= 0.029 P2= 3.50"
2.8	46	0.0870	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.5	46	0.0435	1.46		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	247	0.0486	4.48		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	93	0.0161	6.68	8.20	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
7.3	486	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

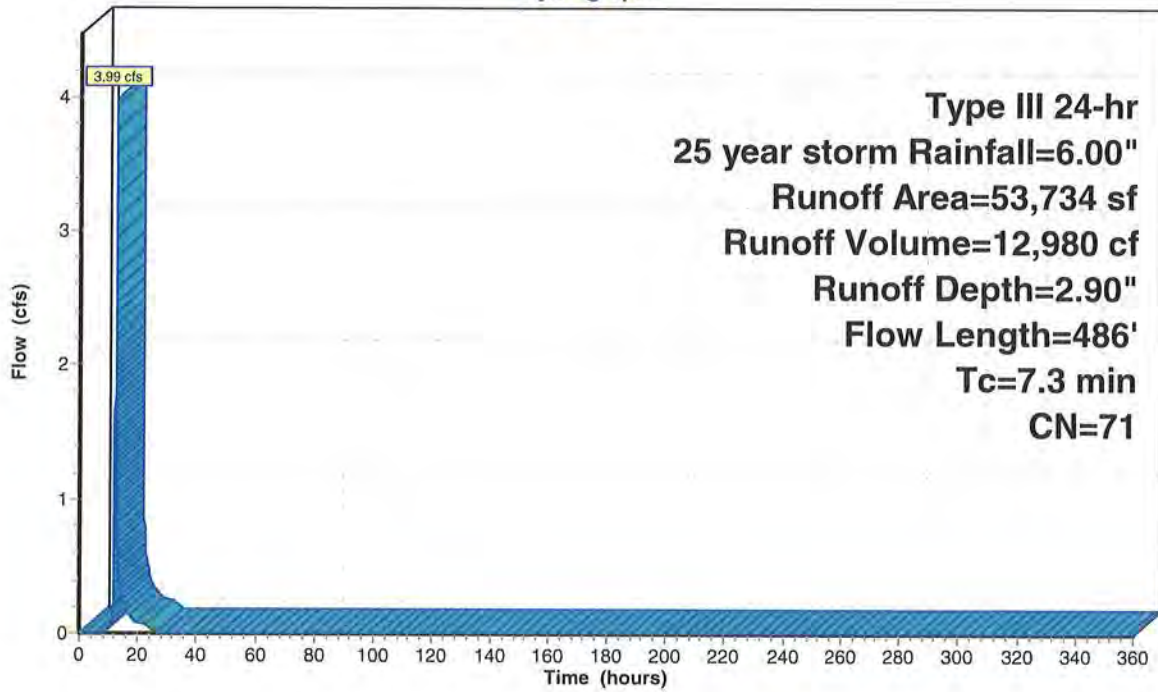
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 25 year storm Rainfall=6.00"

Printed 12/5/2016

Subcatchment 18: Basin A4

Hydrograph



Runoff

Type III 24-hr
25 year storm Rainfall=6.00"
Runoff Area=53,734 sf
Runoff Volume=12,980 cf
Runoff Depth=2.90"
Flow Length=486'
Tc=7.3 min
CN=71

Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 19: Pocket Pond

Inflow Area = 53,734 sf, 29.43% Impervious, Inflow Depth = 2.90" for 25 year storm event
 Inflow = 3.99 cfs @ 12.11 hrs, Volume= 12,980 cf
 Outflow = 3.74 cfs @ 12.14 hrs, Volume= 12,979 cf, Atten= 6%, Lag= 2.0 min
 Primary = 3.74 cfs @ 12.14 hrs, Volume= 12,979 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Starting Elev= 136.50' Surf.Area= 1,107 sf Storage= 1,300 cf
 Peak Elev= 138.20' @ 12.14 hrs Surf.Area= 2,379 sf Storage= 4,266 cf (2,965 cf above start)
 Flood Elev= 140.00' Surf.Area= 2,857 sf Storage= 6,364 cf (5,064 cf above start)

Plug-Flow detention time= 594.3 min calculated for 11,679 cf (90% of inflow)
 Center-of-Mass det. time= 480.1 min (1,317.2 - 837.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	134.00'	6,364 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
134.00	95	71.9	0	0	95	
135.00	386	122.6	224	224	886	
136.00	829	172.5	594	818	2,067	
136.50	1,107	197.3	482	1,300	2,802	
137.00	1,455	224.9	639	1,939	3,736	
137.50	1,803	238.1	813	2,752	4,236	
137.60	2,049	177.8	192	2,944	6,231	
138.00	2,268	186.3	863	3,807	6,488	
139.00	2,857	206.5	2,557	6,364	7,150	

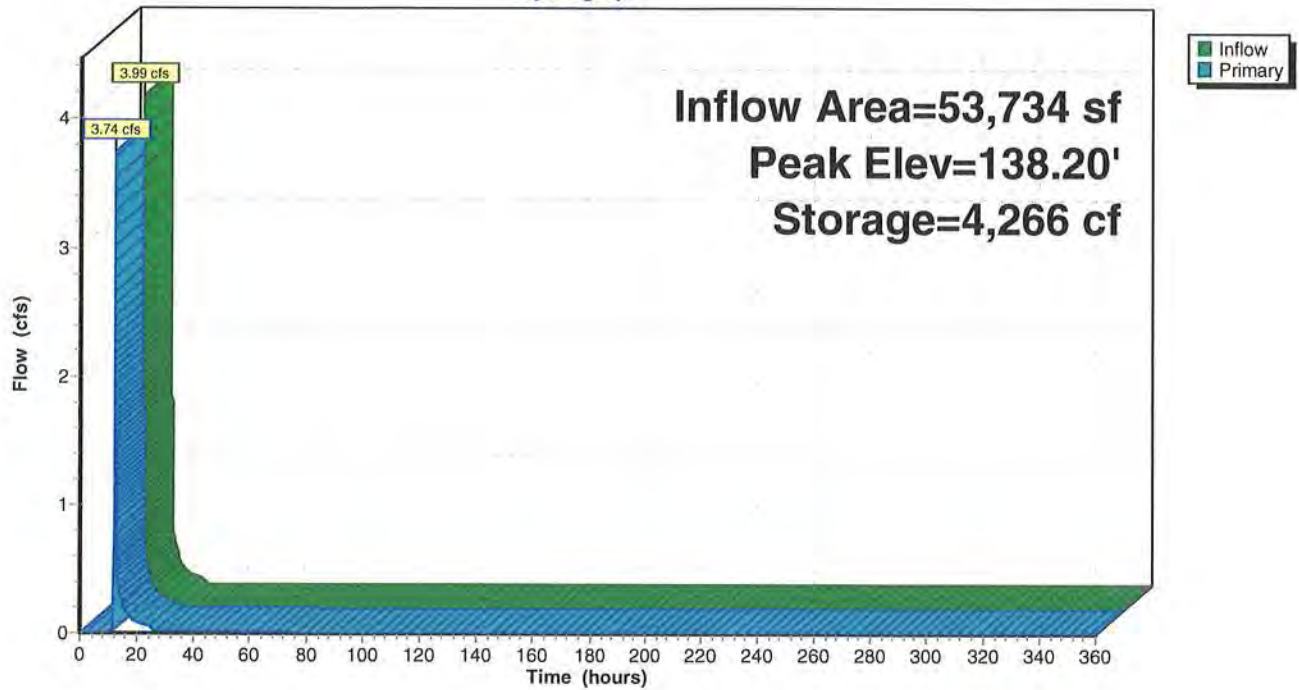
Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	15.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.50' / 134.00' S= 0.0373 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	136.50'	0.7" Vert. Orifice/Grate C= 0.600
#3	Device 1	138.00'	48.0" x 30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.74 cfs @ 12.14 hrs HW=138.20' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 3.74 cfs of 6.12 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.22 fps)
- 3=Orifice/Grate (Weir Controls 3.72 cfs @ 1.45 fps)

Pond 19: Pocket Pond

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 20: Basin A5

Runoff = 18.60 cfs @ 12.39 hrs, Volume= 98,992 cf, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
95,873	70	Woods, Good, HSG C
217,255	55	Woods, Good, HSG B
43,293	74	>75% Grass cover, Good, HSG C
69,274	61	>75% Grass cover, Good, HSG B
1,614	89	Gravel roads, HSG C
1,432	85	Gravel roads, HSG B
1,615	87	Dirt roads, HSG C
54,850	98	Paved parking & roofs
1,600	98	Water Surface
486,806	66	Weighted Average
430,356		88.40% Pervious Area
56,450		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Brook Bot.W=10.00' D=1.50' Z= 1.0 ' /' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

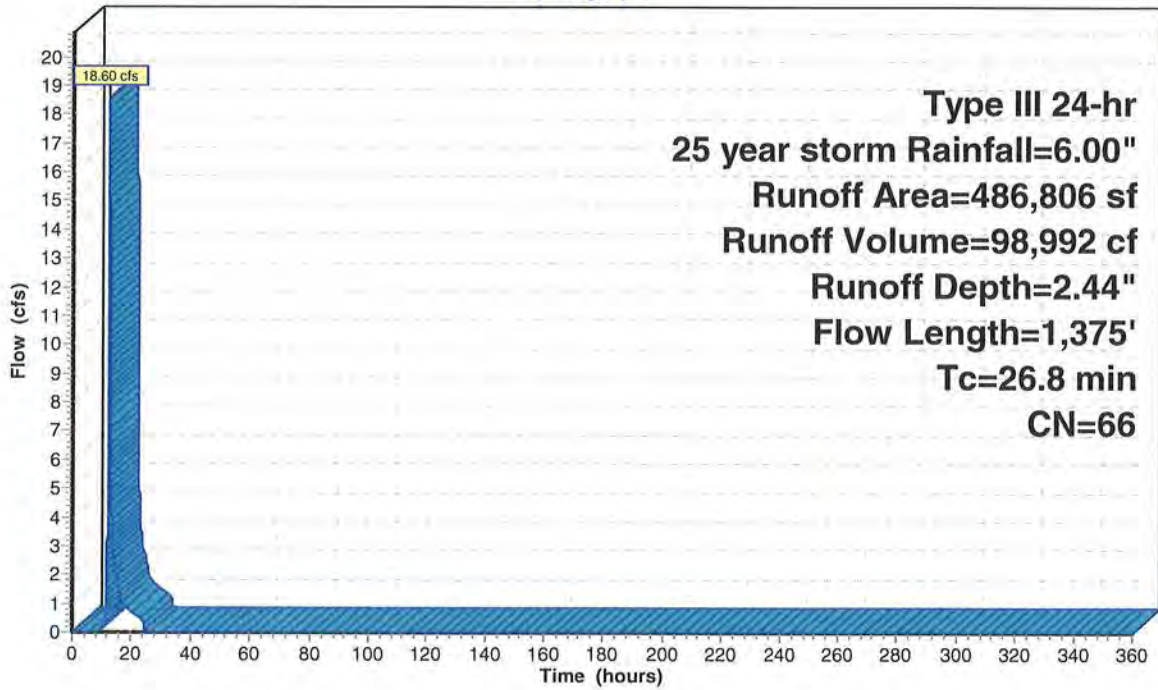
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 20: Basin A5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

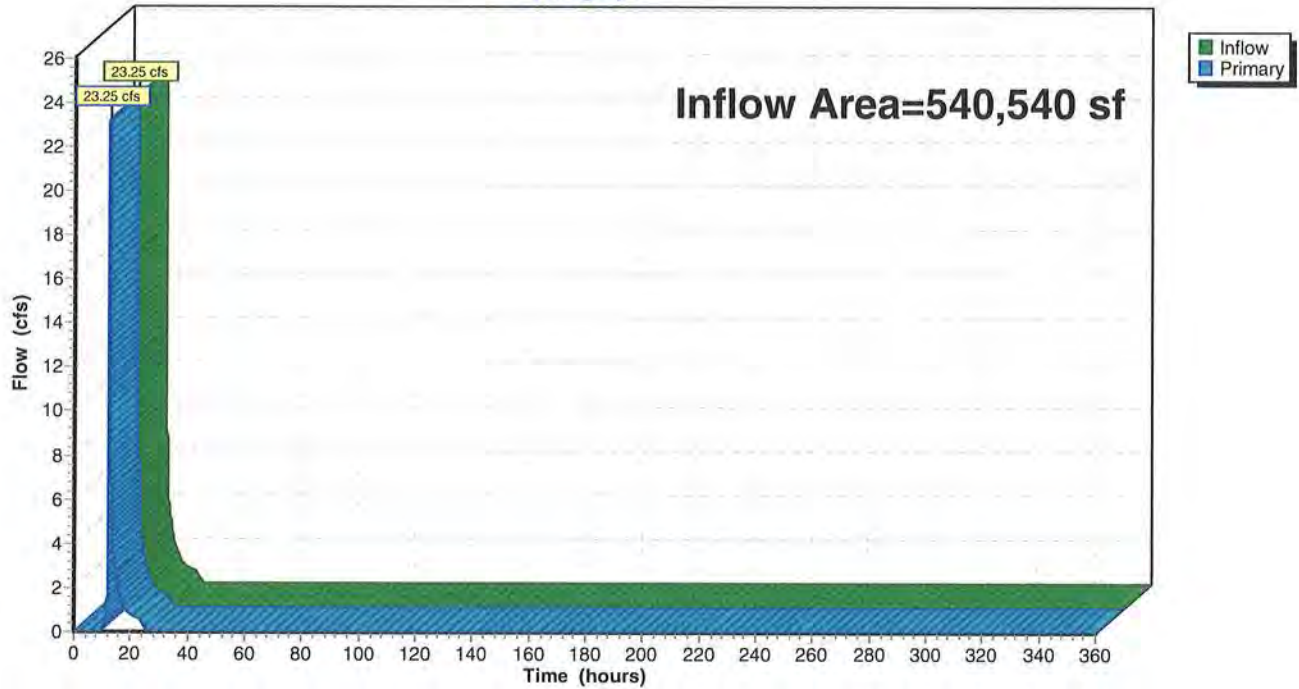
Summary for Link 21: Post-Design Point A

Inflow Area = 540,540 sf, 13.37% Impervious, Inflow Depth = 2.80" for 25 year storm event
Inflow = 23.25 cfs @ 12.36 hrs, Volume= 126,278 cf
Primary = 23.25 cfs @ 12.36 hrs, Volume= 126,278 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 21: Post-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-360.00 hrs, dt=0.01 hrs, 36001 points

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

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Pre ARunoff Area=633,814 sf 9.36% Impervious Runoff Depth=3.49"
Flow Length=1,375' Tc=26.8 min CN=65 Runoff=35.14 cfs 184,545 cf**Link 2: Pre-Design Point A**Inflow=35.14 cfs 184,545 cf
Primary=35.14 cfs 184,545 cf**Subcatchment 3: Pre B**Runoff Area=42,827 sf 0.00% Impervious Runoff Depth=2.65"
Flow Length=397' Tc=16.0 min CN=57 Runoff=2.16 cfs 9,465 cf**Link 4: Pre-Design Line B**Inflow=2.16 cfs 9,465 cf
Primary=2.16 cfs 9,465 cf**Subcatchment 5: Post B1**Runoff Area=21,058 sf 0.00% Impervious Runoff Depth=2.55"
Flow Length=397' Tc=16.0 min CN=56 Runoff=1.01 cfs 4,474 cf**Link 6: Post-Design Line B**Inflow=1.01 cfs 4,474 cf
Primary=1.01 cfs 4,474 cf**Subcatchment 7: Basin A3**Runoff Area=13,647 sf 53.42% Impervious Runoff Depth=5.85"
Flow Length=169' Tc=5.8 min CN=86 Runoff=2.08 cfs 6,650 cf**Pond 8: CB #5**Peak Elev=130.19' Inflow=2.08 cfs 6,650 cf
12.0" Round Culvert n=0.013 L=24.3' S=0.0412 '/' Outflow=2.08 cfs 6,650 cf**Pond 9: DMH #3**Peak Elev=130.01' Inflow=2.08 cfs 6,650 cf
15.0" Round Culvert n=0.013 L=187.8' S=0.0106 '/' Outflow=2.08 cfs 6,650 cf**Subcatchment 10: Basin A1**Runoff Area=86,602 sf 16.91% Impervious Runoff Depth=3.49"
Flow Length=579' Tc=9.5 min CN=65 Runoff=7.18 cfs 25,216 cf**Pond 11: CB #4**Peak Elev=129.83' Inflow=8.96 cfs 31,866 cf
15.0" Round Culvert n=0.013 L=145.0' S=0.0207 '/' Outflow=8.96 cfs 31,866 cf**Subcatchment 12: Basin A2**Runoff Area=8,077 sf 62.54% Impervious Runoff Depth=5.50"
Flow Length=235' Tc=4.6 min CN=83 Runoff=1.23 cfs 3,703 cf**Pond 13: CB #6**Peak Elev=125.92' Inflow=1.23 cfs 3,703 cf
10.0" Round Culvert n=0.013 L=9.3' S=0.3763 '/' Outflow=1.23 cfs 3,703 cf**Pond 14: DMH #1**Peak Elev=125.80' Inflow=9.96 cfs 35,568 cf
15.0" Round Culvert n=0.013 L=6.0' S=0.0833 '/' Outflow=9.96 cfs 35,568 cf**Pond 15: CDS-2025**Peak Elev=122.97' Inflow=9.96 cfs 35,568 cf
15.0" Round Culvert n=0.013 L=209.4' S=0.1074 '/' Outflow=9.96 cfs 35,568 cf**Pond 16: DMH #2**Peak Elev=98.37' Inflow=9.96 cfs 35,568 cf
Primary=1.12 cfs 11,250 cf Secondary=9.09 cfs 24,319 cf Outflow=9.96 cfs 35,568 cf

Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Pond 17: Infiltration System #3

Peak Elev=98.00' Storage=3,362 cf Inflow=1.12 cfs 11,250 cf
Outflow=0.15 cfs 11,252 cf

Subcatchment 18: Basin A4

Runoff Area=53,734 sf 29.43% Impervious Runoff Depth=4.15"
Flow Length=486' Tc=7.3 min CN=71 Runoff=5.74 cfs 18,574 cf

Pond 19: Pocket Pond

Peak Elev=138.26' Storage=4,410 cf Inflow=5.74 cfs 18,574 cf
Outflow=5.58 cfs 18,573 cf

Subcatchment 20: Basin A5

Runoff Area=486,806 sf 11.60% Impervious Runoff Depth=3.60"
Flow Length=1,375' Tc=26.8 min CN=66 Runoff=27.89 cfs 146,114 cf

Link 21: Post-Design Point A

Inflow=35.29 cfs 189,005 cf
Primary=35.29 cfs 189,005 cf

Total Runoff Area = 1,346,565 sf Runoff Volume = 398,740 cf Average Runoff Depth = 3.55"
88.22% Pervious = 1,187,960 sf 11.78% Impervious = 158,605 sf

Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: Pre A

Runoff = 35.14 cfs @ 12.38 hrs, Volume= 184,545 cf, Depth= 3.49"

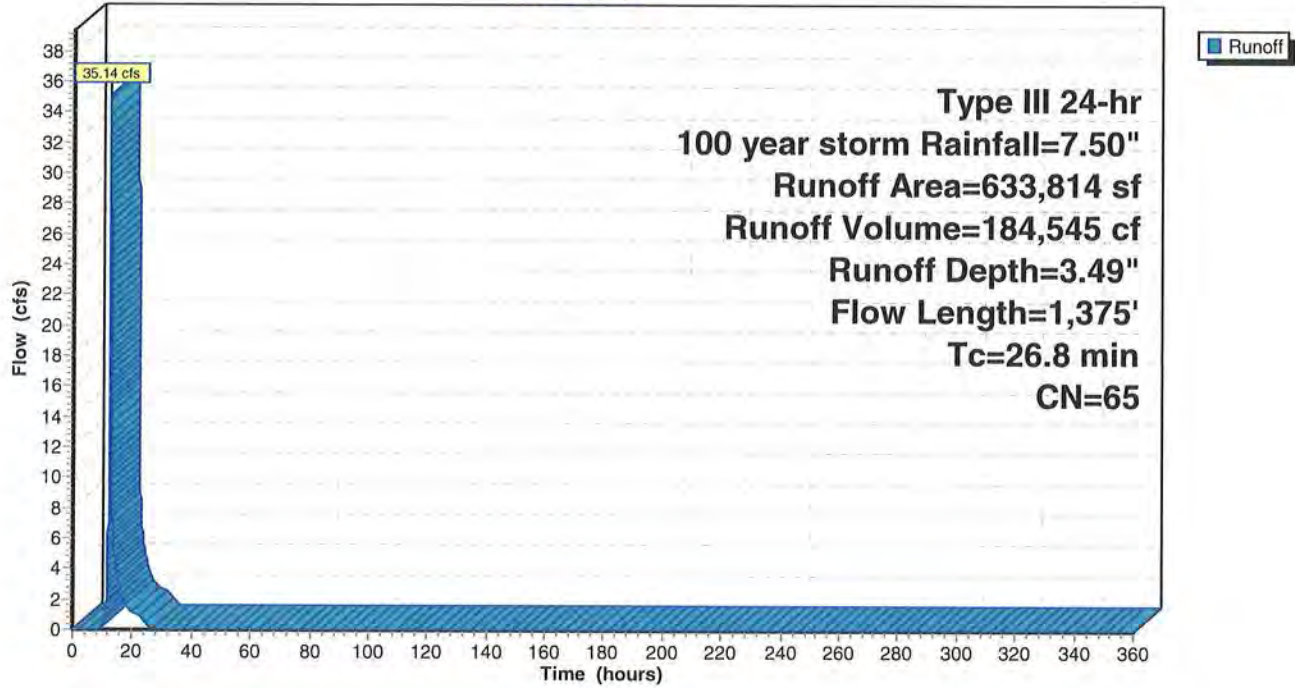
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
153,576	70	Woods, Good, HSG C
280,022	55	Woods, Good, HSG B
116,063	61	>75% Grass cover, Good, HSG B
11,498	74	>75% Grass cover, Good, HSG C
9,346	85	Gravel roads, HSG B
1,614	89	Gravel roads, HSG C
59,355	98	Paved parking & roofs
2,340	87	Dirt roads, HSG C
633,814	65	Weighted Average
574,459		90.64% Pervious Area
59,355		9.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Bot.W=10.00' D=1.50' Z= 1.0 ' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Subcatchment 1: Pre A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

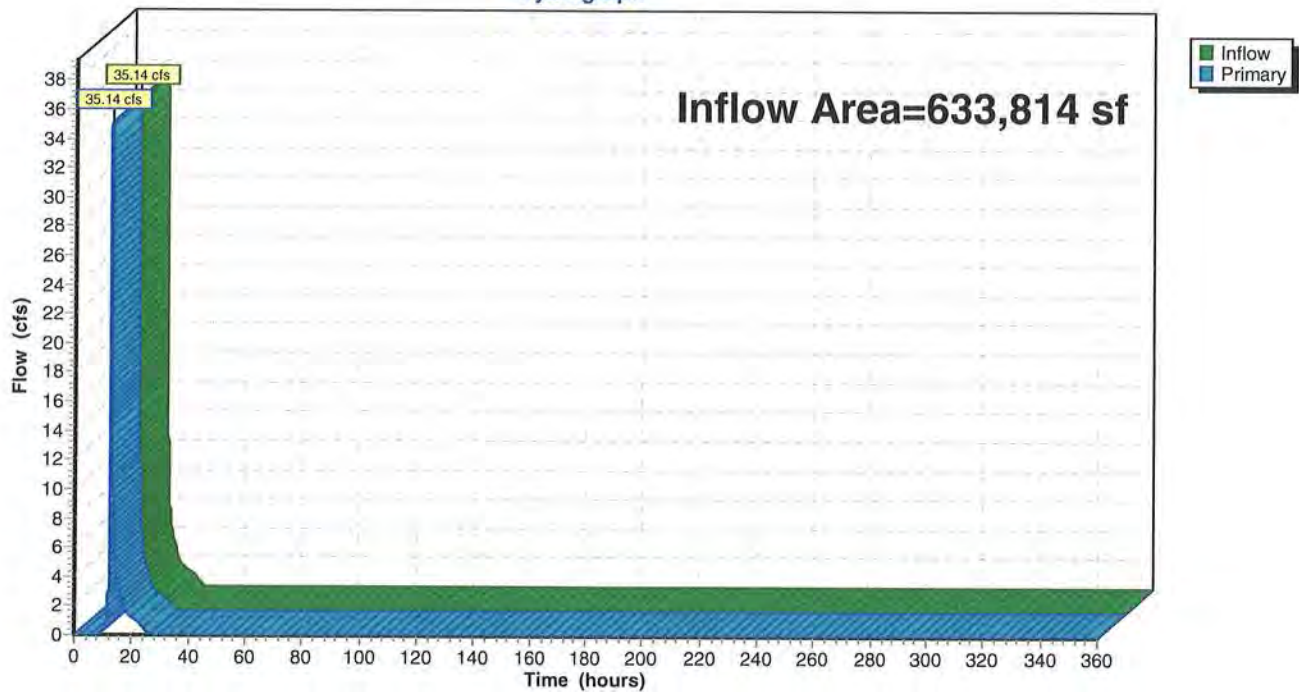
Summary for Link 2: Pre-Design Point A

Inflow Area = 633,814 sf, 9.36% Impervious, Inflow Depth = 3.49" for 100 year storm event
Inflow = 35.14 cfs @ 12.38 hrs, Volume= 184,545 cf
Primary = 35.14 cfs @ 12.38 hrs, Volume= 184,545 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 2: Pre-Design Point A

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 3: Pre B

Runoff = 2.16 cfs @ 12.23 hrs, Volume= 9,465 cf, Depth= 2.65"

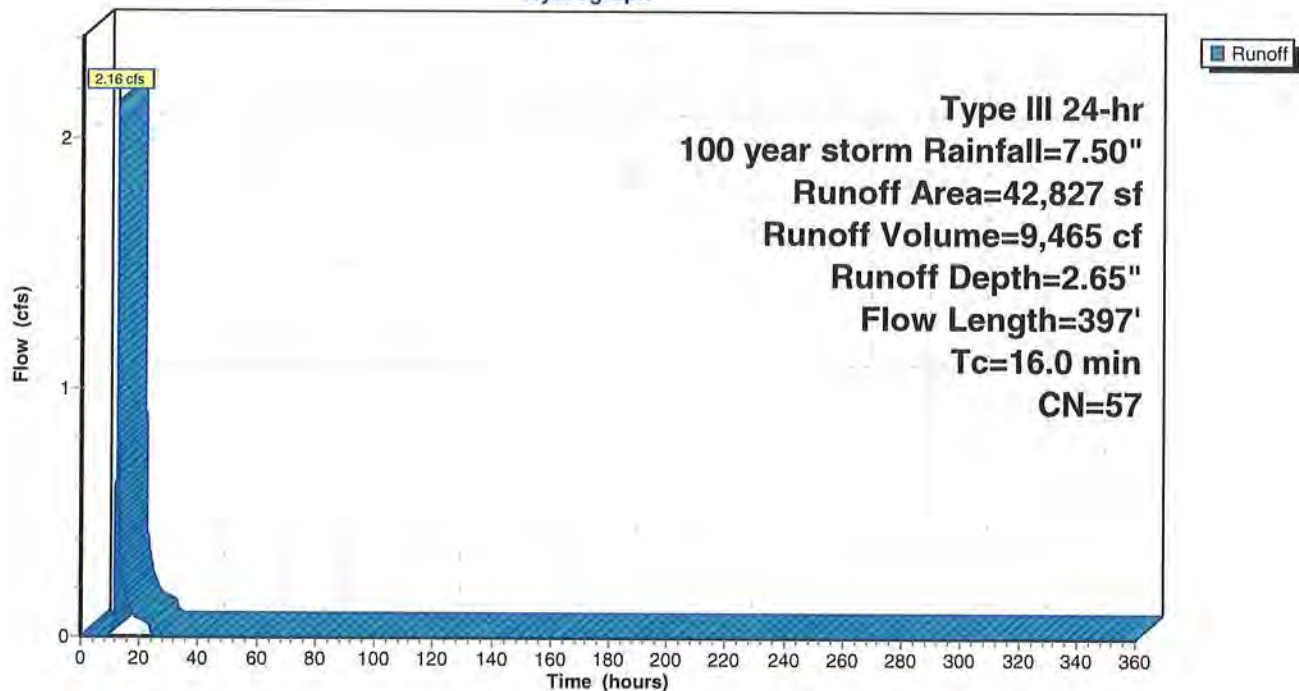
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
30,675	55	Woods, Good, HSG B
12,152	61	>75% Grass cover, Good, HSG B
42,827	57	Weighted Average
42,827		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 3: Pre B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

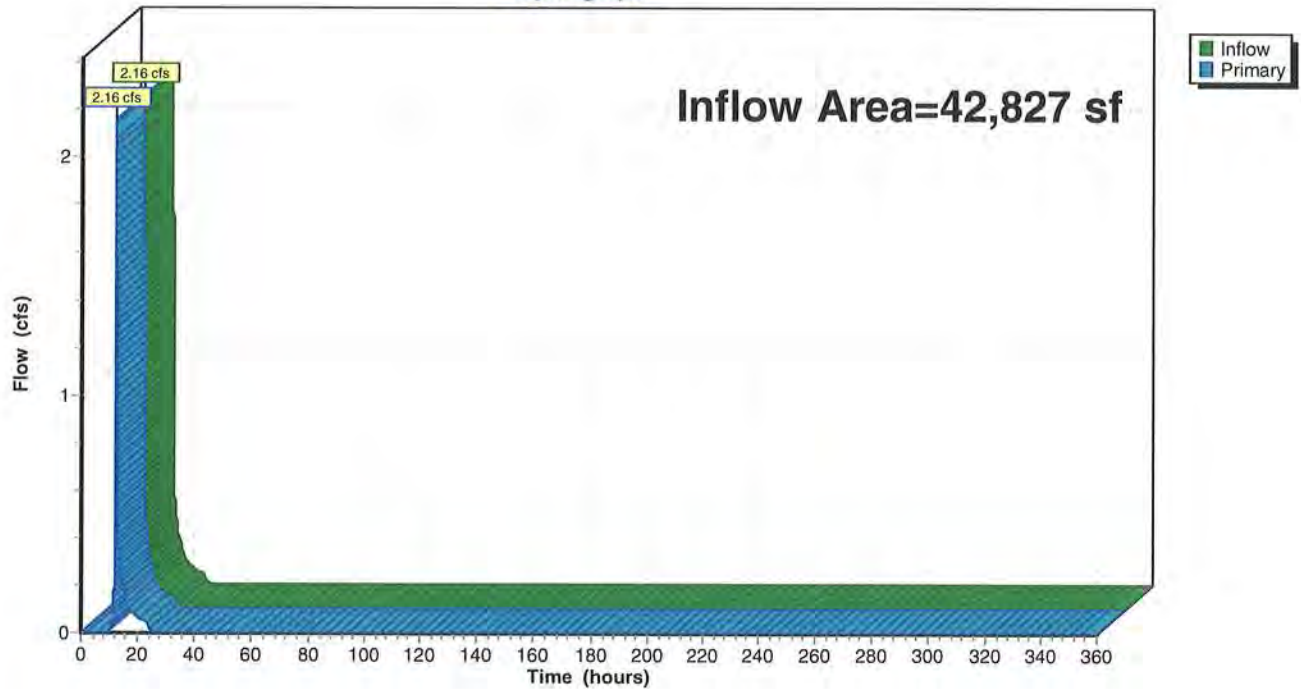
Summary for Link 4: Pre-Design Line B

Inflow Area = 42,827 sf, 0.00% Impervious, Inflow Depth = 2.65" for 100 year storm event
Inflow = 2.16 cfs @ 12.23 hrs, Volume= 9,465 cf
Primary = 2.16 cfs @ 12.23 hrs, Volume= 9,465 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 4: Pre-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 5: Post B1

Runoff = 1.01 cfs @ 12.23 hrs, Volume= 4,474 cf, Depth= 2.55"

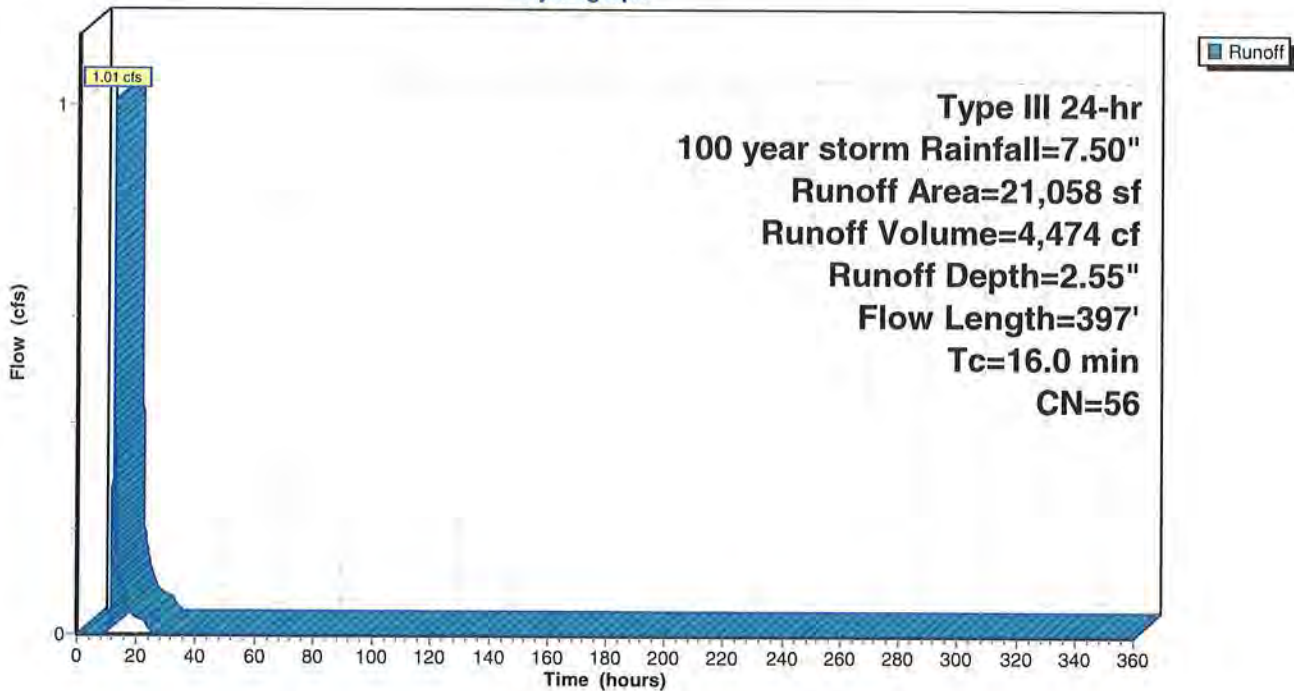
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
18,999	55	Woods, Good, HSG B
2,059	61	>75% Grass cover, Good, HSG B
21,058	56	Weighted Average
21,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	47	0.0266	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
8.2	53	0.0556	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
3.2	297	0.0960	1.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.0	397	Total			

Subcatchment 5: Post B1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

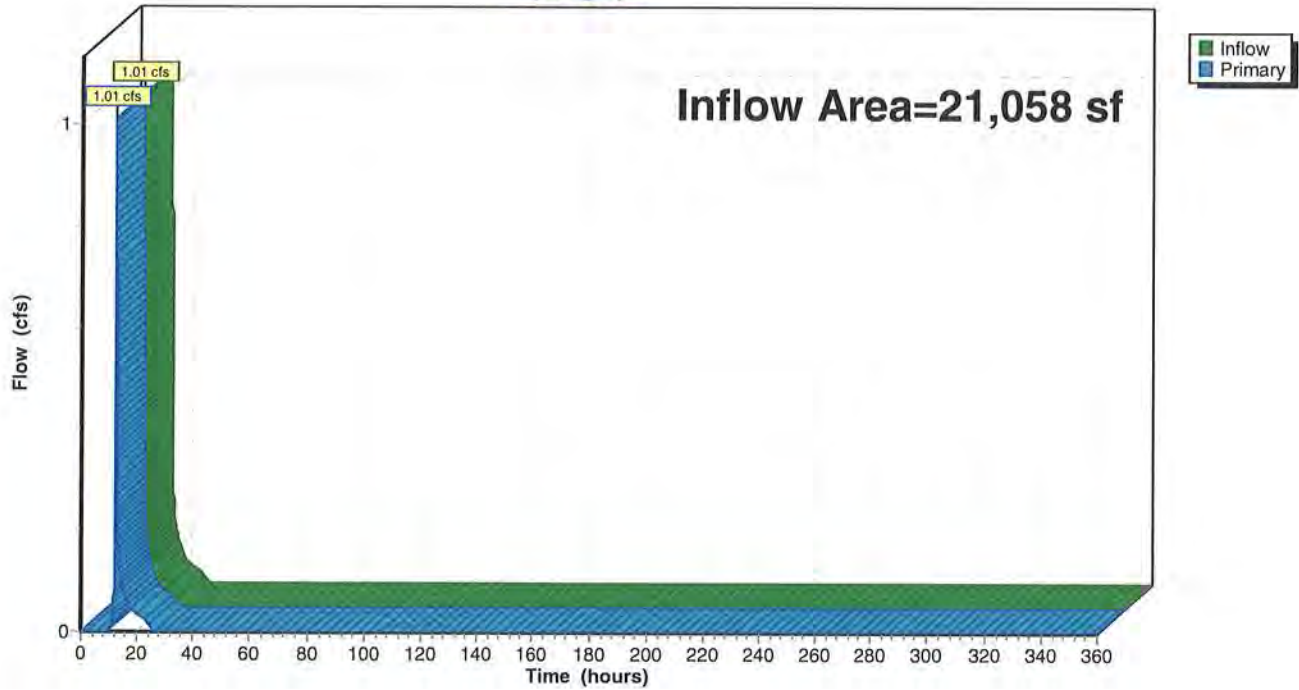
Summary for Link 6: Post-Design Line B

Inflow Area = 21,058 sf, 0.00% Impervious, Inflow Depth = 2.55" for 100 year storm event
Inflow = 1.01 cfs @ 12.23 hrs, Volume= 4,474 cf
Primary = 1.01 cfs @ 12.23 hrs, Volume= 4,474 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 6: Post-Design Line B

Hydrograph



Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 100 year storm Rainfall=7.50"

Printed 12/5/2016

Summary for Subcatchment 7: Basin A3

Runoff = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf, Depth= 5.85"

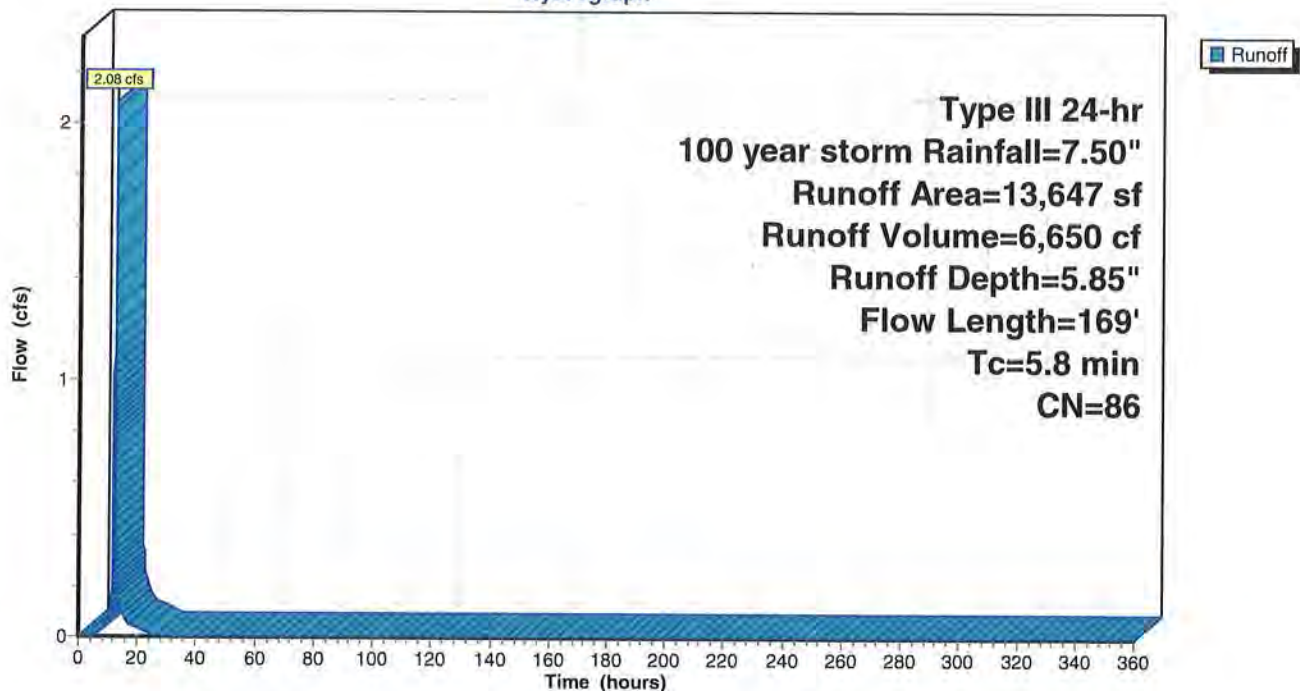
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
7,290	98	Paved parking & roofs
5,560	74	>75% Grass cover, Good, HSG C
797	61	>75% Grass cover, Good, HSG B
13,647	86	Weighted Average
6,357		46.58% Pervious Area
7,290		53.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0775	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.1	5	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0379	3.95		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.8	169	Total			

Subcatchment 7: Basin A3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 8: CB #5

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 5.85" for 100 year storm event
Inflow = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf
Outflow = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf

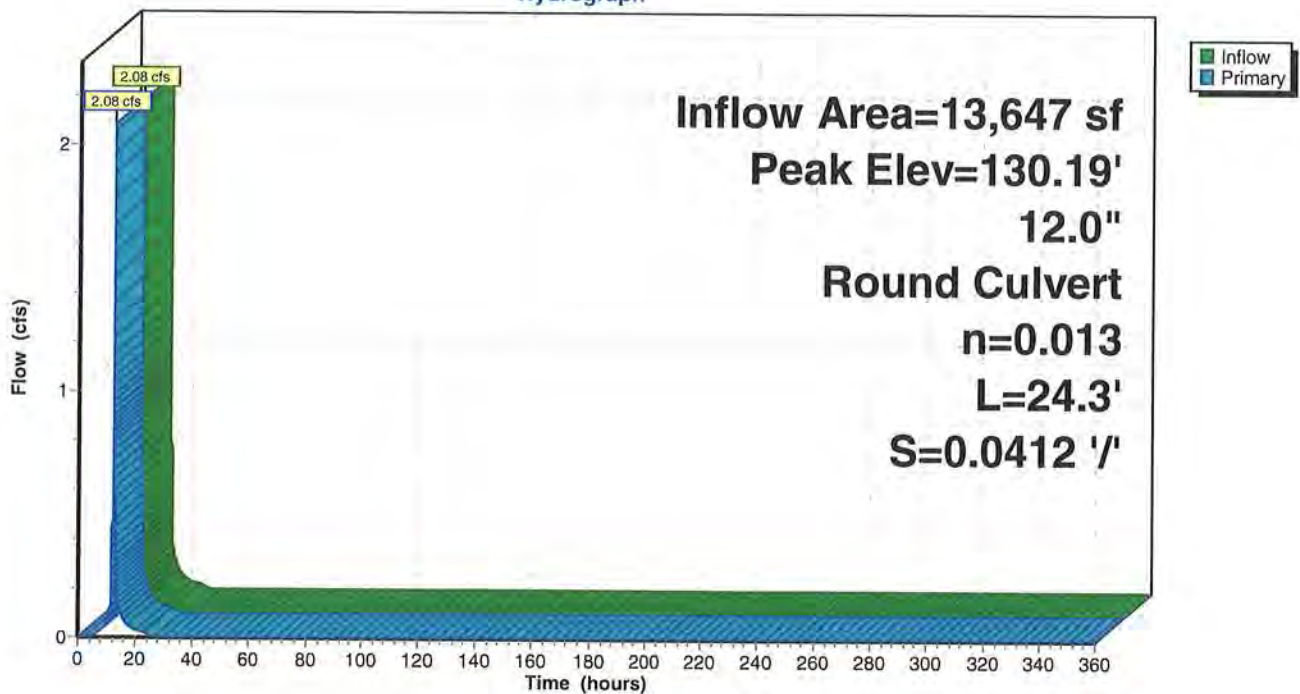
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 130.19' @ 12.15 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	126.00'	12.0" Round Culvert L= 24.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 126.00' / 125.00' S= 0.0412 1/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=127.04' TW=127.45' (Dynamic Tailwater)
↑-1=Culvert (Controls 0.00 cfs)

Pond 8: CB #5

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 9: DMH #3

Inflow Area = 13,647 sf, 53.42% Impervious, Inflow Depth = 5.85" for 100 year storm event
Inflow = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf
Outflow = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.08 cfs @ 12.08 hrs, Volume= 6,650 cf

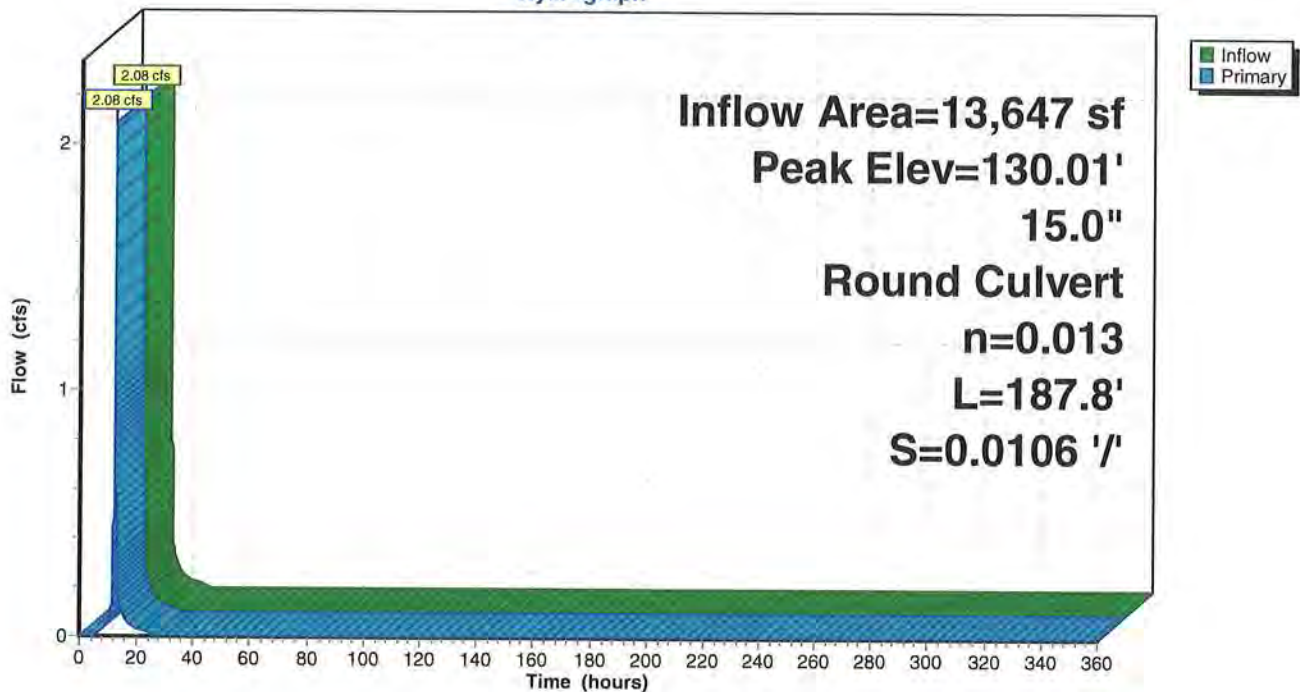
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 130.01' @ 12.14 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	15.0" Round Culvert L= 187.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 125.00' / 123.00' S= 0.0106 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.08 hrs HW=127.45' TW=127.97' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 9: DMH #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 10: Basin A1

Runoff = 7.18 cfs @ 12.14 hrs, Volume= 25,216 cf, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
2,285	70	Woods, Good, HSG C
34,674	55	Woods, Good, HSG B
34,997	61	>75% Grass cover, Good, HSG B
13,046	98	Paved parking & roofs
1,600	98	Water Surface
86,602	65	Weighted Average
71,956		83.09% Pervious Area
14,646		16.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0500	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	61	0.0570	1.67		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	66	0.1590	1.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	89	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	40	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	78	0.0630	3.76		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	145	0.0448	11.14	13.67	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
9.5	579	Total			

Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

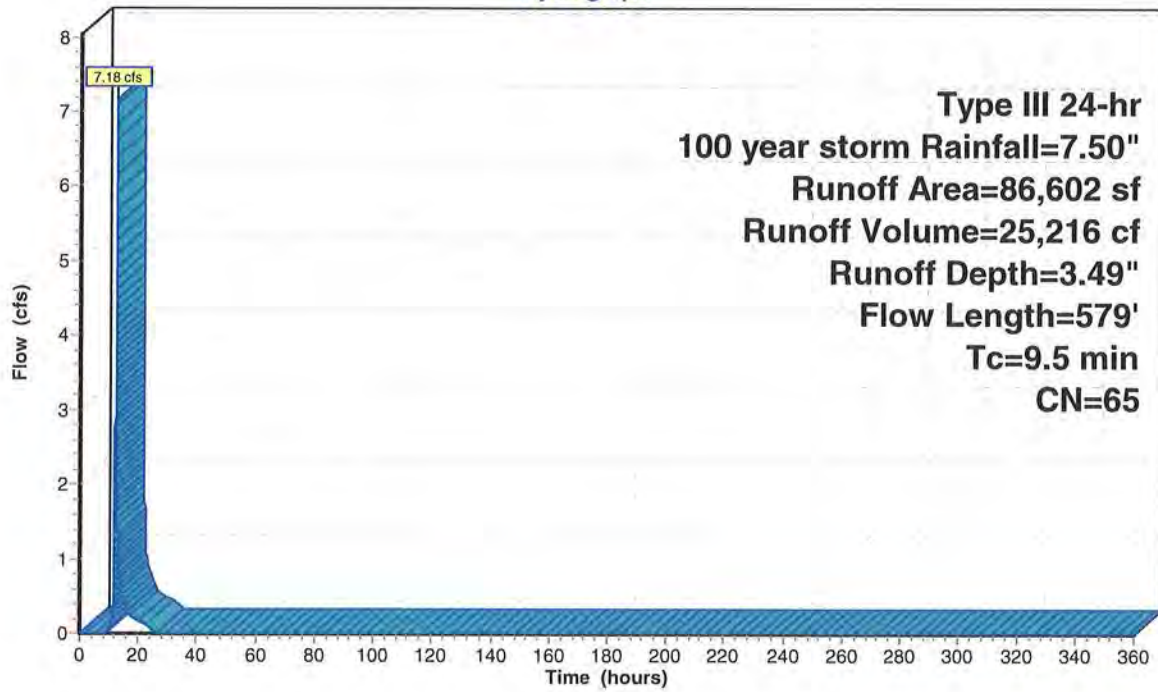
Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Subcatchment 10: Basin A1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 11: CB #4

Inflow Area = 100,249 sf, 21.88% Impervious, Inflow Depth = 3.81" for 100 year storm event
Inflow = 8.96 cfs @ 12.12 hrs, Volume= 31,866 cf
Outflow = 8.96 cfs @ 12.12 hrs, Volume= 31,866 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.96 cfs @ 12.12 hrs, Volume= 31,866 cf

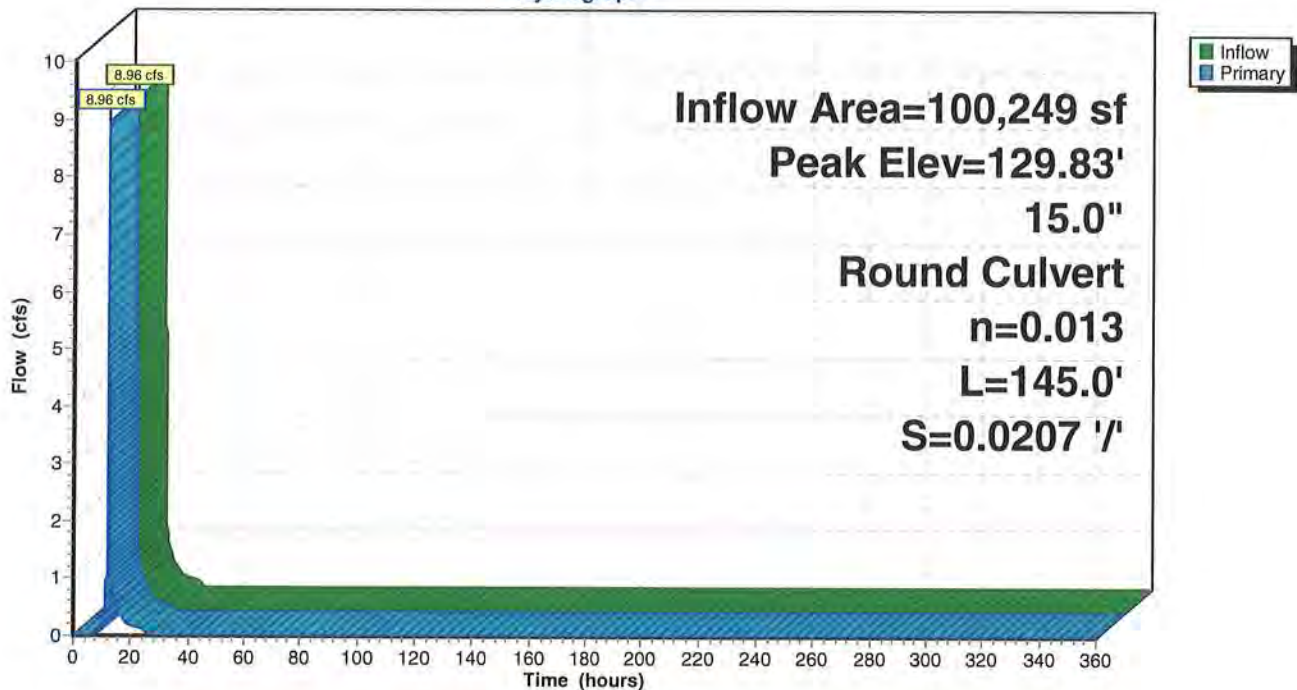
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 129.83' @ 12.13 hrs
Flood Elev= 130.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.00'	15.0" Round Culvert L= 145.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 120.00' S= 0.0207 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=8.93 cfs @ 12.12 hrs HW=129.79' TW=125.78' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 8.93 cfs @ 7.28 fps)

Pond 11: CB #4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 12: Basin A2

Runoff = 1.23 cfs @ 12.07 hrs, Volume= 3,703 cf, Depth= 5.50"

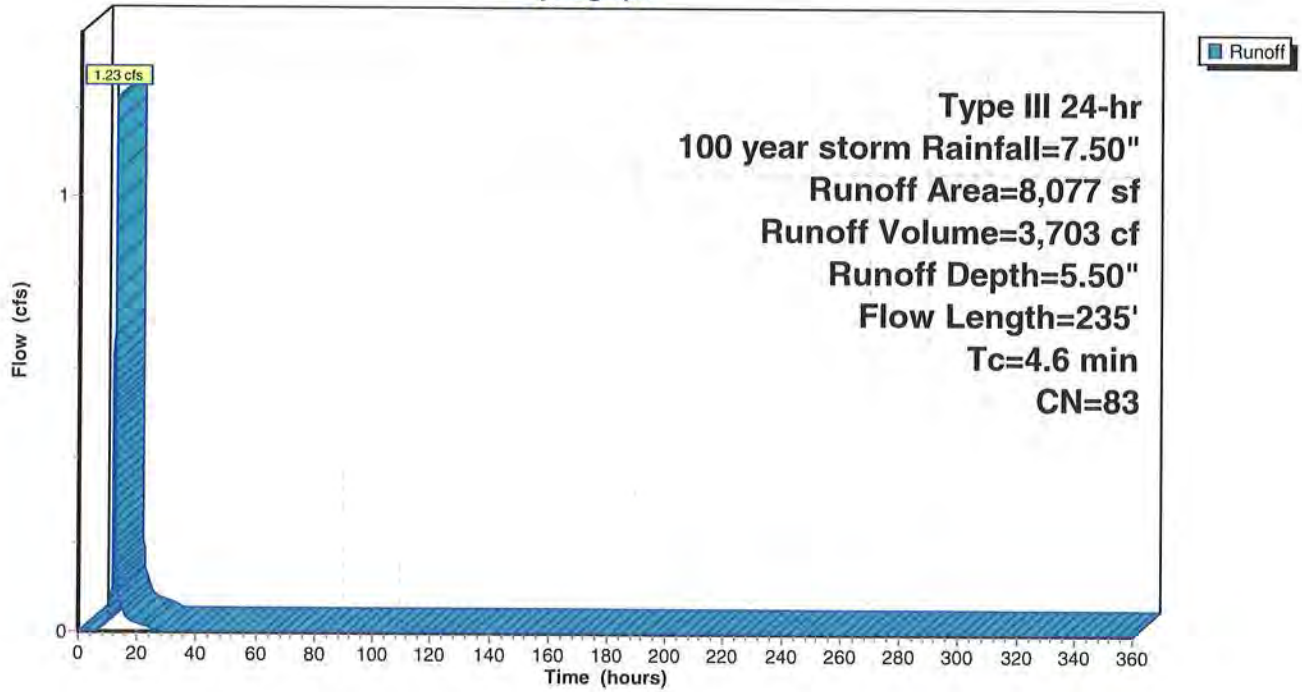
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
1,667	55	Woods, Good, HSG B
1,089	61	>75% Grass cover, Good, HSG B
270	74	>75% Grass cover, Good, HSG C
2,180	98	Paved parking & roofs
2,871	98	Roofs, HSG B
8,077	83	Weighted Average
3,026		37.46% Pervious Area
5,051		62.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	30	0.5000	0.51		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
3.0	28	0.1984	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	177	0.0085	4.85	5.96	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
4.6	235	Total			

Subcatchment 12: Basin A2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 13: CB #6

Inflow Area = 8,077 sf, 62.54% Impervious, Inflow Depth = 5.50" for 100 year storm event
Inflow = 1.23 cfs @ 12.07 hrs, Volume= 3,703 cf
Outflow = 1.23 cfs @ 12.07 hrs, Volume= 3,703 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.23 cfs @ 12.07 hrs, Volume= 3,703 cf

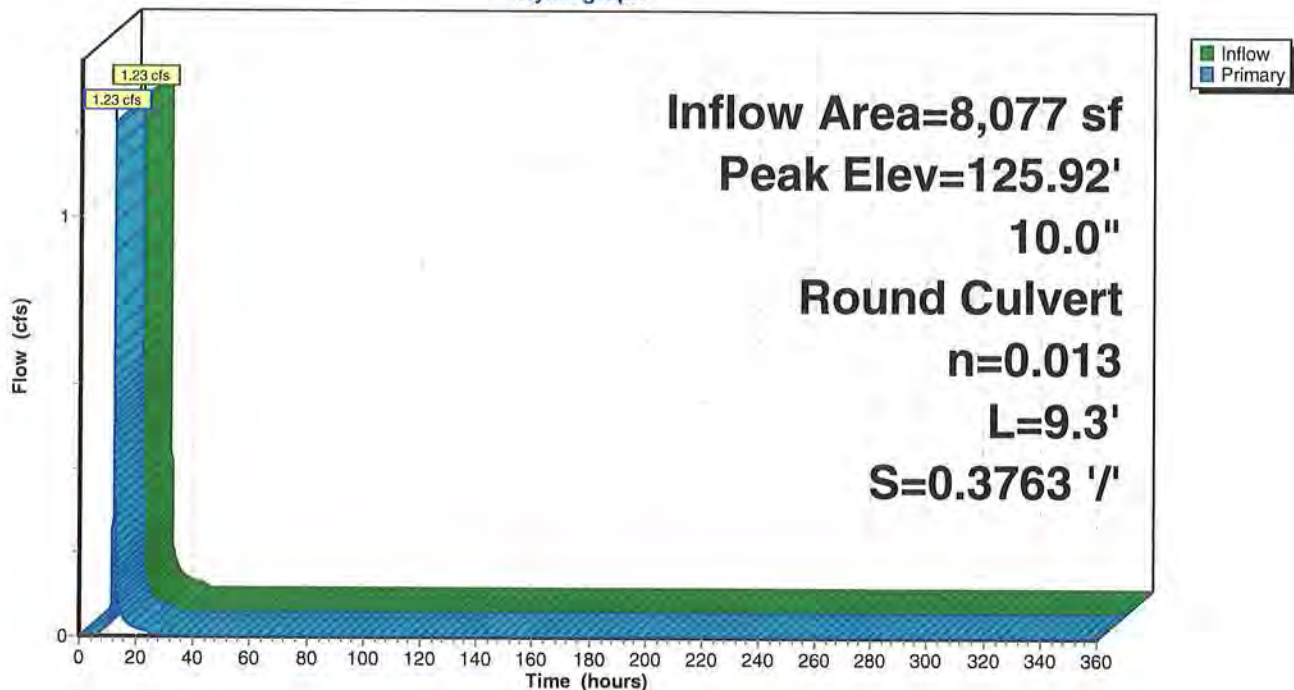
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.92' @ 12.13 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.50'	10.0" Round Culvert L= 9.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.50' / 120.00' S= 0.3763 1/1' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.00 cfs @ 12.07 hrs HW=124.23' TW=124.33' (Dynamic Tailwater)
←1=Culvert (Controls 0.00 cfs)

Pond 13: CB #6

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 14: DMH #1

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 3.94" for 100 year storm event
Inflow = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf
Outflow = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf

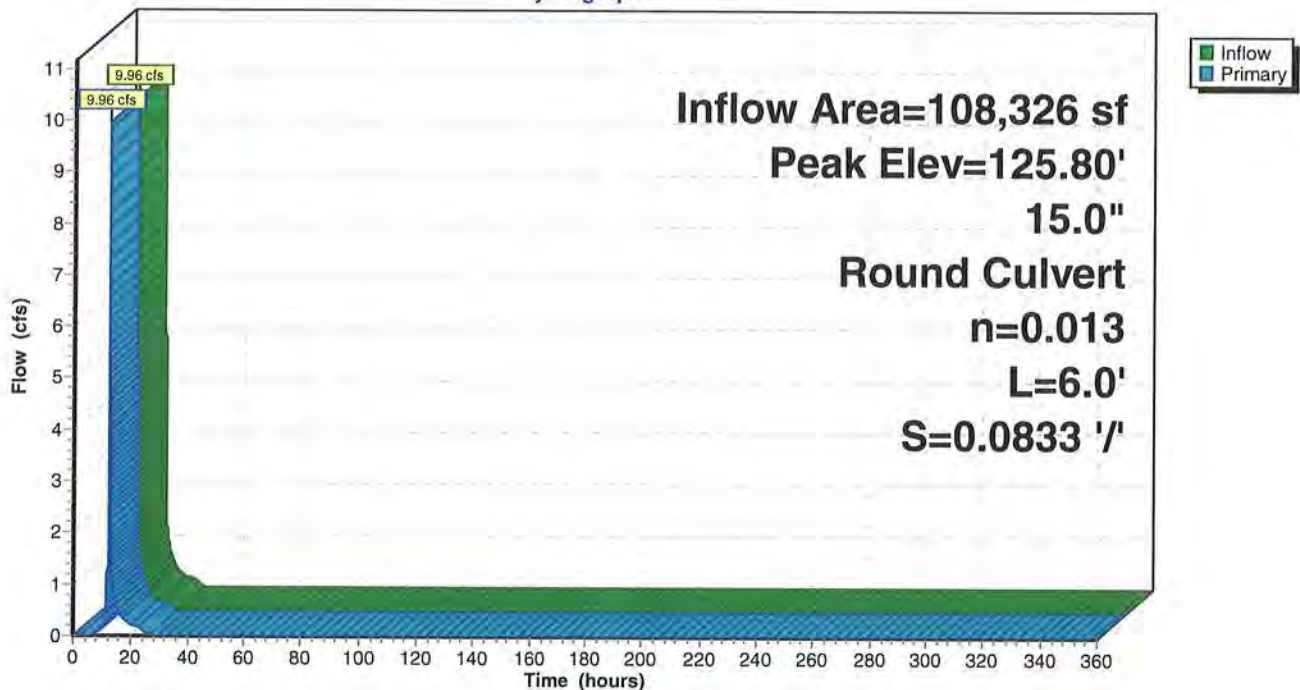
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.80' @ 12.12 hrs
Flood Elev= 127.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	15.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.50' S= 0.0833 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=9.90 cfs @ 12.11 hrs HW=125.76' TW=122.96' (Dynamic Tailwater)
1=Culvert (Inlet Controls 9.90 cfs @ 8.06 fps)

Pond 14: DMH #1

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 15: CDS-2025

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 3.94" for 100 year storm event
Inflow = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf
Outflow = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf

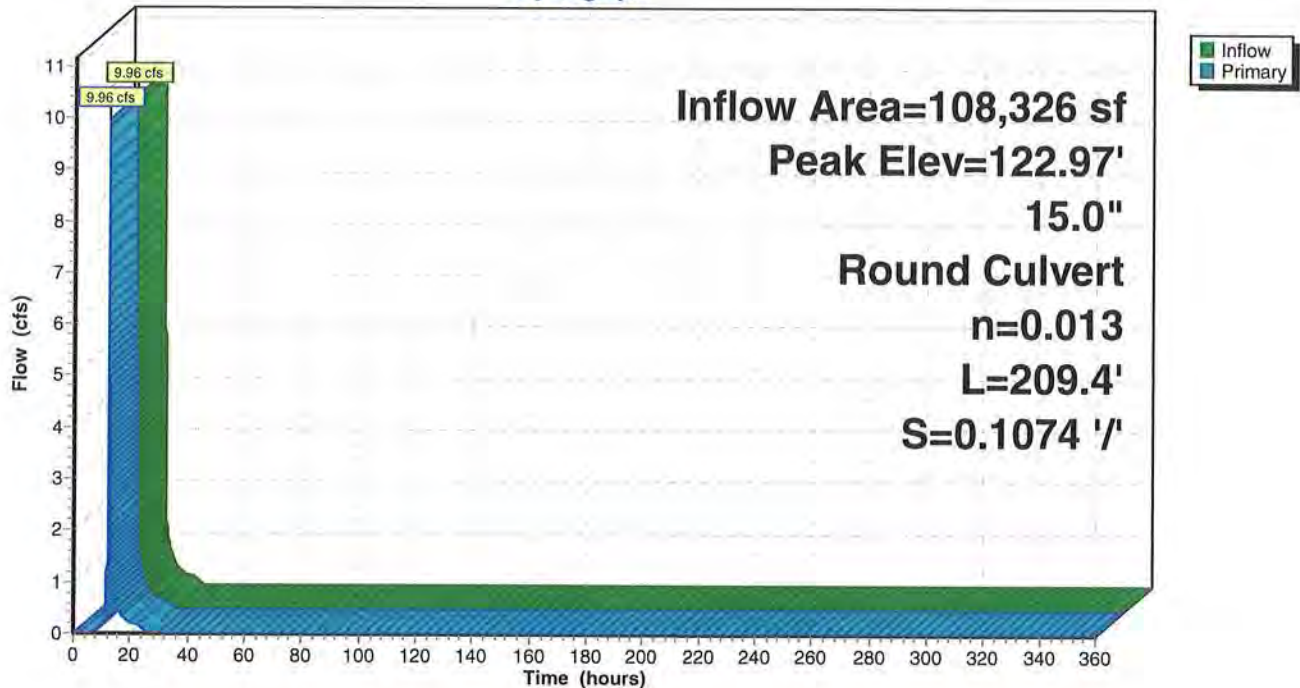
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 122.97' @ 12.11 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	15.0" Round Culvert L= 209.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.50' / 97.00' S= 0.1074 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=9.95 cfs @ 12.11 hrs HW=122.96' TW=98.36' (Dynamic Tailwater)
1=Culvert (Inlet Controls 9.95 cfs @ 8.11 fps)

Pond 15: CDS-2025

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 16: DMH #2

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 3.94" for 100 year storm event
 Inflow = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf
 Outflow = 9.96 cfs @ 12.11 hrs, Volume= 35,568 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.12 cfs @ 11.66 hrs, Volume= 11,250 cf
 Secondary = 9.09 cfs @ 12.12 hrs, Volume= 24,319 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Peak Elev= 98.37' @ 12.12 hrs

Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0" Round Culvert L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 94.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	97.00'	24.0" Round Culvert L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.00' / 94.00' S= 0.0370 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.11 cfs @ 11.66 hrs HW=97.16' TW=95.77' (Dynamic Tailwater)

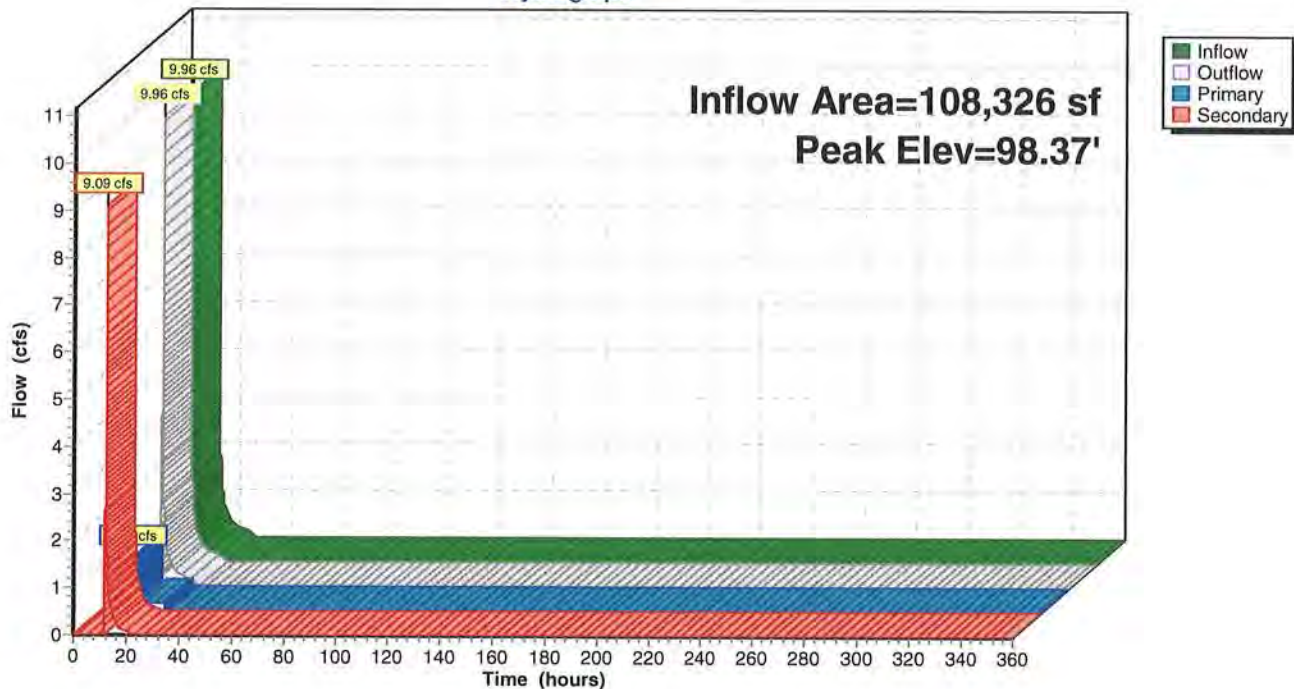
←**1=Culvert** (Inlet Controls 1.11 cfs @ 5.66 fps)

Secondary OutFlow Max=9.08 cfs @ 12.12 hrs HW=98.36' TW=0.00' (Dynamic Tailwater)

←**2=Culvert** (Inlet Controls 9.08 cfs @ 3.98 fps)

Pond 16: DMH #2

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 17: Infiltration System #3

Inflow Area = 108,326 sf, 24.91% Impervious, Inflow Depth = 1.25" for 100 year storm event
 Inflow = 1.12 cfs @ 11.66 hrs, Volume= 11,250 cf
 Outflow = 0.15 cfs @ 10.10 hrs, Volume= 11,252 cf, Atten= 87%, Lag= 0.0 min
 Discarded = 0.15 cfs @ 10.10 hrs, Volume= 11,252 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.00' @ 12.29 hrs Surf.Area= 1,398 sf Storage= 3,362 cf
 Flood Elev= 98.00' Surf.Area= 1,398 sf Storage= 3,363 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 233.5 min (1,130.5 - 897.0)

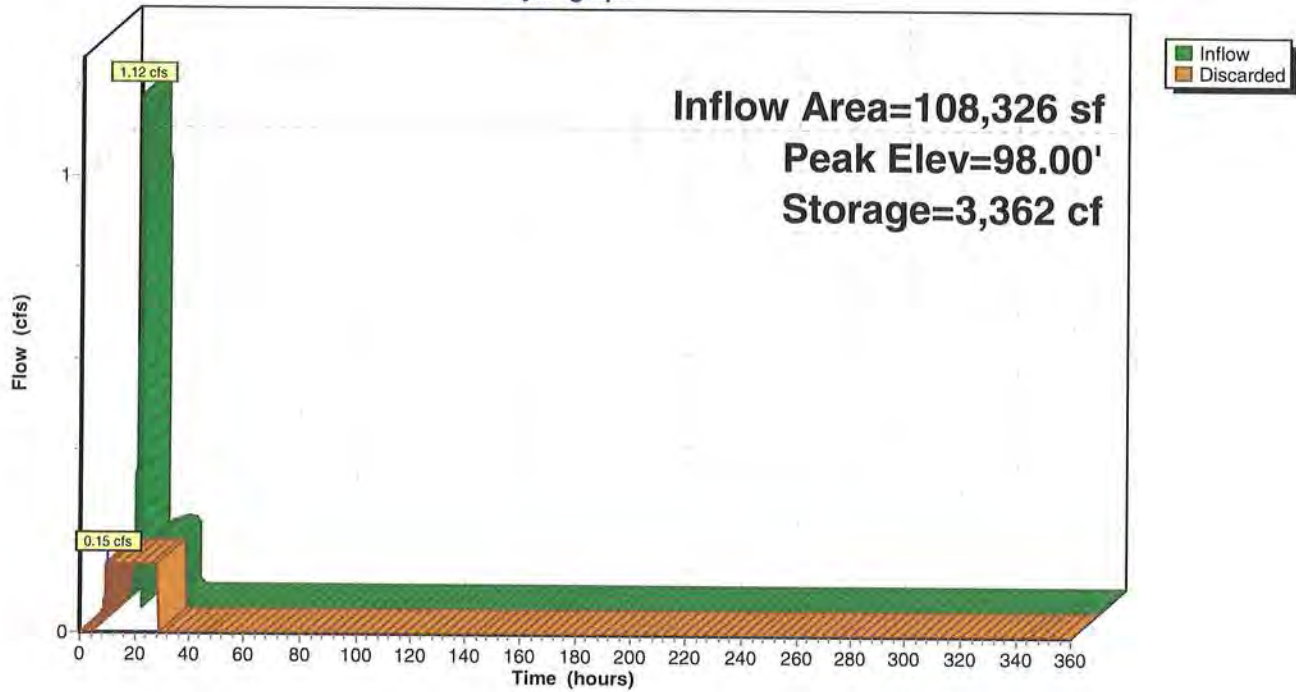
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	1,485 cf	21.50'W x 65.00'L x 4.00'H Prismatic 5,590 cf Overall - 1,878 cf Embedded = 3,712 cf x 40.0% Voids
#2	94.50'	1,878 cf	Cultec R-330XLHD x 36 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		3,363 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	4.680 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.15 cfs @ 10.10 hrs HW=94.04' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Pond 17: Infiltration System #3

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 18: Basin A4

Runoff = 5.74 cfs @ 12.11 hrs, Volume= 18,574 cf, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
17,045	55	Woods, Good, HSG B
15,813	98	Paved parking & roofs
17,689	61	>75% Grass cover, Good, HSG B
3,187	85	Gravel roads, HSG B
53,734	71	Weighted Average
37,921		70.57% Pervious Area
15,813		29.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.0850	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.4	14	0.0357	0.56		Sheet Flow, Gravel n= 0.029 P2= 3.50"
2.8	46	0.0870	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.5	46	0.0435	1.46		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	247	0.0486	4.48		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	93	0.0161	6.68	8.20	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
7.3	486	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

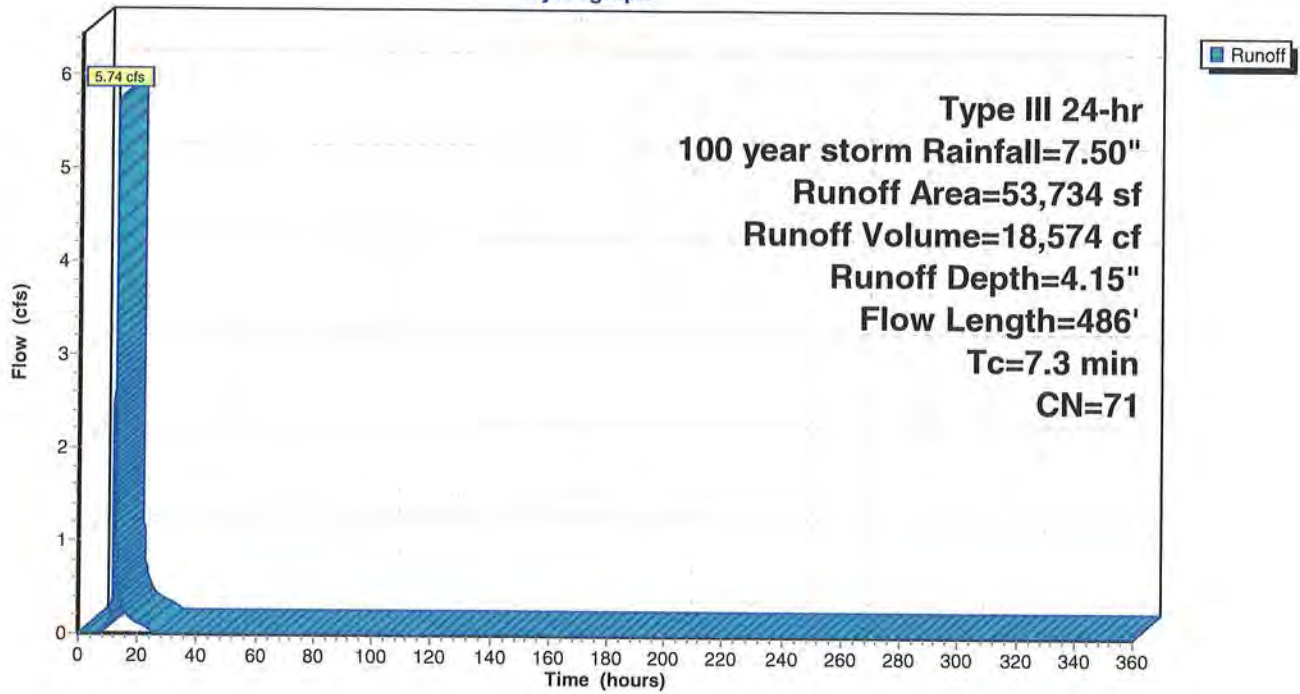
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 100 year storm Rainfall=7.50"

Printed 12/5/2016

Subcatchment 18: Basin A4

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Pond 19: Pocket Pond

Inflow Area = 53,734 sf, 29.43% Impervious, Inflow Depth = 4.15" for 100 year storm event
 Inflow = 5.74 cfs @ 12.11 hrs, Volume= 18,574 cf
 Outflow = 5.58 cfs @ 12.13 hrs, Volume= 18,573 cf, Atten= 3%, Lag= 1.2 min
 Primary = 5.58 cfs @ 12.13 hrs, Volume= 18,573 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Starting Elev= 136.50' Surf.Area= 1,107 sf Storage= 1,300 cf
 Peak Elev= 138.26' @ 12.13 hrs Surf.Area= 2,413 sf Storage= 4,410 cf (3,110 cf above start)
 Flood Elev= 140.00' Surf.Area= 2,857 sf Storage= 6,364 cf (5,064 cf above start)

Plug-Flow detention time= 410.5 min calculated for 17,272 cf (93% of inflow)
 Center-of-Mass det. time= 340.3 min (1,167.1 - 826.7)

Volume	Invert	Avail.Storage	Storage Description			
#1	134.00'	6,364 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
134.00	95	71.9	0	0	95	
135.00	386	122.6	224	224	886	
136.00	829	172.5	594	818	2,067	
136.50	1,107	197.3	482	1,300	2,802	
137.00	1,455	224.9	639	1,939	3,736	
137.50	1,803	238.1	813	2,752	4,236	
137.60	2,049	177.8	192	2,944	6,231	
138.00	2,268	186.3	863	3,807	6,488	
139.00	2,857	206.5	2,557	6,364	7,150	

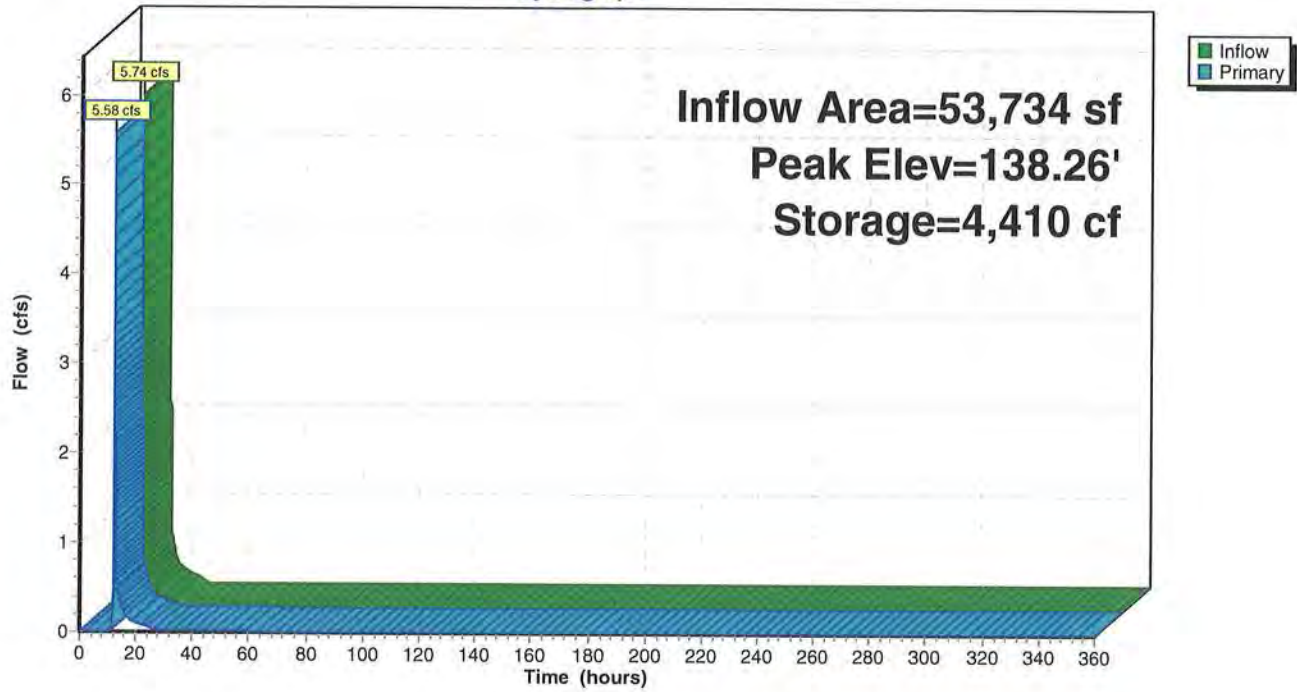
Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	15.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.50' / 134.00' S= 0.0373 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	136.50'	0.7" Vert. Orifice/Grate C= 0.600
#3	Device 1	138.00'	48.0" x 30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.57 cfs @ 12.13 hrs HW=138.26' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 5.57 cfs of 6.29 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.33 fps)
- 3=Orifice/Grate (Weir Controls 5.56 cfs @ 1.66 fps)

Pond 19: Pocket Pond

Hydrograph



Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment 20: Basin A5

Runoff = 27.89 cfs @ 12.38 hrs, Volume= 146,114 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 year storm Rainfall=7.50"

Area (sf)	CN	Description
95,873	70	Woods, Good, HSG C
217,255	55	Woods, Good, HSG B
43,293	74	>75% Grass cover, Good, HSG C
69,274	61	>75% Grass cover, Good, HSG B
1,614	89	Gravel roads, HSG C
1,432	85	Gravel roads, HSG B
1,615	87	Dirt roads, HSG C
54,850	98	Paved parking & roofs
1,600	98	Water Surface
486,806	66	Weighted Average
430,356		88.40% Pervious Area
56,450		11.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Brook Bot.W=10.00' D=1.50' Z= 1.0 '/' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Overall Watershed Analysis 10-28-16

Prepared by Bibbo Associates, LLP

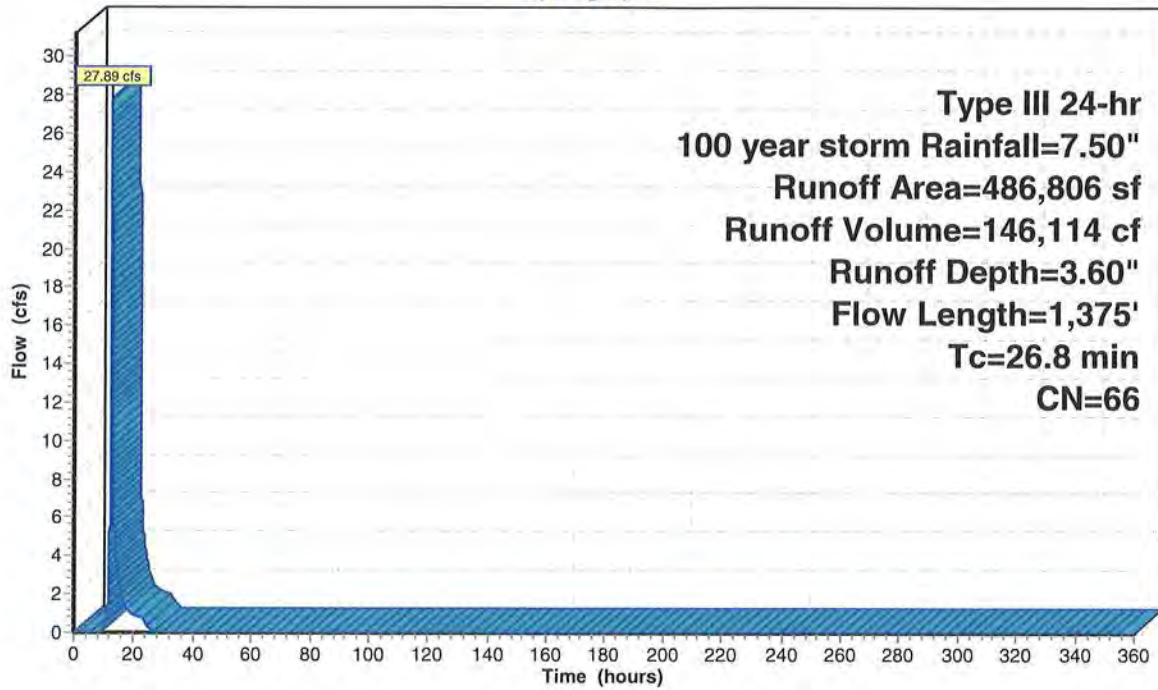
HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 100 year storm Rainfall=7.50"

Printed 12/5/2016

Subcatchment 20: Basin A5

Hydrograph



Runoff

Overall Watershed Analysis 10-28-16

Type III 24-hr 100 year storm Rainfall=7.50"

Prepared by Bibbo Associates, LLP

Printed 12/5/2016

HydroCAD® 10.00-15 s/n 02226 © 2015 HydroCAD Software Solutions LLC

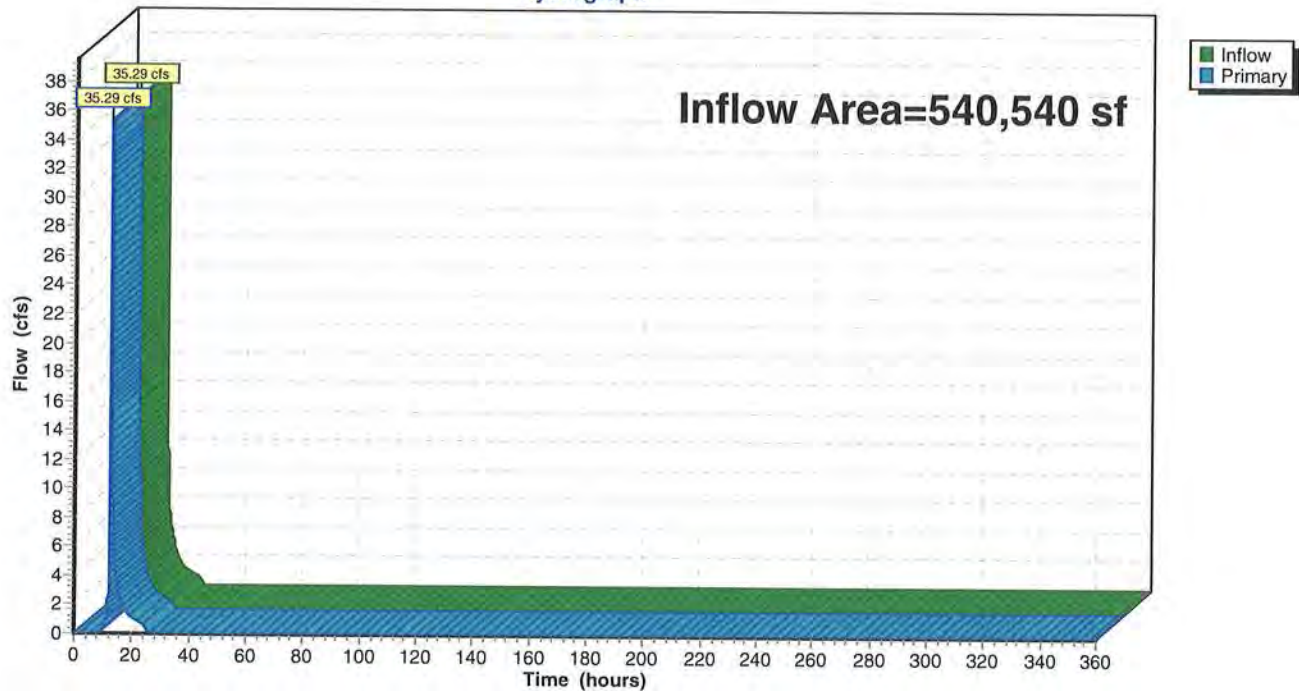
Summary for Link 21: Post-Design Point A

Inflow Area = 540,540 sf, 13.37% Impervious, Inflow Depth = 4.20" for 100 year storm event
Inflow = 35.29 cfs @ 12.35 hrs, Volume= 189,005 cf
Primary = 35.29 cfs @ 12.35 hrs, Volume= 189,005 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 21: Post-Design Point A

Hydrograph





Appendix B:
Water Quality Volume
Calculations



Project Turet - Infiltrator System #3

Rev: 8/14/09

Rev: 10/5/09

Rev: 12/2/16

Water Quality Volume (WQv) Calculation

Subcatchment Area (A):	108326 s.f.
Rainfall (P):	1.3 in.
Percent Imperviousness(I):	20.78 %
Rv = .05 + .009(I)	0.23702
WQv = (P) (Rv) (A) / 12	2782 c.f.



Project Turet - Stormwater Basin

Water Quality Volume (WQv) Calculation

Subcatchment Area (A):	53734 s.f.
Rainfall (P):	1.3 in.
Percent Imperviousness(I):	29.4 %
$R_v = .05 + .009(I)$	0.3146
$WQv = (P) (R_v) (A) / 12$	1831 c.f.



Appendix C:
New York State Stormwater Management Design Manual
Maintenance & Inspection Checklists

Appendix G: Maintenance Inspection Checklists

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
 Location: _____
 Site Status: _____
 Date: _____
 Time: _____
 Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6. Pond, toe & chimney drains clear and functioning		
7. Seeps/leaks on downstream face		
8. Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete	_____	
Corrugated pipe	_____	
Masonry	_____	
1. Low flow orifice obstructed		
2. Low flow trash rack.		
a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance		
a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels		
a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve		
a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve		
a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1. Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4. Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3. Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Infiltration Trench Operation, Maintenance, and Management Inspection Checklist

Project:
 Location:
 Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Trench surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Sediment Traps or Forebays (Annual)		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
3. Dewatering (Monthly)		
Trench dewateres between storms		
4. Sediment Cleanout of Trench (Annual)		
No evidence of sedimentation in trench		
Sediment accumulation doesn't yet require cleanout		
5. Inlets (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repair		
No evidence of erosion		
7. Aggregate Repairs (Annual)		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		

Comments:

Actions to be Taken:



Appendix D:
Rock Outlet Protection Sizing



BIBBO ASSOCIATES, LLP

Consulting Engineers - Planners

1/30/2009

Rev:

10/5/2009

8/30/2016

12/2/2016

Stormwater Basin

Rock Outlet Protection Sizing Calculations

Design Storm: 100 yr

Descp.	Q 100 (cfs)	d50 (in) (See Chart)	dmax (in) d50 x 1.5	La (See Chart)	Diameter of Pipe (Do) (ft)	3 x Diameter of Pipe	W = Do + La	Thickness (in) 1.5 x dmax Calc.	Use	Stone Size (in)
R.O.P.2	5.58	4	6	6	1.25	3.75	7.25	9.0	9.0	4" - 6"



BIBBO ASSOCIATES, LLP

Consulting Engineers - Planners

1/30/2009

Rev:

10/5/2009

8/30/2016

12/2/2016

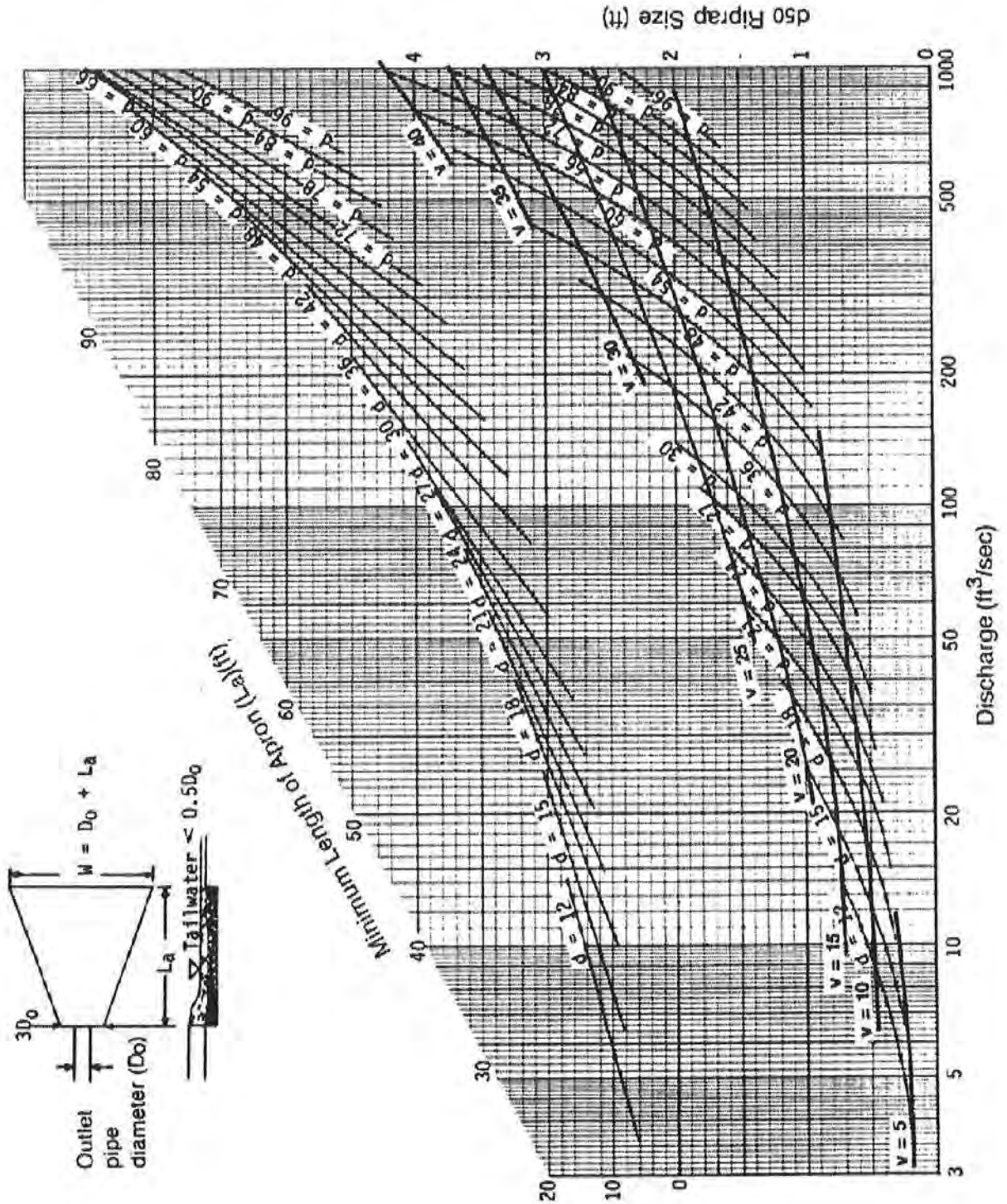
Infiltration System #3

Rock Outlet Protection Sizing Calculations

Design Storm: 100 yr

Descp.	Q 100 (cfs)	d50 (in) (See Chart)	dmax (in) d50 x 1.5	La (See Chart)	Diameter of Pipe (Do) (ft)	3 x Diameter of Pipe	W = Do + La	Thickness (in) 1.5 x dmax Calc.	Use	Stone Size (in)
R.O.P.1	9.09	5	7.5	12	2	6	14	11.3	12.0	6"-9"

Figure 5B.12
Outlet Protection Design—Minimum Tailwater Condition
(Design of Outlet Protection from a Round Pipe Flowing Full,
Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)





Appendix E:
Field Testing Results



Project: Turet Subdivision - East Lane

Stormwater Deep Test Results

Hole ID:	TP I-1
Depth:	Description:
0 - 12"	Top Soil
12"- 48"	Fine Sandy Loam
48"-96"	Mod. Compacted Med. Sands with Some Gravel
<i>Depth To Water</i>	None Encountered
<i>Depth To Rock</i>	None Encountered

Hole ID:	TP I-2
Depth:	Description:
0 - 12"	Top Soil
12"- 48"	Sandy Loam
48"-102"	Compacted Sands and Gravel with Some Silt
<i>Depth To Water</i>	None Encountered
<i>Depth To Rock</i>	None Encountered

Hole ID:	TP I-3
Depth:	Description:
0 - 12"	Top Soil
12"- 48"	Sandy Loam
48"-96"	Compacted Sands and Gravel with Some Silt
<i>Depth To Water</i>	None Encountered
<i>Depth To Rock</i>	None Encountered

Date of Tests: June 25, 2009
 Engineer: Timothy S. Allen



Project: Turet Subdivision - East Lane

Stormwater Percolation Test Results

Hole ID:	Run #	Time Start (Min.)	Time Stop (Min.)	Depth to Water		Time (Min.)	Drop (In.)	Rate (Min. / In.)	Rate Used* (In./Hr.)
				From Ground Surface					
				From (In.)	To (In.)				
PT I-1	1	1:17 PM	1:25 PM	42	45	8	3.00	2.7	
	2	1:26 PM	1:38 PM	42	45	12	3.00	4.0	
	3	1:40 PM	1:52 PM	42	45	12	3.00	4.0	3.888

PT I-2	1	12:43 PM	12:50 PM	38	41	7	3.00	2.3	
	2	12:51 PM	1:00 PM	38	41	9	3.00	3.0	
	3	1:01 PM	1:10 PM	38	41	9	3.00	3.0	5.184

PT I-3	1	1:05 PM	1:12 PM	38	41	7	3.00	2.3	
	2	1:14 PM	1:23 PM	38	41	9	3.00	3.0	
	3	1:25 PM	1:35 PM	38	41	10	3.00	3.3	
	4	1:35 PM	1:45 PM	38	41	10	3.00	3.3	4.680

* See following pages for calculations of percolation rates entered into HydroCAD

Date of Tests: March 31, 2009

Witnessed By: Bibbo Associates, LLP

Project Turret Subdivision
Feature Infiltration Systems

Sheet _____ of _____
Designed _____ Date _____
Checked _____ Date _____

Percolation Calculations

$$A_B = \pi r^2$$
$$3.14 (.5)^2 = 0.785 \text{ SF}$$

$$A_C = \pi Dh$$
$$3.14 (1) \left(\frac{8.5}{12}\right) = 2.23 \text{ SF}$$

$$A_p = 0.785 + 2.23 = 3.01 \text{ SF}$$

$$V_p = 0.785 \times \frac{3}{12} = 0.196 \text{ CF}$$

Perz Rate

$$S_R = \text{VOL/AREA/TIME}$$

System 1

$$S_R = 0.196 / 3.01 / 12 \text{ MIN} = .0054$$

$$.0054 (60 \text{ MIN/HR}) (12 \text{ IN/FT}) = 3.888 \text{ IN/HR}$$

System 2

$$S_R = .196 / 3.01 / 9 \text{ MIN} = .0072$$

$$.0072 (60) (12) = 5.184 \text{ IN/HR}$$

System 3

$$S_R = .196 / 3.01 / 10 \text{ MIN} = .0065$$

$$.0065 (60) (12) = 4.68 \text{ IN/HR}$$



Appendix F:
Contech CDS Pretreatment
Chamber Information



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Nonpoint Pollution Control

Division of Water Quality

Post Office Box 029

Trenton, New Jersey 08625-029

609-633-7021 Fax: 609-984-2147

http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Acting Commissioner

Derek Berg
Regulatory Manager – Stormwater
CONTECH Engineered Solutions
200 Enterprise Drive
Scarborough, ME 04074

Re: Final Certification
Continuous Deflective Separator (CDS) by CONTECH Engineered Solutions LLC

Expiration Date: December 1, 2016
TSS Removal Rate: 50%

Dear Mr. Berg:

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). CONTECH Engineered Solutions LLC has requested a Final Certification for the Continuous Deflective Separator (CDS) Stormwater Treatment System.

This project falls under the July 15, 2011 "Transition for Manufactured Treatment Devices," under *C. Manufactured Treatment Devices Seeking Final Certification – In Process* which are MTDs that have commenced field testing on or before August 1, 2011.

NJDEP received the required information and signed statements by the NJCAT Technical Director and the manufacturer indicating that the requirements of the Field Testing Protocols in place at the initiation of testing have been met or exceeded. The NJCAT letter also includes a recommended certified TSS removal rate and the required maintenance plan.

The NJDEP certifies the use of the CONTECH Engineered Solutions LLC CDS Stormwater Treatment System at a TSS removal rate of 50%, subject to the following conditions:

1. The various models and associated water quality flow capacities shall be sized for the peak flow of the New Jersey Water Quality Design Storm per N.J.A.C. 7:8-5, as shown in Table 1 below.

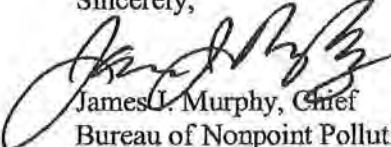
New Jersey Treatment Rates for CDS Models Based on a Surface Area Specific Loading Rate of 25.16gpm/ft ²		
CDS Model	Manhole Diameter (ft)	Treatment Flow Rate (cfs)
CDS-4	4	0.7
CDS-5	5	1.1
CDS-6	6	1.6
CDS-8	8	2.8
CDS-10	10	4.4
CDS-12	12	6.3

2. The CDS Stormwater Treatment System can be used on-line or off-line.
3. A hydrodynamic separator, such as the CDS Stormwater Treatment System, cannot be used in series with another hydrodynamic separator to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. The maintenance plan for the sites using this device shall incorporate at a minimum, the maintenance requirements for the CDS Stormwater Treatment System shown attached.

In addition to the attached, the detailed maintenance plan must include all of the items identified in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel.

Additional information regarding the implementation of the Stormwater Management rules N.J.A.C. 7:8 are available at www.njstormwater.org. Please contact Sandra Blick of my office at (609) 633-7021 if you have any questions.

Sincerely,



James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

c: Chron File
Richard Magee, NJCAT
Mark Pedersen, DLUR
Elizabeth Dragon, BNPC

TABLE 1
Storm Water Treatment Device
Hydraulic and Storage Capacities

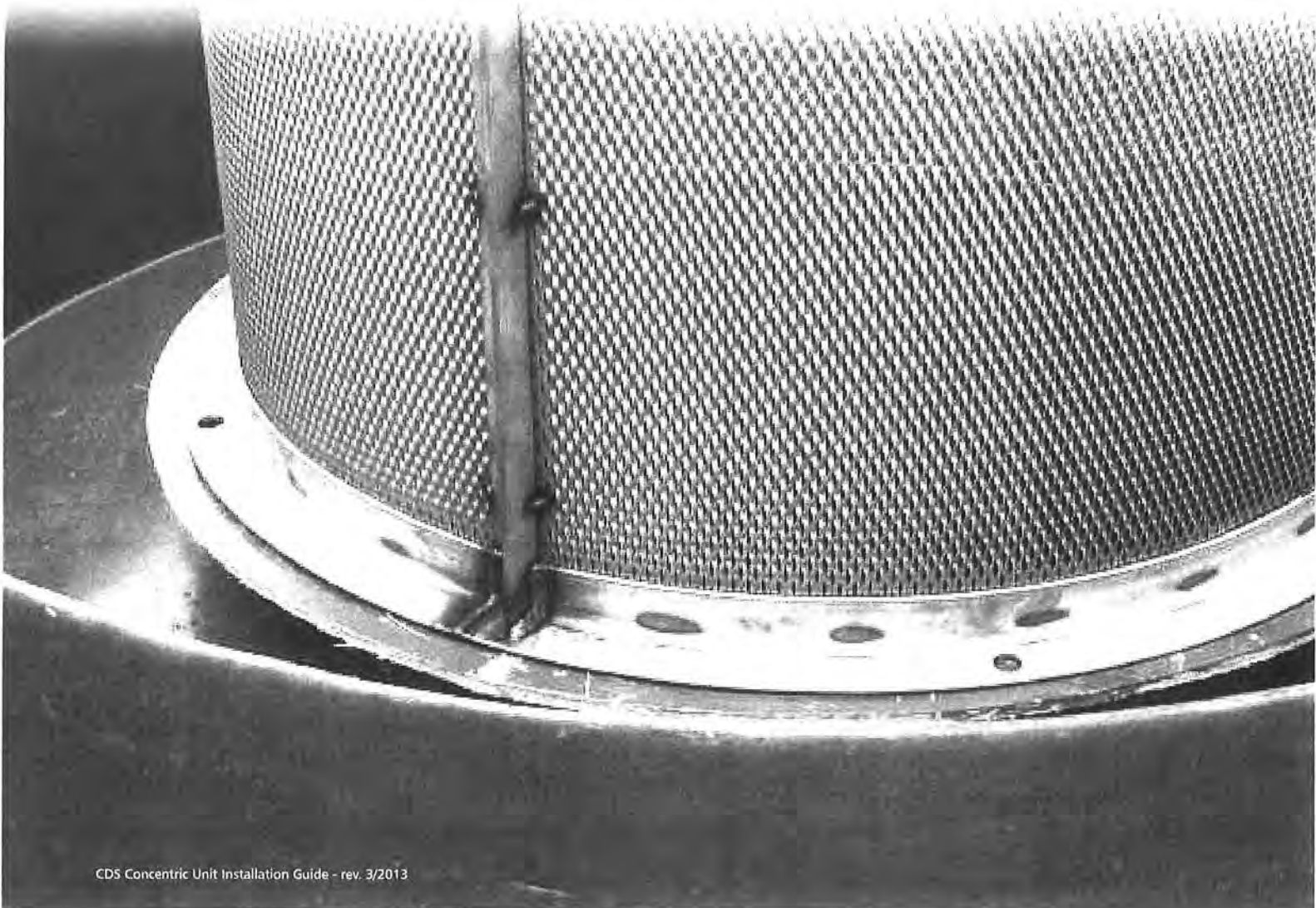
CDS Model	Treatment Capacity (cfs)/(L/s)	Minimum Sump Storage Capacity (yd³)/ (m³)	Minimum Oil Storage Capacity (gal)/(L)
CDS2015-4-C	0.7 (19.8)	0.9 (0.7)	61 (232)
CDS2015-5-C	0.7 (19.8)	1.5 (1.1)	83 (313)
CDS2020-C	1.1 (31.2)	1.5 (1.1)	99 (376)
CDS2025-C	1.6 (45.3)	1.5 (1.1)	116 (439)
CDS3020-C	2.0 (56.6)	2.1 (1.6)	184 (696)
CDS3025-C	2.4 (68.0)	2.1 (1.6)	210 (795)
CDS3030-C	3.0 (85.0)	2.1 (1.6)	236 (895)
CDS3035-C	3.8 (106.2)	2.1 (1.6)	263 (994)
CDS4030-C	4.5 (127.4)	5.6 (4.3)	426 (1612)
CDS4040-C	6.0 (169.9)	5.6 (4.3)	520 (1970)
CDS4045-C	7.5 (212.4)	5.6 (4.3)	568 (2149)
CDS5640-C	9.0 (254.9)	8.7 (6.7)	758 (2869)
CDS5653-C	14.0 (396.5)	8.7 (6.7)	965 (3652)
CDS5668-C	19.0 (538.1)	8.7 (6.7)	1172 (4435)
CDS5678-C	25.0 (708)	8.7 (6.7)	1309 (4956)
CDS2015-5-F	0.7 (19.8)	1.5 (1.1)	109 (413)
CDS2020-5-F	1.1 (31.2)	1.5 (1.1)	142 (538)
CDS2025-5-F	1.6 (45.3)	1.5 (1.1)	153 (579)
CDS3020-6-F	2.0 (56.6)	2.1 (1.6)	202 (765)
CDS3030-6-F	3.0 (85.0)	2.1 (1.6)	288 (1089)
CDS3035-6-F	3.8 (106.2)	2.1 (1.6)	327 (1236)
CDS4030-7-F	4.5 (127.4)	4.3 (3.3)	402 (1522)
CDS4040-7-F	6.0 (169.9)	4.3 (3.3)	500 (1892)
CDS4045-7-F	7.5 (212.4)	4.3 (3.3)	543 (2056)
CDS5640-8-F	9.0 (254.9)	5.6 (4.3)	554 (2098)
CDS5653-8-F	14.0 (396.5)	5.6 (4.3)	720 (2727)
CDS5668-8-F	19.0 (538.1)	5.6 (4.3)	859 (3252)
CDS5678-8-F	25.0 (708)	5.6 (4.3)	1081 (4091)
CDS3030-V	3.0 (85.0)	1.5 (1.1)	N/A
CDS5042-V	9.0 (254.9)	1.6 (1.2)	N/A
CDS5050-V	11.0 (311.5)	1.6 (1.2)	N/A
CDS7070-V	26.0 (736.3)	3.3 (2.5)	N/A
CDS10060-V	30.0 (849.6)	7.1 (5.4)	N/A
CDS10080-V	50.0 (1416.0)	7.1 (5.4)	N/A
CDS100100-V	64.0 (1812.5)	7.1 (5.4)	N/A

* Note that all “-C” systems can be fitted with a grated inlet if necessary

* Note that system internals for the “-C” and “-F” models can be put in larger manholes to accommodate site demands which may change standard capacities listed above

END OF SECTION

Internal Component Assembly and Installation Guide



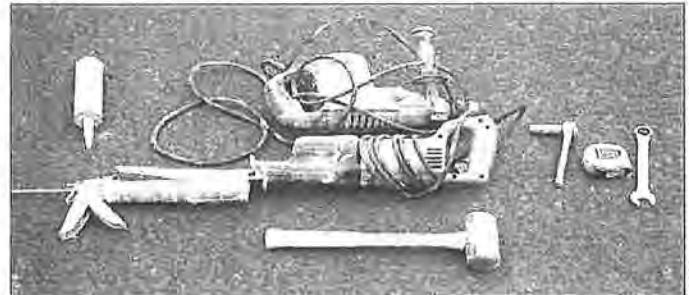
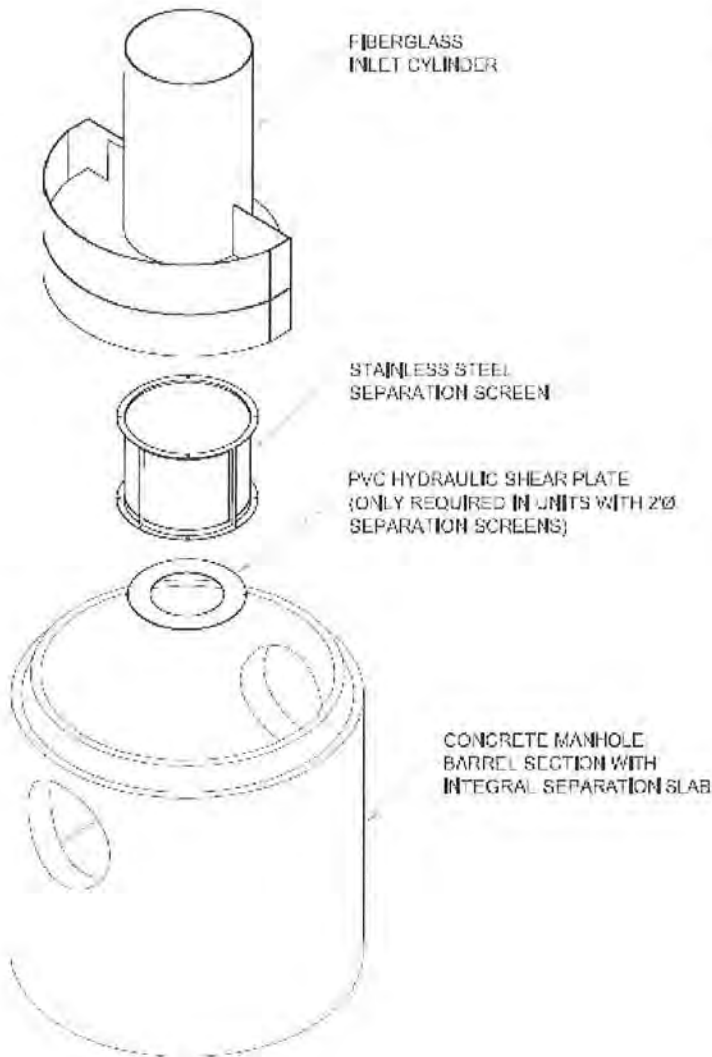
Overview

The CDS® installation will consist of three primary components, the fiberglass inlet cylinder, stainless steel separation screen, and concrete manhole barrel section with integral separation slab. If the CDS® unit has a 2' inside diameter separation screen, the unit will also have a PVC hydraulic shear plate.

Before starting installation, be sure you have all the components, tools, and supplies necessary to complete the work. Contech will ship the fiberglass inlet cylinder, SS separation screen, PVC hydraulic shear plate, and all needed hardware to you prior to the installation date. These internals will typically arrive on two shipping pallets, one with inlet cylinder and the other with the SS separation screen, box of stainless steel hardware, and PVC shear plate if required.

Tools Recommended For A Successful Installation

1. Small rotary hammer drill
2. Hand drill with 1/2" chuck
3. 3/8" diameter masonry bit that will drill a hole at least 3" deep
4. 1/2" diameter wood bit for drilling fiberglass
5. Hammer
6. Reciprocating saw
7. Long blade for saw
8. Tape measure
9. Marker or grease pencil for marking fiberglass
10. Sealant gun
11. Sealant, equivalent to Sikaflex 1a
12. 9/16" deep socket with ratchet drive for tightening 3/8" concrete anchors
13. 3/4" end wrench and 3/4" socket for tightening 1/2" bolts and nuts



Inlet Cylinder & Separation Screen Component Assembly

Remove fiberglass inlet cylinder from the shipping pallet and turn it upside down so it is standing on the cylinder with the horizontal flange facing up (Fig 1). Unbolt separation screen from shipping pallet and place it on top of the inlet cylinder with the **GREEN** painted flange facing the fiberglass flange and center screen over the cylinder opening (Fig 2).



Fig 1. Upside down inlet and screen.

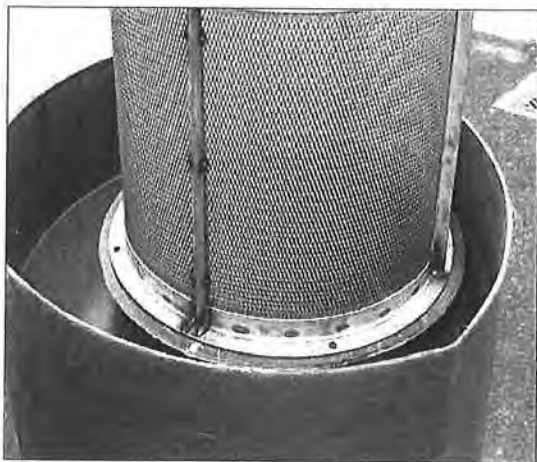


Fig 2. Screen centered over inlet cylinder opening.

Using the hand drill with 1/2" wood bit match drill the holes from the screen flange into the horizontal flange on the fiberglass inlet (Fig 3). Drill just one hole at a time and install 1/2" diameter 316 stainless steel bolts with washers to hold screen centered before moving to the next hole (Fig 4). Once all holes are drilled and bolts installed use 3/4" end wrench and 3/4" socket to tighten until split washer is flat.

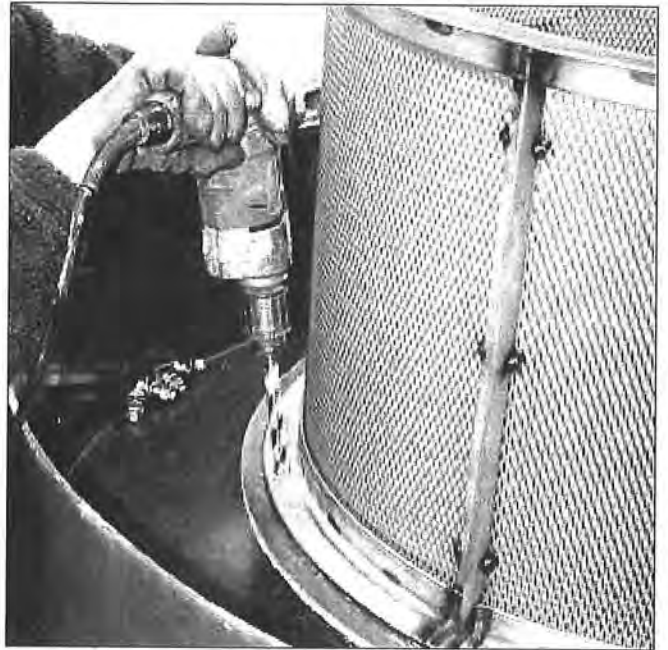


Fig 3. Match drill holes from screen flange.



Fig 4. Attach screen to inlet with 1/2" bolts

Depending on the internal height of the CDS® unit the fiberglass inlet cylinder may need to be cut down from the standard 4' height. The correct cylinder height will be located on the fabrication drawings provided by Contech (Fig 5). Using the tape measure and marker or grease pencil mark the cylinder at the height to be cut and remove top of cylinder with reciprocating saw or other cutting tool (Fig 6).

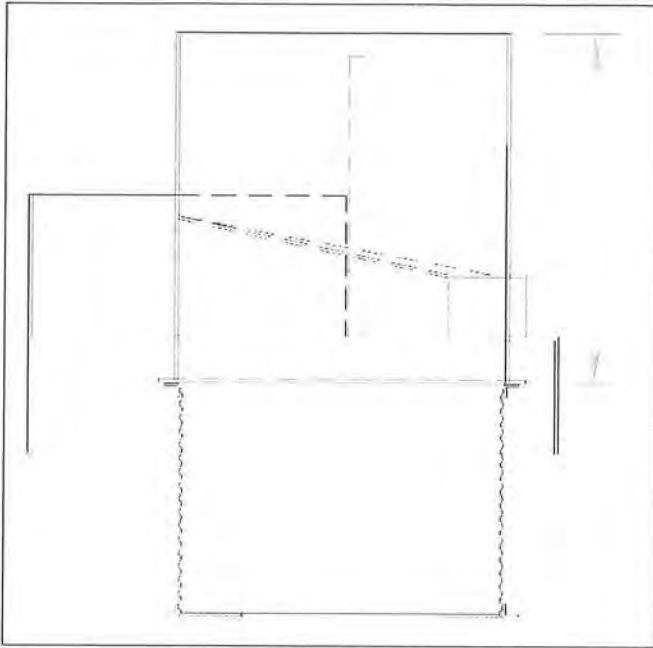


Fig 5. Cylinder height shown on fabrication drawings

Component Assembly Installation

Lift inlet and screen assembly into manhole barrel section centering the cylinder over the sump access hole in separation slab floor (Fig 7). See Contech fabrication drawings for rotation angle of the fiberglass inlet (Fig 8). Coring for inlet pipe must fall within inlet trough and coring for outlet pipe must be outside of inlet trough. If unit has multiple inlet pipes all inlet coring must fall within inlet trough.



Fig 7. Lift inlet and screen assembly into manhole.



Fig 6. Removing top of inlet cylinder.

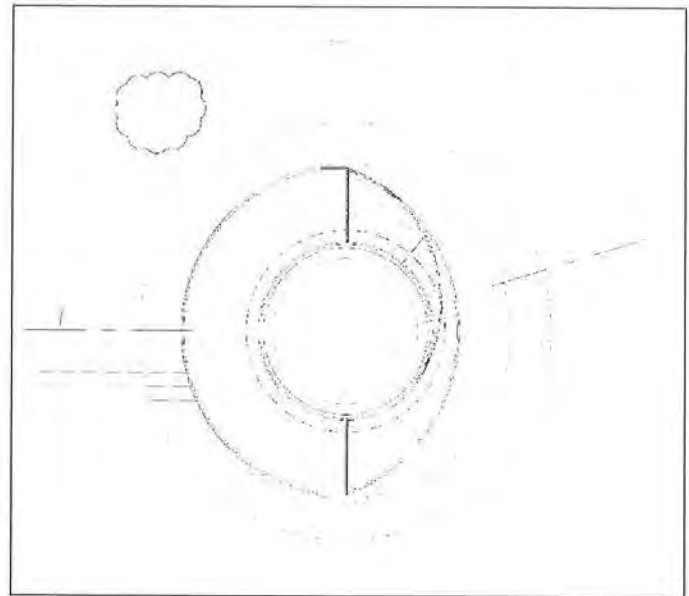


Fig 8. Inlet rotation shown on fabrication drawings.

Using marker or grease pencil, outline the sides of inlet coring down to the trough floor (Fig 9). Next rotate inlet just enough to drill two 1/2" holes on each side of the outline, about 12" apart and 4" outside of outline (Fig 10). Rotate the inlet trough and cylinder back to center so your outline mark is aligned with the inlet core.

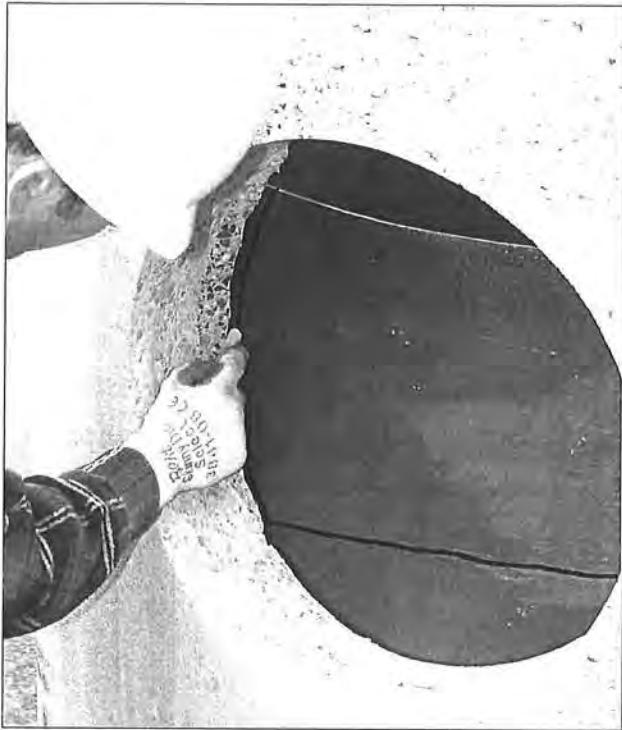


Fig 9. Outline inlet coring on inlet trough flange.

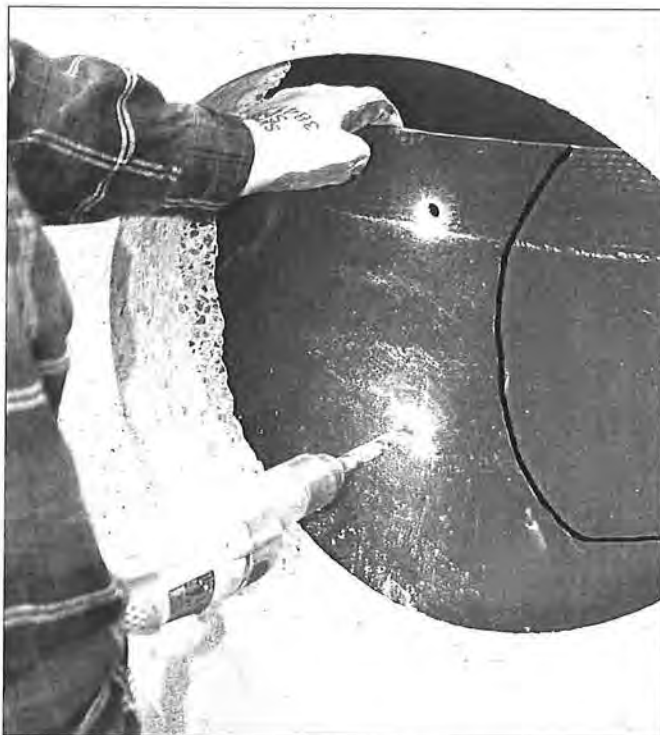


Fig 10. Drill two holes on both sides of coring outline.

Using a small rotary hammer with a 3/8" diameter masonry bit, drill a 3" deep hole into the manhole wall at one of the 1/2" holes you just drilled through the trough flange (Fig 11). You may need to angle the drill to fit between the fiberglass cylinder and the trough flange. Next place one of the provided 3/8" diameter 316 stainless steel wedge anchors into the hole and set it using a large hammer (Fig 12). Repeat steps to set anchors at all four 1/2" holes and snug down anchor nut with 9/16" deep socket.



Fig 11. Drill concrete manhole for wedge anchors.

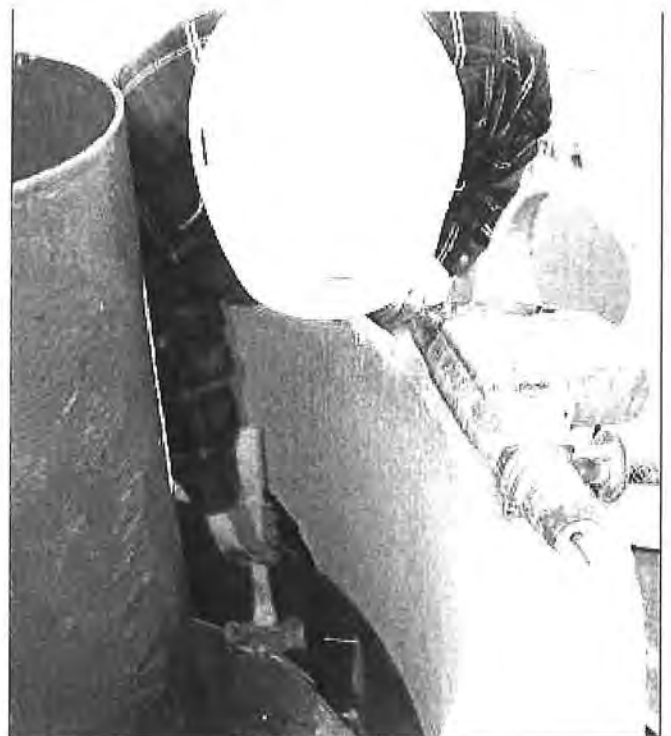


Fig 12. Use hammer to set wedge anchors.

Using a reciprocating saw cut the trough flange to remove the fiberglass inside of the inlet outline you marked, being careful not to cut into the trough floor (Fig 13) (Fig 14).

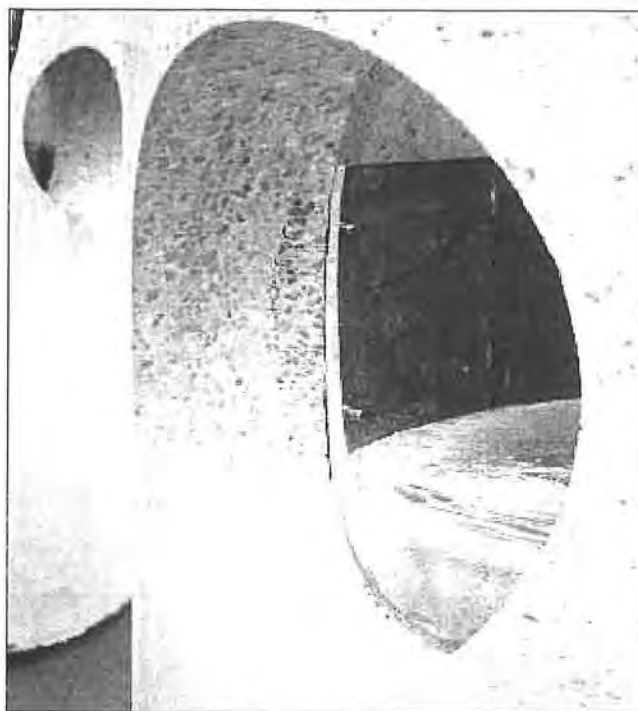


Fig 13. Remove trough flange blocking inlet coring.

Fig 14. Inlet coring with trough flange removed.

With a sealant gun apply a bead of polyurethane elastomeric sealant, equivalent to Sikaflex 1a, down the sides and along bottom of inlet coring to seal any gap between fiberglass and manhole wall (Fig 15). If a gap exists that is too large to be filled with sealant you can fill with butyl mastic and apply sealant over the top.



Fig 15. Seal inlet trough down the sides and along bottom of inlet coring with Sikaflex 1a sealant or equivalent.

If the unit has a 2' inside diameter separation screen Contech will provide a PVC hydraulic shear plate. This shear plate will need to be installed inside of the separation screen so that it rests on the separation slab floor. To install, drop the shear plate down through the fiberglass cylinder keeping it flat (Fig 16). Do not fasten shear plate to floor it must remain removable (Fig 17).



Fig 16. Installing PVC hydraulic shear plate.

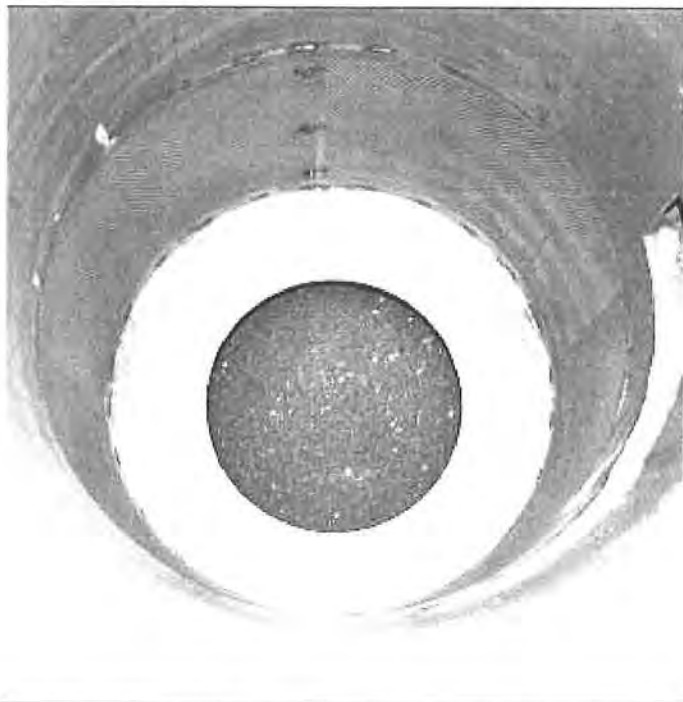


Fig 17. PVC hydraulic shear plate resting on floor.

If the unit has a grated top inlet, Contech will provide a fiberglass deflector pan and cover. This deflector pan will need to be installed on top of the fiberglass cylinder with the open end over the inlet trough. See Contech fabrication drawings for correct location. Do not fasten cover to pan it must remain removable (Fig 18).

Fig 18. Deflector pan installed on top of cylinder.



Stencil manhole barrel section to mark inlet and outlet coring (Fig 18). Be sure that all manhole lifting points are accessible and not blocked by the internal components. If they are, new lift points will need to be provided.

Fig 19. Stencil inlet and outlet coring.



CDS[®] Inspection and Maintenance Guide



Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.5	0.4
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

© 2010 CONTECH Stormwater Solutions

CONTECH Construction Products Inc. provides site solutions for the civil engineering industry. CONTECH's portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other CONTECH division offerings, visit contech-cpi.com or call 800.338.1122.

Nothing in this catalog should be construed as an expressed warranty or an implied warranty of merchantability or fitness for any particular purpose. See the CONTECH standard quotation or acknowledgement for applicable warranties and other terms and conditions of sale.

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CDS Inspection & Maintenance Log

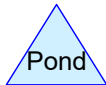
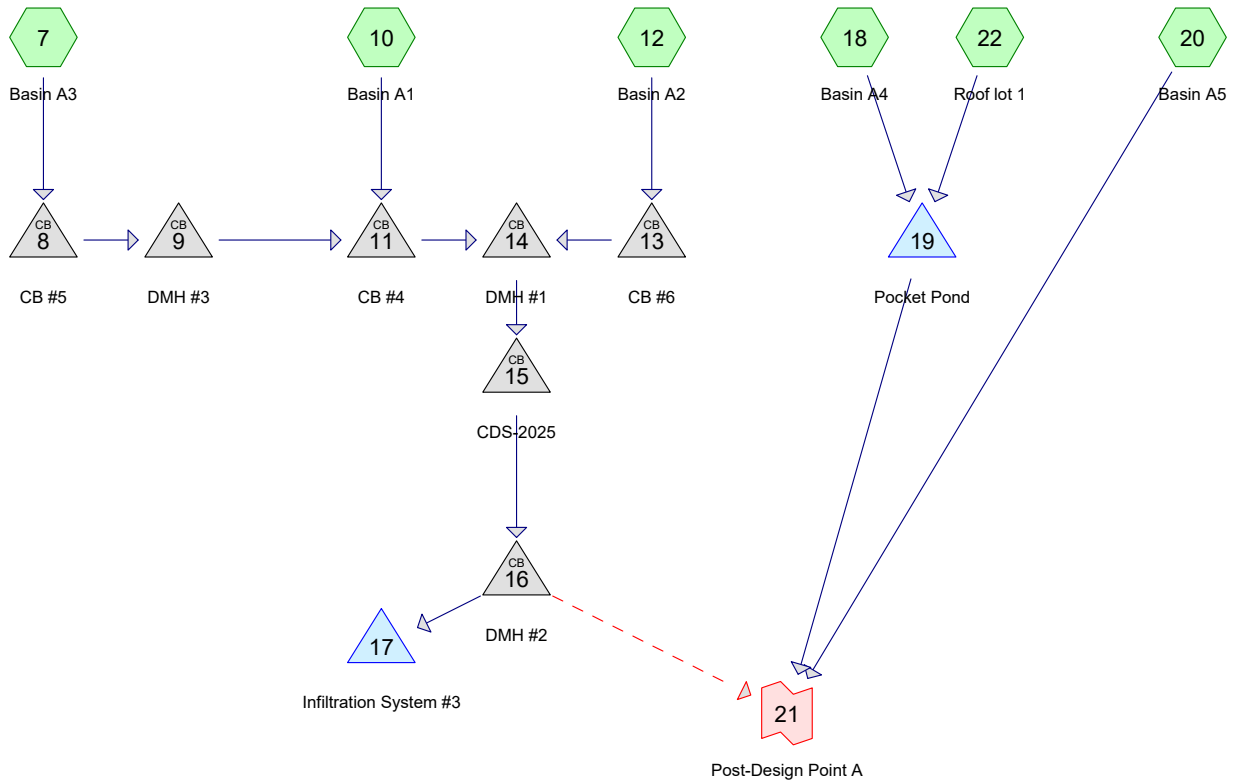
CDS Model: _____ Location: _____

Date	Water depth to sediment ¹	Floatable Layer Thickness ²	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than eighteen inches the system should be cleaned out. Note: To avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.



Appendix G:
Updated 2022 HydroCAD Output Report:
25-Year Storm Post-Development Analysis



Routing Diagram for Overall Watershed Analysis 5-16-22
 Prepared by Bibbo Associates, Printed 6/27/2022
 HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 2

Summary for Subcatchment 7: Basin A3

Runoff = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf, Depth= 4.20"

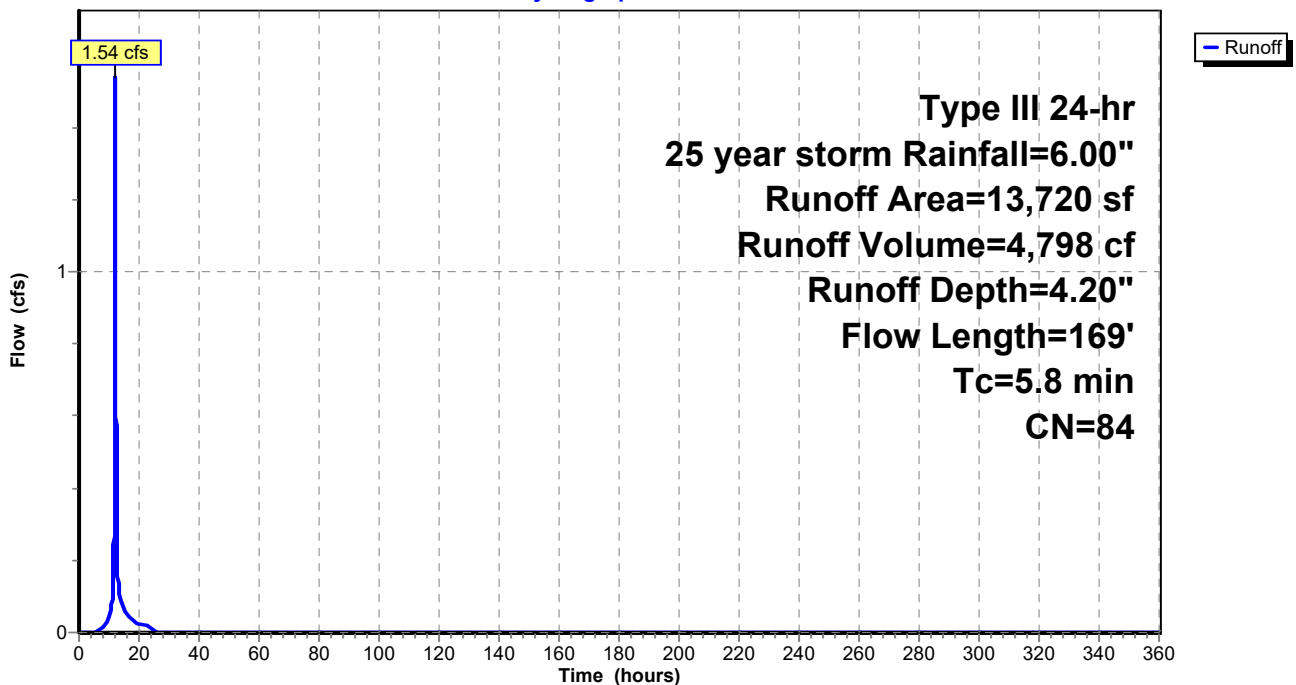
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
6,385	98	Paved parking & roofs
6,538	74	>75% Grass cover, Good, HSG C
797	61	>75% Grass cover, Good, HSG B
13,720	84	Weighted Average
7,335		53.46% Pervious Area
6,385		46.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0775	0.31		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.1	5	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	64	0.0379	3.95		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.8	169	Total			

Subcatchment 7: Basin A3

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 3

Summary for Subcatchment 10: Basin A1

Runoff = 4.93 cfs @ 12.14 hrs, Volume= 17,487 cf, Depth= 2.44"

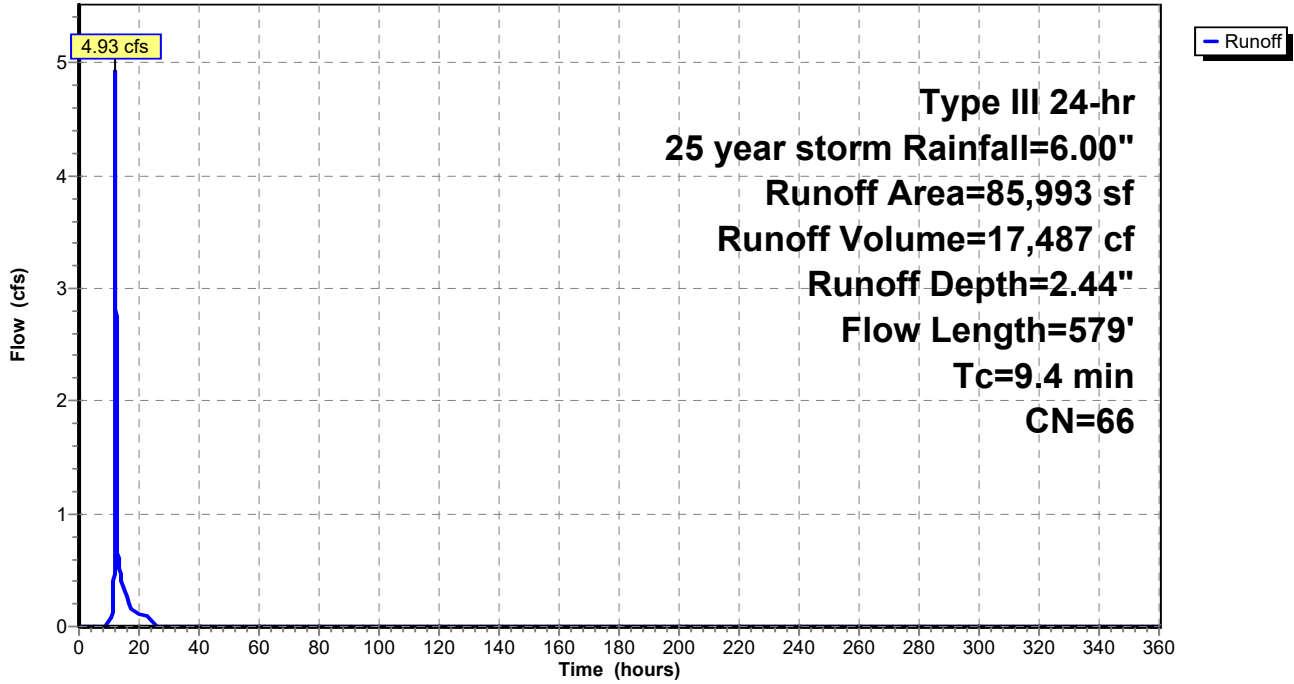
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
2,285	70	Woods, Good, HSG C
35,533	55	Woods, Good, HSG B
31,867	61	>75% Grass cover, Good, HSG B
14,708	98	Paved parking & roofs
1,600	98	Water Surface
85,993	66	Weighted Average
69,685		81.04% Pervious Area
16,308		18.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0500	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	61	0.0570	1.67		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	66	0.1590	1.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	89	0.0450	1.48		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	40	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	78	0.0630	3.76		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	145	0.0448	11.14	13.67	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
9.4	579	Total			

Subcatchment 10: Basin A1

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 5

Summary for Subcatchment 12: Basin A2

Runoff = 1.20 cfs @ 12.07 hrs, Volume= 3,617 cf, Depth= 4.41"

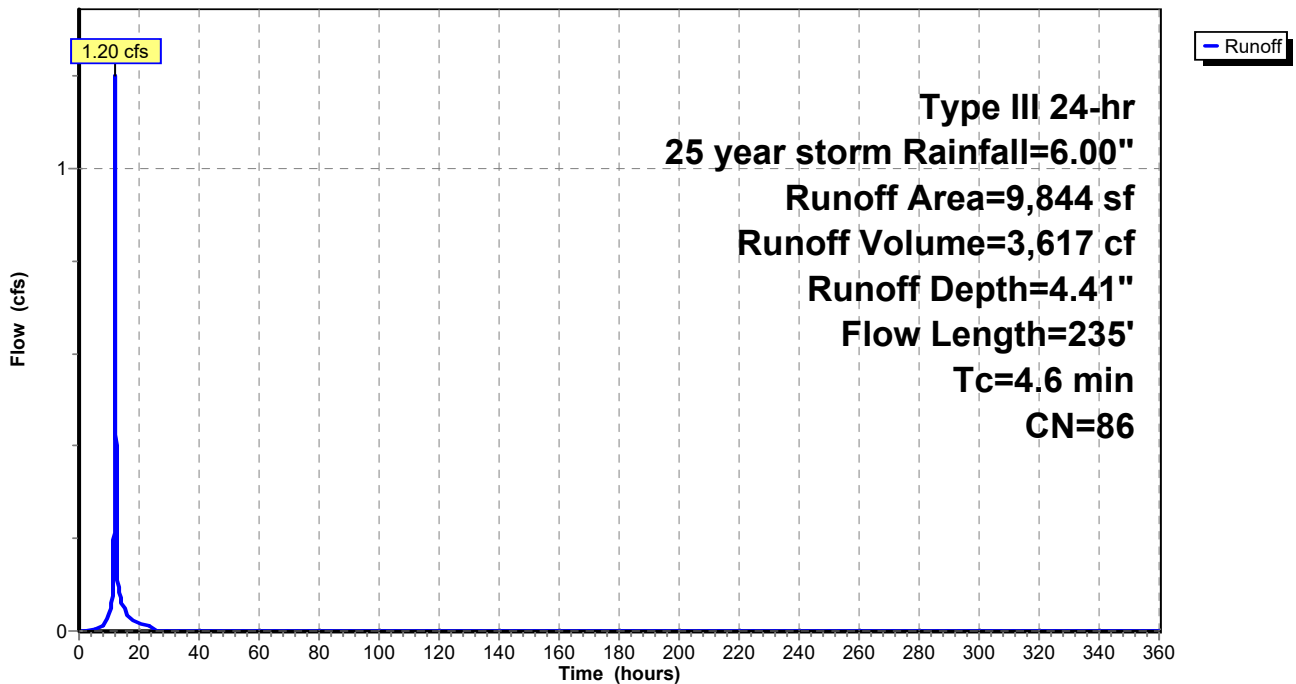
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
1,920	61	>75% Grass cover, Good, HSG B
1,922	74	>75% Grass cover, Good, HSG C
6,002	98	Paved parking & roofs
9,844	86	Weighted Average
3,842		39.03% Pervious Area
6,002		60.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	30	0.5000	0.51		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
3.0	28	0.1984	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.6	177	0.0085	4.85	5.96	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
4.6	235	Total			

Subcatchment 12: Basin A2

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 6

Summary for Subcatchment 18: Basin A4

Runoff = 4.00 cfs @ 12.09 hrs, Volume= 12,414 cf, Depth= 2.90"

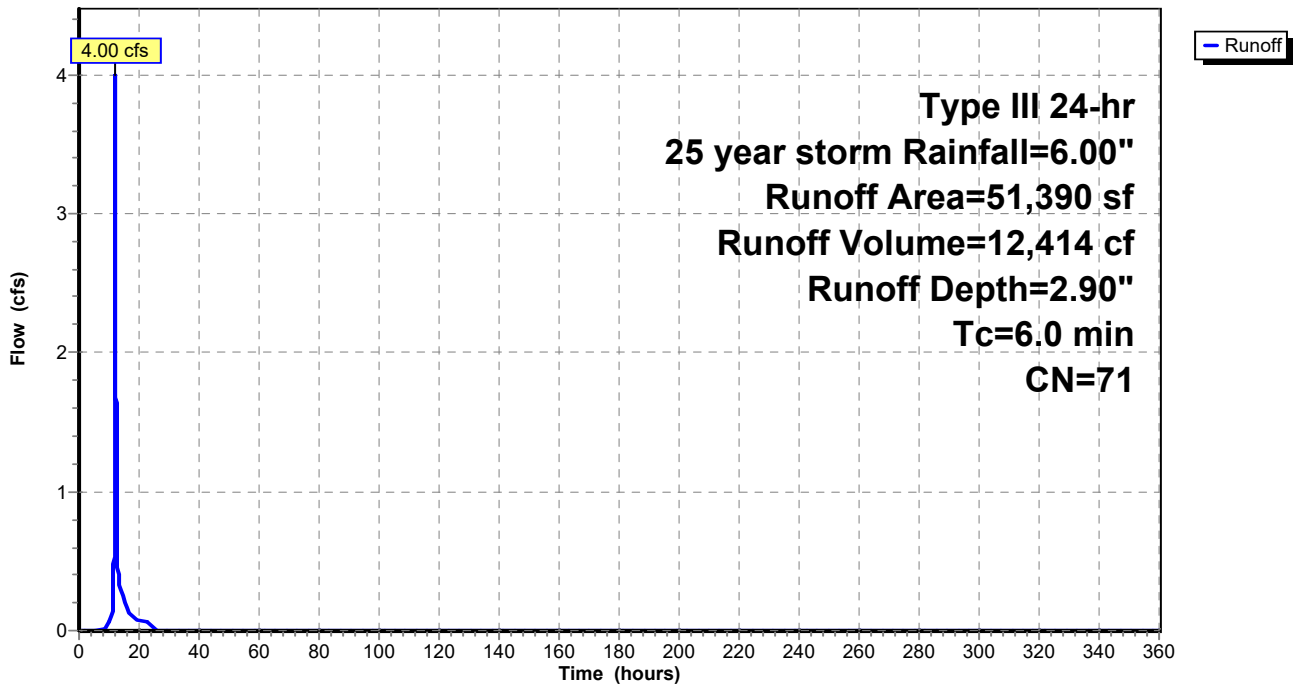
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
18,497	55	Woods, Good, HSG B
15,239	98	Paved parking & roofs
14,467	61	>75% Grass cover, Good, HSG B
3,187	85	Gravel roads, HSG B
51,390	71	Weighted Average
36,151		70.35% Pervious Area
15,239		29.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 18: Basin A4

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 7

Summary for Subcatchment 20: Basin A5

Runoff = 18.50 cfs @ 12.39 hrs, Volume= 98,467 cf, Depth= 2.44"

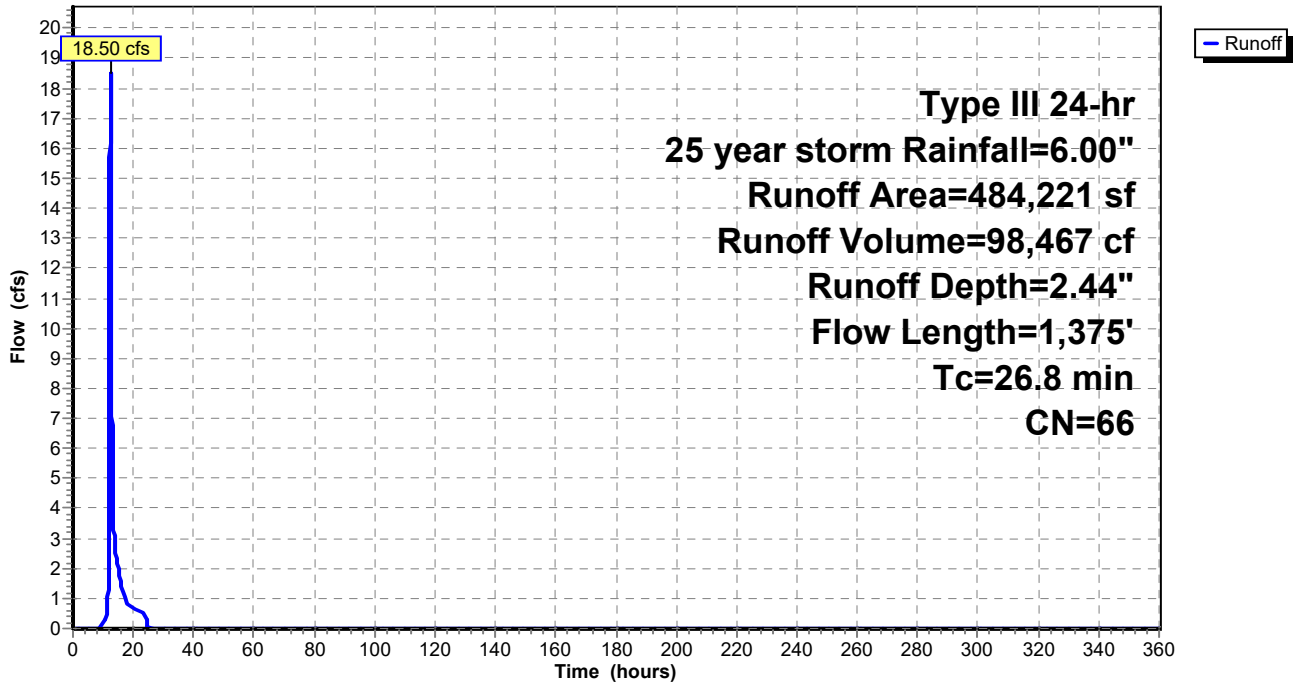
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
95,873	70	Woods, Good, HSG C
214,670	55	Woods, Good, HSG B
43,293	74	>75% Grass cover, Good, HSG C
69,274	61	>75% Grass cover, Good, HSG B
1,614	89	Gravel roads, HSG C
1,432	85	Gravel roads, HSG B
1,615	87	Dirt roads, HSG C
54,850	98	Paved parking & roofs
1,600	98	Water Surface
484,221	66	Weighted Average
427,771		88.34% Pervious Area
56,450		11.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	138	0.0870	4.75		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.0	12	0.0417	4.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.1	554	0.0740	4.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.1	24	0.0500	5.27	4.14	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
3.0	394	0.0188	2.21		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	41	0.0073	2.02	1.58	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
0.3	112	0.0125	6.29	108.54	Trap/Vee/Rect Channel Flow, Brook Bot.W=10.00' D=1.50' Z= 1.0 ' / ' Top.W=13.00' n= 0.030 Stream, clean & straight
26.8	1,375	Total			

Subcatchment 20: Basin A5

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 9

Summary for Subcatchment 22: Roof lot 1

Runoff = 0.47 cfs @ 12.10 hrs, Volume= 1,748 cf, Depth= 5.76"

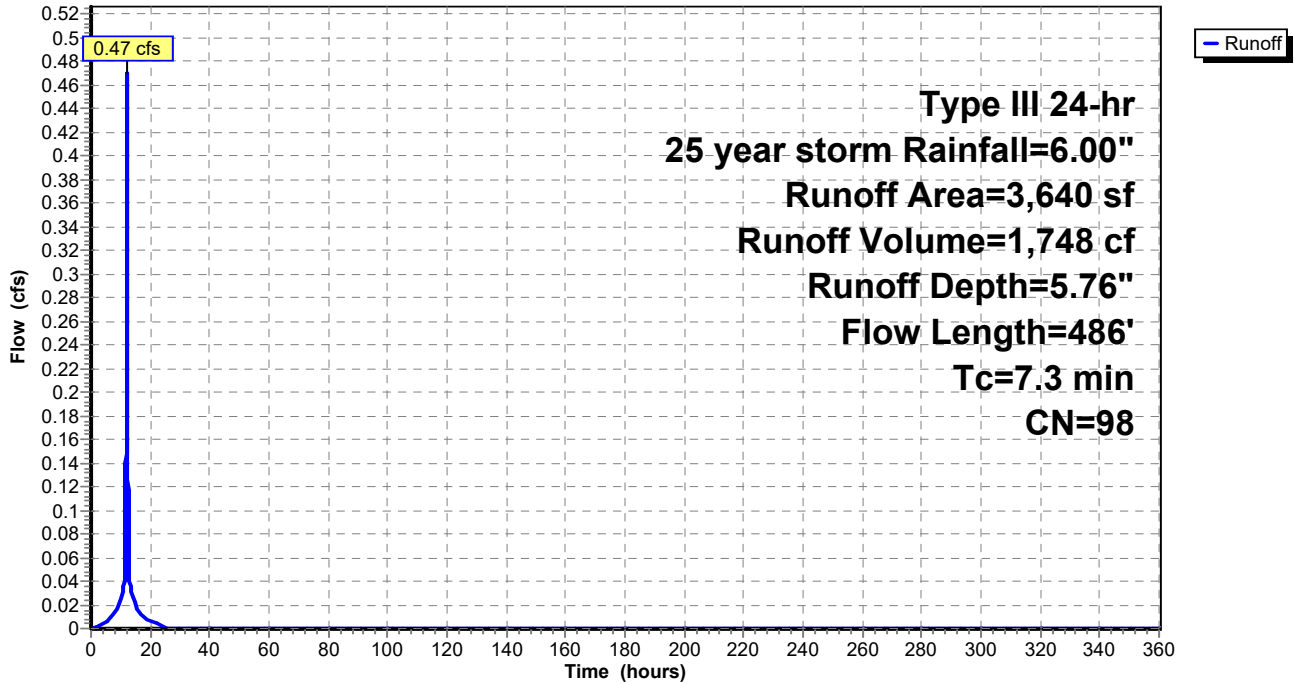
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 year storm Rainfall=6.00"

Area (sf)	CN	Description
* 3,640	98	Roof
3,640		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.0850	0.26		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.4	14	0.0357	0.56		Sheet Flow, Gravel n= 0.029 P2= 3.50"
2.8	46	0.0870	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.5	46	0.0435	1.46		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	247	0.0486	4.48		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	93	0.0161	6.68	8.20	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
7.3	486	Total			

Subcatchment 22: Roof lot 1

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 11

Summary for Pond 8: CB #5

Inflow Area = 13,720 sf, 46.54% Impervious, Inflow Depth = 4.20" for 25 year storm event
 Inflow = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf
 Outflow = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf

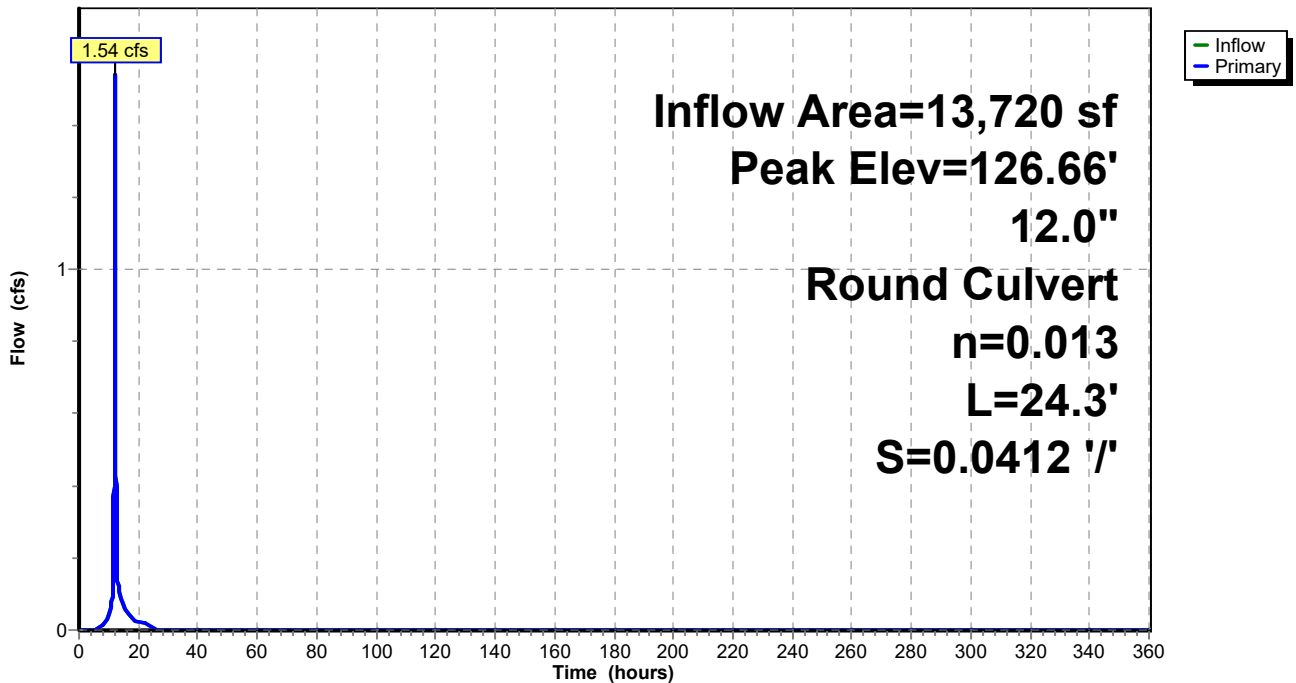
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 126.66' @ 12.08 hrs
 Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	126.00'	12.0" Round Culvert L= 24.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 126.00' / 125.00' S= 0.0412 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.53 cfs @ 12.08 hrs HW=126.66' TW=125.67' (Dynamic Tailwater)
 ↳ **1=Culvert** (Inlet Controls 1.53 cfs @ 2.77 fps)

Pond 8: CB #5

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 12

Summary for Pond 9: DMH #3

Inflow Area = 13,720 sf, 46.54% Impervious, Inflow Depth = 4.20" for 25 year storm event
Inflow = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf
Outflow = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.54 cfs @ 12.08 hrs, Volume= 4,798 cf

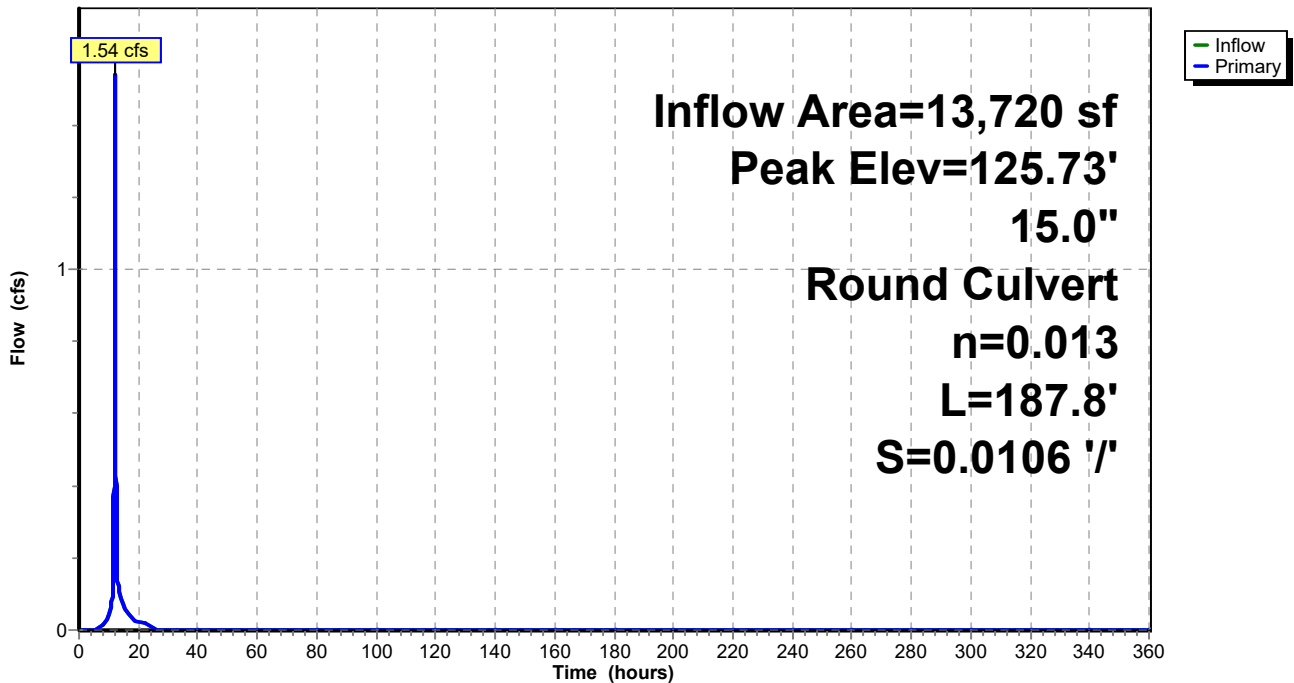
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.73' @ 12.13 hrs
Flood Elev= 130.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	15.0" Round Culvert L= 187.8' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 125.00' / 123.00' S= 0.0106 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.48 cfs @ 12.08 hrs HW=125.67' TW=124.57' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.48 cfs @ 3.21 fps)

Pond 9: DMH #3

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 13

Summary for Pond 11: CB #4

Inflow Area = 99,713 sf, 22.76% Impervious, Inflow Depth = 2.68" for 25 year storm event
Inflow = 6.25 cfs @ 12.12 hrs, Volume= 22,285 cf
Outflow = 6.25 cfs @ 12.12 hrs, Volume= 22,285 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.25 cfs @ 12.12 hrs, Volume= 22,285 cf

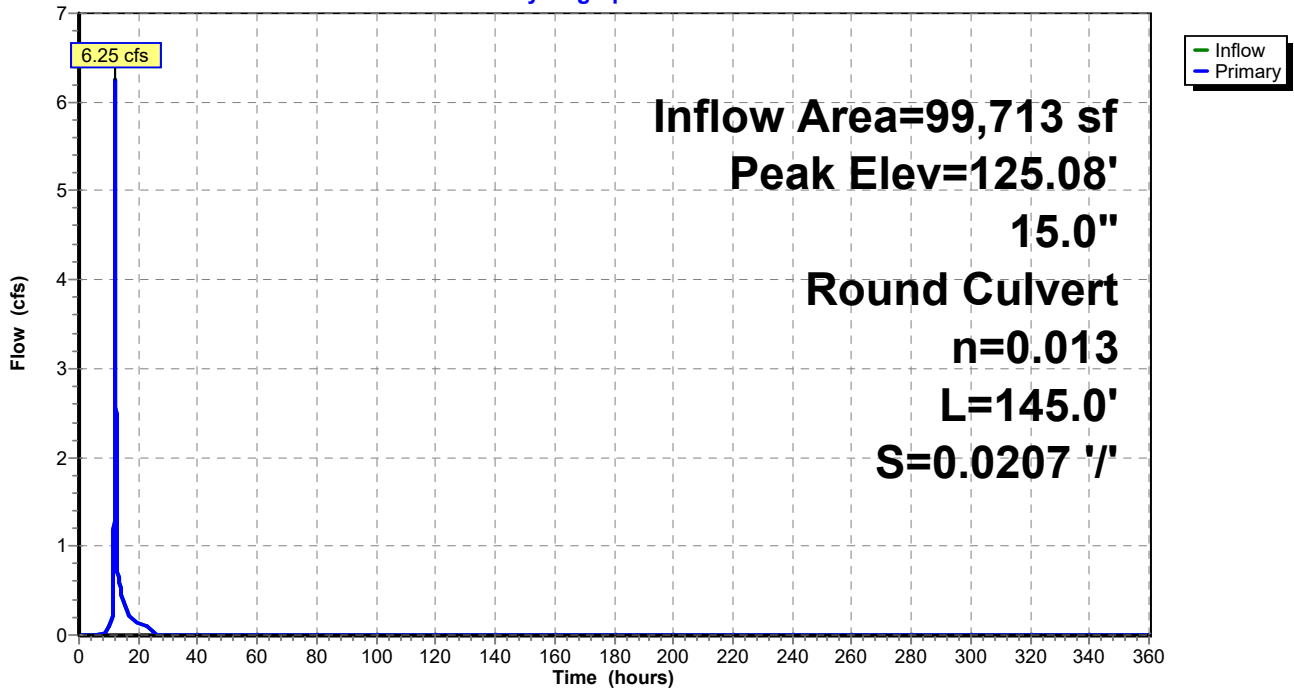
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 125.08' @ 12.13 hrs
Flood Elev= 130.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.00'	15.0" Round Culvert L= 145.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.00' / 120.00' S= 0.0207 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.25 cfs @ 12.12 hrs HW=125.06' TW=123.10' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 6.25 cfs @ 5.09 fps)

Pond 11: CB #4

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 14

Summary for Pond 13: CB #6

Inflow Area = 9,844 sf, 60.97% Impervious, Inflow Depth = 4.41" for 25 year storm event
Inflow = 1.20 cfs @ 12.07 hrs, Volume= 3,617 cf
Outflow = 1.20 cfs @ 12.07 hrs, Volume= 3,617 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.07 hrs, Volume= 3,617 cf

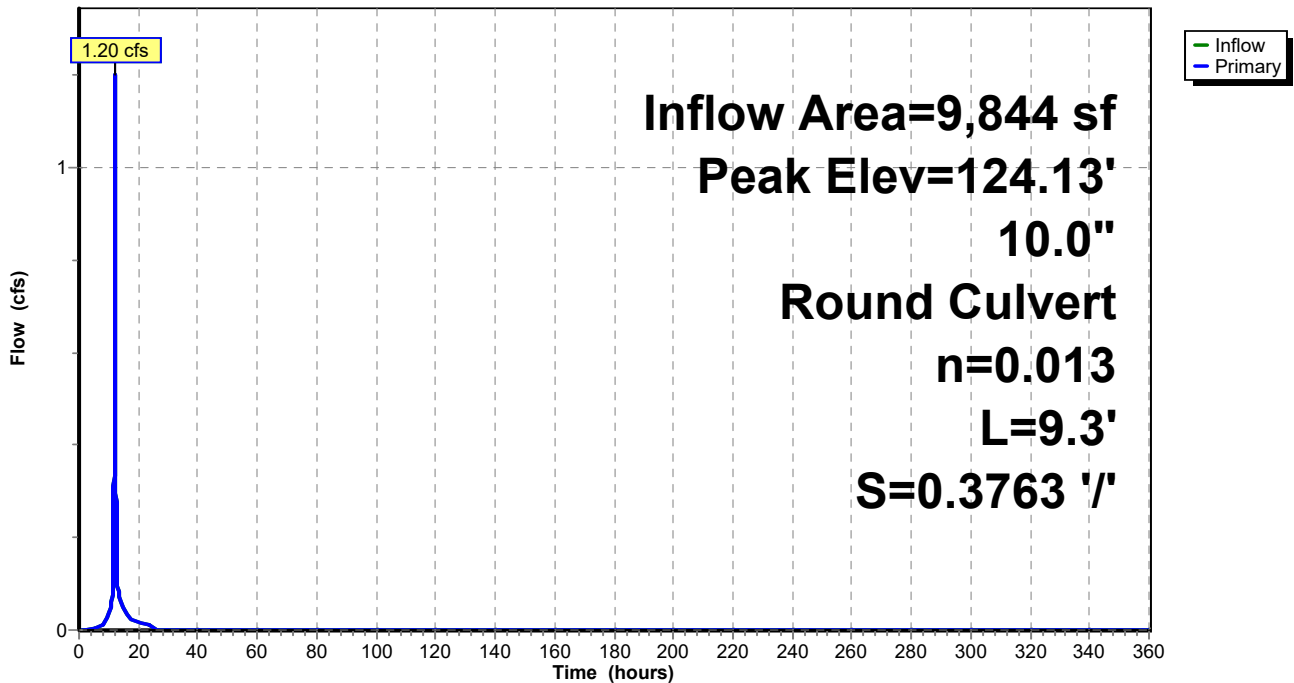
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 124.13' @ 12.07 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	123.50'	10.0" Round Culvert L= 9.3' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 123.50' / 120.00' S= 0.3763 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.20 cfs @ 12.07 hrs HW=124.13' TW=122.39' (Dynamic Tailwater)
↑1=Culvert (Inlet Controls 1.20 cfs @ 2.70 fps)

Pond 13: CB #6

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 15

Summary for Pond 14: DMH #1

Inflow Area = 109,557 sf, 26.19% Impervious, Inflow Depth = 2.84" for 25 year storm event
 Inflow = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf
 Outflow = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf, Atten= 0%, Lag= 0.0 min
 Primary = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf

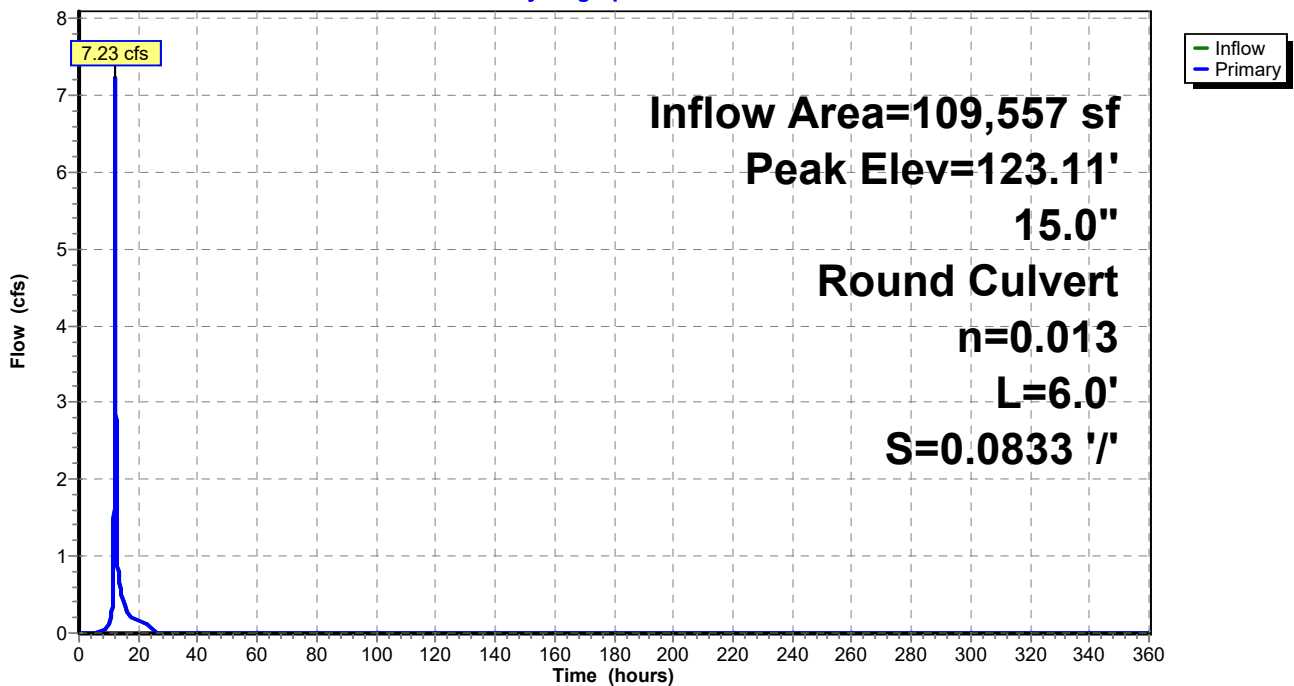
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 123.11' @ 12.12 hrs
 Flood Elev= 127.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	15.0" Round Culvert L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.50' S= 0.0833 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.19 cfs @ 12.11 hrs HW=123.10' TW=121.62' (Dynamic Tailwater)
 ↳ **1=Culvert** (Inlet Controls 7.19 cfs @ 5.86 fps)

Pond 14: DMH #1

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 16

Summary for Pond 15: CDS-2025

Inflow Area = 109,557 sf, 26.19% Impervious, Inflow Depth = 2.84" for 25 year storm event
Inflow = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf
Outflow = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf

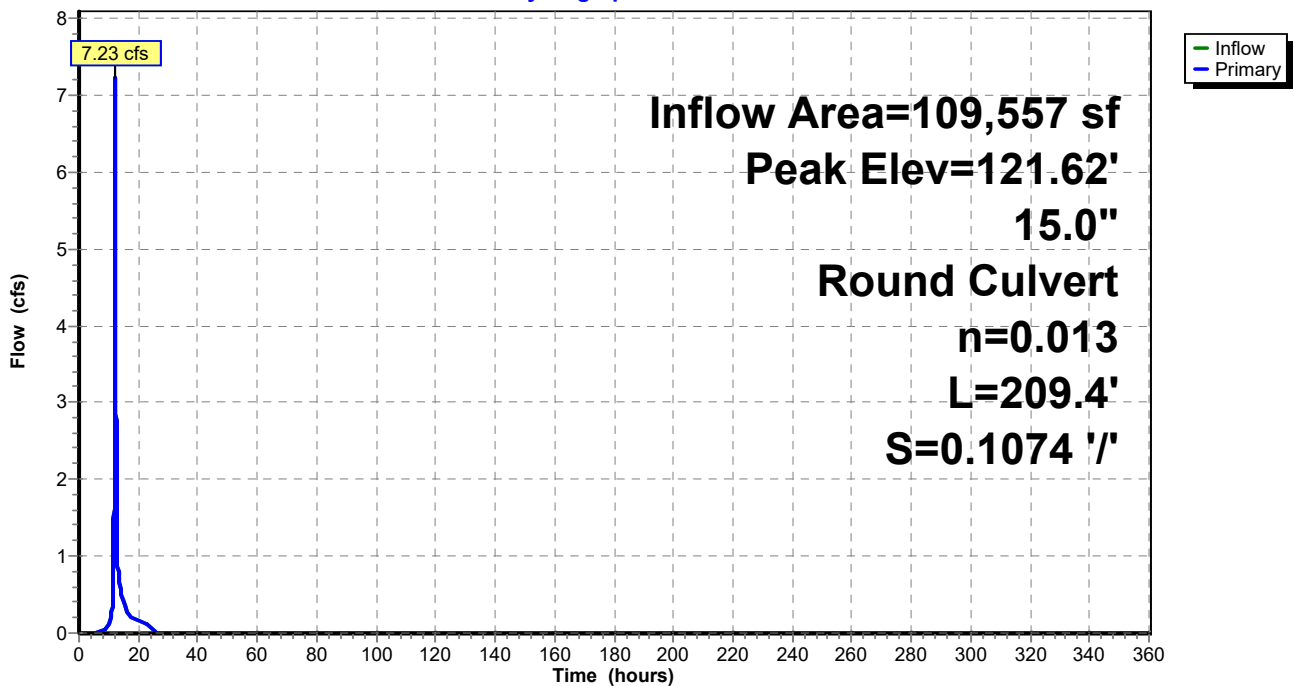
Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
Peak Elev= 121.62' @ 12.11 hrs
Flood Elev= 126.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	15.0" Round Culvert L= 209.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.50' / 97.00' S= 0.1074 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.22 cfs @ 12.11 hrs HW=121.62' TW=98.06' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 7.22 cfs @ 5.89 fps)

Pond 15: CDS-2025

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 17

Summary for Pond 16: DMH #2

Inflow Area = 109,557 sf, 26.19% Impervious, Inflow Depth = 2.84" for 25 year storm event
 Inflow = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf
 Outflow = 7.23 cfs @ 12.11 hrs, Volume= 25,902 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.35 cfs @ 11.77 hrs, Volume= 11,398 cf
 Secondary = 5.97 cfs @ 12.11 hrs, Volume= 14,504 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 98.06' @ 12.11 hrs
 Flood Elev= 100.00'

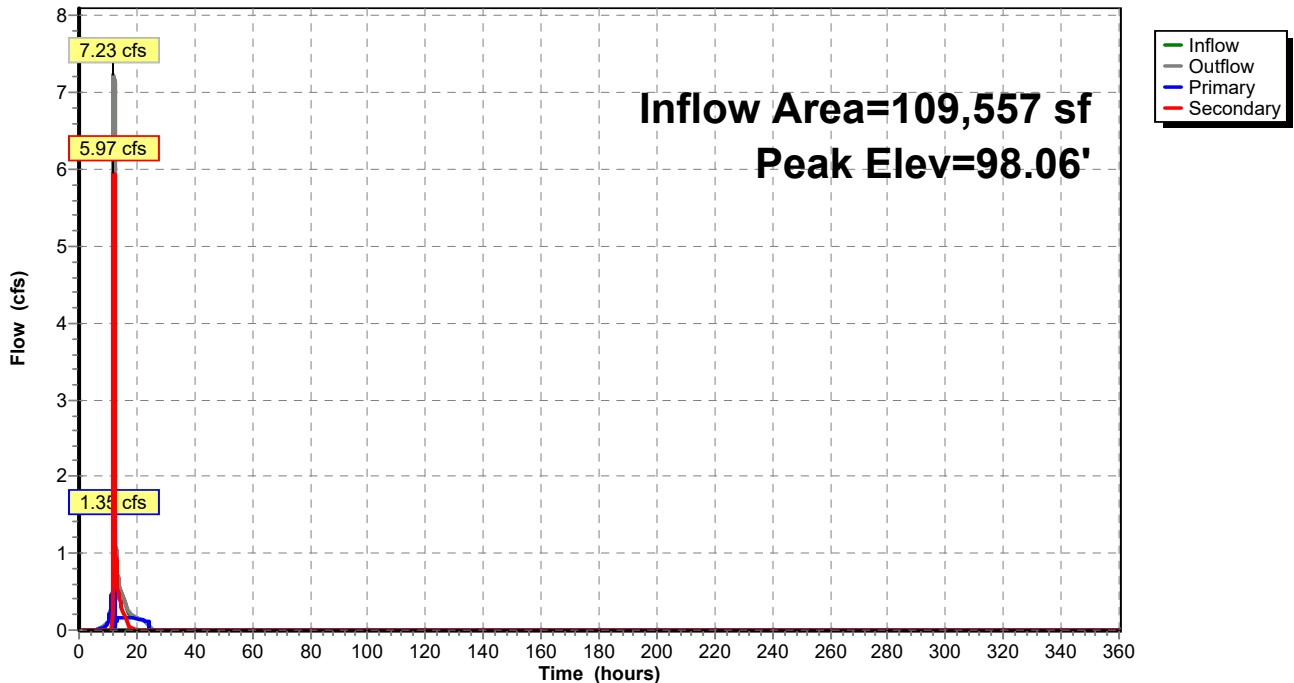
Device	Routing	Invert	Outlet Devices
#1	Primary	94.50'	6.0" Round Culvert L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 94.50' / 94.50' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	97.00'	24.0" Round Culvert L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.00' / 94.00' S= 0.0370 ' S= 0.0370 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.34 cfs @ 11.77 hrs HW=97.14' TW=95.14' (Dynamic Tailwater)
 ↳1=Culvert (Inlet Controls 1.34 cfs @ 6.82 fps)

Secondary OutFlow Max=5.96 cfs @ 12.11 hrs HW=98.06' TW=0.00' (Dynamic Tailwater)
 ↳2=Culvert (Inlet Controls 5.96 cfs @ 3.51 fps)

Pond 16: DMH #2

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 18

Summary for Pond 17: Infiltration System #3

Inflow Area = 109,557 sf, 26.19% Impervious, Inflow Depth = 1.25" for 25 year storm event
 Inflow = 1.35 cfs @ 11.77 hrs, Volume= 11,398 cf
 Outflow = 0.17 cfs @ 10.80 hrs, Volume= 11,400 cf, Atten= 88%, Lag= 0.0 min
 Discarded = 0.17 cfs @ 10.80 hrs, Volume= 11,400 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Peak Elev= 97.51' @ 12.56 hrs Surf.Area= 1,548 sf Storage= 3,424 cf
 Flood Elev= 98.00' Surf.Area= 1,548 sf Storage= 3,729 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 226.7 min (1,127.5 - 900.7)

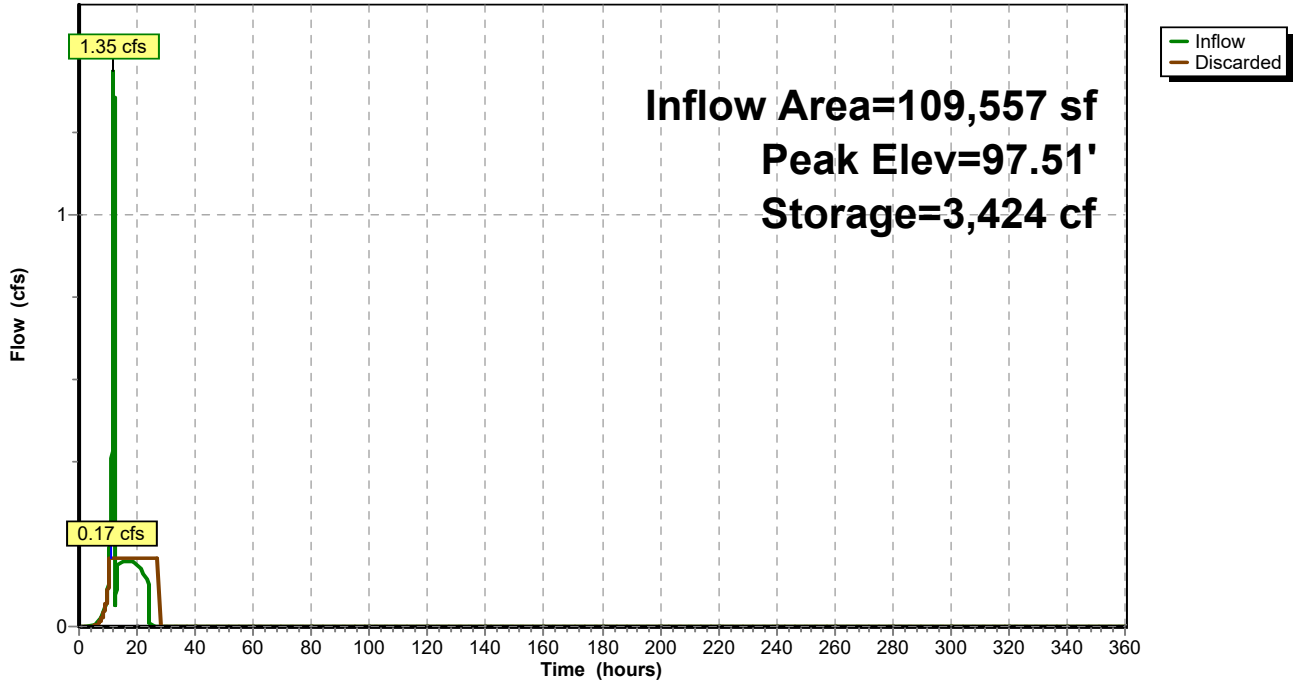
Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	1,642 cf	21.50'W x 72.00'L x 4.00'H Prismatic 6,192 cf Overall - 2,086 cf Embedded = 4,106 cf x 40.0% Voids
#2	94.50'	2,086 cf	Cultec R-330XLHD x 40 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		3,729 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	94.00'	4.680 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.17 cfs @ 10.80 hrs HW=94.04' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.17 cfs)

Pond 17: Infiltration System #3

Hydrograph



Overall Watershed Analysis 5-16-22

Type III 24-hr 25 year storm Rainfall=6.00"

Prepared by Bibbo Associates

Printed 6/27/2022

HydroCAD® 10.00-20 s/n 02226 © 2017 HydroCAD Software Solutions LLC

Page 20

Summary for Pond 19: Pocket Pond

Inflow Area = 55,030 sf, 34.31% Impervious, Inflow Depth = 3.09" for 25 year storm event
 Inflow = 4.47 cfs @ 12.09 hrs, Volume= 14,162 cf
 Outflow = 4.30 cfs @ 12.11 hrs, Volume= 14,161 cf, Atten= 4%, Lag= 1.4 min
 Primary = 4.30 cfs @ 12.11 hrs, Volume= 14,161 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs
 Starting Elev= 136.50' Surf.Area= 1,107 sf Storage= 1,300 cf
 Peak Elev= 138.22' @ 12.11 hrs Surf.Area= 2,390 sf Storage= 4,311 cf (3,011 cf above start)
 Flood Elev= 140.00' Surf.Area= 2,857 sf Storage= 6,364 cf (5,064 cf above start)

Plug-Flow detention time= 548.2 min calculated for 12,860 cf (91% of inflow)
 Center-of-Mass det. time= 445.3 min (1,270.2 - 824.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	134.00'	6,364 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
134.00	95	71.9	0	0	95	
135.00	386	122.6	224	224	886	
136.00	829	172.5	594	818	2,067	
136.50	1,107	197.3	482	1,300	2,802	
137.00	1,455	224.9	639	1,939	3,736	
137.50	1,803	238.1	813	2,752	4,236	
137.60	2,049	177.8	192	2,944	6,231	
138.00	2,268	186.3	863	3,807	6,488	
139.00	2,857	206.5	2,557	6,364	7,150	

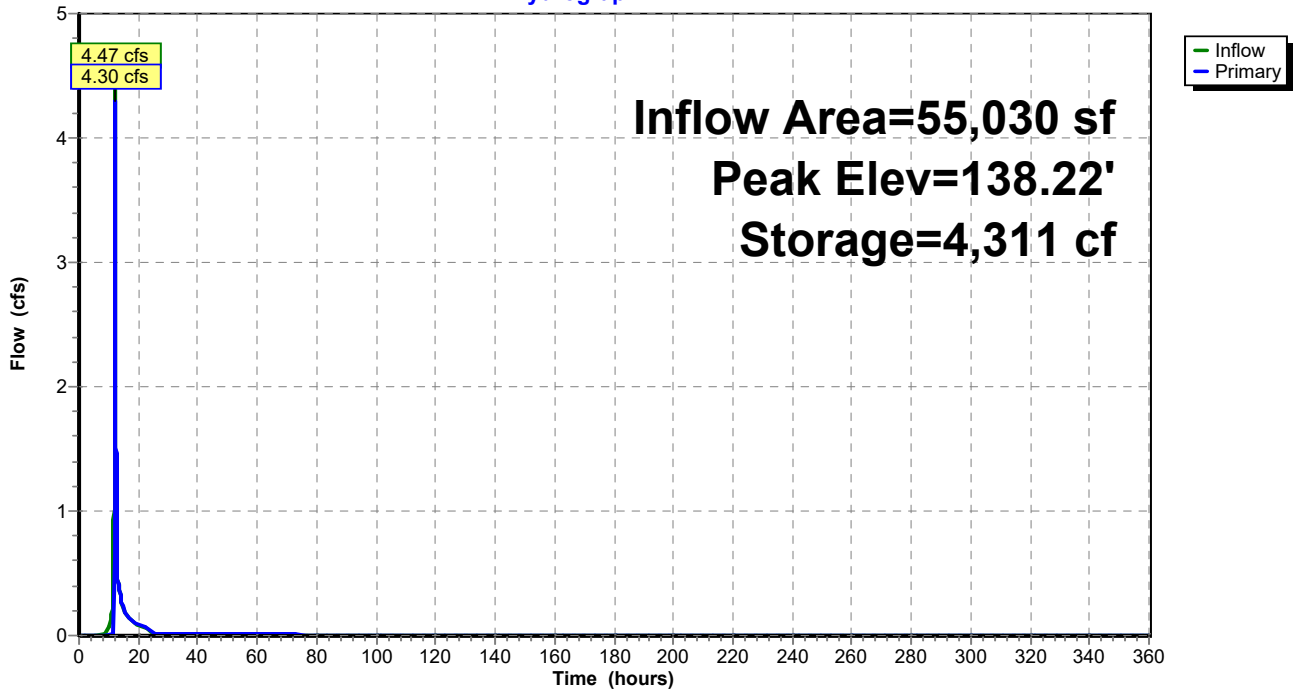
Device	Routing	Invert	Outlet Devices
#1	Primary	136.50'	15.0" Round Culvert L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.50' / 134.00' S= 0.0373 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	136.50'	0.7" Vert. Orifice/Grate C= 0.600
#3	Device 1	138.00'	48.0" x 30.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.29 cfs @ 12.11 hrs HW=138.22' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 4.29 cfs of 6.17 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.02 cfs @ 6.25 fps)
- 3=Orifice/Grate (Weir Controls 4.27 cfs @ 1.52 fps)

Pond 19: Pocket Pond

Hydrograph



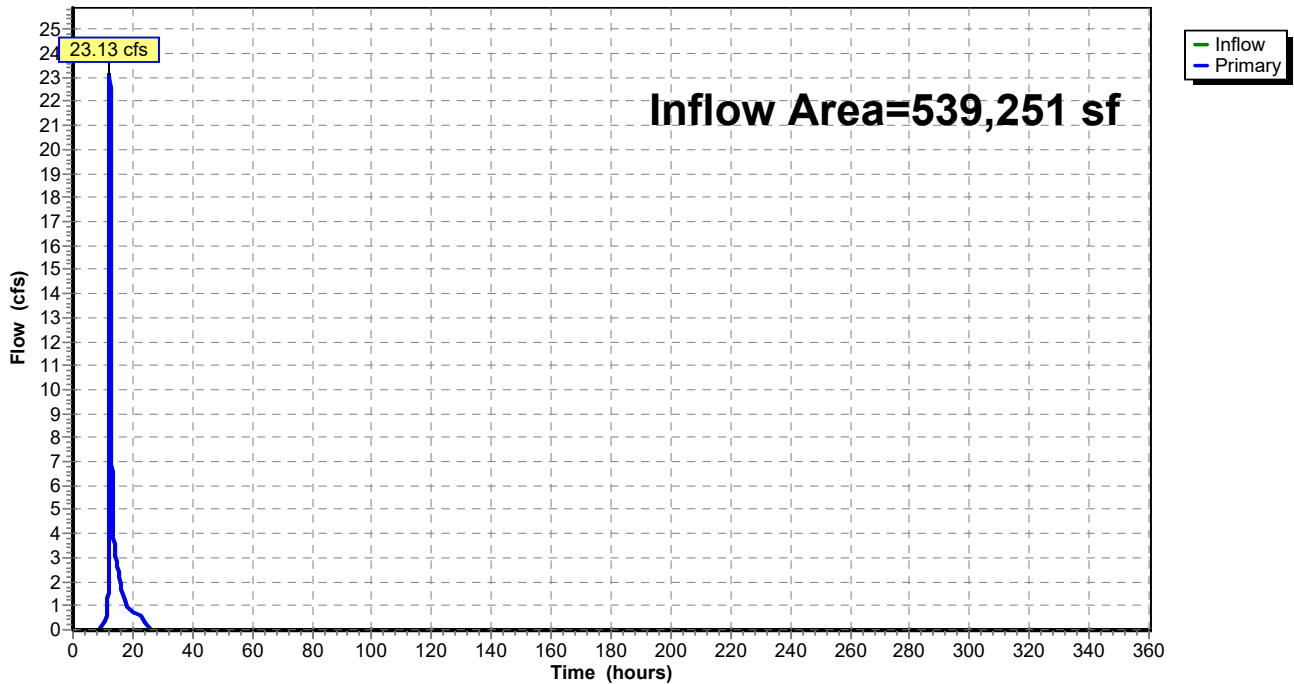
Summary for Link 21: Post-Design Point A

Inflow Area = 539,251 sf, 13.97% Impervious, Inflow Depth = 2.83" for 25 year storm event
Inflow = 23.13 cfs @ 12.36 hrs, Volume= 127,131 cf
Primary = 23.13 cfs @ 12.36 hrs, Volume= 127,131 cf, Atten= 0%, Lag= 0.0 min

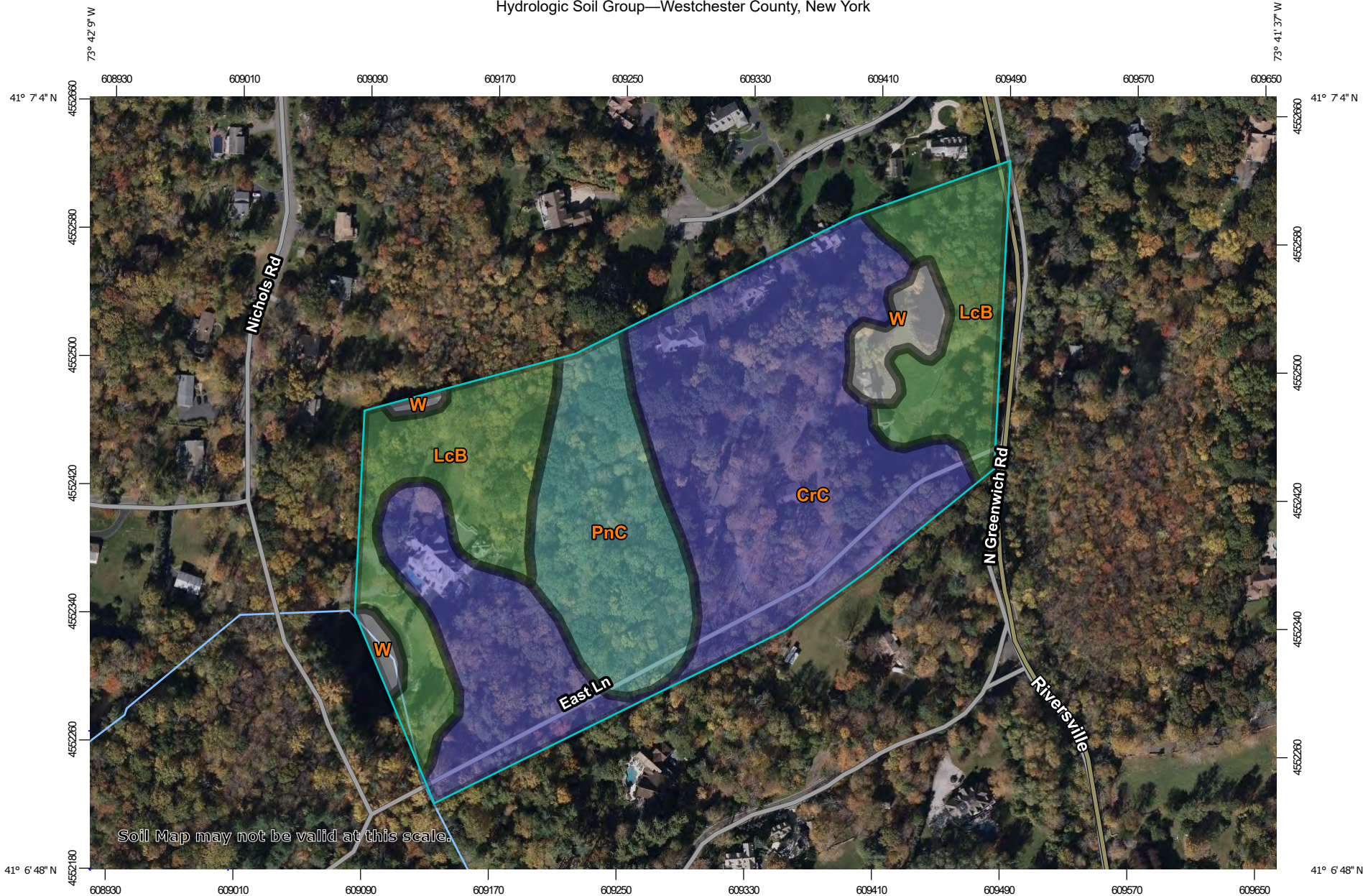
Primary outflow = Inflow, Time Span= 0.00-360.00 hrs, dt= 0.01 hrs

Link 21: Post-Design Point A

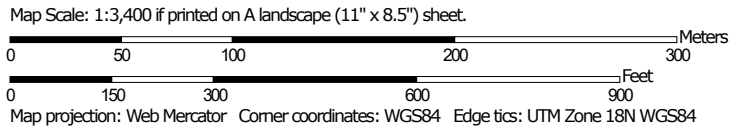
Hydrograph



Hydrologic Soil Group—Westchester County, New York



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines

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

Soil Rating Points


-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: Westchester County, New York
 Survey Area Data: Version 17, Sep 1, 2021

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

Date(s) aerial images were photographed: Oct 4, 2020—Oct 31, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CrC	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	11.8	51.9%
LcB	Leicester loam, 3 to 8 percent slopes, stony	A/D	6.0	26.3%
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.9	17.2%
W	Water		1.0	4.6%
Totals for Area of Interest			22.7	100.0%

Description

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

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

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

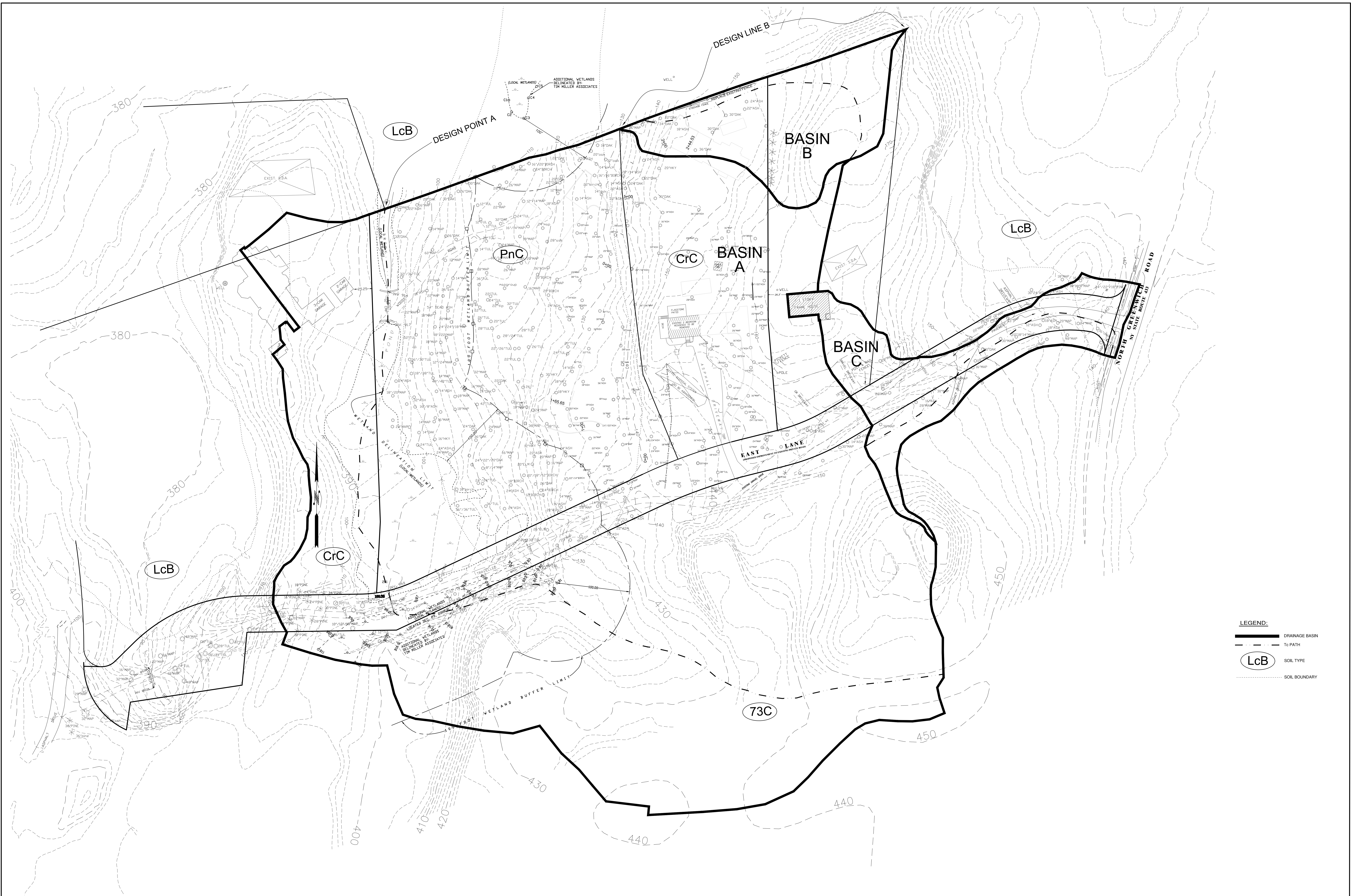
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



LEGEND:

- DRAINAGE BASIN
- TO PATH
- SOIL TYPE
- SOIL BOUNDARY

LEGEND:

- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- EXISTING STONE WALL
- WETLAND BOUNDARY
- 100' WETLAND SETBACK
- EXISTING TREE

PLAN
GRAPHIC SCALE

DATE	DESCRIPTION	BY/CK	DATE	DESCRIPTION	BY/CK

PRE DEVELOPMENT DRAINAGE BASIN PLAN		DATE: 6-6-2022
IREP-CG EAST LANE LLC		SCALE: 1" = 40'
# 8 EAST LANE	TOWN OF NORTH CASTLE, WESTCHESTER COUNTY, NY	FILE: ---
		DSGN: NG
		CHK: NG
		DRN. BY: AW
		SHT NO. FIGURE 1
		DWG NO. PRE

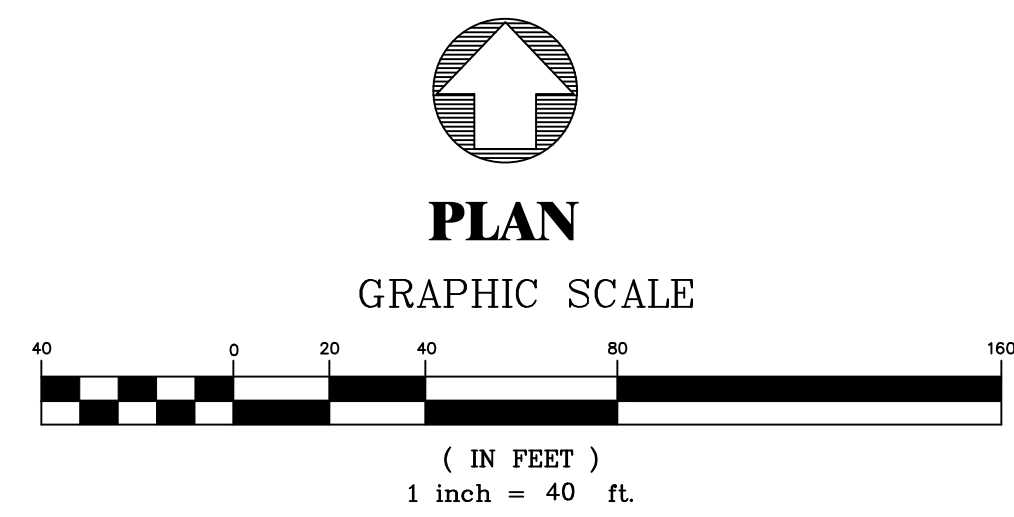
B **BIBBO ASSOCIATES, LLP**
280 ROUTE 100 SUITE 203
SOMERS, NEW YORK 10589
TEL: 914.277.6865

UNAUTHORIZED ALTERATIONS AND ADDITIONS TO THIS DRAWING IS A VIOLATION OF SECTION 2209 (2) OF THE NEW YORK STATE ELECTION LAW.



- LEGEND:**
- - - - - EXISTING 2' CONTOUR
 - - - - - EXISTING 10' CONTOUR
 - ⊘ EXISTING STONE WALL
 - ▭ PROP. RESIDENCE W/ DRIVEWAY
 - ▭ PROPOSED EASEMENT LINE
 - ▭ PROP. SDA
 - ⊙ PROP. WELL
 - ⊙ PERCOLATION TEST
 - ⊙ DEEP TEST
 - - - - - WETLAND BOUNDARY
 - - - - - 100' WETLAND SETBACK
 - ▭ PROPOSED LOT LINE
 - ⊙ EXISTING TREE
 - ⊙ EXISTING TREE TO BE REMOVED
- DEVELOPMENT PLAN LEGEND:**
- - - - - PROPOSED 2' CONTOUR
 - - - - - PROPOSED 10' CONTOUR
 - ▭ PROPOSED COMMON DRIVEWAY & DRIVEWAYS ASPHALT CURBING
 - ▭ PROPOSED CATCH BASIN
 - - - - - PROPOSED FOOTING DRAIN
 - - - - - PROPOSED STORM DRAIN PIPING
 - ▭ PROPOSED LEVEL SPREADER

- LEGEND:**
- ▭ DRAINAGE BASIN
 - - - - - T.O. PATH
 - - - - - SOIL BOUNDARY
 - ⊙ LcB SOIL TYPE



DATE	DESCRIPTION	BY/CHK	DATE	DESCRIPTION	BY/CHK
5-6-2022	POST DEVELOPMENT DRAINAGE BASIN PLAN				
POST DEVELOPMENT DRAINAGE BASIN PLAN					
IREP-CG EAST LANE LLC					
# 8 EAST LANE TOWN OF NORTH CASTLE, WESTCHESTER COUNTY, NY					
DATE	5-6-2022	SCALE	1" = 40'	FILE	---
DSGN/CHK	NG	DRN BY	AW	SHT NO.	FIGURE 2
DWG NO.	POST	BIBBO ASSOCIATES, LLP 293 ROUTE 100 SUITE 203 SOMERS, NEW YORK 10589 TEL. 914 277 5805			

UNAUTHORIZED ALTERATIONS AND ADJUSTMENTS TO THIS DRAWING ARE PROHIBITED. THE PROFESSIONAL ENGINEER'S SEAL AND SIGNATURE ARE REQUIRED FOR ANY CHANGES TO THIS DRAWING. ALL RIGHTS RESERVED BY BIBBO ASSOCIATES, LLP.

Short Environmental Assessment Form

Part 1 - Project Information

Instructions for Completing

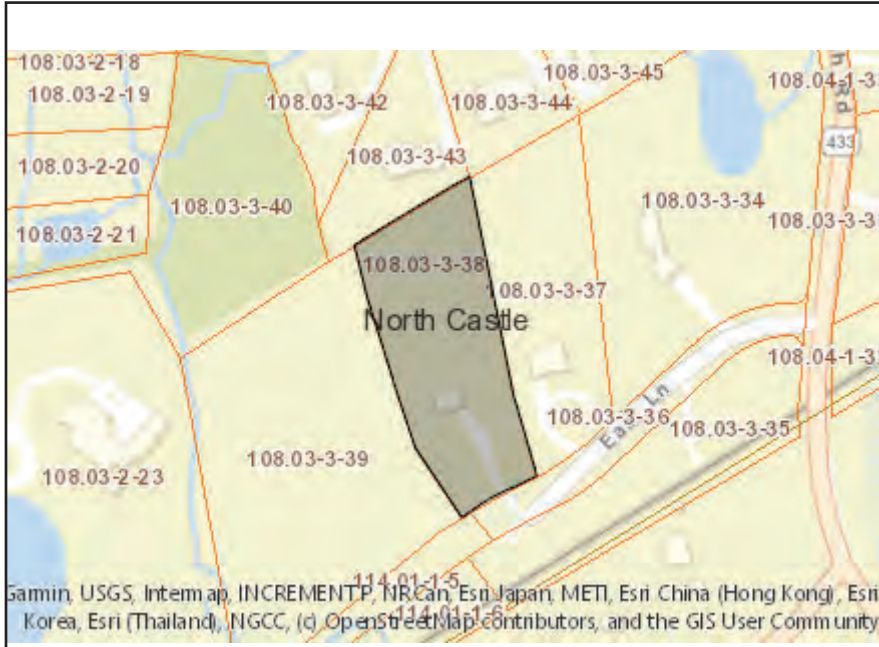
Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information			
Name of Action or Project: IREP-CG EAST LANE LLC			
Project Location (describe, and attach a location map): 8 East Lane, Town of North Castle, NY			
Brief Description of Proposed Action: The Applicant is proposing to construct an approved subdivision and construct a single family residence.			
Name of Applicant or Sponsor: IREP-CG EAST LANE LLC, C/O Greg Altshuler		Telephone: 917-575-8532	
Address: 37 CROSBY STREET, 4A		E-Mail:	
City/PO: NEW YORK		State: NY	Zip Code: 10013
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.			NO <input type="checkbox"/>
			YES <input checked="" type="checkbox"/>
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: Town of North Castle: Wetland, Tree Removal Permit, and Planning Board Approval			NO <input type="checkbox"/>
			YES <input checked="" type="checkbox"/>
3. a. Total acreage of the site of the proposed action?		1.055 acres	
b. Total acreage to be physically disturbed?		2.9 acres	
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor?		8.2 acres	
4. Check all land uses that occur on, are adjoining or near the proposed action:			
5. <input type="checkbox"/> Urban <input type="checkbox"/> Rural (non-agriculture) <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Residential (suburban)			
<input checked="" type="checkbox"/> Forest <input type="checkbox"/> Agriculture <input type="checkbox"/> Aquatic <input type="checkbox"/> Other(Specify):			
<input type="checkbox"/> Parkland			

5. Is the proposed action,	NO	YES	N/A
a. A permitted use under the zoning regulations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Consistent with the adopted comprehensive plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	NO <input type="checkbox"/>	YES <input checked="" type="checkbox"/>	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>	
8. a. Will the proposed action result in a substantial increase in traffic above present levels? b. Are public transportation services available at or near the site of the proposed action? c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	NO <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	YES <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____ _____	NO <input type="checkbox"/>	YES <input checked="" type="checkbox"/>	
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____ Propose Drilled Well _____	NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>	
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____ Proposed OWTS _____	NO <input checked="" type="checkbox"/>	YES <input type="checkbox"/>	
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places? b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	NO <input checked="" type="checkbox"/> <input type="checkbox"/>	YES <input type="checkbox"/> <input checked="" type="checkbox"/>	
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency? b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ _____ _____	NO <input type="checkbox"/> <input checked="" type="checkbox"/>	YES <input checked="" type="checkbox"/> <input type="checkbox"/>	

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply: <input type="checkbox"/> Shoreline <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Agricultural/grasslands <input type="checkbox"/> Early mid-successional <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Urban <input checked="" type="checkbox"/> Suburban		
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Is the project site located in the 100-year flood plan?	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes,	NO	YES
a. Will storm water discharges flow to adjacent properties?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Yes, briefly describe: _____ _____		
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment: Proposed Stormwater basin for WQv treatment.	NO	YES
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe:	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe:	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE		
Applicant/sponsor/name: <u>Nicholas Gaboury, P.E. - sponsor</u> Date: <u>6/27/2022</u>		
Signature: <u></u> Title: <u>Project Engineer</u>		



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.



Part 1 / Question 7 [Critical Environmental Area]	No
Part 1 / Question 12a [National or State Register of Historic Places or State Eligible Sites]	No
Part 1 / Question 12b [Archeological Sites]	Yes
Part 1 / Question 13a [Wetlands or Other Regulated Waterbodies]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
Part 1 / Question 15 [Threatened or Endangered Animal]	No
Part 1 / Question 16 [100 Year Flood Plain]	No
Part 1 / Question 20 [Remediation Site]	No



Turet Subdivision - East Lane

Construction Cost Estimate for Public Improvements, Roadway and Associated Drainage

Item #	Description	Quantity	Unit	Unit Cost	Total Cost
1	Clear/Grub	1.12	Ac.	\$6,000.00	\$6,720
	Subtotal				\$6,720
2	Strip/Stockpile Topsoil	903	CY	\$3.00	\$2,709
	Subtotal				\$2,709
3	Site Prep / Earthwork				
	Earthwork (Cut as Fill-with compaction)	236	CY	\$6.00	\$1,416
	Earthwork (Excess Cut)	694	CY	\$6.00	\$4,164
	Subtotal				\$5,580
4	Site Road Pavement				
	12" Foundation Course (Item 304.05)	1,439	CY	\$40.00	\$57,560
	4" Binder Course (Item 403.13)	390.0	Tons	\$150.00	\$58,500
	2.5" Wearing Course (Item 403.16)	245.0	Tons	\$150.00	\$36,750
	Concrete Curb	1,392	LF	\$23.00	\$32,016
	Subtotal				\$184,826
5	Drainage				
	Catch Basins	3	Ea.	\$3,500.00	\$10,500
	15" HDPE	275	LF	\$31.00	\$8,525
	15" HDPE End Sections	3	Ea.	\$270.00	\$810
	Concrete Trench Drain	1	Ea.	\$8,000.00	\$8,000
	Pocket Pond (w/ outlet structure)	1	LS	\$30,000.00	\$30,000
	Rip-Rap Outlet Protection	5	CY	\$35.00	\$175
	Drainage Swale at North Greenwich Road	180	LF	\$35.00	\$6,300
	Subtotal				\$64,310
6	Landscaping / Ground Cover				
	Spread 4" Topsoil, Seed & Mulch	250	CY	\$4.00	\$1,000
	Subtotal				\$1,000
7	Miscellaneous				
	Removal and disposal of existing drive (East Ln)	8,350	SF	\$1.50	\$12,525
	Removal of 4 existing utility poles and overhead service	4	Ea.	\$3,000.00	\$12,000
	Relocation of 1 utility pole and reconnection of services	1	Ea.	\$5,000.00	\$5,000
	Underground utility trench and service	885	LF	\$30.00	\$26,550
	Reconstruction/restoration of 3 existing driveways	3	Ea.	\$3,000.00	\$9,000
	Subtotal				\$65,075
	Sub Total (1+2+3+4+5+6+7)				\$330,220
	Erosion Control			3%	\$9,907
	Contingency			10%	\$33,022
	Sub Total				\$373,149
	Grand Total				\$373,149



Turet Subdivision - East Lane

Construction Cost Estimate for Common Driveway and Associated Drainage

Item #	Description	Quantity	Unit	Unit Cost	Total Cost
1	Clear/Grub	0.5	Ac.	\$6,000.00	\$3,000
	Subtotal				\$3,000
2	Strip/Stockpile Topsoil	367	CY	\$3.00	\$1,101
	Subtotal				\$1,101
3	Site Prep / Earthwork				
	Earthwork (Cut as Fill-with compaction)	40	CY	\$6.00	\$240
	Earthwork (Excess Cut)	209	CY	\$6.00	\$1,254
	Subtotal				\$1,494
4	Common Drive Pavement				
	6" Foundation Course (Item 304.05)	88	CY	\$40.00	\$3,520
	2" Binder Course (Item 403.13)	61.3	Tons	\$150.00	\$9,195
	1" Wearing Course (Item 403.16)	30.8	Tons	\$150.00	\$4,620
	Asphalt Curb	310	LF	\$23.00	\$7,130
	Subtotal				\$24,465
5	Drainage				
	Catch Basins	2	Ea.	\$3,500.00	\$7,000
	Drainage Manholes	2	Ea.	\$3,700.00	\$7,400
	Contech CDS-2025	1	Ea.	\$22,000.00	\$22,000
	15" HDPE	369	LF	\$31.00	\$11,439
	24" HDPE	34	LF	\$45.00	\$1,530
	Infiltrator System (40 units @ 7.00 LF ea)	280	LF	\$130.00	\$36,400.00
	24" HDPE End Section	1	Ea.	\$350.00	\$350
	Rip-Rap Outlet Protection	6	CY	\$35.00	\$210
	Subtotal				\$86,329
6	Landscaping / Ground Cover				
	Spread 4" Topsoil, Seed & Mulch	250	CY	\$4.00	\$1,000
	Subtotal				\$1,000
	Sub Total (1+2+3+4+5+6)				\$117,389
	Erosion Control			3%	\$3,522
	Contingency			10%	\$11,739
	Sub Total				\$132,650
	Grand Total				\$132,650



Turet Subdivision - East Lane

Cost Estimate for Wetland Mitigation

Item #	Description	Quantity	Unit	Unit Cost	Total Cost
1	Seed Mixes				
	Ernst Riparian Buffer Seed Mix	5	LB	\$33.86	\$169
	Ernst Partially Shaded Area Roadside Seed Mix	5	LB	\$32.30	\$162
	Subtotal				\$331
2	Wetland Plantings				
	Mountain Laurel (<i>Kalmia Latifolia</i>)	21	Ea.	\$75.00	\$1,575
	Witch Hazel (<i>Hamamelis Virginiana</i>)	14	Ea.	\$75.00	\$1,050
	Spicebush (<i>Lindera Benzoin</i>)	17	Ea.	\$90.00	\$1,530
	Hornbeam (<i>Carpinus Caroliana</i>)	3	Ea.	\$150.00	\$450
	Nannyberry (<i>Viburnum Lentago</i>)	7	Ea.	\$90.00	\$630
	Shadbush (<i>Amelanchier Candensis</i>)	3	Ea.	\$90.00	\$270
	Sub Total				\$5,505
3	Miscellaneous				
	Soil scarifying & top soil restoration/mitigation areas	165	CY	\$4.00	\$660
	Norway Spruce (<i>Picea Abies</i>)	20	Ea.	\$250.00	\$5,000
	Survey monuments	9	Ea.	\$2,000.00	\$18,000
	Subtotal				\$23,660
	Subtotal (1+2+3)				\$29,496
	Long Term Monitoring & Maintenance			15%	\$4,424
	Sub Total				\$33,920
	Contingency			10%	\$3,392
	Grand Total				\$37,312