DESIGNING ENVIRONMENTS
2201 North Front Street, Suite 200 :: Harrisburg, PA 17110
717.635.2835 :: www.kandwengineers.com

November 7, 2022

Susquehanna Township
ATTN: Betsy Logan, Community & Economic Development Director
1900 Linglestown Road
Harrisburg, PA 17110

Re: Preliminary Land Development Plan
Cherry Orchard Place
K&W Project No. 2344.001

Dear Ms. Logan:

On behalf of the applicant, Inch's Properties, LLC, please accept this plan submission package regarding the above-referenced project for your review and consideration. The project consists of the construction of a 395-unit multifamily residential development consisting of 252 apartment units, 143 townhouse units, a community building with associated parking, stormwater management and landscape improvements.

The Preliminary Land Development Plan application package consists of the following items:

• One (1) copy	Susquehanna Township Subdivision & Land Development Plan (LDP) Application
• One (1)	Application Fee Check payable to "Susquehanna Township" in the amount of $10,375
• One (1)	Escrow Fee Check payable to "Susquehanna Township" in the amount of $10,000
• One (1)	Planning Module Fee Check payable to "Susquehanna Township" in the amount of $25.00
• One (1)	Check payable to "Dauphin County Planning Commission" in the amount of $1,755.00
• Two (2) copies	Dauphin County Planning Department Application
• Twelve (12) copies	Preliminary Land Development Plans
• Three (3) copies	Post Construction Stormwater Management (PCSM) Report
• One (1)	Disk with Plans & Associated Submission Information

We respectfully request to be placed on the agenda for the next regularly scheduled Planning Commission meeting (which we understand will take place on November 28th) to present and discuss these plans. If you should have any questions or require any additional information regarding this submission, please do not hesitate to contact me. Thank you.

K&W

Jeffrey A. Shyk, RLA
Project Manager

CC: Joe Eisenhauer, Director of Acquisitions, Inch & Co., w/ submission via e-mail
Adam Whalen, P.E., Entitlements Manager, Inch & Co., w/ submission via e-mail

SUSQUEHANNA TOWNSHIP
1900 LINGLESTOWN ROAD HARRISBURG PA 17110

SUBDIVISION AND LAND DEVELOPMENT APPLICATION

Plan Name: Preliminary Land Development Plan for 1235 Martina Drive

Plan Location: Martina Drive & Elmerton Avenue & Kohn Road @ Route 81

☐ Residential Subdivision ☑ Land Development Plan

Number of Lots: 395 units Zoning Classification: B-O-R

Type of Application: ☑ Preliminary ☐ Final

Review Fee: Susquehanna Township: $20,375 Dauphin County: $1,755

Availability of Utilities:

Name of Water Company: Capital Region Water

Name of Electric Company: PPL Elect Utilities Corporation

Sewage – Please attach letter from Sewer Authority

Name of Developer: Inch's Properties, LLC

Address: 2950 Lewisberry Road, York, PA 17404

Phone: 717.755.1565

Name of Landowner: Capital Blue Cross

Address: 2500 Elmerton Avenue, Harrisburg, PA 17101

Phone:

Name of Engineer or Surveyor: K&W, LLC

Address: 2201 N. Front Street, Suite 200, Harrisburg, PA 17110

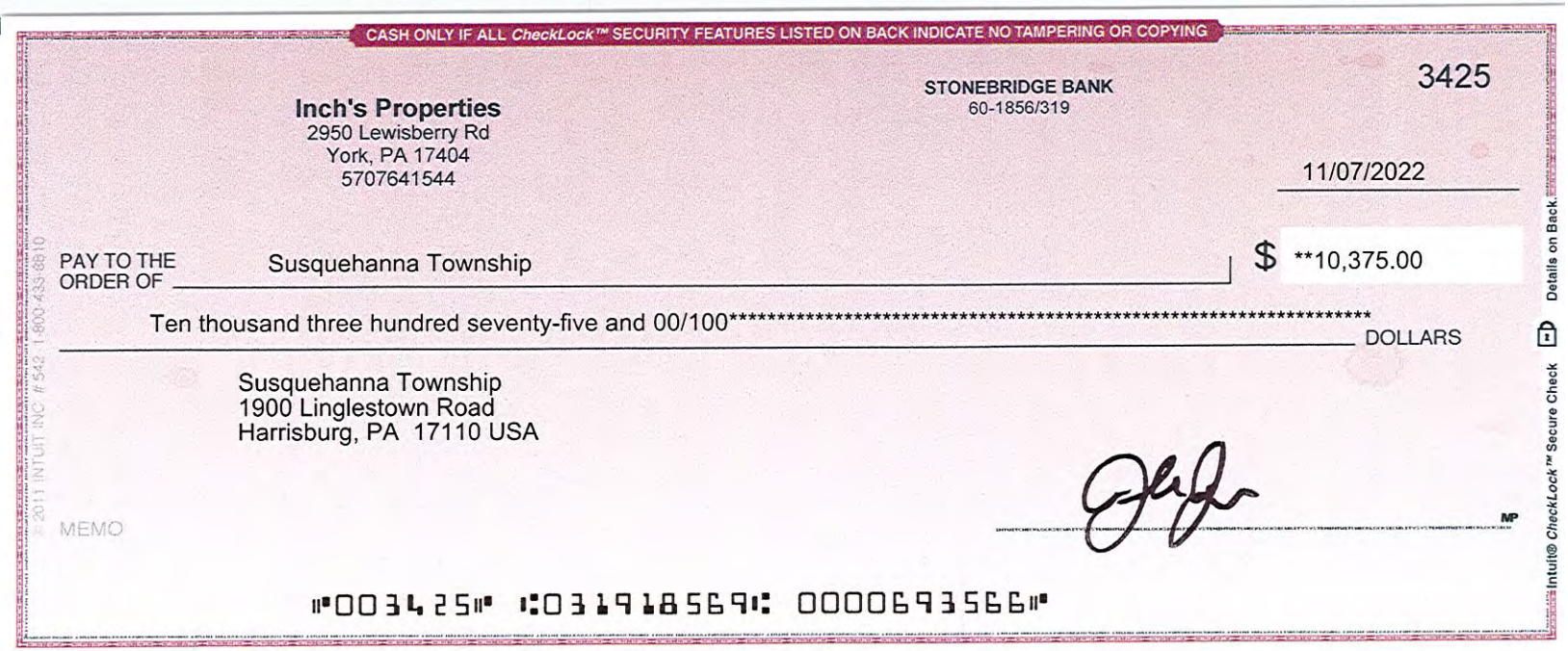
Phone: 717.635.2835

The undersigned represents that to the best of his knowledge and belief all of the above statements are true, correct, and complete.

Date: 11/7/22

Signature of Owner or Applicant:

NOTE:
The Planning Commission will accept a maximum of two, ninety day time extensions. Failure to complete a plan within this time period may result in the Planning Commission recommending disapproval of the plan.



CASH ONLY IF ALL *CheckLock*™ SECURITY FEATURES LISTED ON BACK INDICATE NO TAMPERING OR COPYING

Inch's Properties
2950 Lewisberry Rd
York, PA 17404
5707641544

STONEBRIDGE BANK
60-1856/319

3425

11/07/2022

PAY TO THE ORDER OF Susquehanna Township

$ **10,375.00

Ten thousand three hundred seventy-five and 00/100********** DOLLARS

Susquehanna Township
1900 Linglestown Road
Harrisburg, PA 17110 USA

MEMO

⑈003425⑈ ⑆031918569⑆ 000069356⑈

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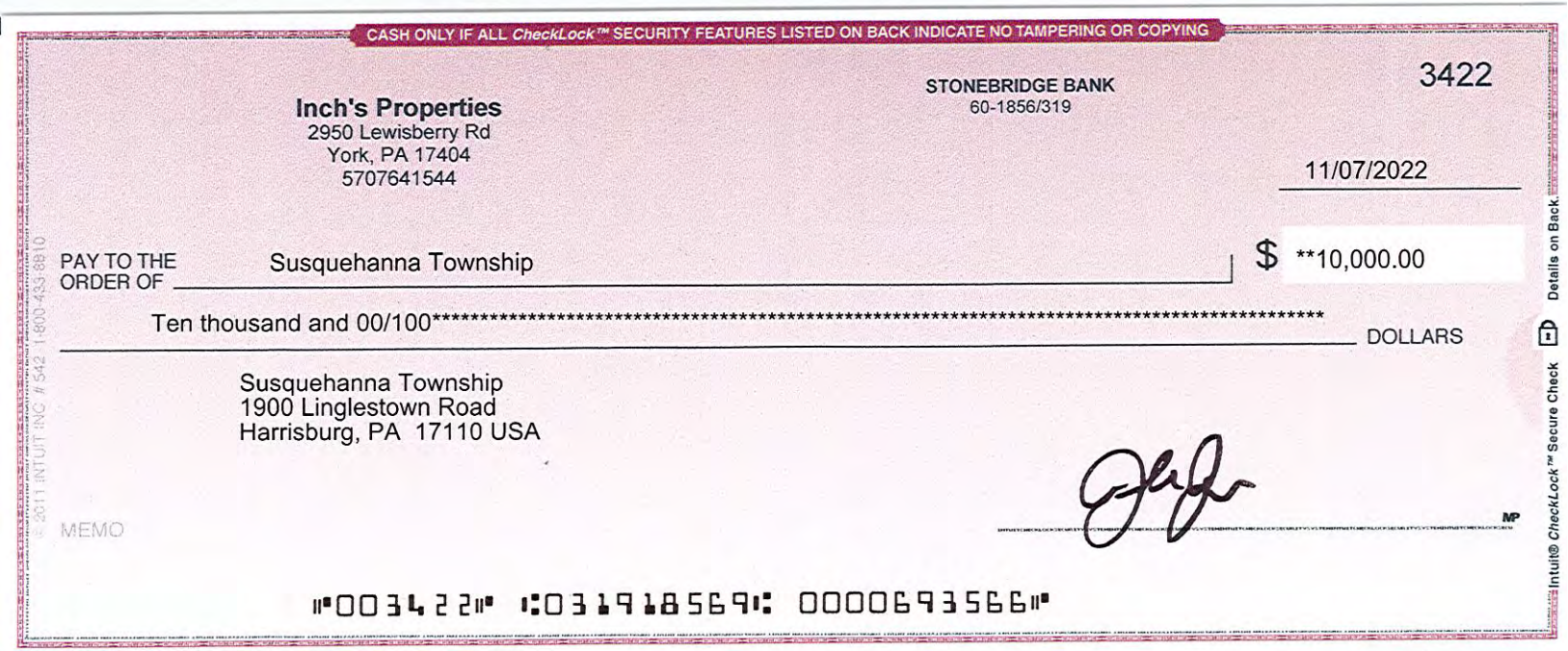
3425

Inch's Properties
11/07/2022 **Susquehanna Township**

Date	Type	Reference	Original Amount	Balance Due	Payment
11/07/2022	Bill	Prelim/Final LD	10,375.00	10,375.00	10,375.00
			Check Amount		10,375.00

Link Bank Operating 10,375.00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3422

Inch's Properties
2950 Lewisberry Rd
York, PA 17404
5707641544

STONEBRIDGE BANK
60-1856/319

11/07/2022

PAY TO THE ORDER OF Susquehanna Township

$ **10,000.00

Ten thousand and 00/100********** DOLLARS

Susquehanna Township
1900 Linglestown Road
Harrisburg, PA 17110 USA

MEMO

⑈003422⑈ ⑆031918569⑆ 000069356⑈

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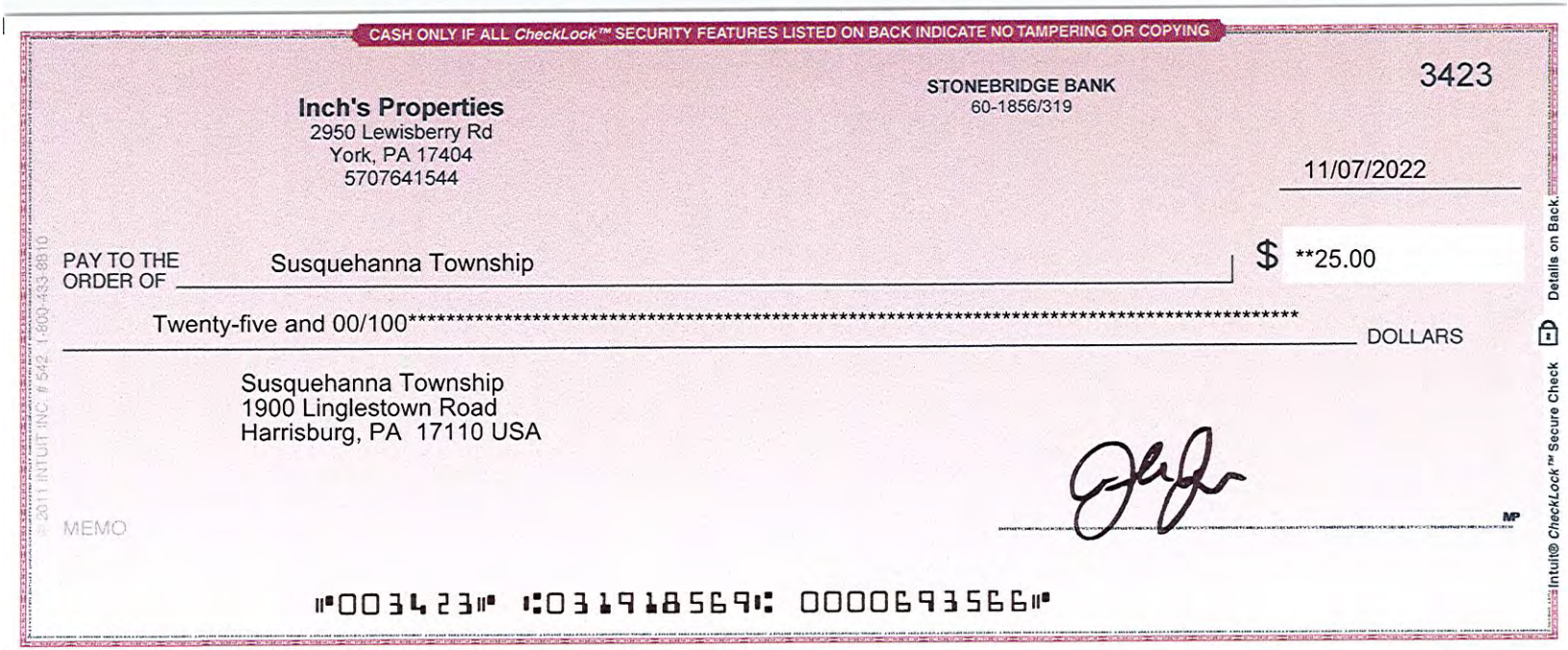
3422

Inch's Properties
11/07/2022 **Susquehanna Township**

Date	Type	Reference	Original Amount	Balance Due	Payment
11/07/2022	Bill	Escrow Funds	10,000.00	10,000.00	10,000.00
			Check Amount		10,000.00

Link Bank Operating 10,000.00



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Inch's Properties
2950 Lewisberry Rd
York, PA 17404
5707641544

STONEBRIDGE BANK
60-1856/319

3423

11/07/2022

PAY TO THE ORDER OF Susquehanna Township

$ **25.00

Twenty-five and 00/100********** DOLLARS

Susquehanna Township
1900 Linglestown Road
Harrisburg, PA 17110 USA

MEMO

⑈003423⑈ ⑆031918569⑆ 000069356⑈

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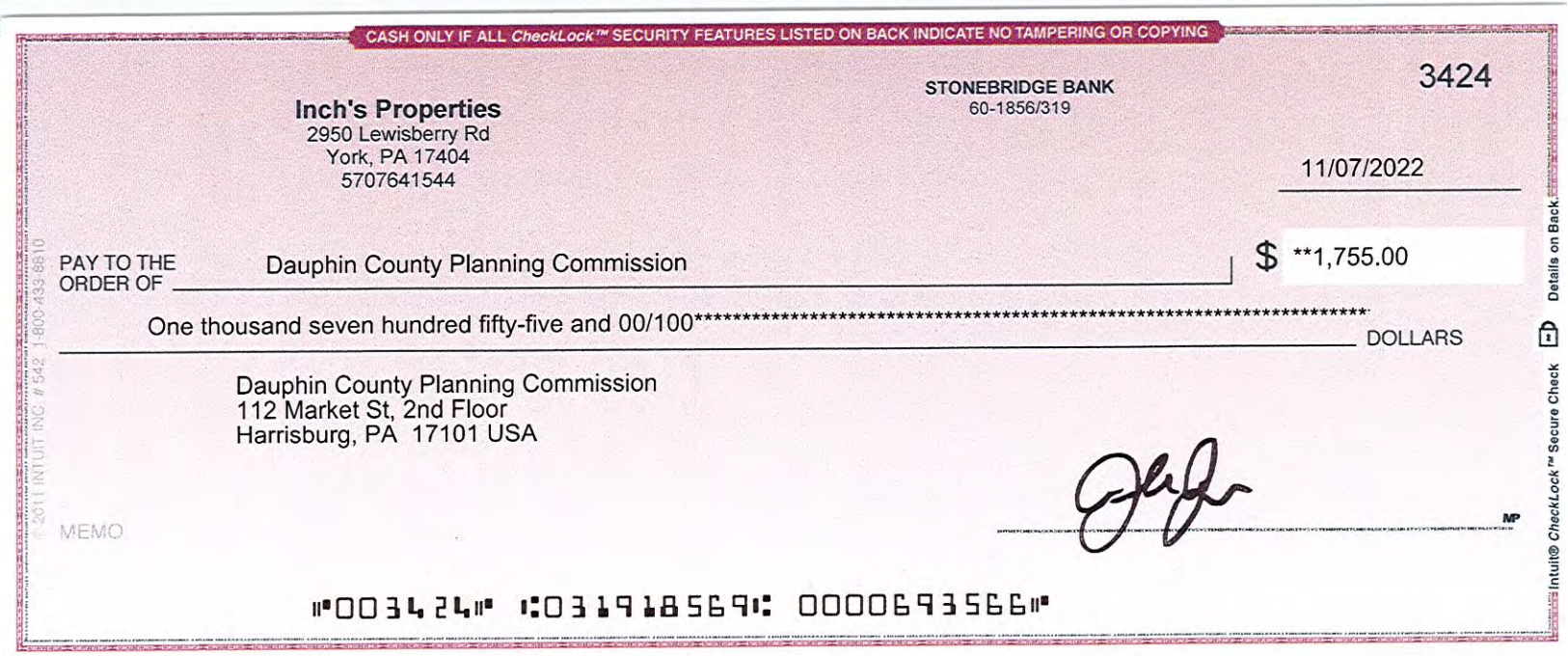
Inch's Properties
11/07/2022 **Susquehanna Township**

3423

Date	Type	Reference	Original Amount	Balance Due	Payment
11/07/2022	Bill	Planning Module	25.00	25.00	25.00
			Check Amount		25.00

Link Bank Operating 25.00



CASH ONLY IF ALL *CheckLock*™ SECURITY FEATURES LISTED ON BACK INDICATE NO TAMPERING OR COPYING

Inch's Properties
2950 Lewisberry Rd
York, PA 17404
5707641544

STONEBRIDGE BANK
60-1856/319

3424

11/07/2022

PAY TO THE ORDER OF Dauphin County Planning Commission

$ **1,755.00

One thousand seven hundred fifty-five and 00/100********** DOLLARS

Dauphin County Planning Commission
112 Market St, 2nd Floor
Harrisburg, PA 17101 USA

MEMO

⑈003424⑈ ⑆031918569⑆ 000693566⑈

Details on Back. Intuit® *CheckLock*™ Secure Check

© 2011 INTUIT INC. #542 1-800-433-8810

3424

Inch's Properties
11/07/2022 **Dauphin County Planning Commission**

Date	Type	Reference	Original Amount	Balance Due	Payment
11/07/2022	Bill	Planning Commission	1,755.00	1,755.00	1,755.00
		Check Amount			1,755.00

Link Bank Operating 1,755.00

Dauphin County Planning Commission
Application for Plan Review

Please complete entire form before submission

Municipality Susquehanna Township				Plat Title Preliminary Land Development Plan for 1235 Martina Drive			
Surveyor K&W, LLC				Engineer K&W, LLC			
Plan Classification: ☐ Subdivision ■ Land Development ☐ Combined				■ Preliminary ☐ Final ☐ P/F ☐ Minor			
~~Owner~~/Developer Inch's Properties, LLC				Phone Number 717.755.1565			
Address 2950 Lewisberry Road, York, PA 17404							
Total Tract Area: 46.27 AC				Subdivided Area: (Subdivision) N/A			
Building(s) Footprint Sq. Footage (Land Development)				Developed Area: (Land Development) 46.27 AC			
Existing # of Lots: 1		Proposed # of Lots: 1		Proposed # of New Dwelling Units: 395			
Existing Sewerage	☐ Public	■ On-Lot	☐ None	Proposed Sewerage	■ Public	☐ On-Lot	☐ None
Existing Water	☐ Public	■ Well	☐ None	Proposed Water	■ Public	☐ Well	☐ None
Zoning District: B-O-R Business Office Residential							
Existing Land Use: Former residential lot				Proposed Land Use: Multi family residential			
Are any zoning variances/subdivision waivers requested? ☐ YES ☑ NO							
List variances/waivers requested: N/A							
Purpose of the Plan: Develop 395 multi family residential units along with new access drives; stormwater management, landscaping and other associated improvements							
Fees Submitted: $ 1,755		Check Number: 3424		Signed by: John Inch		Date: 11/07/2022	

***The Dauphin County Planning Commission meeting is held on the first Monday of each month. The cut off date for plan submission for County Approval is nine (9) days prior to the meeting.*

MUNICIPAL ACCEPTANCE STATEMENT

The Township/Borough of _____ has received the above plan and hereby authorizes the bearer to deliver same to the **Dauphin County Planning Commission Office, 112 Market Street, 2nd Floor, Harrisburg, PA 17101-2015, (717) 234-2639**.

If plan is being submitted for Dauphin County Approval, the Township/Borough will review the plan and provide written comments within 30 days to: Dauphin County Planning Commission,

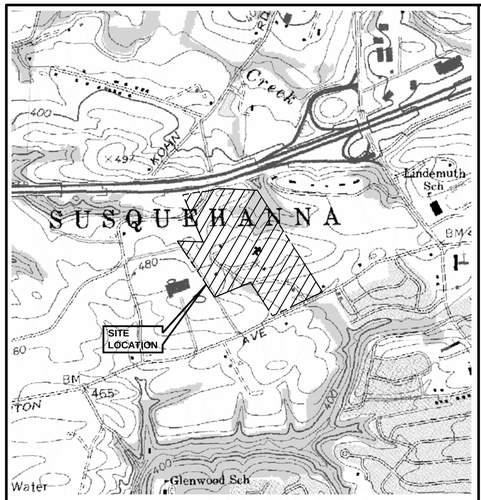
Signed_____ Date _____

Municipal Secretary or Official _____

PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PENNSYLVANIA



LOCATION MAP

SCALE: 1"=1000 FEET

UTILITY INFORMATION

THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS OF ACT 287 OF 1974 AS AMENDED BY ACT 187 OF 1996 FOR NOTIFICATION OF UTILITIES BEFORE EXCAVATION IN CONTRACT AREA. THE UNDERGROUND UTILITIES LOCATION CALL NUMBER IS 1-800-242-1776.

PA ONE-CALL SERIAL NUMBER: 20222432508
PA ONE-CALL SERIAL NUMBER DATE: 08/31/2022

THE FOLLOWING UTILITY FACILITY OWNERS WERE NOTIFIED BY THE PA ONE-CALL SYSTEM, INC.

COMPANY: CAPITAL REGION WATER
ADDRESS: 3003 N FRONT ST
HARRISBURG, PA. 17110
CONTACT: THOMAS YORK
EMAIL: thomas.york@capitalregionwater.com

COMPANY: VERIZON PENNSYLVANIA LLC
ADDRESS: 1026 HAY ST
PITTSBURGH, PA. 15221
CONTACT: DEBORAH BARUM
EMAIL: deborah.d.dela@verizon.com

COMPANY: PA COMMONWEALTH OF
OFFICE OF ADMIN
ADDRESS: 1 TECHNOLOGY PARK
HARRISBURG, PA. 17110
CONTACT: DARRELL MARTIN
EMAIL: damartin@pa.gov

COMPANY: PPL ELECTRIC UTILITIES
CORPORATION
ADDRESS: 434 SUSQUEHANNA TRAIL
NORTHUMBERLAND, PA. 17857
CONTACT: DOUG HAUPT
EMAIL: dlhaupt@pplweb.com

COMPANY: COMCAST
ADDRESS: 4601 SMITH STREET
HARRISBURG, PA. 17109
CONTACT: MICHAEL SWEIGARD
EMAIL: mike_sweigard@cable.comcast.com

COMPANY: SUSQUEHANNA TOWNSHIP
AUTHORITY/SUSQUEHANNA TOWNSHIP
ADDRESS: 1900 LINGLESTOWN RD
HARRISBURG, PA. 17110
CONTACT: TRAVIS MEASE
EMAIL: tmease@susquehannatwp.com

COMPANY: UGI UTILITIES INC
ADDRESS: 1301 AIP DR
MIDDLETOWN, PA. 17057
CONTACT: STEPHEN BATEMAN
EMAIL: sbateman@ugi.com

COMPANY: COMCAST CABLE COMMUNICATIONS INC
ADDRESS: 4601 SMITH ST
HARRISBURG, PA. 17109
CONTACT: DAVE MCCLUCKIE
EMAIL: DAVE_MCCLUCKIE@CABLE.COMCAST.COM

PENNSYLVANIA ONE CALL SYSTEM, INC.
1-800-242-1776
IT'S THE LAW!
DIAL 811 BEFORE YOU DIG

DAUPHIN COUNTY PLANNING COMMISSION

THIS PLAN REVIEWED BY THE DAUPHIN COUNTY PLANNING COMMISSION
THIS _____ DAY OF _____ 20___

CHAIRMAN _____

SECRETARY _____

TOWNSHIP ENGINEER

THIS PLAN REVIEWED BY THE SUSQUEHANNA TOWNSHIP ENGINEER THIS

_____ DAY OF _____ 20___

TOWNSHIP ENGINEER _____

TOWNSHIP BOARD OF COMMISSIONERS

THIS PLAN APPROVED BY THE SUSQUEHANNA TOWNSHIP BOARD OF COMMISSIONERS, AND ALL CONDITIONS IMPOSED WITH RESPECT TO SUCH APPROVAL WERE COMPLETED ON THIS _____ DAY OF _____ 20___

_____ _____
PRESIDENT SECRETARY

RECORDER OF DEEDS

THIS PLAN RECORDED IN THE OFFICE OF THE RECORDER OF DEEDS IN AND

FOR DAUPHIN COUNTY THIS _____ DAY OF _____ 20___

INSTRUMENT NUMBER_____

TOWNSHIP PLANNING COMMISSION

THIS PLAN RECOMMENDED FOR APPROVAL BY THE SUSQUEHANNA TOWNSHIP

PLANNING COMMISSION THIS _____ DAY OF _____ 20___

CHAIRMAN _____

SECRETARY _____

OWNER STORMWATER STATEMENT

I _____ (OWNER) ACKNOWLEDGE THAT THE STORMWATER BMP'S SHOWN WITHIN THESE PLANS ARE PERMANENT FIXTURES THAT CANNOT BE ALTERED OR REMOVED WITHOUT PRIOR APPROVAL BY SUSQUEHANNA TOWNSHIP.

PLAN PREPARER

KUROWSKI AND WILSON, LLC
2201 NORTH FRONT STREET, SUITE 200
HARRISBURG, PA 17110

TELEPHONE: 717.635.2835
EMAIL: JSHYK@KANDWENGINEERS.COM

PROJECT MANAGER: JEFFREY A. SHYK, RLA

SITE SURVEYOR

KUROWSKI AND WILSON, LLC
2201 NORTH FRONT STREET, SUITE 200
HARRISBURG, PA 17110

TELEPHONE: 717.635.2835
EMAIL: DBURKHARD@KANDWENGINEERS.COM

PROJECT MANAGER: DENNIS P. BURKHARD, PLS

CERTIFICATE OF ACCURACY (PLAN)

I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THE LAND DEVELOPMENT PLAN SHOWN AND DESCRIBED HEREON IS TRUE AND CORRECT. _____, 20_____.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED
PROFESSIONAL
J. MARC KUROWSKI
ENGINEER
No. 052032-E

_____, P.E.

CERTIFICATE OF ACCURACY (SURVEY)

I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THE BOUNDARY SURVEY SHOWN AND DESCRIBED HEREON IS TRUE AND CORRECT. _____, 20_____.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED
PROFESSIONAL
DENNIS P. BURKHARD
LAND SURVEYOR
No.43332-R

_____, P.L.S.

CERTIFICATE OF OWNERSHIP, ACKNOWLEDGMENT OF PLAN

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF DAUPHIN

ON THIS THE _____ DAY OF _____, 20___ BEFORE ME THE

UNDERSIGNED PERSONALLY APPEARED.

OWNER(S)
_____

OWNER(S)
_____

WHO BEING DULY SWORN ACCORDING TO LAW, DEPOSE AND SAY THAT THEY ARE THE OWNERS OF THE PROPERTY SHOWN ON THIS PLAN AND THAT THEY ACKNOWLEDGE THE SAME TO BE THEIR ACT AND DEED AND DESIRE THE SAME TO BE RECORDED AS SUCH ACCORDING TO LAW. WITNESS MY HAND AND NOTORIAL SEAL THE DAY AND THE DATE ABOVE WRITTEN

_____
NOTARY PUBLIC MY COMMISSION EXPIRES

IT IS HEREBY CERTIFIED THAT THE UNDERSIGNED ARE THE OWNERS OF THE PROPERTY SHOWN ON THIS PLAT AND THAT ALL STREETS OR PARTS THEREOF, IF NOT PREVIOUSLY DEDICATED, ARE HEREBY TENDERED FOR DEDICATION TO PUBLIC USE.

OWNER(S)
_____

OWNER(S)
_____

LANDOWNER

NAME: CAPITAL BLUE CROSS

ADDRESS: 2500 ELMERTON AVENUE
HARRISBURG, PA 17101

CONTACT: .
TELEPHONE: .

DEVELOPER

NAME: INCH'S PROPERTIES, LLC

ADDRESS: 2950 LEWISBERRY ROAD
YORK, PA 17404

CONTACT: JOE EISENHAUER

EMAIL: JOE@INCHANDCO.COM
PHONE: 717.755.1565

SHEET INDEX

LAND DEVELOPMENT PLANS

Sheet Number	Sheet Title
C1.1	COVER SHEET
C1.2	OVERALL EXISTING FEATURES AND DEMOLITION PLAN
C1.3	OVERALL SITE LAYOUT PLAN
C1.4	SITE LAYOUT PLAN A
C1.5	SITE LAYOUT PLAN B
C1.6	SITE LAYOUT PLAN C
C1.7	SITE LAYOUT PLAN D
C1.8	GRADING PLAN A
C1.9	GRADING PLAN B
C1.10	GRADING PLAN C
C1.11	GRADING PLAN D
C1.12	UTILITY PLAN A
C1.13	UTILITY PLAN B
C1.14	UTILITY PLAN C
C1.15	UTILITY PLAN D
C1.16	LANDSCAPE PLAN A
C1.17	LANDSCAPE PLAN B
C1.18	LANDSCAPE PLAN C
C1.19	LANDSCAPE PLAN D
C1.20	ROAD PROFILES
C1.21	ROAD PROFILE
C1.22	ROAD PROFILES
C1.23	ROAD PROFILES
C1.24	ROAD PROFILES
C1.25	ROAD PROFILES
C1.26	SANITARY PROFILES
C1.27	SITE DETAILS
C1.28	SITE DETAILS
C1.29	UTILITY DETAILS

PCSM PLANS

Sheet Number	Sheet Title
C2.1	COVER SHEET
C2.2	OVERALL EXISTING FEATURES AND DEMOLITION PLAN
C2.3	PCSM PLAN A
C2.4	PCSM PLAN B
C2.5	PCSM PLAN C
C2.6	PCSM PLAN D
C2.7	PROFILES
C2.8	PROFILES
C2.9	PROFILES
C2.10	PROFILES
C2.11	PROFILES
C2.12	PROFILES
C2.13	PROFILES
C2.14	PROFILES
C2.15	PROFILES
C2.16	PROFILES
C2.17	PCSM DETAILS
C2.18	PCSM DETAILS
C2.19	PCSM DETAILS

ZONING DATA

ZONING DISTRICT: BOR - BUSINESS OFFICE RESIDENTIAL DISTRICT

ITEM	REQUIRED	PROPOSED DEVELOPMENT
LOT AREA	40,000 SF	2,015,521.2 SF (46.27 AC)
LOT WIDTH	N/A	N/A
FRONT YARD SETBACK	25'	25'
SIDE YARD SETBACK	20'	20'
REAR YARD SETBACK	20'	20'
MAXIMUM BUILDING COVERAGE	20%	12.6%
MAXIMUM IMPERVIOUS COVERAGE	45%	38.3%
BUILDING HEIGHT	42'	<42'

INTERIOR YARD REQUIREMENTS

(FOR LOTS CONTAINING MORE THAN ONE BUILDING ON A SINGLE LOT, DIMENSIONS LISTED BELOW ARE MINIMUM SEPARATION DISTANCES)

FRONT TO FRONT: 70'
FRONT TO SIDE: 50'
FRONT TO REAR: 70'
SIDE TO REAR: 30'
REAR TO REAR: 50'
SIDE TO SIDE: 15'
CORNER TO CORNER: 20'

SITE DATA

TAX PARCEL ID: 62-023-018

DEED REF / INSTRUMENT NUMBERS: 20120032289; 20120011102; PB H-4, PG 19; DB 5447, PG 176

EXISTING LOT AREA: ± 46.27 AC.

PROPOSED TOWNHOUSE UNITS: 143

PROPOSED APARTMENT UNITS: 252

TOTAL RESIDENTIAL UNITS: 395

SEWAGE DISPOSAL: PUBLIC - SUSQUEHANNA TOWNSHIP SEWER AUTHORITY

WATER SUPPLY: PUBLIC - CAPITAL REGION WATER

PARKING DATA

USE	REQUIREMENT	CALCULATION	REQUIRED SPACES
APARTMENTS	2 SPACES/ DWELLING UNIT	252 APARTMENTS	= 504
TOWNHOUSES	2 SPACES/DWELLING UNIT	143 TOWNHOUSES	= 283 (2 SPACES@ EACH UNIT WILL BE PROVIDED)

TOTAL REQUIRED SPACES (APARTMENTS) = 504
TOTAL PROVIDED PARKING SPACES (APARTMENTS) = 505

GENERAL NOTES

1. THE PURPOSE OF THIS PLAN IS THE CONSTRUCTION OF 252 APARTMENT UNITS, 143 TOWNHOUSE UNITS, A COMMUNITY BUILDING, AND ASSOCIATED SITE IMPROVEMENTS ON THE SUBJECT PROPERTY.
2. THE EXISTING SITE FEATURES, TOPOGRAPHY AND PROPERTY BOUNDARY LINES SHOWN HEREON ARE OBTAINED FROM A DRAWING OF SURVEY INFORMATION PRODUCED BY KUROWSKI & WILSON, LLC.
3. PUBLIC WATER TO BE PROVIDED BY CAPITAL REGION WATER.
4. PUBLIC SEWER TO BE PROVIDED BY SUSQUEHANNA TOWNSHIP.
5. THE SITE DEVELOPMENT WILL COMPLY WITH ALL APPLICABLE TOWNSHIP ORDINANCES IN EFFECT AT THE TIME OF THIS LAND DEVELOPMENT PLAN SUBMISSION.
6. THE PROPOSED STREETS WILL **NOT** BE OFFERED FOR DEDICATION TO SUSQUEHANNA TOWNSHIP.
7. STREET CURB & SIDEWALKS MUST BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF SUSQUEHANNA TOWNSHIP, AS APPLICABLE.
8. ALL CONSTRUCTION SHALL CONFORM TO PENNDOT PUBLICATIONS 408 & 72 STANDARDS AND ALL APPLICABLE SUSQUEHANNA TOWNSHIP ORDINANCES.
9. ALL SIGNS SHALL CONFORM TO PENNSYLVANIA DEPARTMENT OF TRANSPORTATION AND TOWNSHIP SPECIFICATIONS AND SHALL BE INSTALLED BY THE DEVELOPER IN A MANNER SPECIFIED BY THE MUNICIPAL ENGINEER.
10. ALL PERMANENT STORMWATER MANAGEMENT FACILITIES OUTSIDE OF THE PUBLIC RIGHT-OF-WAY SHALL BE OWNED, OPERATED, AND MAINTAINED BY THE PROPERTY OWNER. ALL PERMANENT STORMWATER MANAGEMENT FACILITIES WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE DEDICATED TO SUSQUEHANNA TOWNSHIP OR PENNDOT.
11. A PA NATURAL DIVERSITY INVENTORY (PNDI) SEARCH WAS PERFORMED FOR THE SUBJECT TRACT AND NO ENVIRONMENTAL IMPACTS WERE IDENTIFIED.
12. THERE ARE NO EXISTING COVENANTS FOR THE SUBJECT TRACT.
13. THE DEVELOPER / CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE A MINIMUM OF 48 HOURS NOTICE AND TO COORDINATE WITH THE TOWNSHIP / TOWNSHIP ENGINEER IN REGARDS TO ALL MUNICIPAL INSPECTION WORK REQUIRED ON THE PROJECT SITE.

WETLAND INVESTIGATION CERTIFICATION

I, _____, HEREBY CERTIFY THAT THERE ARE WETLANDS ON THE SUBJECT PROPERTY. THE PROPOSED PROJECT WILL NOT IMPACT OFF-SITE WETLAND, AND WETLAND PERMITS ARE NOT REQUIRED FROM STATE OR FEDERAL GOVERNMENT.

STORMWATER CERTIFICATION OF ACCURACY

I, _____, HEREBY CERTIFY THAT THE STORMWATER MANAGEMENT SITE PLAN MEETS ALL DESIGN STANDARDS AND CRITERIA OF SUSQUEHANNA TOWNSHIP'S STORMWATER MANAGEMENT ORDINANCE.

_____ 20___ _____

K&W
DESIGNING ENVIRONMENTS
2201 North Front Street, Suite 200
Harrisburg, PA 17110
P: 717.635.2835
www.kandwengineers.com

PRELIMINARY LAND DEVELOPMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC
SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE: AS SHOWN
DATE: NOVEMBER 07, 2022
K&W PROJECT: 2344.001
DRAWN BY: HAB
CAD DRAWING: 2344001-A_UCVR.dwg

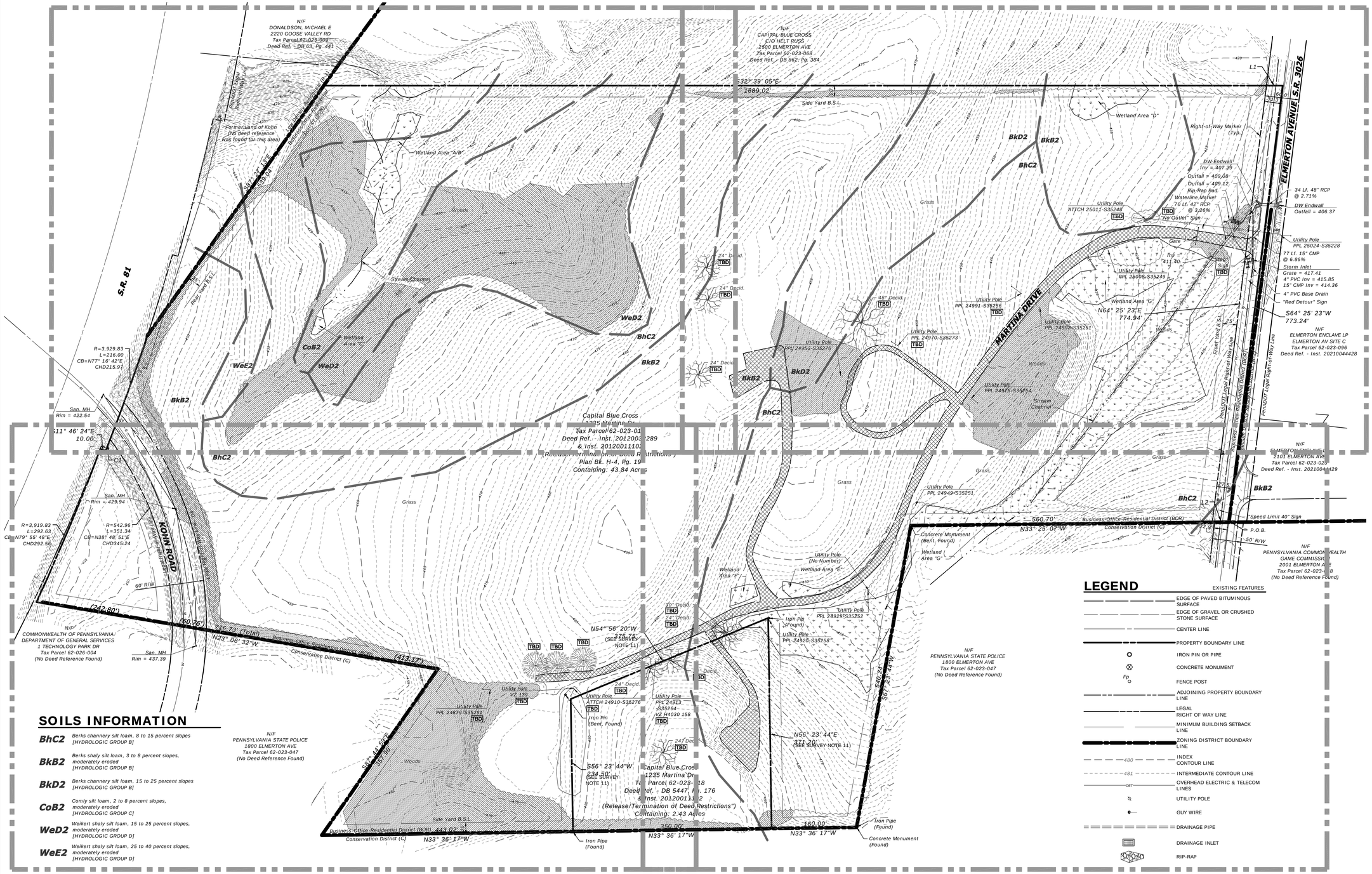
REVISIONS NO.	DATE	DESCRIPTION
1	MARCH 28, 2005	DESCRIPTION
2		
3		
4		
5		
6		
7		

PLAN TYPE:
COVER SHEET

SHEET:
C1.1

REFER TO SHEETS C1.4, C1.8, C1.12 & C1.16 FOR DESIGN INFORMATION

REFER TO SHEETS C1.5, C1.9, C1.13 & C1.17 FOR DESIGN INFORMATION



SOILS INFORMATION

BhC2 Berks channery silt loam, 8 to 15 percent slopes
[HYDROLOGIC GROUP B]

BkB2 Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded
[HYDROLOGIC GROUP B]

BkD2 Berks channery silt loam, 15 to 25 percent slopes
[HYDROLOGIC GROUP B]

CoB2 Comly silt loam, 2 to 8 percent slopes, moderately eroded
[HYDROLOGIC GROUP C]

WeD2 Weikert shaly silt loam, 15 to 25 percent slopes, moderately eroded
[HYDROLOGIC GROUP D]

WeE2 Weikert shaly silt loam, 25 to 40 percent slopes, moderately eroded
[HYDROLOGIC GROUP D]

LEGEND

EXISTING FEATURES

- EDGE OF PAVED BITUMINOUS SURFACE
- EDGE OF GRAVEL OR CRUSHED STONE SURFACE
- CENTER LINE
- PROPERTY BOUNDARY LINE
- IRON PIN OR PIPE
- CONCRETE MONUMENT
- Fp FENCE POST
- ADJOINING PROPERTY BOUNDARY LINE
- LEGAL RIGHT OF WAY LINE
- MINIMUM BUILDING SETBACK LINE
- ZONING DISTRICT BOUNDARY LINE
- 480 INDEX CONTOUR LINE
- 481 INTERMEDIATE CONTOUR LINE
- OHT OVERHEAD ELECTRIC & TELECOM LINES
- UTILITY POLE
- GUY WIRE
- DRAINAGE PIPE
- DRAINAGE INLET
- RIP-RAP

REFER TO SHEETS C1.6, C1.10, C1.14 & C1.18 FOR DESIGN INFORMATION

REFER TO SHEETS C1.7, C1.11, C1.15 & C1.19 FOR DESIGN INFORMATION

SURVEY NOTES

1. THIS SURVEY WAS PERFORMED AND MAPPING PREPARED WITH THE BENEFIT OF A TITLE SEARCH.
2. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN ARE BASED ON A FIELD SURVEY PERFORMED BY K&W ENGINEERS AND CONSULTANTS, COMPLETED IN SEPTEMBER, 2022.
3. PROPERTY LINES SHOWN ARE BASED ON PROPERTY CORNER MARKERS AND OTHER EVIDENCE FOUND, CURRENT DEEDS OF RECORD, AND THE FOLLOWING PLAN(S):
   PB H-4, PG 19
4. "SITE B-1", AS SHOWN ON A FINAL SUBDIVISION PLAN PREPARED FOR THE ESTATE OF PARK SHEESLEY & SHARON S. BAISDEN, BY D.P. RAFFENSPERGER ASSOCIATES, DATED DECEMBER 8, 1986, PROJECT NO. D2-1171, RECORDED IN PLAN BOOK H-4, PAGE 19.
5. CONTOURS AND ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
6. BEARINGS ARE BASED ON PENNSYLVANIA STATE PLANE COORDINATES, SOUTH ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
7. RIGHT-OF-WAY LINES SHOWN FOR ELMERTON AVENUE AND S.R. 81 ARE BASED ON FIELD SURVEY LOCATIONS, PLANS PROVIDED BY PENNDOT DISTRICT 8-0, FOR S.R. 3026: "DOS LOT CONSOLIDATION & SUBDIVISION PLAN" & "ELMERTON ENCLAVE HOP", AND FOR S.R. 81: PLANS FOR LR 1005-3.
8. UTILITY LOCATIONS ARE BASED ON SURFACE EVIDENCE AND LIMITED PA ONE-CALL MARKINGS EVIDENT AT THE TIME OF THE FIELD SURVEY. PA ONE-CALL SERIAL NO. 20222432508 WAS ASSIGNED ON AUGUST 31, 2022.
9. SOME UTILITIES AND UNDERGROUND PIPE LOCATIONS COULD NOT BE VERIFIED AND FURTHER INVESTIGATION IS REQUIRED. APPROXIMATE UTILITY AND PIPE LOCATIONS SHOWN ARE BASED ON THE PREVIOUSLY MENTIONED PLANS.
10. THE SUBJECT PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN THE 100-YEAR FLOODPLAIN AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AND SHOWN ON THE FLOOD INSURANCE RATE MAP (FIRM) FOR (?) TOWNSHIP, COMMUNITY PANEL NO. 420397, MAP NO. 42043C0340D, EFFECTIVE DATE AUGUST 2, 2012.
11. PREVIOUSLY RECORDED DEED RESTRICTIONS AND LOT LINES ASSOCIATED WITH THIS PARCEL ARE SHOWN FOR REFERENCE ONLY AND WERE EXTINGUISHED AS PART OF THE CONSOLIDATION DEED RECORDED IN INSTRUMENT NO 201200112.

DEMOLITION NOTES

1. ALL FEATURES IN BOLD PRINT AND SO LABELED SHALL BE DEMOLISHED, REMOVED, OR RELOCATED AS INDICATED.
2. ITEMS LABELED TO BE REMOVED BY OTHERS WILL BE RELOCATED AND/OR DEMOLISHED BY THE OWNER OR A CONTRACTOR HIRED BY THE OWNER. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL WORK TO BE PERFORMED BY OTHERS.
3. ALL EXISTING UTILITY LIDS (MANHOLE, CLEANOUTS, VALVE COVERS, ETC.) AND ASSOCIATED APPURTENANCES TO REMAIN SHALL BE BROUGHT TO FINAL FINISHED GRADE AS PART OF CONSTRUCTION.

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

LEGEND

DEMOLITION FEATURES

- PROPOSED SAWCUT
- TBD DENOTES A FEATURE TO BE DEMOLISHED
- TBR DENOTES A FEATURE TO BE REMOVED AND RELOCATED
- EX. BITUMINOUS PAVEMENT SURFACE TO BE REMOVED
- EX. TREES TO BE REMOVED
- Gv GAS VALVE
- Gm GAS METER
- TREELINE
- S SANITARY SEWER GRAVITY LINE
- MANHOLE
- W WATER LINE
- Wv WATER VALVE
- Fh FIRE HYDRANT
- WETLAND
- FENCE
- GUIDERAIL
- SIGN
- SOIL TYPE BOUNDARY LINE

0 40 80 160
SCALE: 1" = 80'

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P: 717.635.2835
www.kandwengineers.com

PRELIMINARY LAND DEVELOPMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA
SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-B_MEXF.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
OVERALL EXISTING FEATURES AND DEMOLITION PLAN

SHEET:
C1.2

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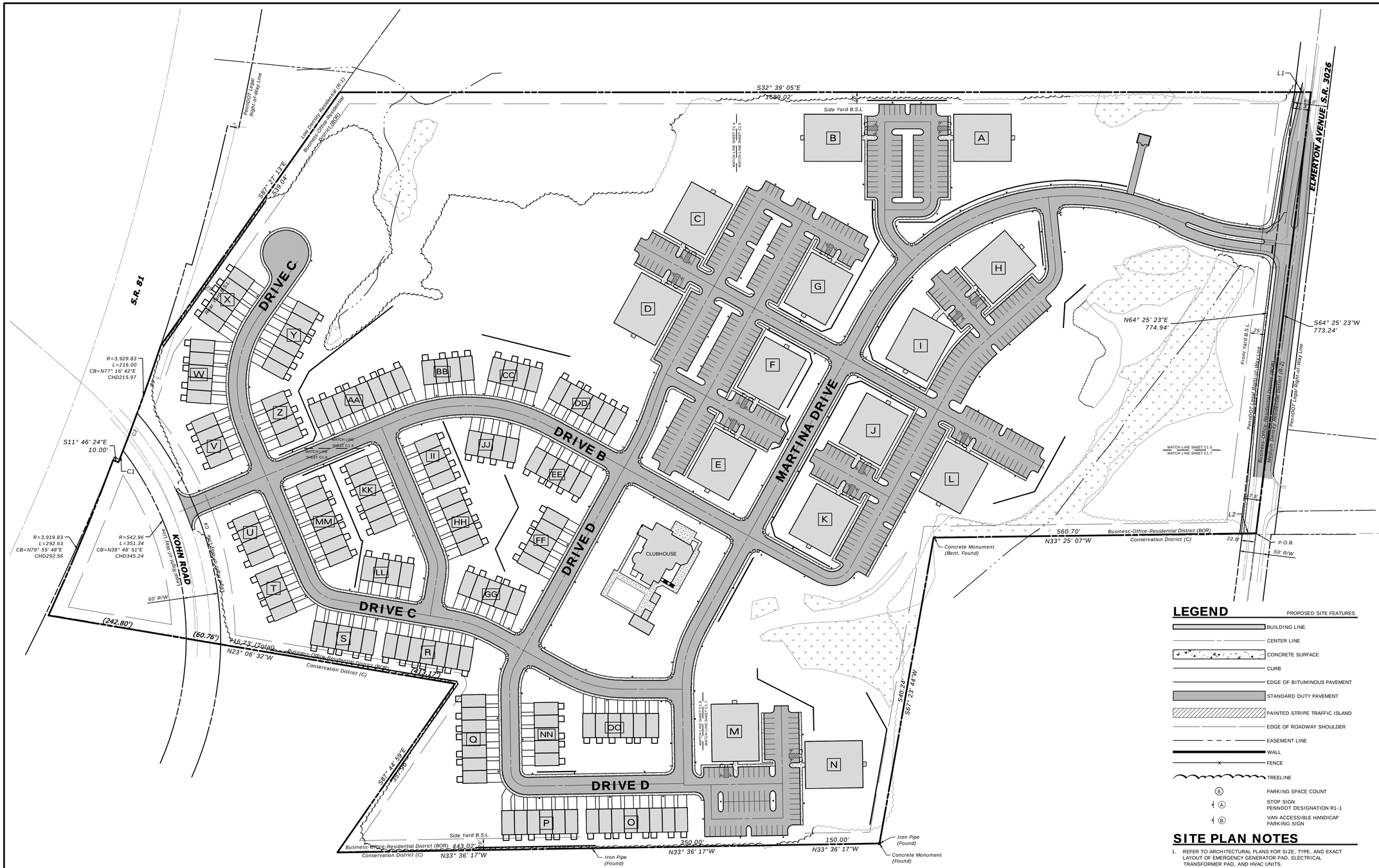

LEGEND

PROPOSED SITE FEATURES

- BUILDING LINE
- CENTER LINE
- CONCRETE SURFACE
- CURB
- EDGE OF BITUMINOUS PAVEMENT
- STANDARD DUTY PAVEMENT
- PAINTED STRIPE TRAFFIC ISLAND
- EDGE OF ROADWAY SHOULDER
- EASEMENT LINE
- WALL
- FENCE
- TREELINE
- (8) PARKING SPACE COUNT
- (A) STOP SIGN PENNDOT DESIGNATION R1-1
- (B) VAN ACCESSIBLE HANDICAP PARKING SIGN

SITE PLAN NOTES

1. REFER TO ARCHITECTURAL PLANS FOR SIZE, TYPE, AND EXACT LAYOUT OF EMERGENCY GENERATOR PAD, ELECTRICAL TRANSFORMER PAD, AND HVAC UNITS.
2. REFER TO ARCHITECTURAL PLANS FOR DUMPSTER ENCLOSURE AND CONCRETE DUMPSTER PAD.
3. REFER TO ARCHITECTURAL PLANS FOR CONCRETE PADS OUTSIDE OF EXTERIOR DOORWAYS.
4. SEE ARCHITECTURAL PLANS FOR CONCRETE SCORING AND BRICK PAVER LAYOUT.
5. ALL RADII ARE 5 FEET, UNLESS SPECIFICALLY DIMENSIONED OTHERWISE WITHIN THE PLAN VIEW. THIS INCLUDES CURB RADII, RADII ON PROPOSED EDGES OF BITUMINOUS PAVEMENT, AND RADII INDICATED FOR PAVEMENT MARKINGS.
6. N.I.C. = NOT IN CONTRACT
7. SIGNS AND PAVEMENT MARKINGS SHALL COMPLY WITH PENNDOT PUBLICATION 408, SECTION 1103, AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AS AMENDED.
8. MAXIMUM SIDEWALK CROSS SLOPE = 2%.

GRAPHIC SCALE
80 40 0 80
1" = 80 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_ldSITE.dwg

REVISIONS

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PLAN TYPE:
OVERALL SITE LAYOUT PLAN

SHEET:
C1.3

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LEGEND

PROPOSED SITE FEATURES

BUILDING LINE	EDGE OF ROADWAY SHOULDER
CENTER LINE	EASEMENT LINE
CONCRETE SURFACE	WALL
CURB	FENCE
EDGE OF BITUMINOUS PAVEMENT	TREELINE
STANDARD DUTY PAVEMENT	PARKING SPACE COUNT
PAINTED STRIPE TRAFFIC ISLAND	STOP SIGN PENNDOT DESIGNATION R1-1
	VAN ACCESSIBLE HANDICAP PARKING SIGN

GRAPHIC SCALE

40 20 0 40

1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP

DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_ldSITE.dwg

REVISIONS

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PLAN TYPE:

SITE LAYOUT PLAN A

SHEET:

C1.4

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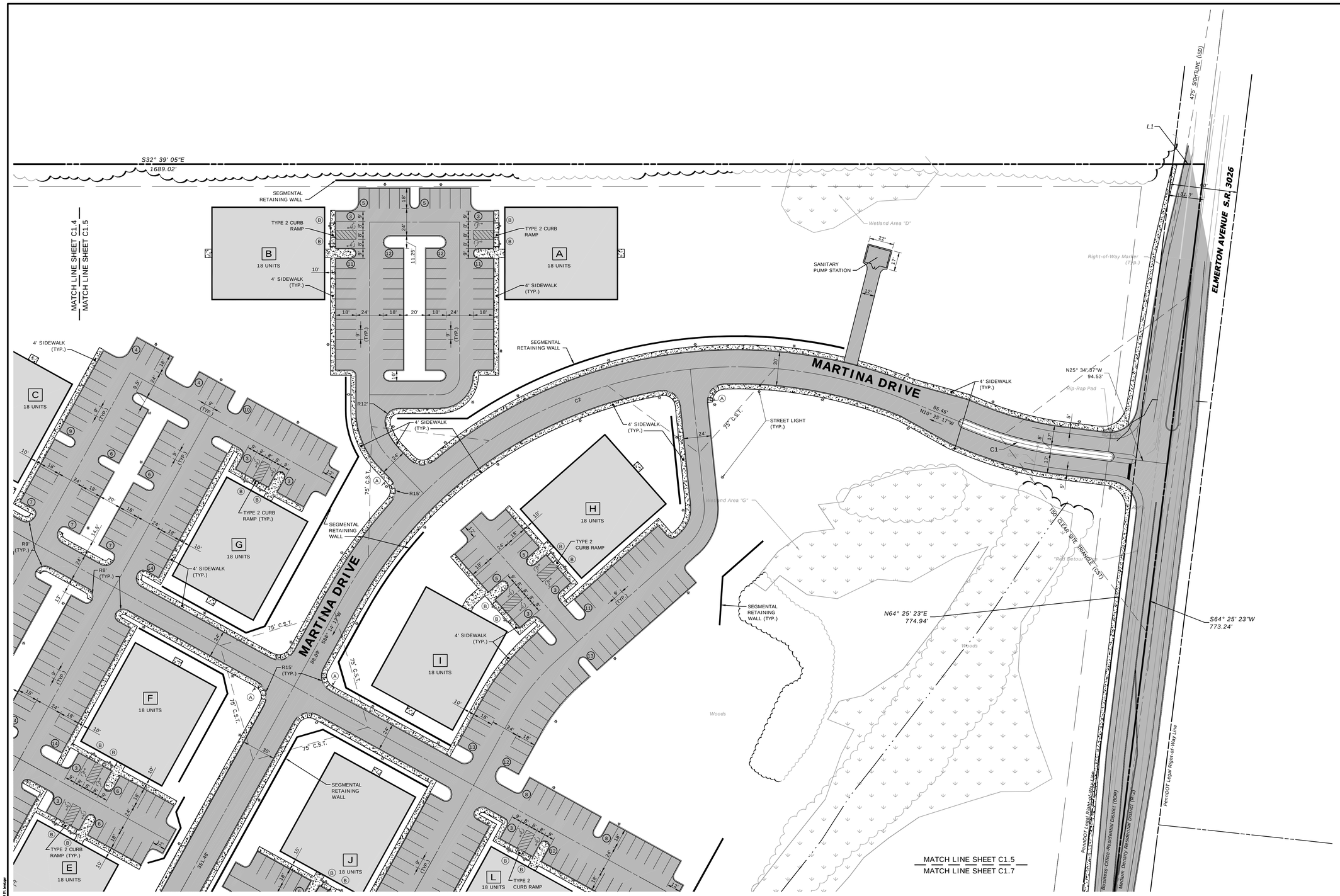

LEGEND

PROPOSED SITE FEATURES

- BUILDING LINE
- CENTER LINE
- CONCRETE SURFACE
- CURB
- EDGE OF BITUMINOUS PAVEMENT
- STANDARD DUTY PAVEMENT
- PAINTED STRIPE TRAFFIC ISLAND
- EDGE OF ROADWAY SHOULDER
- EASEMENT LINE
- WALL
- FENCE
- TREELINE
- (8) PARKING SPACE COUNT
- (A) STOP SIGN PENNDOT DESIGNATION R1-1
- (B) VAN ACCESSIBLE HANDICAP PARKING SIGN

GRAPHIC SCALE
40 20 0 40
1" = 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_MSITE.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
SITE LAYOUT PLAN B

SHEET:
C1.5

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LEGEND

PROPOSED SITE FEATURES

- BUILDING LINE
- CENTER LINE
- CONCRETE SURFACE
- CURB
- EDGE OF BITUMINOUS PAVEMENT
- STANDARD DUTY PAVEMENT
- PAINTED STRIPE TRAFFIC ISLAND
- EDGE OF ROADWAY SHOULDER
- EASEMENT LINE
- WALL
- FENCE
- TREELINE
- (8) PARKING SPACE COUNT
- (A) STOP SIGN PENNDOT DESIGNATION R1-1
- (B) VAN ACCESSIBLE HANDICAP PARKING SIGN

GRAPHIC SCALE
40 20 0 40
1" = 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

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SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

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SCALE:	AS SHOWN
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K&W PROJECT:	2344.001
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CAD DRAWING:	2344001-D_ldSITE.dwg

REVISIONS NO.	DATE	DESCRIPTION
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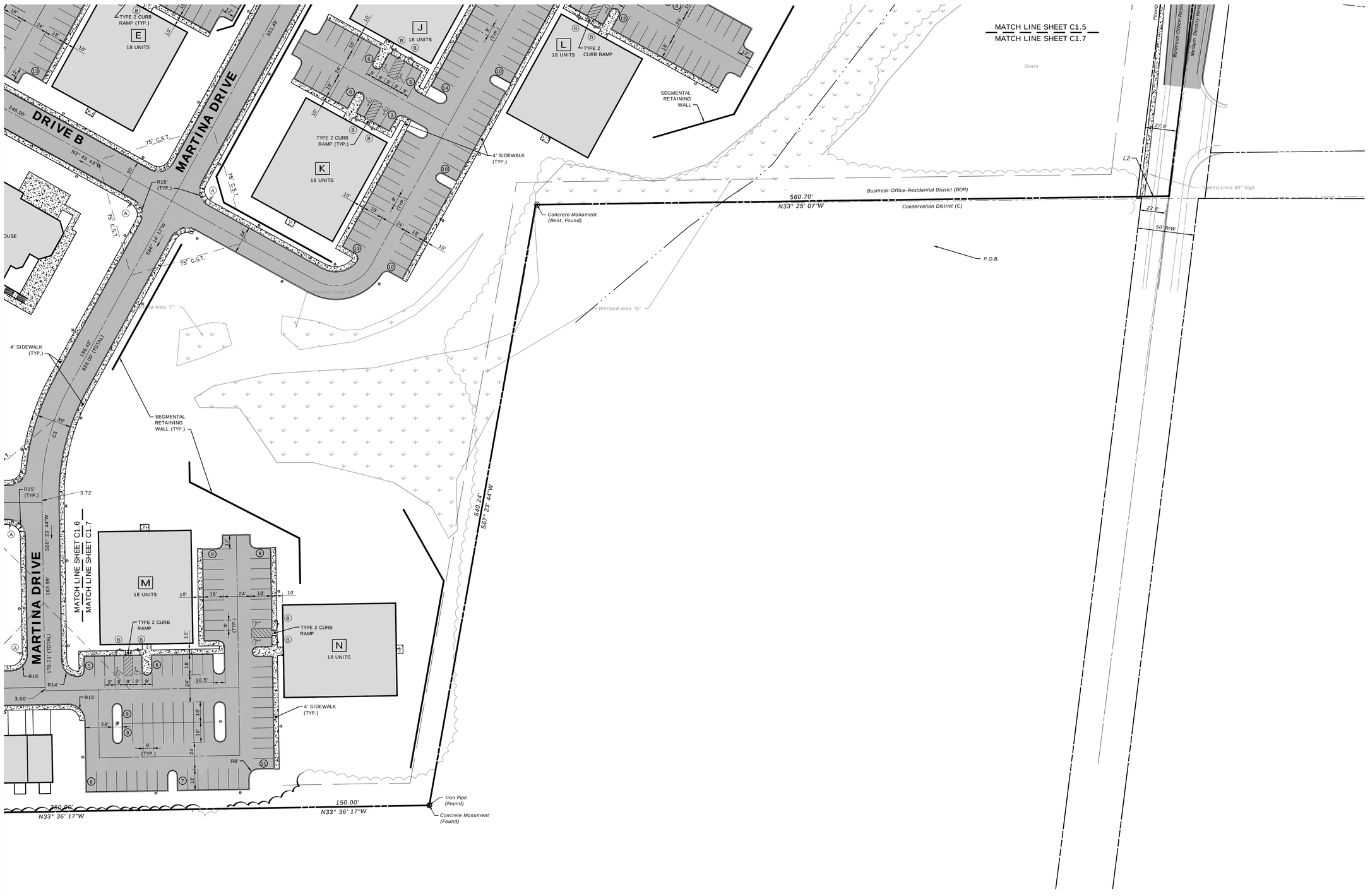
PLAN TYPE:
SITE LAYOUT PLAN C

SHEET:
C1.6



LEGEND

PROPOSED SITE FEATURES

- BUILDING LINE
- CENTER LINE
- CONCRETE SURFACE
- CURB
- EDGE OF BITUMINOUS PAVEMENT
- STANDARD DUTY PAVEMENT
- PAINTED STRIPE TRAFFIC ISLAND
- EDGE OF ROADWAY SHOULDER
- EASEMENT LINE
- WALL
- FENCE
- TREELINE
- (8) PARKING SPACE COUNT
- (A) STOP SIGN PENNDOT DESIGNATION R1-1
- (B) VAN ACCESSIBLE HANDICAP PARKING SIGN

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
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CAD DRAWING:	2344001-D_ldSITE.dwg

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PLAN TYPE:
SITE LAYOUT PLAN D

SHEET:
C1.7

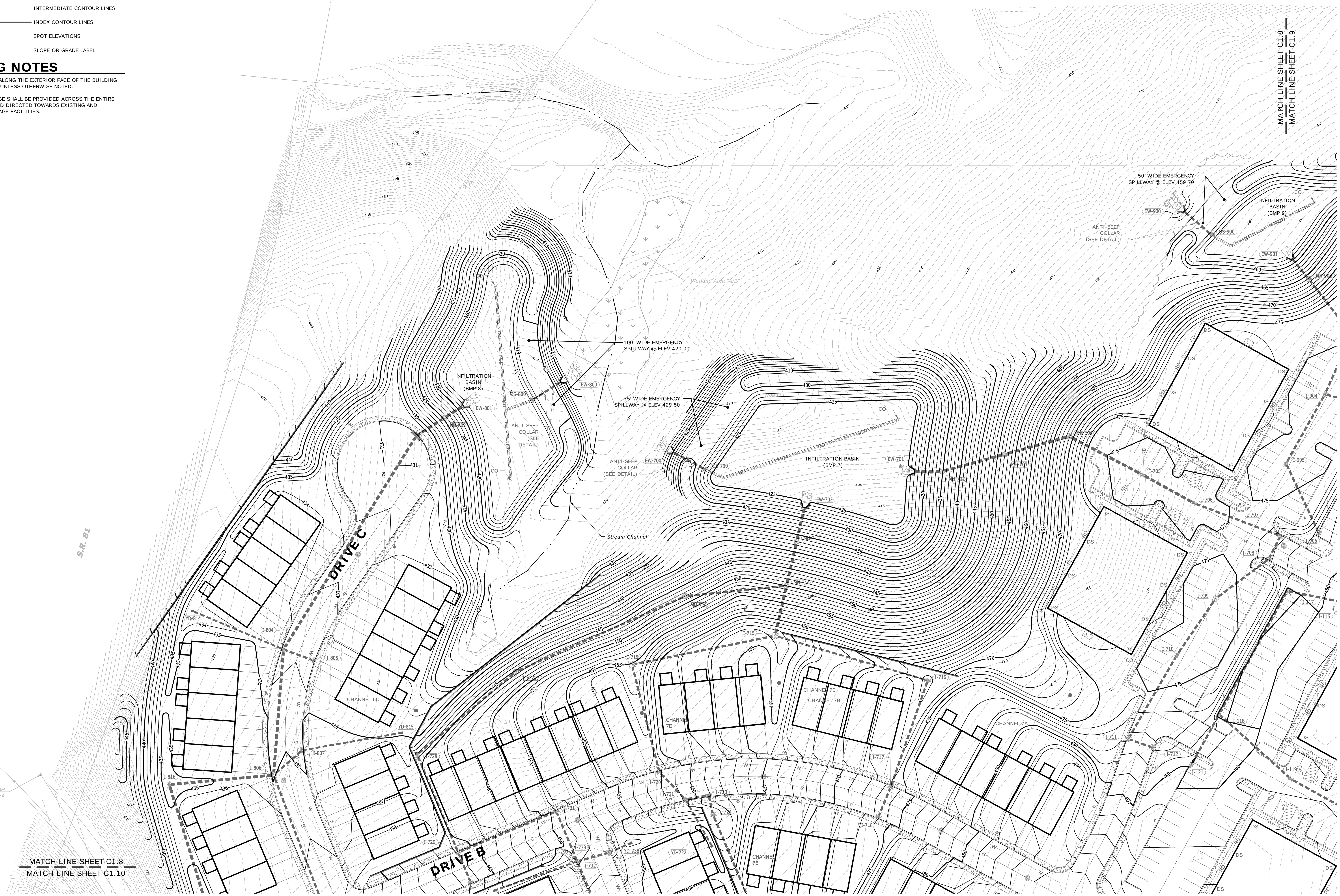
LEGEND

PROPOSED GRADING FEATURES

421	INTERMEDIATE CONTOUR LINES
420	INDEX CONTOUR LINES
422.53	SPOT ELEVATIONS
2.00%	SLOPE OR GRADE LABEL

GRADING NOTES

1. FINISHED GRADE ALONG THE EXTERIOR FACE OF THE BUILDING SHALL BE XXX.XX UNLESS OTHERWISE NOTED.
2. POSITIVE DRAINAGE SHALL BE PROVIDED ACROSS THE ENTIRE PROJECT AREA AND DIRECTED TOWARDS EXISTING AND PROPOSED DRAINAGE FACILITIES.



GRAPHIC SCALE

40 20 0 40

1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA

SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
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DRAWN BY:	HAB
CAD DRAWING:	2344001-E_ldGRADE.dwg

REVISIONS

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PLAN TYPE:

GRADING PLAN A

SHEET:

C1.8

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LEGEND

	PROPOSED GRADING FEATURES
421	INTERMEDIATE CONTOUR LINES
420	INDEX CONTOUR LINES
422.53	SPOT ELEVATIONS
2.00%	SLOPE OR GRADE LABEL

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
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K&W PROJECT:	2344.001
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REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
GRADING PLAN B

SHEET:
C1.9

LEGEND

- PROPOSED GRADING FEATURES
- 421 — INTERMEDIATE CONTOUR LINES
- 420 — INDEX CONTOUR LINES
- 422.53 — SPOT ELEVATIONS
- 2.00% — SLOPE OR GRADE LABEL

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-E_UGRADE.dwg

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PLAN TYPE:
GRADING PLAN C

SHEET:
C1.10

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LEGEND

	PROPOSED GRADING FEATURES
421	INTERMEDIATE CONTOUR LINES
420	INDEX CONTOUR LINES
422.53	SPOT ELEVATIONS
2.00%	SLOPE OR GRADE LABEL

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

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PLAN TYPE:
GRADING PLAN D

SHEET:
C1.11

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LEGEND

PROPOSED UTILITY FEATURES

- SANITARY SEWER MANHOLE
- MH 4 — SANITARY SEWER STRUCTURE LABEL
- S — SANITARY SEWER MAIN
- SANITARY SEWER SERVICE LATERAL
- FM — SANITARY SEWER FORCE MAIN
- DRAINAGE MANHOLE
- DRAINAGE INLET
- YARD DRAINAGE INLET
- ENDWALL
- DRAINAGE CULVERT OR PIPE
- I-45 — DRAINAGE STRUCTURE LABEL
- RD — ROOF DRAIN PIPE
- RIPRAP
- UD — UNDERDRAIN
- W — WATER LINE
- FIRE HYDRANT

UTILITY NOTES

1. ALL ROOF DRAIN PIPING SHALL BE INSTALLED AT A MINIMUM SLOPE OF 1%.
2. ALL SANITARY SEWER CONSTRUCTION MATERIALS, METHOD AND APPURTENANCES SHALL BE IN ACCORDANCE WITH PADEP'S DOMESTIC WASTEWATER FACILITIES MANUAL AND SUSQUEHANNA TOWNSHIP AUTHORITY'S STANDARD SPECIFICATIONS AND DETAILS AT THE TIME OF CONSTRUCTION.
3. THE PENETRATION INTO THE EX. SANITARY SEWER MANHOLE SHALL BE 0.10" ABOVE THE EX. CHANNEL INVERT AND A PSX II BOOT AND TWO (2) STAINLESS STEEL CLAMPS SHALL BE USED. A NEW CHANNEL MUST BE CUT OUT AND FORMED TO SUSQUEHANNA TOWNSHIP AUTHORITY SPECIFICATIONS.
4. ALL SANITARY SEWER LATERAL SECTIONS SHALL BE INSTALLED WITH A MINIMUM SLOPE OF 1%. ALL APARTMENT BUILDINGS SHALL HAVE A 6" SDR-35 PVC SEWER LATERAL, TOWNHOUSES SHALL HAVE A 4" SDR-35 PVC SEWER LATERAL.
5. CURB BOXES ARE REQUIRED OVER ALL SANITARY SEWER CLEANOUTS AND WATER LINE VALVES. ALL CURB BOXES SHALL BE BROUGHT TO FINISHED GRADE
6. EXACT NATURAL GAS CONNECTION POINT TO EXISTING DISTRIBUTION SYSTEM TO BE DETERMINED BY UGI UTILITIES, INC. CONTRACTOR IS RESPPONSIBLE FOR EXCAVATING THE ENTIRE SERVICE TRENCH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE GAS LINE INSTALLATION WITH UGI UTILITIES, INC.
7. ALL DRAINAGE STRUCTURES (INCLUDING INLETS, MANHOLES, ENDWALLS, ETC.) PROPOSED FOR DEDICATION OR LOCATED WITHIN A STREET SECTION SHALL BE CAPABLE OF HANDLING AN HS-25 LOADING.
8. ALL STORMWATER PIPES, CULVERTS, MANHOLES, INLETS, ENDWALLS AND END SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS SET FORTH IN PENNDOT PUBLICATION 408, AS AMENDED, AND SHALL CONFORM TO THE REQUIREMENTS OF THE PENNDOT, BUREAU OF DESIGN, STANDARDS FOR ROADWAY CONSTRUCTION (RC), PUBLICATION NO. 72, IN EFFECT AT THE TIME THE DESIGN IS SUBMITTED.
9. ALL WATER MAINS ARE TO BE C900 PVC PIPE.
10. ALL PADEP WATER SUPPLY REGULATIONS SHALL APPLY.
11. WATER LINES SHALL BE KEPT SEPARATED A MINIMUM OF FIVE (5) FEET HORIZONTALLY FROM ANY OTHER UTILITY, EXCEPT SANITARY SEWER LINES, THE SEPARATION FOR WHICH SHALL BE IN ACCORDANCE WITH PADEP REGULATIONS.
12. ALL WATER MAINS ARE TO BE PRESSURE TESTED WITH A REPRESENTATIVE OF THE WATER DEPARTMENT PRESENT DURING THE TESTING.
13. ALL APARTMENT BUILDINGS SHALL HAVE A 4" C900 WATER LATERAL CONNECTED TO NEW MAIN. ALL TOWNHOUSE UNITS SHALL HAVE A 1.75" K COPPER LINE CONNECTED TO NEW MAIN. TOWNHOUSE UNITS SHALL HAVE INDIVIDUAL WATER METERS.

GRAPHIC SCALE

40 20 0 40

1"= 40 FEET

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SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-F_UTILITY.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
UTILITY PLAN A

SHEET:
C1.12

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MATCH LINE SHEET C1.12
MATCH LINE SHEET C1.13

MARTINA DRIVE

ELMERTON AVENUE S.R. 3026

INFILTRATION BASIN (BMP 9)

CHANNEL 9A

6" SDR-35 PVC SEWER MAIN

4" SDR-35 FORCE MAIN

8" C900 WATER MAIN

6" SDR-35 PVC SEWER MAIN

ANTI-SEEP COLLAR (SEE DETAIL)

70' WIDE EMERGENCY SPILLWAY @ ELEV 451.85

RAIN GARDEN (BMP 4)

INFILTRATION BASIN (BMP 1)

30' WIDE EMERGENCY SPILLWAY @ ELEV 414.95

RAIN GARDEN (BMP 3)

WATER METER & PIT

85' WIDE EMERGENCY SPILLWAY @ ELEV 439.60

INFILTRATION BASIN (BMP 2)

Wetland Area "D"

Utility Pole PPL 25008-S35219

Utility Pole PPL 25024-S35228

Utility Pole PPL 24993-S35251

DW Endwall Outfall = 406.37

Storm Inlet Rim Elevation = 417.41 PVC Inv = 415.85 CMP Inv = 414.36

PVC Base Drain

MATCH LINE SHEET C1.13
MATCH LINE SHEET C1.15

LEGEND

PROPOSED UTILITY FEATURES

- SANITARY SEWER MANHOLE
- SANITARY SEWER STRUCTURE LABEL
- SANITARY SEWER MAIN
- SANITARY SEWER SERVICE LATERAL
- SANITARY SEWER FORCE MAIN
- DRAINAGE MANHOLE
- DRAINAGE INLET
- YARD DRAINAGE INLET
- ENDWALL
- DRAINAGE CULVERT OR PIPE
- DRAINAGE STRUCTURE LABEL
- ROOF DRAIN PIPE
- RIPRAP
- UNDERDRAIN
- WATER LINE
- FIRE HYDRANT

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP, DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-F_IdUTILITY.dwg

REVISIONS

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PLAN TYPE:
UTILITY PLAN B

SHEET:
C1.13

LEGEND

PROPOSED UTILITY FEATURES

- SANITARY SEWER MANHOLE
- SANITARY SEWER STRUCTURE LABEL
- SANITARY SEWER MAIN
- SANITARY SEWER SERVICE LATERAL
- SANITARY SEWER FORCE MAIN
- DRAINAGE MANHOLE
- DRAINAGE INLET
- YARD DRAINAGE INLET
- ENDWALL
- DRAINAGE CULVERT OR PIPE
- DRAINAGE STRUCTURE LABEL
- ROOF DRAIN PIPE
- RIPRAP
- UNDERDRAIN
- WATER LINE
- FIRE HYDRANT

GRAPHIC SCALE

40 20 0 40

1"= 40 FEET

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CAD DRAWING:	2344001-F_&UTILITY.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
UTILITY PLAN C

SHEET:
C1.14

LEGEND

PROPOSED UTILITY FEATURES

- SANITARY SEWER MANHOLE
- SANITARY SEWER STRUCTURE LABEL (MH 4)
- SANITARY SEWER MAIN (S)
- SANITARY SEWER SERVICE LATERAL
- SANITARY SEWER FORCE MAIN (FM)
- DRAINAGE MANHOLE
- DRAINAGE INLET
- YARD DRAINAGE INLET
- ENDWALL
- DRAINAGE CULVERT OR PIPE
- DRAINAGE STRUCTURE LABEL (I-45)
- ROOF DRAIN PIPE (RD)
- RIPRAP
- UNDERDRAIN (UD)
- WATER LINE (W)
- FIRE HYDRANT

GRAPHIC SCALE

40 20 0 40

1" = 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

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PLAN TYPE:
UTILITY PLAN D

SHEET:
C1.15

LEGEND

PROPOSED LANDSCAPE PLAN FEATURES

DECIDUOUS TREES

PLANTING LABEL (As 2)

LANDSCAPE NOTES

SITE PREPARATION

1. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS, AND OTHER FACILITIES, AND LAWNS AND EXISTING EXTERIOR PLANTS FROM DAMAGE CAUSED BY PLANTING OPERATIONS, CONTACT PA-1-CALL 1-800-242-1776 AT A MINIMUM OF THREE WORKING DAYS PRIOR TO COMMENCEMENT OF WORK.
2. PROVIDE EROSION CONTROL MEASURE TO PREVENT EROSION OR DISPLACEMENT OF SOILS AND DISCHARGE OF SOIL-BEARING WATER RUN-OFF OR AIRBORNE DUST TO ADJACENT PROPERTIES AND WALKWAYS.
3. ALL TREE AND SHRUB REMOVAL AS SHOWN ON THE DEMOLITION PLAN SHALL HAVE ALL STUMPS AND ROOTS REMOVED BY MEANS OF STUMP GRINDING AND/OR BACKHOE. ALL BIODEGRADABLE PLANT MATERIAL FROM THE REMOVAL PROCESS SHALL BE COLLECTED AND REMOVED FROM THE SITE.

PLANT BED ESTABLISHMENT

1. CONTRACTOR TO CONFIRM EXISTING TOPSOIL DEPTH AND SHALL FURNISH SOIL ANALYSIS BY QUALIFIED LAB STATING PERCENTAGES OF ORGANIC MATTER, GRADUATION OF SAND, SILT AND CLAY CONTENT, DELETERIOUS MATERIAL, PH AND MINERAL AND PLANT-NUTRIENT content of topsoil. Contractor to provide data at a minimum of 5 different planting areas. Contractor TO SUBMIT EXISTING TOPSOIL DEPTH AND RECOMMENDED QUANTITIES OF NITROGEN, PHOSPHORUS AND POTASH INGREDIENTS TO BE ADDED TO PRODUCE A SATISFACTORY TOPSOIL TO LANDSCAPE ARCHITECT FOR APPROVAL.
2. TOPSOIL SHALL HAVE ACIDITY RANGE OF PH 5.0 TO PH 7.0 AND AN ORGANIC CONTENT OF AT LEAST 3-4%. MINIMUM TOPSOIL DEPTH IN PLANTING BEDS SHALL BE 12" BUT 18" IS RECOMMENDED. ADDITIONAL TOPSOIL SHALL BE ADDED WHEN POSSIBLE.
3. APPLY APPROVED SOIL AMENDMENTS AND FERTILIZER ON SURFACE AND THOROUGHLY BLEND PLANTING SOIL MIX FOR PLANTING BACKFILL.
4. LAY OUT INDIVIDUAL TREE AND SHRUB LOCATIONS AND AREAS FOR MULTIPLE EXTERIOR PLANTINGS. STAKE LOCATIONS, OUTLINE AREAS, ADJUST LOCATIONS WHEN REQUESTED, AND OBTAIN LANDSCAPE ARCHITECTS ACCEPTANCE OF LAYOUT BEFORE PLANTING. MAKE MINOR ADJUSTMENTS AS REQUIRED.

PLANT MATERIAL

1. FURNISH NURSERY-GROWN TREES COMPLYING WITH ANSI Z60.1, WITH HEALTHY ROOT SYSTEMS DEVELOPED BY TRANSPLANTING OR ROOT PRUNING, PROVIDE WELL-SHAPED, FULLY BRANCHED, HEALTHY, VIGOROUS STOCK-FREE OF DISEASE, INSECTS, EGGS, LARVAE, AND DEFECTS SUCH AS KNOTS, SUN SCALE, INJURIES, ABRASIONS, AND DISFIGUREMENT.
2. PROVIDE TREES OF SIZES AND GRADES COMPLYING WITH ANSI Z60.1 FOR THE TYPE OF TREES REQUIRED. TREES OF A LARGER SIZE MAY BE USED IF ACCEPTABLE TO ARCHITECT, WITH A PROPORTIONATE INCREASE IN SIZE OF ROOTS OR BALLS.
3. IF FORMAL ARRANGEMENTS OR CONSECUTIVE ORDER OF TREES IS SHOWN, SELECT STOCK FOR UNIFORM HEIGHT AND SPREAD, AND NUMBER LABEL TO ASSURE SYMMETRY IN PLANTING.

CLEANUP AND PROTECTION

1. DURING EXTERIOR PLANTING, KEEP ADJACENT PAVING AND CONSTRUCTION CLEAN AND WORK AREA IN AN ORDERLY CONDITION.
2. PROTECT EXTERIOR PLANTS FROM DAMAGE DUE TO LANDSCAPE OPERATIONS, OPERATIONS BY OTHER CONTRACTORS AND TRADES, AND OTHERS. MAINTAIN PROTECTION DURING INSTALLATION AND MAINTENANCE PERIODS. TREAT, REPAIR, OR REPLACE DAMAGED EXTERIOR PLANTING.

DISPOSAL

1. REMOVE SURPLUS SOIL AND WASTE MATERIAL, INCLUDING EXCESS SUBSOIL, UNSUITABLE SOIL, TRASH, AND DEBRIS, AND LEGALLY DISPOSE OF THEM OFF OWNER'S PROPERTY.

WARRANTY

1. WARRANT THE FOLLOWING EXTERIOR PLANTS FOR THE WARRANTY PERIOD INDICATED IN THE SPECIFICATIONS, AGAINST DEFECTS INCLUDING DEATH ND UNSATISFACTORY GROWTH. WARRANTY PERIODS FOR ALL PLANT MATERIAL AND SOD: ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION.
2. REMOVE DEAD EXTERIOR PLANTS IMMEDIATELY. REPLACE IMMEDIATELY UNLESS REQUIRED TO PLANT IN THE SUCCEEDING PLANTING SEASON.
3. REPLACE EXTERIOR PLANTS THAT ARE MORE THAN 25 PERCENT DEAD OR IN AN UNHEALTHY CONDITION AT END OF WARRANTY PERIOD.
4. A LIMIT OF ONE REPLACEMENT OF EACH EXTERIOR PLANT WILL BE REQUIRED, EXCEPT FOR LOSSES OR REPLACEMENTS DUE TO FAILURE TO COMPLY WITH REQUIREMENTS.

MISC. PLANTING NOTES

1. ALL PLANTING MATERIAL TO BE INSTALLED AS PER SIZE INDICATED ON PLANT SCHEDULE.
2. ANY SUBSTITUTIONS THAT MAY BE REQUIRED SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO ORDERING MATERIAL.
3. ALL PLANTINGS AND PLANTING PROCEDURES SHALL CONFORM TO GOOD NURSERY AND LANDSCAPE PRACTICE AND THE STANDARDS SET FORTH BY THE AMERICAN ASSOCIATION OF NURSERYMAN.
4. PRIOR TO COMMENCEMENT OF WORK ALL UTILITIES BOTH ABOVE AND BELOW GROUND SHALL BE LOCATED THROUGH THE PA 1CALL SYSTEM AND/OR THE GENERAL CONTRACTOR ON SITE. IF ANY CONFLICTS DO OCCUR THE LANDSCAPE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY FOR RELOCATION.
5. CONTRACTOR TO VERIFY ALL PLANT COUNTS AND LOCATIONS PRIOR TO ORDERING MATERIAL. K&W AND THE OWNER ACCEPT NO RESPONSIBILITY FOR TYPOGRAPHICAL ERRORS AND MISCOUNTS.
6. ALL PLANTINGS SHALL HAVE WATER RETAINING CRYSTALS SUCH AS TERRASORB, OR APPROVED EQUAL, INCORPORATED INTO PLANTING SOIL AS RECOMMENDED BY MANUFACTURER.
7. ANY PLANT NOT INCLUDED IN A PLANTING BED SHALL HAVE A MULCHED CIRCLE. THE SIZE OF THE MULCHED CIRCLE SHALL BE DETERMINED ACCORDING TO THE OVERALL PLANT SIZE OR CALIPER. CONSULT THE LANDSCAPE ARCHITECT FOR CLARIFICATION IF REQUIRED.
8. EACH PLANT SHALL BE PLANTED SUCH THAT THE ROOT FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL. DO NOT, AT ANY TIME, COVER THE ROOTBALL WITH TOPSOIL BACKFILL.
9. THE TOPSOIL BACKFILL SHALL BE FIRMLY TAMPED, COMPARABLE TO FOOT PRESSURE, IN 3" LIFTS TO STABILIZE THE ROOT BALL AND TO PREVENT AIR POCKETS.
10. WATER ALL PLANTINGS INDIVIDUALLY WITH AN OPEN ENDED GARDEN HOSE SUBSEQUENT TO INSTALLATION. DO NOT USE MECHANICAL SPRINKLERS TO WATER PLANTINGS.

SEEDING SCHEDULE

AREA 1 SEED MIX (BASIN FLOOR)
RETENTION BASIN FLOOR MIX - ERNMX-126
RATE: ½ LB/ 1,000 SF

AREA 2 SEED MIX (BASIN SLOPES)
NATIVE STEEP SLOPE MIX WITH ANNUAL RYE-
ERNMX-181; RATE:1 ½ LB/ 1,000 SF

AREA 3 SEED MIX (GENERAL DISTURBED AREA)
5311 CONSERVATION MIX- ERNMX-114;
RATE: 3-5 LB/ 1,000 SF

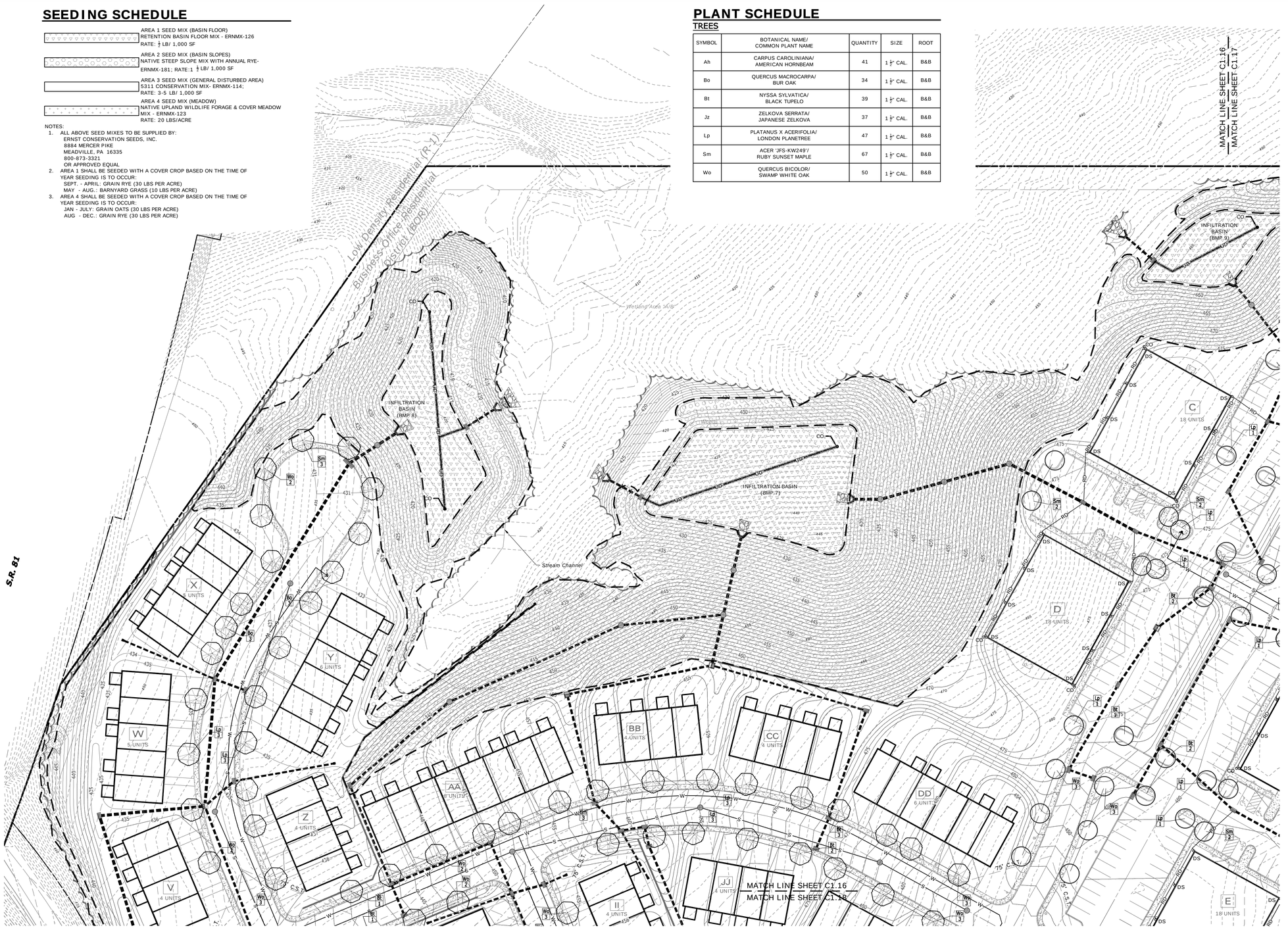
AREA 4 SEED MIX (MEADOW)
NATIVE UPLAND WILDLIFE FORAGE & COVER MEADOW
MIX - ERNMX-123
RATE: 20 LBS/ACRE

NOTES:
1. ALL ABOVE SEED MIXES TO BE SUPPLIED BY:
   ERNST CONSERVATION SEEDS, INC.
   8884 MERCER PIKE
   MEADVILLE, PA 16335
   800-873-3321
   OR APPROVED EQUAL
2. AREA 1 SHALL BE SEEDED WITH A COVER CROP BASED ON THE TIME OF YEAR SEEDING IS TO OCCUR:
   SEPT. - APRIL: GRAIN RYE (30 LBS PER ACRE)
   MAY - AUG.: BARNYARD GRASS (10 LBS PER ACRE)
3. AREA 4 SHALL BE SEEDED WITH A COVER CROP BASED ON THE TIME OF YEAR SEEDING IS TO OCCUR:
   JAN - JULY: GRAIN OATS (30 LBS PER ACRE)
   AUG - DEC.: GRAIN RYE (30 LBS PER ACRE)

PLANT SCHEDULE

TREES

SYMBOL	BOTANICAL NAME/ COMMON PLANT NAME	QUANTITY	SIZE	ROOT
Ah	CARPUS CAROLINIANA/ AMERICAN HORNBEAM	41	1 ½" CAL.	B&B
Bo	QUERCUS MACROCARPA/ BUR OAK	34	1 ½" CAL.	B&B
Bt	NYSSA SYLVATICA/ BLACK TUPELO	39	1 ½" CAL.	B&B
Jz	ZELKOVA SERRATA/ JAPANESE ZELKOVA	37	1 ½" CAL.	B&B
Lp	PLATANUS X ACERIFOLIA/ LONDON PLANETREE	47	1 ½" CAL.	B&B
Sm	ACER 'JFS-KW249'/ RUBY SUNSET MAPLE	67	1 ½" CAL.	B&B
Wo	QUERCUS BICOLOR/ SWAMP WHITE OAK	50	1 ½" CAL.	B&B



GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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DAUPHIN COUNTY, PA

PRELIMINARY LAND DEVELOPMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-G_dLS.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
LANDSCAPE PLAN A

SHEET:
C1.16

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MATCH LINE SHEET C1.16
MATCH LINE SHEET C1.17

MATCH LINE SHEET C1.17
MATCH LINE SHEET C1.19

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

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REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
LANDSCAPE PLAN B

SHEET:
C1.17

MATCH LINE SHEET C1.16
MATCH LINE SHEET C1.18

MATCH LINE SHEET C1.18
MATCH LINE SHEET C1.19

KOHN ROAD

STREET LIGHT

Business - Office Residential District (OOR)
Conservation District (C)

INFILTRATION BASIN (BMP 5)

INFILTRATION BASIN (BMP 6)

CLUBHOUSE

V 4 UNITS
II 4 UNITS
JJ 4 UNITS
KK 6 UNITS
EE 5 UNITS
MM 7 UNITS
HH 5 UNITS
FF 5 UNITS
U 4 UNITS
LL 4 UNITS
GG 5 UNITS
T 4 UNITS
S 5 UNITS
R 7 UNITS
Q 7 UNITS
NN 5 UNITS
OO 6 UNITS
P 6 UNITS
O 8 UNITS

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

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PLAN TYPE:
LANDSCAPE PLAN C

SHEET:
C1.18

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA

SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
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PLAN TYPE:
LANDSCAPE PLAN D

SHEET:
C1.19

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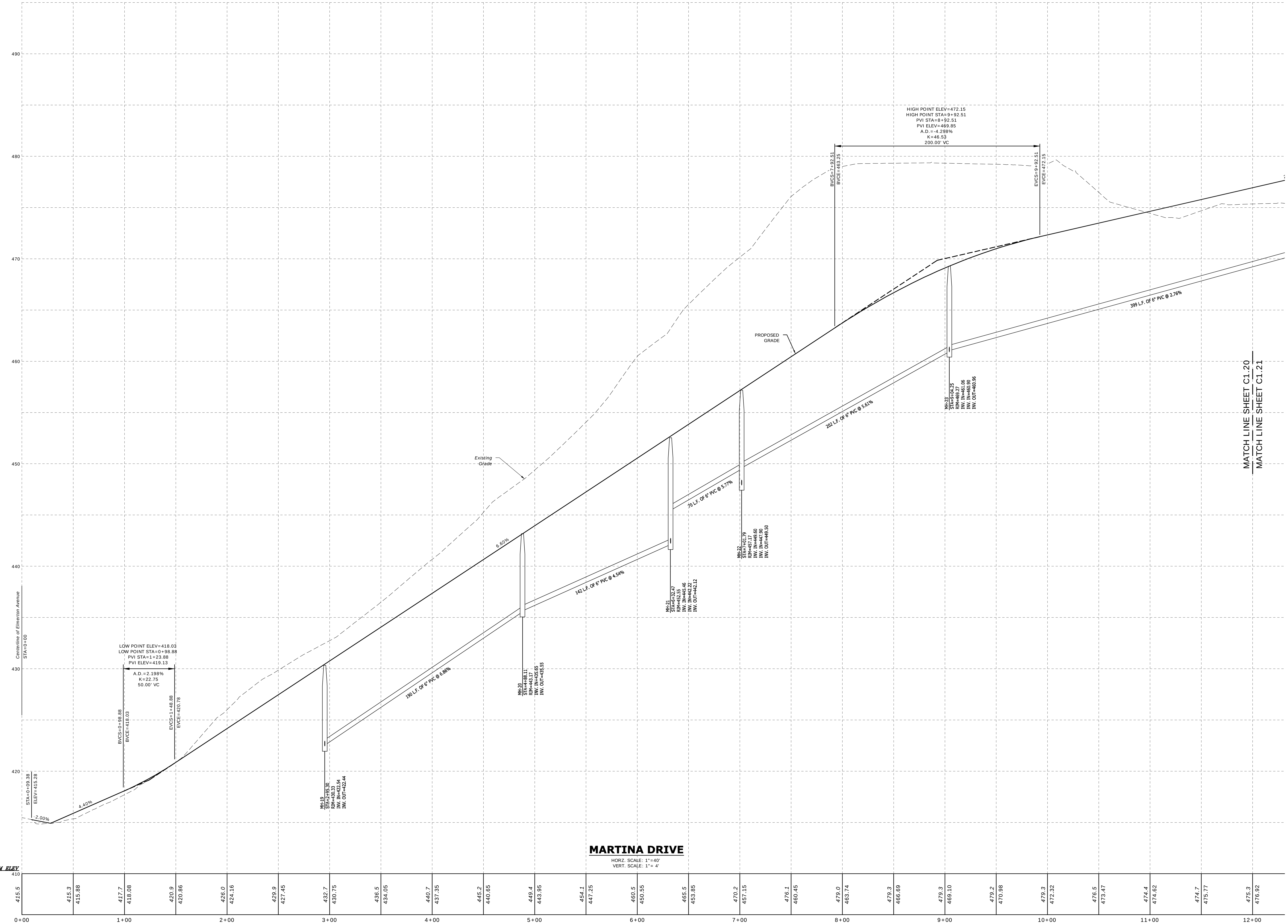

MARTINA DRIVE

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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PRELIMINARY LAND DEVELOPMENT PLAN

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INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA

SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

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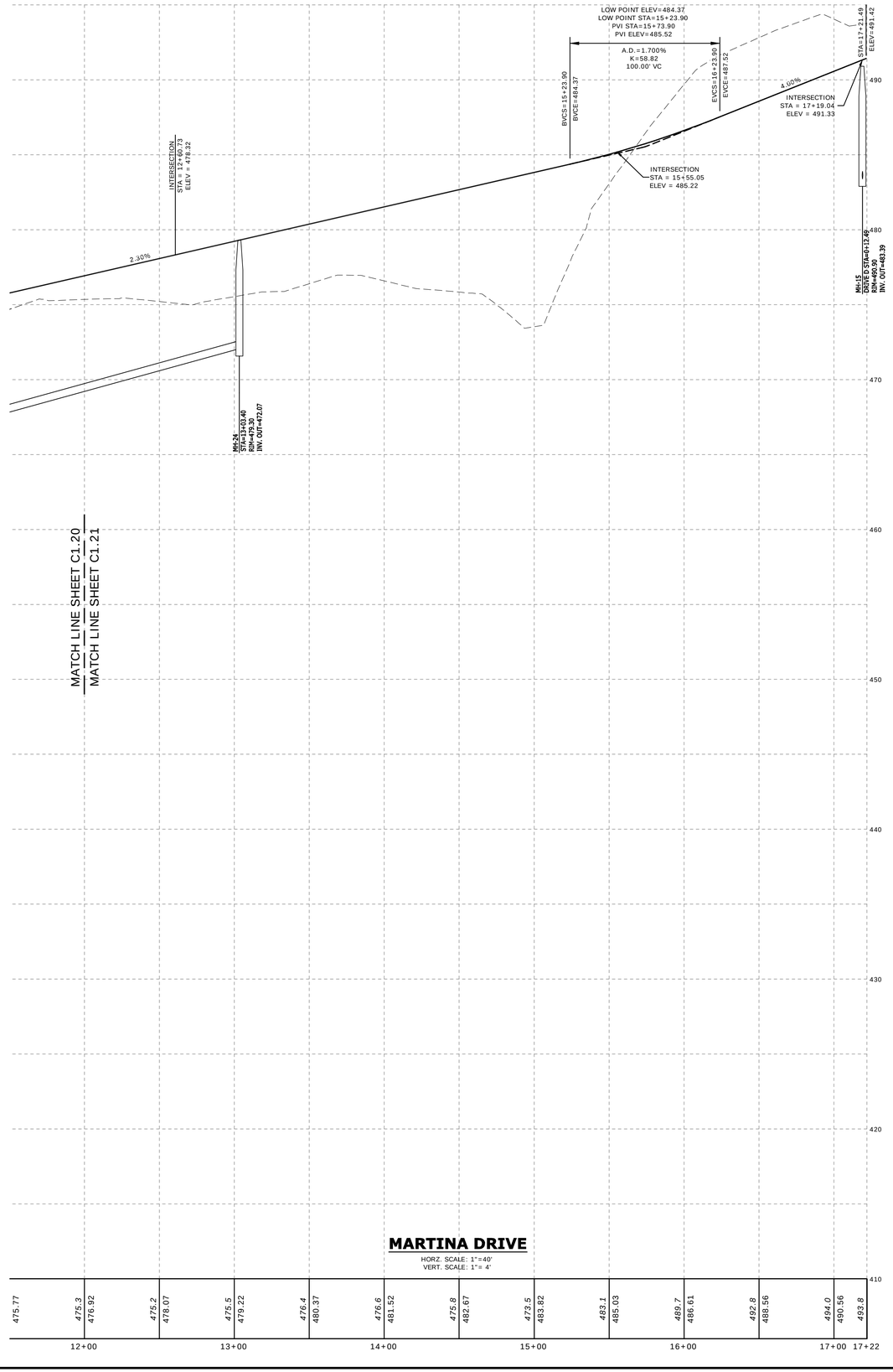
PLAN TYPE:
ROAD PROFILES

SHEET:
C1.20



MATCH LINE SHEET C1.20
MATCH LINE SHEET C1.21

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
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SUSQUEHANNA TOWNSHIP, DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE: AS SHOWN
DATE: NOVEMBER 07, 2022
K&W PROJECT: 2344.001
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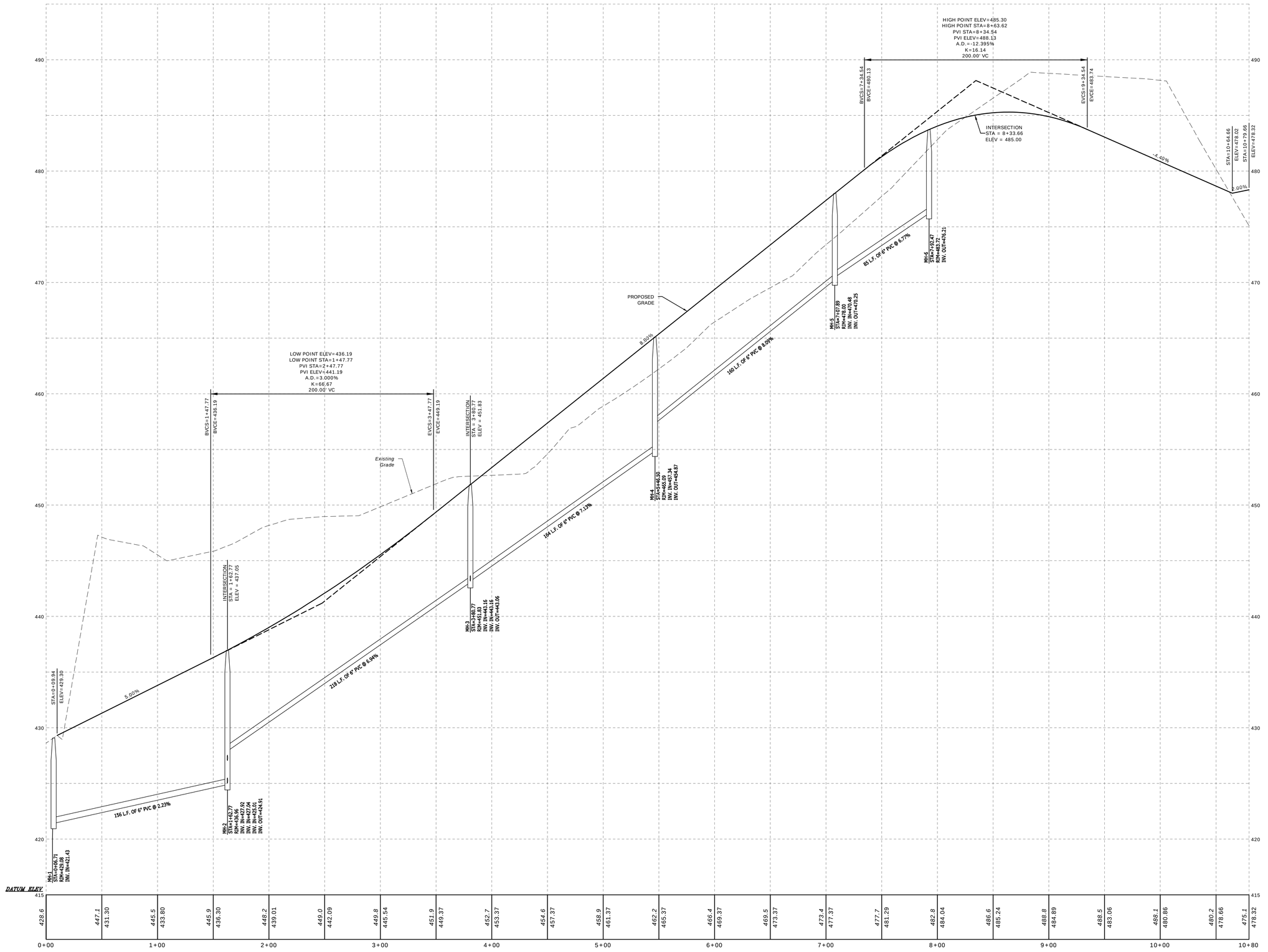
PLAN TYPE:
ROAD PROFILE

SHEET:
C1.21



DRIVE B

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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PRELIMINARY LAND DEVELOPMENT PLAN

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INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
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PLAN TYPE:
ROAD PROFILES

SHEET:
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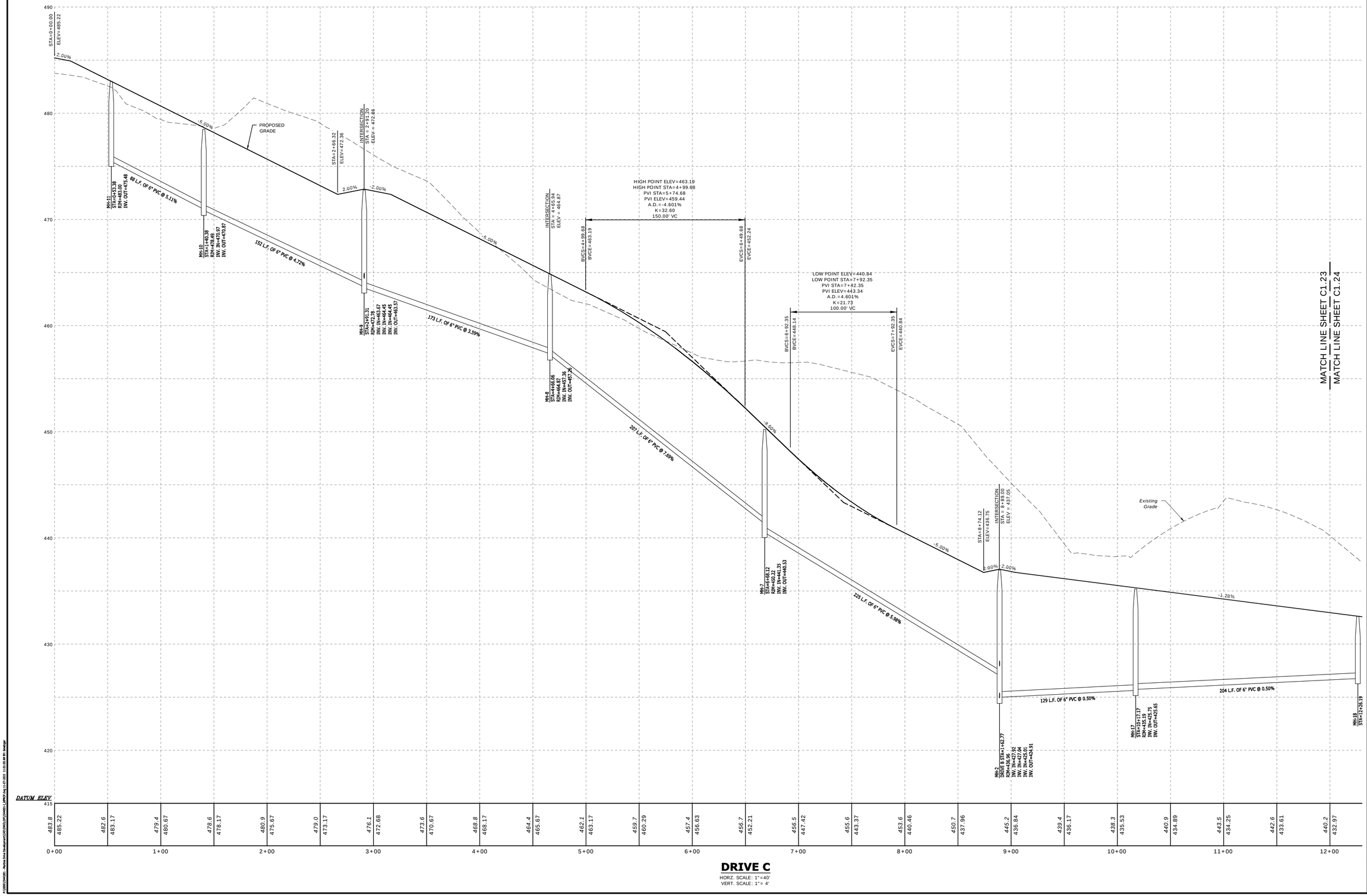

DRIVE C

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

MATCH LINE SHEET C1.23
MATCH LINE SHEET C1.24

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PRELIMINARY LAND DEVELOPMENT PLAN

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SUSQUEHANNA TOWNSHIP — DAUPHIN COUNTY, PA

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PLAN TYPE:
ROAD PROFILES

SHEET:
C1.23

DRIVE C

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

DRIVE D

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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1235 MARTINA DRIVE

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INCH'S PROPERTIES, LLC

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DAUPHIN COUNTY, PA

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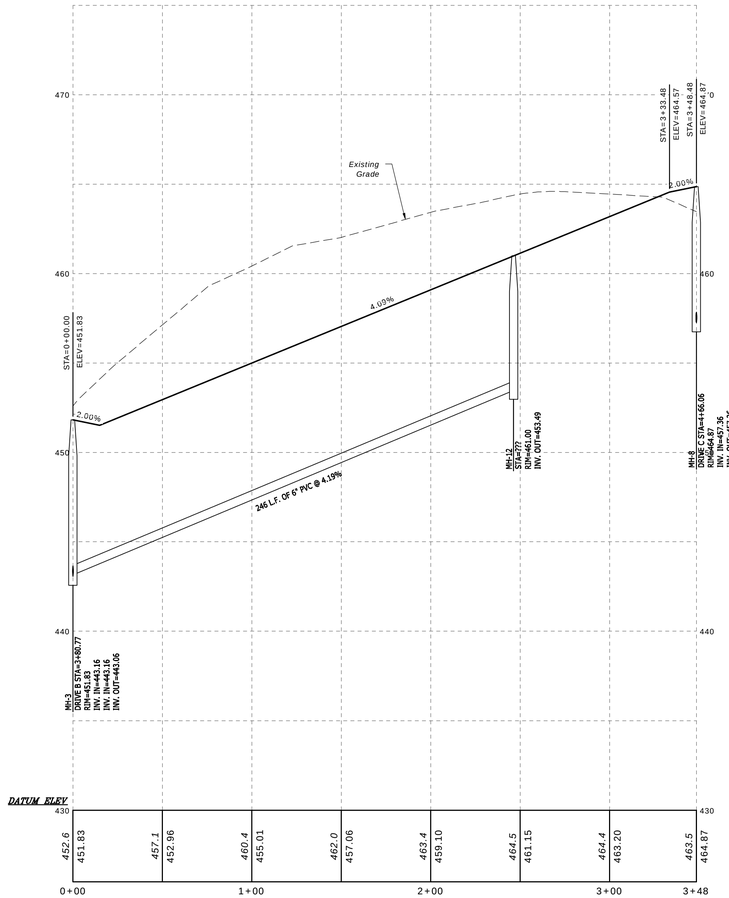
PLAN TYPE:
ROAD PROFILES

SHEET:
C1.24



DRIVE E

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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PRELIMINARY LAND DEVELOPMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-I_idPROF.dwg

REVISIONS NO.	DATE	DESCRIPTION
1		
2		
3		
4		
5		
6		
7		

PLAN TYPE:
ROAD PROFILES

SHEET:
C1.25

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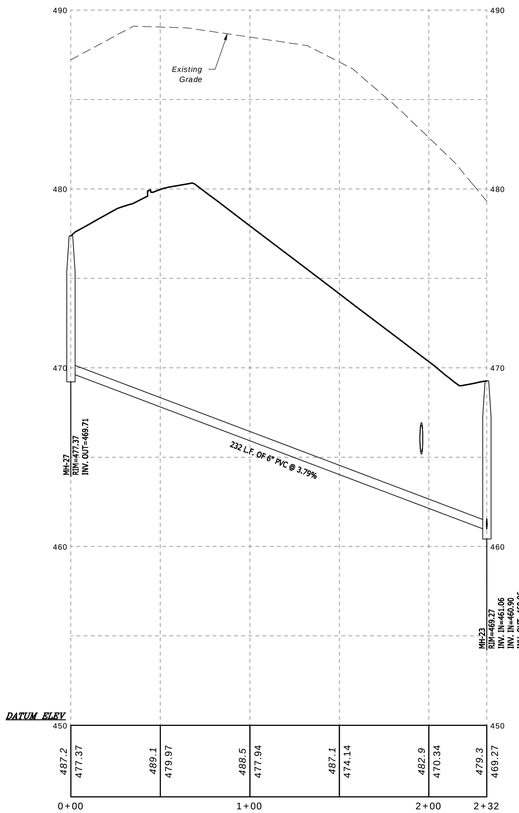
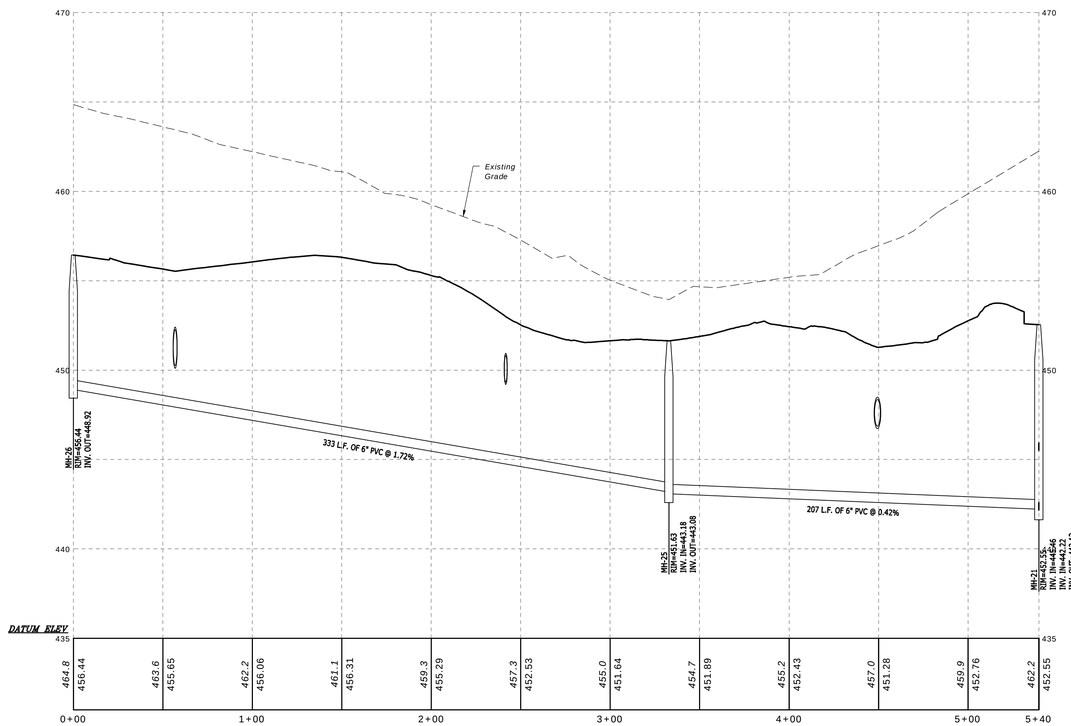


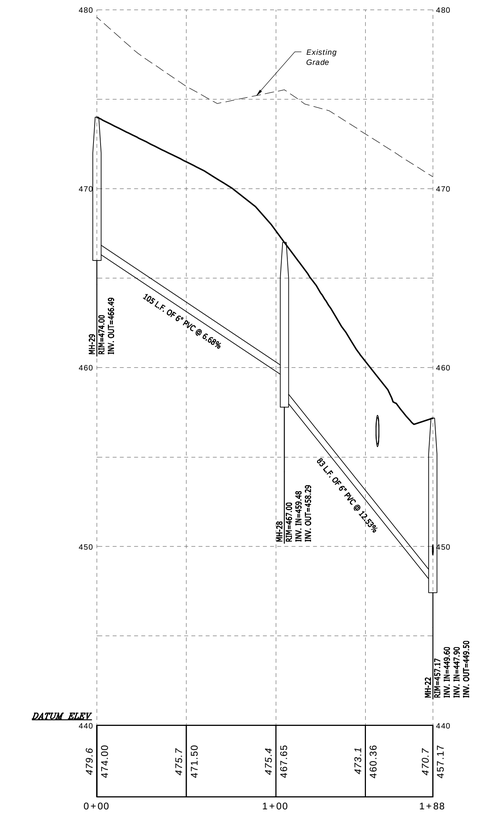
SANITARY: MH-27 to MH-23

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



SANITARY: MH-26 TO MH-21

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



SANITARY: MH-29 TO MH-22

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

K&W
DESIGNING ENVIRONMENTS
2201 North Front Street, Suite 200
Harrisburg, PA 17110
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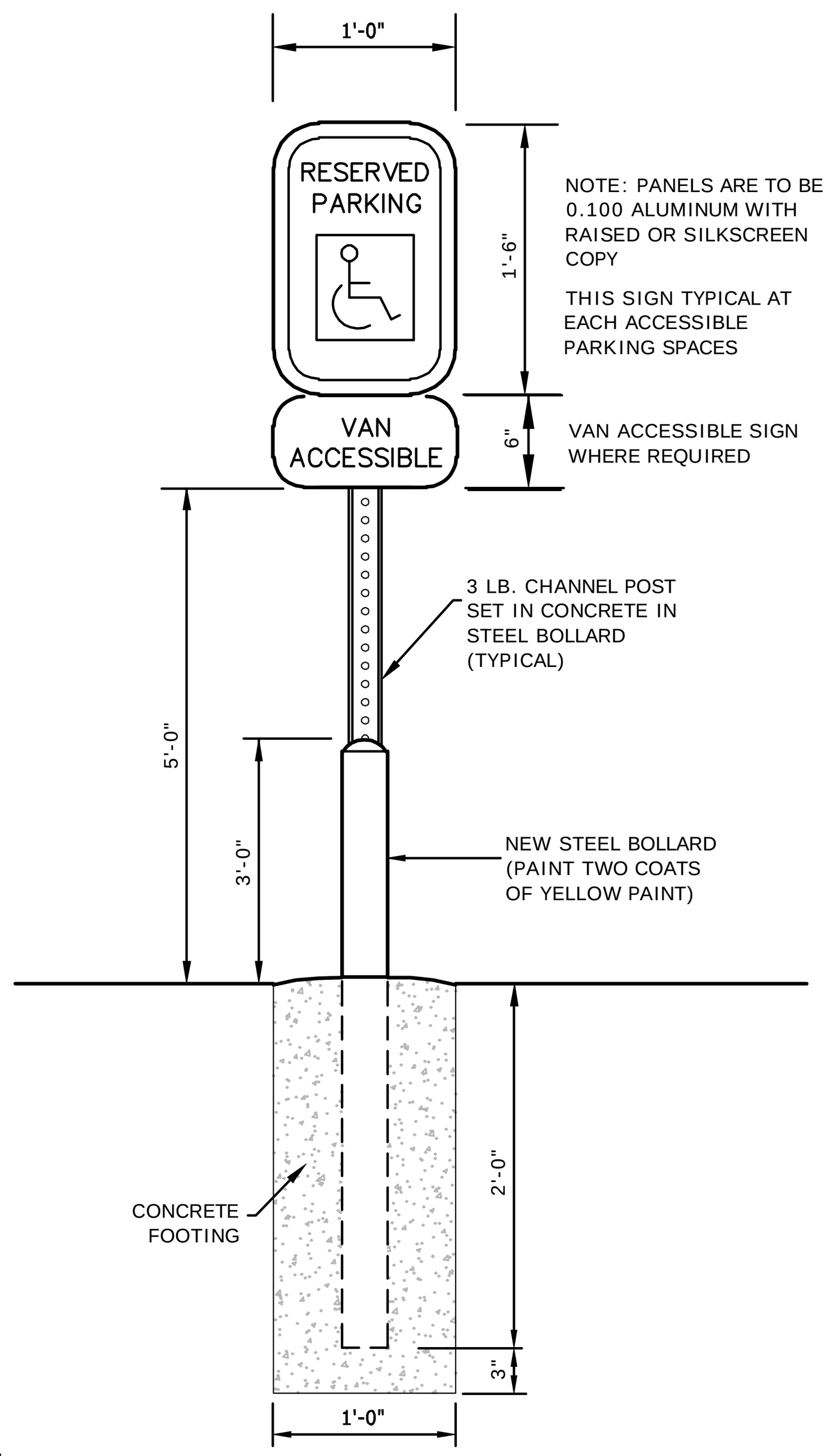
7		

PLAN TYPE:
SANITARY PROFILES

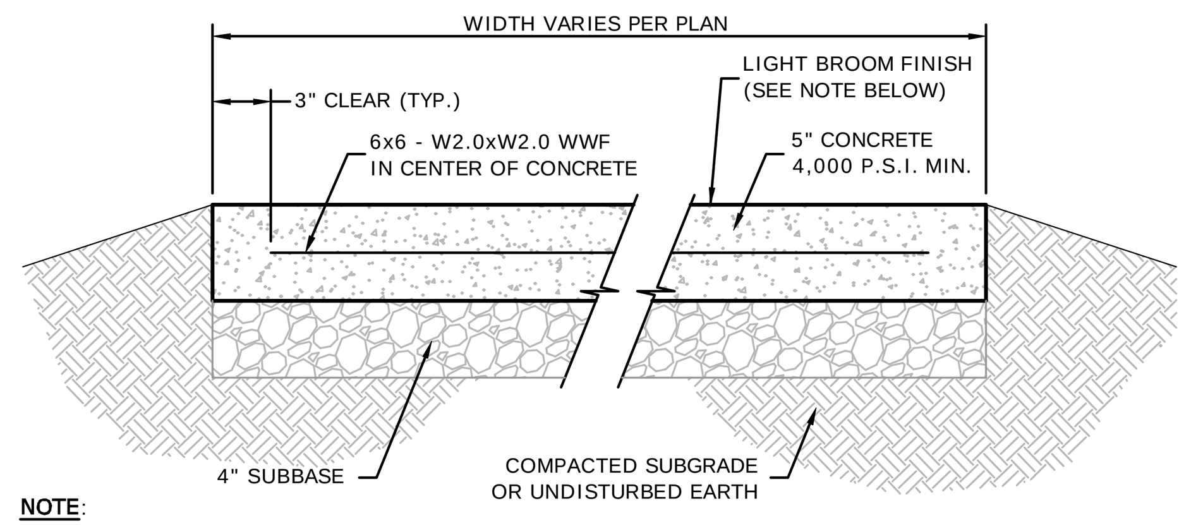
SHEET:
C1.26



NOTES:
1. SIGN SHALL BE INSTALLED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT, ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES, AS AMENDED.

H/C ACCESSIBLE PARKING SIGN

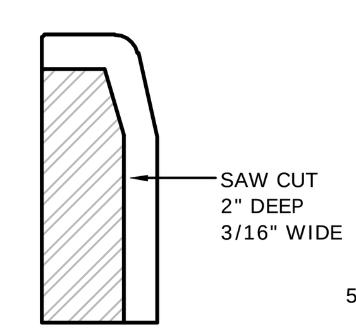
NOT TO SCALE



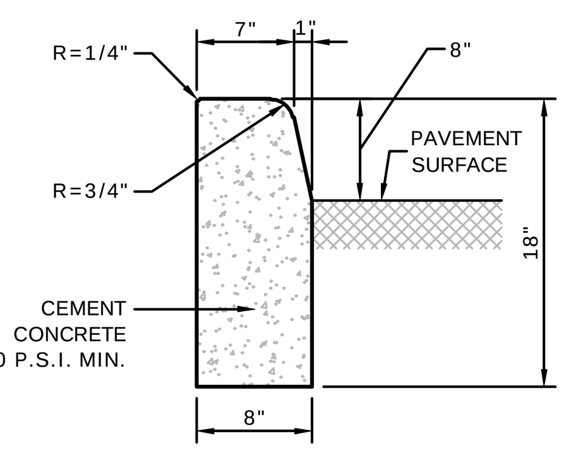
NOTE:
1. SPACE CONTROL JOINTS AT A 5'. PLACE EXPANSION JOINTS AT 20' MAXIMUM, ADJACENT TO EXISTING CONCRETE TO REMAIN, AND MATCH EXISTING IF APPLICABLE.

CONCRETE SIDEWALK

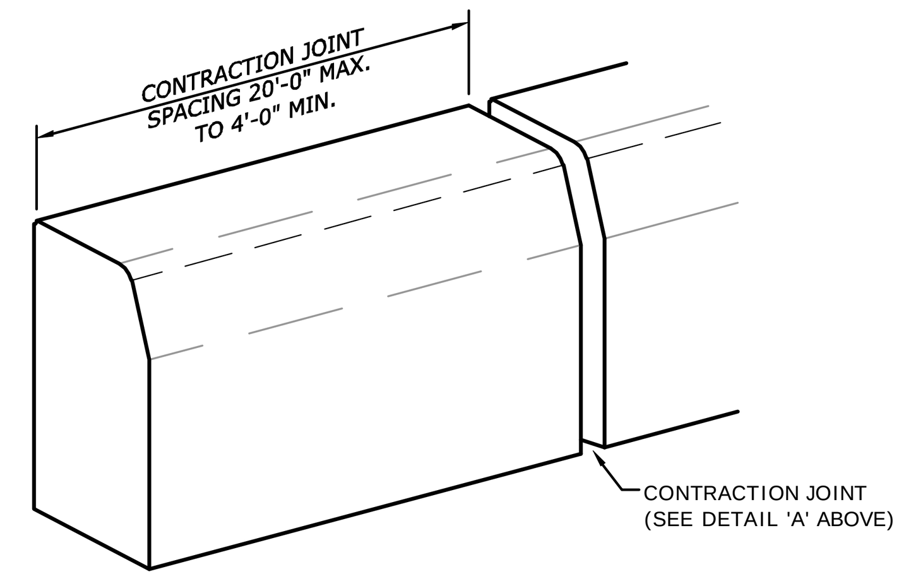
NOT TO SCALE



DETAIL 'A'
CONTRACTION JOINT

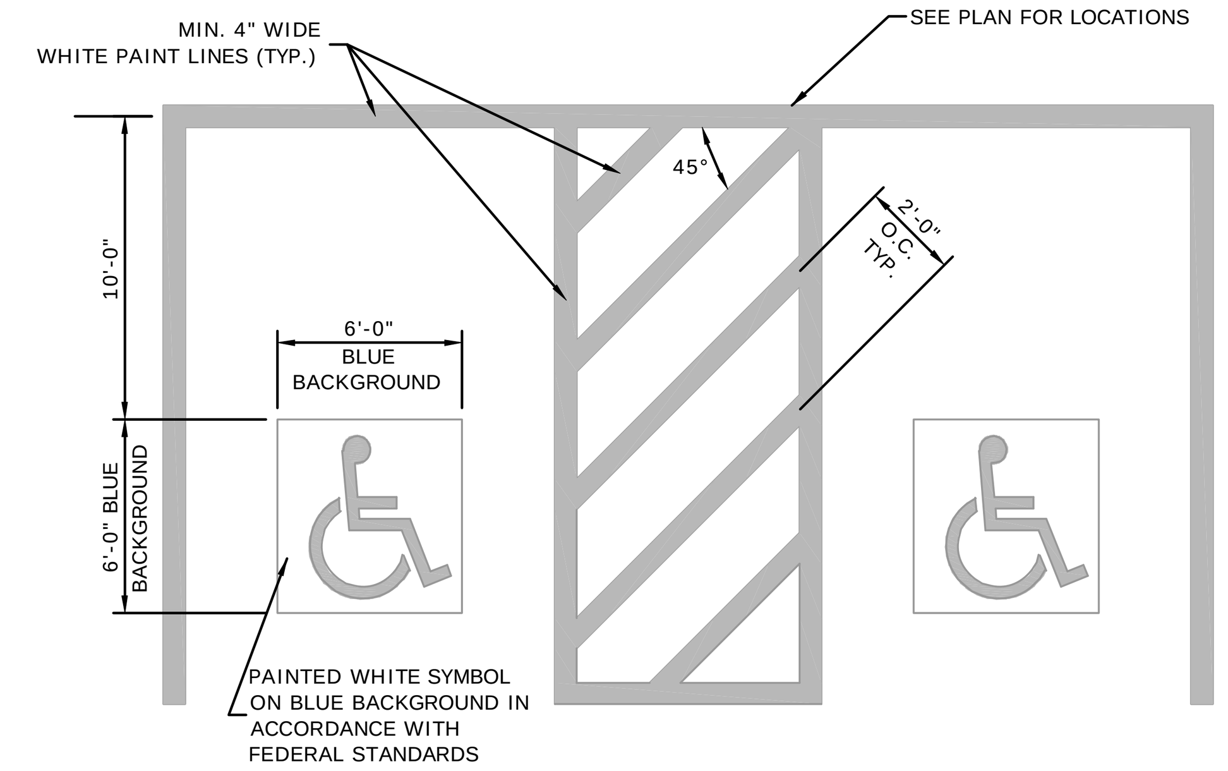


TYPICAL
CROSS SECTION



PENNDOT VERTICAL CURB

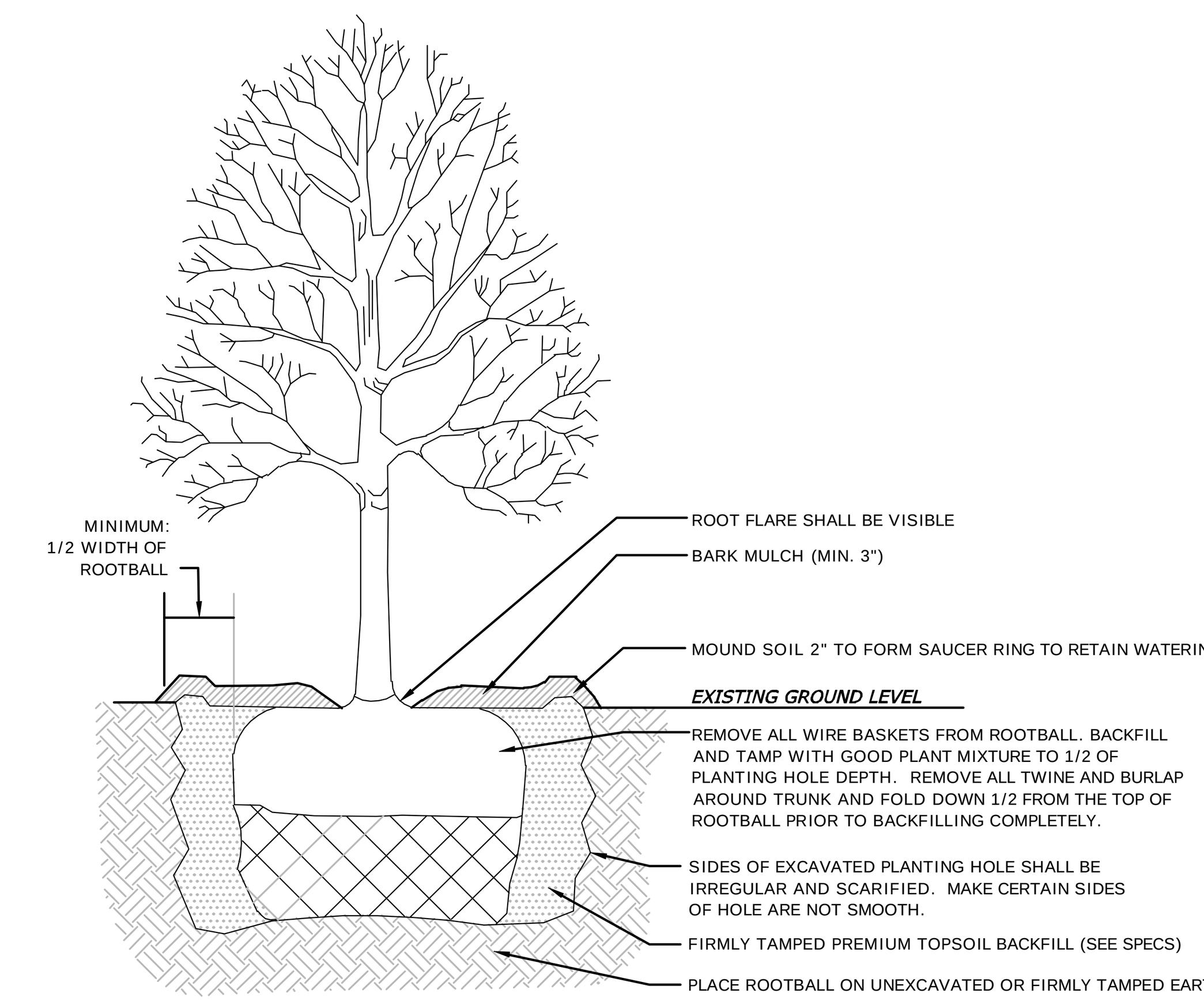
NOT TO SCALE



NOTES:
1. SEE SITE PLAN FOR ACCESSIBLE SPACE LOCATION AND DIMENSIONS.
2. PROVIDE 2 COATS OF PAINT ON ALL SURFACES.

H.C. ACCESSIBLE PARKING SPACE & TRAFFIC ISLAND PAVEMENT MARKING DETAIL

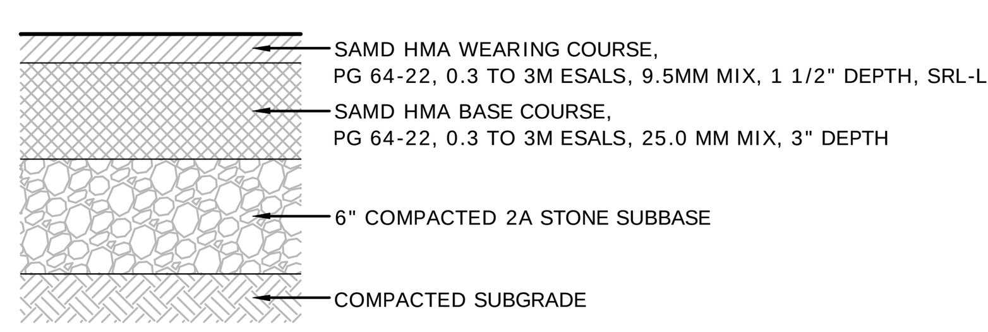
NOT TO SCALE



NOTES:
1. ROOTBALLS OF CONTAINERIZED TREES / SHRUBS SHALL BE SCARIFIED PRIOR TO TOPSOIL BACKFILL.
2. STAKING OF TREE MAY BE REQUIRED IF ROOT BALL OF TREE BECOMES LOOSE DURING PLANTING. FOLLOW AAN STAKING GUIDELINES IF STAKING IS REQUIRED.

DECIDUOUS TREE PLANTING

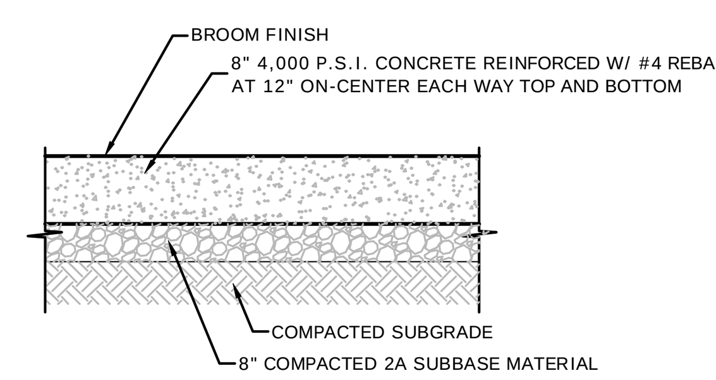
NOT TO SCALE



NOTE:
1. ALL PAVING MATERIALS AND INSTALLATION MATERIALS SHALL CONFORM TO PENNDOT PUBLICATION 408, AS AMENDED.

STANDARD DUTY PAVEMENT SECTION

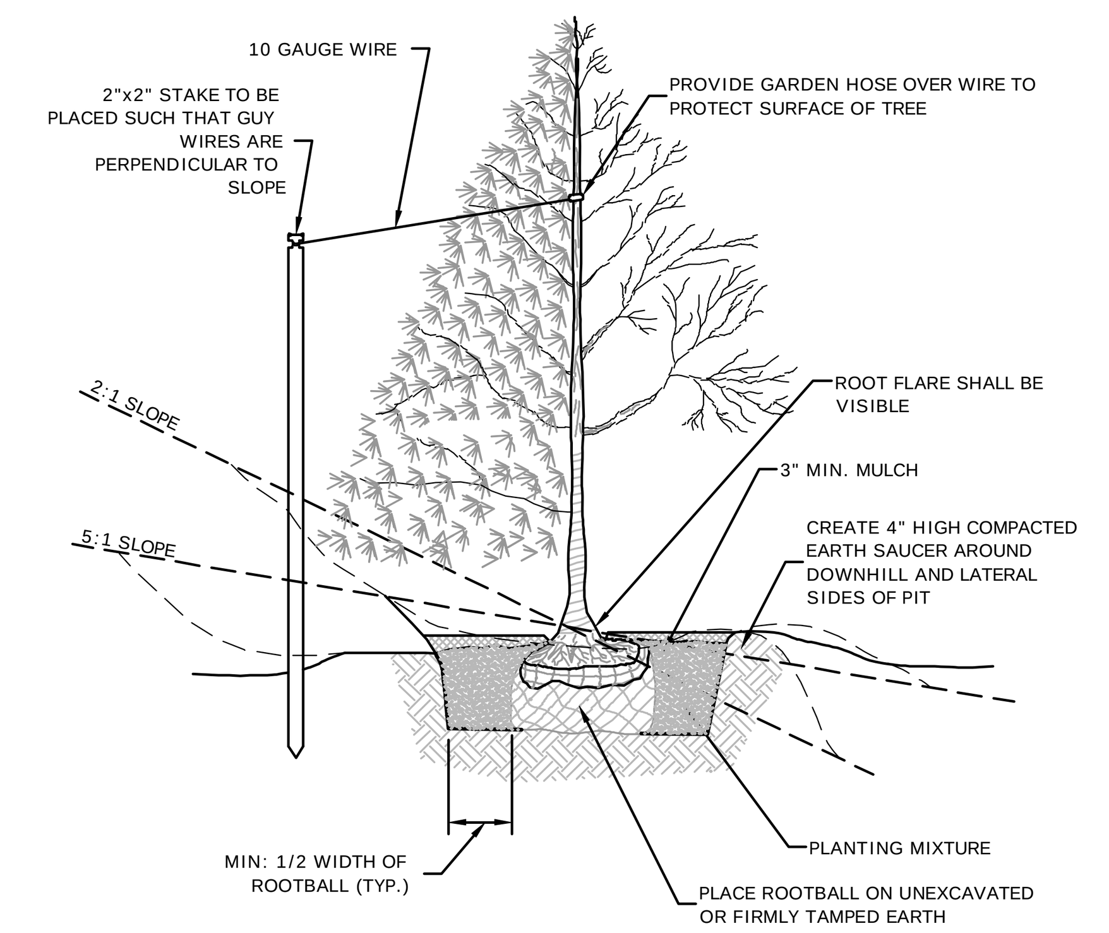
NOT TO SCALE



NOTE:
1. CONTROL AND EXPANSION JOINTS SHALL BE PER AMERICAN CONCRETE INSTITUTE STANDARDS.
2. FOR THE PROPANE TANK PAD, CONTROL JOINTS SHALL BE INCLUDED BETWEEN THE TANKS AND AT MID LENGTH OF THE TANKS.

CONCRETE PAD SECTION

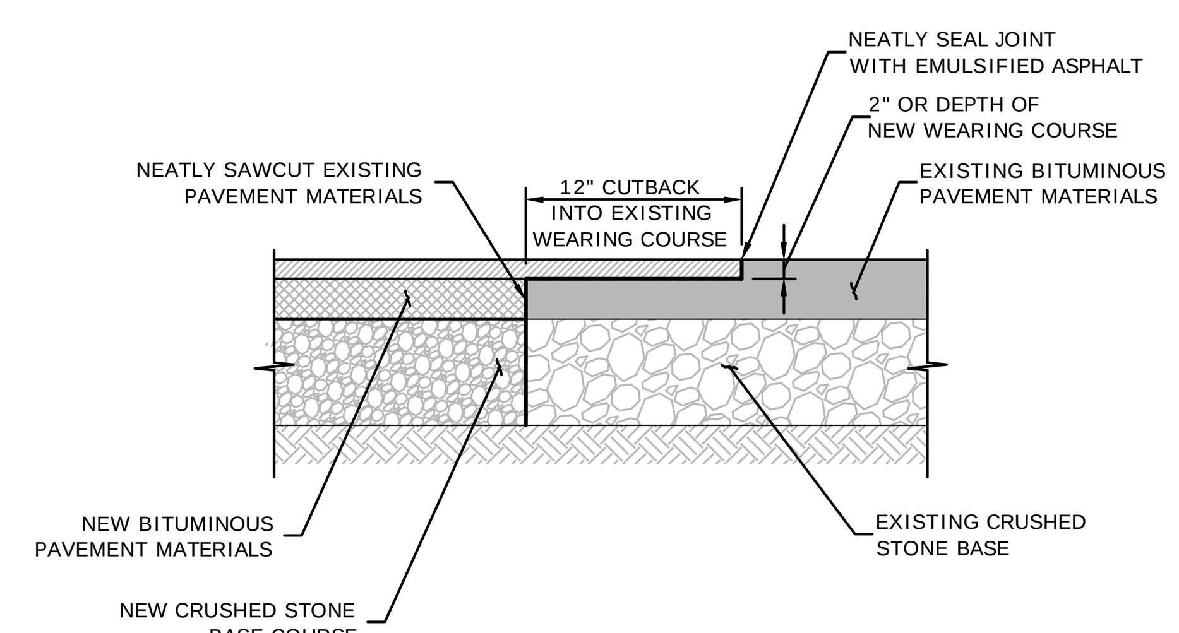
NOT TO SCALE



NOTE: REFER TO OTHER PLANTING DETAILS FOR ADDITIONAL REQUIRMENTS.

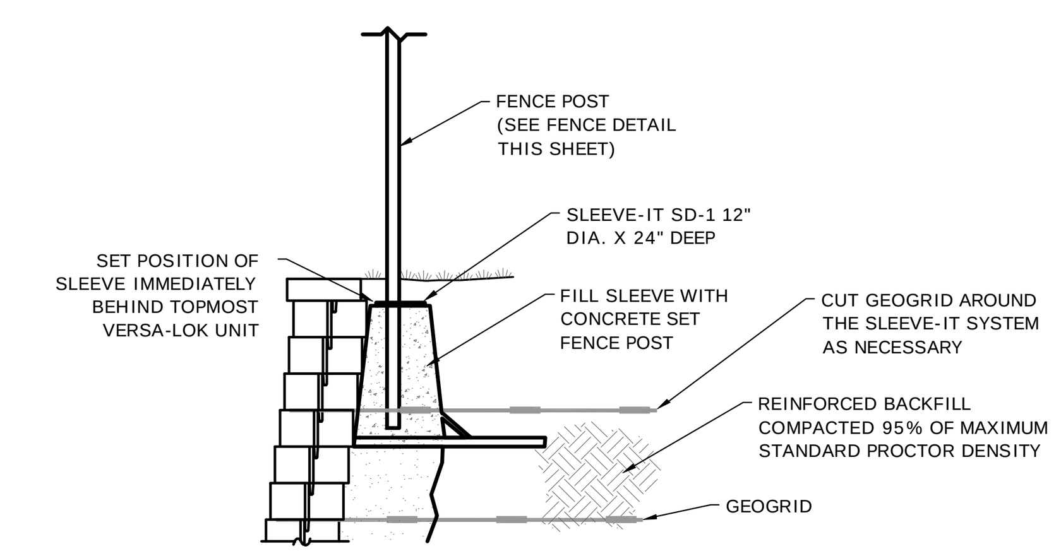
ON-SLOPE TREE PLANTING

NOT TO SCALE



PAVEMENT JOINT WITH CUTBACK INTO EXISTING WEARING COURSE

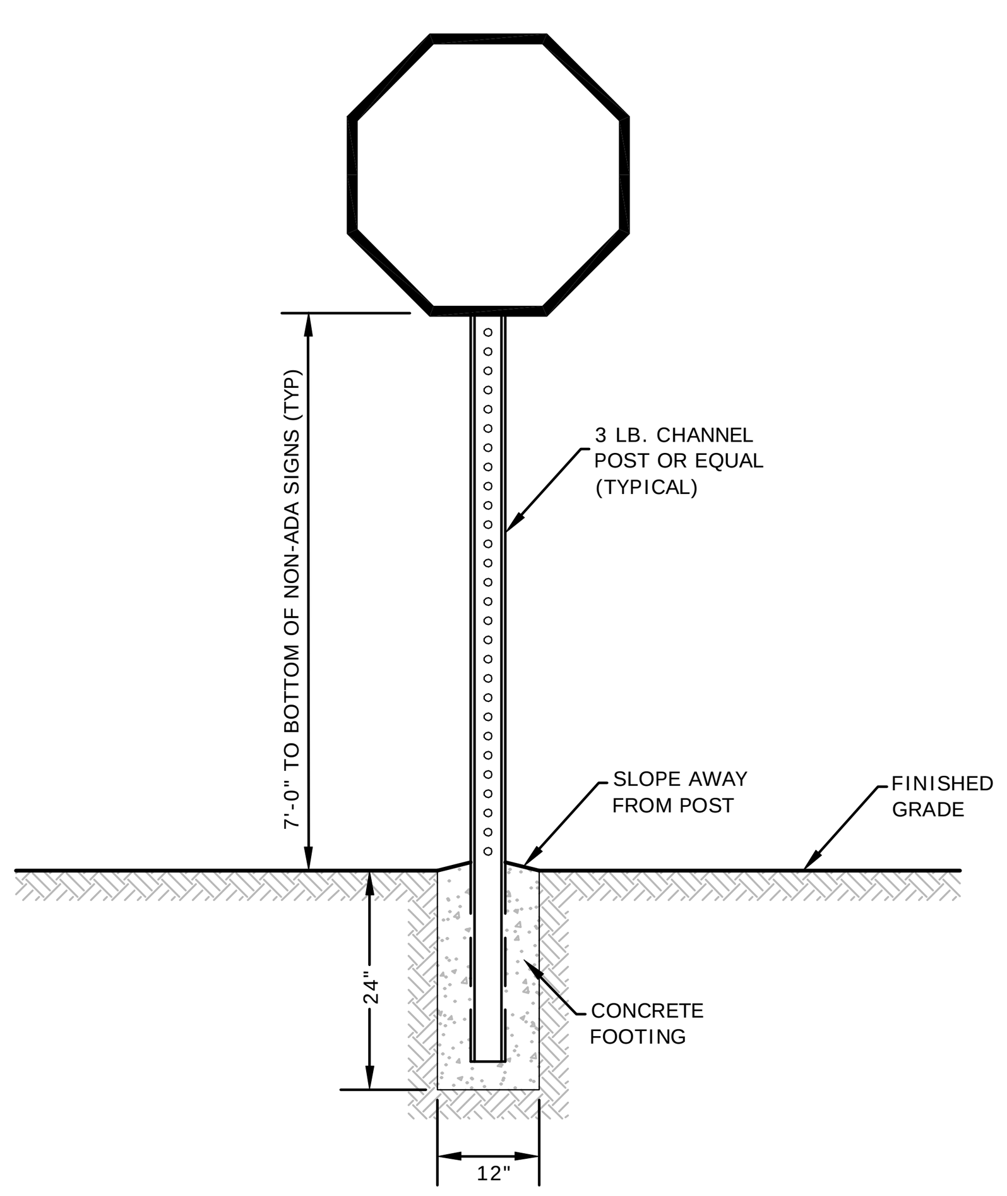
NOT TO SCALE



NOTE:
1. *SEE SLEEVE-IT ® MANUFACTURER, STRATA SYSTEMS PREFERRED SPECIFICATION DOCUMENT FOR APPROPRIATE APPLICATIONS. NOT SUITABLE FOR SOLID BOARD PRIVACY FENCES, PRIVACY CLOTH, OR SCREENING.

FENCE POST DETAIL W/ SLEEVE-IT

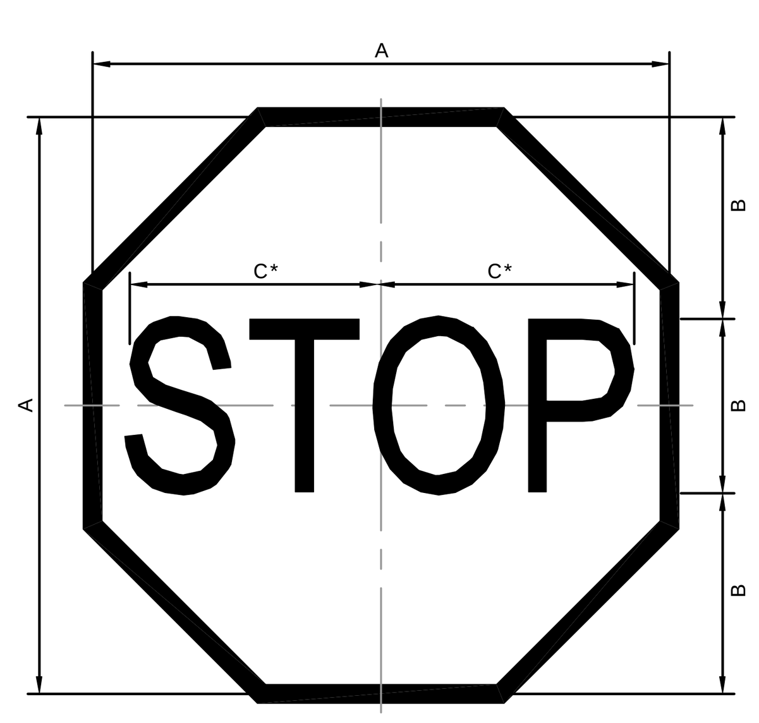
NOT TO SCALE



NOTE:
1. REFER TO ACCESSIBLE PARKING SIGN FOR STEEL BOLLARD FOR SIGNS LOCATED IN PAVEMENT NOT PROTECTED BY CURBS.

TYPICAL SIGN AND POST INSTALLATION

NOT TO SCALE



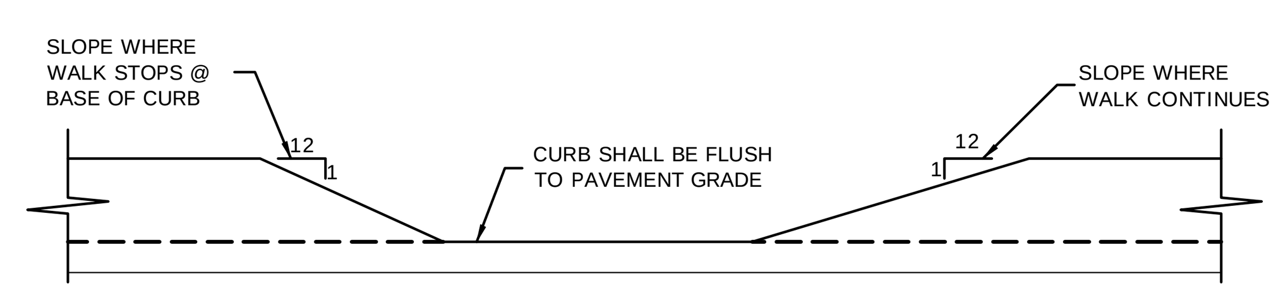
COLOR: LEGEND AND BORDER — WHITE (REFLECTORIZED)
BACKGROUND — RED (REFLECTORIZED)

SIGN SIZE	DIMENSIONS A	B	C	SERIES LINE	BOR-DER	BLANK STD
24 X 24	24	8	10	C	3/8	B1-24
30 X 30	30	10	12.5	C	3/4	B1-30
36 X 36	36	12	15	C	7/8	B1-36
48 X 48	48	16	20	C	1-3/8	B1-48

* REDUCE SPACING 40%

PENNDOT R1-1 STOP SIGN

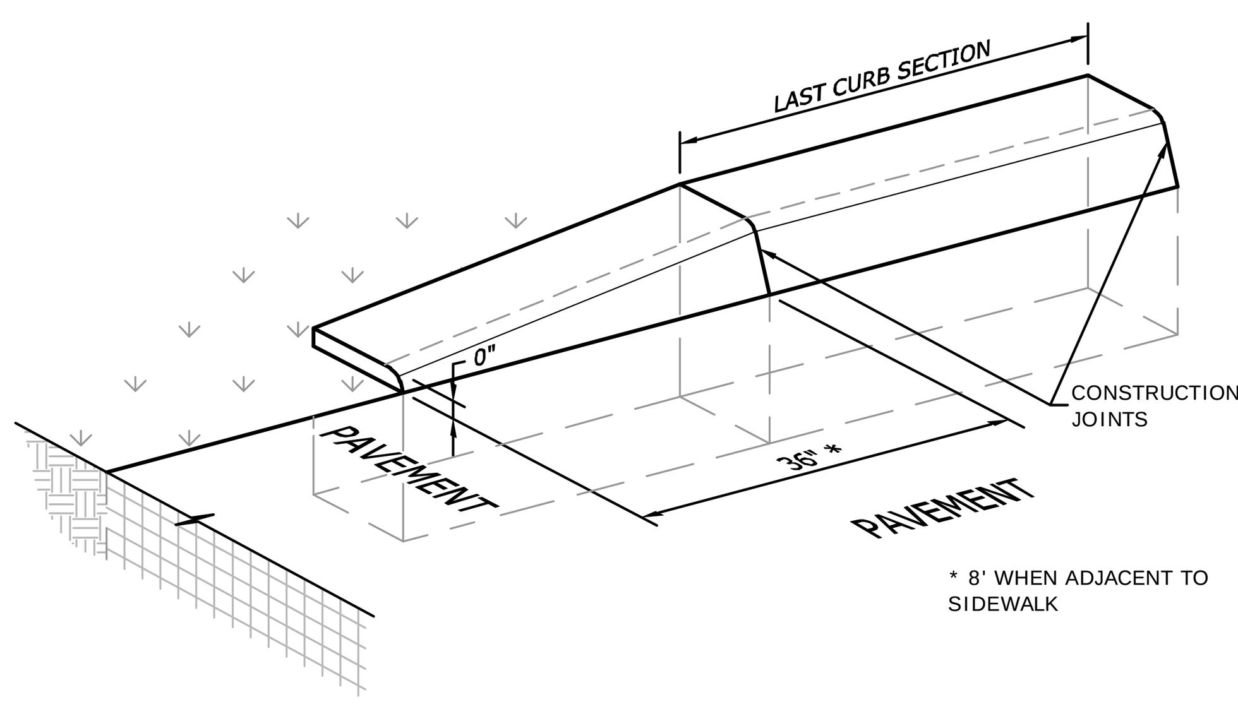
NOT TO SCALE



PLAN

DEPRESSED CURB

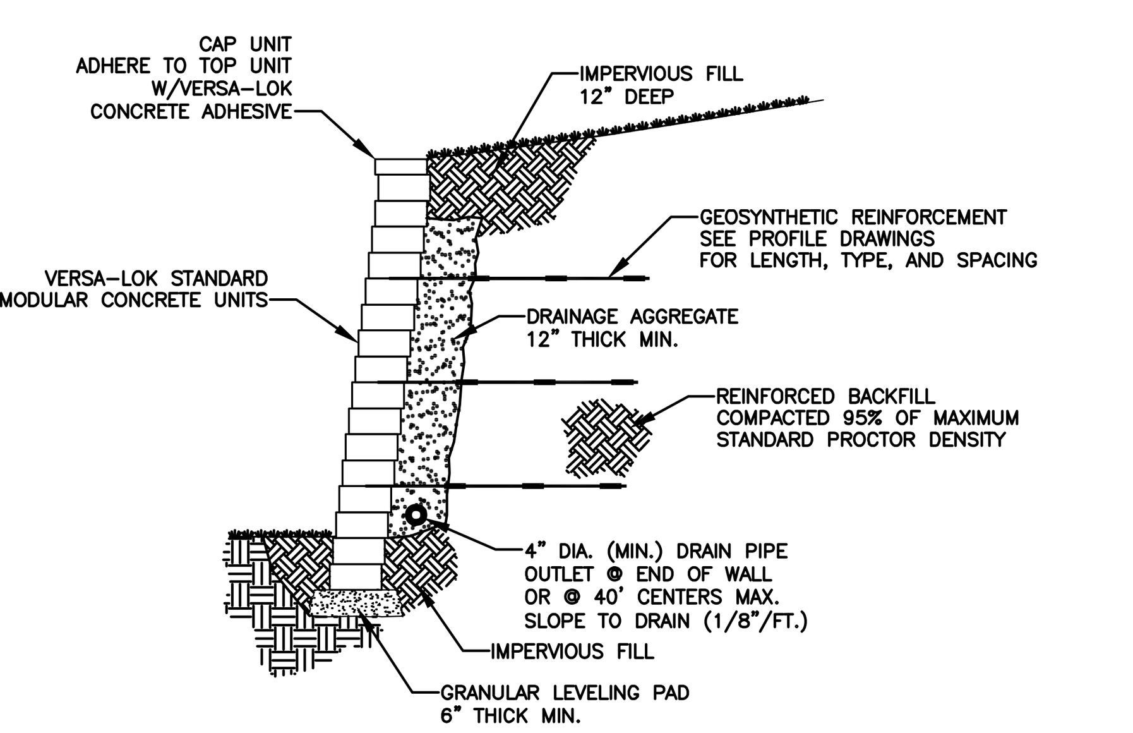
NOT TO SCALE



* 8' WHEN ADJACENT TO SIDEWALK

END CURB TRANSITION

NOT TO SCALE



TYPICAL SECTION—REINFORCED RETAINING WALL
MODULAR CONCRETE UNIT
SCALE: NONE

NOTE: CONTRACTOR SHALL SUBMIT CONSTRUCTION DRAWINGS AND DESIGN CALCULATIONS FOR THE RETAINING WALL SYSTEM. THE DRAWINGS AND CALCULATIONS SHALL BE PREPARED, STAMPED, AND SIGNED BY A PROFESSIONAL ENGINEERING IN PENNSYLVANIA.

TYPICAL RETAINING WALL

NOT TO SCALE

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REVISIONS

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PLAN TYPE:
SITE DETAILS

SHEET:
C1.27

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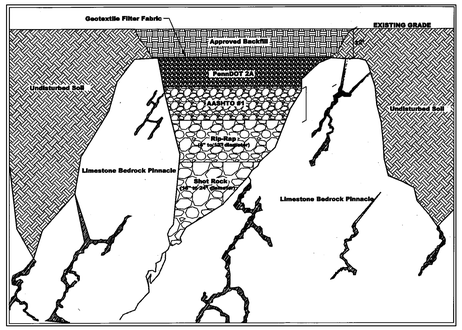


NOTES:

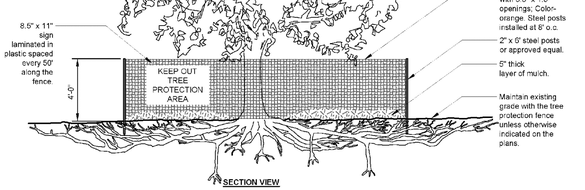
1. THE REPAIRS OUTLINED BELOW ARE GENERAL GUIDELINES AND EACH SINKHOLE OCCURRENCE SHOULD BE THOROUGHLY REVIEWED BY THE GEOTECHNICAL ENGINEER OF RECORD FOR AN APPROPRIATE REMEDIATION PLAN:

STRUCTURAL AREAS (AREAS WITHIN THE BUILDING FOOTPRINT OR BENEATH PAVEMENT)
- ANY AND ALL LOOSE AND/OR SATURATED SOILS WITHIN THE SINKHOLE SHOULD BE EXCAVATED AND CONTINUE UNTIL STABLE SOILS, A "THROAT" IS IDENTIFIED, OR UNTIL THE EXTENT OF THE EXCAVATION EQUIPMENT IS REACHED.
- UPON REMOVAL OF THE UNSTABLE SOILS, THE EXCAVATION SHOULD BE BACKFILLED USING HIGH MOBILITY, LOW STRENGTH FLOWABLE FILL (500 PSI) TO FINAL SUBGRADE ELEVATION.

NON-STRUCTURAL AREAS (NON-BUILDING/LANDSCAPED AREAS)
- ANY AND ALL LOOSE AND/OR SATURATED SOILS SHOULD BE EXCAVATED FROM THE SINKHOLE. EXCAVATION SHOULD CONTINUE UNTIL STABLE SOILS, A "THROAT" IS IDENTIFIED, OR UNTIL THE EXTENT OF THE EXCAVATION EQUIPMENT IS REACHED.
- THE EXCAVATION SHOULD BE BACKFILLED WITH AGGREGATE OF DECREASING SIZE AS DEPICTED ON THE *INVERTED FILTER DETAIL*

SINKHOLE REPAIR DETAIL

NOT TO SCALE



Notes:
1- See specifications for additional tree protection requirements.

2- If there is no existing irrigation, see specifications for watering requirements.

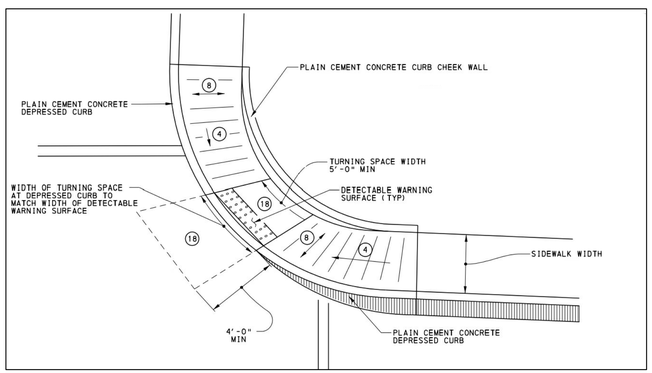
3- No pruning shall be performed except by approved arborist.

4- No equipment shall operate inside the protective fencing including during fence installation and removal.

5- See site preparation plan for any modifications with the Tree Protection area.

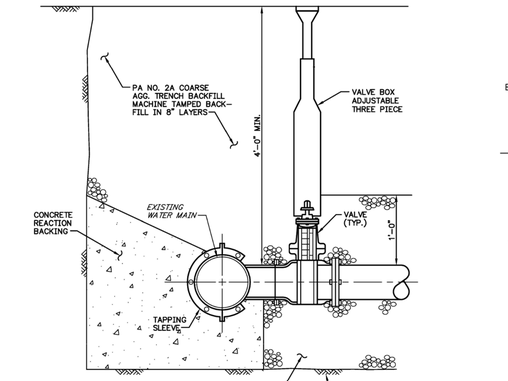
TREE PROTECTION DETAIL

NOT TO SCALE



TYPE 2 CURB RAMP

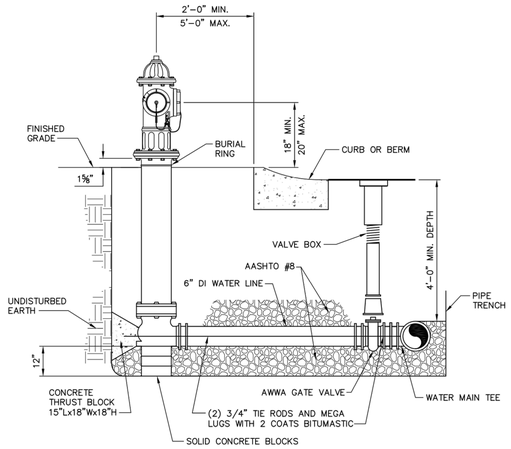
NOT TO SCALE



NOTE:
ALL MJ FITTINGS TO BE WRAPPED IN 40 MIL PLASTIC PRIOR TO POURING REACTION BACKINGS

TAPPING SLEEVE AND VALVE DETAIL

NOT TO SCALE



NOTES:

1. PLUG HYDRANT DRAINS IN AREAS WHERE GROUNDWATER IS PRESENT. COORDINATE WITH OWNER AND ENGINEER.
2. FIRE HYDRANT DRAINS SHALL BE KEPT FREE OF THRUST BLOCK CONCRETE.

FIRE HYDRANT SETTING DETAIL

NOT TO SCALE

NO.	REVISION	DATE	BY

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PLAN TYPE:
SITE DETAILS

SHEET:
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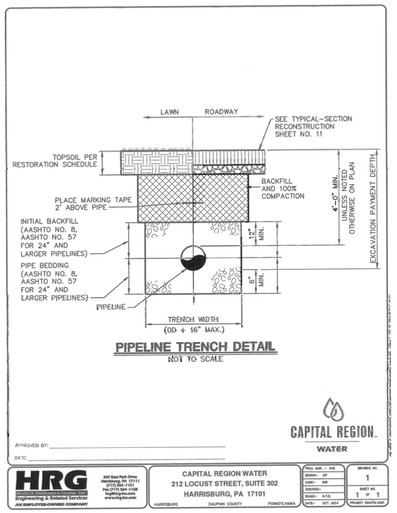
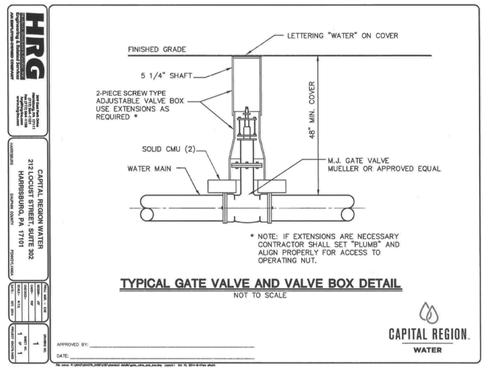


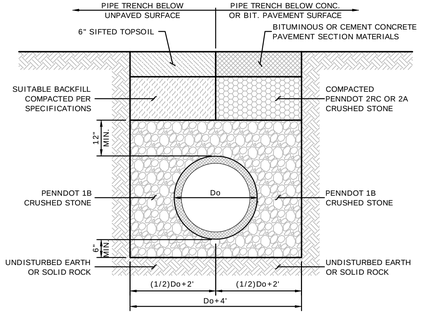
PIPELINE TRENCH DETAIL

NOT TO SCALE



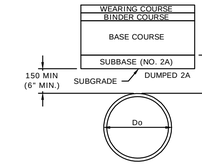
TYPICAL GATE VALVE AND VALVE BOX DETAIL

NOT TO SCALE



SANITARY SEWER PIPE TRENCH SECTION

NOT TO SCALE



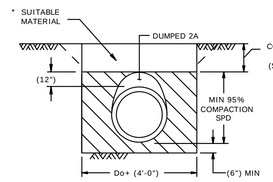
THERMOPLASTIC PIPE (UNDER PAVEMENT)

NOT TO SCALE

NOTES

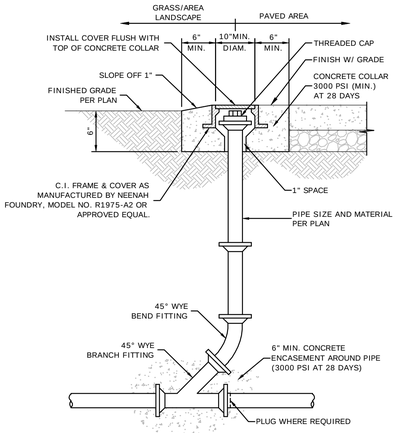
1. THE INSTALLATION OF PIPES (72") OR GREATER INSIDE DIAMETER OR SPAN IS PERMITTED WITHOUT PLACING EMBANKMENT FIRST. MAKE THE BACKFILL ENVELOPE AS SHOWN ON THIS DRAWING EXCEPT PROVIDE 2A MATERIAL ON EACH SIDE OF THE PIPE EQUAL TO ONE OUTSIDE DIAMETER OR SPAN OF THE PIPE. FOR CONCRETE PIPE, THE WIDTH OF UNCOMPACTED AGGREGATE FOR BEDDING (AASHTO NO. 8) REMAINS AT Do + (4'-0"). PAYMENT FOR THE 2A MATERIAL IS AS PER NOTE 3.
2. A HIGHER STRENGTH PIPE THAN SPECIFIED MAY BE SUPPLIED AT NO ADDITIONAL COST TO THE DEPARTMENT.
3. PAYMENT FOR THE BACKFILL ENVELOPE INCLUDING BEDDING, COARSE AGGREGATE AND SUITABLE MATERIAL UP TO (12") ABOVE THE PIPE IS INCIDENTAL TO THE PIPE.
4. TO PRECLUDE POINT LOADING ON RELATIVELY RIGID CONCRETE PIPE, DO NOT COMPACT AASHTO NO. 8 BEDDING MATERIAL.
5. FOR TRENCH BOX/SHORING INSTALLATION REQUIREMENTS REFER TO PUBLICATION 408, SECTION 601.
6. PERMIT PLACEMENT OF BACKFILL MATERIAL IN LAYERS, LIFTS, (8") THICK WHEN USING VIBRATORY COMPACTION EQUIPMENT.
7. COMPACT TOP 1000 (3'-0") OF SUBGRADE TO 100% IN ACCORDANCE WITH PUBLICATION 408, SECTION 206.3.
8. FOR REINFORCED CONCRETE PIPES INSTALLED WITH GREATER THAN (48') OF FILL, PROVIDE (12") BEDDING MINIMUM AND (16") WHEN ROCK IS PRESENT.
9. PLACE 2A COARSE AGGREGATE MATERIAL, IN LIFTS (4") THICK, ADJACENT TO THE LOWER HAUNCHES TO A HEIGHT OF (12") ABOVE TOP OF PIPE. COMPACT TO 95% SPD. TEST THE BACKFILL MATERIAL AND CONTINUE EMBANKMENT IN ACCORDANCE WITH PUBLICATION 408, SECTION 601.

* SUITABLE MATERIAL = MATERIAL CONTAINING NO DEBRIS, ORGANIC MATTER. FROZEN MATERIAL OR LARGE STONES WITH A DIAMETER GREATER THAN ONE-HALF THE THICKNESS OF THE COMPACTED LAYERS BEING PLACED.



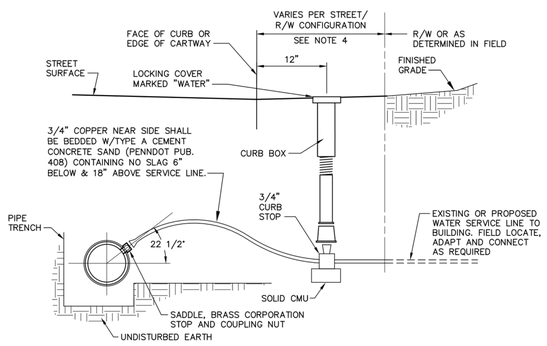
THERMOPLASTIC PIPE

NOT TO SCALE



SANITARY SEWER CLEANOUT

NOT TO SCALE

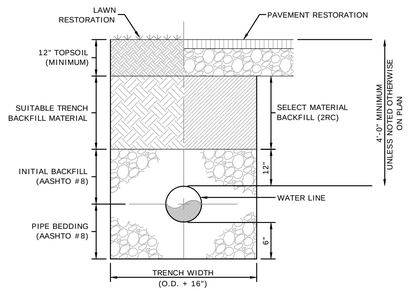


NOTES:

1. FOR SERVICE LINES 2" AND SMALLER.
2. FOR 3/4" SERVICE ON NEW DUCTILE IRON WATER MAINS, DELETE THE SADDLE FROM INSTALLATION.
3. EXISTING SERVICE BOXES AND RODS TO BE REMOVED AND DISPOSED.
4. NEW SERVICE LINE TO EXTEND FROM NEW MAIN TO EXISTING CURB STOP. IF NO CURB BOX EXISTS, SERVICES TO EXTEND TO 1'-0" INSIDE PROPERTY LINE.
5. USE 1" DIAMETER SERVICE LINE INSTEAD OF 3/4" WHERE DIRECTED BY OWNER TO MATCH EXISTING SERVICE OR WHERE INDICATED ON WORK ORDER.

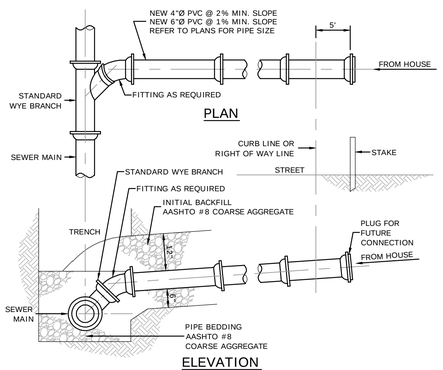
WATER SERVICE LINE INSTALLATION DETAIL

NOT TO SCALE



WATER LINE TRENCH

NOT TO SCALE



STANDARD SANITARY LATERAL

NOT TO SCALE

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SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-H_UDETL.dwg

REVISIONS NO.	DATE	DESCRIPTION
1		
2		
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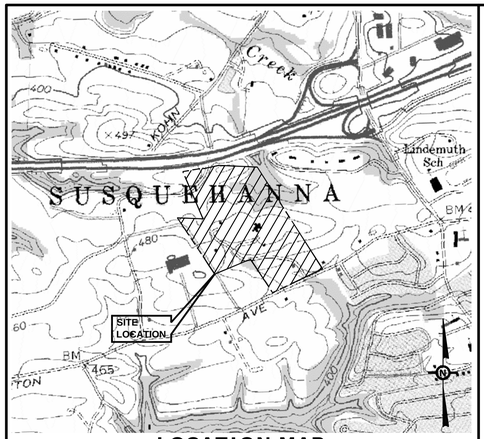
PLAN TYPE:
UTILITY DETAILS

SHEET:
C1.29

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP, DAUPHIN COUNTY, PENNSYLVANIA



LOCATION MAP

SCALE: 1"=1000 FEET

PLAN PREPARER

KUROWSKI AND WILSON, LLC
2201 NORTH FRONT STREET, SUITE 200
HARRISBURG, PA 17110

TELEPHONE: 717.635.2835
EMAIL: JSHYK@KANDWENGINEERS.COM

PROJECT MANAGER: JEFFREY A. SHYK, RLA

SITE SURVEYOR

KUROWSKI AND WILSON, LLC
2201 NORTH FRONT STREET, SUITE 200
HARRISBURG, PA 17110

TELEPHONE: 717.635.2835
EMAIL: DBURKHARD@KANDWENGINEERS.COM

PROJECT MANAGER: DENNIS P. BURKHARD, PLS

LANDOWNER

NAME: CAPITAL BLUE CROSS

ADDRESS: 2500 ELMERTON AVENUE
HARRISBURG, PA 17101

CONTACT: .
TELEPHONE: .

DEVELOPER

NAME: INCH'S PROPERTIES, LLC

ADDRESS: 2950 LEWISBERRY ROAD
YORK, PA 17404

CONTACT: JOE EISENHAUER

EMAIL: JOE@INCHANDCO.COM
PHONE: 717.755.1565

WATERSHED NOTE

THE SITE IS LOCATED IN THE PAXTON CREEK WATERSHED APPROXIMATELY 1.4 MILES EAST OF PAXTON CREEK. ACCORDING TO 25 PA CODE CHAPTER 93, PAXTON CREEK IS DESIGNATED AS A WARM WATER FISH (WWF) AND MIGRATORY FISH (MF). PAXTON CREEK IS NOT LISTED AS A HIGH QUALITY, EXCEPTIONAL VALUE, OR SPECIAL PROTECTION STREAM. THE SITE DRAINS TO THREE (3) DIFFERENT TRIBUTARIES TO PAXTON CREEK, TRIBUTARY 10154 TO THE WEST, TRIBUTARY 10166 TO THE NORTH, AND TRIBUTARY 10141 TO THE SOUTH. ALL THREE (3) TRIBUTARIES TO PAXTON CREEK ARE IMPAIRED ACCORDING TO CHAPTER 5 OF THE INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT DUE TO PATHOGENS. THE SITE DISCHARGES TO WATERS WITH A TMDL.

SHEET INDEX

PCSM PLAN GENERAL NOTES

THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL COMPLY WITH ALL REQUIREMENTS OF THE N.P.D.E.S. PERMIT FOR THE PROJECT SITE, INCLUDING OBTAINING STATUS AS A CO-PERMITTEE OF THE PERMIT. FOR INFORMATION REGARDING COMPLIANCE WITH THE N.P.D.E.S. PERMIT, CONTACT:

THE DAUPHIN COUNTY CONSERVATION DISTRICT
1451 PETERS MOUNTAIN ROAD
DAUPHIN, PA 17018
717.921.8100 PHONE
717.921.8276 FAX

1. THE PERMITTEE SHALL PROVIDE ENGINEERING CONSTRUCTION OVERSIGHT FOR THE PROPOSED STORMWATER BMPs. ADDITIONAL SOIL TESTING MAY BE REQUIRED PRIOR TO THE INSTALLATION OF BMPs TO ENSURE PROPER LOCATION AND FUNCTION. A LICENSED PROFESSIONAL KNOWLEDGEABLE IN THE DESIGN AND CONSTRUCTION OF STORMWATER BMPs SHALL CONDUCT THE OVERSIGHT.
2. THE "POST CONSTRUCTION STORMWATER MANAGEMENT NARRATIVE AND CALCULATIONS" REPORT SHALL BE CONSIDERED PART OF THE PLANS.
3. A "NOTICE OF TERMINATION" (NOT) WILL BE REQUIRED TO BE SUBMITTED. PRIOR TO ACCEPTING THE NOT, CONSERVATION DISTRICT STAFF WILL PERFORM A FINAL INSPECTION TO ENSURE SITE STABILIZATION AND VERIFY ADEQUATE INSTALLATION AND FUNCTION OF STORMWATER BMPs.
4. COMPACTION OF FILL ALL STRUCTURAL FILL TO BE PLACED IN 6" LIFTS AND COMPACTED TO NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN 2% OF THE OPTIMUM. APPLICABLE FOR BERMS, STREETS, ETC. UNLESS SPECIFIED OTHERWISE ON THE PLANS OR IN ANY SUPPLEMENTAL SPECIFICATIONS.
5. ALL STORMWATER STRUCTURES GREATER THAN FIVE FEET IN DEPTH REQUIRE STEPS.
6. AREAS PROPOSED FOR INFILTRATION BMPS SHALL BE PROTECTED FROM SEDIMENTATION AND COMPACTION DURING THE CONSTRUCTION PHASE TO MAINTAIN MAXIMUM INFILTRATION CAPACITY.

RECYCLING OR DISPOSAL OF MATERIALS

1. ALL WASTE AND MATERIALS DEPOSITED IN AND REMOVED FROM POST-CONSTRUCTION STORMWATER MANAGEMENT BMP FACILITIES AND FROM IMPERVIOUS AREAS DURING OPERATION AND MAINTENANCE SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET.SEQ., 271.1., AND 287.1 ET.SEQ. NO WASTE MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
2. ANTICIPATED CONSTRUCTION WASTE MAY INCLUDE TYPICAL BUILDING MATERIALS (I.E. LUMBER, DRYWALL, MASONRY, CARDBOARD AND PAPER, INSULATION, ASPHALT, ROOFING, PLASTIC AND VINYL, PAINTS, STAINS, SOLVENTS AND SEALANTS, (ETC.)
3. IT IS STRONGLY ENCOURAGED THAT SUCH RECOVERABLE WASTE MATERIALS BE SEPARATED AND APPROPRIATELY RECYCLED. NO POTENTIAL TOXIC OR HAZARDOUS WASTE IS KNOWN TO BE PRESENT ON SITE. IF ANY TOXIC OR HAZARDOUS WASTE IS ENCOUNTERED, THE CONTRACTOR SHALL FOLLOW ANY AND ALL APPLICABLE STATE OR FEDERAL REGULATIONS ASSOCIATED WITH THE DISPOSAL OF SUCH MATERIALS.

ENVIRONMENTAL DUE DILIGENCE

1. ENVIRONMENTAL DUE DILIGENCE MUST BE PERFORMED TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATABASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OF AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF A REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF CLEAN FILL".
2. ANY PLACEMENT OF CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FR-001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL.

MULCH SPECIFICATIONS

ON ALL DISTURBED AREAS WHICH DO NOT HAVE AN EROSION CONTROL BLANKET SPECIFIED FOR INSTALLATION, STRAW MULCH SHALL BE APPLIED AT THE RATE OF 3.0 TONS PER ACRE IMMEDIATELY AFTER SEEDING THE SURFACE. ON STEEP SLOPES OF 3:1 OR GREATER, MULCH SHALL BE ANCHORED THROUGH THE USE OF JUTE NETTING OR MIXING WITH ASPHALT AT THE RATE OF 100 GALLONS PER 3 TONS OF STRAW MULCH.

APPLY THE FOLLOWING SOIL SUPPLEMENTS PRIOR TO PERMANENT SEEDING IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 804:

A) PULVERIZED AGRICULTURAL LIMESTONE APPLIED AT A RATE OF 800 POUNDS PER 1,000 SQUARE YARDS.

B) 10-20-20 ANALYSIS COMMERCIAL FERTILIZER APPLIED AT A RATE OF 140 POUNDS PER 1,000 SQUARE YARDS

C) 38-0-0 UREAFORM SLOW-RELEASE NITROGEN FERTILIZER APPLIED AT A RATE OF 50 POUNDS PER 1,000 SQUARE YARDS.

SEED MIXTURES

TEMPORARY SEED MIXTURE
TEMPORARY SEEDING SHALL CONSIST OF ANNUAL RYEGRASS (100 PERCENT BY WEIGHT), OR EQUIVALENT, AND SHALL BE PLACED AT THE RATE OF 40 POUNDS PER ACRE; PURITY: 95%; GERMINATION: 85%. TEMPORARY SEEDING SHALL BE APPLIED TO DISTURBED AREAS THAT ARE TO BE REDISTURBED LATER IN THE CONSTRUCTION PROCESS.

PERMANENT SEED MIXTURE
TURF TYPE TALL FESCUE SHALL BE APPLIED AT A RATE OF 21.0 POUNDS PER 1,000 SY. 80% MIN. GERMINATION; MIN. PURITY: 98%.

OPERATION & MAINTENANCE PROGRAM FOR BMPs AND SWM FACILITIES

1. THE PURPOSE OF THESE INSTRUCTIONS IS TO IDENTIFY THE OWNERSHIP AND MAINTENANCE ACTIVITIES ASSOCIATED WITH THE PROPOSED STRUCTURAL STORMWATER BMP'S. THE SUBJECT SITE HAS BEEN DESIGNED SUCH THAT THE INCREASE IN STORMWATER VOLUME SHALL BE ATTENUATED BY INFILTRATION FACILITIES. IN ORDER TO MEET THE NPDES PHASE II REQUIREMENTS THE ABOVE FACILITIES HAVE BEEN DESIGNED TO MITIGATE THE INCREASE IN STORMWATER RUNOFF VOLUME DURING THE 2 YEAR, 24 HOUR STORM EVENT.
2. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE STORMWATER FACILITIES AND BMP'S LOCATED OUTSIDE OF THE PUBLIC-RIGHT-OF-WAY. THESE FACILITIES INCLUDE BUT ARE NOT LIMITED TO THE CONVEYANCE SYSTEMS ONSITE, CHANNEL CONVEYANCE, AND BMPS 1-9. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR KEEPING THE FACILITIES FREE OF OBSTRUCTIONS. THE PROPERTY OWNER SHALL GRANT TO THE TOWNSHIP THE RIGHT TO ENTER ALL PARTS OF THE PROPERTY TO INSPECT ON SITE STORMWATER MANAGEMENT FACILITIES IN ORDER TO ENSURE THEY ARE BEING OPERATED AS INTENDED PER THE PROVIDED MAINTENANCE REQUIREMENTS. THE PROPERTY OWNER SHALL FURTHER RECOGNIZE THAT IF SAID STORMWATER FACILITIES ARE NOT MAINTAINED IN ACCORDANCE WITH THE ABOVE, SUSQUEHANNA TOWNSHIP HAS LEGAL RIGHT TO ACCESS THE PROPERTY, APPLY REQUIRED MAINTENANCE MEASURES TO SAID AREAS, AND ASSESS PENALTIES AND COSTS INVOLVED.

THE AFOREMENTIONED FACILITIES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.

INCH'S PROPERTIES, LLC
2950 LEWISBERRY ROAD
YORK, PA 17404

CONTACT: JOE EISENHAUER
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INFILTRATION BASIN

OPERATION & MAINTENANCE PROCEDURES

ACTIVITY	SCHEDULE
REMOVE LITTER & DEBRIS, STABILIZE ERODED BANKS, REPAIR UNDERCUT & ERODED AREAS AT INFLOW & OUTFLOW STRUCTURES	AS NEEDED
INSPECT FACILITY AND CONTROL STRUCTURE TO ENSURE FUNCTIONALITY	QUARTERLY
UPGRADIENT CATCH BASINS AND INLETS SHOULD BE INSPECTED	SEMI-ANNUAL
INSPECT FACILITY FOR SIGNS OF WETNESS OR DAMAGE TO STRUCTURES, NOTE ERODED AREAS. IF DEAD OR DYING GRASS ON THE BOTTOM IS OBSERVED, CHECK TO ENSURE THAT WATER IS PERCOLATING 2-3 DAYS FOLLOWING STORMS.	SEMI-ANNUAL
NOTE SIGNS OF HYDROCARBON CONTAMINATION AND HANDLE PROPERLY	SEMI-ANNUAL
DISC OR OTHERWISE AERATE BOTTOM, DETHATCH BASIN BOTTOM	ANNUAL

GENERAL MAINTENANCE NOTES:
1. VEGETATION ALONG THE SURFACE OF THE INFILTRATION BASIN SHOULD BE MAINTAINED IN GOOD CONDITION, AND ANY BARE SPOTS REVEGETATED AS SOON AS POSSIBLE WITH ORIGINAL SEED MIX SPECIFIED ON THESE PLANS
2. VEHICULAR ACCESS SHOULD BE PROHIBITED AND CARE SHOULD BE TAKEN TO AVOID COMPACTION BY MOWERS.

BIORETENTION FACILITY / RAIN GARDEN

OPERATION & MAINTENANCE PROCEDURES

ACTIVITY	SCHEDULE
REMULCH/RESEED VOID AREAS, TREAT DISEASED TREES AND SHRUBS, MOW TURF AREAS	AS NEEDED
WATER PLANTS DAILY FOR TWO WEEKS	AT PROJECT COMPLETION
INSPECT SOIL & REPAIR ERODED AREAS, REMOVE LITTER AND DEBRIS	MONTHLY
INSPECT FOR SEDIMENT BUILDUP, EROSION, VEGETATIVE CONDITIONS, REMOVE & REPLACE DEAD & DISEASED VEGETATION	SEMI-ANNUAL
MOW VEGETATION TO A HEIGHT OF 4"-6" ABOVE GRADE ONCE A YEAR, PREFERABLY WHEN THE GROUND IS FROZEN	ANNUAL

GENERAL MAINTENANCE NOTES:
1. WHILE VEGETATION IS BEING ESTABLISHED, PRUNING AND WEEDING MAY BE REQUIRED
2. DURING PERIODS OF EXTENDED DROUGHT, BIORETENTION AREAS MAY REQUIRE WATERING
3. AN UNDERDRAIN IS PROVIDED AND OPERABLE VIA VALVE. PROVIDED VALVE SHOULD ONLY BE OPENED IN THE EVENT THE FACILITY IS NOT DEWATERING AS DESIGNED
4. SHOULD SEEDING BE WASHED OUT DURING THE STABILIZATION PROCESS, ADDITIONAL SEEDING, OF ORIGINALLY SPECIFIED MIX, SHALL BE PROVIDED IN BARE AREAS FOR STABILIZATION

VEGETATED SWALE

OPERATION & MAINTENANCE PROCEDURES

ACTIVITY	SCHEDULE
PLANT ALTERNATIVE GRASS SPECIES IN THE EVENT OF UNSUCCESSFUL ESTABLISHMENT; RESEED BARE AREAS. INSTALL APPROPRIATE EROSION CONTROL MEASURES. ROTOTILL & REPLANT SWALE IF DRAW DOWN TIME IS > 48 HRS	AS NEEDED
INSPECT/CORRECT EROSION PROBLEMS DAMAGE TO VEGETATION, & SEDIMENT/ DEBRIS ACCUMULATION; POOLS OF STANDING WATER; DEWATER/ DISCHARGE TO APPROVED LOCATION. MOW & TRIM VEGETATION ONLY WHEN DRY TO AVOID RUTTING; INSPECT SWALE INLET & OUTLET FOR SIGNS OF EROSION OR BLOCKAGE	ANNUAL
INSPECT SWALE AFTER SPRING MELT, REMOVE RESIDUALS AND REPLACE DAMAGED VEGETATION. MULCHING/SOIL AERATION OR MANIPULATION MAY BE REQUIRED. USE NONTOXIC, ORGANIC DEICING AGENTS APPLIED AS BLENDED MAGNESIUM CHLORIDE-BASED LIQUID OR AS PRETREATED SALT.	WINTER

GENERAL MAINTENANCE NOTES:
1. WATER DURING DRY PERIODS, FERTILIZE, AND APPLY PESTICIDE ONLY WHEN ABSOLUTELY NECESSARY
2. STABILIZE WITH EROSION CONTROL MATTING / PERMANENT SEEDING

STORMWATER COLLECTION/CONVEYANCE

OPERATION & MAINTENANCE PROCEDURES

ACTIVITY	SCHEDULE
INLETS & CATCH BASINS SHOULD BE CLEANED OF DEBRIS. REPAIRS SHOULD BE MADE AS SOON AS PROBLEMS ARISE	CLEAN ANNUALLY & REPAIR AS NEEDED
INSPECT OUTFALL STRUCTURES QUARTERLY DURING 1ST YEAR & 1X PER YEAR THEREAFTER	QUARTERLY & ANNUALLY
COLLECTION/CONVEYANCE SYSTEMS SHOULD BE INSPECTED	SEMI-ANNUAL

GENERAL MAINTENANCE NOTES:
1. VACTOR TRUCKS MAY BE AN EFFICIENT CLEANING MECHANISM.
2. CATCH BASINS SHOULD BE CLEANED BEFORE HALF FULL.

SOIL LIMITATIONS AND RESOLUTIONS

1. **CAVING CUT BANKS** - CONTRACTOR SHOULD EMPLOY PROPER CONSTRUCTION, STABILIZATION, AND SAFE WORKING TECHNIQUES TO ENSURE SAFETY ON STEEP SLOPE AREAS AND WITHIN AND AROUND ALL EXCAVATIONS INCLUDING FOOTERS, FOUNDATIONS AND UTILITY TRENCHES. BENCHING AND TRENCH BOXES SHOULD BE EMPLOYED WHERE REQUIRED OR APPROPRIATE TO ENSURE SAFE WORKING CONDITIONS AND COMPLIANCE WITH APPLICABLE SAFETY STANDARDS AND REGULATIONS.
2. **CORROSIVE TO CONCRETE/STEEL** - WHERE PERMITTED, UNDERGROUND PIPES, CONDUITS, AND STORAGE TANKS SHOULD BE MADE CORROSION RESISTANT MATERIALS. WHERE NECESSARY, SUITABLE PRECAUTIONS SHOULD BE TAKEN TO PROTECT UNDERGROUND CONCRETE AND UNCOATED STEEL STRUCTURES AND FACILITIES FROM CORROSION.
3. **DROUGHTY SOILS** - IRRIGATION MAY BE REQUIRED FOR SEED GERMINATION AND ESTABLISHMENT OF A SUFFICIENT STAND OF VEGETATIVE COVER. USE OF SOD OR ADVANCED SEEDING TECHNIQUES, SUCH AS HYDROSEEDING, SHOULD BE CONSIDERED.
4. **EASILY ERODIBLE** - CONTRACTOR SHALL LIMIT THE EXTENT AND DURATION OF EARTH DISTURBANCE TO THE LEAST AMOUNT PRACTICABLE TO COMPLETE THE PROJECT. CONTRACTOR SHOULD PHASE CONSTRUCTION WHERE POSSIBLE TO LIMIT THE TOTAL AMOUNT OF DISTURBED AREA AT ANY GIVEN TIME. TEMPORARY AND PERMANENT STABILIZATION MEASURES SHOULD BE IMPLEMENTED AS SOON AS POSSIBLE. SEDIMENT CONTROL BMPS MAY REQUIRE MORE FREQUENT MAINTENANCE AND SEDIMENT REMOVAL AS COMPARED WITH SITES THAT DO NOT HAVE EASILY ERODIBLE SOIL. CONTRACTOR SHALL CONTACT THE SITE DESIGN ENGINEER AND THE CONSERVATION DISTRICT TO DEVISE ALTERNATIVE SOLUTIONS IF ANY EROSION CONDITIONS OCCUR THAT CANNOT BE ADDRESSED BY MEASURES FOUND IN THE PLANS.
5. **DEPTH TO SATURATED ZONE / SEASONAL HIGH WATER TABLE** - STRUCTURES WITH BASEMENTS AND OTHER SUBSURFACE STRUCTURES SHOULD BE AVOIDED. BUILDING FOUNDATIONS SHOULD BE FURNISHED WITH APPROPRIATE FOUNDATION DRAINS AND SUMP PUMPS WHERE NECESSARY. SATURATED SOILS SHOULD BE DEWATERED PRIOR TO USE IN GRADING. WET, MUCKY, OR SOUPY SOILS SHOULD NOT BE USED IN THE CONSTRUCTION OF FILLS OR SLOPES. IF ACCUMULATED WATER NEEDS TO BE REMOVED FROM A WORK AREA, THE WATER SHALL BE TO A SEDIMENT CONTROL BMP, SUCH AS A SEDIMENT TRAP, SEDIMENT BASIN, OR PUMPED WATER FILTER BAG PLACED FOR DISCHARGE OVER A STABILIZED, WELL-VEGETATED AREA. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
6. **HYDRIC / HYDRIC INCLUSIONS** - HYDRIC SOILS OR SOILS WITH HYDRIC INCLUSIONS MAY BE INDICATIVE OF WETLANDS, HIGH GROUNDWATER TABLE, OR POORLY DRAINED SOILS. WETLANDS SHOULD BE IDENTIFIED AND AVOIDED IF POSSIBLE. DEWATERING TECHNIQUES SHALL BE USED AS NEEDED.
7. **LOW STRENGTH/LANDSLIDE PRONE** - FOR SOILS WITH LOW STRENGTH, PRECAUTIONS SHOULD BE TAKEN TO PREVENT SLOPE FAILURES DUE TO IMPROPER CONSTRUCTION PRACTICES SUCH AS OVER-STEEPENING AND OVERLOADING OF SLOPES, REMOVAL OF LATERAL SUPPORT, AND FAILURE TO PREVENT SATURATION OF SLOPES. SETBACKS SHOULD BE APPLIED IN ACCORDANCE WITH PADEP STANDARDS UNLESS IT CAN BE SHOWN THAT PROPOSED CUTS AND FILLS DO NOT POSE A HAZARD TO PUBLIC SAFETY OR SURFACE WATERS. ALSO, ROAD FILL MATERIAL WILL LIKELY NEED TO BE IMPORTED IN AREAS WHERE SOILS HAVE LOW STRENGTH. CONTRACTOR SHALL CONSULT PROJECT GEOTECHNICAL ENGINEER/INSPECTOR FOR APPROPRIATE MEASURES TO BE IMPLEMENTED TO COMPACT, MITIGATE, AND/OR STABILIZE AREAS OF LOW STRENGTH OR LANDSLIDE PRONE SOILS.
8. **SLOW PERCOLATION** - CONTRACTOR SHALL PERFORM SITE GRADING TO PROVIDE SUFFICIENT POSITIVE DRAINAGE AWAY FROM BUILDINGS, FOUNDATIONS, AND OTHER STRUCTURES. IF ACCUMULATED WATER NEEDS TO BE REMOVED FROM A WORK AREA, THE WATER SHALL BE TO A SEDIMENT CONTROL BMP, SUCH AS A SEDIMENT TRAP, SEDIMENT BASIN, OR PUMPED WATER FILTER BAG PLACED FOR DISCHARGE OVER A STABILIZED, WELL-VEGETATED AREA.
9. **PIPING** - SOILS THAT ARE SUSCEPTIBLE TO PIPING CAN BE ERODIBLE AND NOT WELL SUITED FOR CONSTRUCTION OF EMBANKMENTS, DIKES, AND LEVEES. CONSTRUCTION TECHNIQUES SHALL BE EMPLOYED TO ENSURE THESE SOILS ARE PROPERLY COMPACTED AND STABILIZED
10. **POOR SOURCE OF TOPSOIL** - MANY SOIL TYPES ARE DROUGHTY OR TOO WET TO BE SUITABLE SOURCES OF TOPSOIL. SOIL TESTS SHOULD BE DONE TO DETERMINE THE PROPER APPLICATION OF SOIL AMENDMENTS TO PROMOTE THE GROWTH OF THE DESIRED VEGETATION. WHEREVER SOILS THAT ARE FAIR OR GOOD SOURCES OF TOPSOIL EXIST ON A SITE, THEY SHOULD BE CAREFULLY PRESERVED AND STORED FOR LATER USE IN RESTORATION. IF NECESSARY, TOPSOIL MAY BE IMPORTED TO THE SITE.
11. **FROST ACTION** - CONTRACTOR SHALL CONSULT PROJECT GEOTECHNICAL ENGINEER / INSPECTOR REGARDING ANY SPECIAL MEASURES TO BE TAKEN FOR EARTHWORK THAT IS TO OCCUR DURING PERIODS OF FROST.
12. **SLOPES** - EXCAVATIONS SHOULD BE STABILIZED TO PREVENT EROSION AND CONTRACTOR SHOULD EMPLOY PROPER CONSTRUCTION TECHNIQUES TO ENSURE SAFETY ON STEEP SLOPE AREAS.
13. **DEPTH OF ROCK** - IF BEDROCK IS ENCOUNTERED, REMOVE AS NECESSARY IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
14. **SOIL PH LEVELS** - CONTRACTOR SHALL HAVE SOIL PH TESTED TO DETERMINE CORRECT FERTILIZER APPLICATION RATES.
15. **FLOODING POTENTIAL -** ENSURE THAT THE SITE HAS PROPER DRAINAGE.
16. **HIGH GROUNDWATER LEVEL** - CONTRACTOR SHALL EMPLOY DEWATERING TECHNIQUES AS APPROVED BY THE CONSERVATION DISTRICT. PUMPED WATER FILTER BAGS SHALL BE USED TO DEWATER UTILITY TRENCHES AND BELOW GRADE EXCAVATIONS.
17. **BASIN AREAS AND EMBANKMENTS** - FILL FOR BASIN EMBANKMENTS SHALL BE COMPACTED IN 8" LIFTS TO 98% MAXIMUM DRY DENSITY (STANDARD PROCTOR) +/- 2% MOISTURE CONTENT PER ASTM D-1557. ANTI-SEEP COLLARS SHALL BE INSTALLED ON A BASIN DISCHARGE PIPING TO PREVENT SEEPAGE OF WATER FROM THE BASIN. CONSULT WITH SITE DESIGN ENGINEER FOR THE SPECIFIC ANTI-SEEP COLLAR SIZE REQUIREMENTS.

K&W DESIGNING ENVIRONMENTS
2201 North Front Street, Suite 200
Harrisburg, PA 17110
P: 717.635.2835
www.kandwengineers.com

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC
SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-A_PCSMCVR.dwg

REVISIONS NO.	DATE	DESCRIPTION
1	MARCH 28, 2005	DESCRIPTION
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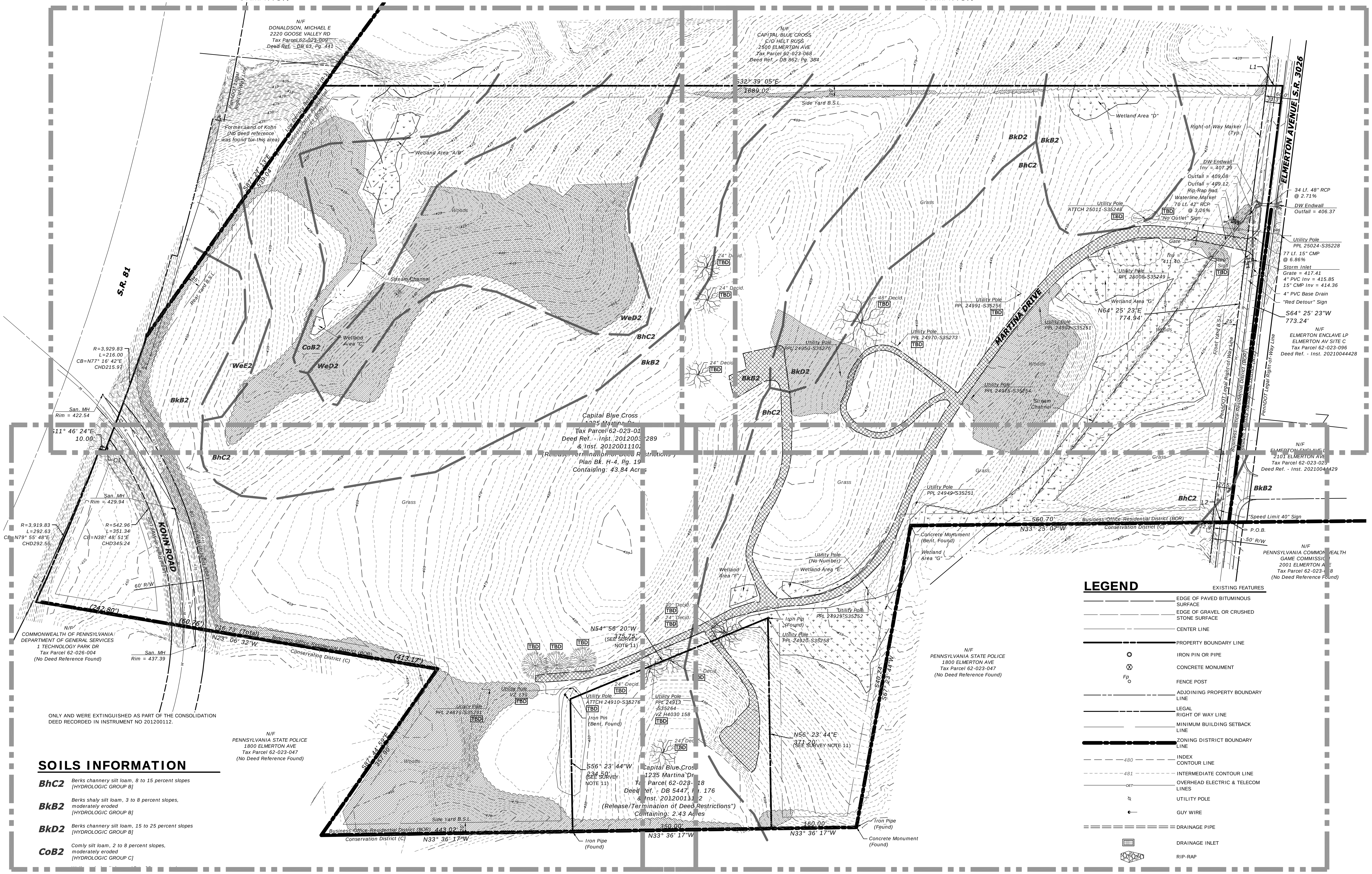
PLAN TYPE:
COVER SHEET

SHEET:
C2.1

REFER TO SHEET C2.3 FOR DESIGN INFORMATION

REFER TO SHEET C2.4 FOR DESIGN INFORMATION



SOILS INFORMATION

BhC2	Berks channery silt loam, 8 to 15 percent slopes [HYDROLOGIC GROUP B]
BkB2	Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded [HYDROLOGIC GROUP B]
BkD2	Berks channery silt loam, 15 to 25 percent slopes [HYDROLOGIC GROUP B]
CoB2	Comly silt loam, 2 to 8 percent slopes, moderately eroded [HYDROLOGIC GROUP C]

LEGEND

EXISTING FEATURES

- EDGE OF PAVED BITUMINOUS SURFACE
- EDGE OF GRAVEL OR CRUSHED STONE SURFACE
- CENTER LINE
- PROPERTY BOUNDARY LINE
- IRON PIN OR PIPE
- CONCRETE MONUMENT
- Fp FENCE POST
- ADJOINING PROPERTY BOUNDARY LINE
- LEGAL RIGHT OF WAY LINE
- MINIMUM BUILDING SETBACK LINE
- ZONING DISTRICT BOUNDARY LINE
- 480 INDEX CONTOUR LINE
- 481 INTERMEDIATE CONTOUR LINE
- OET OVERHEAD ELECTRIC & TELECOM LINES
- UTILITY POLE
- GUY WIRE
- DRAINAGE PIPE
- DRAINAGE INLET
- RIP-RAP
- Gv GAS VALVE
- Gm GAS METER
- TREELINE
- S SANITARY SEWER GRAVITY LINE
- MANHOLE
- W WATER LINE
- Wv WATER VALVE
- Fh FIRE HYDRANT
- WETLAND
- FENCE
- GUIDERAIL
- SIGN
- SOIL TYPE BOUNDARY LINE

REFER TO SHEET C2.5 FOR DESIGN INFORMATION

REFER TO SHEET C2.6 FOR DESIGN INFORMATION

SURVEY NOTES

1. THIS SURVEY WAS PERFORMED AND MAPPING PREPARED WITH THE BENEFIT OF A TITLE SEARCH.
2. BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN ARE BASED ON A FIELD SURVEY PERFORMED BY K&W ENGINEERS AND CONSULTANTS, COMPLETED IN SEPTEMBER, 2022.
3. PROPERTY LINES SHOWN ARE BASED ON PROPERTY CORNER MARKERS AND OTHER EVIDENCE FOUND, CURRENT DEEDS OF RECORD, AND THE FOLLOWING PLAN(S):
   PB H-4, PG 19
4. "SITE B-1", AS SHOWN ON A FINAL SUBDIVISION PLAN PREPARED FOR THE ESTATE OF PARK SHEESLEY & SHARON S. BAISDEN, BY D.P. RAFFENSPERGER ASSOCIATES, DATED DECEMBER 8, 1986, PROJECT NO. D2-1171, RECORDED IN PLAN BOOK H-4, PAGE 19.
5. CONTOURS AND ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
6. BEARINGS ARE BASED ON PENNSYLVANIA STATE PLANE COORDINATES, SOUTH ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
7. RIGHT-OF-WAY LINES SHOWN FOR ELMERTON AVENUE AND S.R. 81 ARE BASED ON FIELD SURVEY LOCATIONS, PLANS PROVIDED BY PENNDOT DISTRICT 8-0, FOR S.R. 3026: "DGS LOT CONSOLIDATION & SUBDIVISION PLAN" & "ELMERTON ENCLAVE HOP", AND FOR S.R. 81: PLANS FOR LR 1005-3.
8. UTILITY LOCATIONS ARE BASED ON SURFACE EVIDENCE AND LIMITED PA ONE-CALL MARKINGS EVIDENT AT THE TIME OF THE FIELD SURVEY. PA ONE-CALL SERIAL NO. 20222432508 WAS ASSIGNED ON AUGUST 31, 2022.
9. SOME UTILITIES AND UNDERGROUND PIPE LOCATIONS COULD NOT BE VERIFIED AND FURTHER INVESTIGATION IS REQUIRED. APPROXIMATE UTILITY AND PIPE LOCATIONS SHOWN ARE BASED ON THE PREVIOUSLY MENTIONED PLANS.
10. THE SUBJECT PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN THE 100-YEAR FLOODPLAIN AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AND SHOWN ON THE FLOOD INSURANCE RATE MAP (FIRM) FOR (?) TOWNSHIP, COMMUNITY PANEL NO. 420397, MAP NO. 42043C0340D, EFFECTIVE DATE AUGUST 2, 2012.
11. PREVIOUSLY RECORDED DEED RESTRICTIONS AND LOT LINES ASSOCIATED WITH THIS PARCEL ARE SHOWN FOR REFERENCE ONLY AND WERE EXTINGUISHED AS PART OF THE CONSOLIDATION DEED RECORDED IN INSTRUMENT NO 201200112.

DEMOLITION NOTES

1. ALL FEATURES IN BOLD PRINT AND SO LABELED SHALL BE DEMOLISHED, REMOVED, OR RELOCATED AS INDICATED.
2. ITEMS LABELED TO BE REMOVED BY OTHERS WILL BE RELOCATED AND/OR DEMOLISHED BY THE OWNER OR A CONTRACTOR HIRED BY THE OWNER. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL WORK TO BE PERFORMED BY OTHERS.
3. ALL EXISTING UTILITY LIDS (MANHOLE, CLEANOUTS, VALVE COVERS, ETC.) AND ASSOCIATED APPURTENANCES TO REMAIN SHALL BE BROUGHT TO FINAL FINISHED GRADE AS PART OF CONSTRUCTION.

PENNSYLVANIA ONE CALL SYSTEM, INC.
1-800-242-1776
STOP-CALL BEFORE YOU DIG

LEGEND

DEMOLITION FEATURES

- PROPOSED SAWCUT
- TBD DENOTES A FEATURE TO BE DEMOLISHED
- TBR DENOTES A FEATURE TO BE REMOVED AND RELOCATED
- EX. BITUMINOUS PAVEMENT SURFACE TO BE REMOVED
- EX. TREES TO BE REMOVED

SCALE: 1" = 80' (0, 40, 80, 160)

K&W
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2201 North Front Street, Suite 200
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P: 717.635.2835
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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA

SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-B_PCSMEXF.dwg

REVISIONS

NO.	DATE	DESCRIPTION
1		
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PLAN TYPE:
OVERALL EXISTING FEATURES AND DEMOLITION PLAN

SHEET:
C2.2

LEGEND

PROPOSED PCSM CONTROL PLAN FEATURES

NPDES PERMIT BOUNDARY

LIMIT OF DISTURBANCE

POI-1 — WATERSHED POINT OF INTEREST

AREA 1 SEED MIX (BASIN FLOOR)
RETENTION BASIN FLOOR MIX - ERNMX-126
RATE: ¼ LB/ 1,000 SF

AREA 2 SEED MIX (BASIN SLOPES)
NATIVE STEEP SLOPE MIX WITH ANNUAL RYE-
ERNMX-181; RATE:1 ¼ LB/ 1,000 SF

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1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP

DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
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K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-C_PCSMPLAN.dwg

REVISIONS

NO.	DATE	DESCRIPTION
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PLAN TYPE:
PCSM PLAN A

SHEET:
C2.3

GRAPHIC SCALE
40 20 0 40
1" = 40 FEET

MATCH LINE SHEET C2.3
MATCH LINE SHEET C2.4

MATCH LINE SHEET C2.4
MATCH LINE SHEET C2.6

LIMIT OF DISTURBANCE
= 38.11 ACRES /

ELKTON AVENUE S.R. 3026

INFILTRATION BASIN (BMP 9)

INFILTRATION BASIN (BMP 1)

INFILTRATION BASIN (BMP 2)

RAIN GARDEN (BMP 4)

RAIN GARDEN (BMP 3)

ANTI-SEEP COLLAR (SEE DETAIL)

70' WIDE EMERGENCY SPILLWAY @ ELEV 451.85

30' WIDE EMERGENCY SPILLWAY @ ELEV 414.95

85' WIDE EMERGENCY SPILLWAY @ ELEV 439.60

CHANNEL 9A

8" C900 WATER MAIN

WATER METER & PIT

Roll Detour Sign

Wetland Area "D"

Wetland Area "E"

Wetland Area "F"

Utility Pole PPL 25008-S35219

Utility Pole PPL 25024-S35228

Inv = 411.40

Inlet Inv = 417.41
PVC Inv = 415.85
CMP Inv = 414.36

PVC Base Drain

48" RCP 1%

DW Endwall Outfall = 406.37

POI-1

A 18 UNITS
B 18 UNITS
C 18 UNITS
D 18 UNITS
E 18 UNITS
F 18 UNITS
G 18 UNITS
H 18 UNITS
I 18 UNITS
J 18 UNITS
K 18 UNITS
L 18 UNITS

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-C_PCSMPLAN.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
PCSM PLAN B

SHEET:
C2.4

P:\2000\2344001 - Martina Drive Development\CAD\SHOP\DWG\2344001_C_PCSMPLAN.dwg 11/15/2023 10:47:58 AM BY: bhettinger

MATCH LINE SHEET C2.3

MATCH LINE SHEET C2.5

MATCH LINE SHEET C2.5

MATCH LINE SHEET C2.6

LIMIT OF DISTURBANCE
= 38.11 ACRES

POI-4

POI-3

INFILTRATION BASIN
(BMP 6)

INFILTRATION
STREET BASIN
(BMP 5)

16' WIDE
EMERGENCY
SPILLWAY @
ELEV. 473.20

85' WIDE EMERGENCY
SPILLWAY @ ELEV 469.72

ANTI-SEEP
COLLAR
(SEE DETAIL)

ANTI-SEEP
COLLAR
(SEE DETAIL)

CLUBHOUSE

8" C900
WATER MAIN

8" C900
WATER MAIN

CHANNEL 5A

CHANNEL 6A

CHANNEL 6B

CHANNEL 7E

CHANNEL 7F

CHANNEL 7G

CHANNEL 8A

CHANNEL 8B

CHANNEL 8C

STREET LIGHT
(TYP.)

KOHN ROAD

Business-Office-Residential District (BOR)

Conservation District (C)

Iron Pipe
(Found)

Rim = 437.39

Rim = 434.04

GRAPHIC SCALE

40 20 0 40

1"= 40 FEET

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-C_PCSMPLAN.dwg

REVISIONS NO.	DATE	DESCRIPTION
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PLAN TYPE:
PCSM PLAN C

SHEET:
C2.5

MATCH LINE SHEET C2.4
MATCH LINE SHEET C2.6

MATCH LINE SHEET C2.5
MATCH LINE SHEET C2.6

POI-2

LIMIT OF DISTURBANCE
= 38.11 ACRES

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
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K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-C_PCSMPLAN.dwg

REVISIONS NO.	DATE	DESCRIPTION
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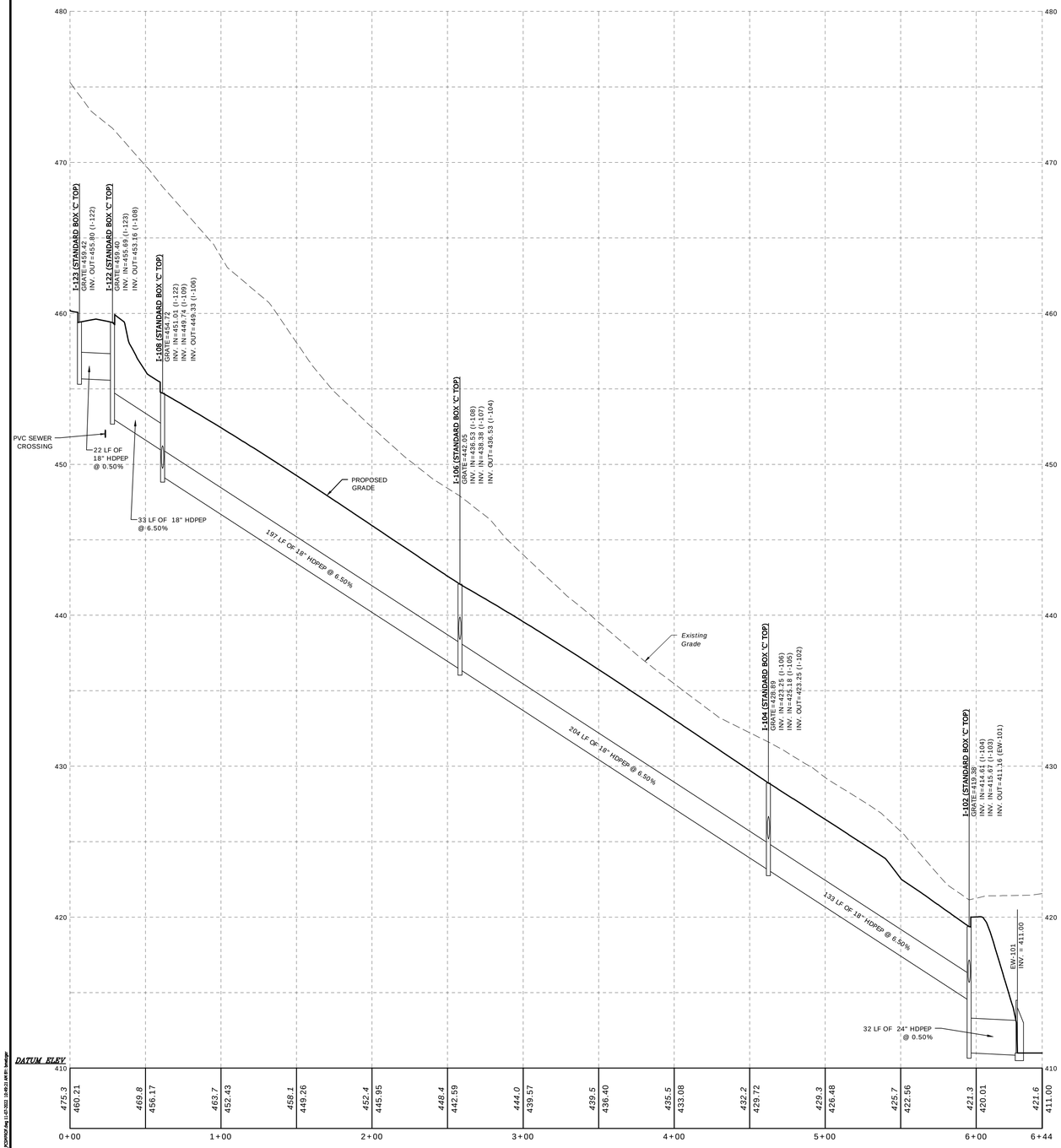
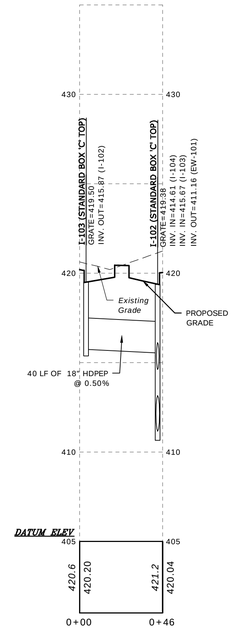
PLAN TYPE:
PCSM PLAN D

SHEET:
C2.6



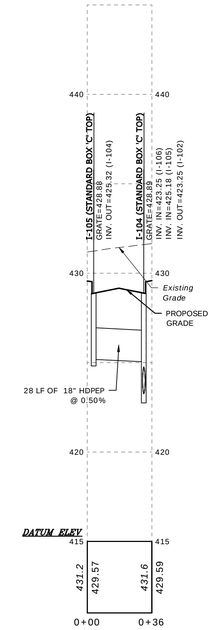
STORM SEWER: I-123 TO EW-101

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



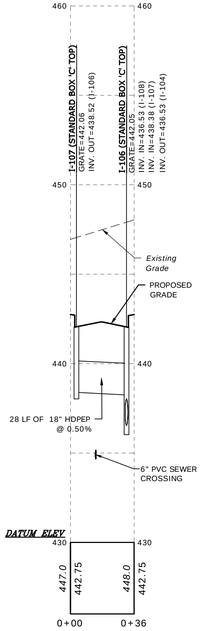
STORM SEWER: I-103 TO I-102

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



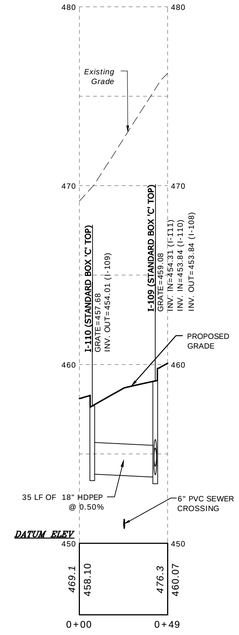
STORM SEWER: I-105 TO I-104

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



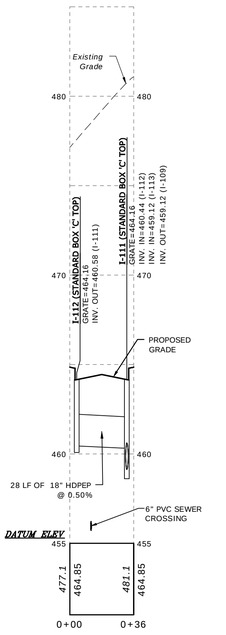
STORM SEWER: I-107 TO I-106

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



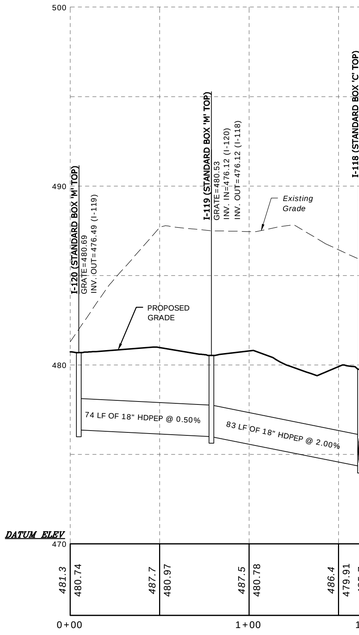
STORM SEWER: I-110 TO I-109

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: I-112 TO I-111

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: I-120 TO I-118

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP — DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_PCSMPROF.dwg

REVISIONS

NO.	DATE	DESCRIPTION
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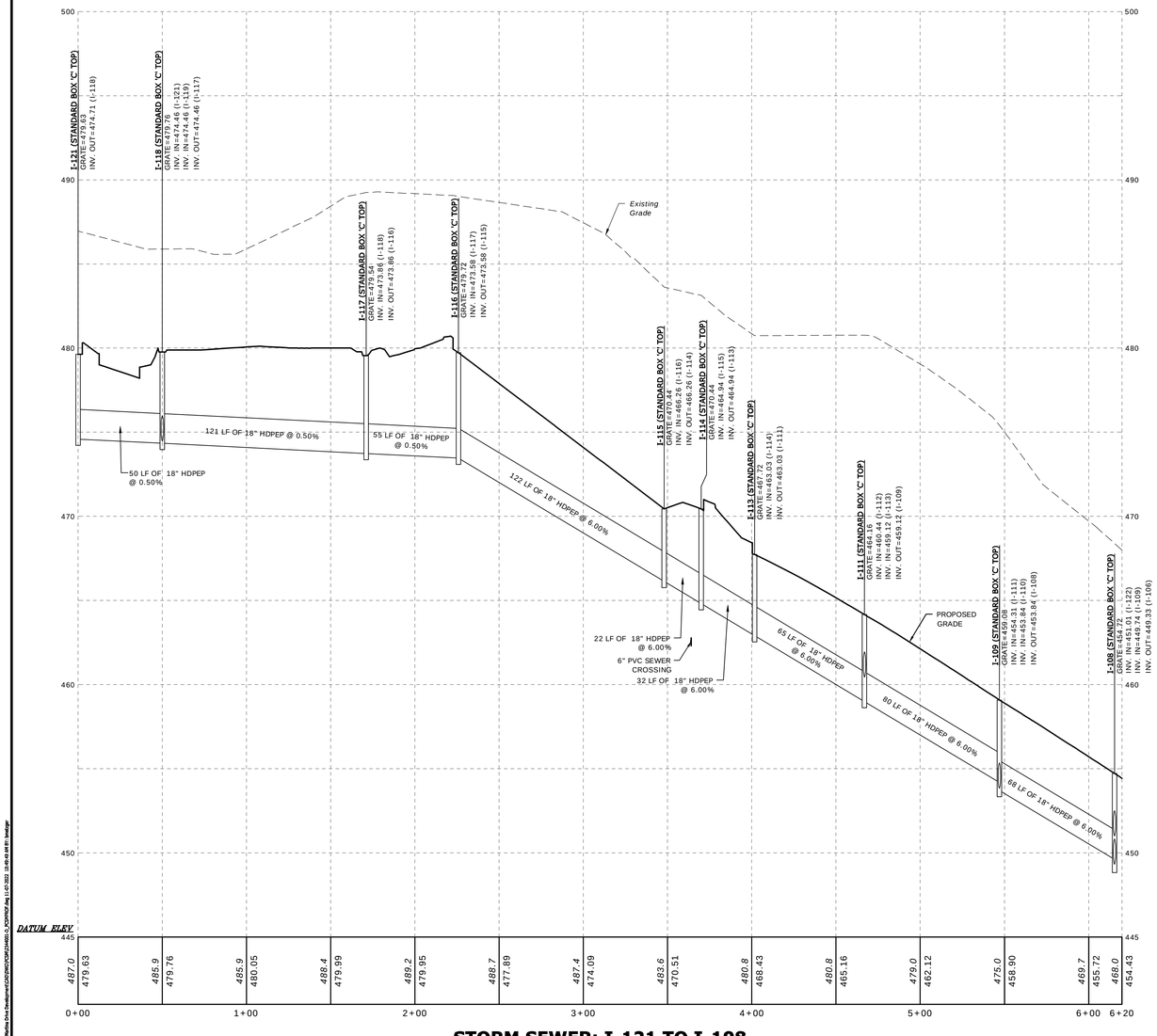
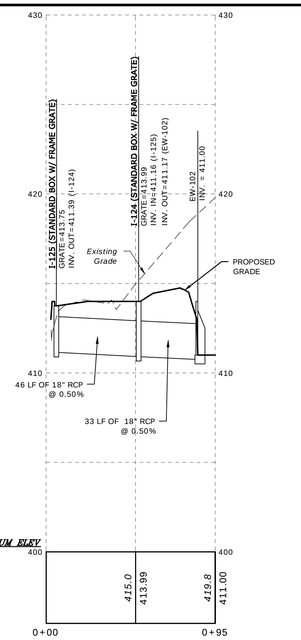
PLAN TYPE:
PROFILES

SHEET:
C2.7



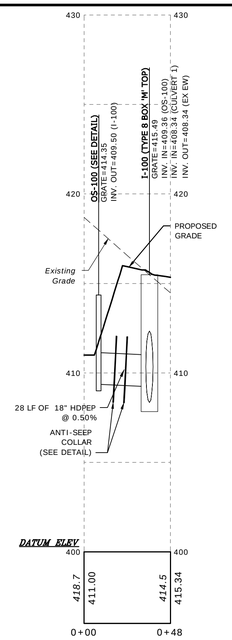
STORM SEWER: I-121 TO I-108

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



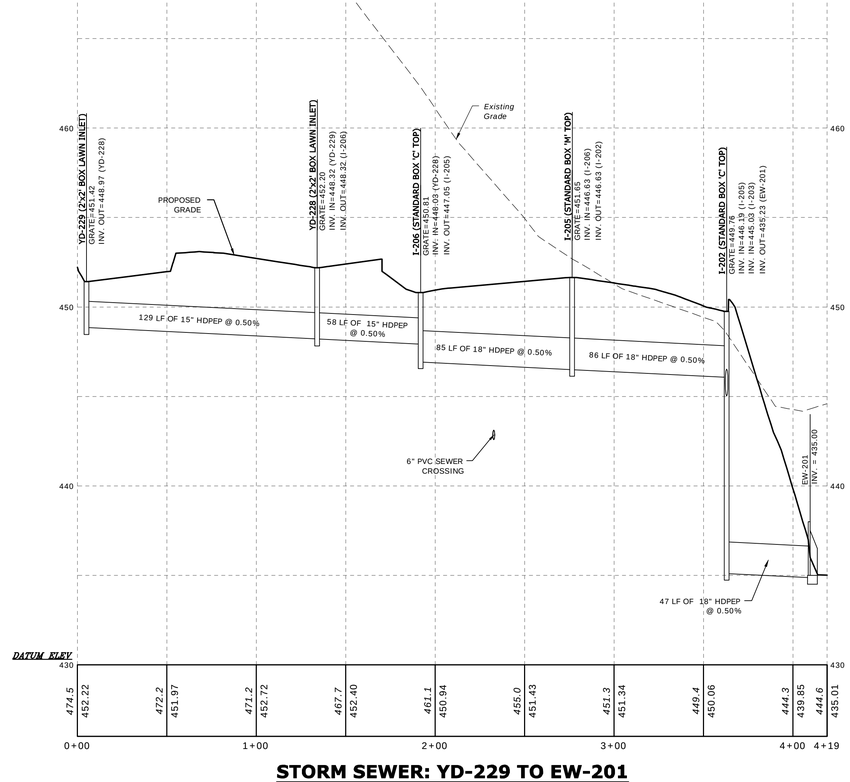
STORM SEWER: I-125 TO EW-102

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: OS-100 TO I-100

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: YD-229 TO EW-201

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP — DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_PCSMPROF.dwg

REVISIONS NO.	DATE	DESCRIPTION
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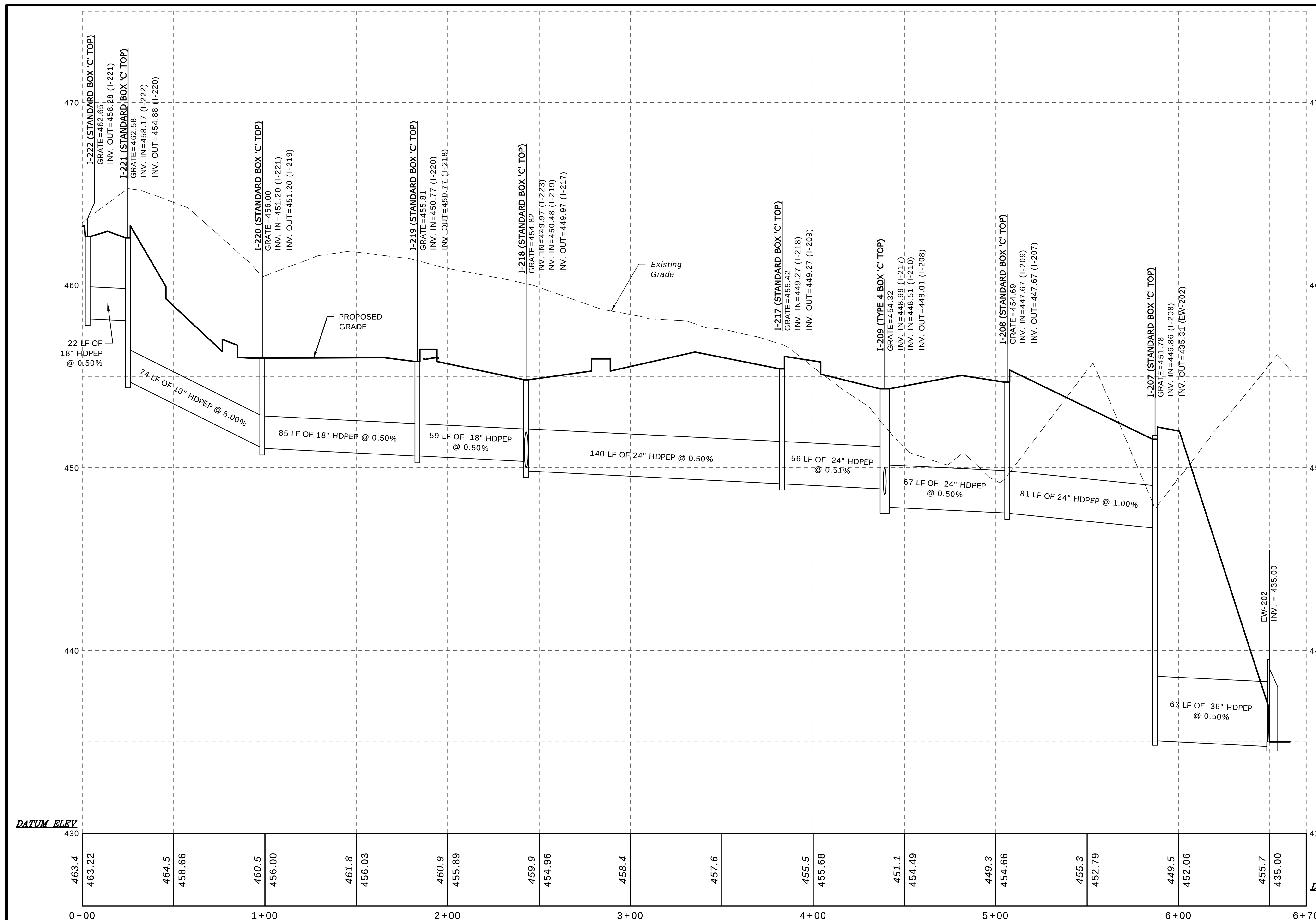
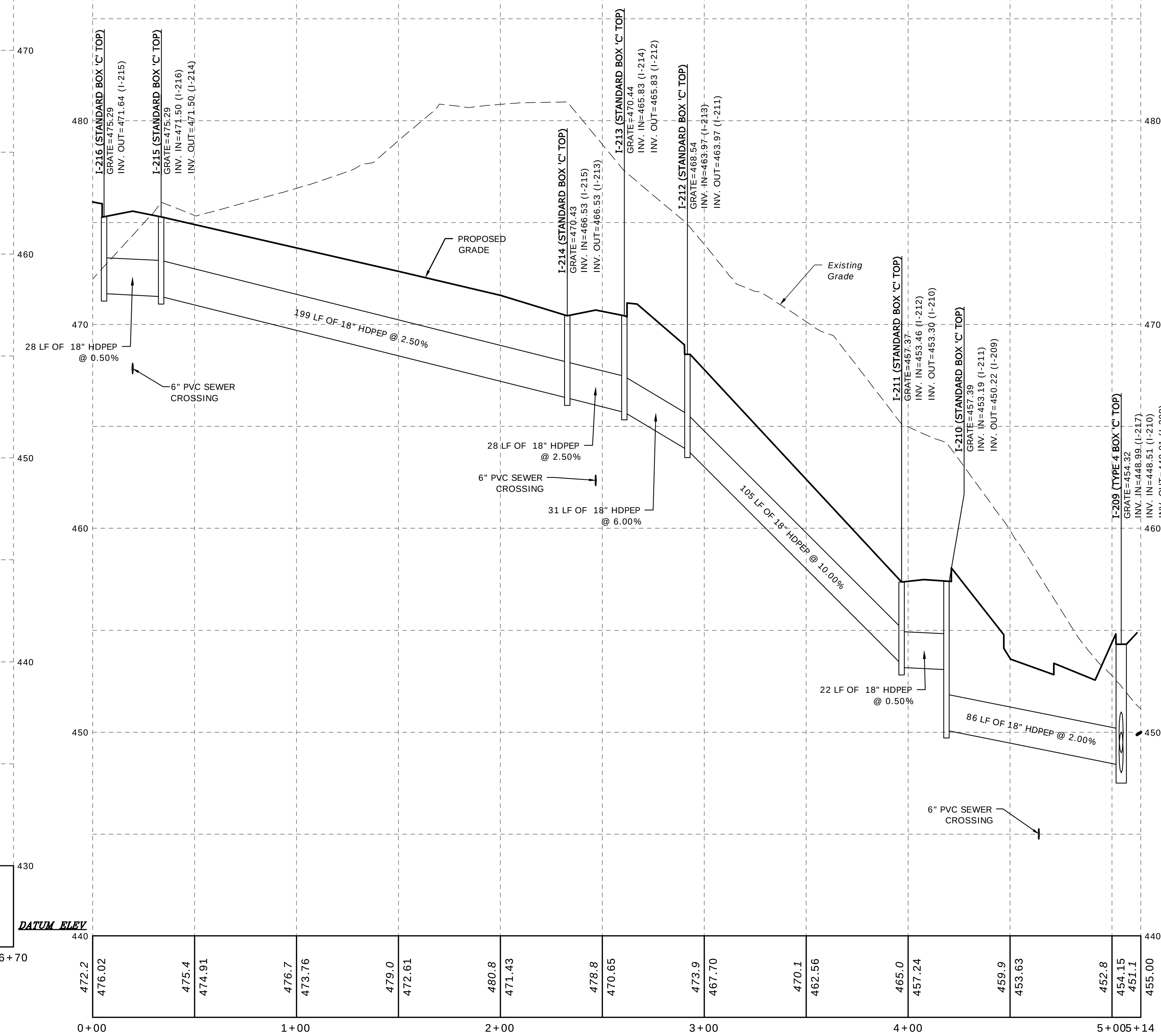
PLAN TYPE:
PROFILES

SHEET:
C2.8



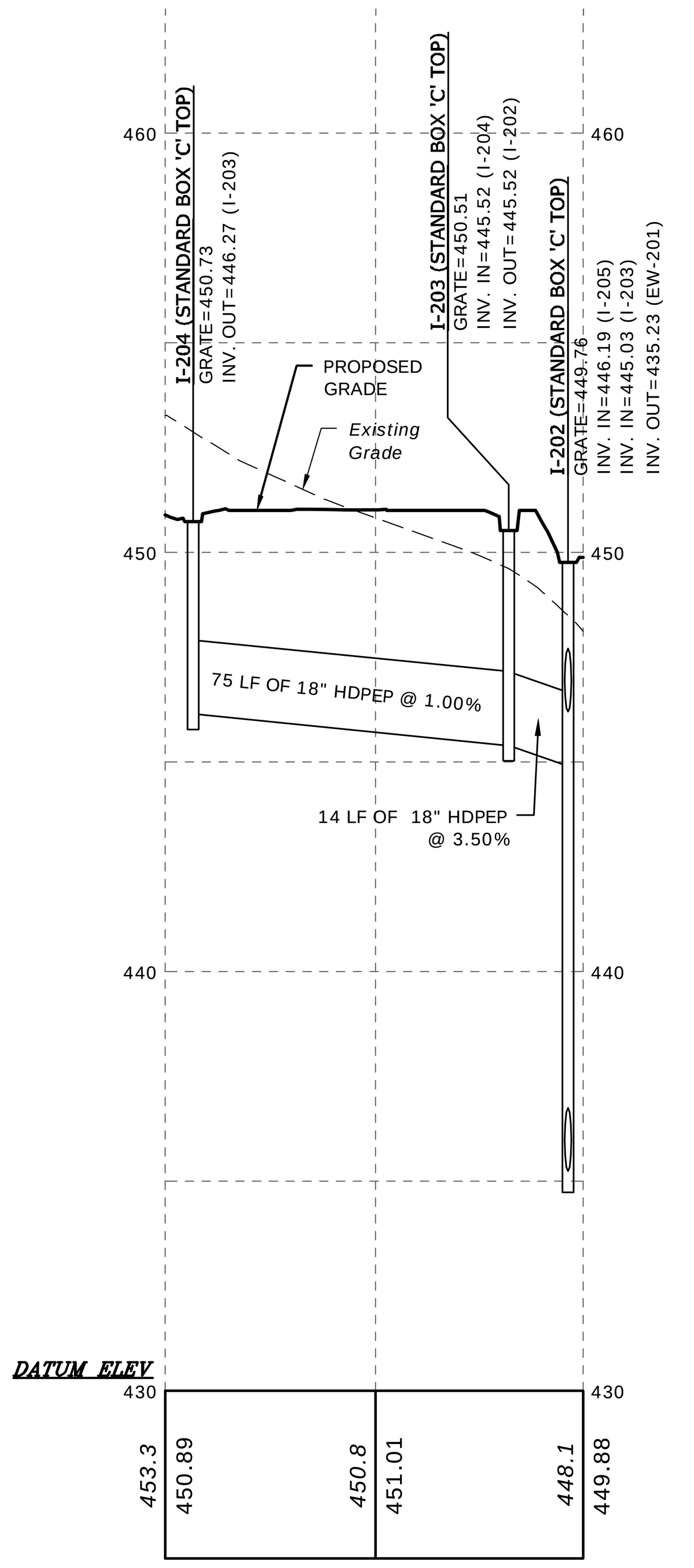
STORM SEWER: I-222 TO EW-202

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



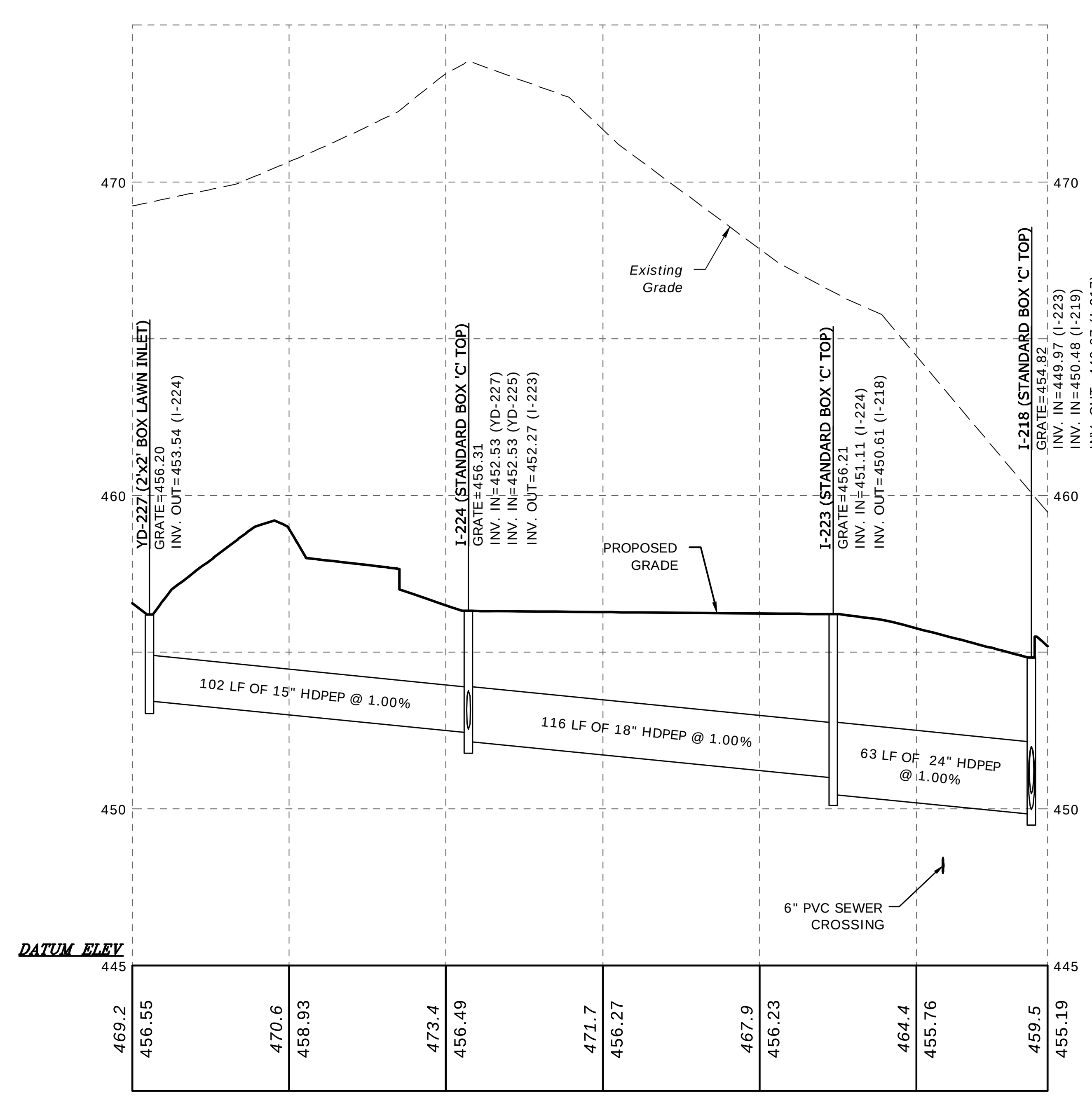
STORM SEWER: I-216 TO I-209

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



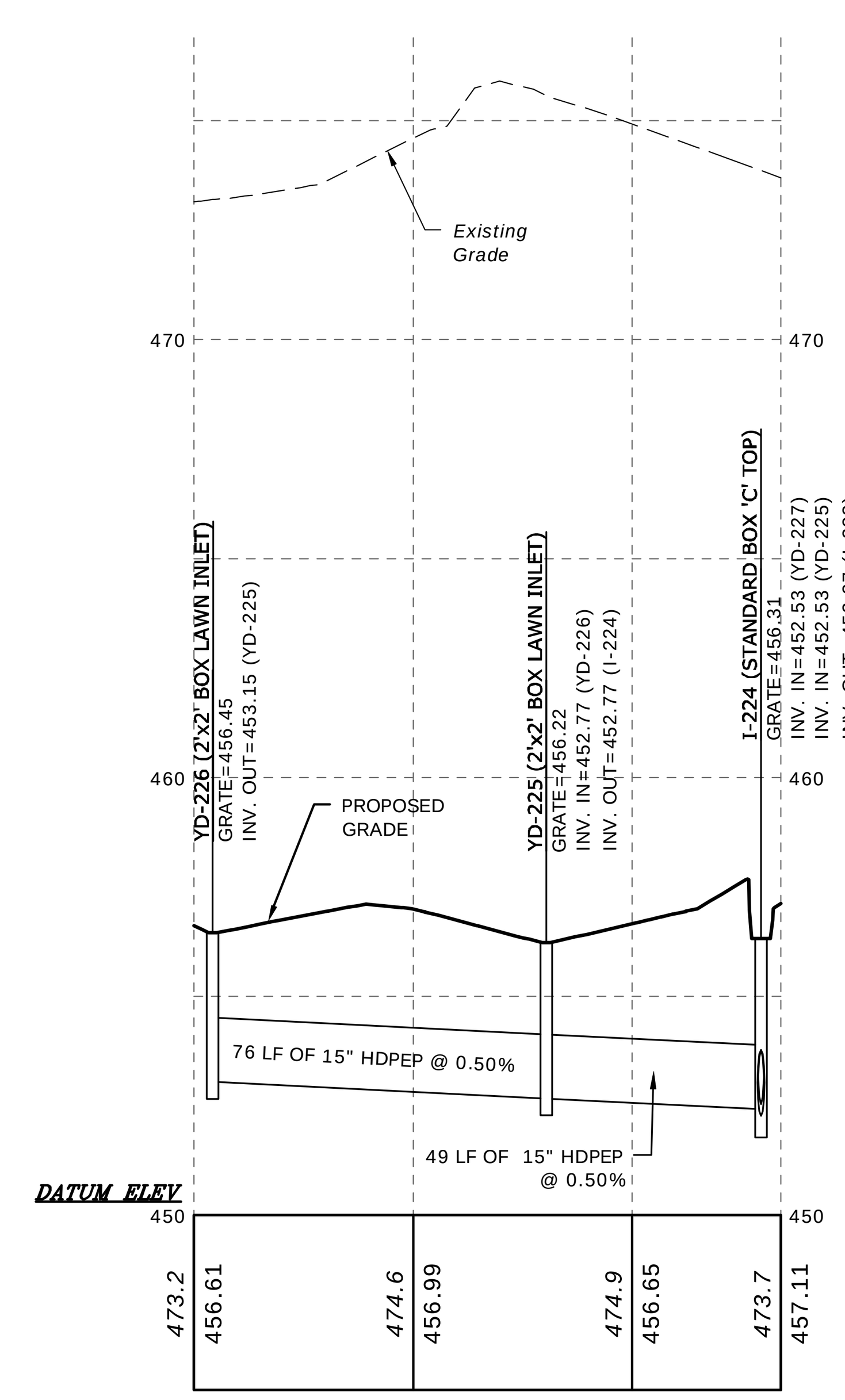
STORM SEWER: I-204 TO I-202

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



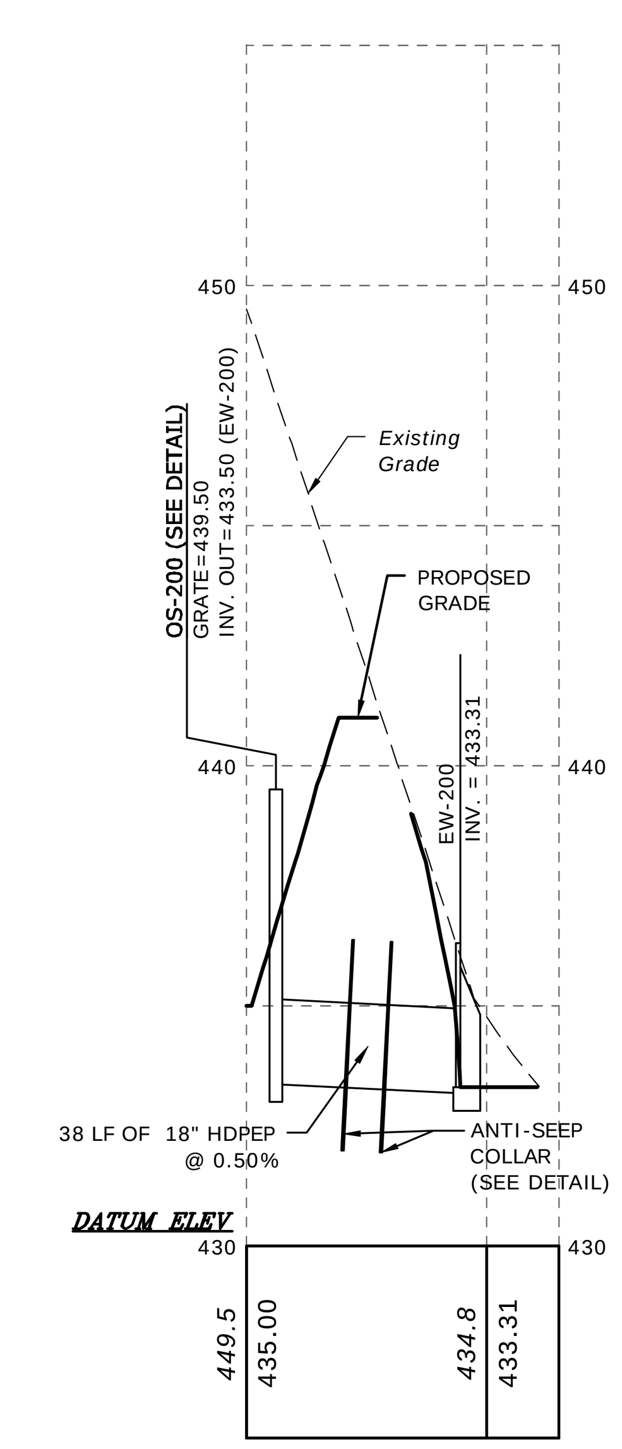
STORM SEWER: YD-227 TO I-218

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: YD-226 TO I-224

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: OS-200 TO EW-200

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA
SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
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CAD DRAWING: 2344001-D_PCSMPROF.dwg	

REVISIONS

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PLAN TYPE:
PROFILES

SHEET:
C2.9

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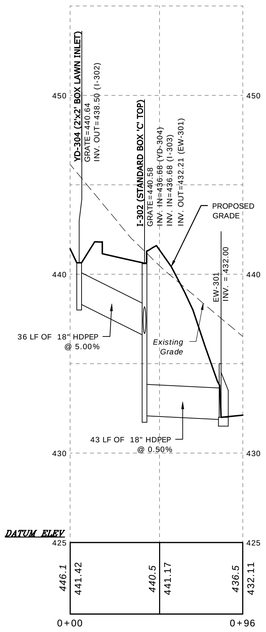
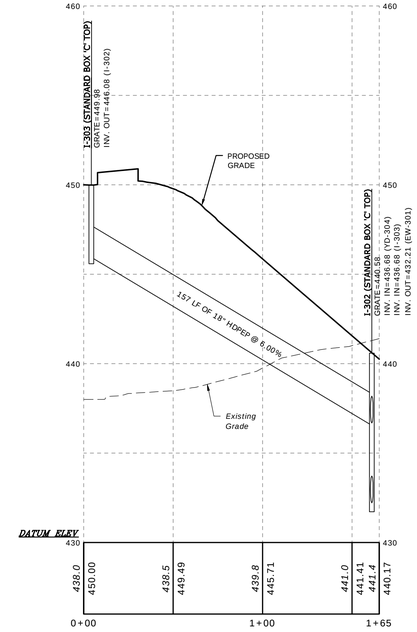


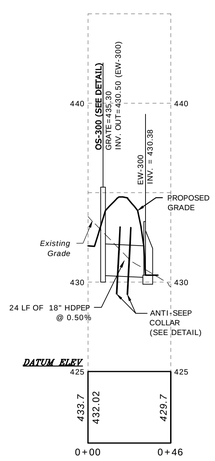
STORM SEWER: YD-304 TO EW-301

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



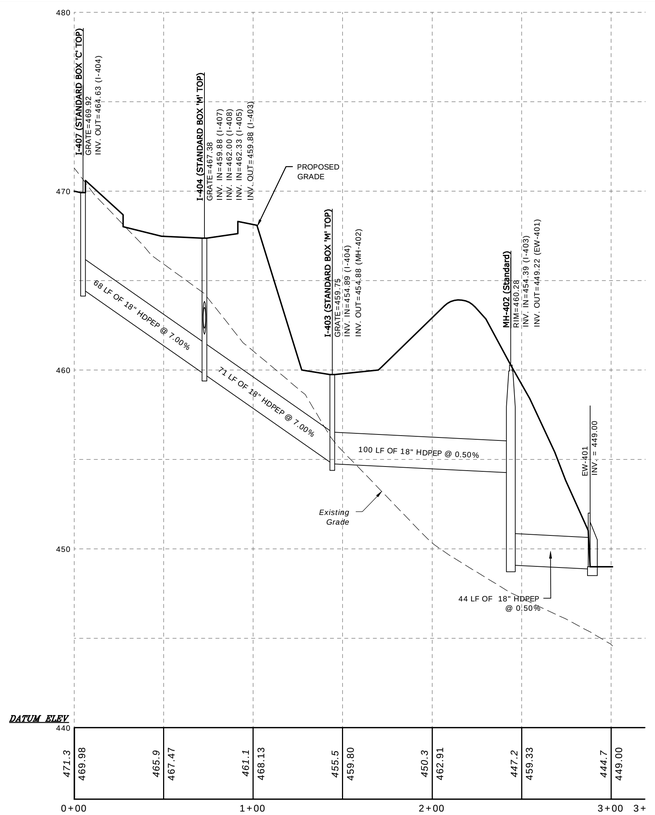
STORM SEWER: I-303 TO I-302

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



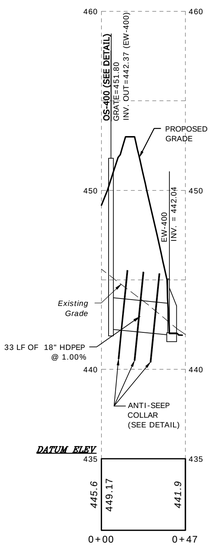
STORM SEWER: OS-300 TO EW-300

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



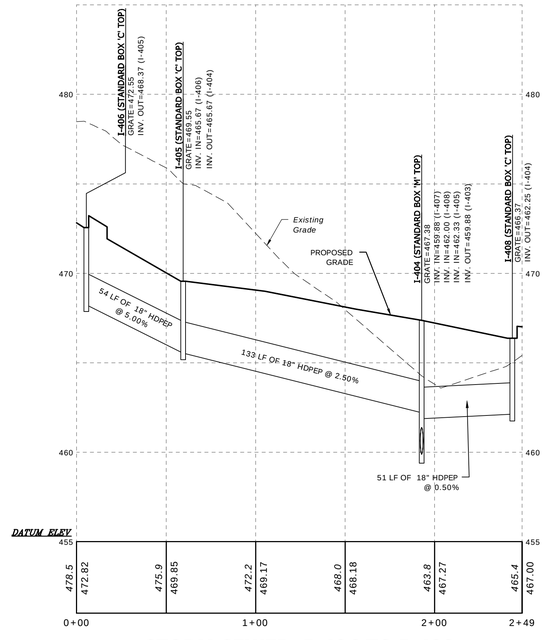
STORM SEWER: I-407 TO EW-401

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



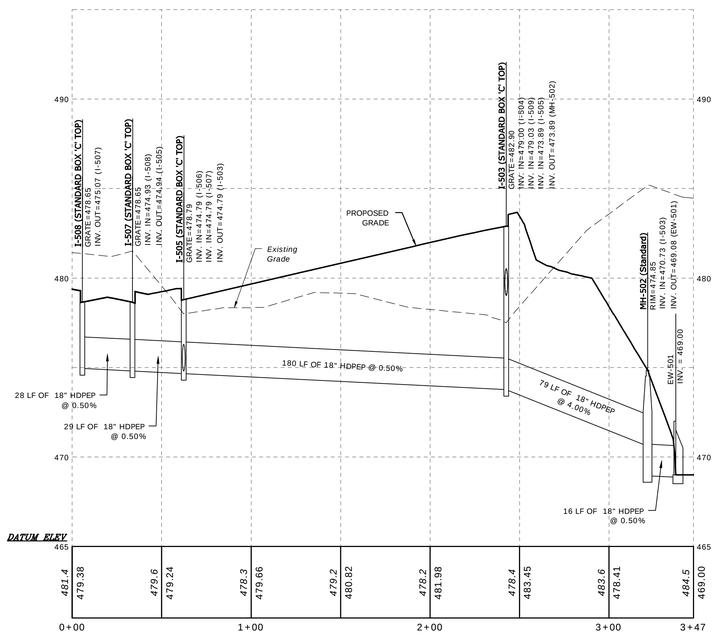
STORM SEWER: OS-400 TO EW-400

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



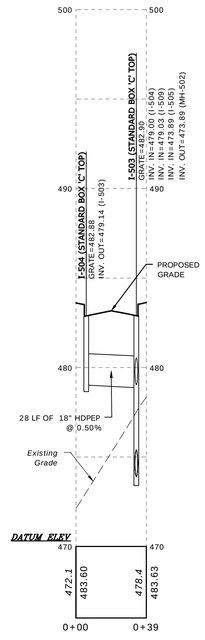
STORM SEWER: I-406 TO I-408

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



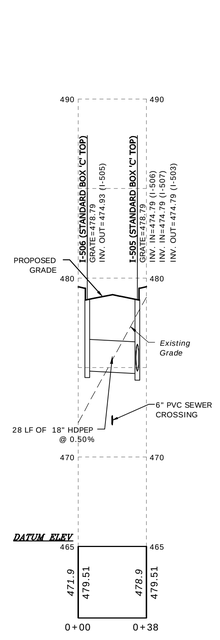
STORM SEWER: I-508 TO EW-501

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: I-504 TO I-503

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: I-506 TO I-505

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE

FOR

INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP — DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_PCSMPROF.dwg

REVISIONS NO.	DATE	DESCRIPTION
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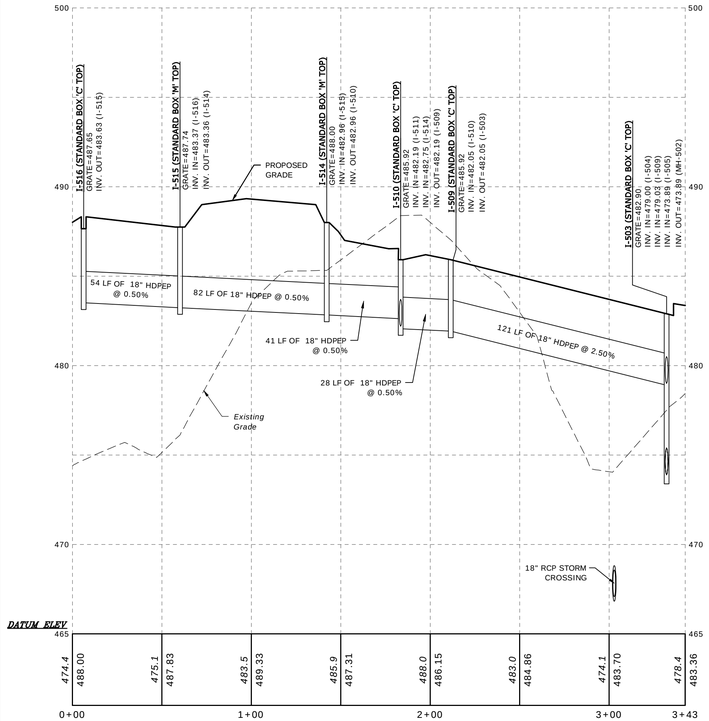
PLAN TYPE:
PROFILES

SHEET:
C2.10



STORM SEWER: I-516 TO I-503

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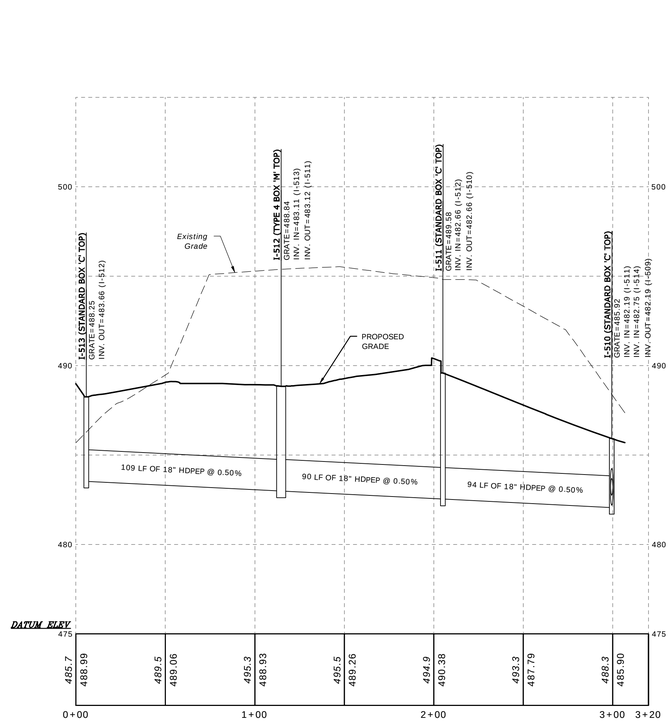
VERT. SCALE: 1"= 4'



STORM SEWER: I-513 TO I-510

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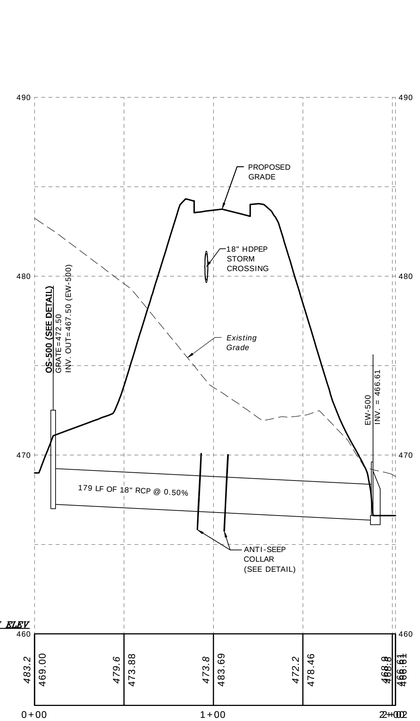
VERT. SCALE: 1"= 4'



STORM SEWER: OS-500 TO EW-500

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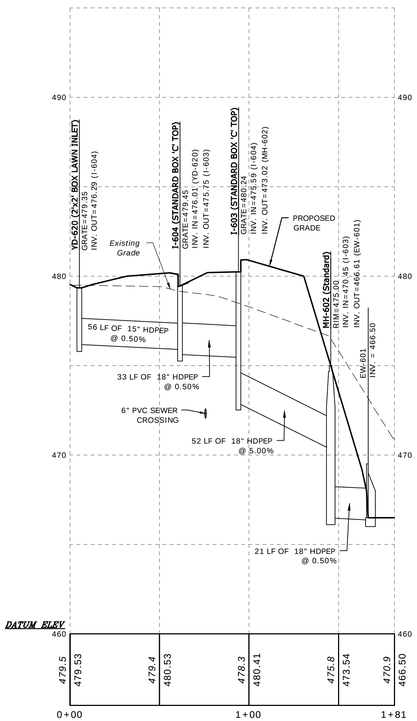
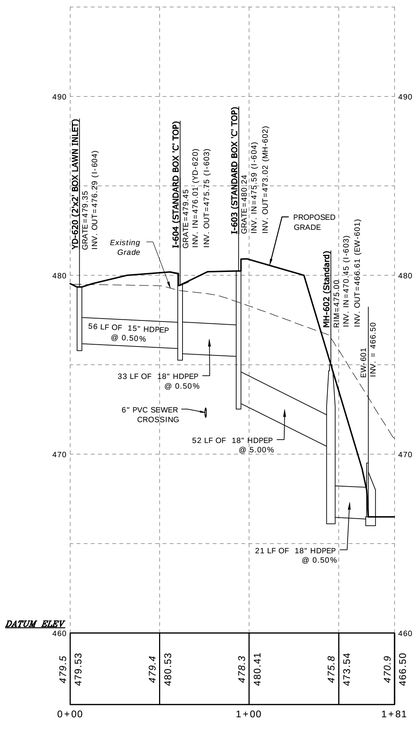
VERT. SCALE: 1"= 4'



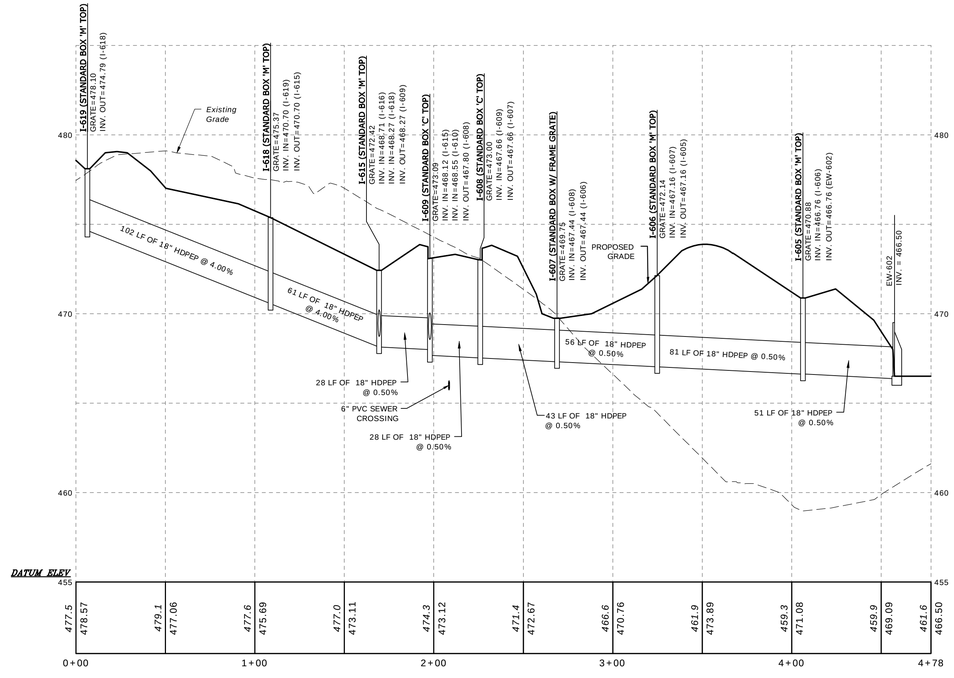
STORM SEWER: YD-620 TO EW-601

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: YD-620 TO EW-601

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: I-619 TO EW-602

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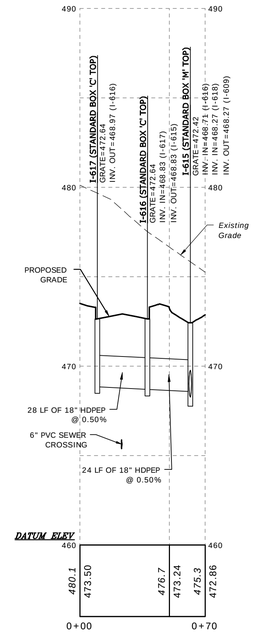
VERT. SCALE: 1"= 4'



STORM SEWER: I-617 TO I-615

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE: AS SHOWN
DATE: NOVEMBER 07, 2022
K&W PROJECT: 2344.001
DRAWN BY: HAB
CAD DRAWING: 2344001-D_PCSMPROF.dwg

REVISIONS NO.	DATE	DESCRIPTION
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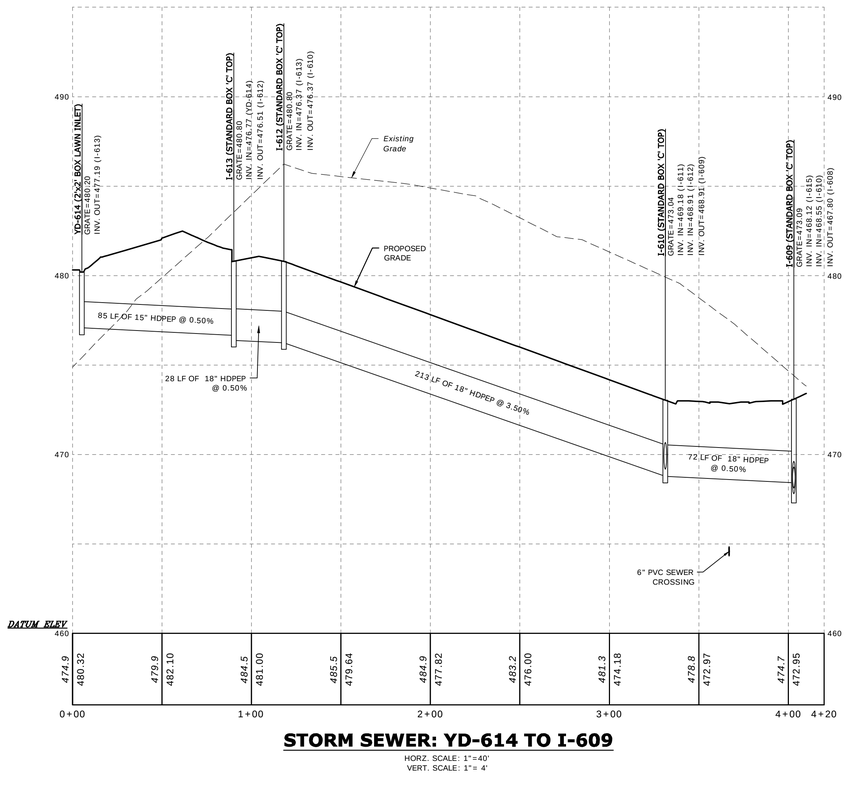
PLAN TYPE:
PROFILES

SHEET:
C2.11



STORM SEWER: YD-614 TO I-609

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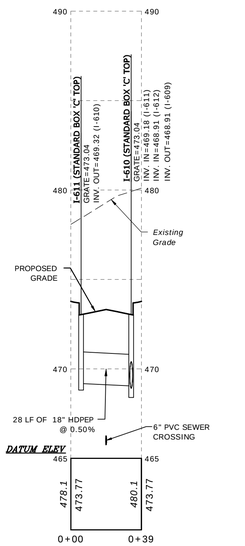
VERT. SCALE: 1"= 4'



STORM SEWER: I-611 TO I-610

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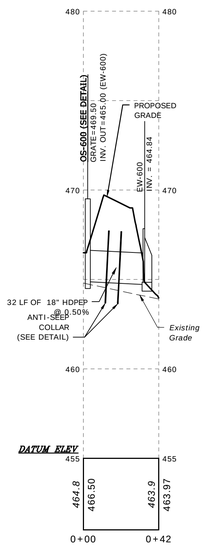
VERT. SCALE: 1"= 4'



STORM SEWER: OS-600 TO EW-600

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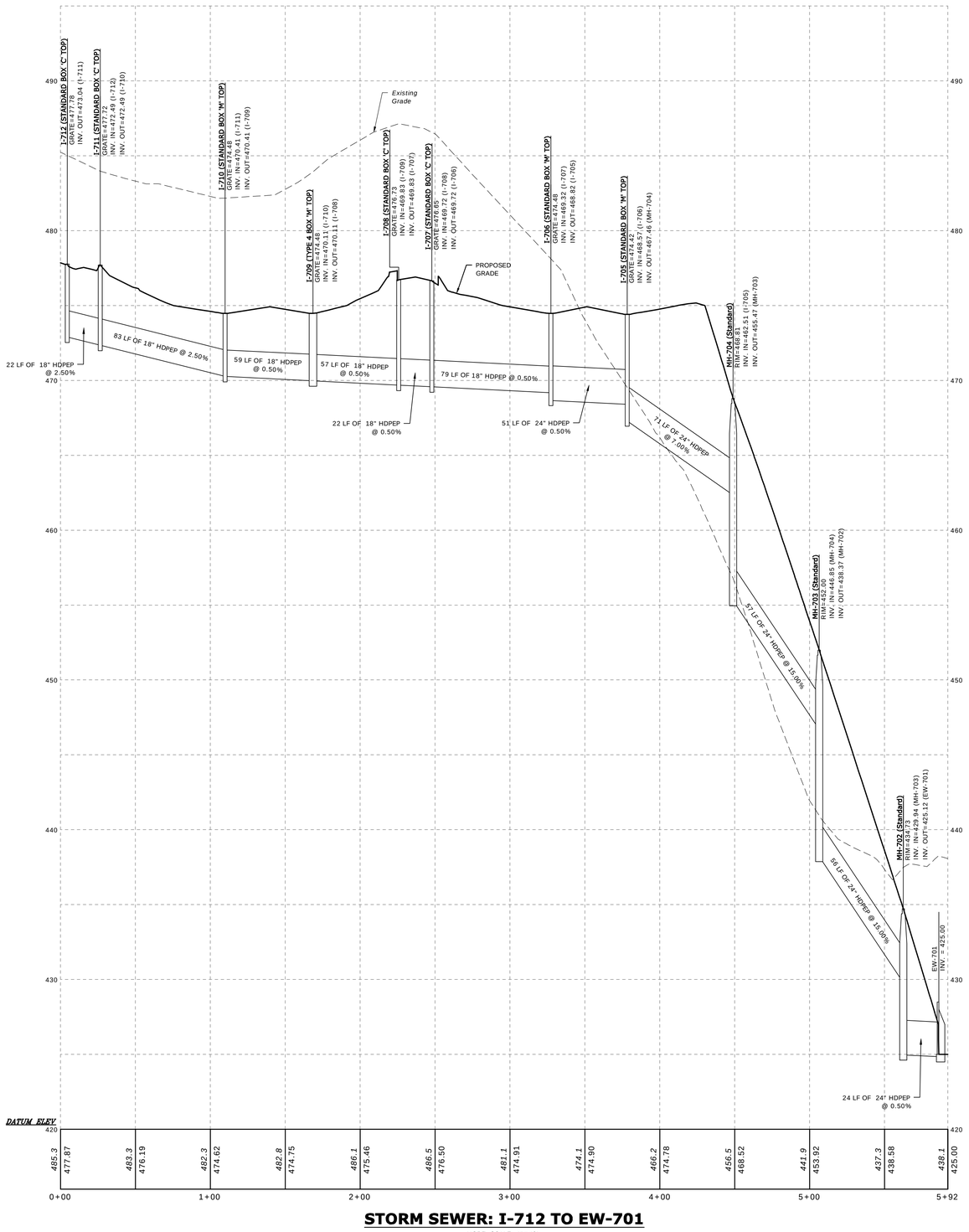
VERT. SCALE: 1"= 4'



STORM SEWER: I-712 TO EW-701

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_PCSMPROF.dwg

REVISIONS NO.	DATE	DESCRIPTION
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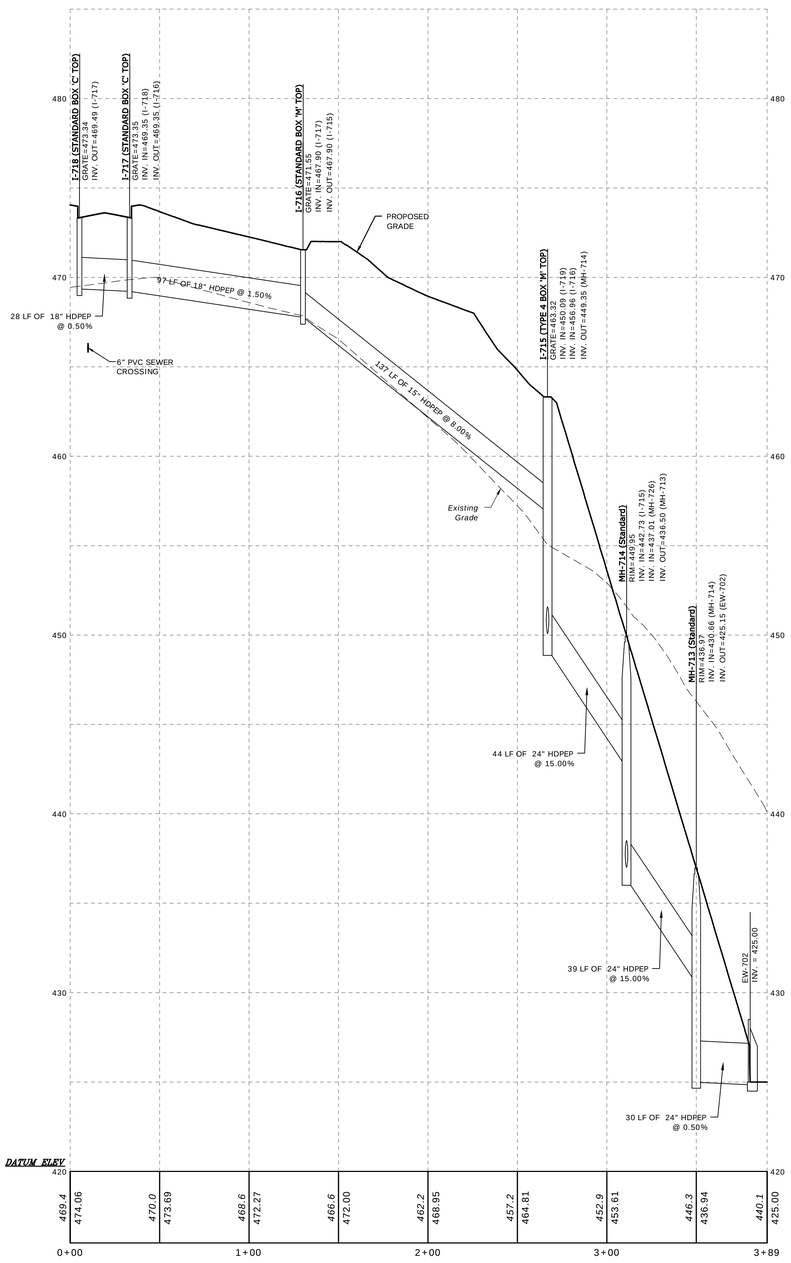
PLAN TYPE:
PROFILES

SHEET:
C2.12



STORM SEWER: I-718 TO EW-702

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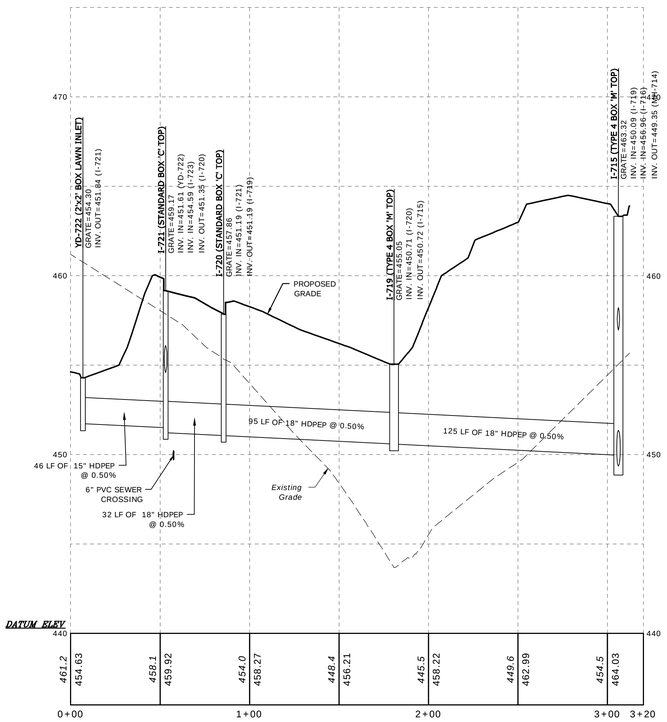
VERT. SCALE: 1"= 4'



STORM SEWER: YD-722 TO I-715

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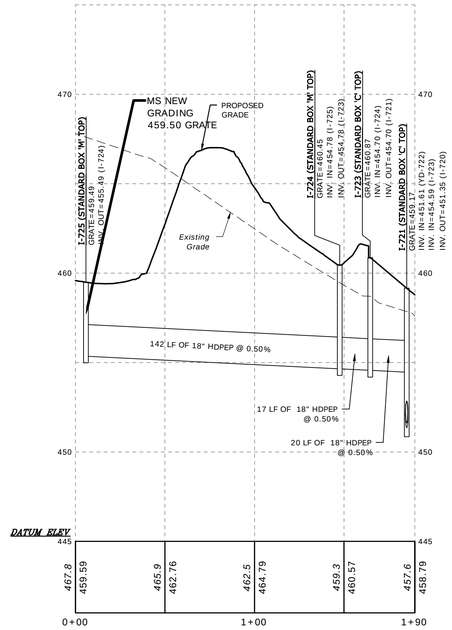

STORM SEWER: I-725 TO I-721

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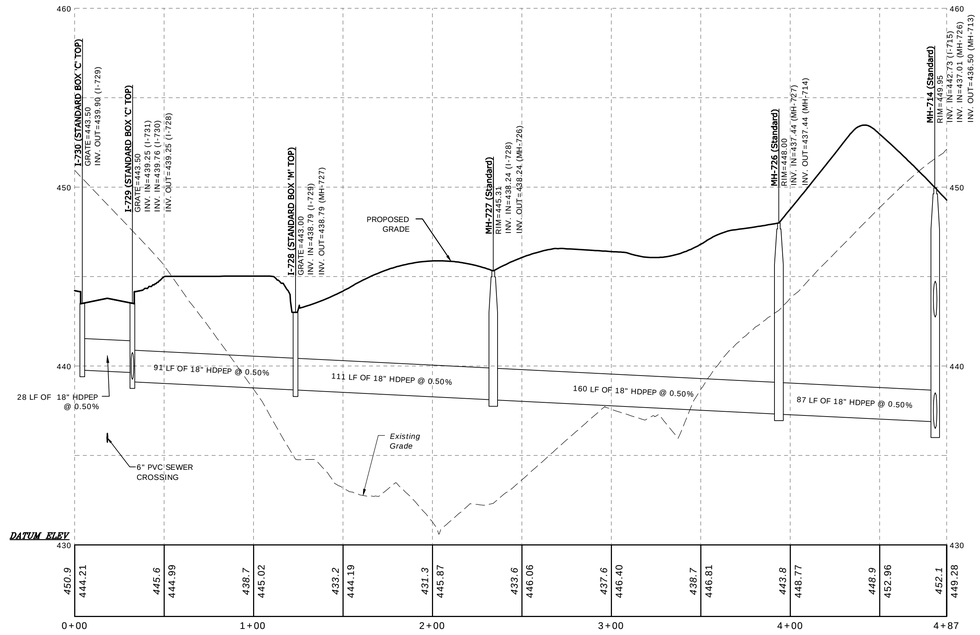

STORM SEWER: I-730 TO MH-714

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP — DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_PCSMPROF.dwg

REVISIONS NO.	DATE	DESCRIPTION
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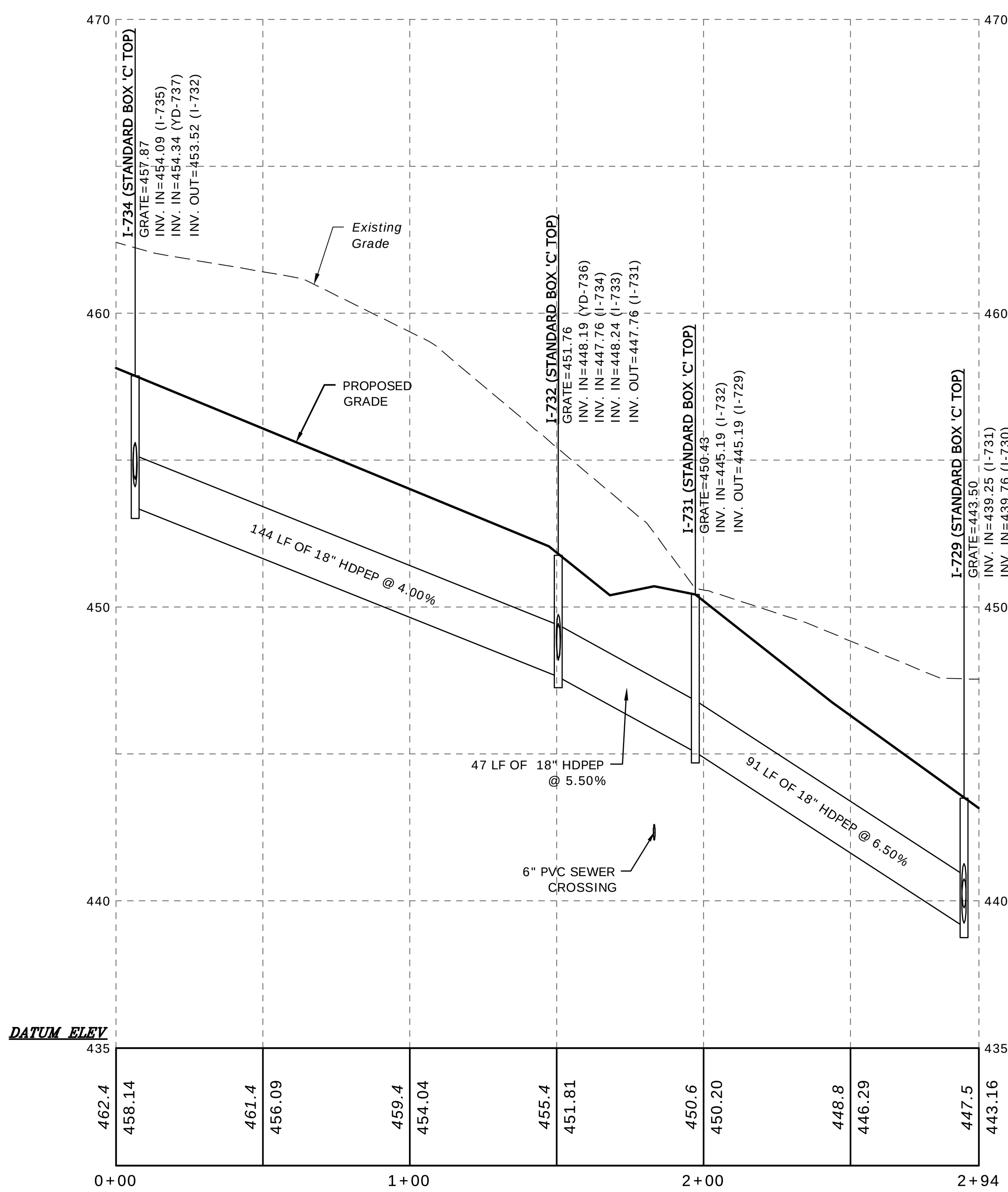
PLAN TYPE:
PROFILES

SHEET:
C2.13



STORM SEWER: I-734 TO I-729

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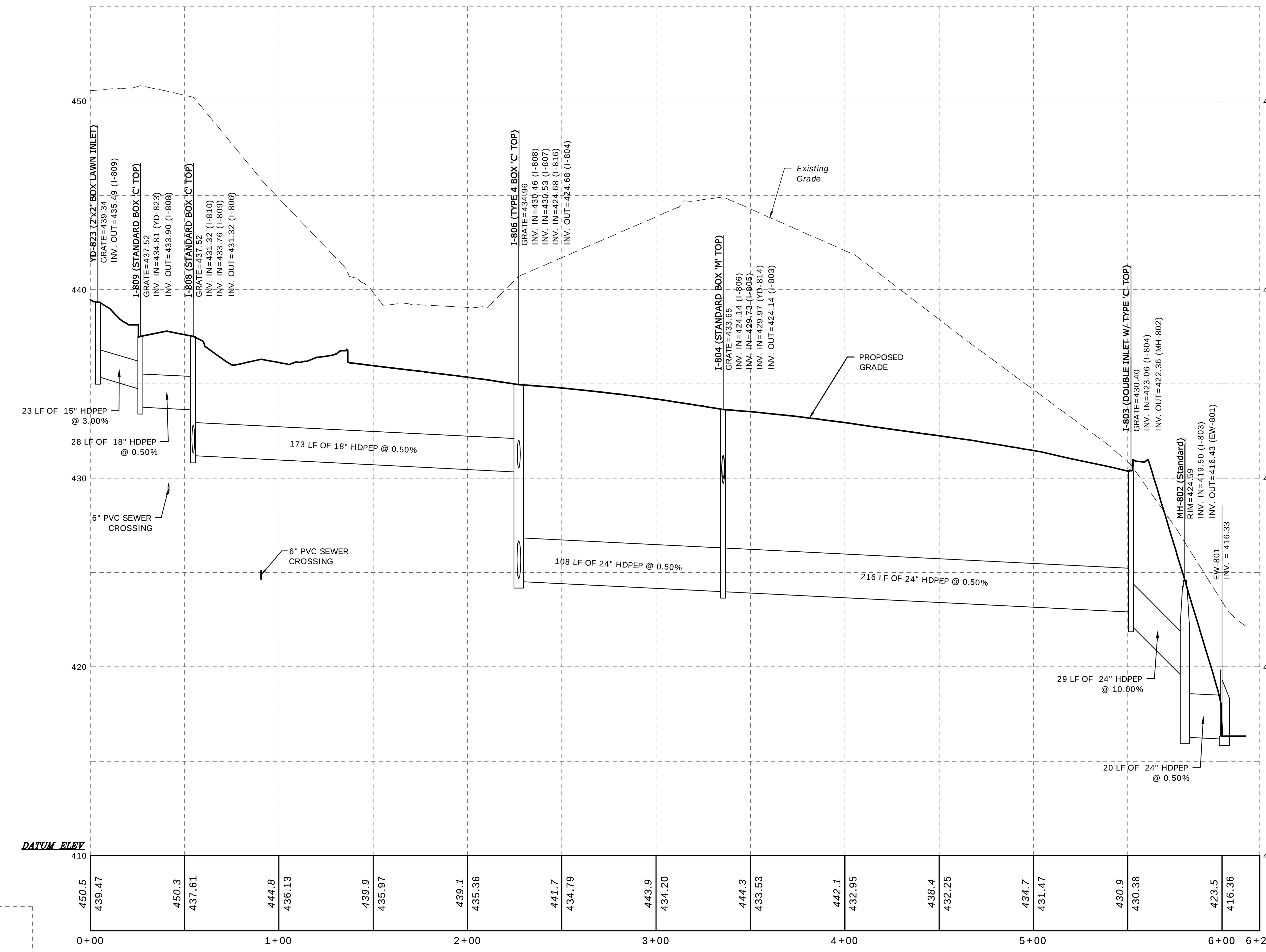
VERT. SCALE: 1"= 4'



STORM SEWER: YD-823 TO EW-801

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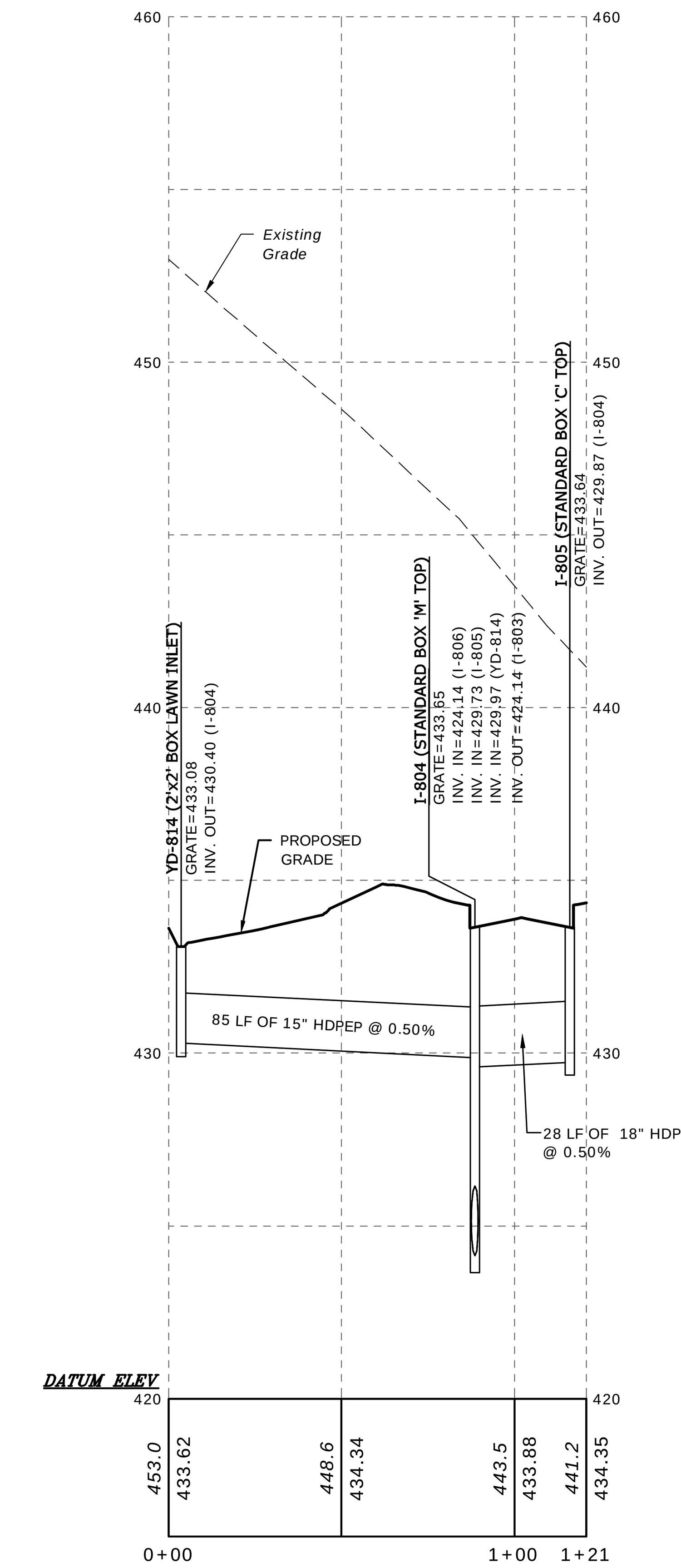
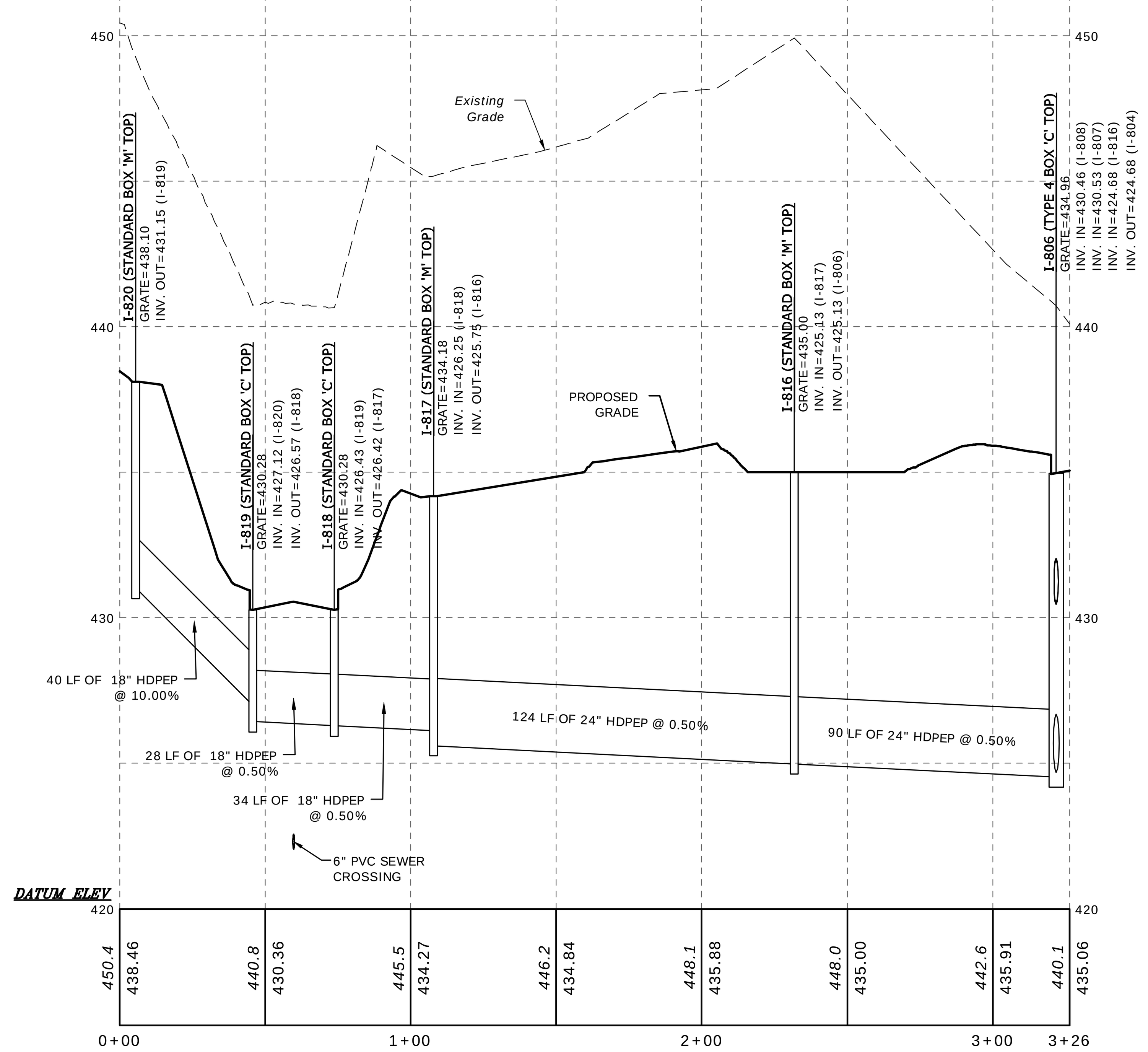
VERT. SCALE: 1"= 4'



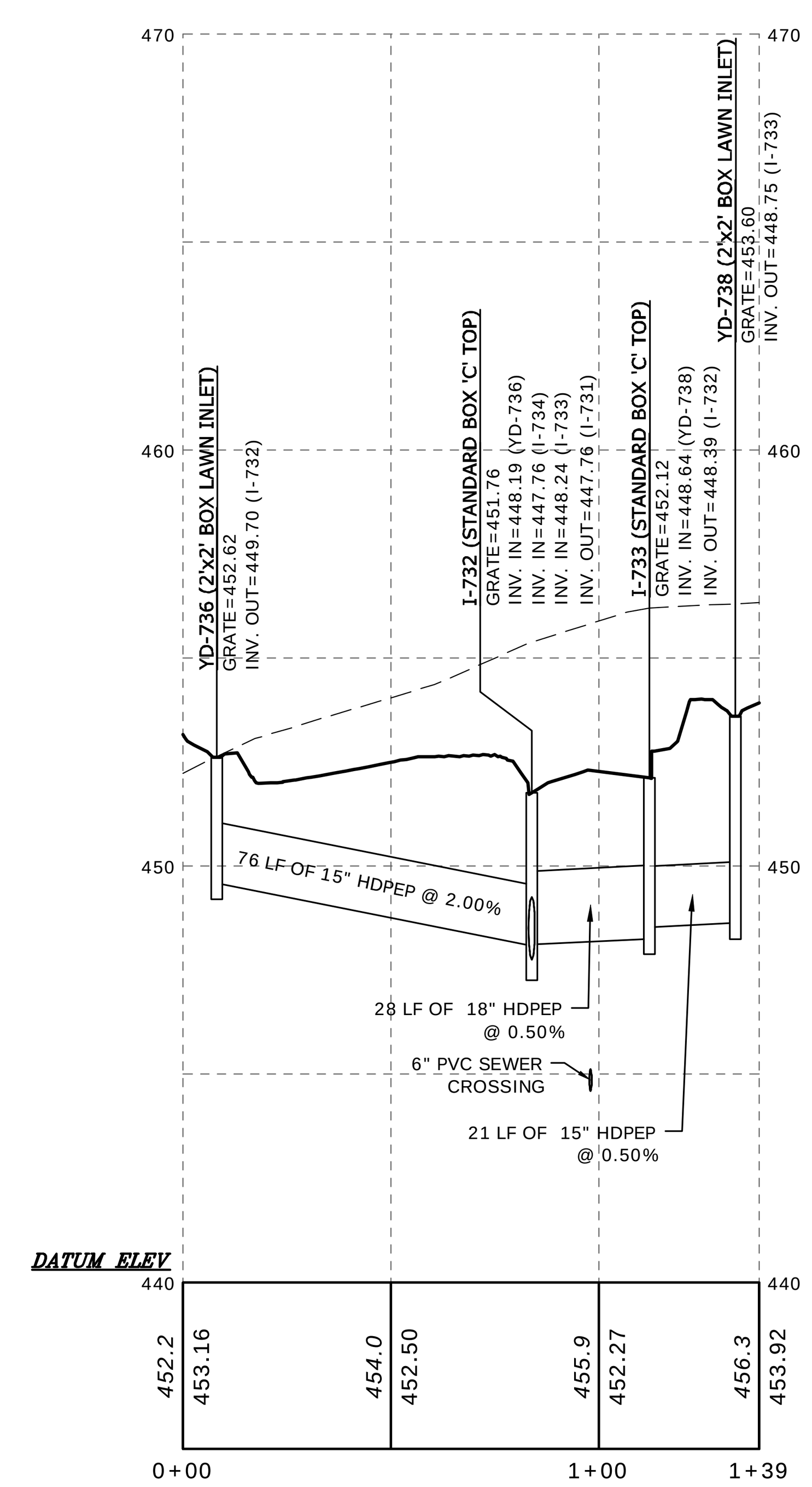
STORM SEWER: YD-814 TO I-805

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



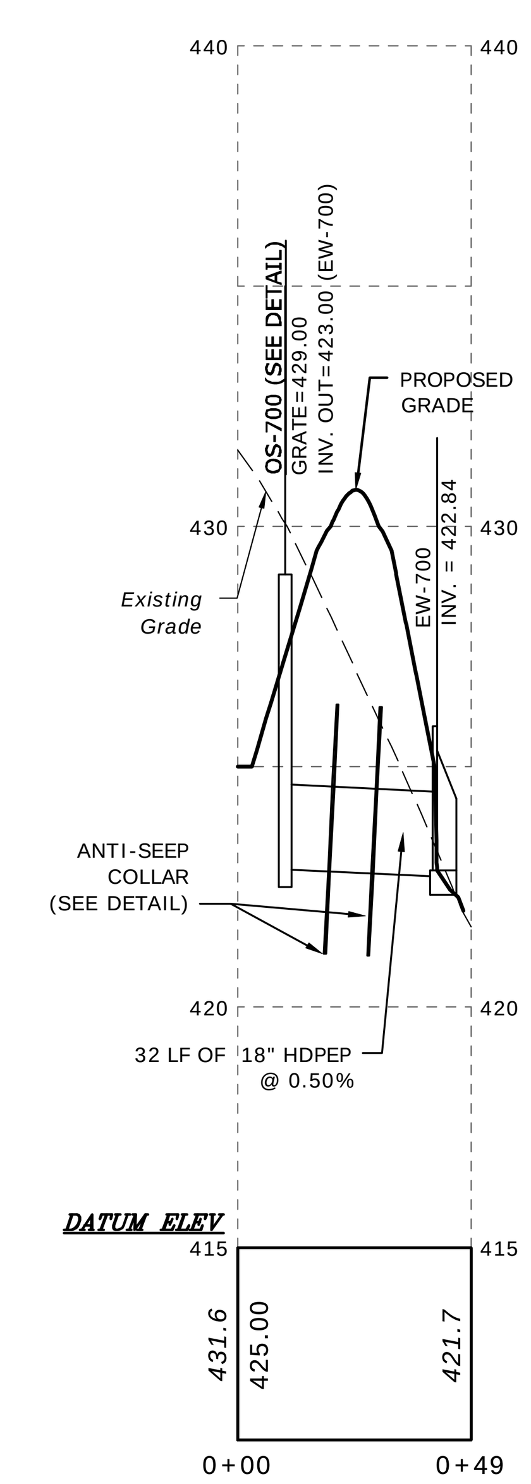
STORM SEWER: I-820 TO I-806

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



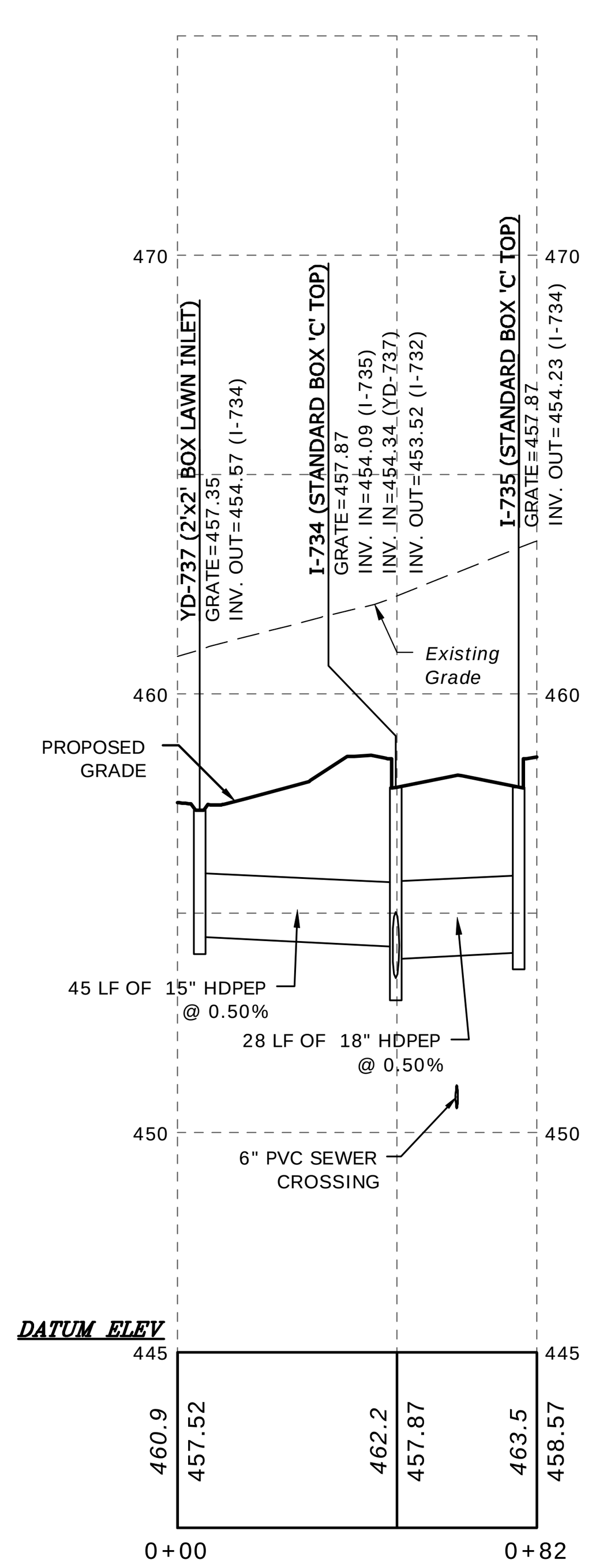
STORM SEWER: YD-736 TO I-733

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



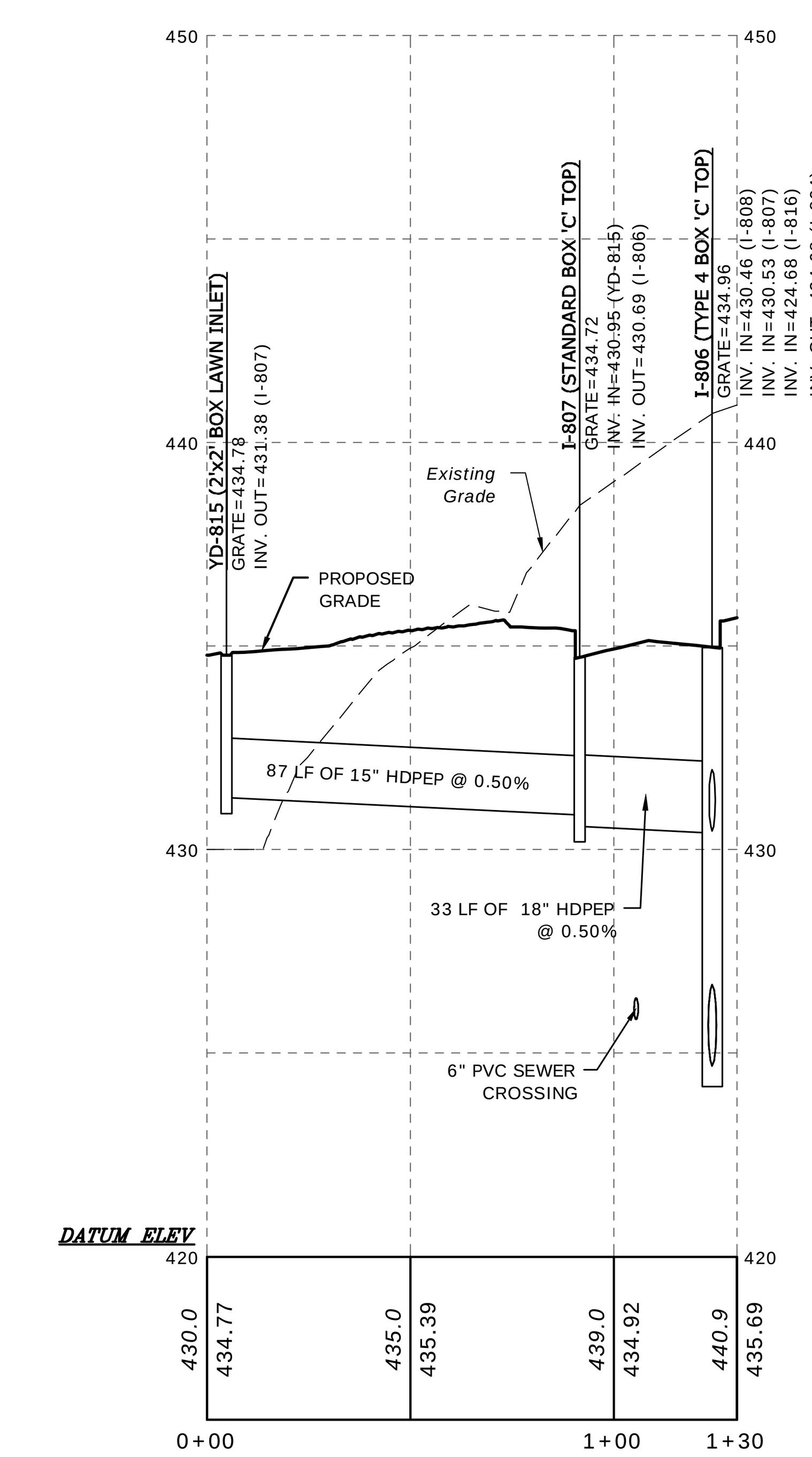
STORM SEWER: OS-700 TO EW-700

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: YD-737 TO I-735

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'



STORM SEWER: YD-815 TO I-806

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA
SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING: 2344001-D_PCSMPROF.dwg	

REVISIONS

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PLAN TYPE:
PROFILES

SHEET:
C2.14

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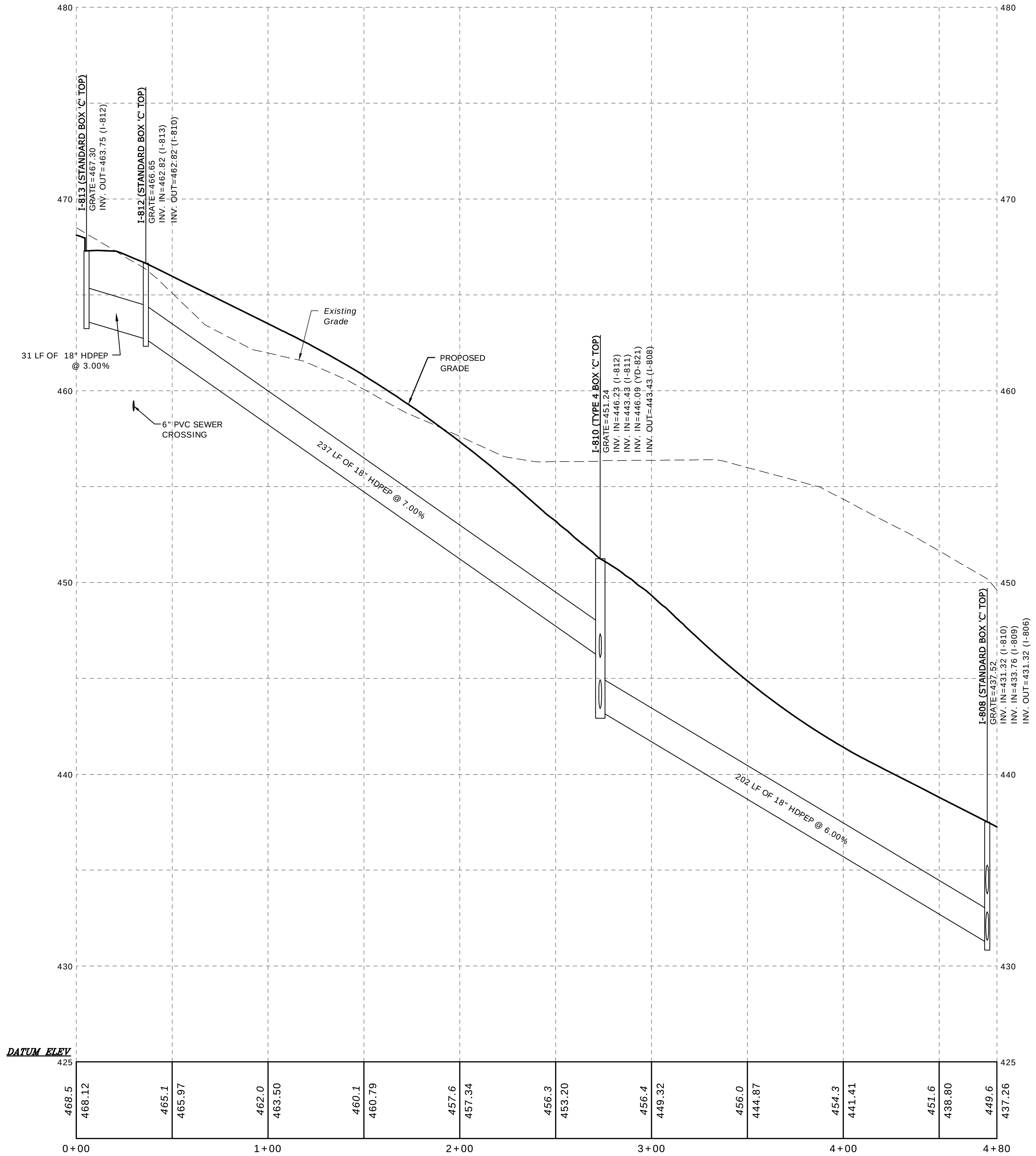

STORM SEWER: I-813 TO I-808

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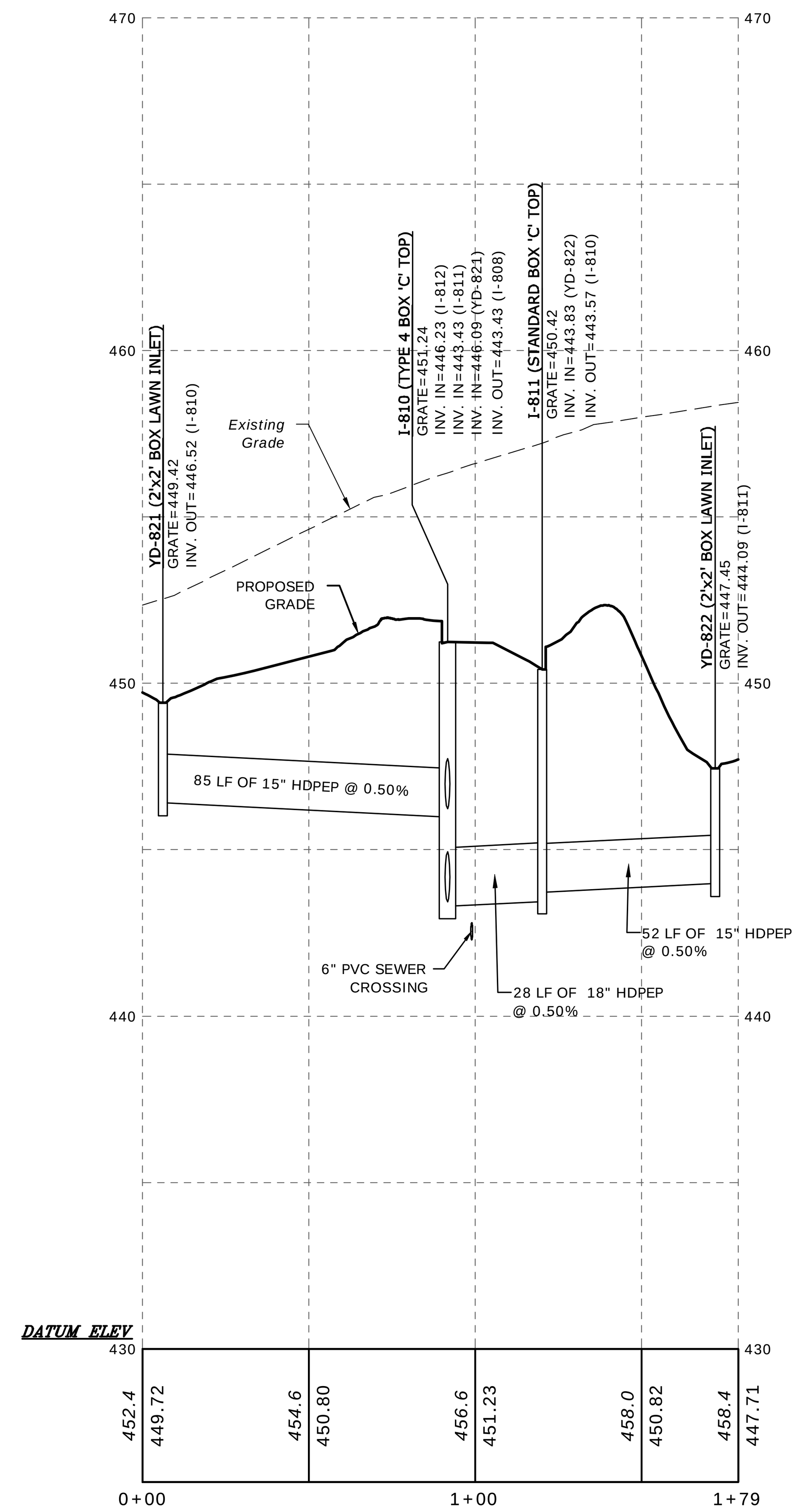
VERT. SCALE: 1"= 4'



STORM SEWER: YD-821 TO YD-822

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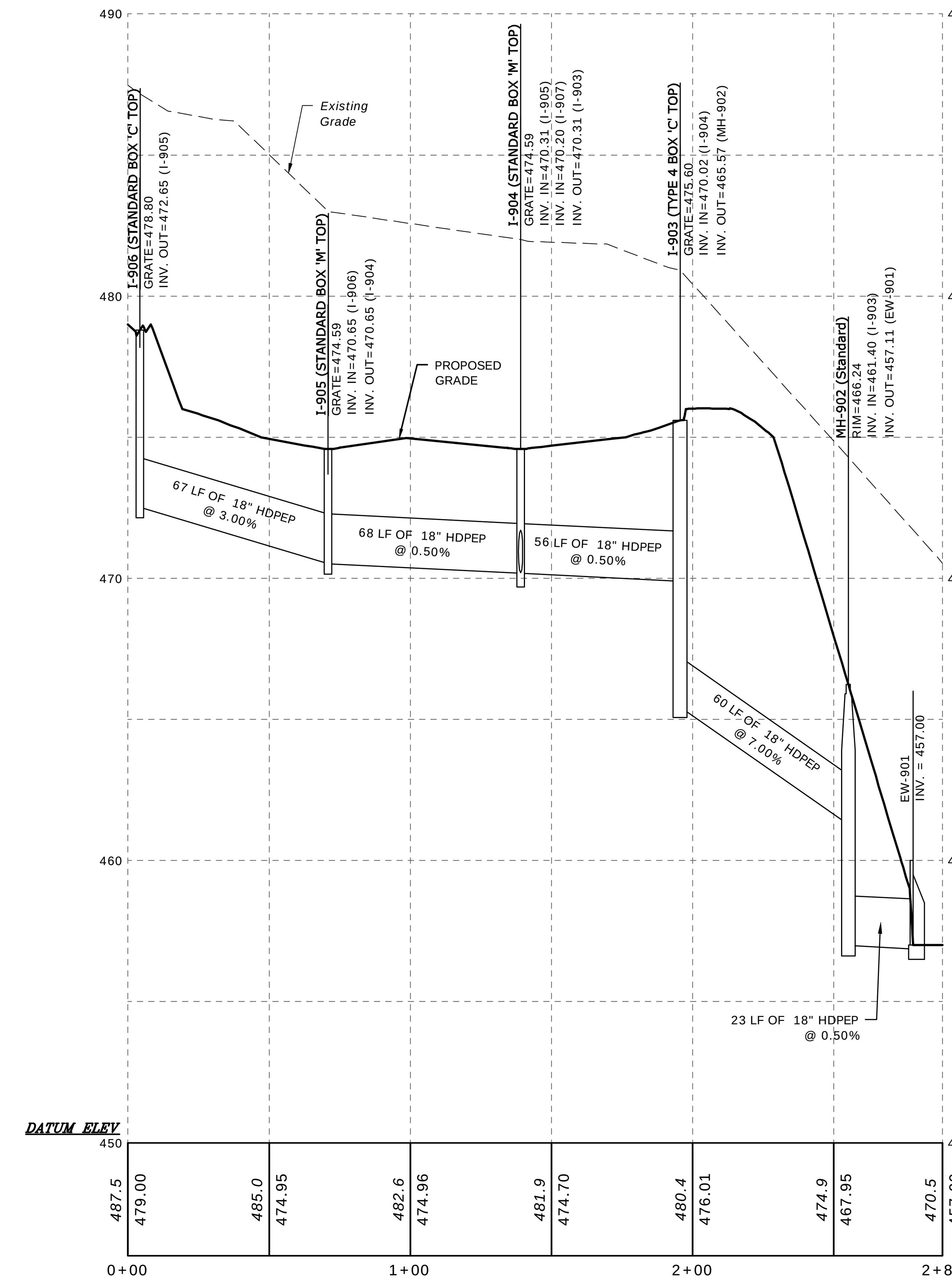
VERT. SCALE: 1"= 4'



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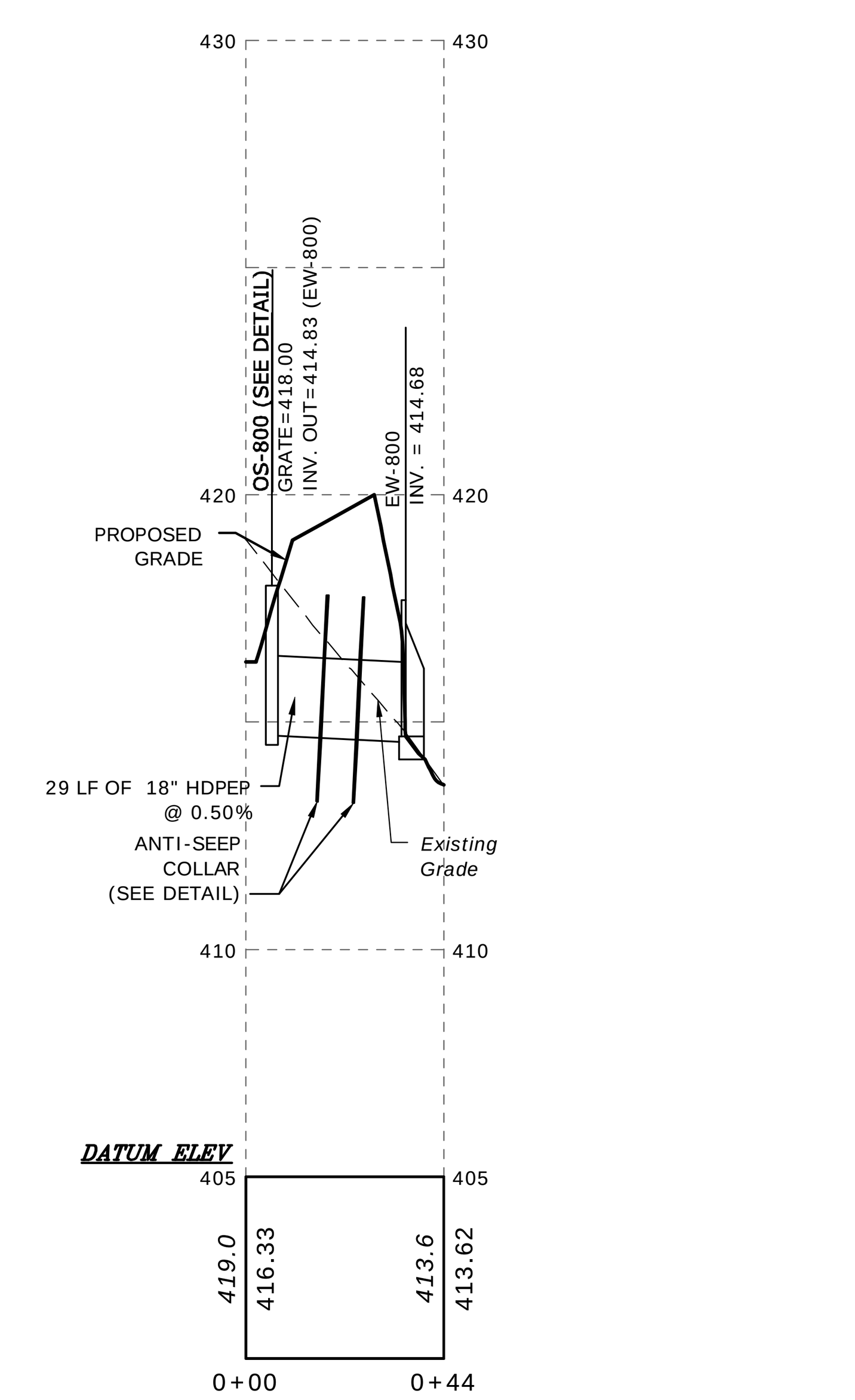

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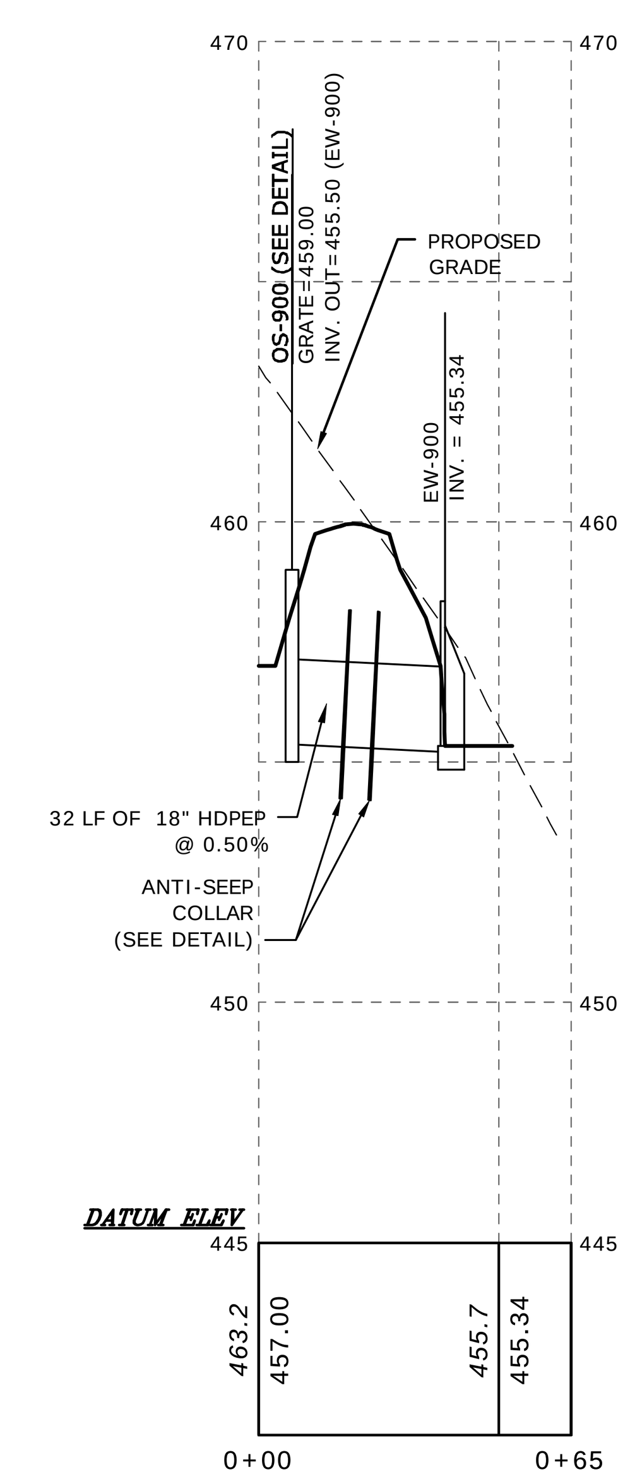

STORM SEWER: OS-900 TO EW-900

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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1235 MARTINA DRIVE
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INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-D_PCSMPROF.dwg

REVISIONS

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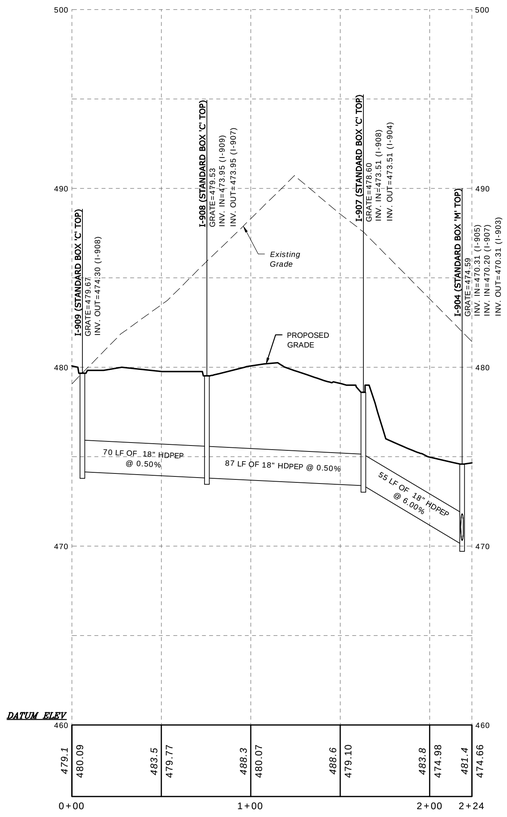
PLAN TYPE:
PROFILES

SHEET:
C2.15



STORM SEWER: I-909 TO I-904

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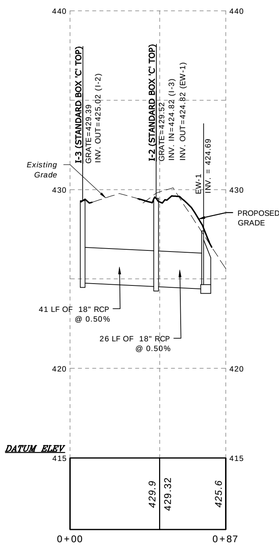
VERT. SCALE: 1"= 4'



STORM SEWER: I-3 TO EW-1

HORZ. SCALE: 1"=40'
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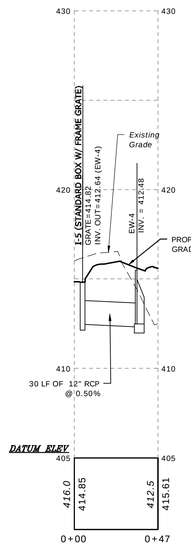

STORM SEWER: I-5 TO EW-4

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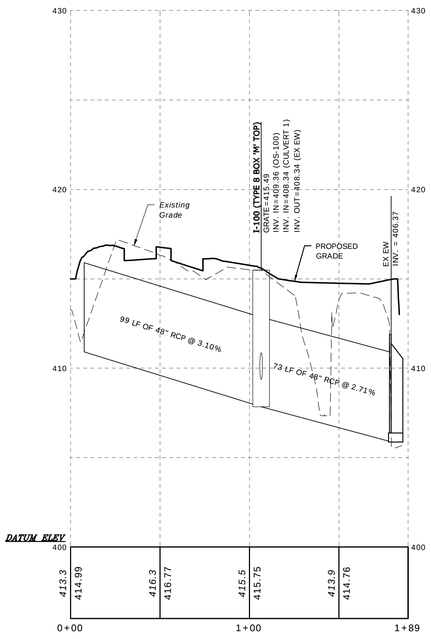

STORM SEWER: CULVERT 1 TO EX EW

HORZ. SCALE: 1"=40'
VERT. SCALE: 1"= 4'

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE

FOR

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SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE: AS SHOWN
DATE: NOVEMBER 07, 2022
K&W PROJECT: 2344.001
DRAWN BY: HAB
CAD DRAWING: 2344001-D_PCSMPROF.dwg

REVISIONS

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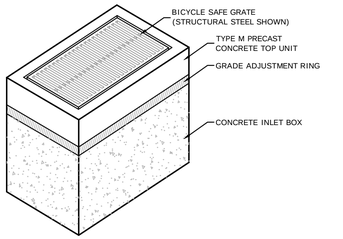
PLAN TYPE:
PROFILES

SHEET:
C2.16

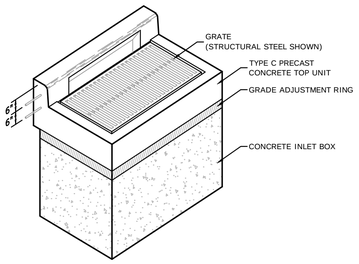


NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH PENN DOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-46M. CONTRACTOR SHALL VERIFY INLET BOX SIZING BASED ON PIPE SIZES AND ALIGNMENT PRIOR TO ORDERING PRECAST STRUCTURES. STRUCTURE SHALL BE CERTIFIED FOR H20 LOADING.
2. ALL DRAINAGE STRUCTURES SHALL HAVE POURED-IN-PLACE CONCRETE CHANNEL BOTTOMS.
3. USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS WHEN REQUIRED.
4. ALL INLETS IN PARKED AREAS SHALL HAVE HEAVY-DUTY BICYCLE SAFE GRATING.
5. ALL INLETS IN PAVED/CONCRETE PEDESTRIAN AREAS SHALL HAVE ADA COMPLIANT GRATING.
6. ALL INLETS SHALL BE SUMPED BELOW GRADE (2 INCHES) TO AID IN THE RUNOFF FLOW TO THE INLETS.
7. ALL FRAMES, CONCRETE TOP UNITS, AND GRADE ADJUSTMENTS RINGS SHALL BE SET IN A BED OF FULL MORTAR IN ACCORDANCE WITH PENNDOT PUBLICATION 408.
8. ALL INLETS DEEPER THAN FIVE FEET SHALL BE PROVIDED WITH MANHOLE-TYPE STEPS FOR ACCESS.
9. IMMEDIATELY UPON INSTALLATION, ALL JOINTS SHALL BE SEALED WITH MASTIC (OR EQUIVALENT) IN INLETS LOCATED IN GRASSED AREAS AND WITHIN BMPS TO PREVENT SOIL FROM WASHING INTO THE STRUCTURE THROUGH THE JOINTS.

TYPE 'M' INLET

NOT TO SCALE

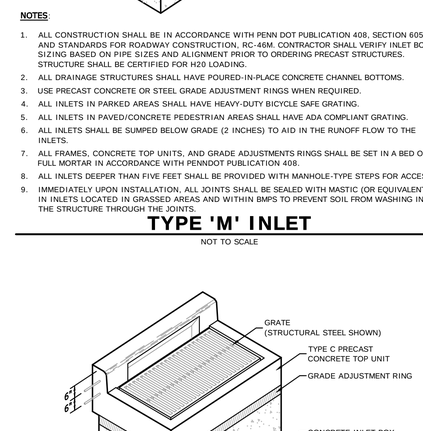


NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH PENN DOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-45M. CONTRACTOR SHALL VERIFY INLET BOX SIZING BASED ON PIPE SIZES AND ALIGNMENT PRIOR TO ORDERING PRECAST STRUCTURES. STRUCTURE SHALL BE CERTIFIED FOR H20 LOADING.
2. ALL DRAINAGE STRUCTURES SHALL HAVE POURED-IN-PLACE CONCRETE CHANNEL BOTTOMS.
3. USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS WHEN REQUIRED.
4. ALL INLETS SHALL HAVE BICYCLE SAFE GRATES.
5. ALL INLETS SHALL BE SUMPED BELOW GRADE (2 INCHES) TO AID IN THE RUNOFF FLOW TO THE INLETS.
6. ALL FRAMES, CONCRETE TOP UNITS, AND GRADE ADJUSTMENTS RINGS SHALL BE SET IN A BED OF FULL MORTAR IN ACCORDANCE WITH PENNDOT PUBLICATION 408.
7. ALL INLETS OVER FOUR FEET IN DEPTH, AS DETERMINED FROM FINISHED GRADE TO THE BOTTOM OF THE INLET, SHALL BE PROVIDED WITH STEPS FOR ACCESSIBILITY

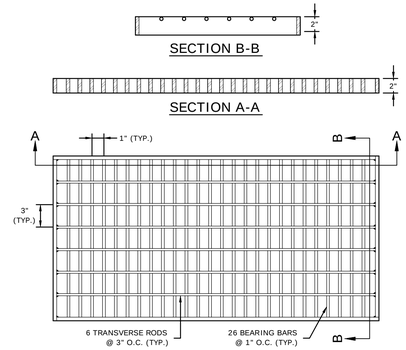
TYPE 'C' INLET

NOT TO SCALE



STORM SEWER CLEANOUT

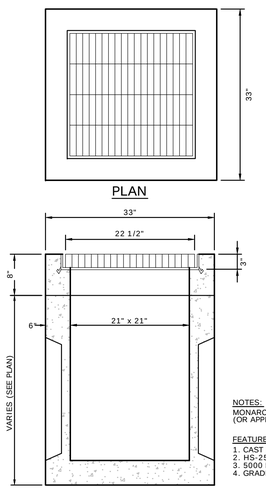
NOT TO SCALE



PLAN

STRUCTURAL STEEL BICYCLE SAFE GRATE

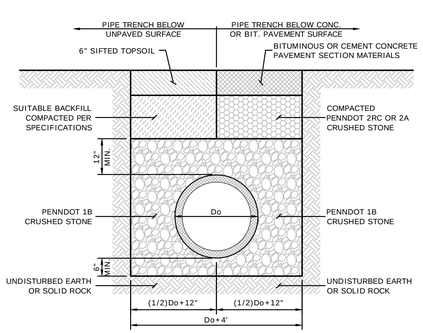
NOT TO SCALE



NOTE:
1. ALL YARD INLETS IN PAVED/CONCRETE PEDESTRIAN AREAS SHALL HAVE HANDICAPPED ACCESSIBLE GRATES INSTALLED.
2. ALL OTHER YARD INLETS SHALL HAVE BICYCLE SAFE GRATES

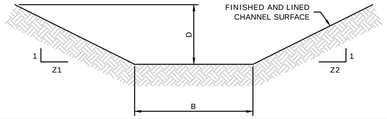
2'x2' LAWN INLET

NOT TO SCALE



STORM PIPE TRENCH SECTION

NOT TO SCALE



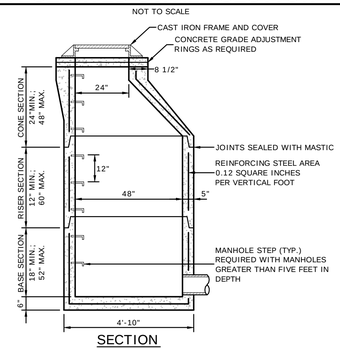
SWALE DESIGNATION	B (FT)	D (FT)	Z1	Z2	PERMANENT VEGETATION	TEMPORARY VEGETATION
5A	15.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
6A	7.50	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
6B	6.80	1	7	7	VEGETATION - CLASS C	STRAW WITH NET
6C	15.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
7A	40.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
7B	4.50	1	8	8	VEGETATION - CLASS C	STRAW WITH NET
7C	4.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
7D	4.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
7E	12.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
7F	5.00	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
7G	7.50	1	6	6	VEGETATION - CLASS C	STRAW WITH NET
8A	7.30	1	3	3	VEGETATION - CLASS C	STRAW WITH NET
8B	5.50	1	10	10	VEGETATION - CLASS C	STRAW WITH NET
8C	4.00	1	3.5	3.5	VEGETATION - CLASS C	STRAW WITH NET
9A	8.00	1	7	7	VEGETATION - CLASS C	STRAW WITH NET

NOTES:

1. VEGETATED CHANNELS SHALL BE CONSTRUCTED FREE OF ROCKS, TREE ROOTS, STUMPS OR OTHER PROJECTIONS THAT WILL IMPEDE NORMAL CHANNEL FLOW AND / OR PREVENT GOOD LINING TO SOIL CONTACT. THE CHANNEL SHALL BE INITIALLY OVER-EXCAVATED TO ALLOW FOR THE PLACEMENT OF TOPSOIL.
2. ALL CHANNELS MUST BE KEPT FREE OF OBSTRUCTIONS SUCH AS FILL GROUND, FALLEN LEAVES AND WOODY DEBRIS, ACCUMULATED SEDIMENT, AND CONSTRUCTION MATERIALS / WASTES. CHANNELS SHOULD BE KEPT MOWED AND / OR FREE OF ALL WEEDY, BRUSHY OR WOODY GROWTH. ANY UNDERGROUND UTILITIES RUNNING ACROSS / THROUGH THE CHANNEL(S) SHALL BE IMMEDIATELY BACKFILLED AND THE CHANNEL(S) REPAIRED AND STABILIZED PER THE CHANNEL CROSS-SECTION DETAIL.

VEGETATED SWALE SECTION

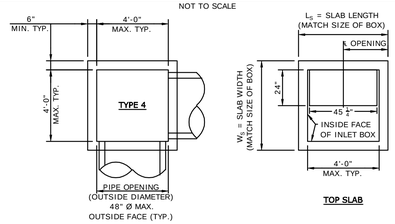
NOT TO SCALE



SECTION

4' DIAMETER PRECAST CONCRETE MANHOLE

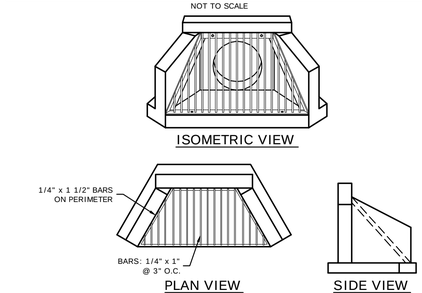
NOT TO SCALE



NOTE: REFER TO PENNDOT RC STANDARDS, LATEST EDITION, AS AMENDED.

TYPE 4 INLET

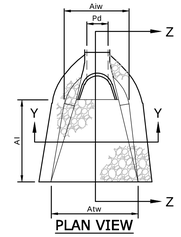
NOT TO SCALE



NOTES:
1. TRASH RACK MATERIAL TO BE HOT DIPPED GALVANIZED STEEL.
2. ATTACH TRASH RACK TO HEADWALL WITH 3/8" DIA. S.S. ANCHOR BOLTS.
3. HINGED VERSION AVAILABLE.

TYPE 'DW' ENDWALL WITH TRASH RACK

NOT TO SCALE



OUTLET NO.	PIPE DIA Pd (IN)	RIPRAP		APRON		
		SIZE (R-_)	THICK Rt (IN)	LENGTH Ai (FT)	INITIAL WIDTH Aiw (FT)	TERMINAL WIDTH Atw (FT)
EW-1	18	3	9	8	4.50	12.50
EW-4	12	3	9	4	3.00	4.60
EW-101	24	3	9	9	6.00	9.60
EW-102	18	3	9	7	4.50	7.30
EW-200	18	3	9	8	4.50	12.50
EW-201	18	3	9	8	4.50	7.70
EW-202	36	3	9	13	9.00	14.20
EW-300	18	3	9	8	4.50	12.50
EW-301	18	3	9	7	4.50	7.30
EW-400	18	4	18	8	4.50	12.50
EW-401	18	3	9	7	4.50	7.30
EW-500	18	3	9	8	4.50	12.50
EW-501	18	4	18	12	4.50	9.30
EW-600	18	4	18	10	4.50	14.50
EW-601	18	3	9	7	4.50	7.30
EW-602	18	3	9	7	4.50	7.30
EW-700	18	3	9	10	4.50	14.50
EW-701	24	3	9	9	6.00	9.60
EW-702	24	3	9	9	6.00	9.60
EW-800	18	5	27	15	4.50	19.50
EW-801	24	3	9	9	6.00	9.60
EW-900	18	4	18	13	4.50	17.50
EW-901	18	3	9	7	4.50	7.30

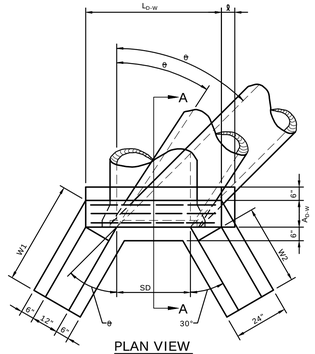
NOTES:

ALL APRONS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN. TERMINAL WIDTHS SHALL BE ADJUSTED AS NECESSARY TO MATCH RECEIVING CHANNELS.

ALL APRONS SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EACH RUNOFF EVENT. DISPLACED RIPRAP WITHIN THE APRON SHALL BE REPLACED IMMEDIATELY.

STANDARD CONSTRUCTION DETAIL #9-1
RIPRAP APRONS AT PIPE OUTLETS

NOT TO SCALE



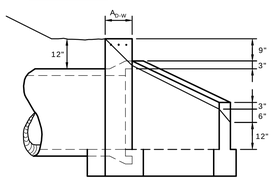


TABLE A			
PIPE DIAM	L	W	A
18"&<	4.0'	4.0'	12"
24"	4.6'	4.25'	12"
36"	5.8'	4.6'	12"
42"	6.3'	5.8'	12"
48"	6.9'	6.9'	12"
54"	7.5'	8.0'	12"
60"	8.1'	9.2'	15"
72"	9.2'	11.5'	15"

NOTES:
-CONCRETE SHALL BE CLASS "AA"
-EXPOSED EDGES SHALL BE CHAMFERED ONE (1) INCH

NOTE: ALL ENDWALLS AND HEADWALLS SHALL HAVE A TRASH SCREEN (SEE DETAIL)

TYPE 'DW' ENDWALL

NOT TO SCALE

K&W
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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA
SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-E_PCSMDETL.dwg

REVISIONS

NO.	DATE	DESCRIPTION
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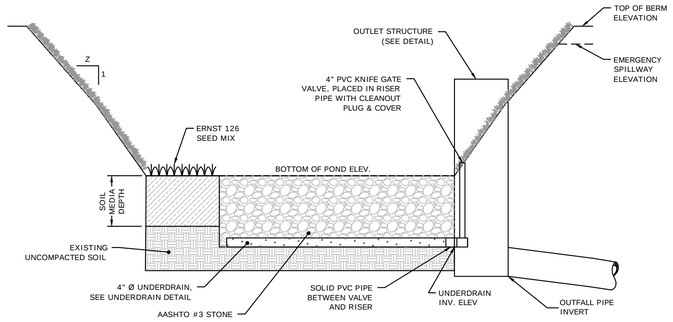
2		
3		
4		
5		
6		
7		

PLAN TYPE:
PCSM DETAILS

SHEET:
C2.17

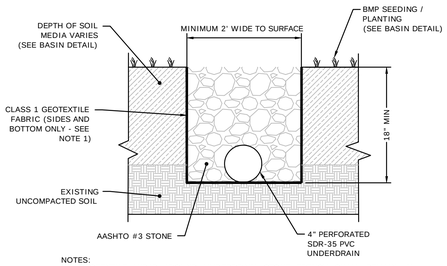


BASIN DESIGNATION	OUTLET STRUCTURE DESIGNATION	BOTTOM OF POND ELEVATION	Z	SOIL MEDIA DEPTH (FT)	EMERGENCY SPILLWAY ELEVATION	TOP OF BERM ELEVATION	UNDERDRAIN INVERT ELEVATION	OUTFALL PIPE INVERT ELEVATION	OUTFALL PIPE DIAMETER (IN)
BMP 1	OS-100	411.00	3	0.50	414.55	416.00	409.50	409.50	18
BMP 2	OS-200	435.00	3	0.50	439.60	441.00	433.50	433.50	18
BMP 3	OS-300	432.00	3	0.50	434.88	436.00	430.50	430.50	18
BMP 4	OS-400	449.00	3	0.50	451.85	453.00	447.50	442.37	18
BMP 5	OS-500	469.00	3	0.50	473.50	475.00	467.50	467.50	18
BMP 6	OS-600	466.50	3	0.50	469.72	471.00	465.50	465.00	18
BMP 7	OS-700	425.00	3	0.50	429.50	431.00	423.50	423.00	18
BMP 8	OS-800	416.33	3	1.00	420.00	421.33	414.83	414.83	18
BMP 9	OS-900	457.00	3	0.50	459.70	461.00	455.50	455.50	18

NOTES:
1. CONTRACTOR SHALL OVER-EXCAVATE THE BASIN BOTTOM TO ACCEPT TOPSOIL REQUIRED FOR PLANTINGS.
2. EXISTING SUBGRADE WITHIN BASIN AREA SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC.
3. SPREAD TOPSOIL AT THE SPECIFIED DEPTH WITHIN THE FACILITY BOTTOM TO BRING THE AREA UP TO FINAL GRADE.
4. GEOTEXTILE WRAP AROUND UNDERDRAIN STONE TRENCH SHALL REMAIN IN PLACE UNTIL BASIN STABILIZATION. ONCE VEGETATION IS ESTABLISHED, TOP LAYER OF GEOTEXTILE MAY BE CUT AND REMOVED.
5. INSTALL ERNST 126 SEEDING IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
6. PROVIDE NATURAL JUTE NETTING AND WATER TO PROMOTE VEGETATIVE GROWTH.
7. DO NOT INSTALL SEEDING DURING NON-GERMINATION PERIODS.
8. UNDERDRAIN VALVE WILL BE OPENED ONLY FOR REQUIRED MAINTENANCE AND IF THE BASIN HAS NOT COMPLETELY DEWATERED WITHIN 72 HOURS.

INFILTRATION BASIN CROSS SECTION

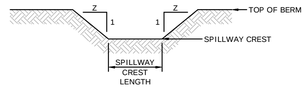
NOT TO SCALE



NOTES:
1. GEOTEXTILE WRAP AROUND UNDERDRAIN STONE TRENCH SHALL REMAIN IN PLACE UNTIL BASIN STABILIZATION. ONCE VEGETATION IS ESTABLISHED, TOP LAYER OF GEOTEXTILE MAY BE CUT AND REMOVED.

UNDERDRAIN DETAIL

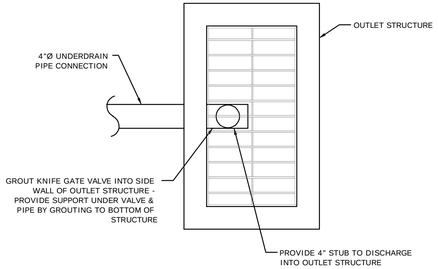
NOT TO SCALE



SPILLWAY DESIGNATION	CREST LENGTH (FEET)	CREST ELEV. (FEET)	TOP OF BERM ELEV. (FEET)	Z	PERMANENT SPILLWAY SURFACE LINING	TEMPORARY SPILLWAY SURFACE LINING
BMP 1	30	414.55	416.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 2	85	439.60	441.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 3	50	434.88	436.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 4	70	451.85	453.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 5	35	473.20	475.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 6	75	469.72	471.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 7	75	429.50	431.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 8	100	420.00	421.33	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL
BMP 9	50	459.70	461.00	3	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL	NORTH AMERICAN GREEN P300 OR APPROVED EQUAL

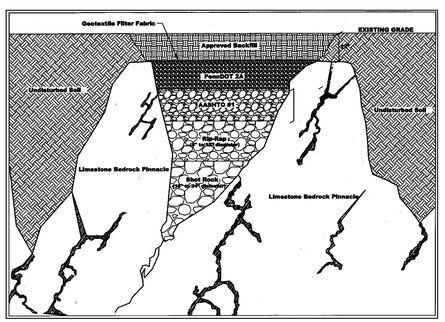
BASIN SPILLWAY

NOT TO SCALE



KNIFE GATE VALVE CONNECTION

NOT TO SCALE



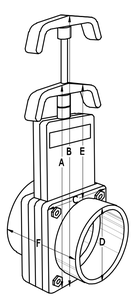
NOTES:
1. THE REPAIRS OUTLINED BELOW ARE GENERAL GUIDELINES AND EACH SINKHOLE OCCURRENCE SHOULD BE THOROUGHLY REVIEWED BY THE GEOTECHNICAL ENGINEER OF RECORD FOR AN APPROPRIATE REMEDIATION PLAN:

STRUCTURAL AREAS (AREAS WITHIN THE BUILDING FOOTPRINT OR BENEATH PAVEMENT)
- ANY AND ALL LOOSE AND/OR SATURATED SOILS WITHIN THE SINKHOLE SHOULD BE EXCAVATED AND CONTINUE UNTIL STABLE SOILS, A "THROAT" IS IDENTIFIED, OR UNTIL THE EXTENT OF THE EXCAVATION EQUIPMENT IS REACHED.
- UPON REMOVAL OF THE UNSTABLE SOILS, THE EXCAVATION SHOULD BE BACKFILLED USING HIGH MOBILITY, LOW STRENGTH FLOWABLE FILL (500 PSI) TO FINAL SUBGRADE ELEVATION.

NON-STRUCTURAL AREAS (NON-BUILDING/LANDSCAPED AREAS)
- ANY AND ALL LOOSE AND/OR SATURATED SOILS SHOULD BE EXCAVATED FROM THE SINKHOLE. EXCAVATION SHOULD CONTINUE UNTIL STABLE SOILS, A "THROAT" IS IDENTIFIED, OR UNTIL THE EXTENT OF THE EXCAVATION EQUIPMENT IS REACHED.
- THE EXCAVATION SHOULD BE BACKFILLED WITH AGGREGATE OF DECREASING SIZE AS DEPICTED ON THE *INVERTED FILTER DETAIL*

SINKHOLE REPAIR DETAIL

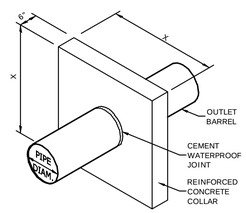
NOT TO SCALE



SIZE	A	B	C	D	E	F
4" PVC	13 1/4"	18"	6 5/8"	5"	7 7/16"	5 3/16"

KNIFE GATE VALVE

NOT TO SCALE

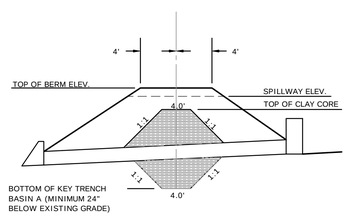


BASIN DESIGNATION	X (INCHES)	NUMBER OF COLLARS	SPACING OF COLLARS (FT)	DISTANCE OF COLLAR FROM OUTLET STRUCTURE (FT)
BMP 1	44.40	2	6.00	11.00
BMP 2	52.80	2	8.00	15.25
BMP 3	45.12	2	6.00	8.75
BMP 4	59.52	3	9.00	8.50
BMP 5	51.36	2	15.00	82.50
BMP 6	48.48	2	7.00	12.50
BMP 7	59.28	2	9.00	8.50
BMP 8	51.36	2	8.00	10.00
BMP 9	43.92	2	6.00	10.00

NOTES:
1. MIN. CONCRETE COMPRESSIVE STRENGTH = 3,750 P.S.I.
2. REINFORCEMENT SHALL BE 6x6 W4.0xW4.0 OR #3 REBAR SPACED 12" EACH WAY, CENTERED WITHIN COLLAR, 3" MIN. COVER.
3. SEE OUTLET STRUCTURE PROFILE FOR LOCATION.

CONCRETE ANTI-SEEP COLLAR

NOT TO SCALE



BASIN DESIGNATION	TOP OF BERM ELEV.	SPILLWAY ELEV.	TOP OF CLAY CORE ELEV. (FT)
BMP 1	416.00	414.55	413.55
BMP 2	441.00	439.60	438.60
BMP 3	436.00	434.88	434.20
BMP 4	453.00	451.85	451.40
BMP 5	474.00	473.20	472.20
BMP 6	471.00	469.72	468.90
BMP 7	431.00	429.50	428.50
BMP 8	421.33	420.00	419.00
BMP 9	461.00	459.70	459.20

NOTE:
1. CLAY CORE SHALL BE COMPOSED OF IMPORTED CL, CH, MH OR CL-ML SOILS WITH A PERMEABILITY LESS THAN OR EQUAL TO 1.0×10^{-5} CM/S. MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 95% MAXIMUM DENSITY PER ASTM-D 1557; WITHIN ± 3% OPTIMUM MOISTURE CONTENT.

CLAY CORE DETAIL

NOT TO SCALE

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POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE: AS SHOWN
DATE: NOVEMBER 07, 2022
K&W PROJECT: 2344.001
DRAWN BY: HAB
CAD DRAWING: 2344001-E_PCSMDETL.dwg

REVISIONS NO.	DATE	DESCRIPTION
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3		
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PLAN TYPE:
PCSM DETAILS

SHEET:
C2.18

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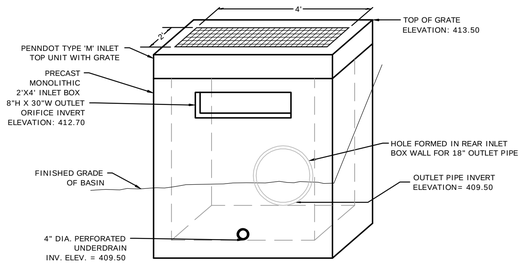


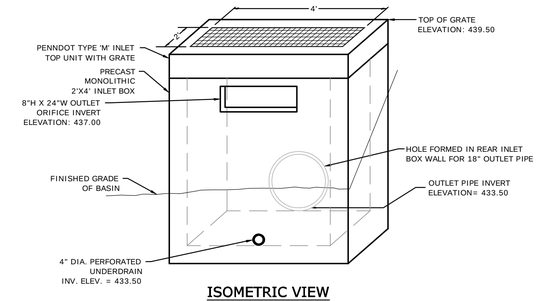
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-100)

NOT TO SCALE



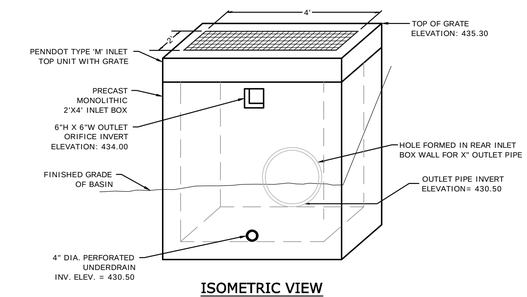
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-200)

NOT TO SCALE



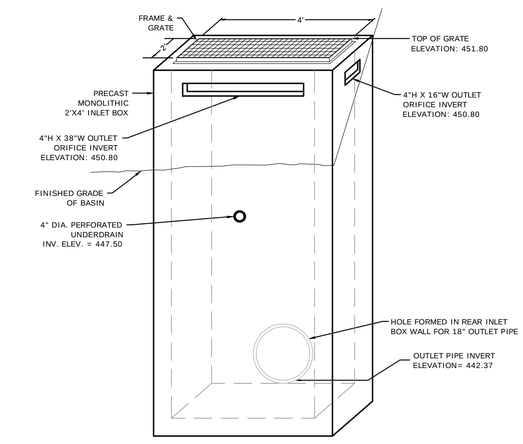
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-300)

NOT TO SCALE



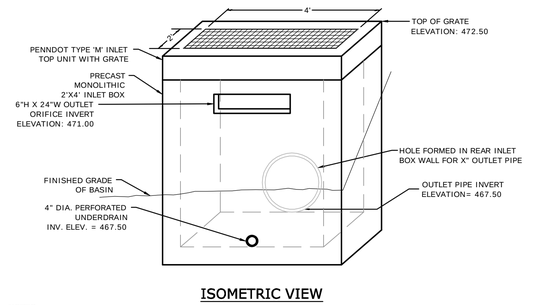
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-400)

NOT TO SCALE



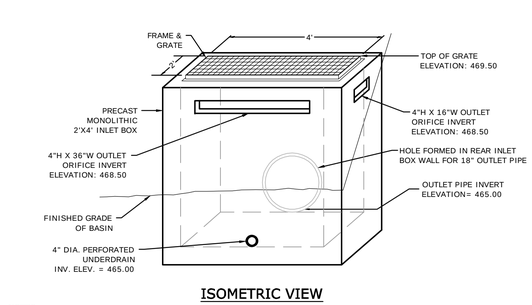
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-500)

NOT TO SCALE



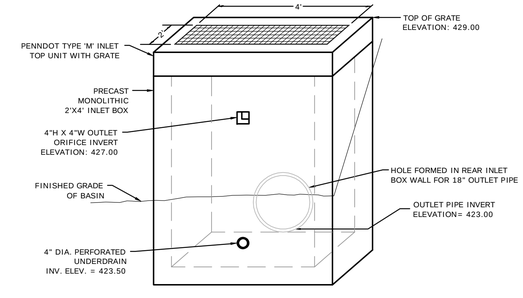
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-600)

NOT TO SCALE



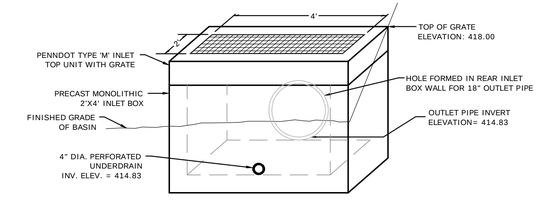
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-700)

NOT TO SCALE



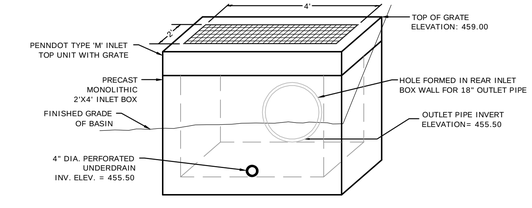
ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-800)

NOT TO SCALE



ISOMETRIC VIEW

NOTES:

1. THE PROPOSED OUTLET STRUCTURE SHALL BE IN ACCORDANCE WITH PENNDOT PUBLICATION 408, SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION, RC-34.
2. ALL JOINTS SHALL BE GROUTED INSIDE AND OUTSIDE.

STORMWATER MANAGEMENT BASIN PERMANENT OUTLET STRUCTURE (OS-900)

NOT TO SCALE

K&W
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2201 North Front Street, Suite 200
Harrisburg, PA 17110
P: 717.635.2835
www.kandwengineers.com

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

SUSQUEHANNA TOWNSHIP
DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	HAB
CAD DRAWING:	2344001-E_PCSMDETL.dwg

REVISIONS

NO.	DATE	DESCRIPTION
1		
2		
3		
4		
5		
6		
7		

PLAN TYPE:
PCSM DETAILS

SHEET:
C2.19

POST CONSTRUCTION STORMWATER MANAGEMENT NARRATIVE AND CALCULATIONS

1235 Martina Drive

Developer
Inch's Properties, LLC

Location
1235 Martina Drive
Harrisburg, PA 17110
Susquehanna Township, Dauphin County

November 7, 2022

K&W Project No. 2344.001

Prepared by:

K&W
DESIGNING ENVIRONMENTS
2201 North Front Street, Suite 200 :: Harrisburg, PA 17110
717.635.2835 :: www.kandwengineers.com

Table of Contents

Appendices

Introduction

Introduction & Purpose

The purpose of this report is to describe the methods of stormwater management associated with the proposed 395-unit multi-family residential development. The project includes 14 apartment buildings (18 units each), 143 townhouse units, 1 clubhouse, and associated drives, parking lots, and stormwater management facilities. The property is approximately 46.27 acres in size; however, the project area has been limited to 38.11 acres in size and is located in Susquehanna Township, Dauphin County, Pennsylvania.

Site Soils and Geology

Soil Characteristics

According to information obtained from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, the following soil types are located within or near the project site:

- BhC2 – Berks channery silt loam, 8 to 15 percent slopes, HSG B
- BkB2 – Berks shaly silt loam, 3 to 8 percent slopes, HSG B
- BkD2 – Berks channery silt loam, 15 to 25 percent slopes, HSG B
- CoB2 – Comly silt loam, 2 to 8 percent slopes, HSG C
- WeD2 – Weikert shaly silt loam, 15 to 25 percent slopes, HSG D
- WeE2 – Weikert shaly silt loam, 25 to 40 percent slopes, HSG D

Soil Limitations

The soil limitations for site soils shown below were obtained from Appendix E (Table E.1) of the PA Erosion and Sediment Pollution Control Manual (March 2012).

Soil Name	LIMITATIONS															
	Cutbanks Cave	Corrosive to Concrete / Steel	Droughty	Easily Erodible	Flooding	Depth to Saturated Zone / Seasonal High	Hydric / Hydric Inclusions	Low Strength / Landslide Prone	Slow Percolation	Piping	Poor Source of Topsoil	Frost Action	Shrink - Swell	Potential Sinkhole	Ponding	Wetness
Berks (BhC2, BkB2, BkD2)	X	C	X	X			X		X	X	X					
Comly (CoB2)	X	C/S	X	X		X	X			X	X	X				
Weikert (WeD2, WeE2)	X	C/S	X				X	X	X	X	X	X				

Soil Limitation Resolutions

1. Caving Cut Banks – Contractor should employ proper construction, stabilization, and safe working techniques to ensure safety on steep slope areas and within and around all excavations including footers, foundations and utility trenches. Benching and trench boxes should be employed where required or appropriate to ensure safe working conditions and compliance with applicable safety standards and regulations.
2. Corrosive to Concrete/Steel – Where permitted, underground pipes, conduits, and storage tanks should be made corrosion resistant materials. Where necessary, suitable precautions should be taken to protect underground concrete and uncoated steel structures and facilities from corrosion.
3. Droughty Soils – Irrigation may be required for seed germination and establishment of a sufficient stand of vegetative cover. Use of sod or advanced seeding techniques, such as hydroseeding, should be considered.
4. Easily Erodible – Contractor shall limit the extent and duration of earth disturbance to the least amount practicable to complete the project. Contractor should phase construction where possible to limit the total amount of disturbed area at any given time. Temporary and permanent stabilization measures should be implemented as soon as possible. Sediment control BMPs may require more frequent maintenance and sediment removal as compared with sites that do not have easily erodible soil. Contractor shall contact the site design engineer and the conservation district to devise alternative solutions if any erosion conditions occur that cannot be addressed by measures found in the plans.
5. Depth to Saturated Zone / Seasonal High Water Table – Structures with basements and other subsurface structures should be avoided. Building foundations should be furnished with appropriate foundation drains and sump pumps where necessary. Saturated soils should be dewatered prior to use in grading. Wet, mucky, or soupy soils should not be used in the construction of fills or slopes. If accumulated water needs to be removed from a work area, the water shall be to a sediment control BMP, such as a sediment trap, sediment basin, or pumped water filter bag placed for discharge over a stabilized, well-vegetated area. Seeps or springs encountered during construction shall be handled in accordance with the standard and specification for subsurface drain or other approved method.
6. Hydric / Hydric Inclusions – Hydric soils or soils with hydric inclusions may be indicative of wetlands, high groundwater table, or poorly drained soils. Wetlands should be identified and avoided if possible. Dewatering techniques shall be used as needed.
7. Low Strength/Landslide Prone – For soils with low strength, precautions should be taken to prevent slope failures due to improper construction practices such as over-steepening and overloading of slopes, removal of lateral support, and failure to prevent saturation of slopes. Setbacks should be applied in accordance with PADEP standards unless it can be shown that proposed cuts and fills do not pose a hazard to public safety or surface waters. Also, road fill material will likely need to be imported in areas where soils have low strength. Contractor shall consult project geotechnical engineer/inspector for appropriate measures to be implemented to compact, mitigate, and/or stabilize areas of low strength or landslide prone soils.
8. Slow Percolation – Contractor shall perform site grading to provide sufficient positive drainage away from buildings, foundations, and other structures. If accumulated water needs to be removed from a work area, the water shall be to a sediment control BMP, such as a sediment trap, sediment basin, or pumped water filter bag placed for discharge over a stabilized, well-vegetated area.

9. Piping – Soils that are susceptible to piping can be erodible and not well suited for construction of embankments, dikes, and levees. Construction techniques shall be employed to ensure these soils are properly compacted and stabilized
10. Poor Source of Topsoil – Many soil types are droughty or too wet to be suitable sources of topsoil. Soil tests should be done to determine the proper application of soil amendments to promote the growth of the desired vegetation. Wherever soils that are fair or good sources of topsoil exist on a site, they should be carefully preserved and stored for later use in restoration. If necessary, topsoil may be imported to the site.
11. Frost Action – Contractor shall consult project geotechnical engineer / inspector regarding any special measures to be taken for earthwork that is to occur during periods of frost.
12. Slopes – Excavations should be stabilized to prevent erosion and contractor should employ proper construction techniques to ensure safety on steep slope areas.
13. Depth of Rock – If bedrock is encountered, remove as necessary in accordance with project specifications.
14. Soil pH Levels – Contractor shall have soil pH tested to determine correct fertilizer application rates.
15. Flooding Potential – Ensure that the site has proper drainage.
16. High Groundwater Level – Contractor shall employ dewatering techniques as approved by the conservation district. Pumped water filter bags shall be used to dewater utility trenches and below grade excavations.
17. Basin Areas and Embankments – Fill for basin embankments shall be compacted in 8" lifts to 98% maximum dry density (standard proctor) +/- 2% moisture content per ASTM D-1557. Anti-seep collars shall be installed on a basin discharge piping to prevent seepage of water from the basin. Consult with site design engineer for the specific anti-seep collar size requirements.

Design Approach & System Elements

Currently, the site is a vacant lot, and from reviewing aerial imagery provided by Google and Historical Aerial Photographs of Pennsylvania, this appears to have been the case for the past 50 years.

The site is located in the Paxton Creek watershed approximately 1.4 miles east of Paxton Creek. According to 25 PA Code Chapter 93, Paxton Creek is designated as a Warm Water Fish (WWF) and Migratory Fish (MF). Paxton Creek is not listed as a High Quality, Exceptional Value, or Special Protection stream. The site drains to three (3) different tributaries to Paxton Creek, Tributary 10154 to the West, Tributary 10166 to the North, and Tributary 10141 to the South. All three (3) tributaries to Paxton Creek are impaired according to Chapter 5 of the Integrated Water Quality Monitoring and Assessment Report due to pathogens. The site discharges to waters with a TMDL.

The site layout and approach to stormwater management was completed in an integrated manner by attempting to limit the impacts of vegetation loss and soil changes; by minimizing impervious areas to the greatest extent possible; by incorporating both structural and non-structural Best Management Practices (BMPs); and by considering the overall impacts to the existing drainage areas.

The property has been designed such that the increase in stormwater discharge will be managed by a series of BMPs. In an effort to preserve the integrity of stream channels and maintain and protect the physical, biological, and chemical qualities of the receiving stream, the BMPs have been designed to prevent downstream increases in runoff and flooding, maintain groundwater recharge, improve water quality, and reduce thermal impacts.

Thermal impacts have been minimized by providing Post Construction Stormwater Management (PCSM) BMPs (BMP 1-9) that allow for increased evapotranspiration and lower runoff temperatures as overland flow from impervious areas has time to cool before leaving the site and entering the downstream watercourse.

The stormwater management facilities have been designed using the Hydraflow Hydrographs extension of AutoCAD Civil 3D and the SCS Method. The facilities have been designed to release runoff such that the computed post-development rates for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events will not exceed the computed pre-development runoff rates as required by the Susquehanna Township Stormwater Management Ordinance. The site is also located within the Act 167 Paxton Creek Release Rate District in Dauphin County, which requires that the post-development release rates do not exceed 100% of pre-development conditions for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events. Precipitation data was taken from NOAA Atlas 14, and can be found in Appendix C.

The proposed conveyance facilities were designed to meet all requirements of the Susquehanna Township Stormwater Management Ordinance. The conveyance facilities were designed to convey peak runoff rates from the 10-year storm event, as determined using the Rational Method and the Intensity-Duration-Frequency (IDF) curves for Harrisburg, PA which were obtained from NOAA Atlas 14. All proposed pipes are a minimum of 15-inches in diameter and will be constructed of HDPE or RCP. The storm sewer systems were designed using Hydraflow Storm Sewers extension of AutoCAD Civil 3D. Stormwater conveyance calculations can be found in Appendix E.

Pre-Development Conditions

In pre-development conditions, the site has been delineated into six (6) drainage areas. Currently, the site consists of wooded areas, existing Martina Drive, and lawn areas. There are six (6) Points of interest (POIs) for the site, all of which discharge to tributaries of Paxton Creek. POI 1 is located at the outfall of the existing 48" RCP culvert on the south side of Elmerton Avenue (S.R. 3026), and receives runoff from Drainage Area 1. POI 2 is located on the southwestern property line in an existing stream channel, and receives runoff from Drainage Area 2. POI 3 is located at the northwestern property line and receives runoff from Drainage Area 3. POI 4 is located at the western property line and receives runoff from Drainage Area 4. POI 5 is located at the northern property line at the western side of Kohn Road, and receives runoff from Drainage Area 5. POI 6 is located on the eastern property line in an existing stream channel, and receives runoff from Drainage Area 6.

Pre-Development Drainage Area 1

Pre-Development Drainage Area 1 is the area tributary to POI 1, which is located at the outfall of the existing 48" RCP culvert on the south side of Elmerton Avenue (S.R. 3026). Runoff from existing wooded areas, existing Martina Drive, and lawn areas reaches the POI via overland flow, an existing stream channel, an existing 42" RCP culvert located under the existing driveway, and finally through an existing 48" RCP culvert located under Elmerton Avenue.

Pre-Development Drainage Area 2

Pre-Development Drainage Area 2 is the area tributary to POI 2, which is located on the southwestern property line in an existing stream channel. Runoff from the existing wooded areas, existing Martina Drive, and lawn areas reaches the POI via overland flow and an existing stream channel.

Pre-Development Drainage Area 3

Pre-Development Drainage Area 3 is the area tributary to POI 3, which is located on the northwestern property line. Runoff from the existing wooded areas, existing Martina Drive, and lawn areas reaches the POI via overland flow.

Pre-Development Drainage Area 4

Pre-Development Drainage Area 4 is the area tributary to POI 4, which is located on the western property line. Runoff from the existing wooded areas and lawn areas reaches the POI via overland flow.

Pre-Development Drainage Area 5

Pre-Development Drainage Area 5 is the area tributary to POI 5, which is located on the northern property line at the western side of Kohn Road. Runoff from the existing wooded areas, lawn areas, and Kohn Road reaches the POI via overland flow.

Pre-Development Drainage Area 6

Pre-Development Drainage Area 6 is the area tributary to POI 6, which is located on the eastern property line in an existing stream channel. Runoff from the existing wooded and lawn areas reaches the POI via overland flow and an existing stream channel.

Pre-Development Calculations

The SCS Method was used to generate runoff hydrographs. Hydrographs for the pre-development drainage areas were created for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events. For pre-development conditions, all existing non-forested disturbed pervious areas and 20% of existing impervious areas within the limits of disturbance were considered as meadow.

Curve Numbers

Land Use	Curve Number
Impervious	98
Open Space (HSG B)	61
Open Space (HSG C)	74
Open Space (HSG D)	80
Meadow (HSG B)	58
Meadow (HSG C)	71
Meadow (HSG D)	78
Woods (HSG B)	55
Woods (HSG C)	70
Woods (HSG D)	77

Pre-Development Drainage Area Table

Pre-Development Drainage Areas

Cover Type	DA 1	DA 2	DA 3	DA 4	DA 5	DA 6
Impervious (ac)	0.80	0.34	0.03	0.00	0.20	0.00
Open Space (HSG B) (ac)	2.49	1.09	0.00	0.00	0.00	0.02
Open Space (HSG C) (ac)	0.00	0.00	0.00	0.00	0.00	0.00
Open Space (HSG D) (ac)	0.00	0.00	0.00	0.00	0.00	0.00
Meadow (HSG B) (ac)	8.21	5.07	2.15	1.78	0.38	10.59
Meadow (HSG C) (ac)	0.00	0.00	0.00	0.00	0.00	0.10
Meadow (HSG D) (ac)	0.00	0.00	0.00	0.00	0.00	0.62
Woods (HSG B) (ac)	2.87	0.32	1.78	0.17	0.03	1.47
Woods (HSG C) (ac)	0.00	0.00	0.00	0.00	0.00	1.69
Woods (HSG D) (ac)	0.00	0.00	0.00	0.00	0.00	3.28
20% Disturbed Impervious as Meadow (ac)	0.19	0.11	0.01	0.00	0.00	0.00
Total (ac)	14.76	7.04	3.96	1.94	0.61	17.77
Curve Number	59	59	57	58	71	63
Tc (min)	23.4	20.5	13.2	12.1	6.0*	13.8

Pre-Development Peak Runoff Rates

	Pre-Development Runoff (cfs)					
Event	**DA 1**	**DA 2**	**DA 3**	**DA 4**	**DA 5**	**DA 6**
1 Year	0.50	0.24	0.07	0.05	0.43	2.24
2 Year	2.01	0.96	0.48	0.31	0.72	6.07
10 Year	11.20	5.34	3.62	1.95	1.69	22.75
25 Year	20.77	9.90	6.91	3.61	2.49	37.73
50 Year	30.60	14.60	10.30	5.31	3.26	52.80
100 Year	42.84	20.43	14.53	7.42	4.18	71.53

Pre-Development

The following table summarizes the pre-development discharge from the site:

	Pre-Development Discharge (cfs)					
Event	**POI 1**	**POI 2**	**POI 3**	**POI 4**	**POI 5**	**POI 6**
1 Year	0.50	0.24	0.07	0.05	0.43	2.24
2 Year	2.01	0.96	0.48	0.31	0.72	6.07
10 Year	11.20	5.34	3.62	1.95	1.69	22.75
25 Year	20.77	9.90	6.91	3.61	2.49	37.73
50 Year	30.60	14.60	10.30	5.31	3.26	52.80
100 Year	42.84	20.43	14.53	7.42	4.18	71.53

Post-Development Conditions

For post-development conditions, the site has been delineated into fifteen (15) drainage areas. The site consists of fourteen (14) apartment buildings with eighteen (18) units each, 143 townhouse units, a clubhouse building, five (5) drives, associated parking lots, and nine (9) stormwater BMPs. As described in pre-development conditions, there are six (6) Points of Interest (POIs) for the site, all of which discharges to tributaries of Paxton Creek. POI receives runoff from Drainage Area 1, Drainage Area 2, Drainage Area 3, Drainage Area 4, and Bypass 1. POI 2 receives runoff from Drainage Area 5 and Bypass 2. POI 3 receives runoff from Drainage Area 6 and Bypass 3. POI 4 receives runoff from Bypass 4. POI 5 receives runoff from Bypass 5. POI 6 receives runoff from Drainage Area 7, Drainage Area 8, Drainage Area 9, and Bypass 6. The remainder of the runoff from the site becomes offsite bypass.

Post-Development Drainage Area 1

Post-Development Drainage Area 1 is the area tributary to BMP 1. Runoff from this area includes parts of proposed Martina Drive, apartment buildings, parking areas, and open space areas. Runoff from Drainage Area 1 reaches BMP 1 via a proposed conveyance network and overland flow, which ultimately discharges to the proposed reconstructed culvert that discharges to POI 1.

Post-Development Drainage Area 2

Post-Development Drainage Area 2 is the area tributary to BMP 2. Runoff from this area includes parts of proposed Martina Drive, apartment buildings, parking areas, and open space areas. Runoff from Drainage Area 1 reaches BMP 2 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 1 via an existing stream channel and proposed reconstructed culvert.

Post-Development Drainage Area 3

Post-Development Drainage Area 3 is the area tributary to BMP 3. Runoff from this area includes a proposed apartment building, parking areas, and open space areas. Runoff from Drainage Area 3 reaches BMP 3 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 1 via an existing stream channel and proposed reconstructed culvert.

Post-Development Drainage Area 4

Post-Development Drainage Area 4 is the area tributary to Basin 4. Runoff from this area includes a proposed apartment building, parking areas, and open space areas. Runoff from Drainage Area 4 reaches BMP 4 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 1 via overland flow.

Post-Development Bypass 1

Post-Development Bypass represents the areas within the site that become offsite discharge and are not conveyed to any BMPs in POI 1. Runoff from this area reaches POI 1 via an existing stream channel and proposed reconstructed culvert.

Post-Development Drainage Area 5

Post-Development Drainage Area 5 is the area tributary to BMP 5. Runoff from this area includes parts of Proposed Martina Drive, Drive B, the proposed clubhouse, apartment buildings, parking areas, and open space areas. Runoff from Drainage Area 5 reaches BMP 5 via a proposed

conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 2 via overland flow.

Post-Development Bypass 2

Post-Development Bypass represents the areas within the site that become offsite discharge and are not conveyed to any BMPs in POI 2. Runoff from this area reaches POI 2 via overland flow.

Post-Development Drainage Area 6

Post-Development Drainage Area 6 is the area tributary to BMP 6. Runoff from this area includes parts of Proposed Drive C, Drive D, townhouses, parking areas, and open space areas. Runoff from Drainage Area 6 reaches BMP 6 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 3 via overland flow.

Post-Development Bypass 3

Post-Development Bypass represents the areas within the site that become offsite discharge and are not conveyed to any BMPs in POI 3. Runoff from this area reaches POI 3 via overland flow.

Post-Development Bypass 4

Post-Development Bypass represents the areas within the site that become offsite discharge and are not conveyed to any BMPs in POI 4. Runoff from this area reaches POI 4 via overland flow.

Post-Development Bypass 5

Post-Development Bypass represents the areas within the site that become offsite discharge and are not conveyed to any BMPs in POI 5. Runoff from this area reaches POI 5 via overland flow.

Post-Development Drainage Area 7

Post-Development Drainage Area 7 is the area tributary to BMP 7. Runoff from this area includes parts of Proposed Drive B, Drive C, Drive D, Drive E, townhouses, parking areas, and open space areas. Runoff from Drainage Area 7 reaches BMP 7 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 6 via overland flow and existing stream channel.

Post-Development Drainage Area 8

Post-Development Drainage Area 8 is the area tributary to BMP 8. Runoff from this area includes parts of Proposed Drive B, Drive C, townhouses, parking areas, and open space areas. Runoff from Drainage Area 8 reaches BMP 8 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 6 via overland flow and existing stream channel.

Post-Development Drainage Area 9

Post-Development Drainage Area 9 is the area tributary to BMP 9. Runoff from this area includes proposed apartment buildings, parking areas, and open space areas. Runoff from Drainage Area 9 reaches BMP 9 via a proposed conveyance network and overland flow, which ultimately discharges onsite, and reaches POI 6 via overland flow and existing stream channel.

Post-Development Bypass 6

Post-Development Bypass represents the areas within the site that become offsite discharge and are not conveyed to any BMPs in POI 6. Runoff from this area reaches POI 6 via overland flow.

Post-Development Calculations

The SCS Method was used to generate runoff hydrographs. Hydrographs for the post-development drainage areas were created for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events. The proposed stormwater management facilities were designed to attenuate the calculated post-development discharge rates to no greater than the computed pre-development runoff rates. Infiltration testing was completed, however, as a conservative estimate for design purposes, no infiltration was applied for the post-development hydrograph routing calculations.

Curve Numbers

Land Use	Curve Number
Impervious	98
Open Space (HSG B)	61
Open Space (HSG C)	74
Open Space (HSG D)	80
Meadow (HSG B)	58
Meadow (HSG C)	71
Meadow (HSG D)	78
Woods (HSG B)	55
Woods (HSG C)	70
Woods (HSG D)	77

Post-Development Drainage Area Table

Post-Development Drainage Areas

Cover Type	DA 1	DA 2	DA 3	DA 4	Byp 1	DA 5	Byp 2	DA 6	Byp 3	Byp 4	Byp 5	DA 7	DA 8	DA 9	Byp 6
Impervious (ac)	2.32	2.78	0.32	0.68	0.41	1.90	0.00	2.10	0.00	0.00	0.04	3.47	2.93	1.13	0.07
Open Space (HSG B) (ac)	2.15	1.76	0.39	0.52	2.84	1.41	1.48	1.62	0.08	0.00	0.00	2.03	1.65	0.61	0.32
Open Space (HSG C) (ac)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28
Open Space (HSG D) (ac)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.13	0.00	0.05
Meadow (HSG B) (ac)	0.00	0.00	0.00	0.00	0.78	0.00	0.90	0.00	0.21	0.06	0.19	0.33	0.30	0.37	0.23
Meadow (HSG C) (ac)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.11
Meadow (HSG D) (ac)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.06	0.00	0.47
Woods (HSG B) (ac)	0.00	0.00	0.00	0.00	1.45	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.63
Woods (HSG C) (ac)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06
Woods (HSG D) (ac)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.16	0.00	0.90
Total (ac)	4.47	4.54	0.71	1.20	5.47	3.31	2.68	3.72	0.29	0.06	0.23	7.45	5.74	2.11	4.11
Curve Number	80	84	78	82	62	82	59	82	59	58	65	82	81	80	70
Tc (min)	6.0*	6.0*	6.0*	6.0*	18.8	6.0*	13.7	6.0*	6.0*	6.0*	6.0*	6.0*	6.0*	6.0*	13.8

*Minimum Tc Assumed

Post-Development Peak Runoff Rates

	Post-Development Runoff (cfs)														
Event	**DA 1**	**DA 2**	**DA 3**	**DA 4**	**Byp 1**	**DA 5**	**Byp 2**	**DA 6**	**Byp 3**	**Byp 4**	**Byp 5**	**DA 7**	**DA 8**	**DA 9**	**Byp 6**
1 Year	6.34	8.11	0.86	1.92	0.48	5.29	0.10	5.95	0.02	0.00	0.07	11.91	8.65	2.99	1.70
2 Year	9.04	11.10	1.26	2.67	1.43	7.37	0.46	8.28	0.08	0.01	0.16	16.59	12.19	4.27	3.09
10 Year	17.48	20.18	2.51	5.01	5.89	13.83	2.52	15.54	0.41	0.08	0.48	31.13	23.21	8.25	7.86
25 Year	24.05	26.98	3.51	6.80	10.05	18.75	4.57	21.08	0.71	0.14	0.75	42.21	31.71	11.35	11.93
50 Year	30.15	33.21	4.45	8.44	14.25	23.29	6.65	26.17	1.01	0.20	1.01	52.41	39.56	14.23	15.89
100 Year	37.18	40.34	5.53	10.33	19.42	28.50	9.25	32.03	1.38	0.28	1.33	64.14	48.59	17.55	20.60

The following table summarizes the post-development discharge from the site:

	Post-Development Discharge (cfs)					
Event	**POI 1**	**POI 2**	**POI 3**	**POI 4**	**POI 5**	**POI 6**
1 Year	0.48	0.10	0.02	0.00	0.07	1.70
2 Year	1.43	0.46	0.08	0.01	0.16	3.09
10 Year	8.71	2.56	0.74	0.08	0.48	19.61
25 Year	18.24	7.49	3.36	0.14	0.75	30.46
50 Year	28.20	11.17	5.89	0.20	1.01	41.69
100 Year	39.99	17.32	12.38	0.28	1.33	57.53

Pre- vs. Post-Development Summary

Release Rate Requirements

Susquehanna Township and The Act 167 Paxton Creek Release Rate District requires that the post-development discharge does not exceed 100% of the pre-development discharge for the 1-, 2-, 10-, 25-, 50-, and 100-year storm events. Since the allowable rates are 100% of pre-development rates, refer to the Pre- vs. Post-Development Discharge Table for comparison of allowable rates to design rates for each Point of Interest.

Pre- vs. Post-Development Discharge Table

A summary of the pre- and post-development peak flows are as follows:

	Pre-Development Discharge (cfs)						Post-Development Discharge (cfs)					
Event	**POI 1**	**POI 2**	**POI 3**	**POI 4**	**POI 5**	**POI 6**	**POI 1**	**POI 2**	**POI 3**	**POI 4**	**POI 5**	**POI 6**
1 Year	0.50	0.24	0.07	0.05	0.43	2.24	0.48	0.10	0.02	0.00	0.07	1.70
2 Year	2.01	0.96	0.48	0.31	0.72	6.07	1.43	0.46	0.08	0.01	0.16	3.09
10 Year	11.20	5.34	3.62	1.95	1.69	22.75	8.71	2.56	0.74	0.08	0.48	19.61
25 Year	20.77	9.90	6.91	3.61	2.49	37.73	18.24	7.49	3.36	0.14	0.75	30.46
50 Year	30.60	14.60	10.30	5.31	3.26	52.80	28.20	11.17	5.89	0.20	1.01	41.69
100 Year	42.84	20.43	14.53	7.42	4.18	71.53	39.99	17.32	12.38	0.28	1.33	57.53

Net Change Table

	Net Change (cfs)					
Event	**POI 1**	**POI 2**	**POI 3**	**POI 4**	**POI 5**	**POI 6**
1 Year	-0.02	-0.14	-0.06	-0.05	-0.36	-0.54
2 Year	-0.58	-0.50	-0.40	-0.29	-0.56	-2.98
10 Year	-2.49	-2.78	-2.88	-1.88	-1.22	-3.14
25 Year	-2.53	-2.42	-3.55	-3.47	-1.74	-7.27
50 Year	-2.40	-3.43	-4.41	-5.11	-2.24	-11.11
100 Year	-2.85	-3.11	-2.15	-7.15	-2.85	-14.00

Volume Management Design

The Pennsylvania Department of Environmental Protection (PADEP) recommends that post construction stormwater management (PCSM) best management practices (BMPs) be designed to prevent increases of runoff volume when functioning for a 2-year/24-hour frequency storm.

To manage the difference in runoff volume to each downstream surface water, several BMP facilities have been designed. These facilities can manage the required volumes using infiltration and/or evapotranspiration as per PADEP guidance as well as attenuate the post-development discharge to the required runoff rates.

Tributary 10141 to Paxton Creek

Volume Control BMP		Infiltration Volume (cf)	Evapotranspiration (ET) Volume (cf)	Total Volume Provided (cf)
BMP 1	-	24,873	0	24,873
BMP 2	-	23,925	1,520	25,445
BMP 3	-	3,572	0	3,572
BMP 4	-	3,058	291	3,349
BMP 5	-	16,581	1,053	17,634
			Total Volume Management Provided -	**74,872**
			Volume Management Required -	**65,811**

Tributary 1054 to Paxton Creek

Volume Control BMP		Infiltration Volume (cf)	Evapotranspiration (ET) Volume (cf)	Total Volume Provided (cf)
BMP 6	-	19,227	1,221	20,448
			Total Volume Management Provided -	**20,448**
			Volume Management Required -	**17,916**

Tributary 10166 to Paxton Creek

Volume Control BMP		Infiltration Volume (cf)	Evapotranspiration (ET) Volume (cf)	Total Volume Provided (cf)
BMP 7	-	36,170	2,322	38,492
BMP 8	-	21,217	2,412	23,629
BMP 9	-	11,362	617	11,979
			Total Volume Management Provided -	**74,100**
			Volume Management Required -	**69,487**

Operation and Maintenance of Structural BMPs

The purpose of this section is to identify the operation and maintenance activities associated with the proposed stormwater management facilities. A record of all inspections and maintenance activities shall be kept by the responsible party. Operation and maintenance of these facilities shall be the responsibility of the property owner.

Infiltration Basins / Beds

As Needed: Inspect the basin after runoff events and make sure that runoff drains down within 72 hours. Mow, remove litter and debris, stabilize eroded banks, repair undercut and eroded areas at inflow and outflow structures. Underdrain valve should be opened only for required maintenance or if the basin infiltration volume has not completely drained within 72 hours (valve shall be immediately closed when basin is completely drained). The bottom should be inspected for low spots or compaction.

Semi-Annual: Catch basins and inlets (upgradient of infiltration basin) should be inspected. Inspect facility for signs of wetness or damage to structures, note eroded areas. Underdrain valve should be inspected to ensure that it is closed and functional. If dead or dying grass on the bottom is observed, check to ensure that water is percolating 2-3 days following storms. Note signs of petroleum hydrocarbon contamination and handle properly.

Annual: Disc or otherwise aerate bottom, dethatch basin bottom.

Every 5 Years: Scrape bottom and remove sediment. Restore original cross-section and infiltration rate. Seed or sod to restore ground cover.

1. Vegetation along the surface of the infiltration basin should be maintained in good condition, and any bare spots revegetated as soon as possible.
2. Vehicles should not be parked or driven on basins, avoid compaction.

Vegetated Swale

As Needed: Plant alternative grass species in the event of unsuccessful establishment. Reseed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming. Rototill and replant swale if draw down time is more than 48 hours. Water during dry periods, fertilize, and apply pesticide only when absolutely necessary.

Annual: Inspect and correct erosion problems, damage to vegetation, and sediment and debris accumulation (address when > 3 inches at any spot or covering vegetation. Inspect vegetation on side slopes for erosion and formation of rills or gullies, correct as needed. Inspect for pools of standing water; dewater and discharge to an approved location and restore to design grade and immediately stabilize with erosion control matting and permanent seeding. Mow and trim vegetation to ensure safety, aesthetics, proper swale operation, or to suppress weeds and invasive vegetation; dispose of cuttings in a local composting facility; mow only when swale is dry to avoid rutting. Inspect for litter; remove prior to mowing. Inspect for uniformity in cross-section and longitudinal slope, correct as needed. Inspect swale inlet (curb cuts, pipes, etc.) and outlet for signs of erosion or blockage, correct as needed.

Winter: Inspect swale immediately after the spring melt, remove residuals (e.g. sand) and replace damaged vegetation without disturbing remaining vegetation. If roadside or parking lot runoff is directed into the swale, mulching and/or soil aeration/manipulation may be required in the spring to restore soil structure and moisture capacity and to reduce the impacts of deicing agents. Use nontoxic, organic deicing agents, applied either as blended, magnesium chloride-based liquid products or as pretreated salt. Use salt-tolerant vegetation in swales.

Conclusion

The proposed stormwater management facilities are designed to perform in a manner that meets or exceeds the requirements of the Susquehanna Township Stormwater Management Ordinance and the requirements of the NPDES PAG-02 Permit. Stormwater management facilities have been designed to control post-development peak runoff rates to less than the pre-development runoff rates prescribed by the ordinance. The systems have been designed to manage the increase in runoff volume and the net change in pollutant loads for Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Nitrogen (TN) for storms up to and including the 2-year/24-hour design storm event.

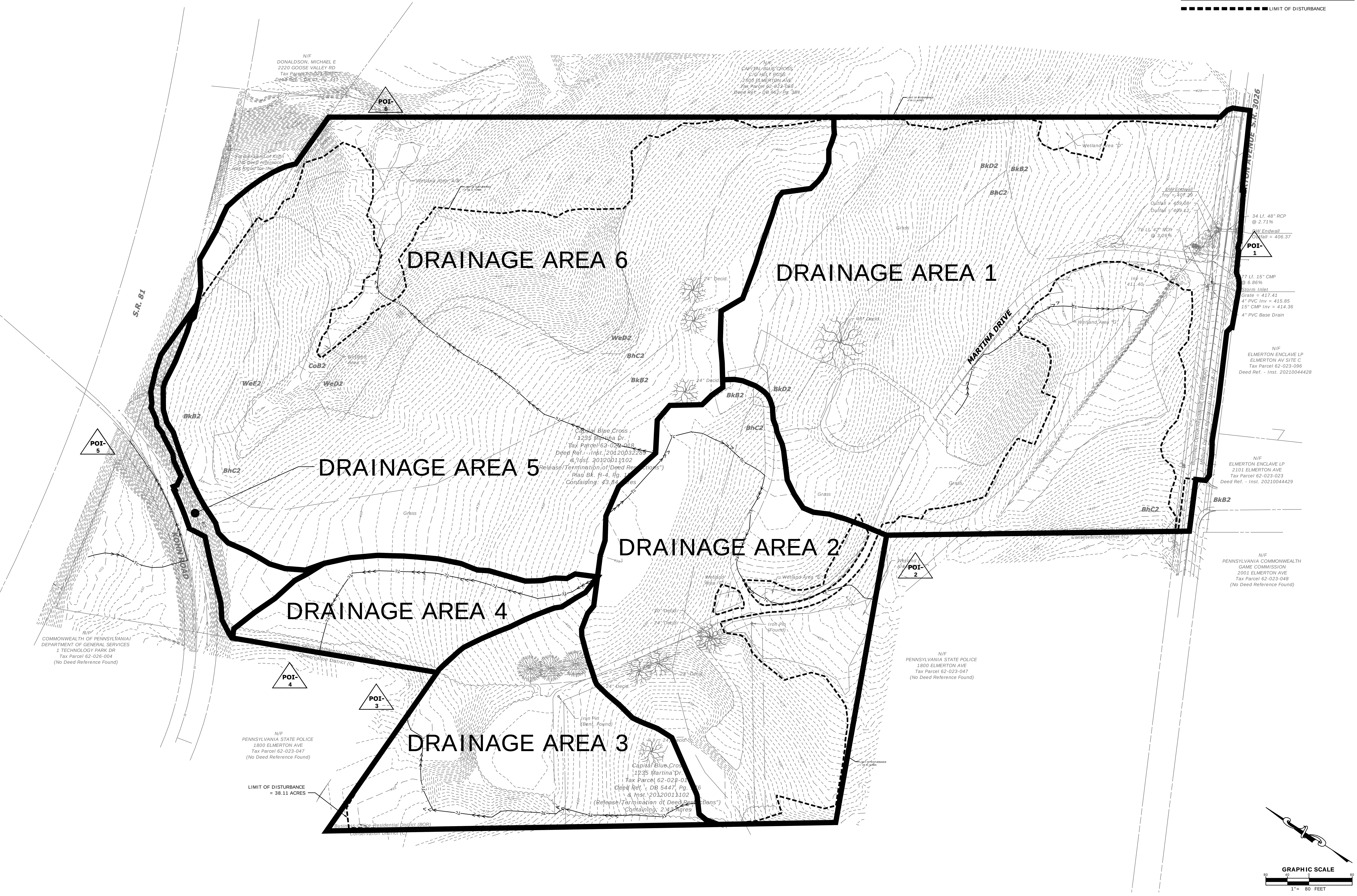
Appendix A
Drainage Area Maps

LEGEND — PRE-DEVELOPMENT DRAINAGE AREA FEATURES

- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION TRAVEL PATH (Tc)
- POI-1 — WATERSHED POINT OF INTEREST

LEGEND — PROPOSED E&S CONTROL PLAN FEATURES

- LIMIT OF DISTURBANCE



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Harrisburg, PA 17110
P: 717.635.2835
www.kandwengineers.com

DRAINAGE AREA MAPS
1235 MARTINA DRIVE
FOR
INCH'S PROPERTIES, LLC

DAUPHIN COUNTY, PA
SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

SCALE:	AS SHOWN
DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
DRAWN BY:	WHM
CAD DRAWING:	2344.001-I_ld PREDA.dwg

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PLAN TYPE:
PRE DEV. DRAINAGE AREA MAP

SHEET:
1 OF 6

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LEGEND — POST-DEVELOPMENT DRAINAGE AREA FEATURES

- DRAINAGE AREA BOUNDARY
- BYPASS DRAINAGE AREA BOUNDARY
- Tc — TIME OF CONCENTRATION TRAVEL PATH
- POI-1 — WATERSHED POINT OF INTEREST

LEGEND — PROPOSED E&S CONTROL PLAN FEATURES

- LIMIT OF DISTURBANCE

DRAINAGE AREA 1

DRAINAGE AREA 2

DRAINAGE AREA 3

DRAINAGE AREA 4

DRAINAGE AREA 5

DRAINAGE AREA 6

DRAINAGE AREA 7

DRAINAGE AREA 8

BYPASS 1

BYPASS 2

BYPASS 3
LIMIT OF DISTURBANCE
= 38.11 ACRES

BYPASS 4

BYPASS 5

BYPASS 6

POI-1

POI-2

POI-3

POI-4

POI-5

POI-6

N/F
DONALDSON, MICHAEL E
2220 GOOSE VALLEY RD
Tax Parcel 62-023-108
Deed Ref. - Bk 61, Pg 141

N/F
CAPITOLHILL CROSS
C/O HELT ROSS
2506 ELMERTON AVE
Tax Parcel 62-023-088
Deed Ref. - DB 967, Pg 385

N/F
COMMONWEALTH OF PENNSYLVANIA/
DEPARTMENT OF GENERAL SERVICES
1 TECHNOLOGY PARK DR
Tax Parcel 62-026-004
(No Deed Reference Found)

N/F
PENNSYLVANIA STATE POLICE
1800 ELMERTON AVE
Tax Parcel 62-023-047
(No Deed Reference Found)

N/F
ELMERTON ENCLAVE LP
ELMERTON AV SITE C
Tax Parcel 62-023-096
Deed Ref. - Inst. 20210044428

N/F
ELMERTON ENCLAVE LP
2101 ELMERTON AVE
Tax Parcel 62-023-023
Deed Ref. - Inst. 20210044429

N/F
PENNSYLVANIA COMMONWEALTH
GAME COMMISSION
2001 ELMERTON AVE
Tax Parcel 62-023-048
(No Deed Reference Found)

S.R. 81

KOHN ROAD

P.O.B.

GRAPHIC SCALE
0 40 80
1"= 80 FEET

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SUSQUEHANNA TOWNSHIP

PROFESSIONAL SEAL

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DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
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CAD DRAWING:	2344.001-J_Id POSTDA.dwg

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PLAN TYPE:
POST DEV. DRAINAGE AREA MAP

SHEET:
2 OF 6

LEGEND POST-DEVELOPMENT DRAINAGE AREA FEATURES

POI-1 — WATERSHED POINT OF INTEREST

INLET DRAINAGE AREA BOUNDARY

LEGEND PROPOSED E&S CONTROL PLAN FEATURES

LIMIT OF DISTURBANCE

GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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SUSQUEHANNA TOWNSHIP DAUPHIN COUNTY, PA

PROFESSIONAL SEAL

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DATE:	NOVEMBER 07, 2022
K&W PROJECT:	2344.001
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CAD DRAWING:	2344.001-J_Id POSTDA.dwg

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PLAN TYPE:
INLET DRAINAGE AREA MAP A

SHEET:
3 OF 6

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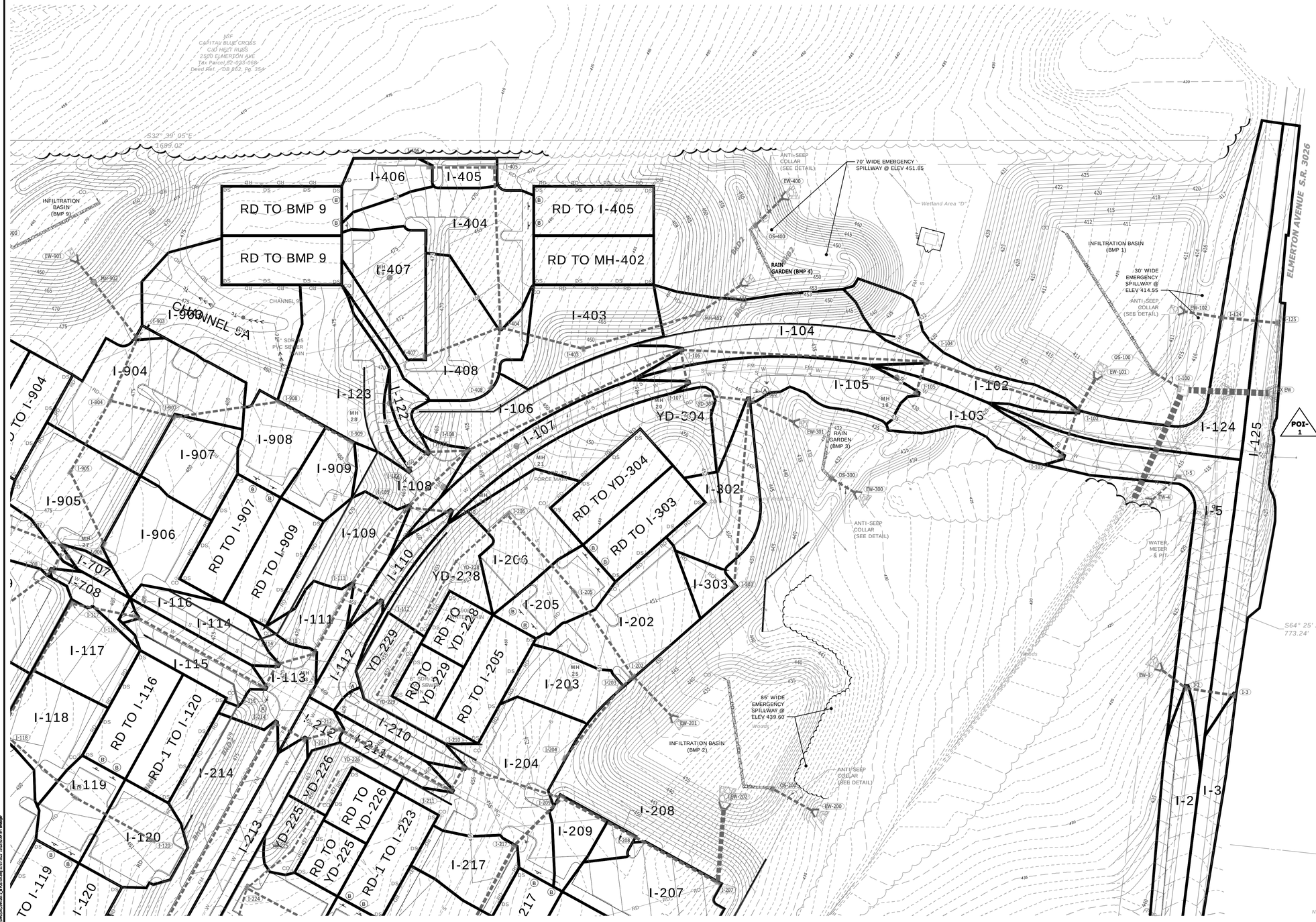
LEGEND POST-DEVELOPMENT DRAINAGE AREA FEATURES

POI-1 — WATERSHED POINT OF INTEREST

INLET DRAINAGE AREA BOUNDARY

LEGEND PROPOSED E&S CONTROL PLAN FEATURES

LIMIT OF DISTURBANCE



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DRAWN BY:	WHM
CAD DRAWING:	2344.001-3_Id POSTDA.dwg

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PLAN TYPE:
INLET DRAINAGE AREA MAP B

SHEET:
4 OF 6

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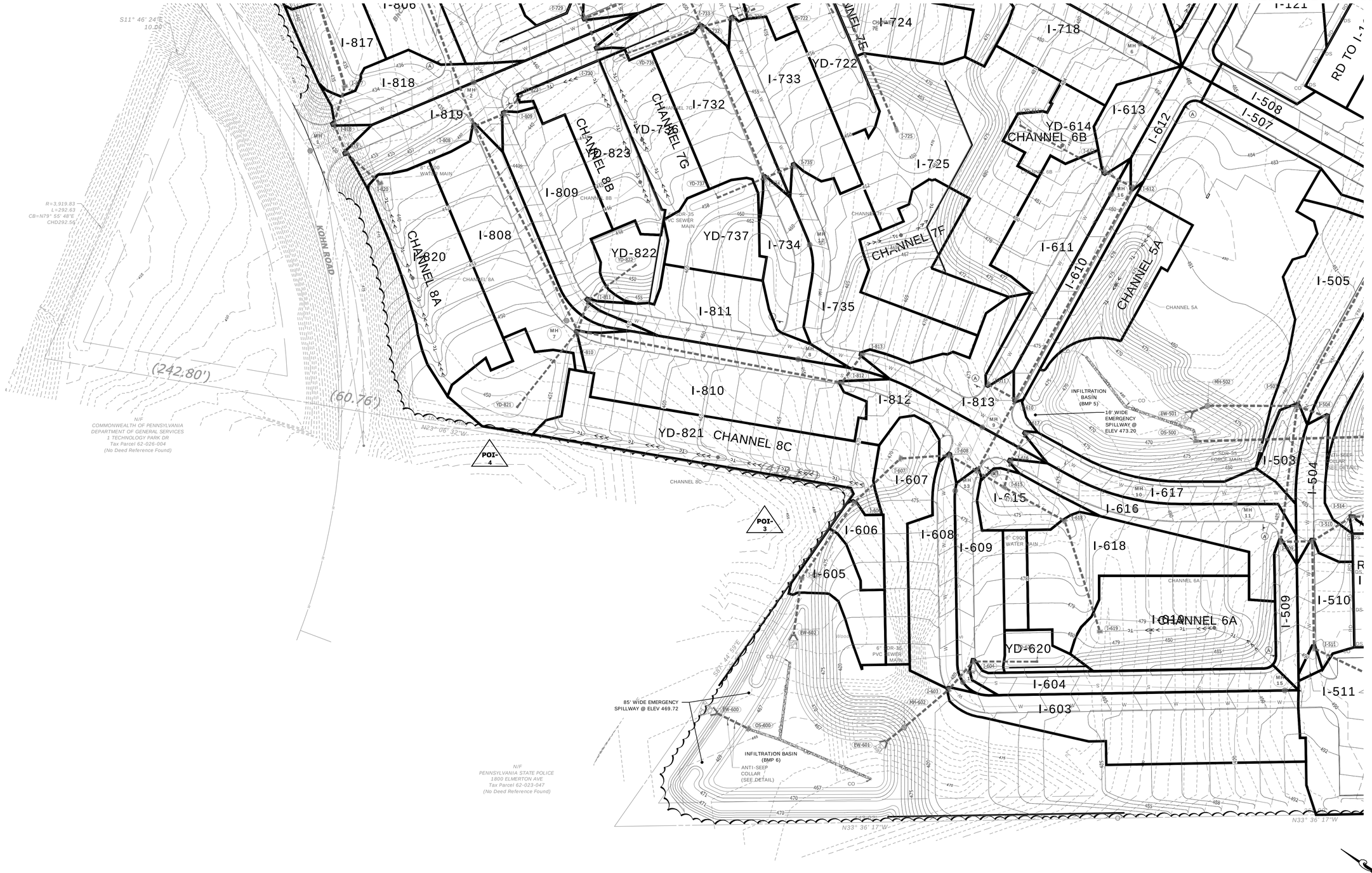
LEGEND POST-DEVELOPMENT DRAINAGE AREA FEATURES

POI-1 — WATERSHED POINT OF INTEREST

INLET DRAINAGE AREA BOUNDARY

LEGEND PROPOSED E&S CONTROL PLAN FEATURES

LIMIT OF DISTURBANCE



GRAPHIC SCALE
40 20 0 40
1"= 40 FEET

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PLAN TYPE:
INLET DRAINAGE AREA MAP C

SHEET:
5 OF 6

LEGEND POST-DEVELOPMENT DRAINAGE AREA FEATURES

POI-1 — WATERSHED POINT OF INTEREST

INLET DRAINAGE AREA BOUNDARY

LEGEND PROPOSED E&S CONTROL PLAN FEATURES

LIMIT OF DISTURBANCE

GRAPHIC SCALE

40 20 0 40

1" = 40 FEET

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PLAN TYPE:
INLET DRAINAGE AREA MAP D

SHEET:
6 OF 6

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Appendix B
Soil & Geologic Maps

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Dauphin County, Pennsylvania

2344-001 Martina Drive

September 9, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

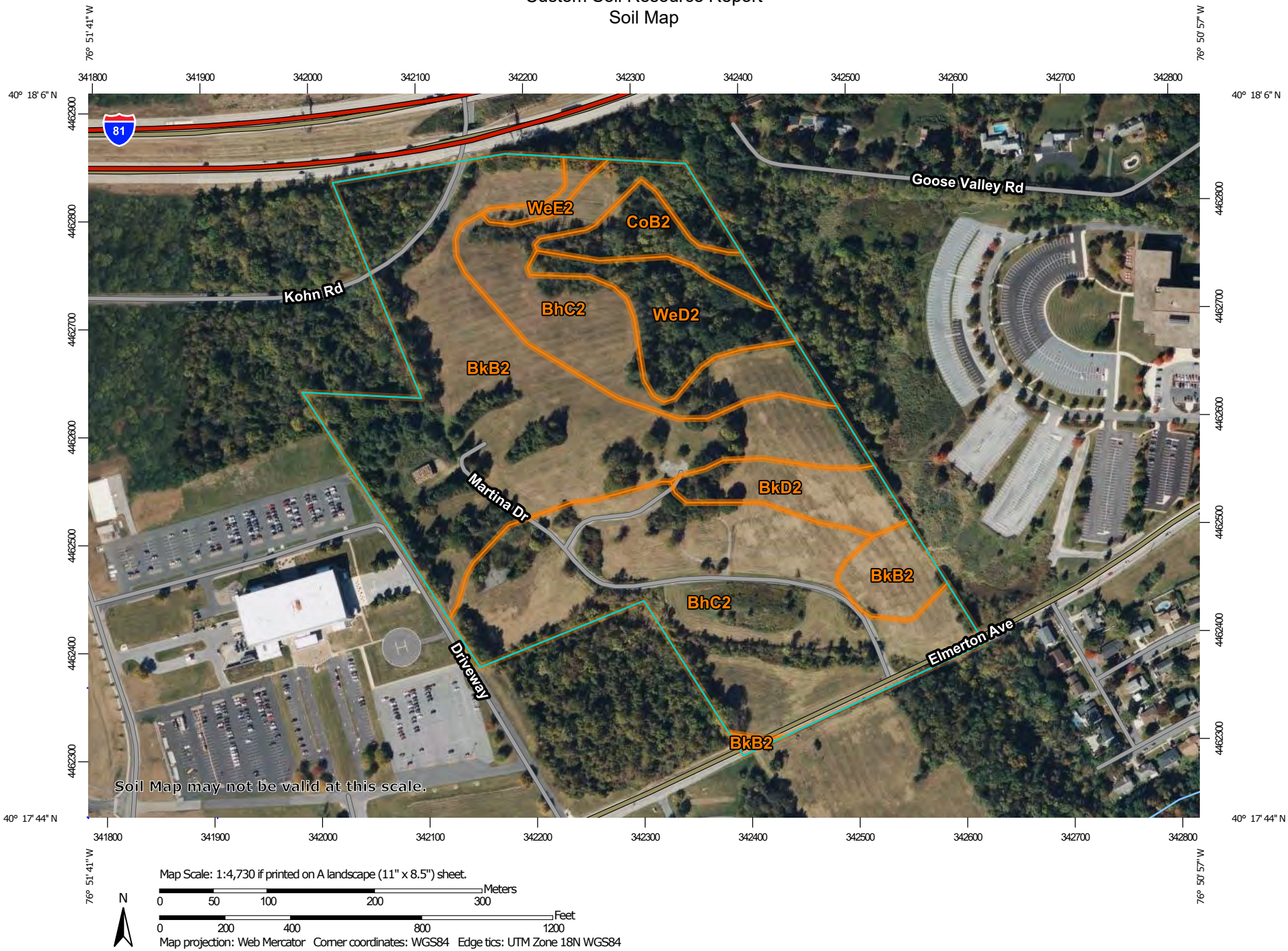
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,730 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Dauphin County, Pennsylvania
Survey Area Data: Version 18, Aug 31, 2021

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

Date(s) aerial images were photographed: Jul 6, 2020—Nov 7, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BhC2	Berks channery silt loam, 8 to 15 percent slopes	22.1	44.1%
BkB2	Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded	20.0	39.9%
BkD2	Berks channery silt loam, 15 to 25 percent slopes	2.3	4.5%
CoB2	Comly silt loam, 2 to 8 percent slopes, moderately eroded	1.9	3.7%
WeD2	Weikert shaly silt loam, 15 to 25 percent slopes, moderately eroded	3.4	6.7%
WeE2	Weikert shaly silt loam, 25 to 40 percent slopes, moderately eroded	0.5	1.0%
Totals for Area of Interest		**50.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit

descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Dauphin County, Pennsylvania

BhC2—Berks channery silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2sgcg
Elevation: 320 to 3,570 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Mountain slopes, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw1 - 8 to 14 inches: very channery silt loam
Bw2 - 14 to 26 inches: very channery silt loam
C - 26 to 36 inches: extremely channery silt loam
R - 36 to 46 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Other vegetative classification: Dry Uplands (DU2), Dry Uplands (DU3)
Hydric soil rating: No

Minor Components

Weikert
Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Brinkerton
Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

BkB2—Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded

Map Unit Setting
National map unit symbol: l4n0
Elevation: 300 to 3,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 45 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Berks and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Acid silty residuum weathered from shale and siltstone

Typical profile
H1 - 0 to 7 inches: channery silt loam

H2 - 7 to 29 inches: very channery silt loam
H3 - 29 to 34 inches: extremely channery silt loam
H4 - 34 to 38 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Ernest

Percent of map unit: 3 percent
Hydric soil rating: No

Bedington

Percent of map unit: 3 percent
Hydric soil rating: No

Blairton

Percent of map unit: 2 percent
Hydric soil rating: No

Weikert

Percent of map unit: 2 percent
Hydric soil rating: No

BkD2—Berks channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2sgb7
Elevation: 320 to 3,630 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Not prime farmland

Map Unit Composition

Berks and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Mountain slopes, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery silt loam
Bw1 - 7 to 14 inches: very channery silt loam
Bw2 - 14 to 21 inches: extremely channery silt loam
C - 21 to 36 inches: extremely channery silt loam
R - 36 to 46 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Dry Uplands (DU2)
Hydric soil rating: No

Minor Components

Weikert

Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

CoB2—Comly silt loam, 2 to 8 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4np
Elevation: 300 to 1,500 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 217 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Comly and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comly

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Colluvium derived from shale and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 23 inches: silty clay loam
H3 - 23 to 44 inches: channery loam
H4 - 44 to 48 inches: bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 35 inches to fragipan; 44 to 60 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 18 to 35 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Bedington

Percent of map unit: 3 percent
Hydric soil rating: No

Berks

Percent of map unit: 2 percent
Hydric soil rating: No

WeD2—Weikert shaly silt loam, 15 to 25 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4qd
Elevation: 300 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 217 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone

Typical profile

A1 - 0 to 7 inches: channery silt loam
B2 - 7 to 17 inches: very channery silt loam
C3 - 17 to 27 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Berks

Percent of map unit: 10 percent
Landform: Valleys, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: Unranked

Wharton

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, head slope, side slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

WeE2—Weikert shaly silt loam, 25 to 40 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: l4qf

Elevation: 300 to 1,600 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 9 inches: very channery silt loam
H2 - 9 to 17 inches: extremely channery silt loam
H3 - 17 to 21 inches: bedrock

Properties and qualities

Slope: 25 to 50 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Berks

Percent of map unit: 9 percent
Hydric soil rating: No

Klinesville

Percent of map unit: 3 percent
Hydric soil rating: No

Comly

Percent of map unit: 3 percent
Hydric soil rating: No

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Appendix C
Pre-Development Hydrology

NOAA Atlas 14, Volume 2, Version 3
Location name: Susquehanna Twp, Pennsylvania, USA*
Latitude: 40.299°, Longitude: -76.8547°
Elevation: 488.34 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.324** (0.292-0.359)	**0.386** (0.347-0.429)	**0.456** (0.409-0.507)	**0.505** (0.453-0.561)	**0.568** (0.506-0.629)	**0.613** (0.545-0.678)	**0.658** (0.584-0.729)	**0.704** (0.621-0.779)	**0.760** (0.665-0.842)	**0.804** (0.698-0.892)
10-min	**0.516** (0.464-0.572)	**0.616** (0.553-0.684)	**0.725** (0.651-0.806)	**0.803** (0.719-0.891)	**0.900** (0.803-0.997)	**0.971** (0.863-1.08)	**1.04** (0.923-1.15)	**1.11** (0.975-1.22)	**1.19** (1.04-1.32)	**1.25** (1.09-1.39)
15-min	**0.643** (0.579-0.714)	**0.771** (0.692-0.857)	**0.913** (0.820-1.01)	**1.01** (0.907-1.12)	**1.14** (1.01-1.26)	**1.22** (1.09-1.35)	**1.31** (1.16-1.45)	**1.39** (1.23-1.54)	**1.50** (1.31-1.66)	**1.57** (1.36-1.74)
30-min	**0.876** (0.790-0.973)	**1.06** (0.952-1.18)	**1.29** (1.16-1.44)	**1.46** (1.31-1.62)	**1.67** (1.49-1.85)	**1.83** (1.63-2.03)	**1.99** (1.77-2.20)	**2.15** (1.89-2.37)	**2.35** (2.06-2.61)	**2.52** (2.19-2.79)
60-min	**1.09** (0.982-1.21)	**1.33** (1.19-1.48)	**1.65** (1.48-1.84)	**1.89** (1.70-2.10)	**2.22** (1.98-2.46)	**2.47** (2.20-2.74)	**2.73** (2.42-3.02)	**3.00** (2.64-3.32)	**3.36** (2.94-3.72)	**3.66** (3.17-4.05)
2-hr	**1.27** (1.14-1.41)	**1.54** (1.38-1.71)	**1.94** (1.74-2.15)	**2.26** (2.02-2.50)	**2.72** (2.42-3.01)	**3.11** (2.76-3.44)	**3.54** (3.12-3.91)	**4.00** (3.50-4.42)	**4.69** (4.06-5.18)	**5.28** (4.52-5.83)
3-hr	**1.39** (1.25-1.55)	**1.68** (1.51-1.87)	**2.11** (1.90-2.36)	**2.47** (2.22-2.75)	**2.98** (2.65-3.30)	**3.41** (3.02-3.78)	**3.89** (3.42-4.31)	**4.40** (3.85-4.87)	**5.18** (4.47-5.74)	**5.84** (4.98-6.48)
6-hr	**1.71** (1.54-1.92)	**2.07** (1.86-2.33)	**2.60** (2.33-2.91)	**3.04** (2.72-3.40)	**3.69** (3.28-4.11)	**4.26** (3.75-4.73)	**4.89** (4.28-5.43)	**5.59** (4.84-6.20)	**6.65** (5.68-7.38)	**7.57** (6.39-8.40)
12-hr	**2.09** (1.86-2.38)	**2.52** (2.24-2.87)	**3.17** (2.82-3.61)	**3.74** (3.30-4.24)	**4.59** (4.03-5.19)	**5.35** (4.65-6.03)	**6.20** (5.34-6.98)	**7.17** (6.11-8.05)	**8.66** (7.26-9.72)	**9.98** (8.25-11.2)
24-hr	**2.42** (2.23-2.68)	**2.92** (2.68-3.22)	**3.67** (3.37-4.05)	**4.34** (3.97-4.78)	**5.38** (4.88-5.90)	**6.33** (5.68-6.90)	**7.42** (6.61-8.06)	**8.69** (7.65-9.41)	**10.7** (9.28-11.6)	**12.5** (10.7-13.5)
2-day	**2.80** (2.56-3.12)	**3.37** (3.08-3.76)	**4.24** (3.86-4.72)	**4.99** (4.53-5.55)	**6.16** (5.55-6.82)	**7.21** (6.44-7.96)	**8.41** (7.46-9.27)	**9.81** (8.60-10.8)	**12.0** (10.4-13.2)	**14.0** (11.9-15.3)
3-day	**2.98** (2.73-3.30)	**3.58** (3.29-3.97)	**4.49** (4.12-4.97)	**5.29** (4.82-5.83)	**6.51** (5.89-7.16)	**7.61** (6.83-8.35)	**8.87** (7.90-9.70)	**10.3** (9.10-11.3)	**12.6** (10.9-13.7)	**14.6** (12.5-16.0)
4-day	**3.16** (2.91-3.48)	**3.80** (3.50-4.18)	**4.75** (4.37-5.22)	**5.58** (5.11-6.12)	**6.86** (6.23-7.49)	**8.00** (7.23-8.73)	**9.32** (8.34-10.1)	**10.8** (9.59-11.8)	**13.2** (11.5-14.3)	**15.3** (13.2-16.6)
7-day	**3.70** (3.43-4.06)	**4.44** (4.11-4.87)	**5.50** (5.08-6.02)	**6.43** (5.92-7.02)	**7.84** (7.16-8.55)	**9.09** (8.26-9.90)	**10.5** (9.48-11.4)	**12.1** (10.8-13.2)	**14.7** (12.9-15.9)	**16.9** (14.7-18.3)
10-day	**4.27** (3.98-4.61)	**5.10** (4.75-5.51)	**6.24** (5.81-6.75)	**7.22** (6.70-7.79)	**8.68** (8.00-9.35)	**9.95** (9.13-10.7)	**11.4** (10.4-12.2)	**13.0** (11.7-13.9)	**15.4** (13.7-16.5)	**17.5** (15.4-18.8)
20-day	**5.81** (5.46-6.22)	**6.88** (6.47-7.36)	**8.17** (7.68-8.74)	**9.25** (8.66-9.88)	**10.8** (10.1-11.5)	**12.1** (11.3-12.9)	**13.6** (12.5-14.4)	**15.1** (13.9-16.1)	**17.4** (15.9-18.5)	**19.3** (17.5-20.6)
30-day	**7.20** (6.79-7.66)	**8.49** (8.00-9.03)	**9.91** (9.34-10.5)	**11.1** (10.4-11.8)	**12.8** (12.0-13.6)	**14.2** (13.2-15.1)	**15.7** (14.6-16.6)	**17.3** (16.0-18.3)	**19.6** (18.0-20.8)	**21.5** (19.6-22.9)
45-day	**9.06** (8.61-9.57)	**10.6** (10.1-11.2)	**12.2** (11.6-12.9)	**13.5** (12.8-14.2)	**15.3** (14.5-16.1)	**16.7** (15.8-17.6)	**18.2** (17.1-19.1)	**19.7** (18.5-20.8)	**21.9** (20.4-23.1)	**23.6** (22.0-24.9)
60-day	**10.8** (10.3-11.4)	**12.7** (12.0-13.3)	**14.4** (13.7-15.1)	**15.8** (15.0-16.6)	**17.7** (16.8-18.6)	**19.3** (18.2-20.2)	**20.8** (19.7-21.9)	**22.5** (21.1-23.6)	**24.7** (23.1-26.0)	**26.5** (24.7-27.9)

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

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Watershed Model Schematic

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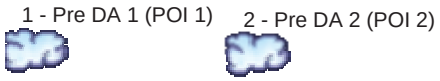
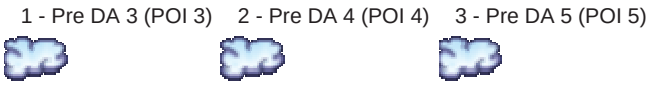


Watershed Model Schematic



Watershed Model Schematic

1 - Pre DA 6 (POI 6)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.500	2.013	-------	-------	11.20	20.77	30.60	42.84	Pre DA 1 (POI 1)
2	SCS Runoff	------	0.239	0.960	-------	-------	5.344	9.904	14.60	20.43	Pre DA 2 (POI 2)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.071	0.480	-------	-------	3.620	6.905	10.30	14.53	Pre DA 3 (POI 3)
2	SCS Runoff	------	0.051	0.306	-------	-------	1.953	3.610	5.310	7.422	Pre DA 4 (POI 4)
3	SCS Runoff	------	0.433	0.723	-------	-------	1.694	2.486	3.255	4.178	Pre DA 5 (POI 5)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	2.242	6.068	-------	-------	22.75	37.73	52.80	71.53	Pre DA 6 (POI 6)

Time of Concentration Calculation

Pre Development Drainage Area 1

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
150	0.4	2.92	4.67	22.15
			Total Sheet Flow Time:	**22.15**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
314.18	Unpaved	4.21	6.80	1.24
			Total Shallow Concentrated Flow Time:	**1.24**

Total Time of Concentration (min) = 23.39

Time of Concentration Calculation

Pre Development Drainage Area 2

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
100	0.24	2.92	1.5	16.76
			Total Sheet Flow Time:	**16.76**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
152.07	Unpaved	2.04	1.6	1.24
140.19	Unpaved	5.28	10.7	0.44
197.42	Paved	4.07	4.00	0.81
95.79	Unpaved	3.68	5.20	0.43
129.58	Paved	3.58	3.10	0.60
60.12	Unpaved	4.65	8.30	0.22
			Total Shallow Concentrated Flow Time:	**3.75**

Total Time of Concentration (min) = 20.51

Time of Concentration Calculation

Pre Development Drainage Area 3

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
100	0.24	2.92	5	10.35
			Total Sheet Flow Time:	**10.35**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
264.98	Unpaved	4.65	8.3	0.95
333.62	Unpaved	2.93	3.3	1.90
			Total Shallow Concentrated Flow Time:	**2.85**

Total Time of Concentration (min) = 13.20

Time of Concentration Calculation

Pre Development Drainage Area 4

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
100	0.24	2.92	5.5	9.97
			Total Sheet Flow Time:	**9.97**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
531.07	Unpaved	4.11	6.5	2.15
			Total Shallow Concentrated Flow Time:	**2.15**

Total Time of Concentration (min) = 12.12

Time of Concentration Calculation

Pre Development Drainage Area 6

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
100	0.24	2.92	3.5	11.94
			Total Sheet Flow Time:	**11.94**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
602.85	Unpaved	5.57	11.9	1.81
			Total Shallow Concentrated Flow Time:	**1.81**

Total Time of Concentration (min) = 13.75

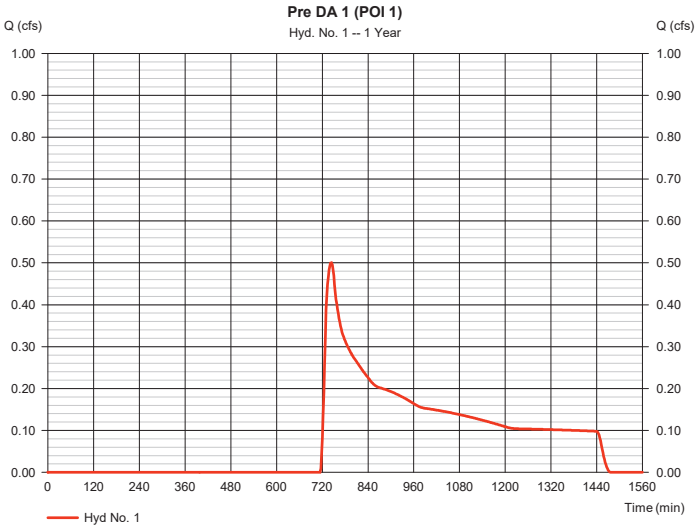
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 1 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.500 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 7,251 cuft
Drainage area	= 14.760 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.40 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



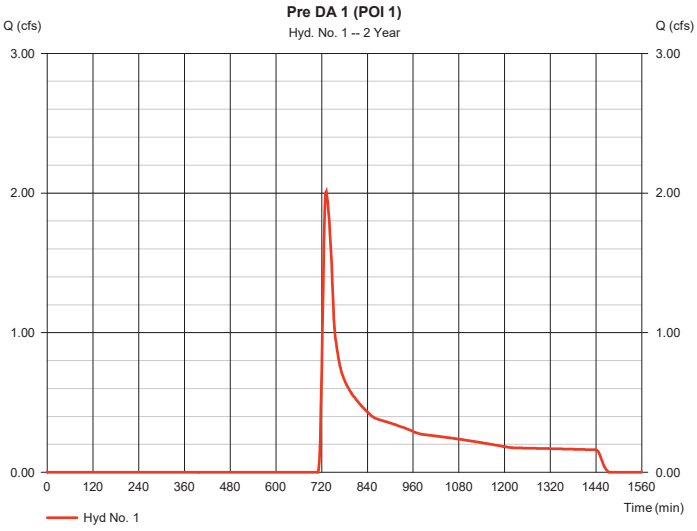
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 1 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.013 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 15,056 cuft
Drainage area	= 14.760 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.40 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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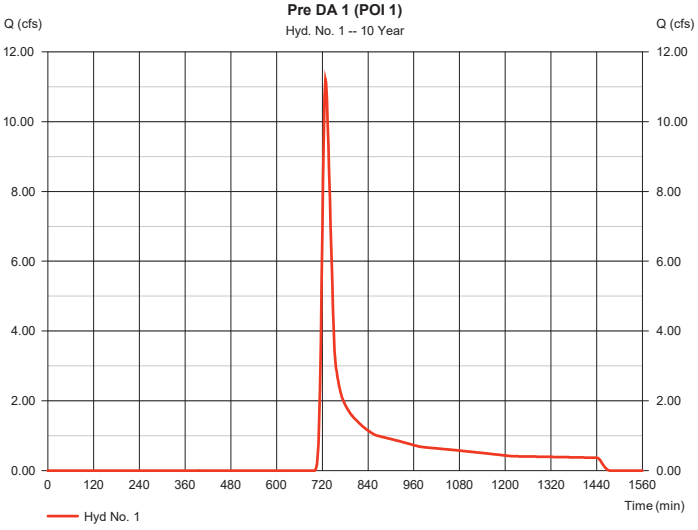
Hyd. No. 1

Pre DA 1 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 11.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 47,948 cuft
Drainage area	= 14.760 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.40 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



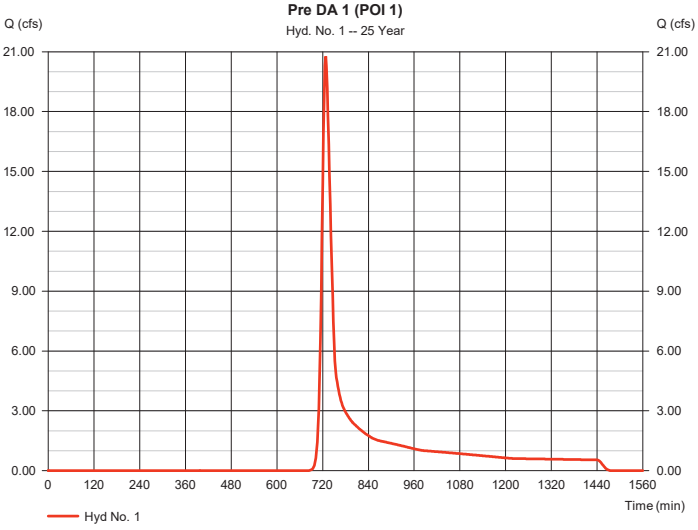
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 1 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 20.77 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 79,373 cuft
Drainage area	= 14.760 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.40 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

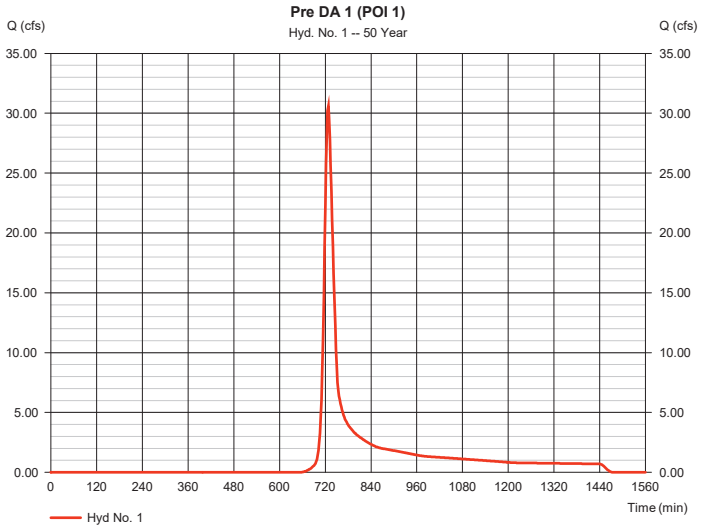


Hydrograph Report

Hyd. No. 1

Pre DA 1 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 30.60 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 111,945 cuft
Drainage area	= 14.760 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.40 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

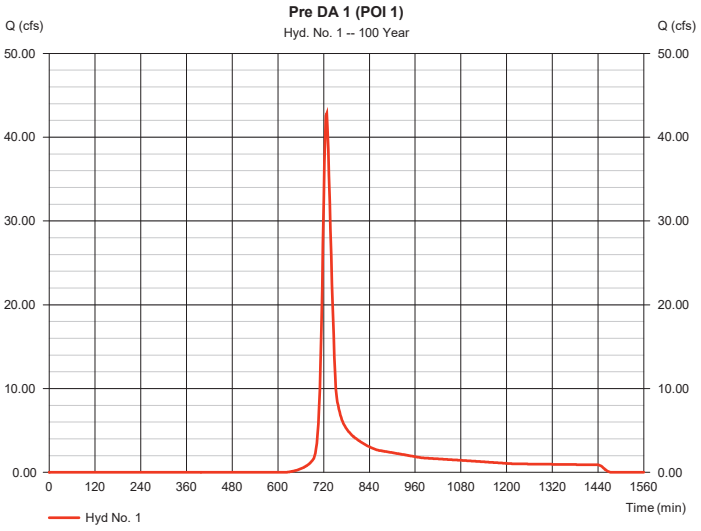


Hydrograph Report

Hyd. No. 1

Pre DA 1 (POI 1)

Hydrograph type	= SCS Runoff	Peak discharge	= 42.84 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 152,787 cuft
Drainage area	= 14.760 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 23.40 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hyd. No. 2

Pre DA 2 (POI 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.239 cfs
Storm frequency	= 1 yrs	Time to peak	= 744 min
Time interval	= 2 min	Hyd. volume	= 3,459 cuft
Drainage area	= 7.040 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
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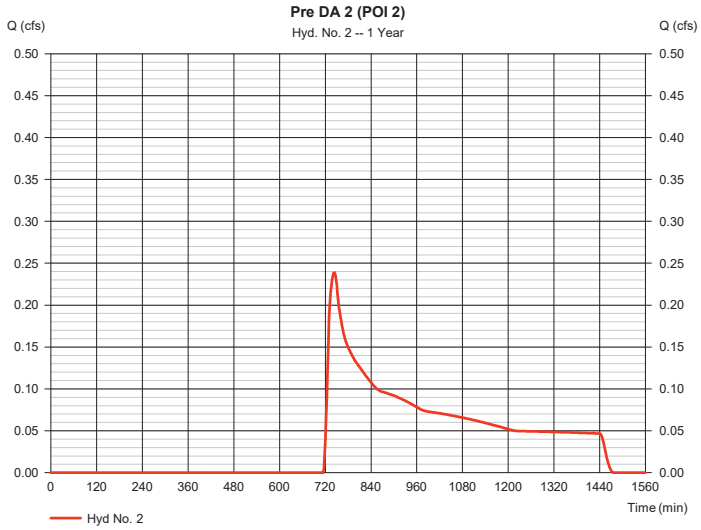
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

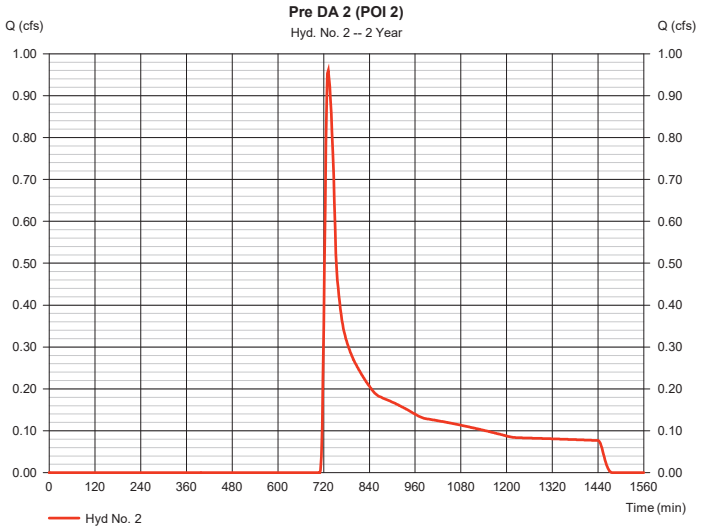


Hydrograph Report

Hyd. No. 2

Pre DA 2 (POI 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.960 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 7,181 cuft
Drainage area	= 7.040 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.50 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



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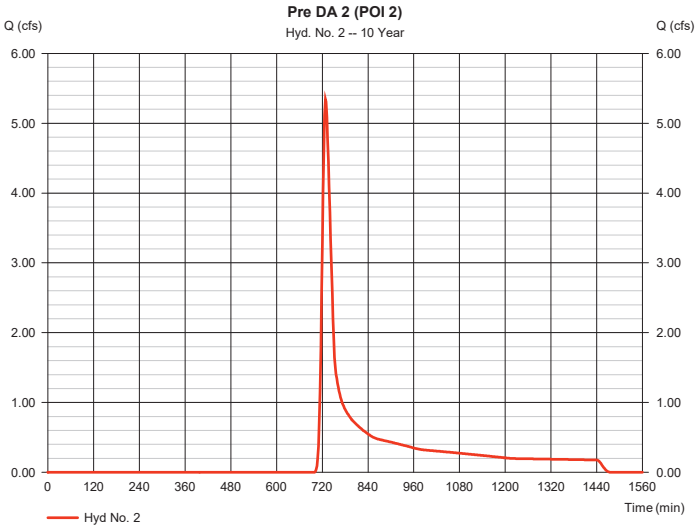
Hyd. No. 2

Pre DA 2 (POI 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.344 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 22,869 cuft
Drainage area	= 7.040 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.50 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



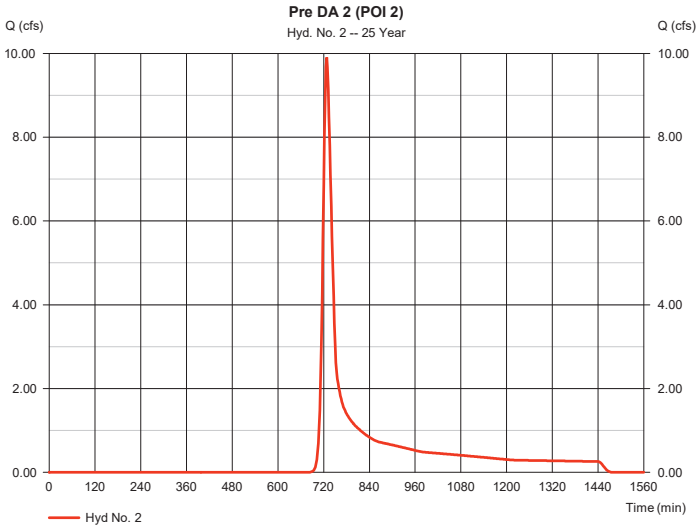
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 2

Pre DA 2 (POI 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.904 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 37,858 cuft
Drainage area	= 7.040 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.50 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



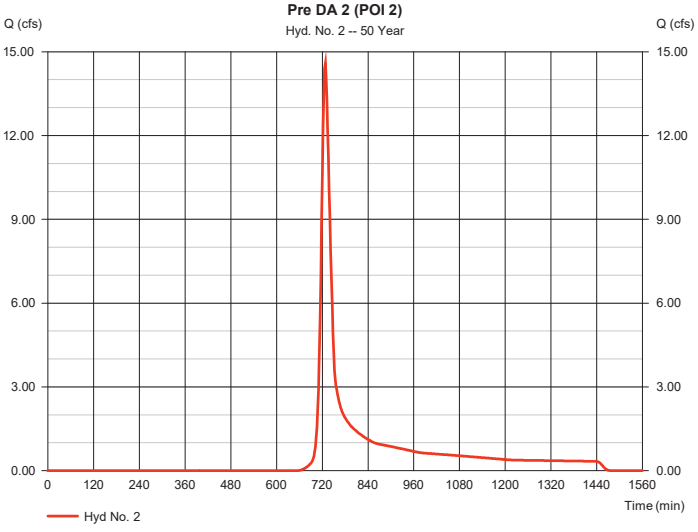
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 2

Pre DA 2 (POI 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 14.60 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 53,394 cuft
Drainage area	= 7.040 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.50 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



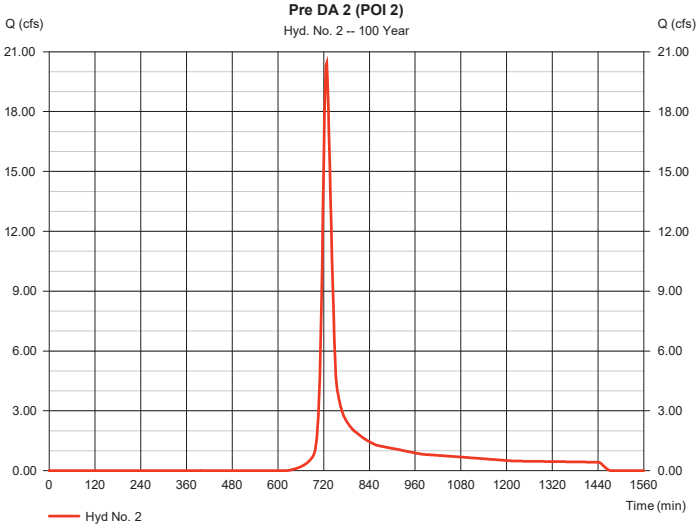
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 2

Pre DA 2 (POI 2)

Hydrograph type	= SCS Runoff	Peak discharge	= 20.43 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 72,874 cuft
Drainage area	= 7.040 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 20.50 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



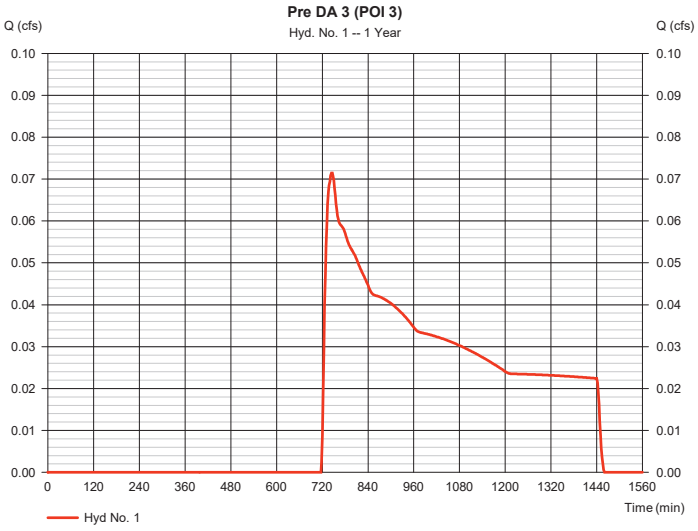
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 3 (POI 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.071 cfs
Storm frequency	= 1 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 1,455 cuft
Drainage area	= 3.960 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



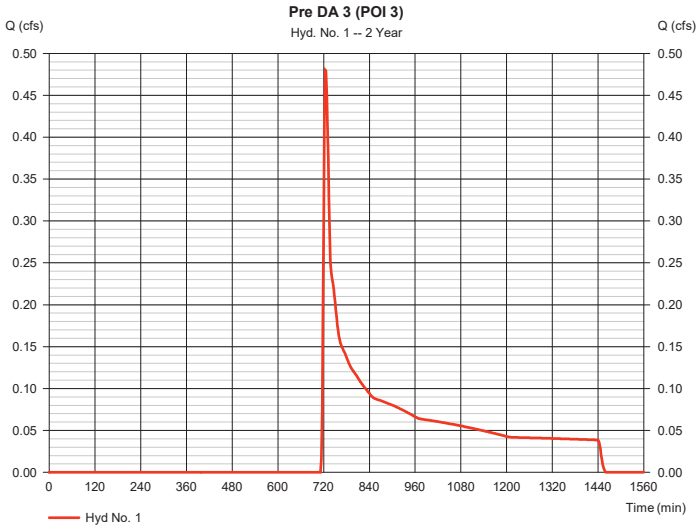
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 3 (POI 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.480 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 3,297 cuft
Drainage area	= 3.960 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



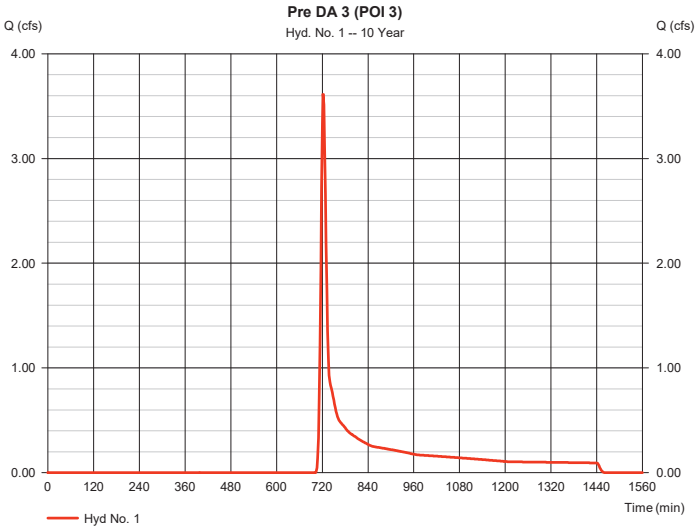
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 3 (POI 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.620 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 11,451 cuft
Drainage area	= 3.960 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



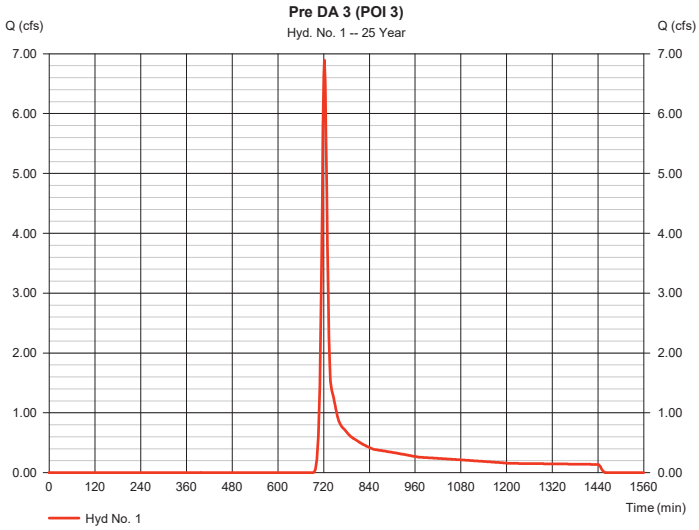
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 1

Pre DA 3 (POI 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.905 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 19,462 cuft
Drainage area	= 3.960 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

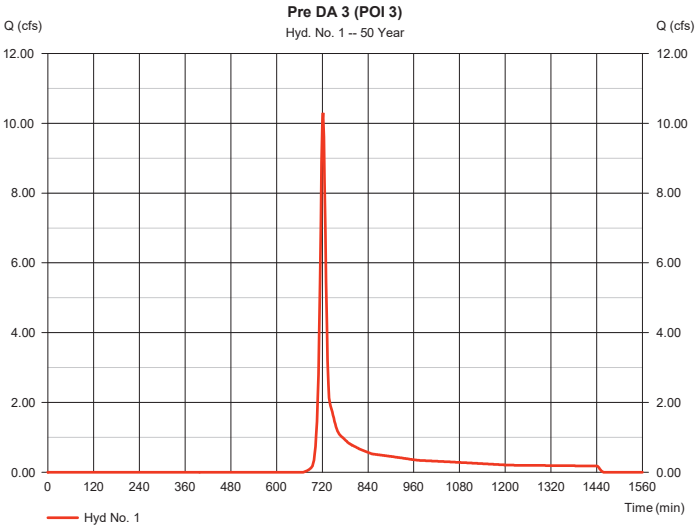


Hydrograph Report

Hyd. No. 1

Pre DA 3 (POI 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 10.30 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 27,867 cuft
Drainage area	= 3.960 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

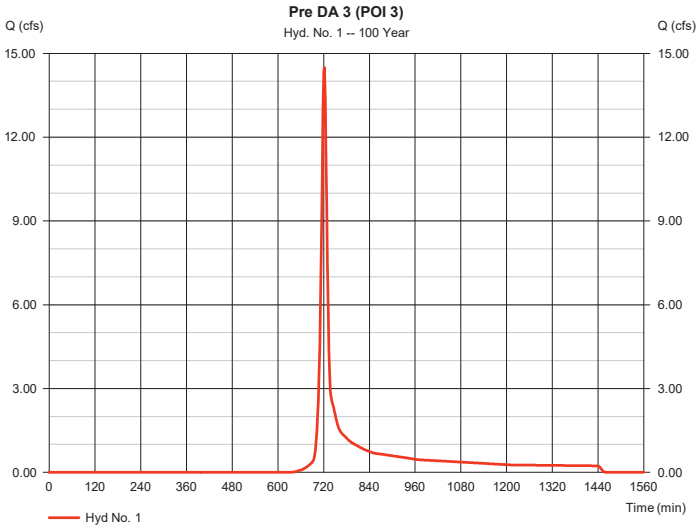


Hydrograph Report

Hyd. No. 1

Pre DA 3 (POI 3)

Hydrograph type	= SCS Runoff	Peak discharge	= 14.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 38,498 cuft
Drainage area	= 3.960 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.20 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

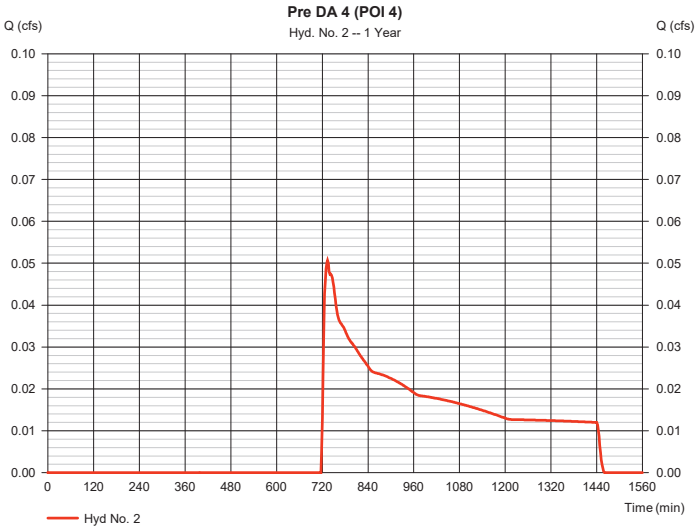


Hydrograph Report

Hyd. No. 2

Pre DA 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.051 cfs
Storm frequency	= 1 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 833 cuft
Drainage area	= 1.940 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

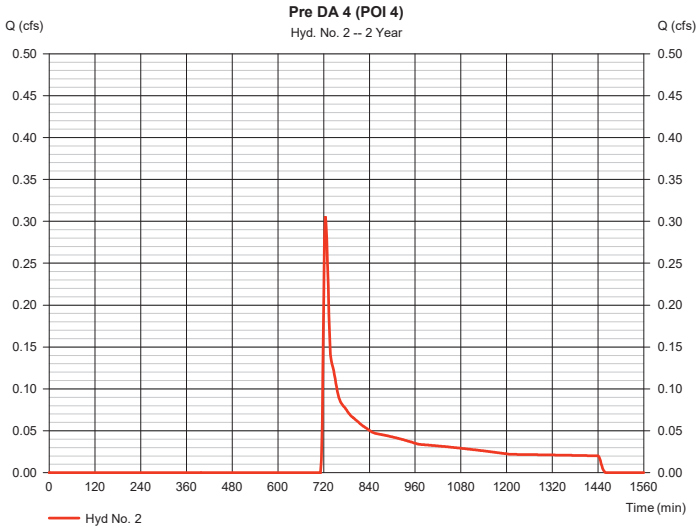


Hydrograph Report

Hyd. No. 2

Pre DA 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.306 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 1,802 cuft
Drainage area	= 1.940 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

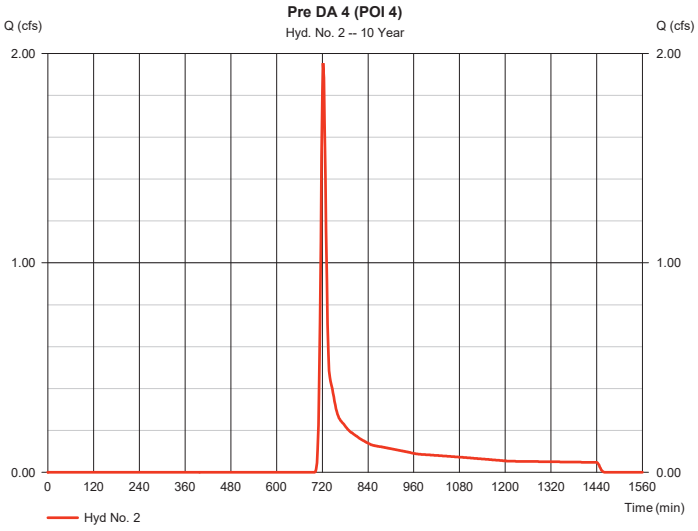


Hydrograph Report

Hyd. No. 2

Pre DA 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.953 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 5,993 cuft
Drainage area	= 1.940 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

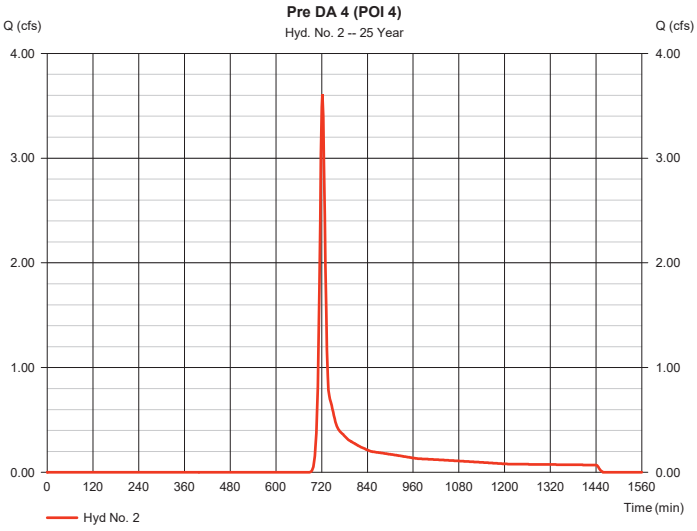


Hydrograph Report

Hyd. No. 2

Pre DA 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.610 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 10,048 cuft
Drainage area	= 1.940 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

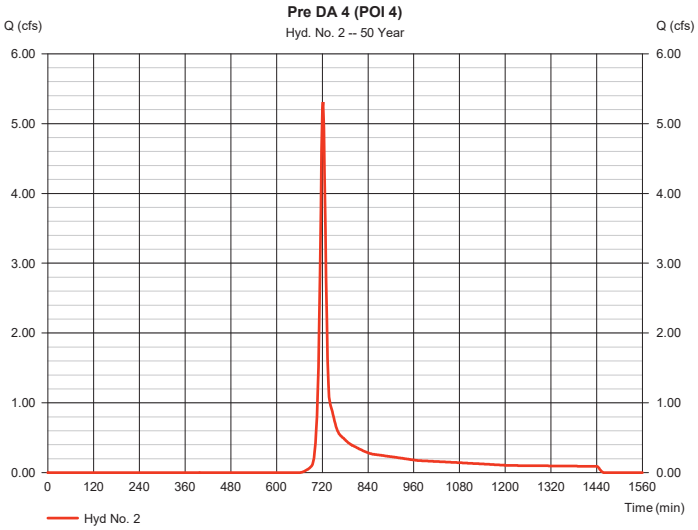


Hydrograph Report

Hyd. No. 2

Pre DA 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.310 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 14,276 cuft
Drainage area	= 1.940 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

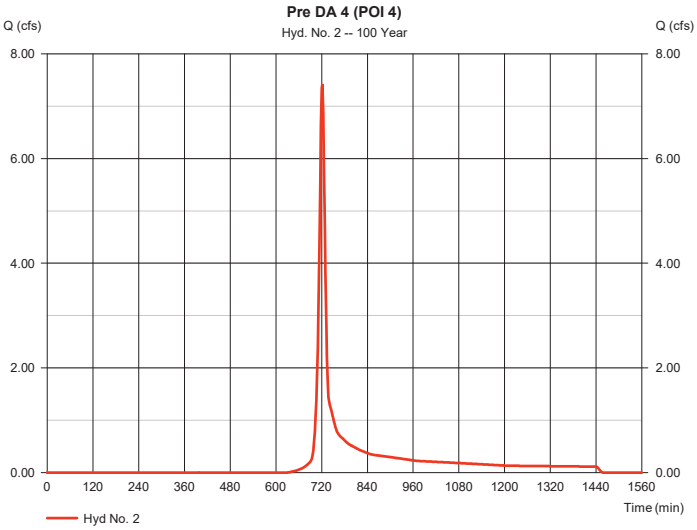


Hydrograph Report

Hyd. No. 2

Pre DA 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 7.422 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 19,600 cuft
Drainage area	= 1.940 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 12.10 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



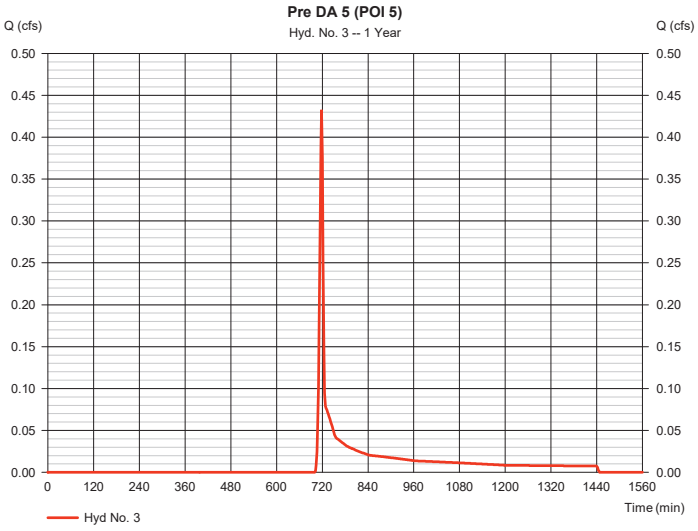
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Pre DA 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.433 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 938 cuft
Drainage area	= 0.610 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



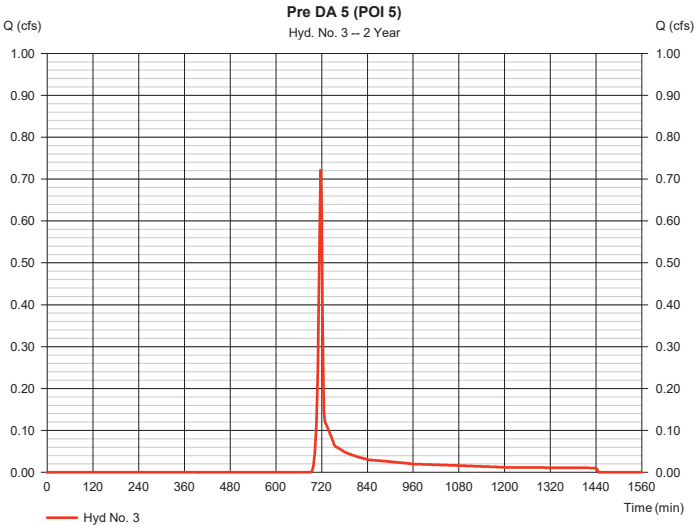
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Pre DA 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.723 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,484 cuft
Drainage area	= 0.610 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



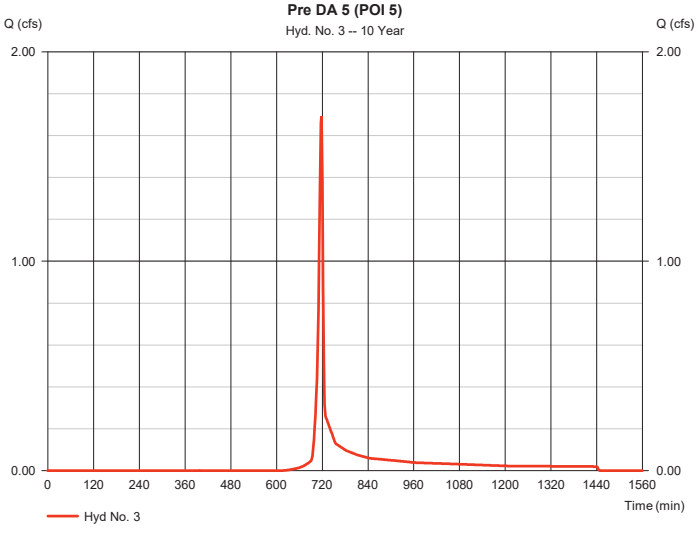
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Pre DA 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.694 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,387 cuft
Drainage area	= 0.610 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



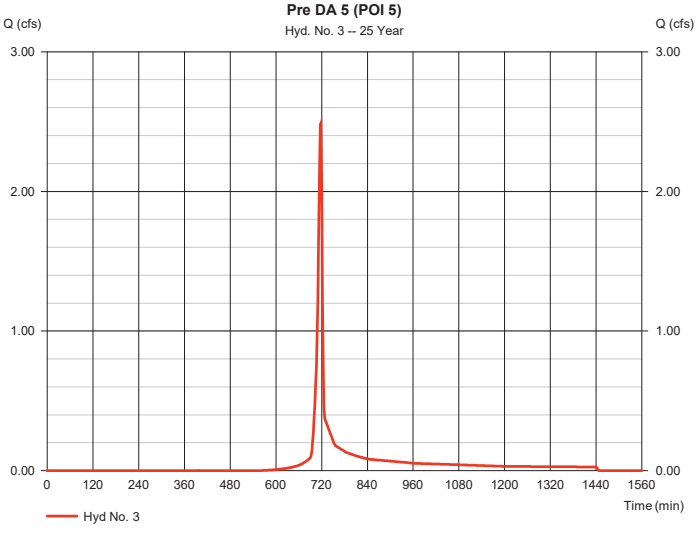
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Pre DA 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.486 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 4,998 cuft
Drainage area	= 0.610 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

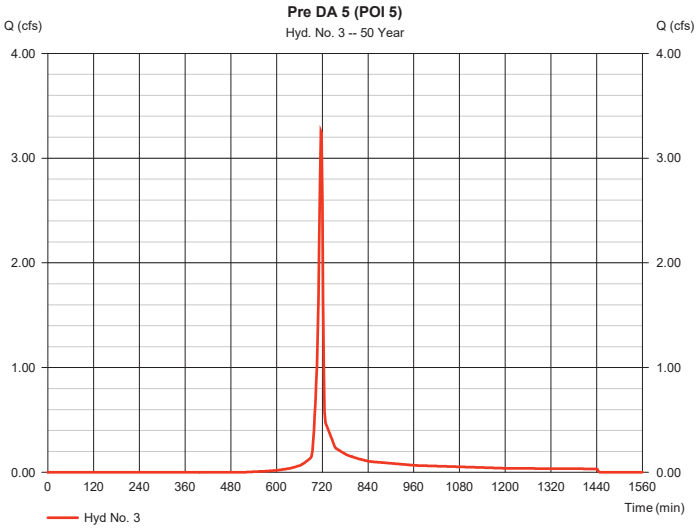


Hydrograph Report

Hyd. No. 3

Pre DA 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.255 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 6,574 cuft
Drainage area	= 0.610 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

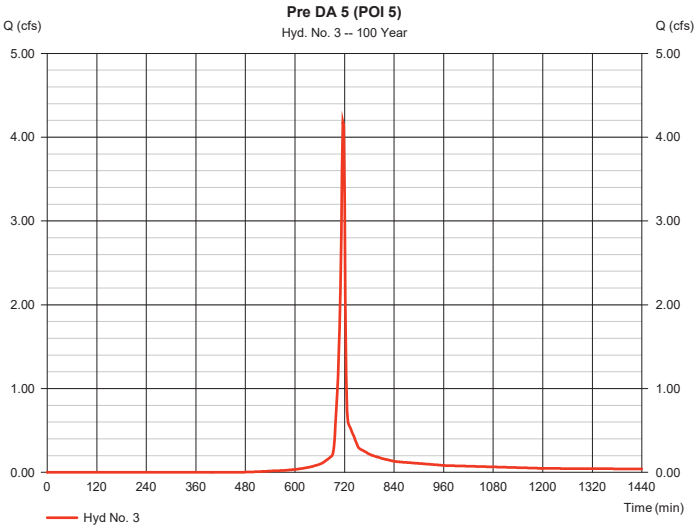


Hydrograph Report

Hyd. No. 3

Pre DA 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.178 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 8,469 cuft
Drainage area	= 0.610 ac	Curve number	= 71
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

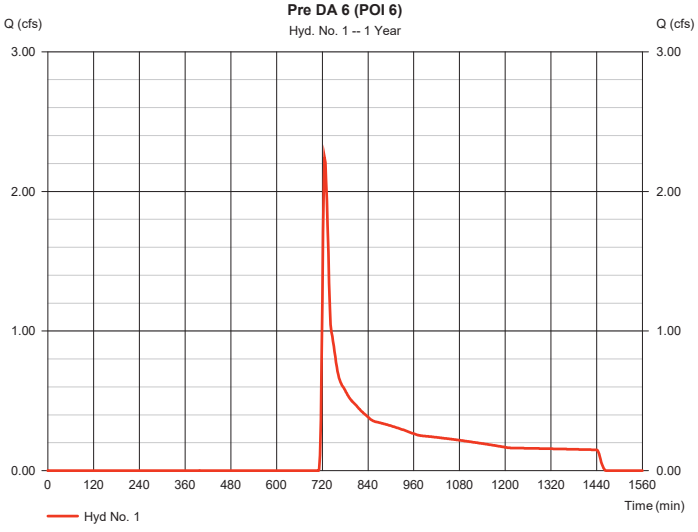


Hydrograph Report

Hyd. No. 1

Pre DA 6 (POI 6)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.242 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 13,687 cuft
Drainage area	= 17.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

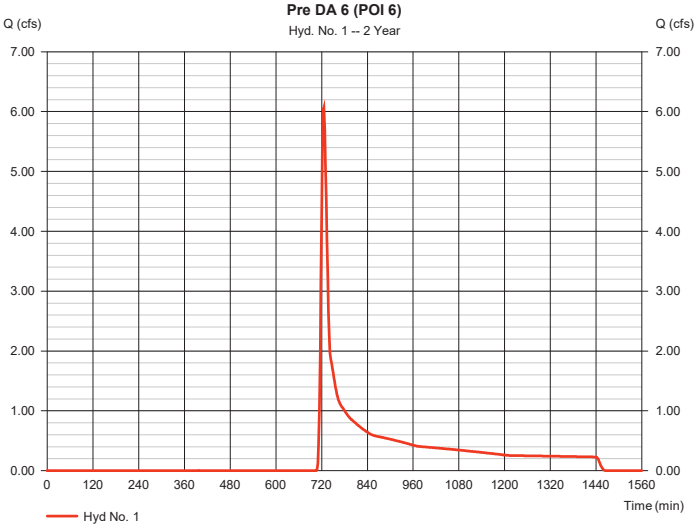


Hydrograph Report

Hyd. No. 1

Pre DA 6 (POI 6)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.068 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 25,149 cuft
Drainage area	= 17.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

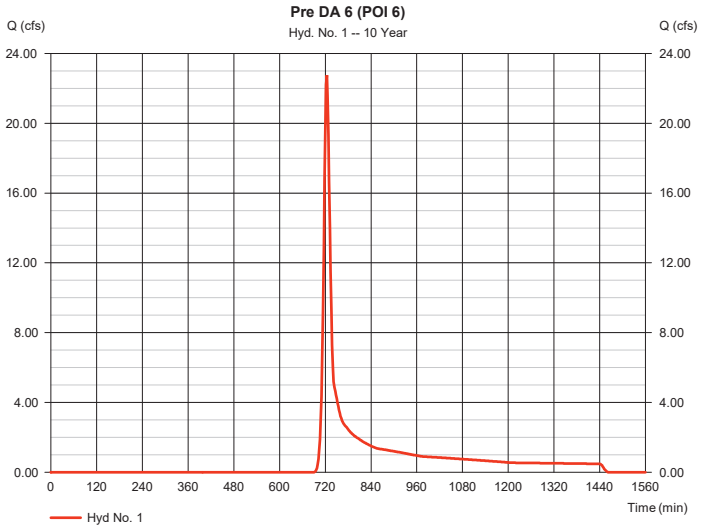


Hydrograph Report

Hyd. No. 1

Pre DA 6 (POI 6)

Hydrograph type	= SCS Runoff	Peak discharge	= 22.75 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 69,721 cuft
Drainage area	= 17.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

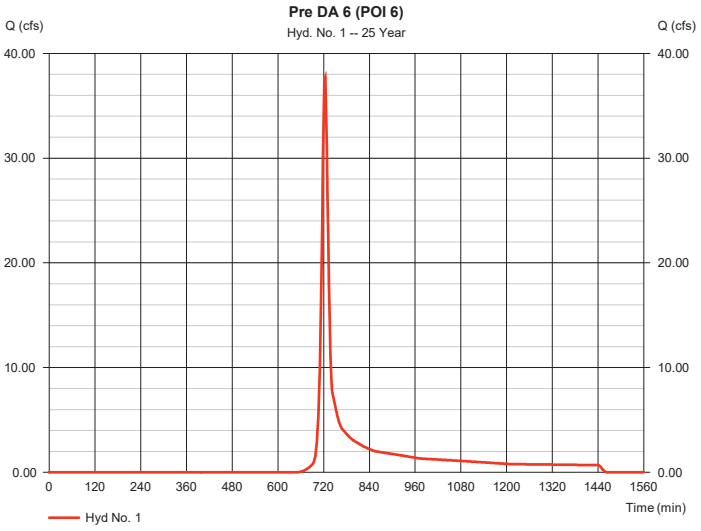


Hydrograph Report

Hyd. No. 1

Pre DA 6 (POI 6)

Hydrograph type	= SCS Runoff	Peak discharge	= 37.73 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 110,362 cuft
Drainage area	= 17.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

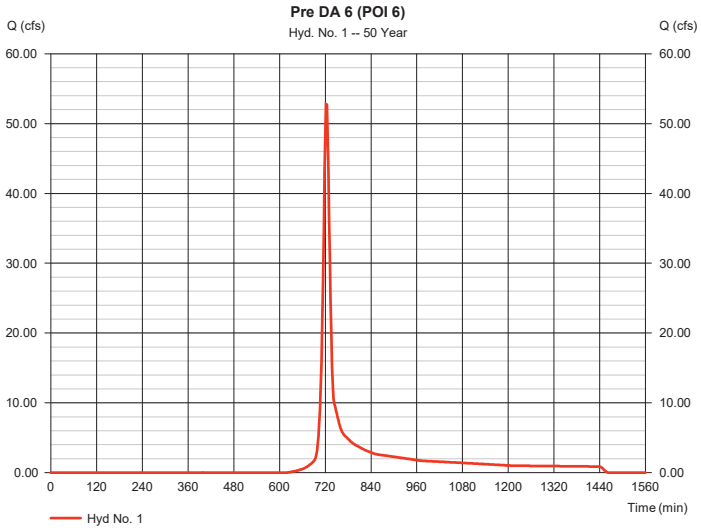


Hydrograph Report

Hyd. No. 1

Pre DA 6 (POI 6)

Hydrograph type	= SCS Runoff	Peak discharge	= 52.80 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 151,569 cuft
Drainage area	= 17.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

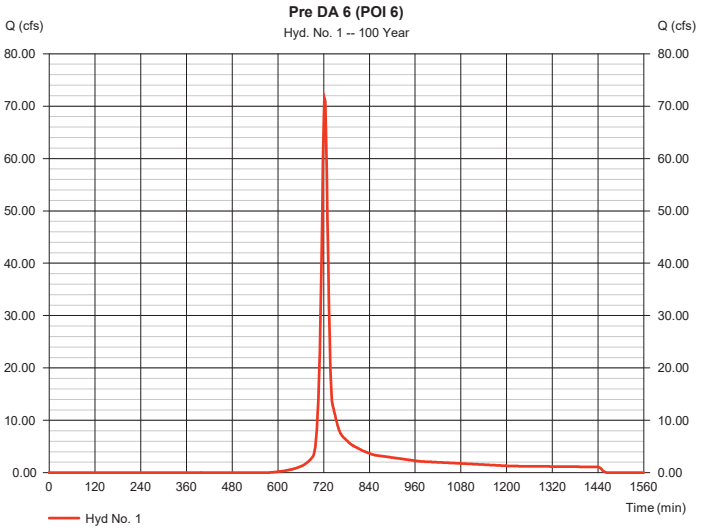


Hydrograph Report

Hyd. No. 1

Pre DA 6 (POI 6)

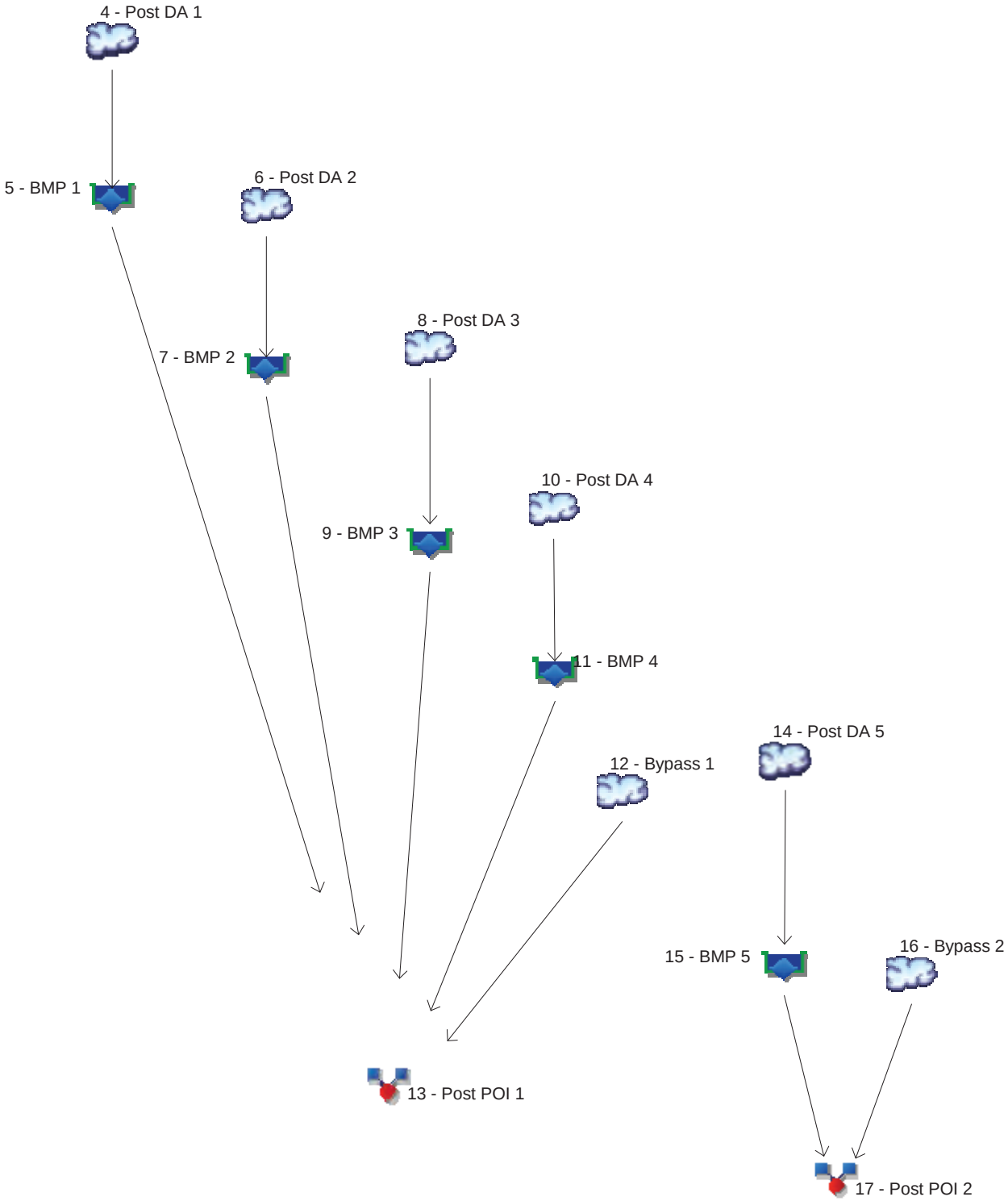
Hydrograph type	= SCS Runoff	Peak discharge	= 71.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 202,429 cuft
Drainage area	= 17.770 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



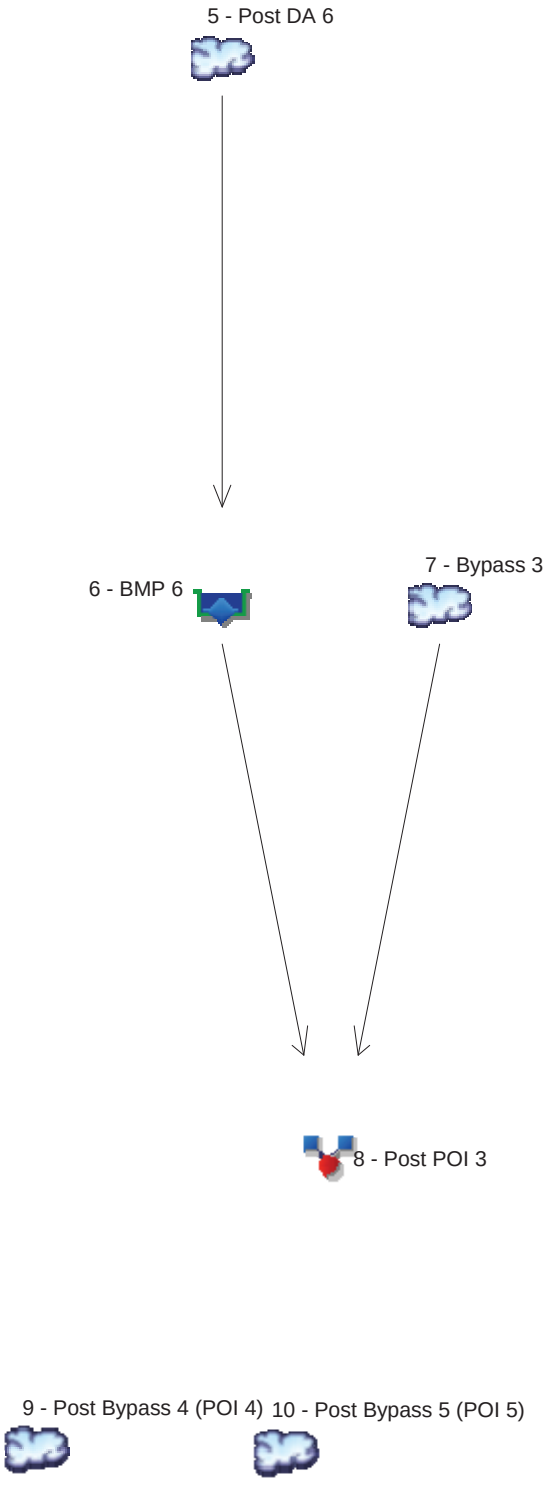
Appendix D
Post-Development Hydrology

Watershed Model Schematic

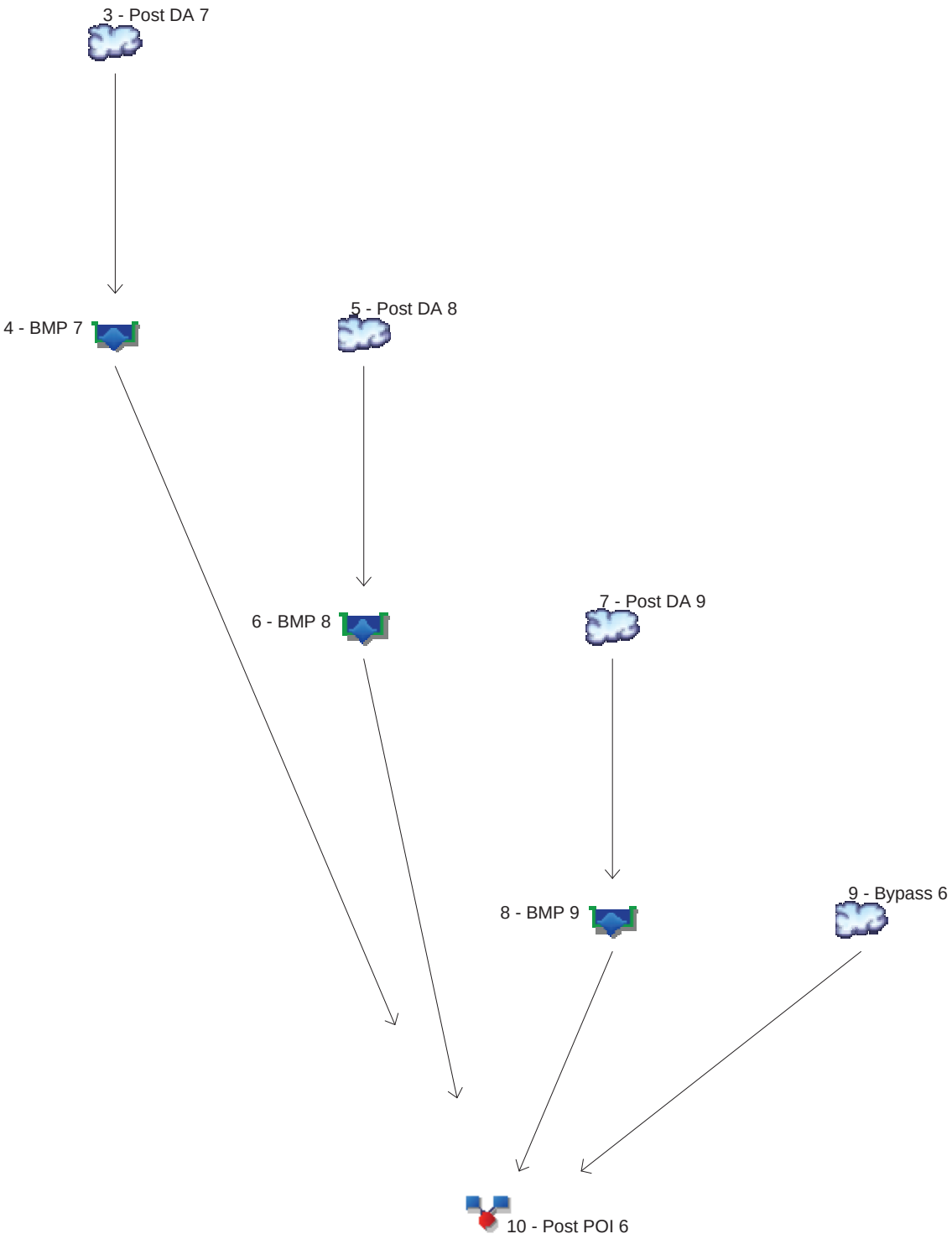
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021



Watershed Model Schematic



Watershed Model Schematic



Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
4	SCS Runoff	------	6.341	9.041	-------	-------	17.48	24.05	30.15	37.18	Post DA 1
5	Reservoir	4	0.000	0.000	-------	-------	0.312	1.159	2.957	5.892	BMP 1
6	SCS Runoff	------	8.111	11.10	-------	-------	20.18	26.98	33.21	40.34	Post DA 2
7	Reservoir	6	0.000	0.110	-------	-------	1.211	4.123	6.224	7.966	BMP 2
8	SCS Runoff	------	0.860	1.259	-------	-------	2.513	3.513	4.446	5.527	Post DA 3
9	Reservoir	8	0.000	0.000	-------	-------	0.033	0.128	0.339	0.634	BMP 3
10	SCS Runoff	------	1.918	2.672	-------	-------	5.014	6.799	8.443	10.33	Post DA 4
11	Reservoir	10	0.041	0.168	-------	-------	3.183	4.813	5.860	8.148	BMP 4
12	SCS Runoff	------	0.481	1.431	-------	-------	5.892	10.05	14.25	19.42	Bypass 1
13	Combine	5, 7, 9, 11, 12	0.481	1.431	-------	-------	8.708	18.24	28.20	39.99	Post POI 1
14	SCS Runoff	------	5.291	7.370	-------	-------	13.83	18.75	23.29	28.50	Post DA 5
15	Reservoir	14	0.000	0.068	-------	-------	0.837	2.980	4.533	8.088	BMP 5
16	SCS Runoff	------	0.097	0.456	-------	-------	2.524	4.566	6.651	9.247	Bypass 2
17	Combine	15, 16	0.097	0.456	-------	-------	2.564	7.486	11.17	17.32	Post POI 2

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
5	SCS Runoff	------	5.947	8.283	-------	-------	15.54	21.08	26.17	32.03	Post DA 6
6	Reservoir	5	0.000	0.000	-------	-------	0.717	3.218	5.548	11.76	BMP 6
7	SCS Runoff	------	0.016	0.083	-------	-------	0.409	0.708	1.011	1.383	Bypass 3
8	Combine	6, 7	0.016	0.083	-------	-------	0.744	3.357	5.894	12.38	Post POI 3
9	SCS Runoff	------	0.002	0.014	-------	-------	0.078	0.139	0.200	0.276	Post Bypass 4 (POI 4)
10	SCS Runoff	------	0.074	0.162	-------	-------	0.477	0.748	1.014	1.333	Post Bypass 5 (POI 5)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
3	SCS Runoff	------	11.91	16.59	-------	-------	31.13	42.21	52.41	64.14	Post DA 7
4	Reservoir	3	0.000	0.061	-------	-------	0.397	0.562	2.712	10.32	BMP 7
5	SCS Runoff	------	8.653	12.19	-------	-------	23.21	31.71	39.56	48.59	Post DA 8
6	Reservoir	5	0.117	0.469	-------	-------	11.75	15.34	16.52	17.70	BMP 8
7	SCS Runoff	------	2.993	4.268	-------	-------	8.250	11.35	14.23	17.55	Post DA 9
8	Reservoir	7	0.000	0.000	-------	-------	0.404	3.013	8.784	14.24	BMP 9
9	SCS Runoff	------	1.702	3.087	-------	-------	7.856	11.93	15.89	20.60	Bypass 6
10	Combine	4, 6, 8, 9	1.702	3.087	-------	-------	19.61	30.46	41.69	57.53	Post POI 6

Time of Concentration Calculation

Post Development Bypass 1

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
150	0.4	2.92	7.2	18.63
			Total Sheet Flow Time:	**18.63**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
37.45	Unpaved	4.73	8.6	0.13
			Total Shallow Concentrated Flow Time:	**0.13**

Total Time of Concentration (min) = 18.76

Time of Concentration Calculation

Post Development Bypass 2

Sheet Flow

Flow Length (ft)	Manning's n-value	2-yr/24-hr precip. (in)	Land Slope (%)	Time (min)
150	0.24	2.92	6.5	12.90
			Total Sheet Flow Time:	**12.90**

Shallow Concentrated Flow

Flow Length (ft)	Surface Description	Average Velocity (ft/s)	Land Slope (%)	Time (min)
174.83	Unpaved	3.50	4.7	0.83
			Total Shallow Concentrated Flow Time:	**0.83**

Total Time of Concentration (min) = 13.73

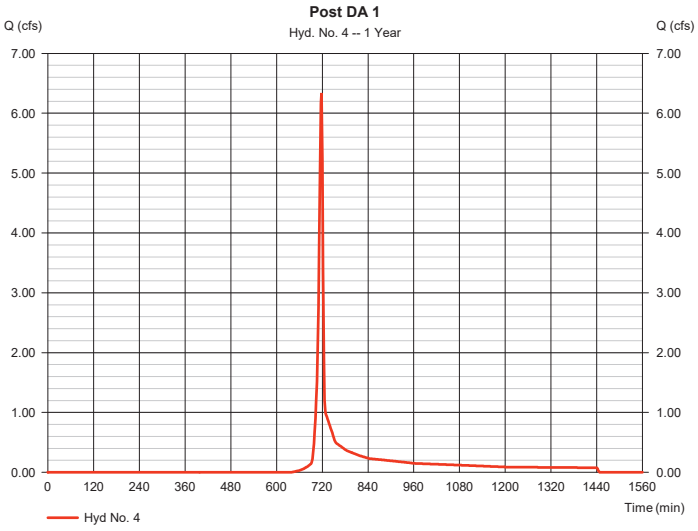
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

Post DA 1

Hydrograph type	= SCS Runoff	Peak discharge	= 6.341 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 12,687 cuft
Drainage area	= 4.470 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



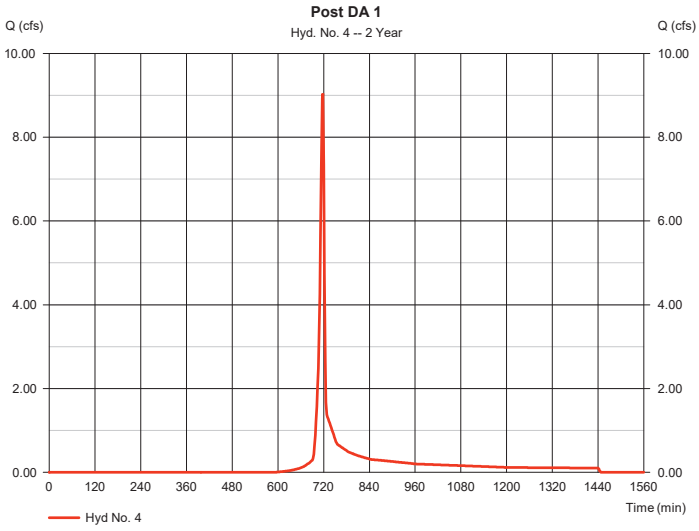
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

Post DA 1

Hydrograph type	= SCS Runoff	Peak discharge	= 9.041 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 18,107 cuft
Drainage area	= 4.470 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



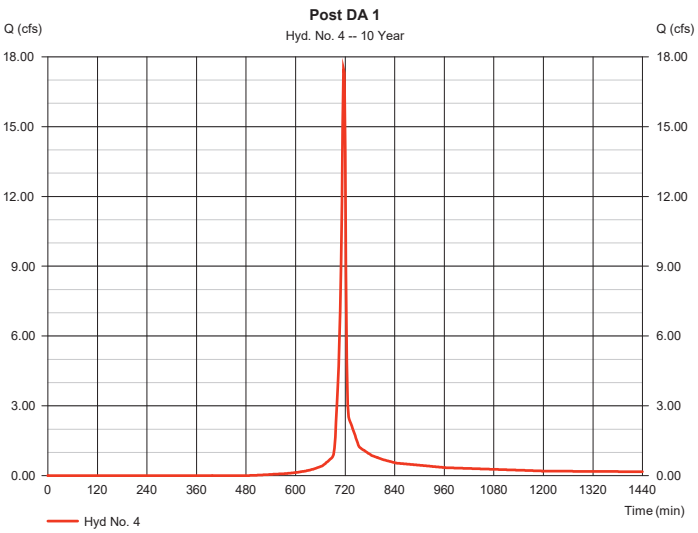
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

Post DA 1

Hydrograph type	= SCS Runoff	Peak discharge	= 17.48 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 35,380 cuft
Drainage area	= 4.470 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



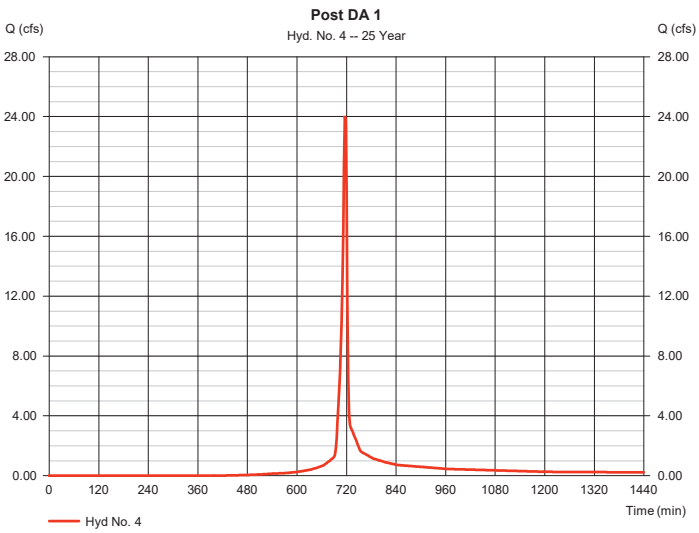
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

Post DA 1

Hydrograph type	= SCS Runoff	Peak discharge	= 24.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 49,087 cuft
Drainage area	= 4.470 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

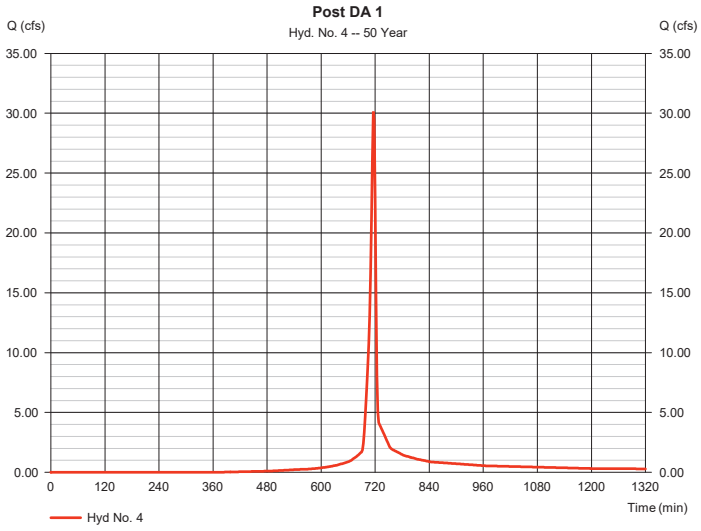


Hydrograph Report

Hyd. No. 4

Post DA 1

Hydrograph type	= SCS Runoff	Peak discharge	= 30.15 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 62,069 cuft
Drainage area	= 4.470 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

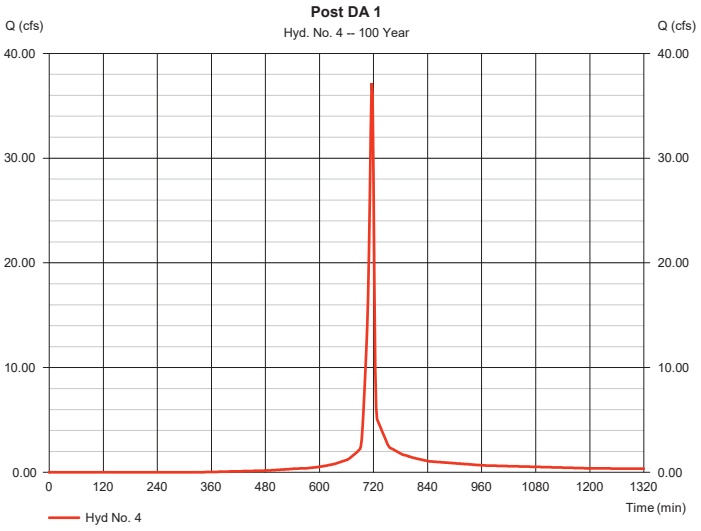


Hydrograph Report

Hyd. No. 4

Post DA 1

Hydrograph type	= SCS Runoff	Peak discharge	= 37.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 77,330 cuft
Drainage area	= 4.470 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 1 - BMP 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 411.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	411.00	13,939	0	0
1.00	412.00	15,371	14,648	14,648
2.00	413.00	16,876	16,116	30,764
3.00	414.00	18,432	17,647	48,411
4.00	415.00	20,047	19,232	67,642
5.00	416.00	21,732	20,882	88,524

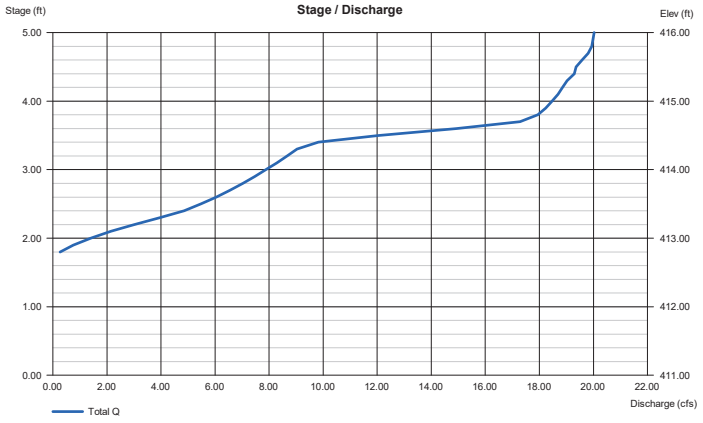
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	8.00	0.00	0.00
Span (in)	= 18.00	30.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 409.50	412.70	0.00	0.00
Length (ft)	= 28.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 414.35	414.55	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



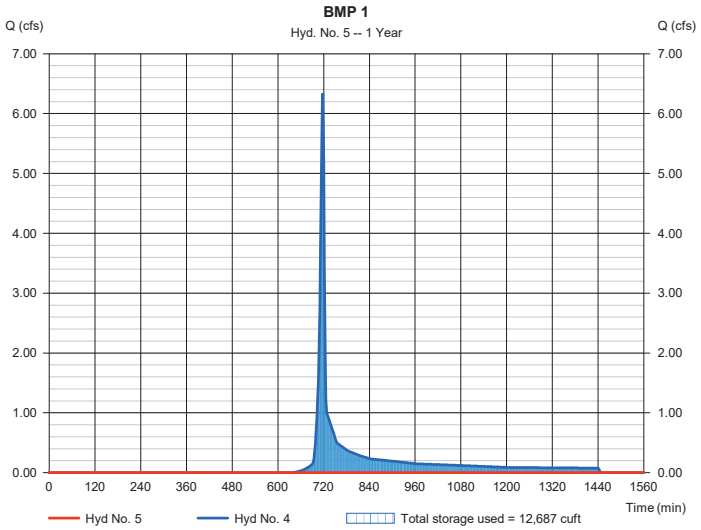
Hydrograph Report

Hyd. No. 5

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - Post DA 1	Max. Elevation	= 411.87 ft
Reservoir name	= BMP 1	Max. Storage	= 12,687 cuft

Storage Indication method used.



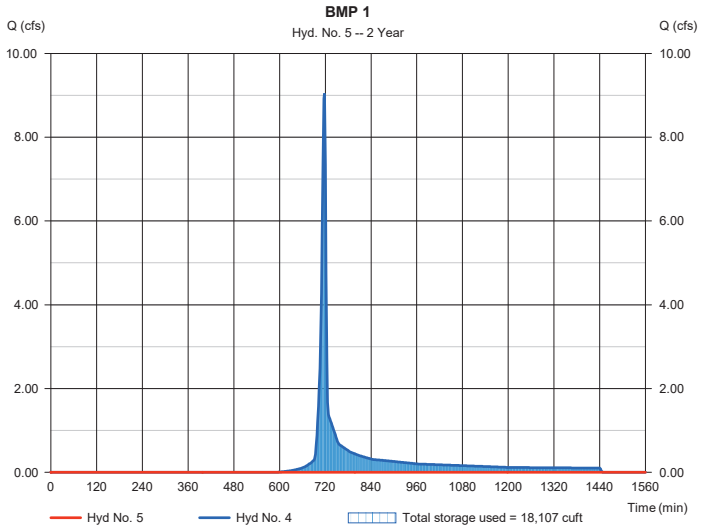
Hydrograph Report

Hyd. No. 5

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 4 - Post DA 1	Max. Elevation	= 412.21 ft
Reservoir name	= BMP 1	Max. Storage	= 18,107 cuft

Storage Indication method used.



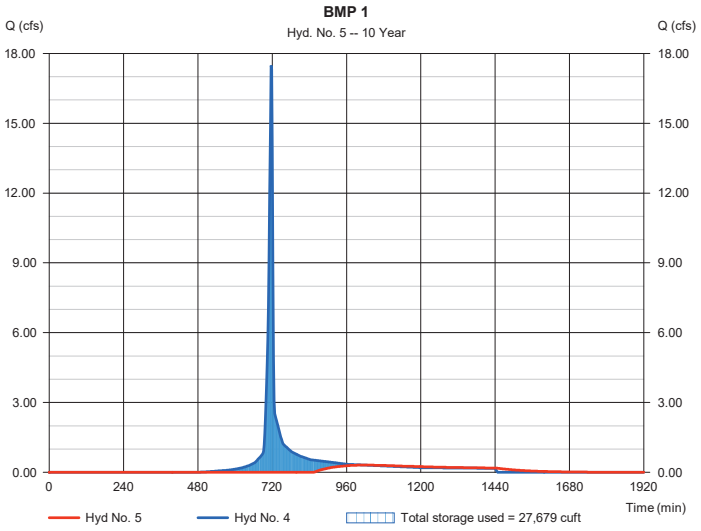
Hydrograph Report

Hyd. No. 5

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 0.312 cfs
Storm frequency	= 10 yrs	Time to peak	= 1020 min
Time interval	= 2 min	Hyd. volume	= 9,445 cuft
Inflow hyd. No.	= 4 - Post DA 1	Max. Elevation	= 412.81 ft
Reservoir name	= BMP 1	Max. Storage	= 27,679 cuft

Storage Indication method used.



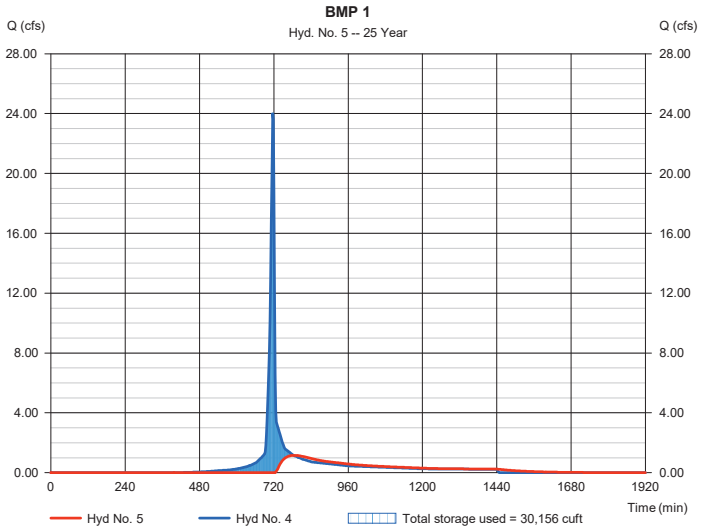
Hydrograph Report

Hyd. No. 5

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 1.159 cfs
Storm frequency	= 25 yrs	Time to peak	= 784 min
Time interval	= 2 min	Hyd. volume	= 23,152 cuft
Inflow hyd. No.	= 4 - Post DA 1	Max. Elevation	= 412.96 ft
Reservoir name	= BMP 1	Max. Storage	= 30,156 cuft

Storage Indication method used.



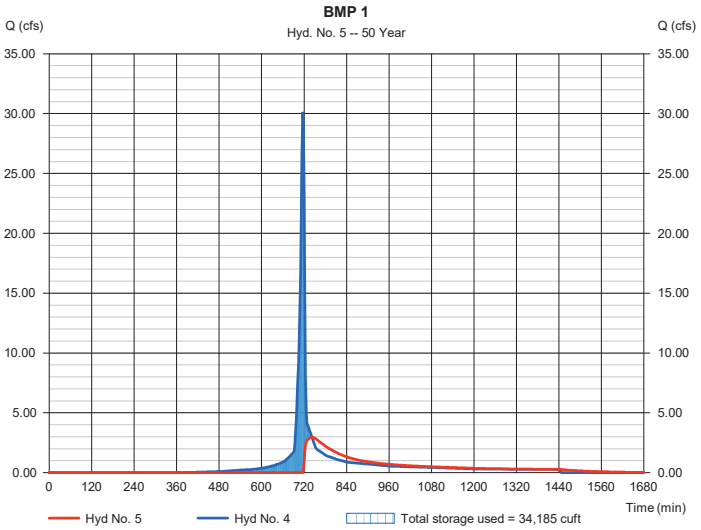
Hydrograph Report

Hyd. No. 5

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 2.957 cfs
Storm frequency	= 50 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 36,134 cuft
Inflow hyd. No.	= 4 - Post DA 1	Max. Elevation	= 413.19 ft
Reservoir name	= BMP 1	Max. Storage	= 34,185 cuft

Storage Indication method used.



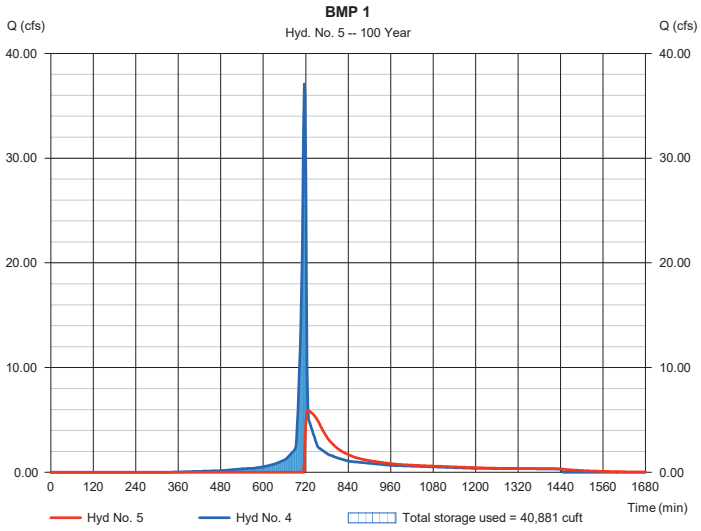
Hydrograph Report

Hyd. No. 5

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 5.892 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 51,395 cuft
Inflow hyd. No.	= 4 - Post DA 1	Max. Elevation	= 413.57 ft
Reservoir name	= BMP 1	Max. Storage	= 40,881 cuft

Storage Indication method used.

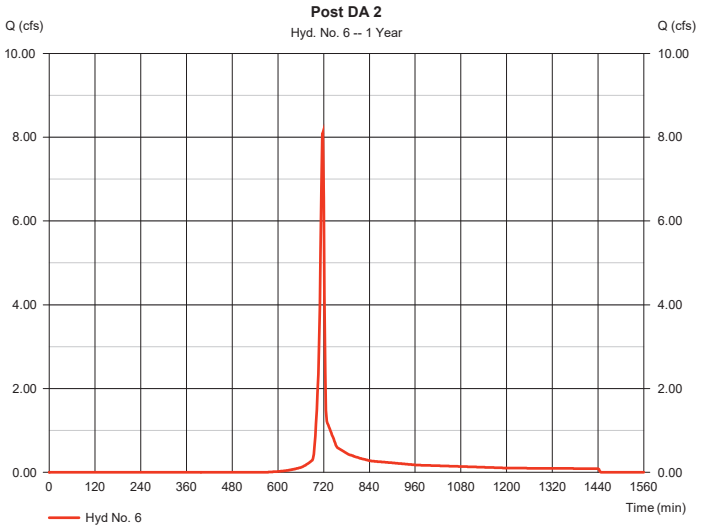


Hydrograph Report

Hyd. No. 6

Post DA 2

Hydrograph type	= SCS Runoff	Peak discharge	= 8.111 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 16,288 cuft
Drainage area	= 4.540 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

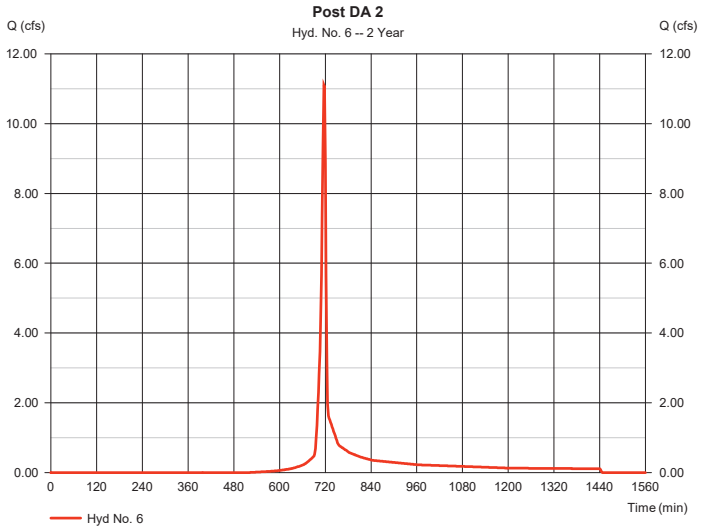


Hydrograph Report

Hyd. No. 6

Post DA 2

Hydrograph type	= SCS Runoff	Peak discharge	= 11.10 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 22,414 cuft
Drainage area	= 4.540 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

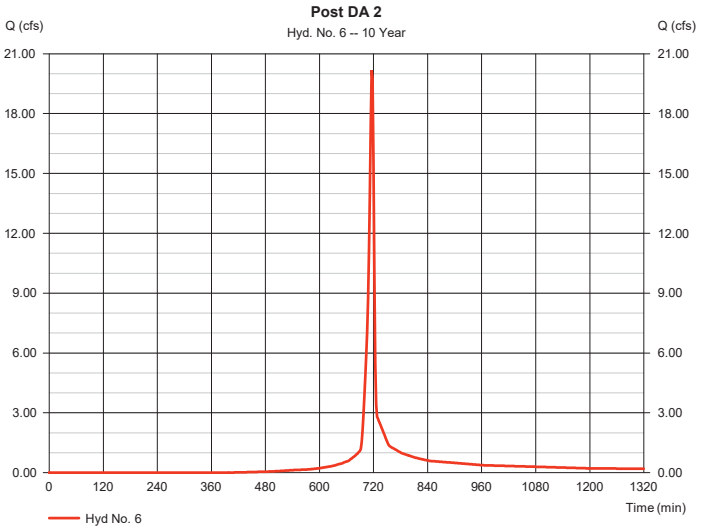


Hydrograph Report

Hyd. No. 6

Post DA 2

Hydrograph type	= SCS Runoff	Peak discharge	= 20.18 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 41,299 cuft
Drainage area	= 4.540 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

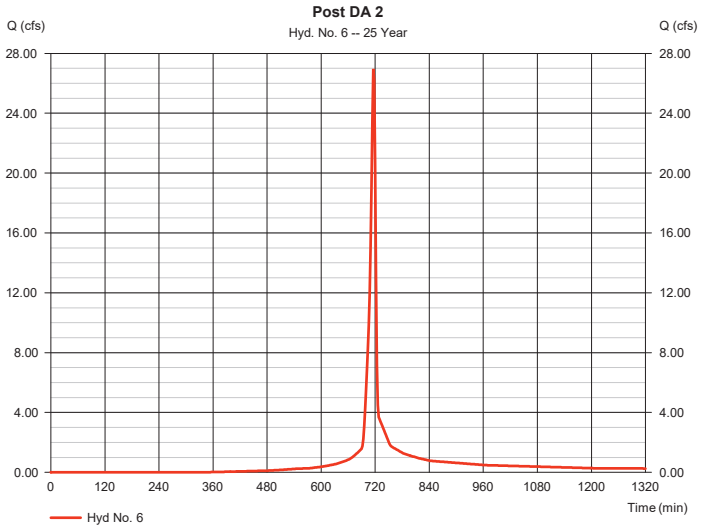


Hydrograph Report

Hyd. No. 6

Post DA 2

Hydrograph type	= SCS Runoff	Peak discharge	= 26.98 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 55,927 cuft
Drainage area	= 4.540 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

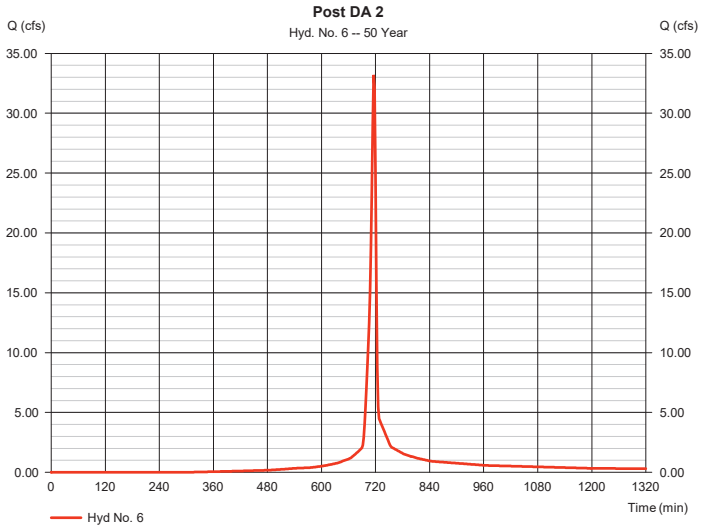


Hydrograph Report

Hyd. No. 6

Post DA 2

Hydrograph type	= SCS Runoff	Peak discharge	= 33.21 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 69,622 cuft
Drainage area	= 4.540 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

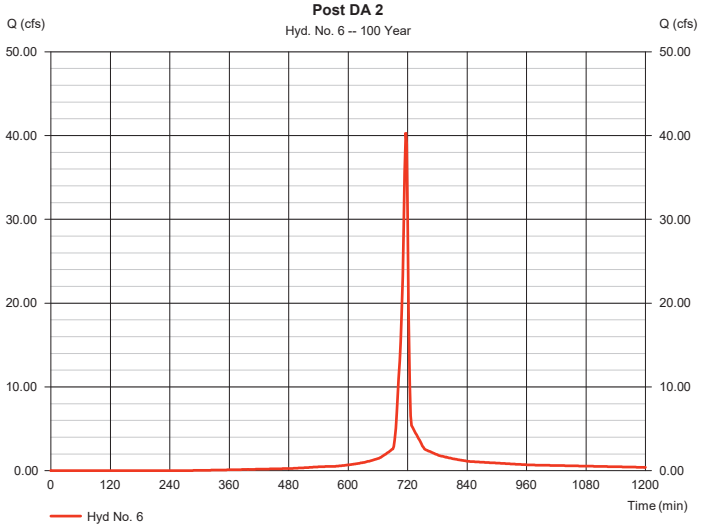


Hydrograph Report

Hyd. No. 6

Post DA 2

Hydrograph type	= SCS Runoff	Peak discharge	= 40.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 85,593 cuft
Drainage area	= 4.540 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 2 - BMP 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 435.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	435.00	9,147	0	0
1.00	436.00	10,285	9,710	9,710
2.00	437.00	11,490	10,881	20,590
3.00	438.00	12,779	12,127	32,718
4.00	439.00	14,129	13,447	46,165
5.00	440.00	15,536	14,826	60,990
6.00	441.00	16,999	16,260	77,251

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	8.00	0.00	0.00
Span (in)	= 18.00	24.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 433.50	437.00	0.00	0.00
Length (ft)	= 38.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

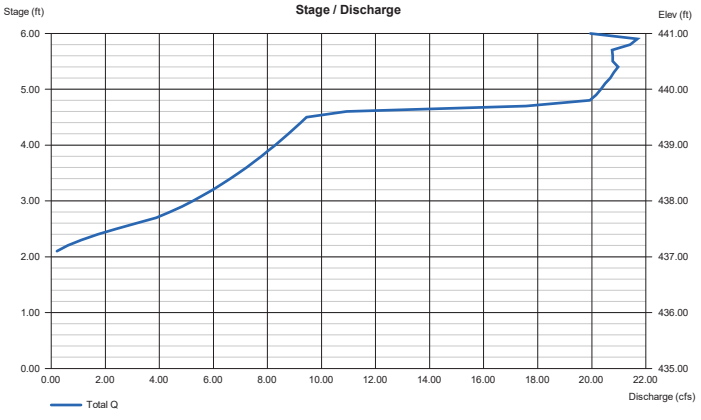
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	85.00	0.00	0.00
Crest El. (ft)	= 439.50	439.60	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

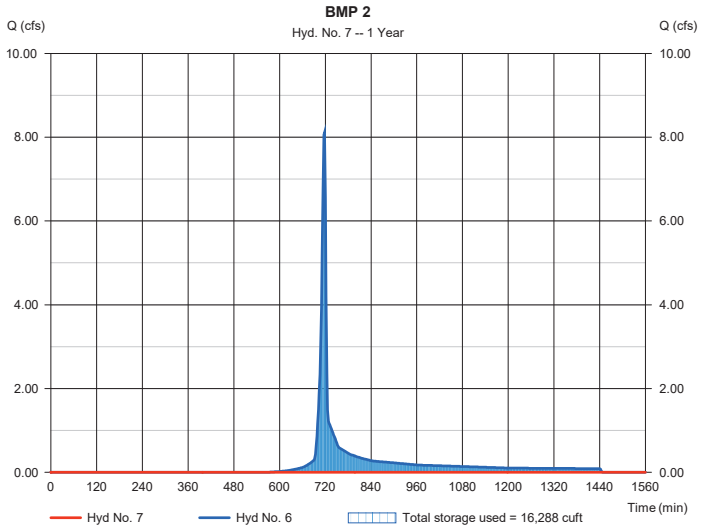
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 7

BMP 2

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 6 - Post DA 2	Max. Elevation	= 436.60 ft
Reservoir name	= BMP 2	Max. Storage	= 16,288 cuft

Storage Indication method used.



Hydrograph Report

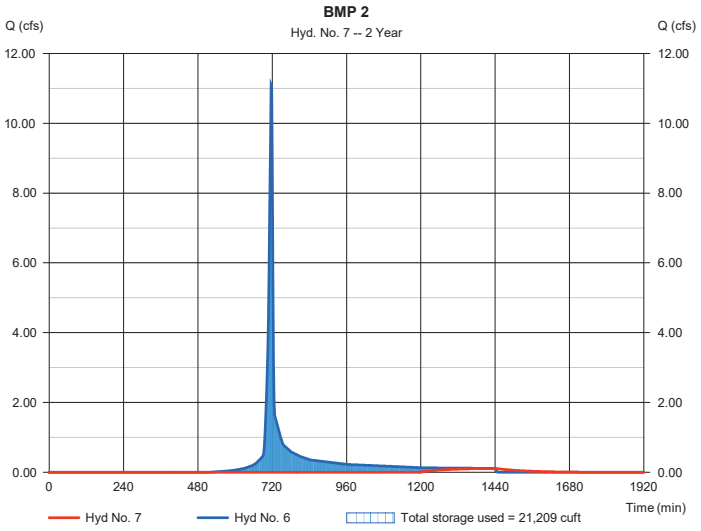
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 7

BMP 2

Hydrograph type	= Reservoir	Peak discharge	= 0.110 cfs
Storm frequency	= 2 yrs	Time to peak	= 1440 min
Time interval	= 2 min	Hyd. volume	= 1,818 cuft
Inflow hyd. No.	= 6 - Post DA 2	Max. Elevation	= 437.05 ft
Reservoir name	= BMP 2	Max. Storage	= 21,209 cuft

Storage Indication method used.



Hydrograph Report

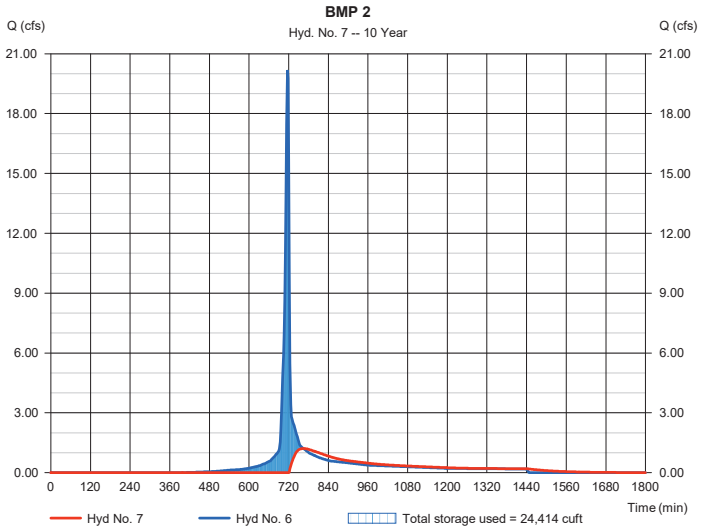
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 7

BMP 2

Hydrograph type	= Reservoir	Peak discharge	= 1.211 cfs
Storm frequency	= 10 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 20,703 cuft
Inflow hyd. No.	= 6 - Post DA 2	Max. Elevation	= 437.32 ft
Reservoir name	= BMP 2	Max. Storage	= 24,414 cuft

Storage Indication method used.



Hydrograph Report

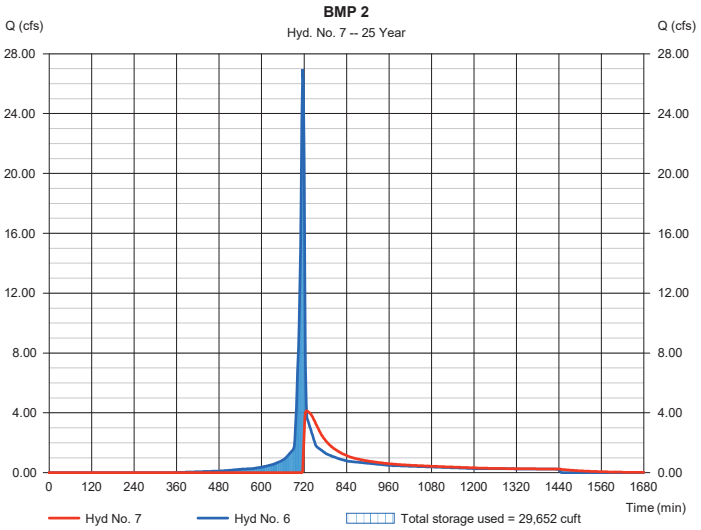
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 7

BMP 2

Hydrograph type	= Reservoir	Peak discharge	= 4.123 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 35,331 cuft
Inflow hyd. No.	= 6 - Post DA 2	Max. Elevation	= 437.75 ft
Reservoir name	= BMP 2	Max. Storage	= 29,652 cuft

Storage Indication method used.



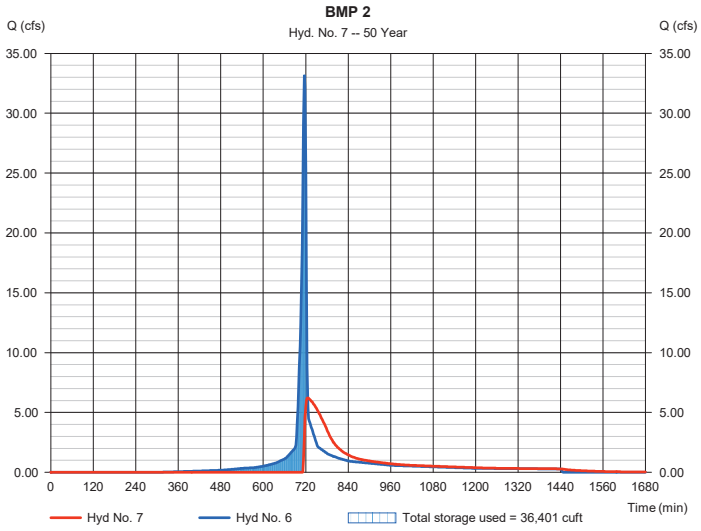
Hydrograph Report

Hyd. No. 7

BMP 2

Hydrograph type	= Reservoir	Peak discharge	= 6.224 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 49,026 cuft
Inflow hyd. No.	= 6 - Post DA 2	Max. Elevation	= 438.27 ft
Reservoir name	= BMP 2	Max. Storage	= 36,401 cuft

Storage Indication method used.



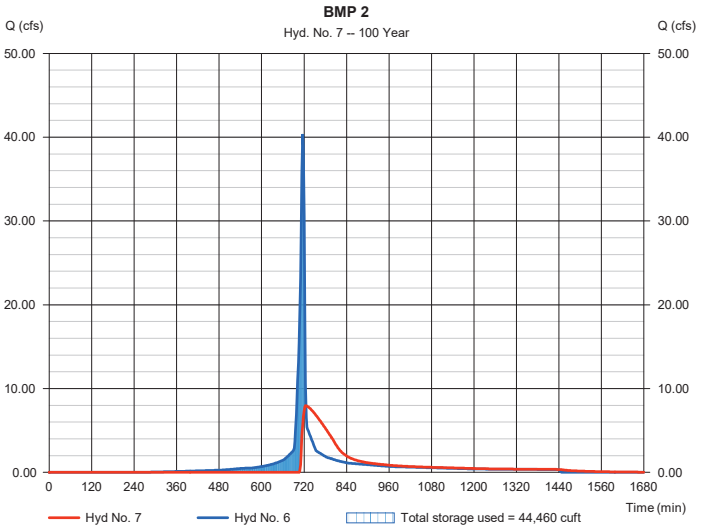
Hydrograph Report

Hyd. No. 7

BMP 2

Hydrograph type	= Reservoir	Peak discharge	= 7.966 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 64,997 cuft
Inflow hyd. No.	= 6 - Post DA 2	Max. Elevation	= 438.87 ft
Reservoir name	= BMP 2	Max. Storage	= 44,460 cuft

Storage Indication method used.

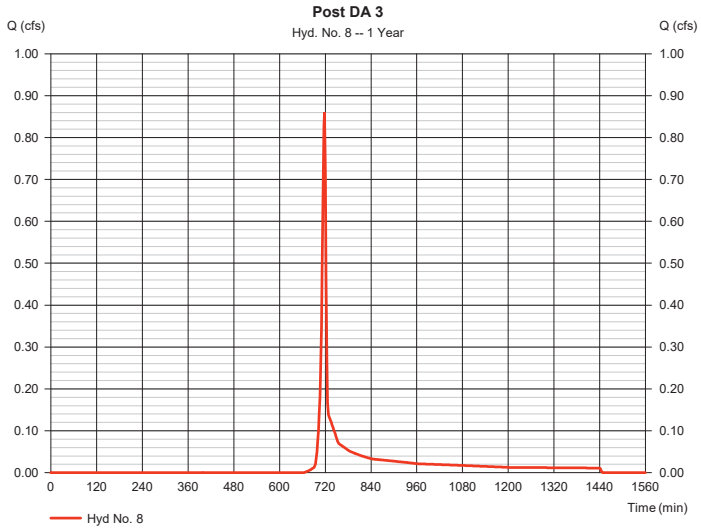


Hydrograph Report

Hyd. No. 8

Post DA 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.860 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,730 cuft
Drainage area	= 0.690 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

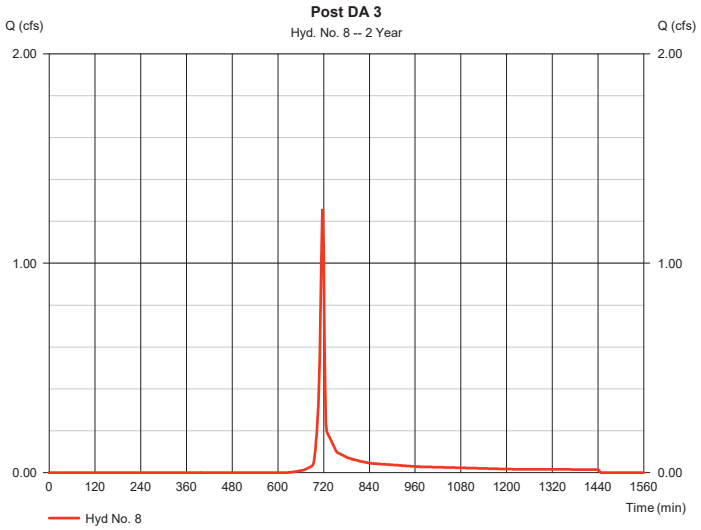


Hydrograph Report

Hyd. No. 8

Post DA 3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.259 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,518 cuft
Drainage area	= 0.690 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

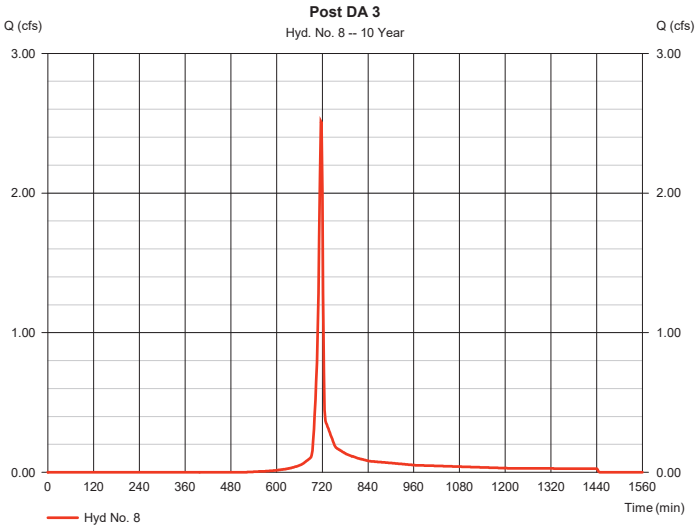


Hydrograph Report

Hyd. No. 8

Post DA 3

Hydrograph type	= SCS Runoff	Peak discharge	= 2.513 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 5,075 cuft
Drainage area	= 0.690 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

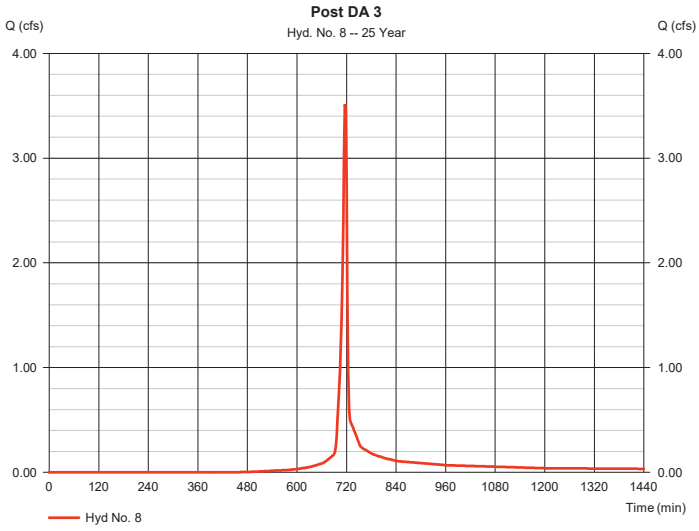


Hydrograph Report

Hyd. No. 8

Post DA 3

Hydrograph type	= SCS Runoff	Peak discharge	= 3.513 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 7,132 cuft
Drainage area	= 0.690 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

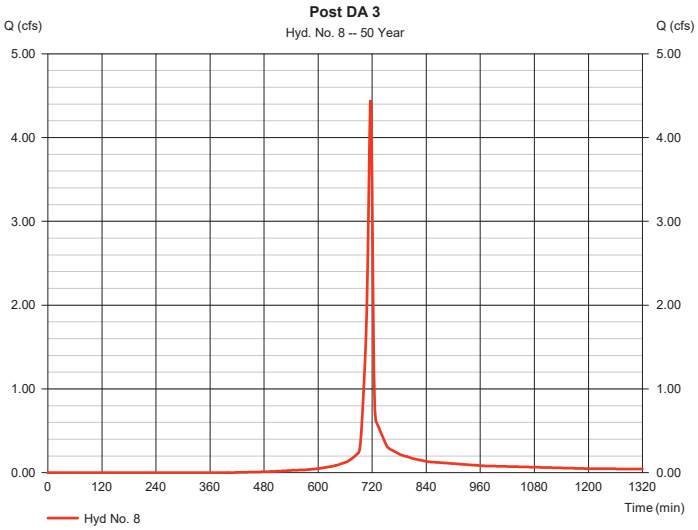


Hydrograph Report

Hyd. No. 8

Post DA 3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.446 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 9,092 cuft
Drainage area	= 0.690 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

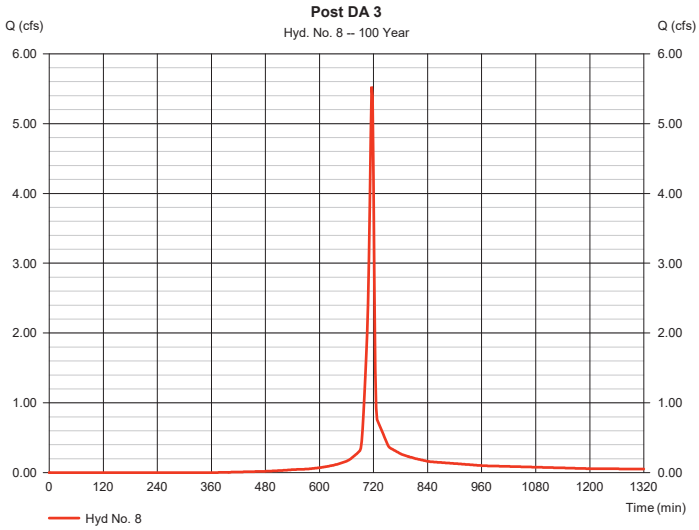


Hydrograph Report

Hyd. No. 8

Post DA 3

Hydrograph type	= SCS Runoff	Peak discharge	= 5.527 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 11,406 cuft
Drainage area	= 0.690 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Pond No. 3 - BMP 3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 432.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	432.00	1,343	0	0
1.00	433.00	1,960	1,642	1,642
2.00	434.00	2,681	2,311	3,953
3.00	435.00	3,487	3,075	7,028
4.00	436.00	4,352	3,911	10,939

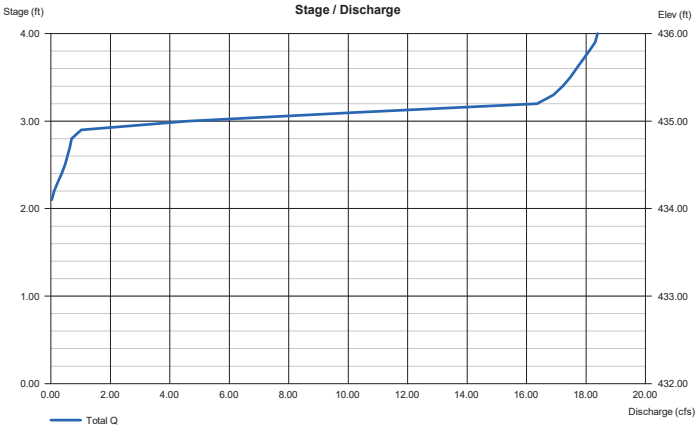
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	0.00	0.00
Span (in)	= 18.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 430.50	434.00	0.00	0.00
Length (ft)	= 24.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	35.00	0.00	0.00
Crest El. (ft)	= 435.30	434.88	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

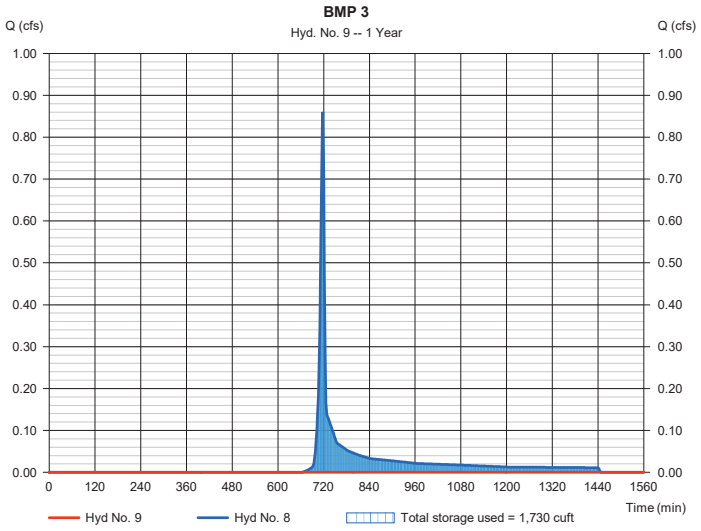
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 9

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 8 - Post DA 3	Max. Elevation	= 433.04 ft
Reservoir name	= BMP 3	Max. Storage	= 1,730 cuft

Storage Indication method used.



Hydrograph Report

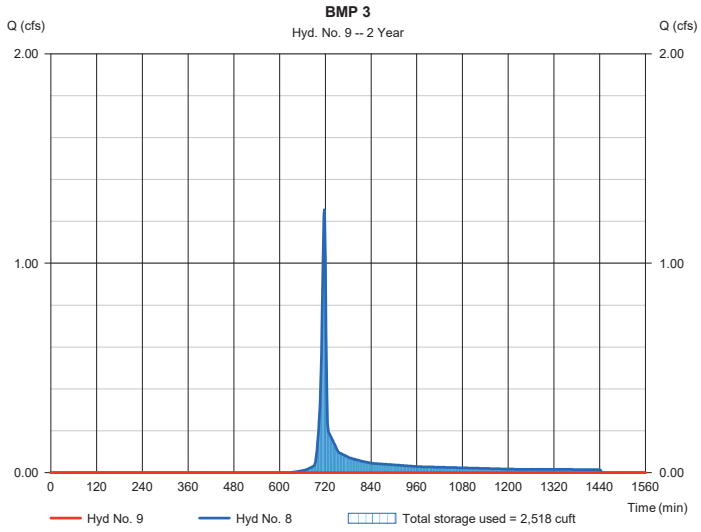
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 9

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 8 - Post DA 3	Max. Elevation	= 433.38 ft
Reservoir name	= BMP 3	Max. Storage	= 2,518 cuft

Storage Indication method used.



Hydrograph Report

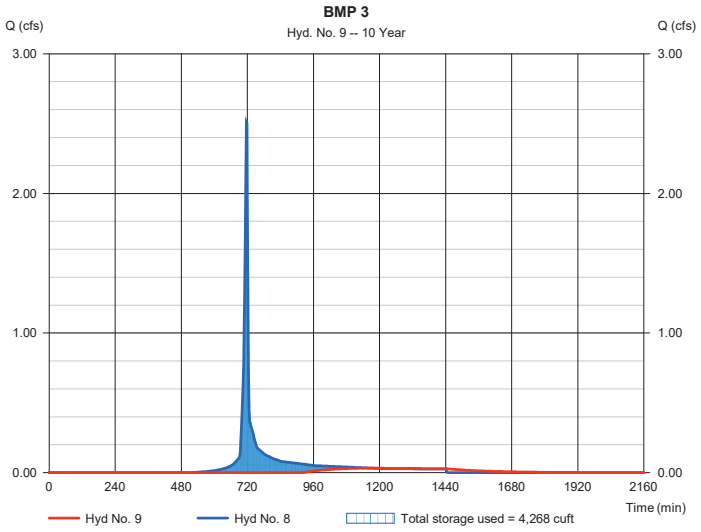
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 9

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 0.033 cfs
Storm frequency	= 10 yrs	Time to peak	= 1162 min
Time interval	= 2 min	Hyd. volume	= 1,112 cuft
Inflow hyd. No.	= 8 - Post DA 3	Max. Elevation	= 434.10 ft
Reservoir name	= BMP 3	Max. Storage	= 4,268 cuft

Storage Indication method used.



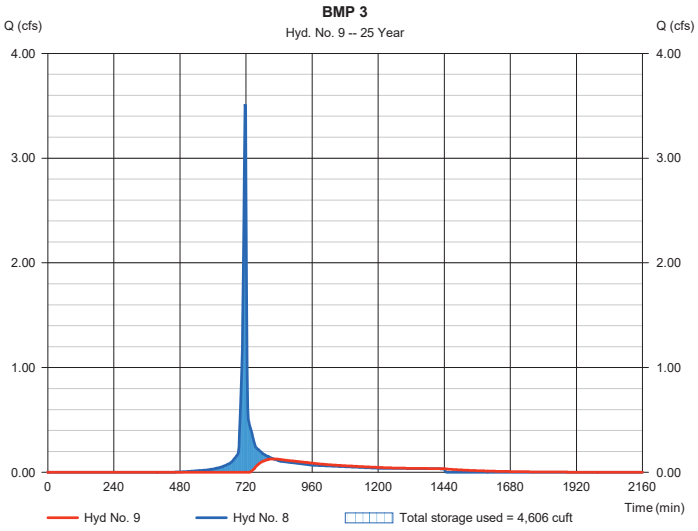
Hydrograph Report

Hyd. No. 9

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 0.128 cfs
Storm frequency	= 25 yrs	Time to peak	= 820 min
Time interval	= 2 min	Hyd. volume	= 3,169 cuft
Inflow hyd. No.	= 8 - Post DA 3	Max. Elevation	= 434.21 ft
Reservoir name	= BMP 3	Max. Storage	= 4,606 cuft

Storage Indication method used.



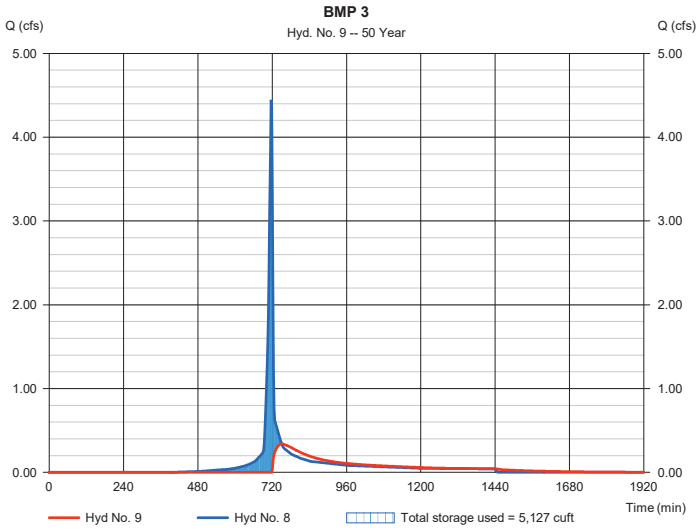
Hydrograph Report

Hyd. No. 9

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 0.339 cfs
Storm frequency	= 50 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 5,129 cuft
Inflow hyd. No.	= 8 - Post DA 3	Max. Elevation	= 434.38 ft
Reservoir name	= BMP 3	Max. Storage	= 5,127 cuft

Storage Indication method used.



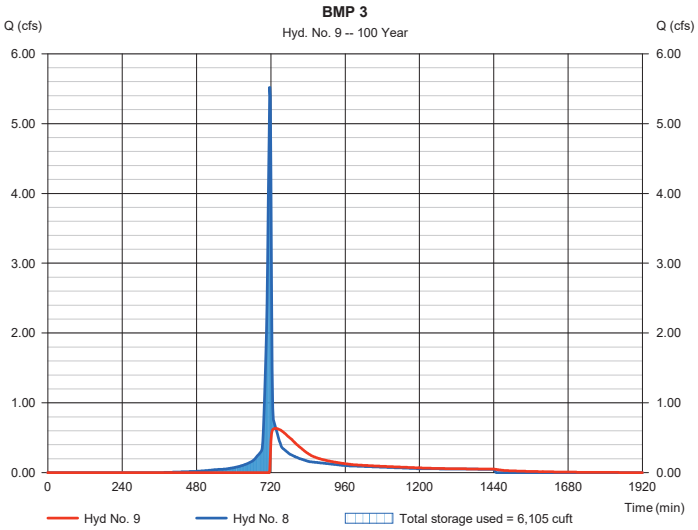
Hydrograph Report

Hyd. No. 9

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 0.634 cfs
Storm frequency	= 100 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 7,443 cuft
Inflow hyd. No.	= 8 - Post DA 3	Max. Elevation	= 434.70 ft
Reservoir name	= BMP 3	Max. Storage	= 6,105 cuft

Storage Indication method used.

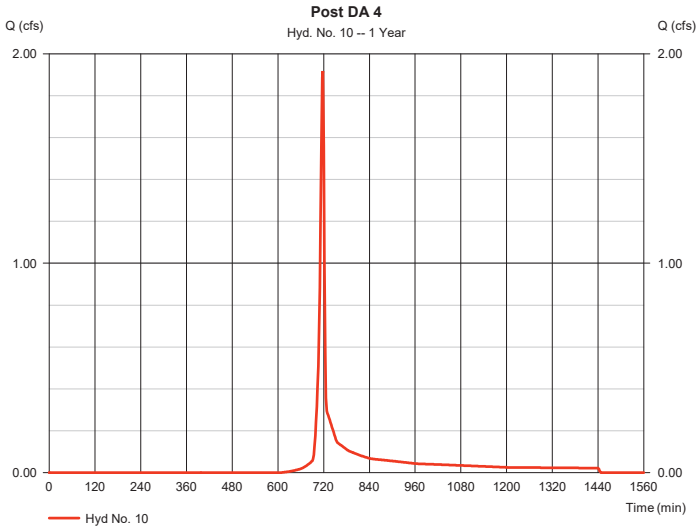


Hydrograph Report

Hyd. No. 10

Post DA 4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.918 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,837 cuft
Drainage area	= 1.200 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

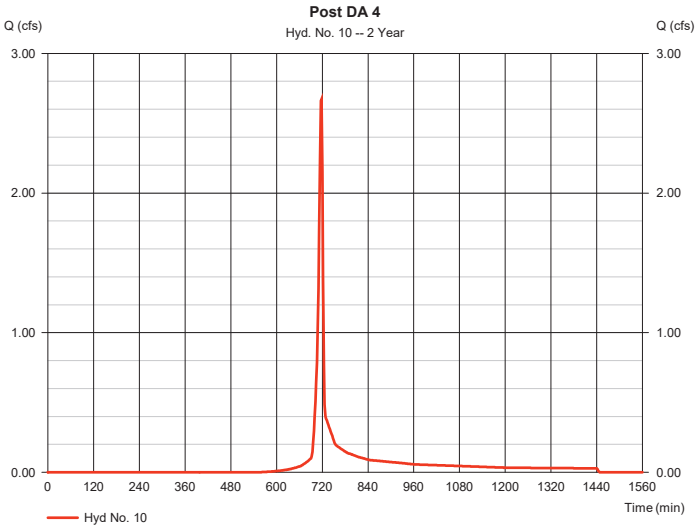


Hydrograph Report

Hyd. No. 10

Post DA 4

Hydrograph type	= SCS Runoff	Peak discharge	= 2.672 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 5,376 cuft
Drainage area	= 1.200 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

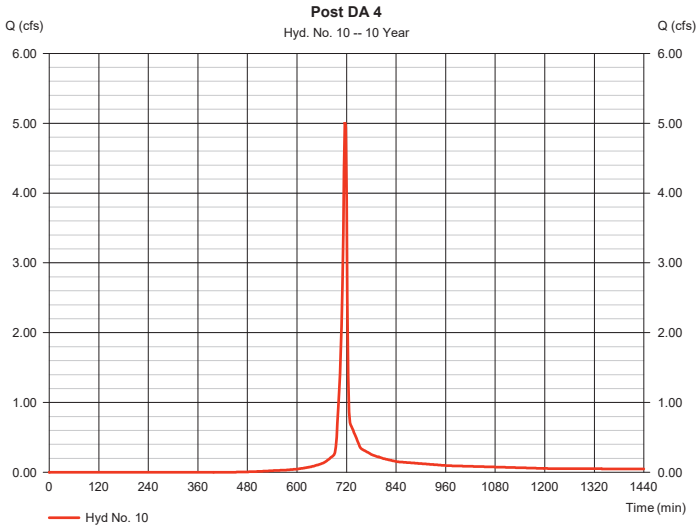


Hydrograph Report

Hyd. No. 10

Post DA 4

Hydrograph type	= SCS Runoff	Peak discharge	= 5.014 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 10,194 cuft
Drainage area	= 1.200 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

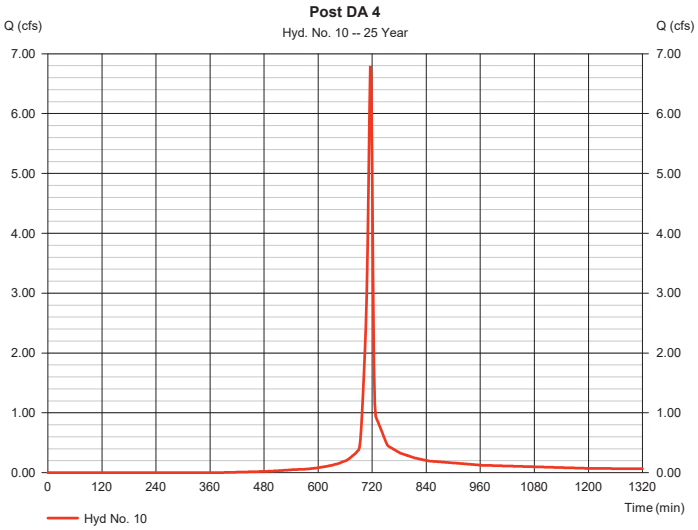


Hydrograph Report

Hyd. No. 10

Post DA 4

Hydrograph type	= SCS Runoff	Peak discharge	= 6.799 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 13,971 cuft
Drainage area	= 1.200 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

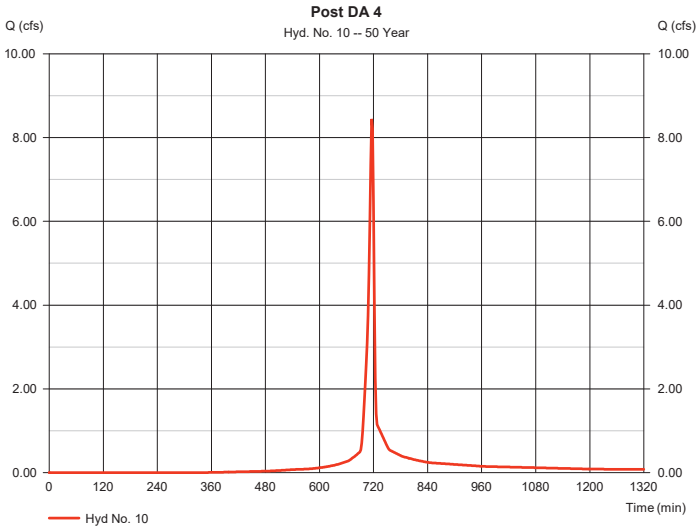


Hydrograph Report

Hyd. No. 10

Post DA 4

Hydrograph type	= SCS Runoff	Peak discharge	= 8.443 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 17,526 cuft
Drainage area	= 1.200 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

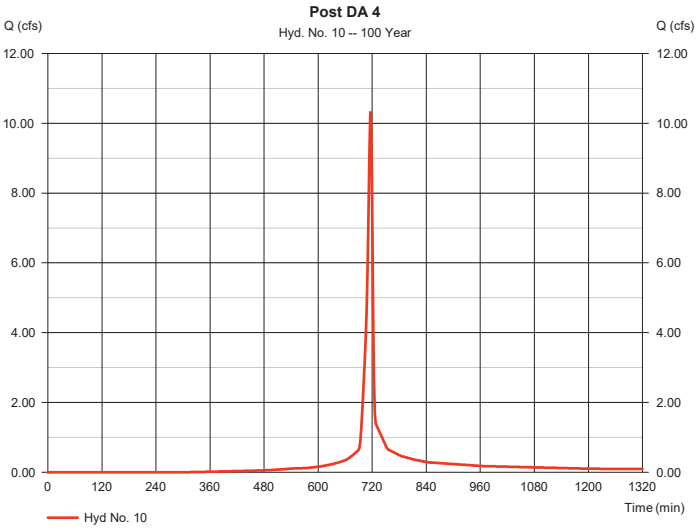


Hydrograph Report

Hyd. No. 10

Post DA 4

Hydrograph type	= SCS Runoff	Peak discharge	= 10.33 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 21,689 cuft
Drainage area	= 1.200 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 4 - BMP 4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 449.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	449.00	918	0	0
1.00	450.00	1,694	1,286	1,286
2.00	451.00	2,613	2,137	3,423
3.00	452.00	3,589	3,088	6,511
4.00	453.00	4,621	4,094	10,605

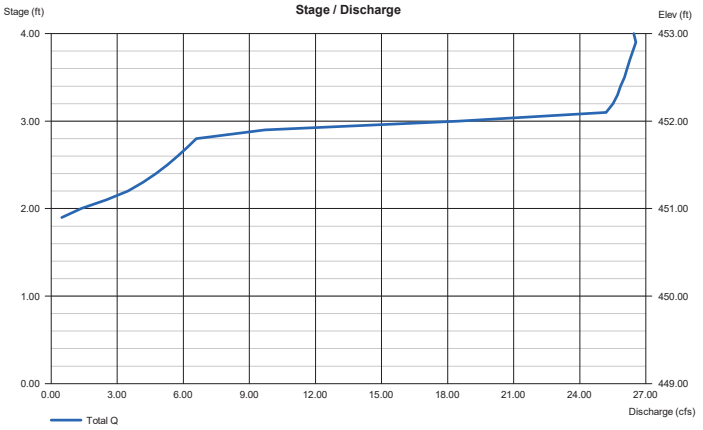
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	4.00	0.00
Span (in)	= 18.00	38.00	16.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 442.37	450.80	450.80	0.00
Length (ft)	= 33.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	50.00	0.00	0.00
Crest El. (ft)	= 451.80	451.85	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



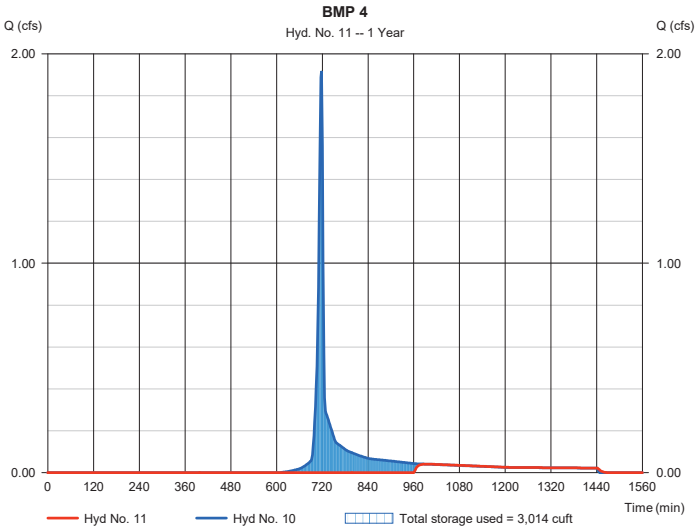
Hydrograph Report

Hyd. No. 11

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 0.041 cfs
Storm frequency	= 1 yrs	Time to peak	= 994 min
Time interval	= 2 min	Hyd. volume	= 841 cuft
Inflow hyd. No.	= 10 - Post DA 4	Max. Elevation	= 450.81 ft
Reservoir name	= BMP 4	Max. Storage	= 3,014 cuft

Storage Indication method used.



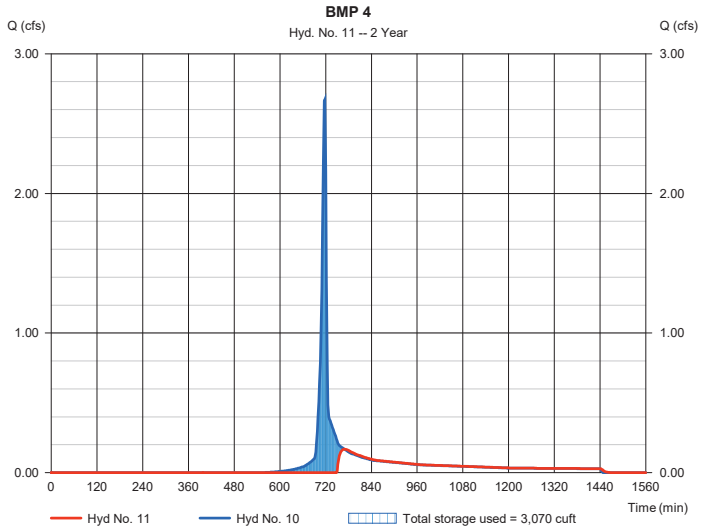
Hydrograph Report

Hyd. No. 11

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 0.168 cfs
Storm frequency	= 2 yrs	Time to peak	= 770 min
Time interval	= 2 min	Hyd. volume	= 2,379 cuft
Inflow hyd. No.	= 10 - Post DA 4	Max. Elevation	= 450.83 ft
Reservoir name	= BMP 4	Max. Storage	= 3,070 cuft

Storage Indication method used.



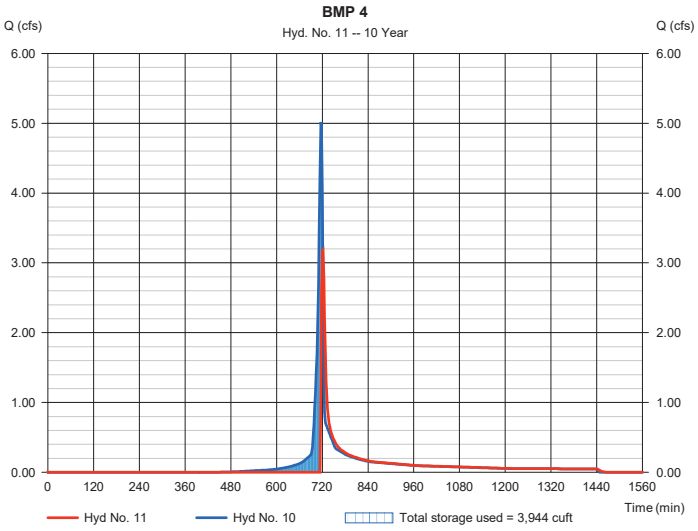
Hydrograph Report

Hyd. No. 11

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 3.183 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 7,198 cuft
Inflow hyd. No.	= 10 - Post DA 4	Max. Elevation	= 451.17 ft
Reservoir name	= BMP 4	Max. Storage	= 3,944 cuft

Storage Indication method used.



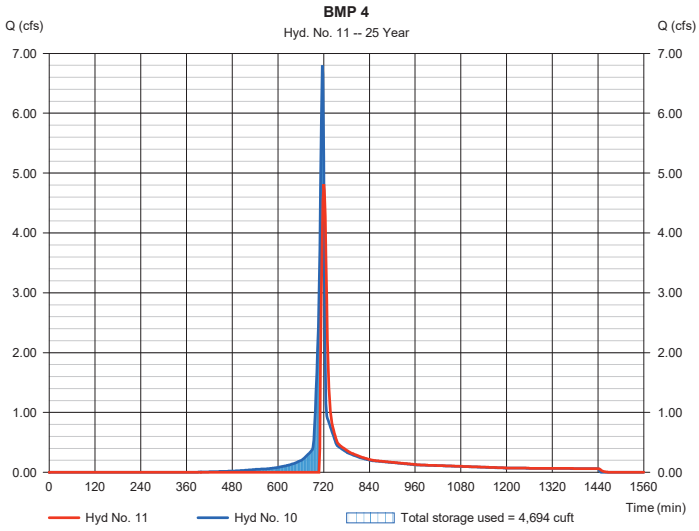
Hydrograph Report

Hyd. No. 11

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 4.813 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 10,974 cuft
Inflow hyd. No.	= 10 - Post DA 4	Max. Elevation	= 451.41 ft
Reservoir name	= BMP 4	Max. Storage	= 4,694 cuft

Storage Indication method used.



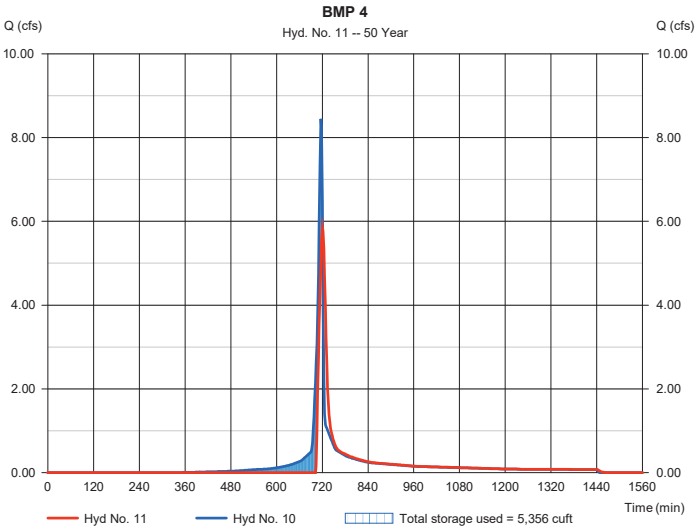
Hydrograph Report

Hyd. No. 11

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 5.860 cfs
Storm frequency	= 50 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,530 cuft
Inflow hyd. No.	= 10 - Post DA 4	Max. Elevation	= 451.63 ft
Reservoir name	= BMP 4	Max. Storage	= 5,356 cuft

Storage Indication method used.



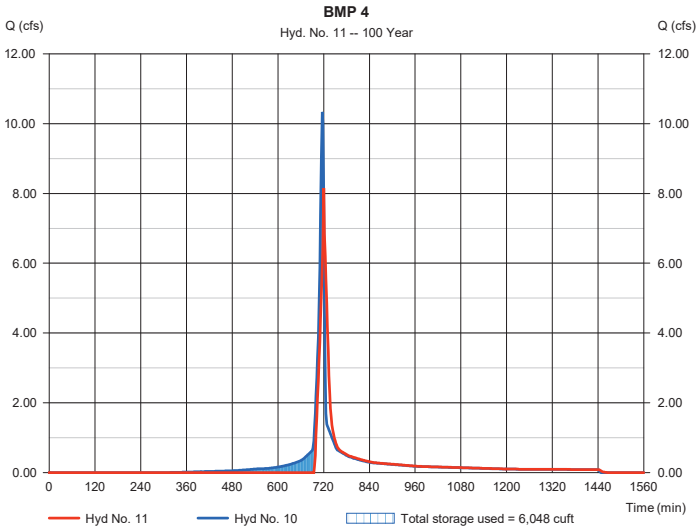
Hydrograph Report

Hyd. No. 11

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 8.148 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 18,692 cuft
Inflow hyd. No.	= 10 - Post DA 4	Max. Elevation	= 451.85 ft
Reservoir name	= BMP 4	Max. Storage	= 6,048 cuft

Storage Indication method used.

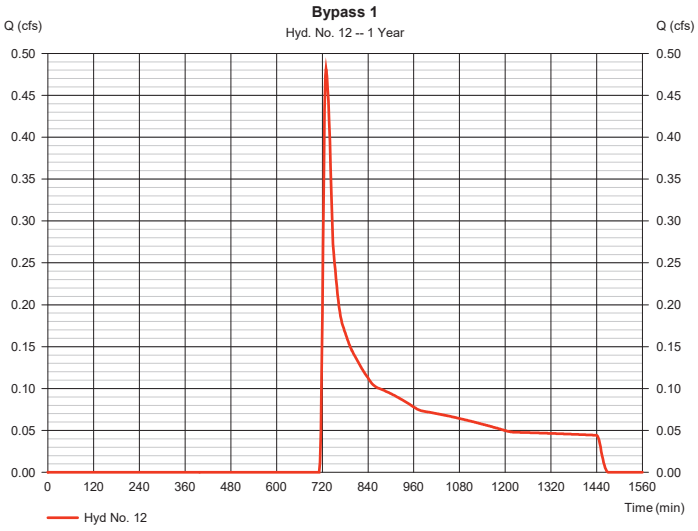


Hydrograph Report

Hyd. No. 12

Bypass 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.481 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 3,865 cuft
Drainage area	= 5.470 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.80 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

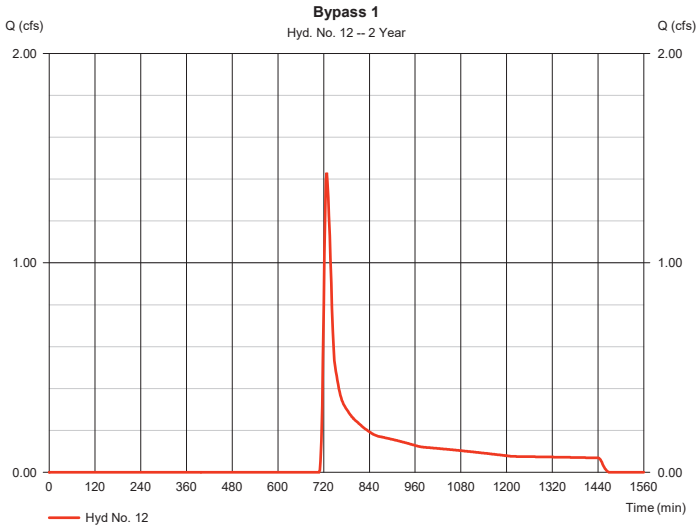


Hydrograph Report

Hyd. No. 12

Bypass 1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.431 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 7,282 cuft
Drainage area	= 5.470 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.80 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

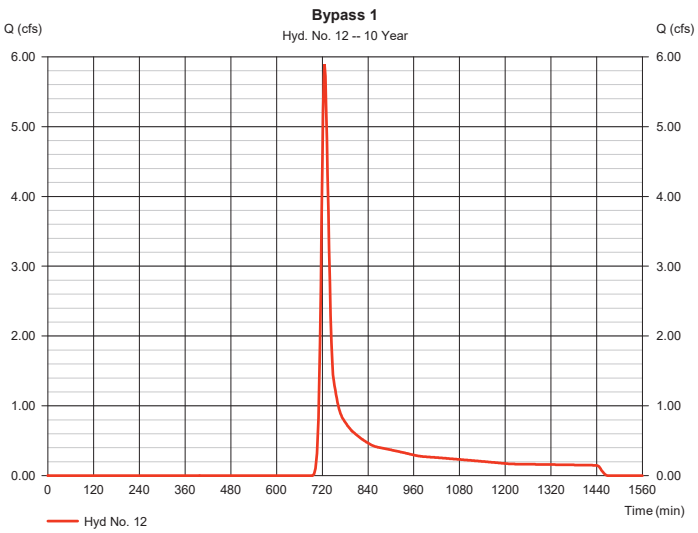


Hydrograph Report

Hyd. No. 12

Bypass 1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.892 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 20,833 cuft
Drainage area	= 5.470 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.80 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

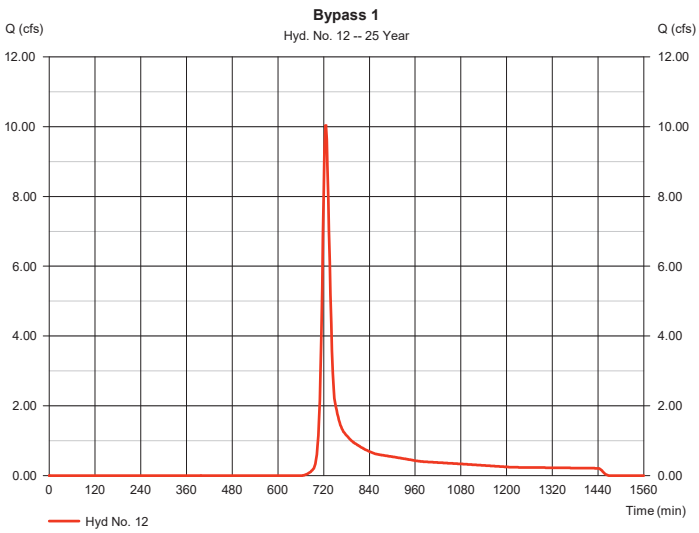


Hydrograph Report

Hyd. No. 12

Bypass 1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 33,323 cuft
Drainage area	= 5.470 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.80 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



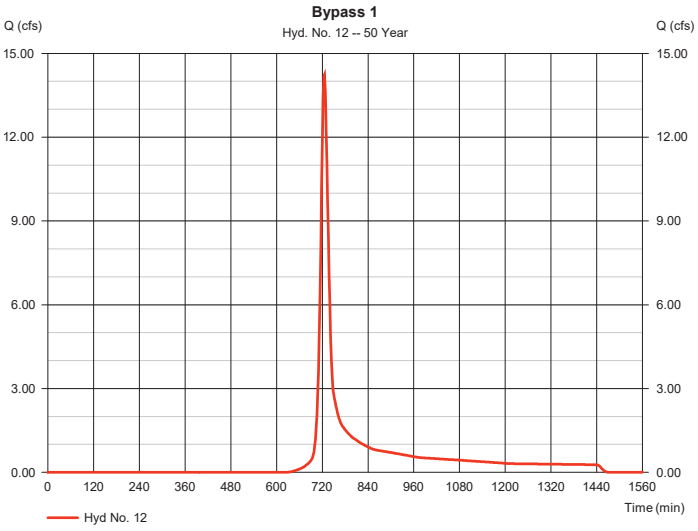
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 12

Bypass 1

Hydrograph type	= SCS Runoff	Peak discharge	= 14.25 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 46,051 cuft
Drainage area	= 5.470 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.80 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



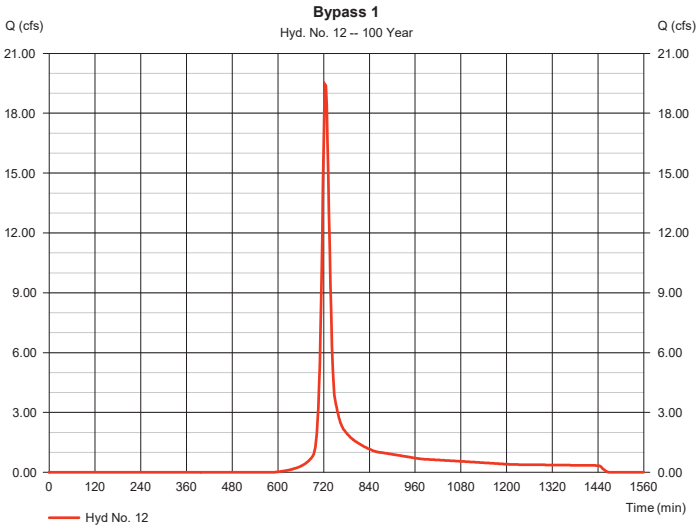
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 12

Bypass 1

Hydrograph type	= SCS Runoff	Peak discharge	= 19.42 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 61,821 cuft
Drainage area	= 5.470 ac	Curve number	= 62
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.80 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



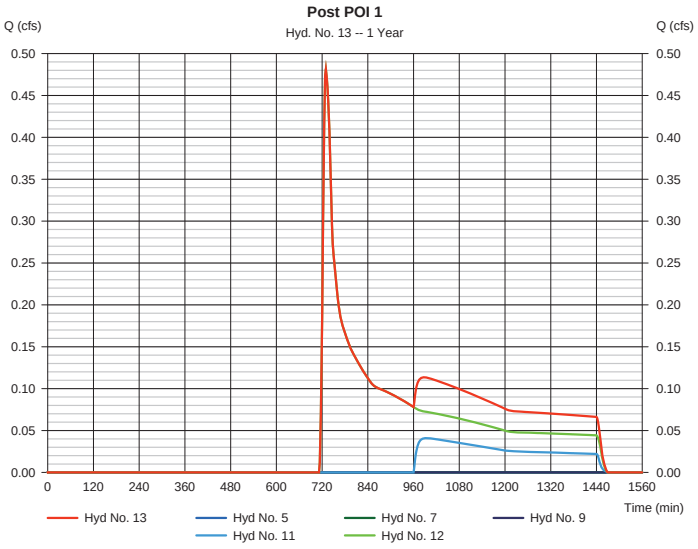
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Post POI 1

Hydrograph type	= Combine	Peak discharge	= 0.481 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 4,706 cuft
Inflow hyds.	= 5, 7, 9, 11, 12	Contrib. drain. area	= 5.470 ac



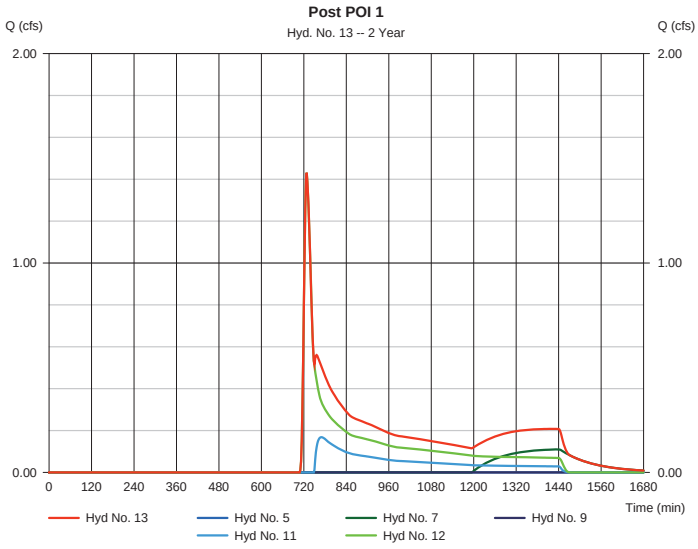
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Post POI 1

Hydrograph type	= Combine	Peak discharge	= 1.431 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 11,479 cuft
Inflow hyds.	= 5, 7, 9, 11, 12	Contrib. drain. area	= 5.470 ac



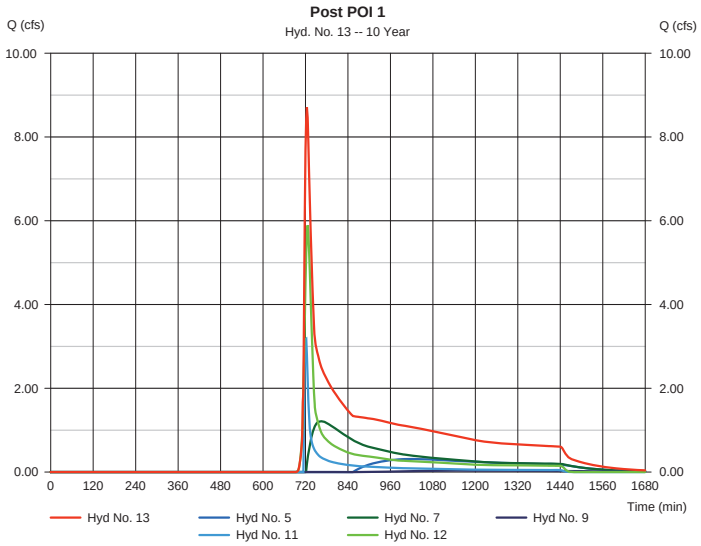
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Post POI 1

Hydrograph type	= Combine	Peak discharge	= 8.708 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 59,291 cuft
Inflow hyds.	= 5, 7, 9, 11, 12	Contrib. drain. area	= 5.470 ac



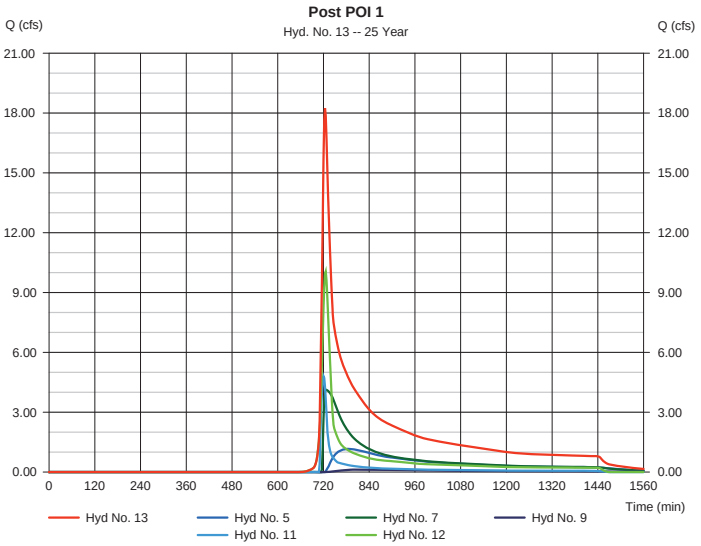
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Post POI 1

Hydrograph type	= Combine	Peak discharge	= 18.24 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 105,949 cuft
Inflow hyds.	= 5, 7, 9, 11, 12	Contrib. drain. area	= 5.470 ac



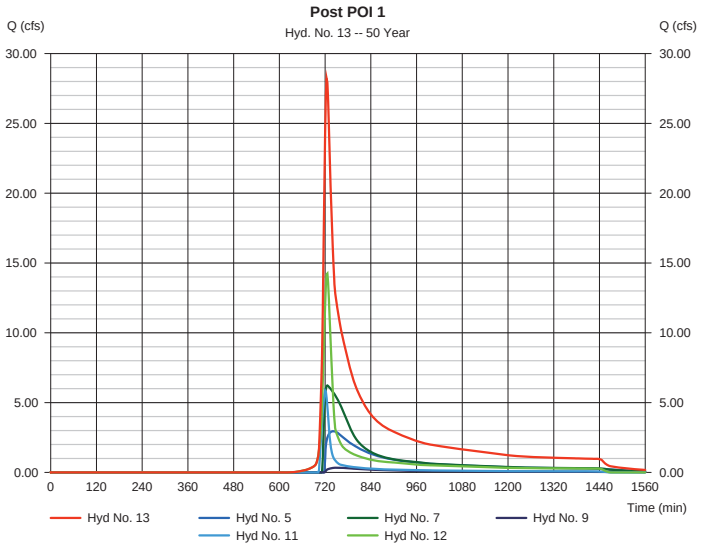
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Post POI 1

Hydrograph type	= Combine	Peak discharge	= 28.20 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 150,871 cuft
Inflow hyds.	= 5, 7, 9, 11, 12	Contrib. drain. area	= 5.470 ac



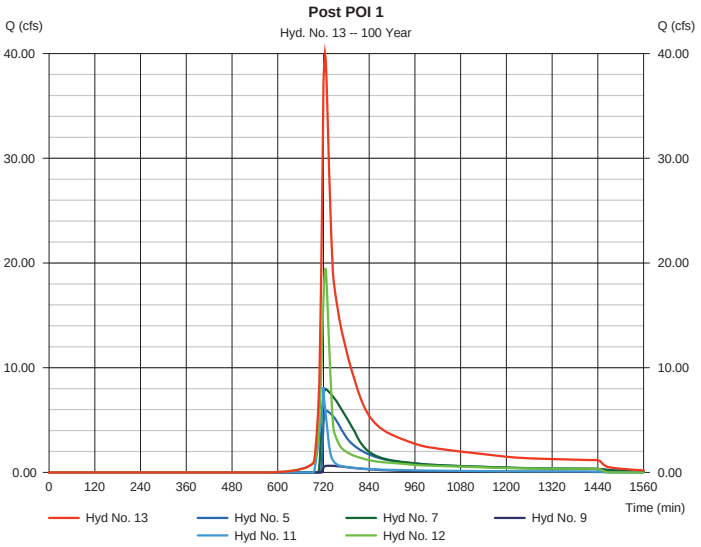
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Post POI 1

Hydrograph type	= Combine	Peak discharge	= 39.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 204,349 cuft
Inflow hyds.	= 5, 7, 9, 11, 12	Contrib. drain. area	= 5.470 ac



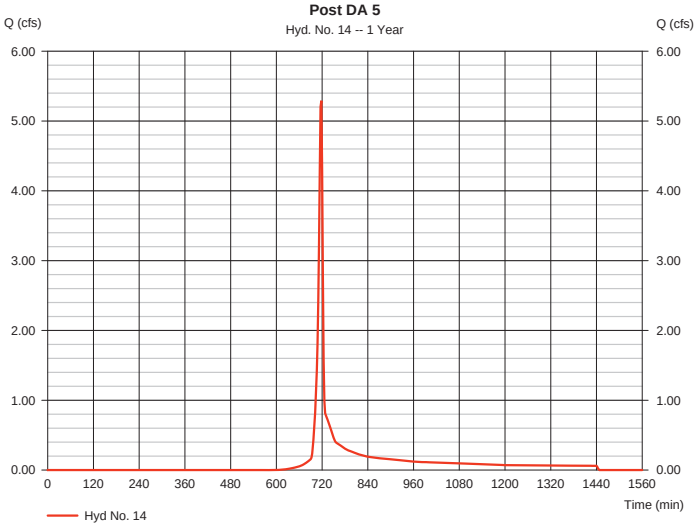
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Post DA 5

Hydrograph type	= SCS Runoff	Peak discharge	= 5.291 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 10,585 cuft
Drainage area	= 3.310 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



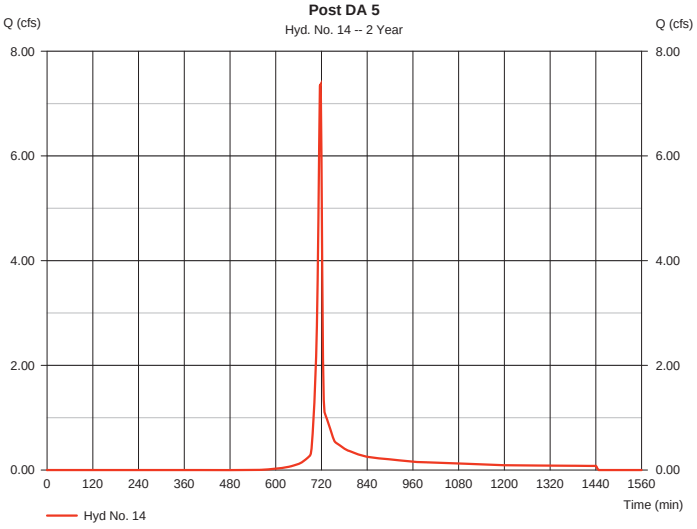
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Post DA 5

Hydrograph type	= SCS Runoff	Peak discharge	= 7.370 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 14,827 cuft
Drainage area	= 3.310 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



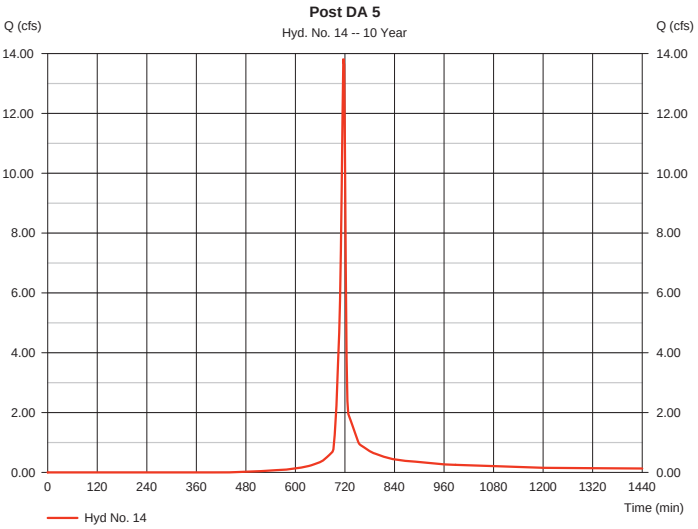
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Post DA 5

Hydrograph type	= SCS Runoff	Peak discharge	= 13.83 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 28,119 cuft
Drainage area	= 3.310 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



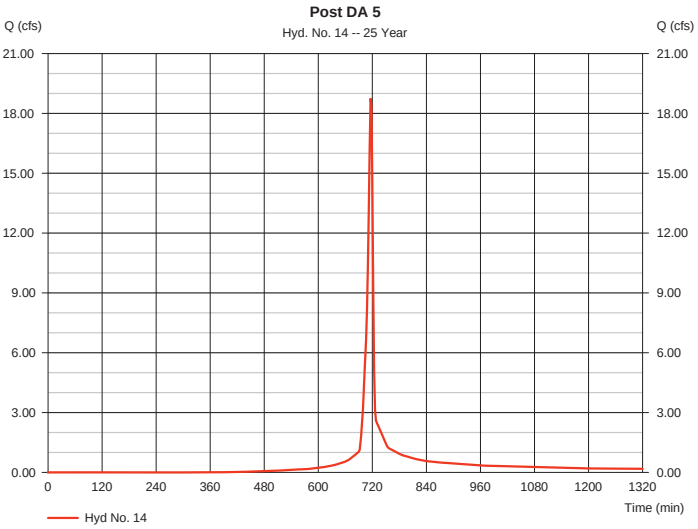
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Post DA 5

Hydrograph type	= SCS Runoff	Peak discharge	= 18.75 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 38,536 cuft
Drainage area	= 3.310 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



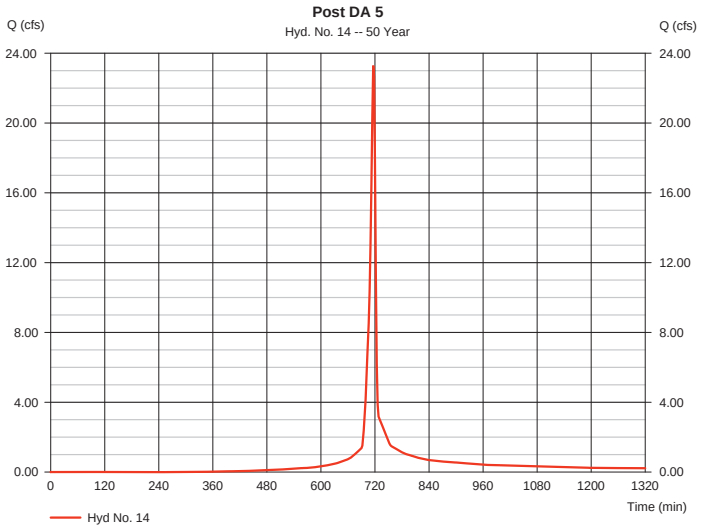
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Post DA 5

Hydrograph type	= SCS Runoff	Peak discharge	= 23.29 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 48,344 cuft
Drainage area	= 3.310 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



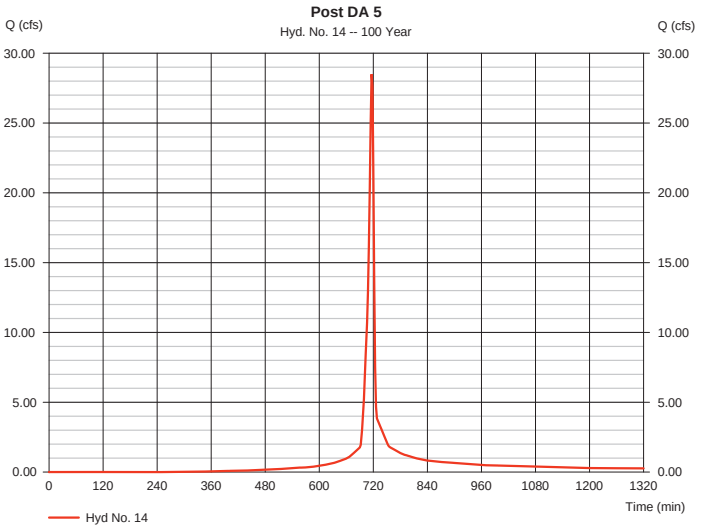
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Post DA 5

Hydrograph type	= SCS Runoff	Peak discharge	= 28.50 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 59,825 cuft
Drainage area	= 3.310 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Pond No. 5 - BMP 5

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 469.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	469.00	5,938	0	0
1.00	470.00	7,071	6,495	6,495
2.00	471.00	8,311	7,682	14,177
3.00	472.00	9,671	8,981	23,158
4.00	473.00	11,236	10,443	33,601
5.00	474.00	13,019	12,115	45,717
6.00	475.00	14,826	13,911	59,628

Culvert / Orifice Structures

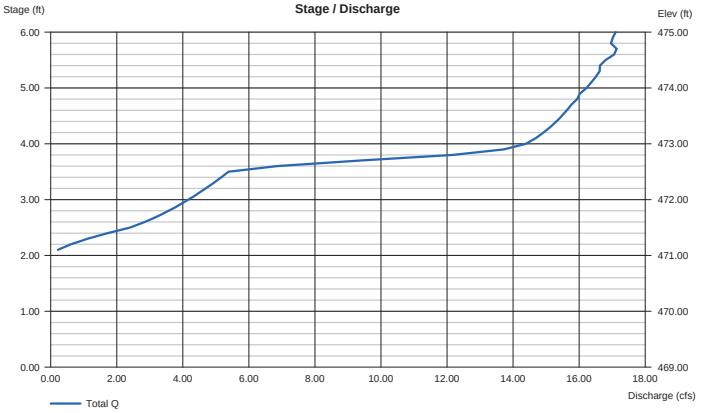
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	0.00	0.00
Span (in)	= 18.00	24.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 467.50	471.00	0.00	0.00
Length (ft)	= 162.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	16.00	0.00	0.00
Crest El. (ft)	= 472.50	473.20	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr)	= 0.000 (by Wet area)
TW Elev. (ft)	= 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

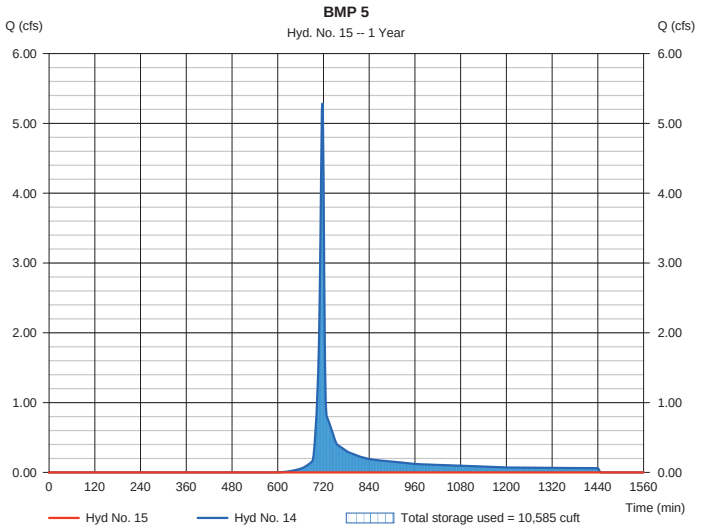
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 15

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 14 - Post DA 5	Max. Elevation	= 470.53 ft
Reservoir name	= BMP 5	Max. Storage	= 10,585 cuft

Storage Indication method used.



Hydrograph Report

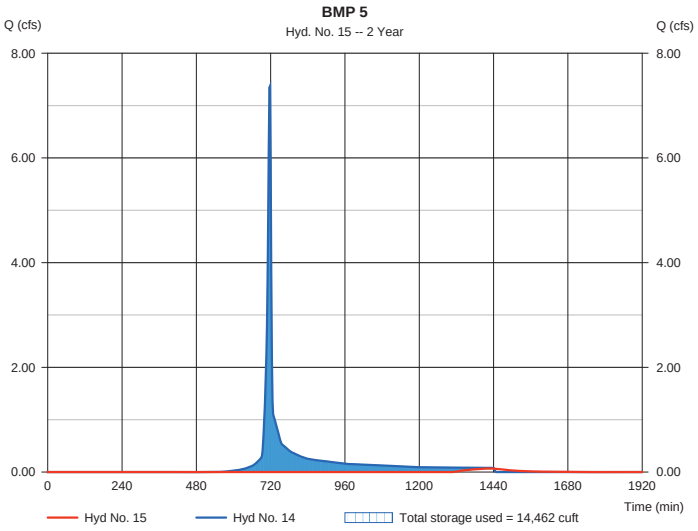
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 15

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 0.068 cfs
Storm frequency	= 2 yrs	Time to peak	= 1442 min
Time interval	= 2 min	Hyd. volume	= 646 cuft
Inflow hyd. No.	= 14 - Post DA 5	Max. Elevation	= 471.03 ft
Reservoir name	= BMP 5	Max. Storage	= 14,462 cuft

Storage Indication method used.



Hydrograph Report

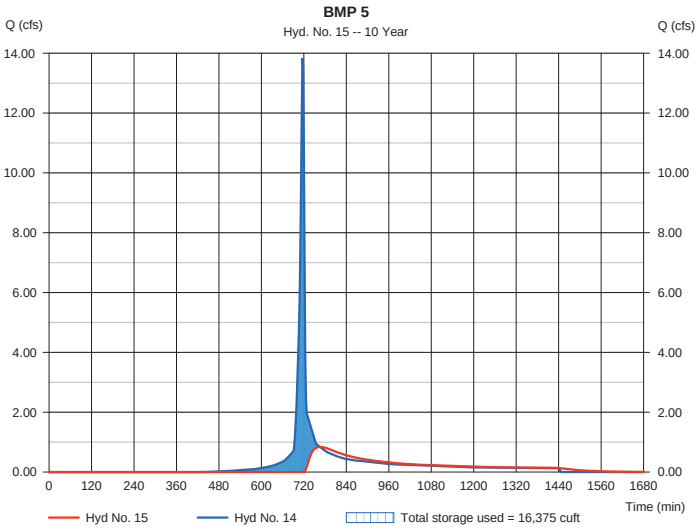
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 15

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 0.837 cfs
Storm frequency	= 10 yrs	Time to peak	= 766 min
Time interval	= 2 min	Hyd. volume	= 13,938 cuft
Inflow hyd. No.	= 14 - Post DA 5	Max. Elevation	= 471.24 ft
Reservoir name	= BMP 5	Max. Storage	= 16,375 cuft

Storage Indication method used.



Hydrograph Report

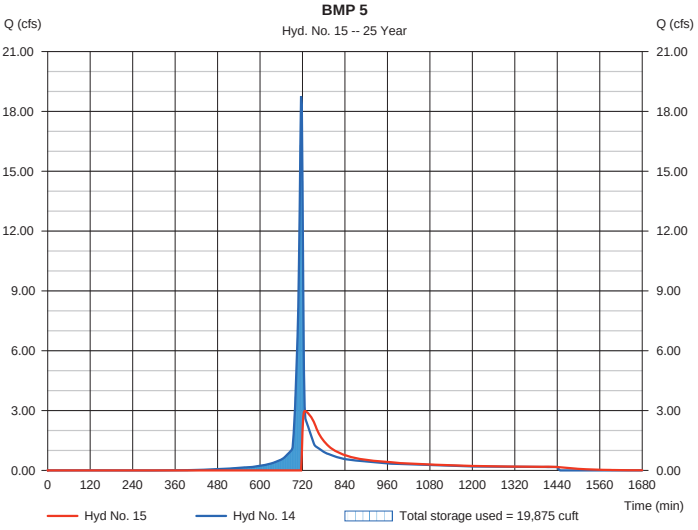
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 15

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 2.980 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 24,355 cuft
Inflow hyd. No.	= 14 - Post DA 5	Max. Elevation	= 471.63 ft
Reservoir name	= BMP 5	Max. Storage	= 19,875 cuft

Storage Indication method used.



Hydrograph Report

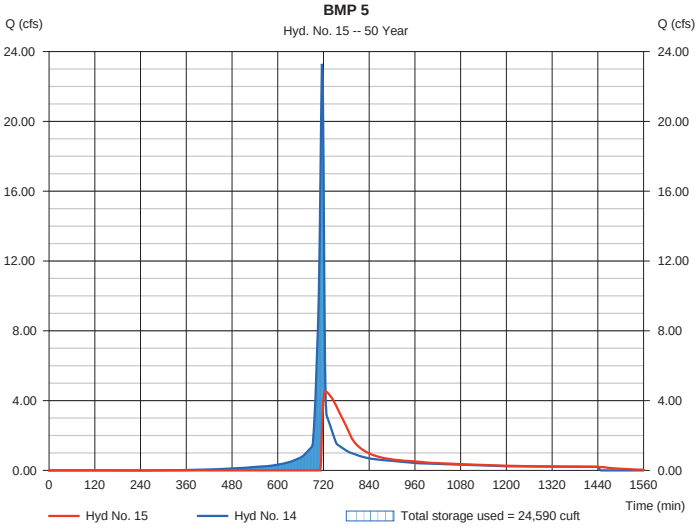
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 15

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 4.533 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 34,163 cuft
Inflow hyd. No.	= 14 - Post DA 5	Max. Elevation	= 472.14 ft
Reservoir name	= BMP 5	Max. Storage	= 24,590 cuft

Storage Indication method used.



Hydrograph Report

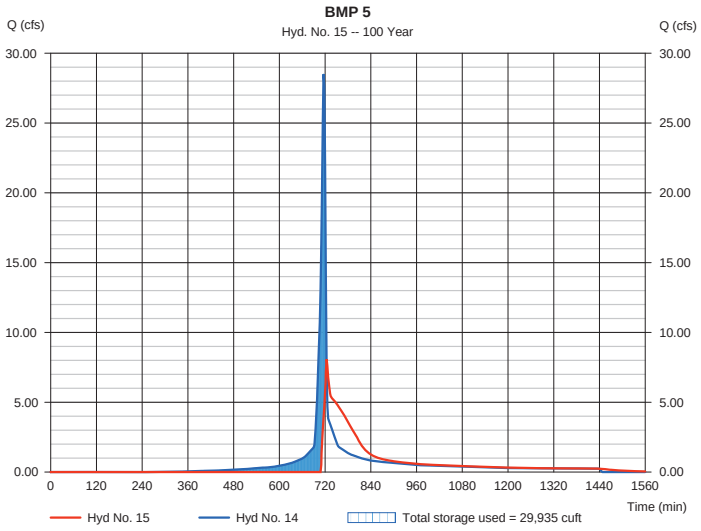
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 15

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 8.088 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 45,643 cuft
Inflow hyd. No.	= 14 - Post DA 5	Max. Elevation	= 472.65 ft
Reservoir name	= BMP 5	Max. Storage	= 29,935 cuft

Storage Indication method used.



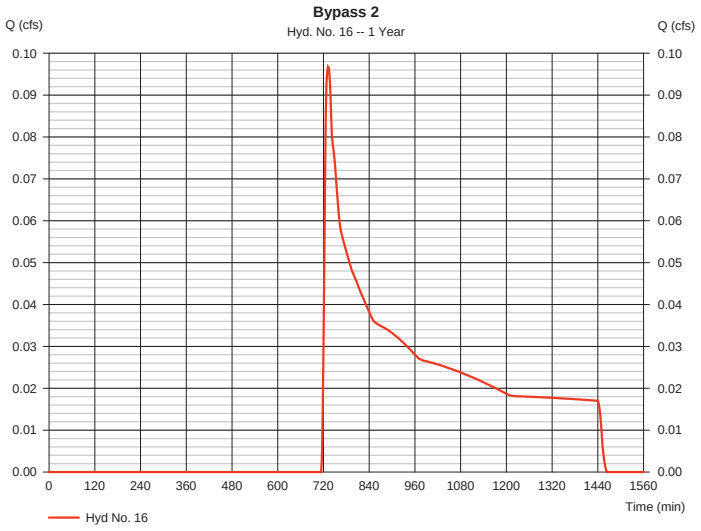
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 16

Bypass 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.097 cfs
Storm frequency	= 1 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 1,261 cuft
Drainage area	= 2.680 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



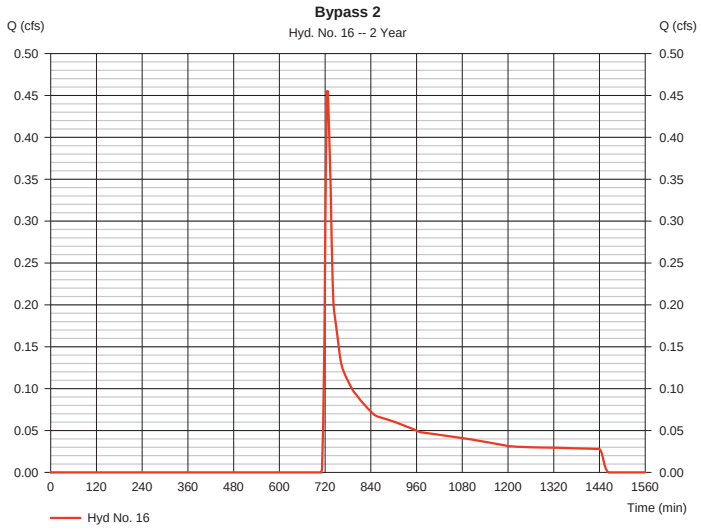
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 16

Bypass 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.456 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 2,619 cuft
Drainage area	= 2.680 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



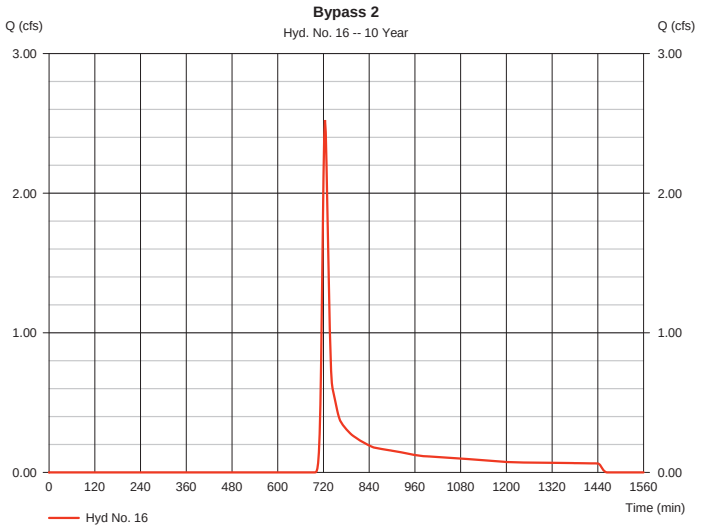
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 16

Bypass 2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.524 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 8,339 cuft
Drainage area	= 2.680 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

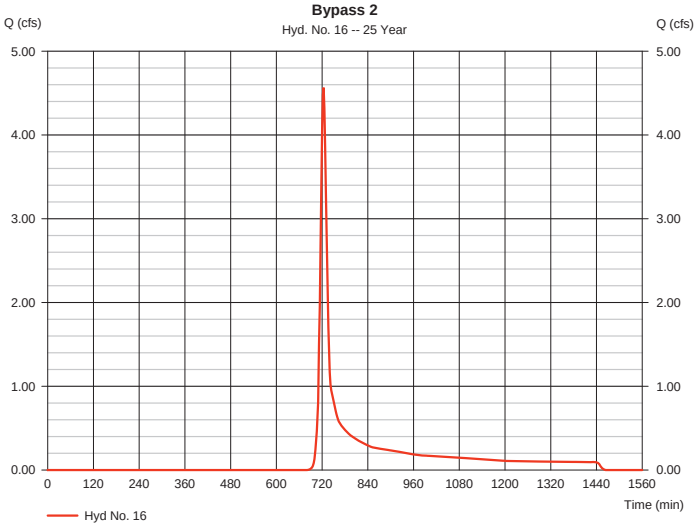


Hydrograph Report

Hyd. No. 16

Bypass 2

Hydrograph type	= SCS Runoff	Peak discharge	= 4.566 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 13,805 cuft
Drainage area	= 2.680 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

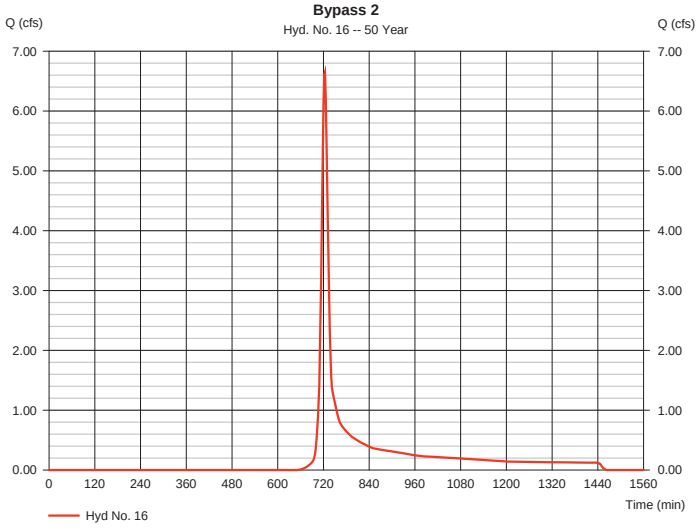


Hydrograph Report

Hyd. No. 16

Bypass 2

Hydrograph type	= SCS Runoff	Peak discharge	= 6.651 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 19,470 cuft
Drainage area	= 2.680 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

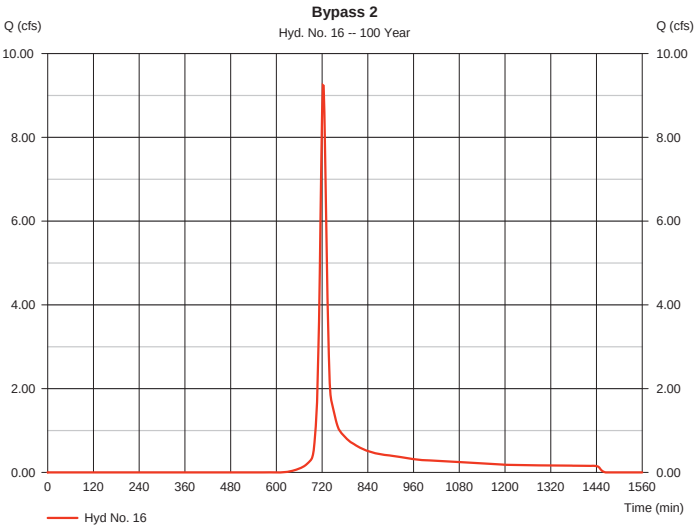


Hydrograph Report

Hyd. No. 16

Bypass 2

Hydrograph type	= SCS Runoff	Peak discharge	= 9.247 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 26,574 cuft
Drainage area	= 2.680 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.70 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

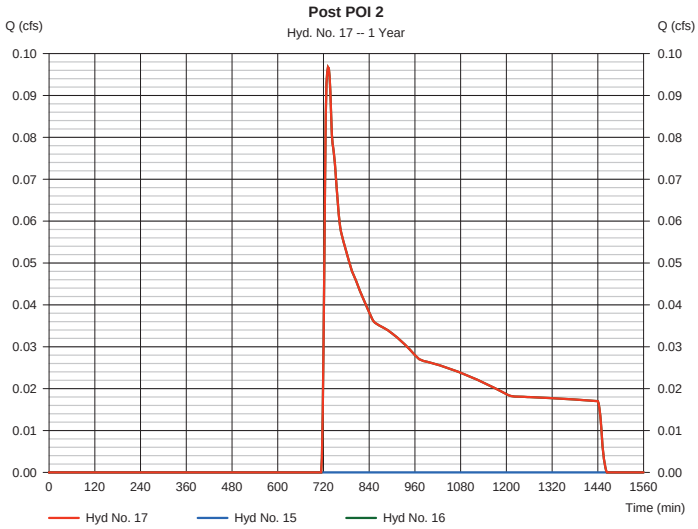


Hydrograph Report

Hyd. No. 17

Post POI 2

Hydrograph type	= Combine	Peak discharge	= 0.097 cfs
Storm frequency	= 1 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 1,261 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 2.680 ac



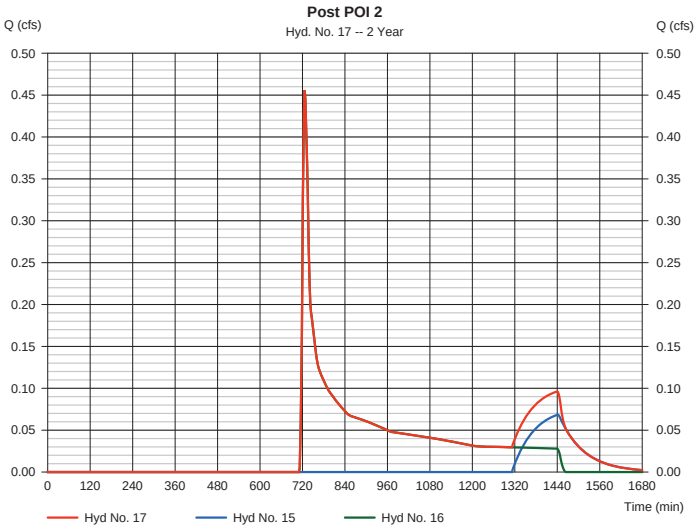
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 17

Post POI 2

Hydrograph type	= Combine	Peak discharge	= 0.456 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 3,265 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 2.680 ac



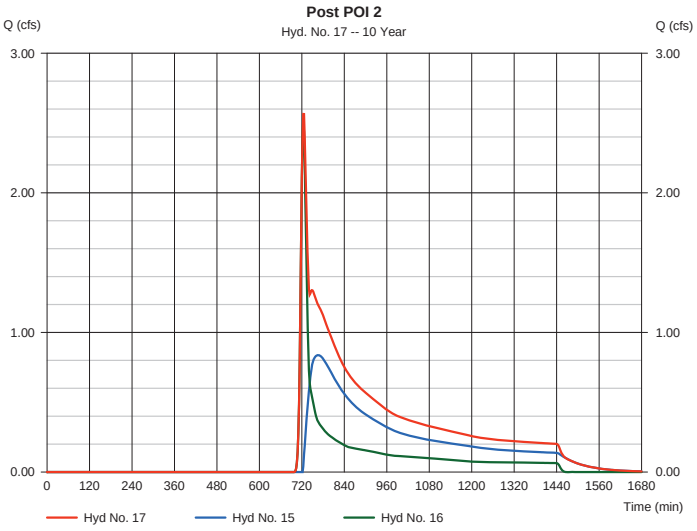
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 17

Post POI 2

Hydrograph type	= Combine	Peak discharge	= 2.564 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 22,277 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 2.680 ac



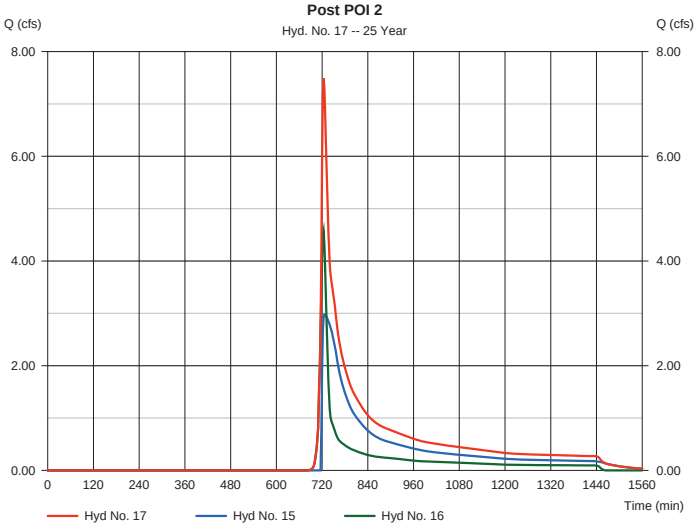
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 17

Post POI 2

Hydrograph type	= Combine	Peak discharge	= 7.486 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 38,160 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 2.680 ac



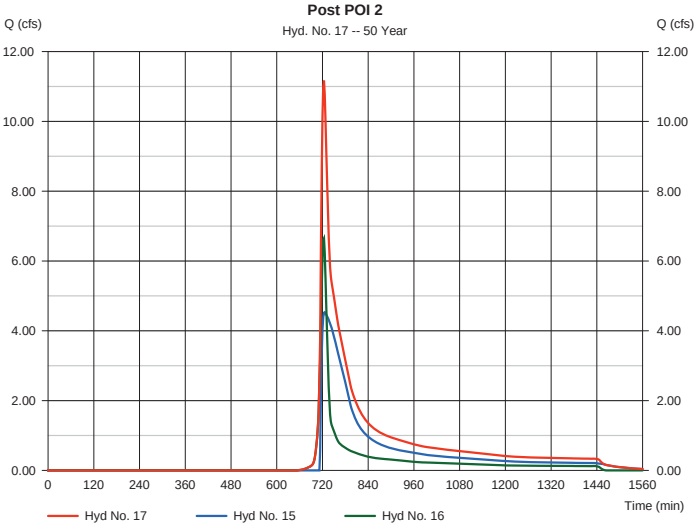
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 17

Post POI 2

Hydrograph type	= Combine	Peak discharge	= 11.17 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 53,633 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 2.680 ac



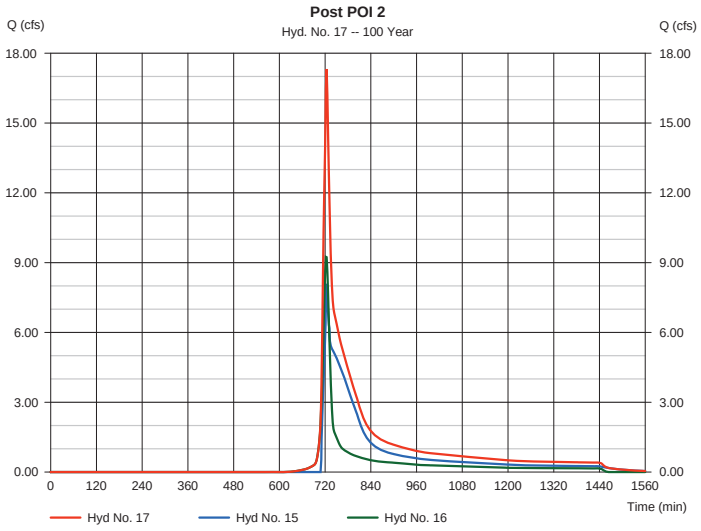
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 17

Post POI 2

Hydrograph type	= Combine	Peak discharge	= 17.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 72,217 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 2.680 ac



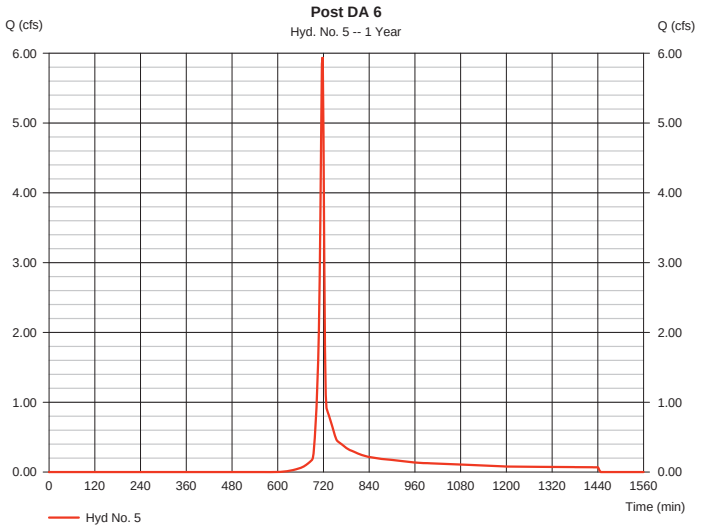
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 6

Hydrograph type	= SCS Runoff	Peak discharge	= 5.947 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 11,896 cuft
Drainage area	= 3.720 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



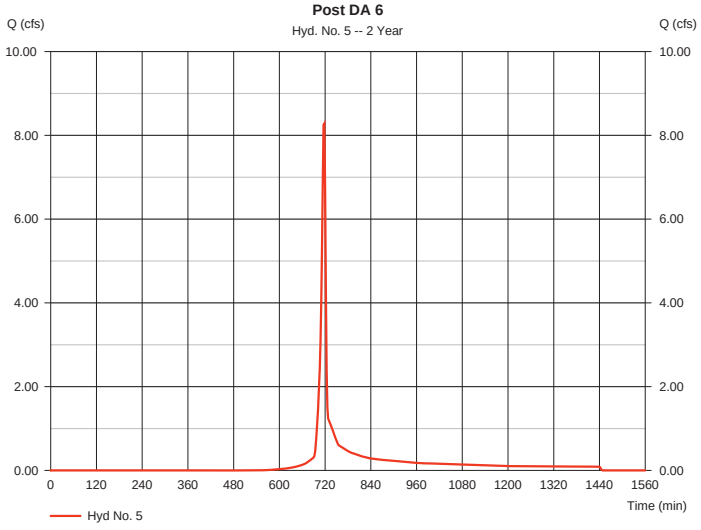
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 6

Hydrograph type	= SCS Runoff	Peak discharge	= 8.283 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 16,664 cuft
Drainage area	= 3.720 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



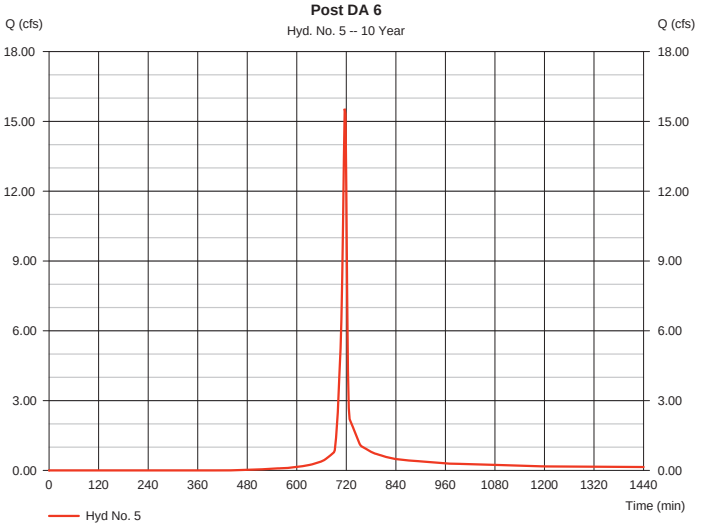
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 6

Hydrograph type	= SCS Runoff	Peak discharge	= 15.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 31,602 cuft
Drainage area	= 3.720 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



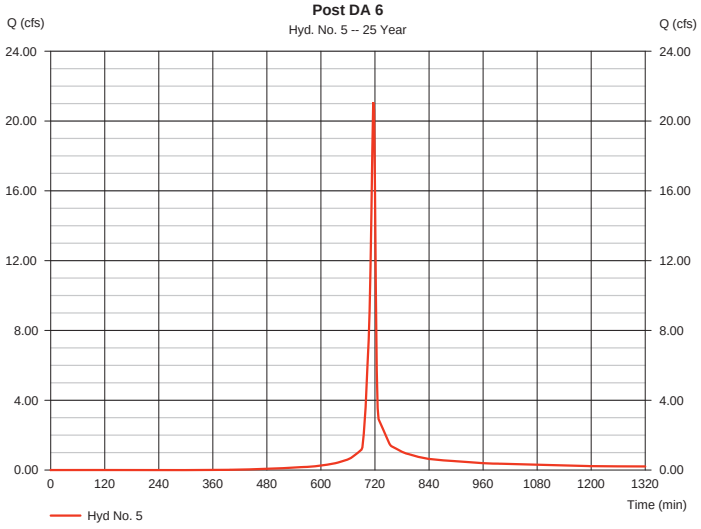
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 6

Hydrograph type	= SCS Runoff	Peak discharge	= 21.08 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 43,310 cuft
Drainage area	= 3.720 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



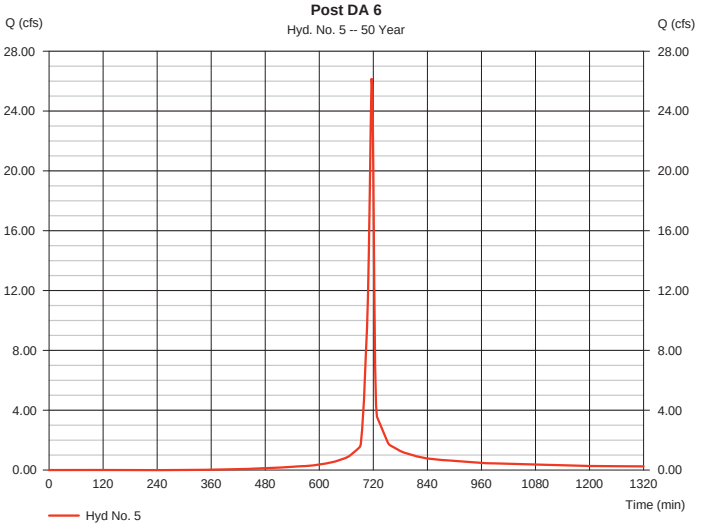
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 6

Hydrograph type	= SCS Runoff	Peak discharge	= 26.17 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 54,332 cuft
Drainage area	= 3.720 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



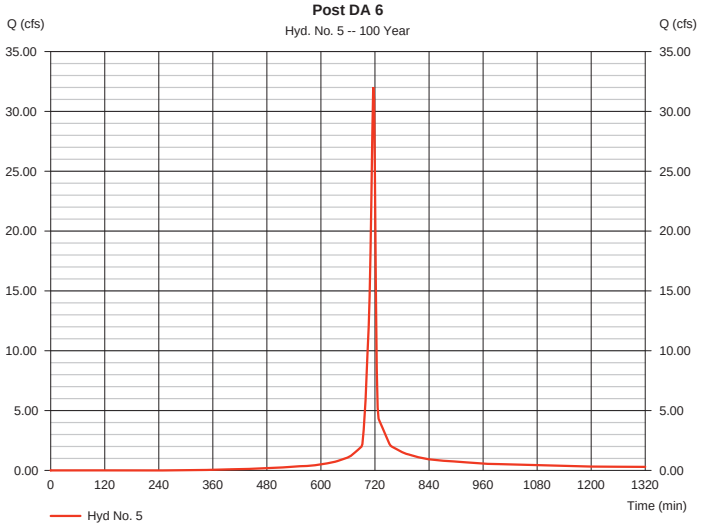
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 6

Hydrograph type	= SCS Runoff	Peak discharge	= 32.03 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 67,235 cuft
Drainage area	= 3.720 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Pond No. 1 - BMP 6

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 466.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	466.50	7,121	0	0
0.50	467.00	8,501	3,900	3,900
1.50	468.00	9,985	9,232	13,132
2.50	469.00	11,575	10,769	23,901
3.50	470.00	13,275	12,414	36,315
4.50	471.00	15,020	14,137	50,452

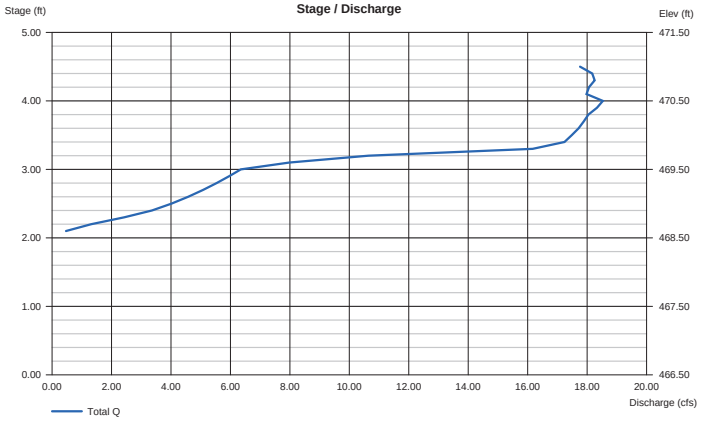
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	4.00	0.00
Span (in)	= 18.00	36.00	16.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 465.00	468.50	468.50	0.00
Length (ft)	= 32.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	85.00	0.00	0.00
Crest El. (ft)	= 469.50	469.72	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

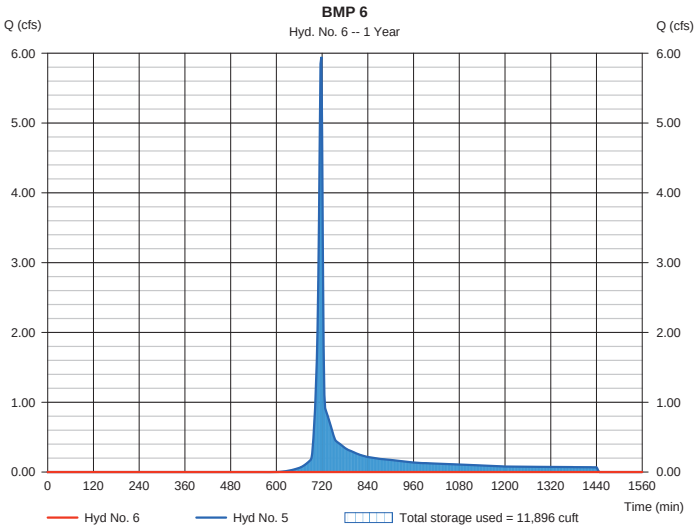
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 5 - Post DA 6	Max. Elevation	= 467.87 ft
Reservoir name	= BMP 6	Max. Storage	= 11,896 cuft

Storage Indication method used.



Hydrograph Report

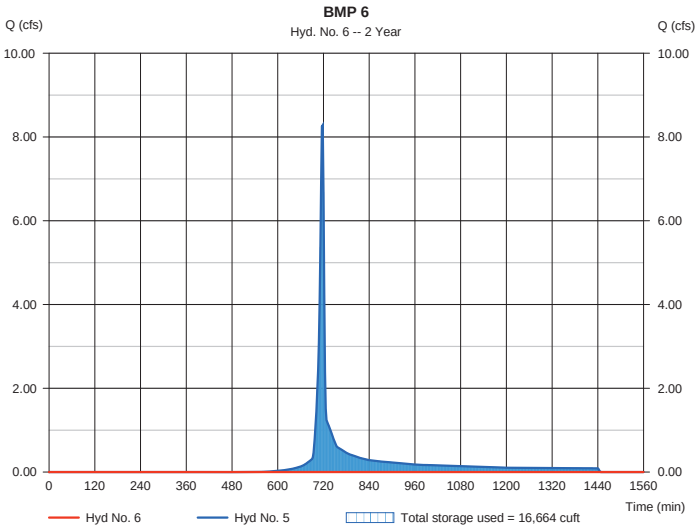
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 5 - Post DA 6	Max. Elevation	= 468.33 ft
Reservoir name	= BMP 6	Max. Storage	= 16,664 cuft

Storage Indication method used.



Hydrograph Report

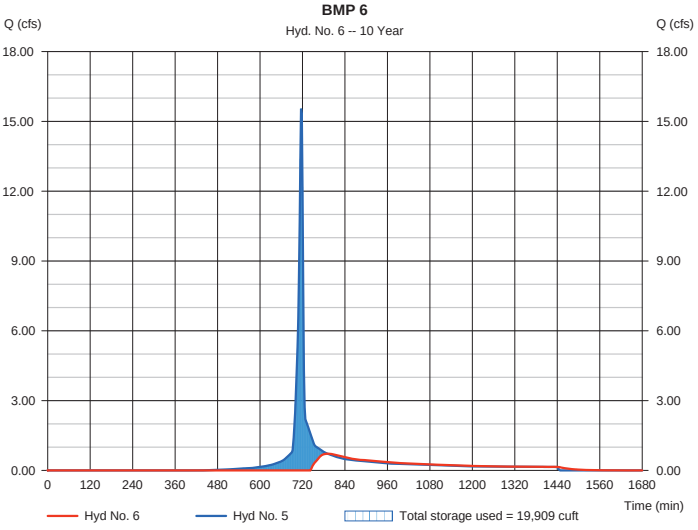
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 0.717 cfs
Storm frequency	= 10 yrs	Time to peak	= 792 min
Time interval	= 2 min	Hyd. volume	= 13,083 cuft
Inflow hyd. No.	= 5 - Post DA 6	Max. Elevation	= 468.63 ft
Reservoir name	= BMP 6	Max. Storage	= 19,909 cuft

Storage Indication method used.



Hydrograph Report

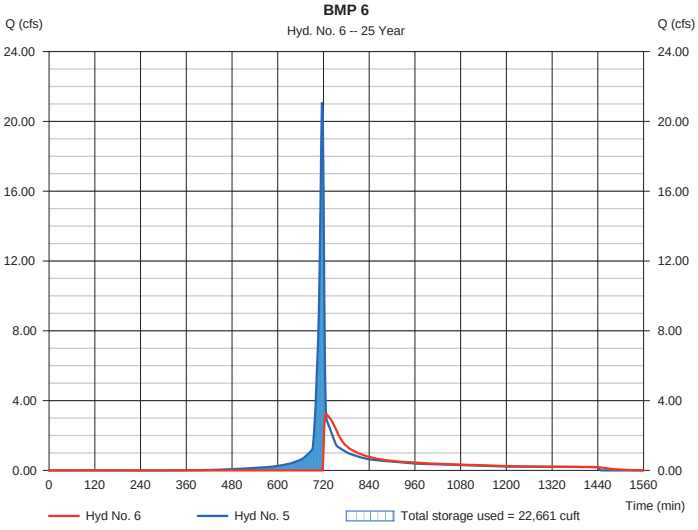
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 3.218 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 24,791 cuft
Inflow hyd. No.	= 5 - Post DA 6	Max. Elevation	= 468.88 ft
Reservoir name	= BMP 6	Max. Storage	= 22,661 cuft

Storage Indication method used.



Hydrograph Report

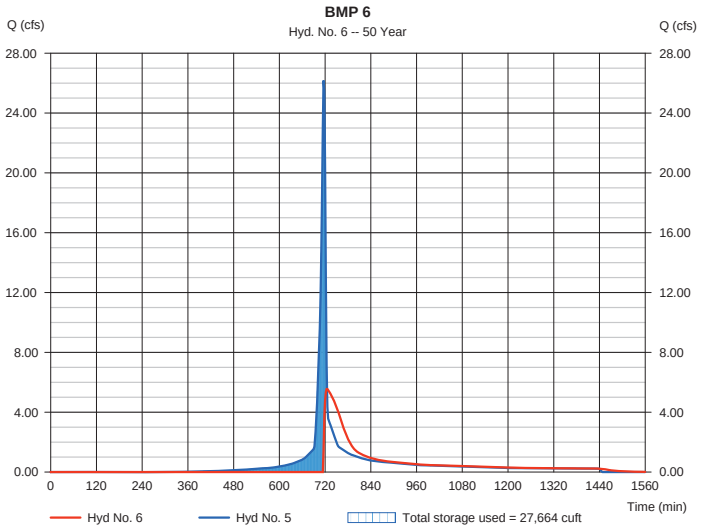
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 5.548 cfs
Storm frequency	= 50 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 35,813 cuft
Inflow hyd. No.	= 5 - Post DA 6	Max. Elevation	= 469.30 ft
Reservoir name	= BMP 6	Max. Storage	= 27,664 cuft

Storage Indication method used.



Hydrograph Report

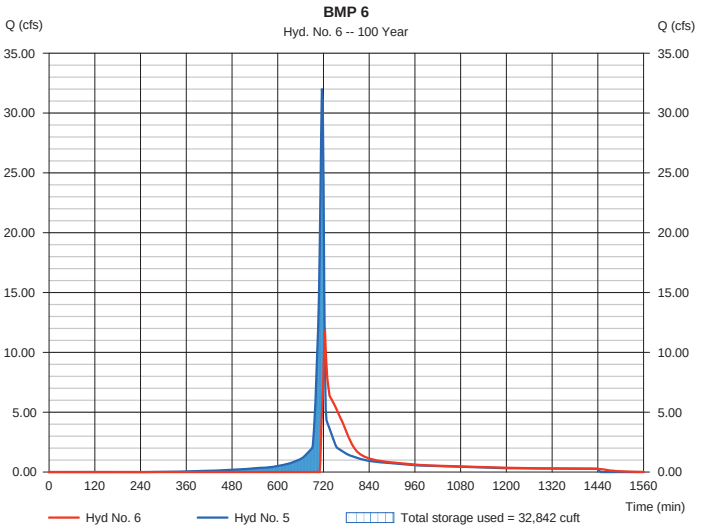
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 11.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 48,716 cuft
Inflow hyd. No.	= 5 - Post DA 6	Max. Elevation	= 469.72 ft
Reservoir name	= BMP 6	Max. Storage	= 32,842 cuft

Storage Indication method used.



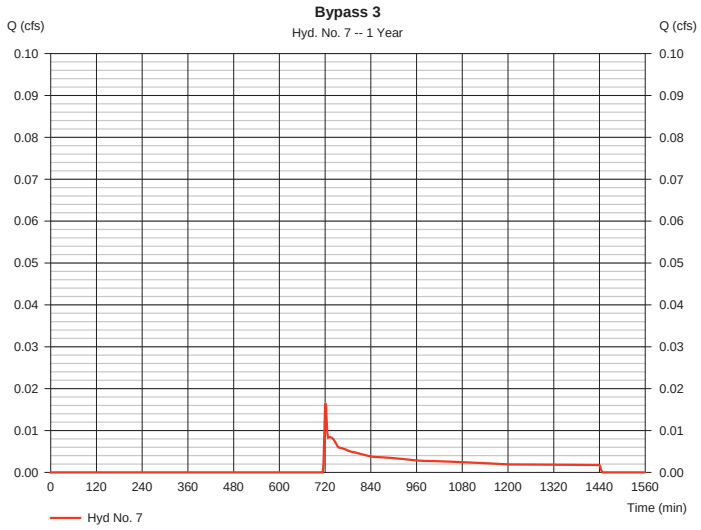
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Bypass 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.016 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 131 cuft
Drainage area	= 0.290 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



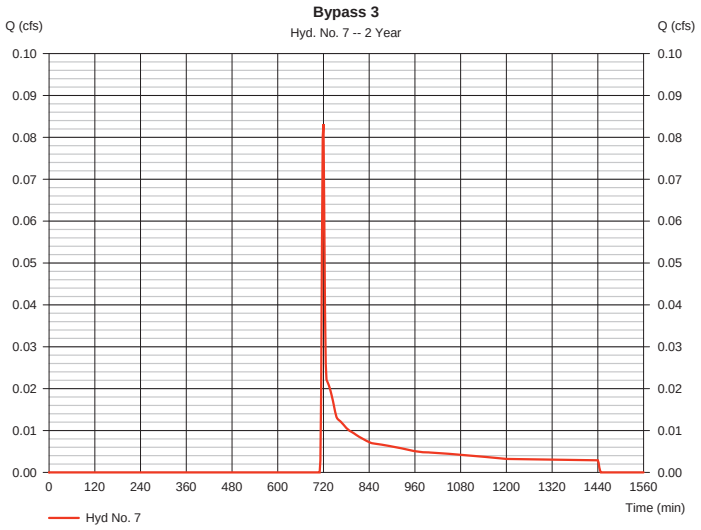
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Bypass 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.083 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 272 cuft
Drainage area	= 0.290 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

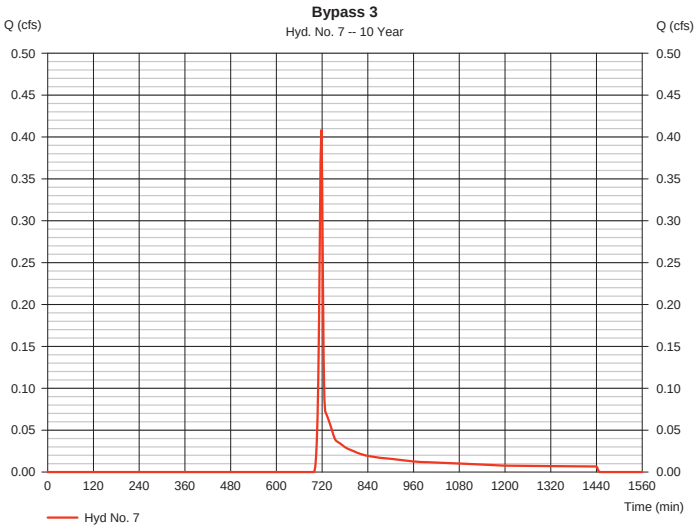


Hydrograph Report

Hyd. No. 7

Bypass 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.409 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 868 cuft
Drainage area	= 0.290 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

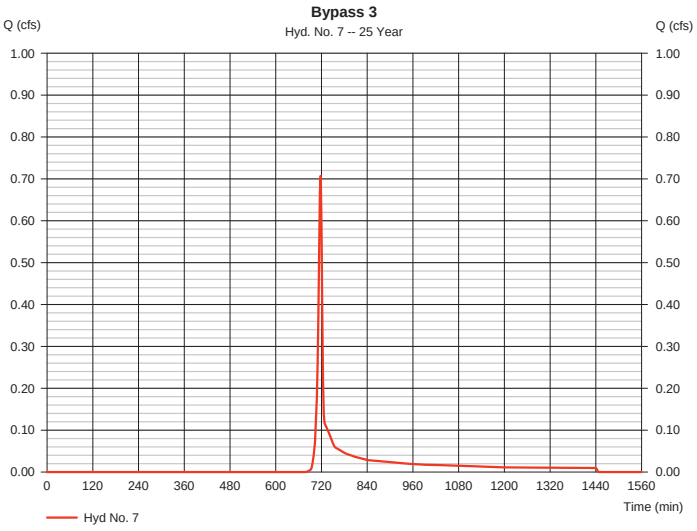


Hydrograph Report

Hyd. No. 7

Bypass 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.708 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,436 cuft
Drainage area	= 0.290 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

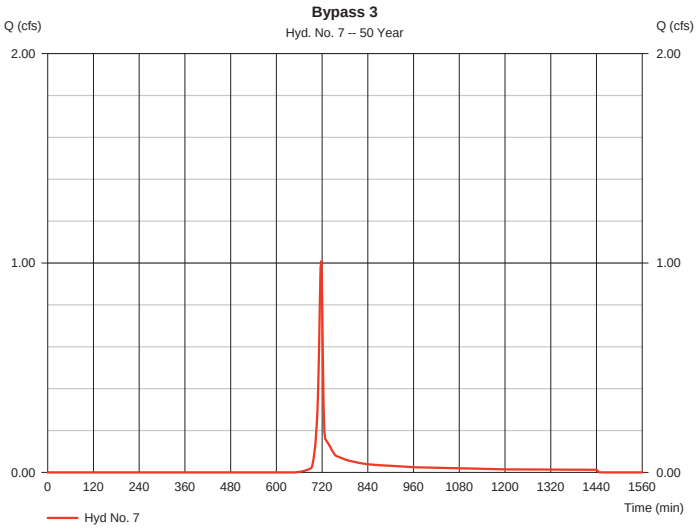


Hydrograph Report

Hyd. No. 7

Bypass 3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.011 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,026 cuft
Drainage area	= 0.290 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

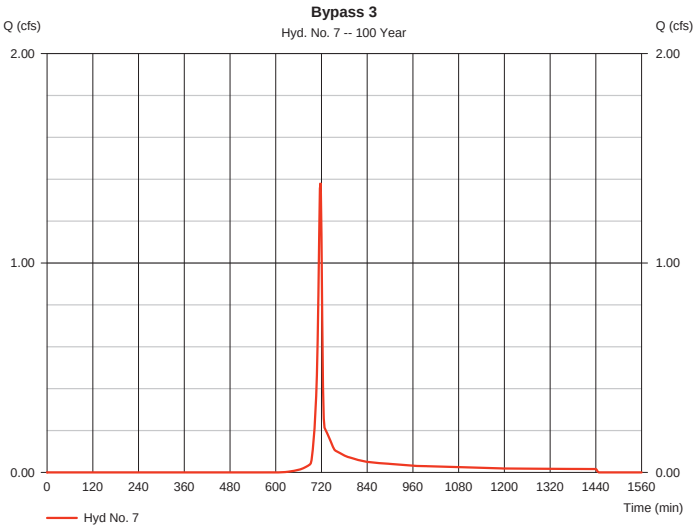


Hydrograph Report

Hyd. No. 7

Bypass 3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.383 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,765 cuft
Drainage area	= 0.290 ac	Curve number	= 59
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



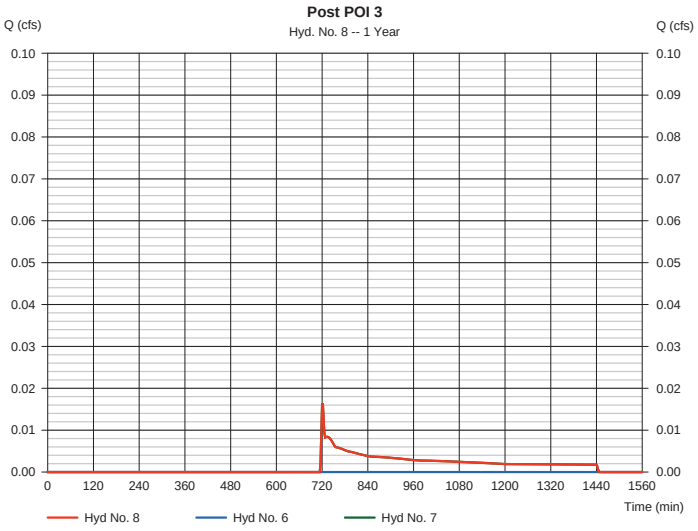
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

Post POI 3

Hydrograph type	= Combine	Peak discharge	= 0.016 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 131 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 0.290 ac



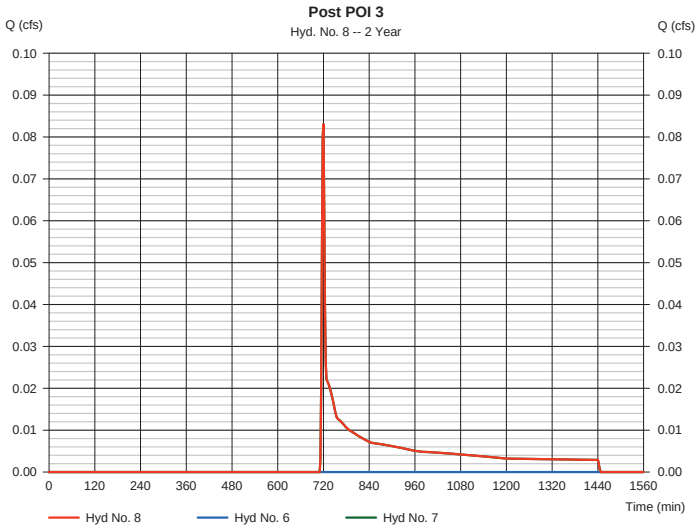
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

Post POI 3

Hydrograph type	= Combine	Peak discharge	= 0.083 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 272 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 0.290 ac



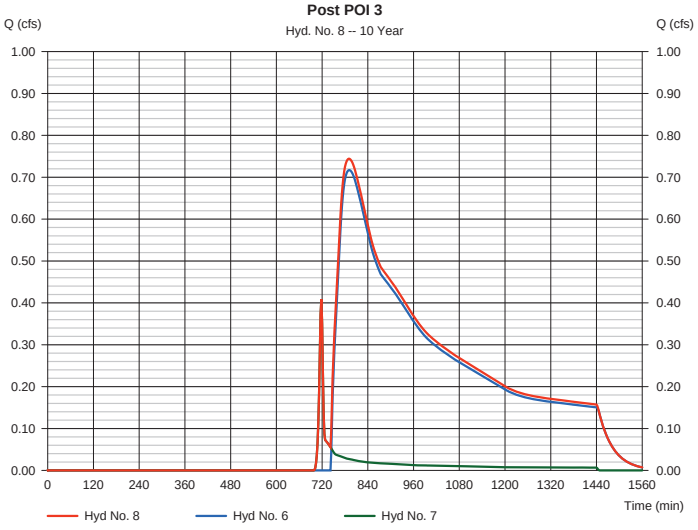
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

Post POI 3

Hydrograph type	= Combine	Peak discharge	= 0.744 cfs
Storm frequency	= 10 yrs	Time to peak	= 790 min
Time interval	= 2 min	Hyd. volume	= 13,951 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 0.290 ac



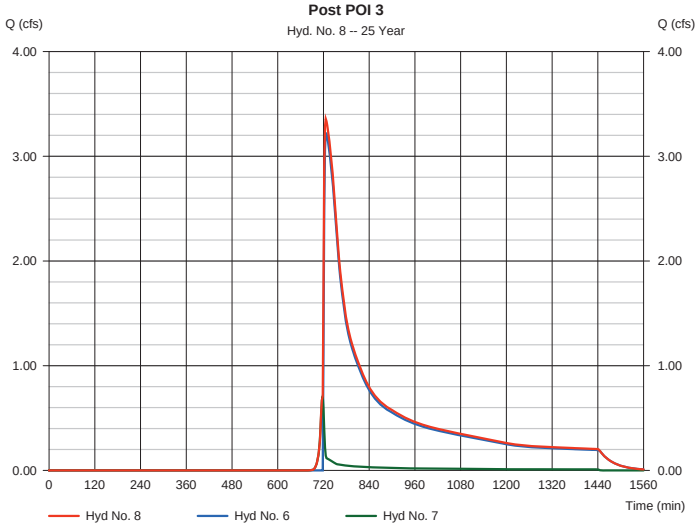
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

Post POI 3

Hydrograph type	= Combine	Peak discharge	= 3.357 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 26,228 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 0.290 ac



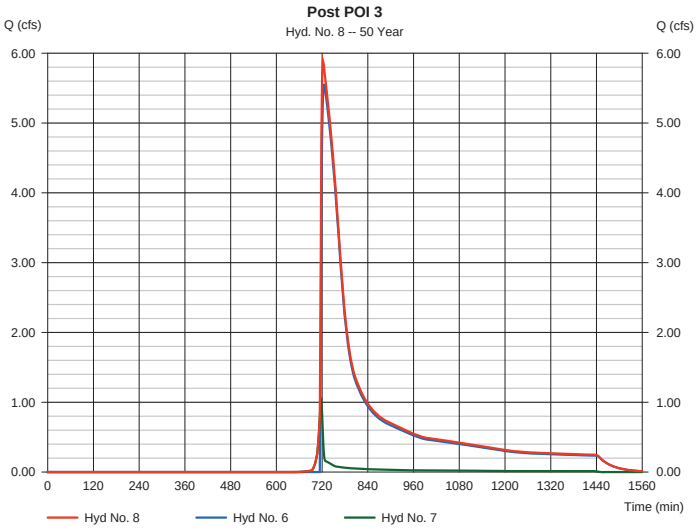
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

Post POI 3

Hydrograph type	= Combine	Peak discharge	= 5.894 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 37,839 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 0.290 ac



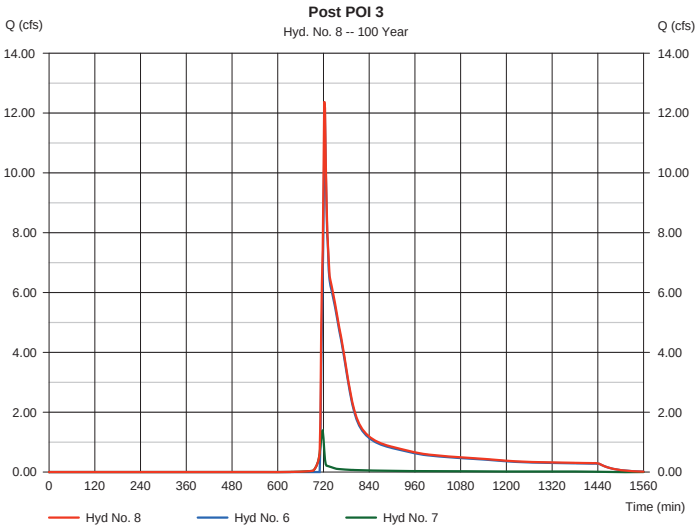
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

Post POI 3

Hydrograph type	= Combine	Peak discharge	= 12.38 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 51,481 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 0.290 ac



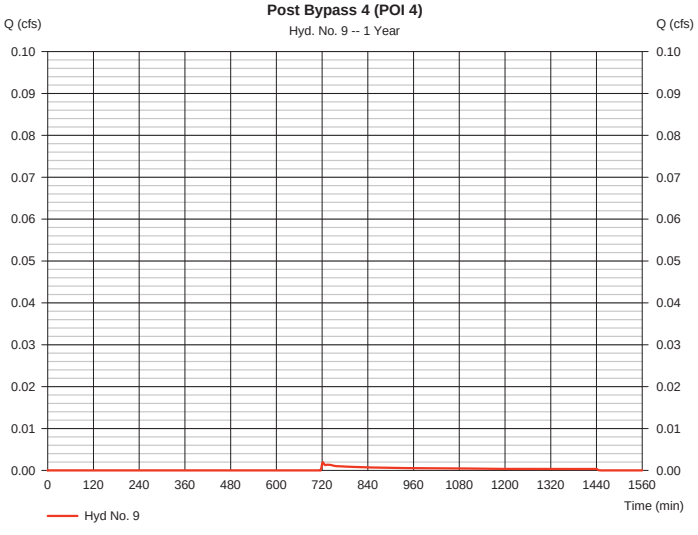
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Post Bypass 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.002 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 23 cuft
Drainage area	= 0.060 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



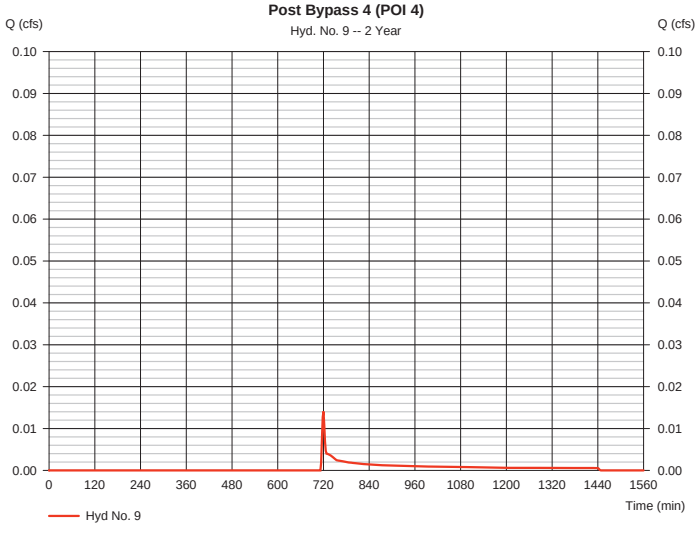
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Post Bypass 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.014 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 51 cuft
Drainage area	= 0.060 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



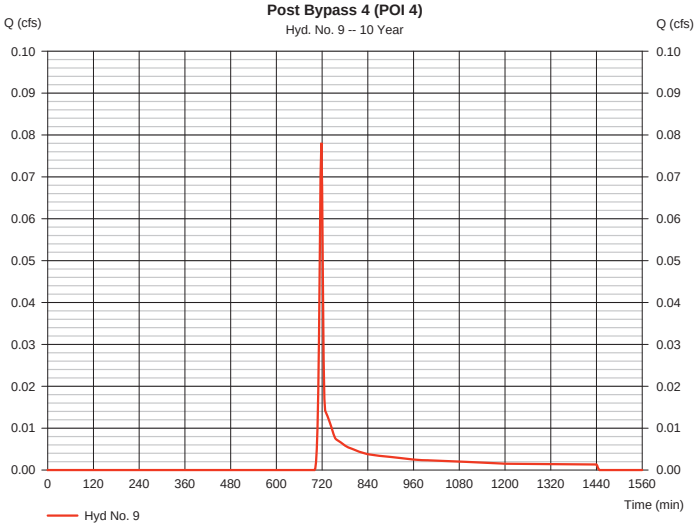
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Post Bypass 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.078 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 168 cuft
Drainage area	= 0.060 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



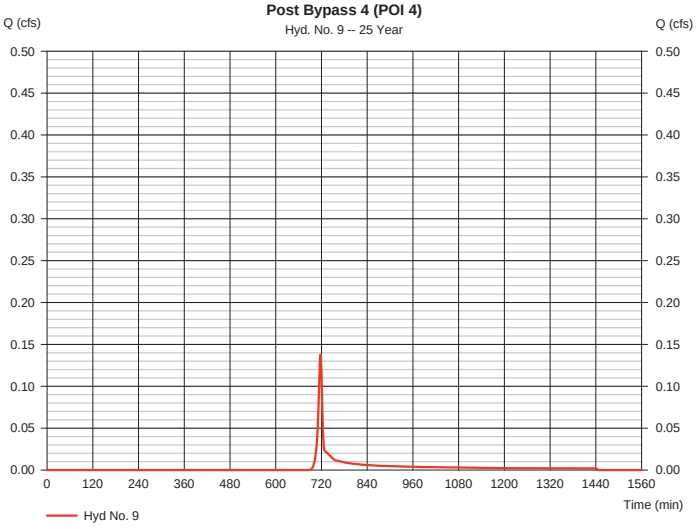
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Post Bypass 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.139 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 283 cuft
Drainage area	= 0.060 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



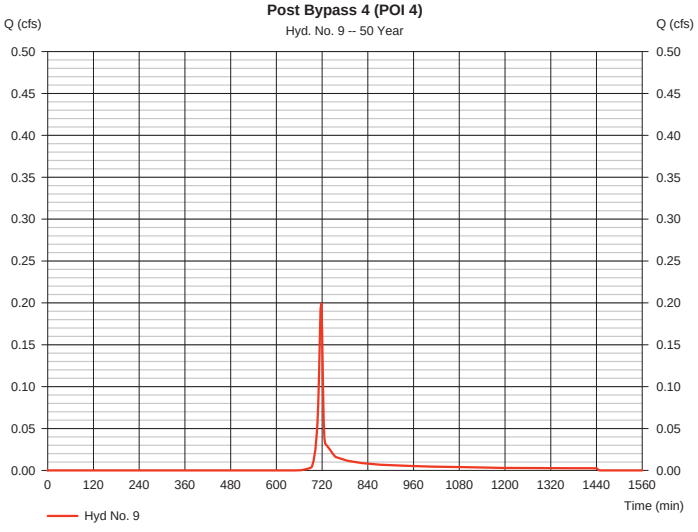
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Post Bypass 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.200 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 401 cuft
Drainage area	= 0.060 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



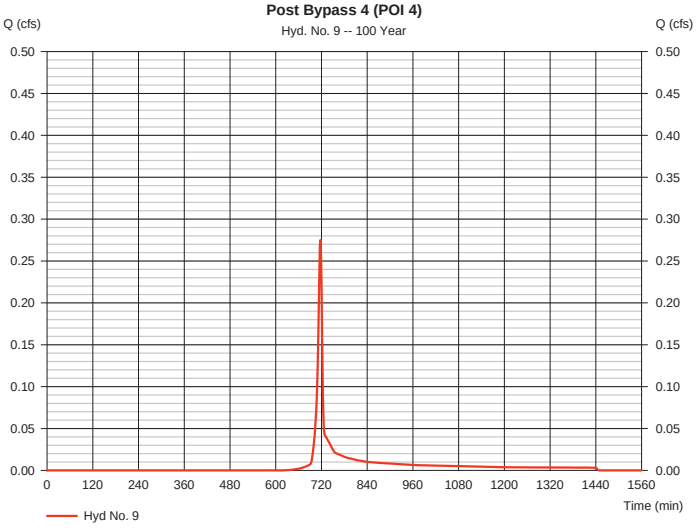
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Post Bypass 4 (POI 4)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.276 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 551 cuft
Drainage area	= 0.060 ac	Curve number	= 58
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



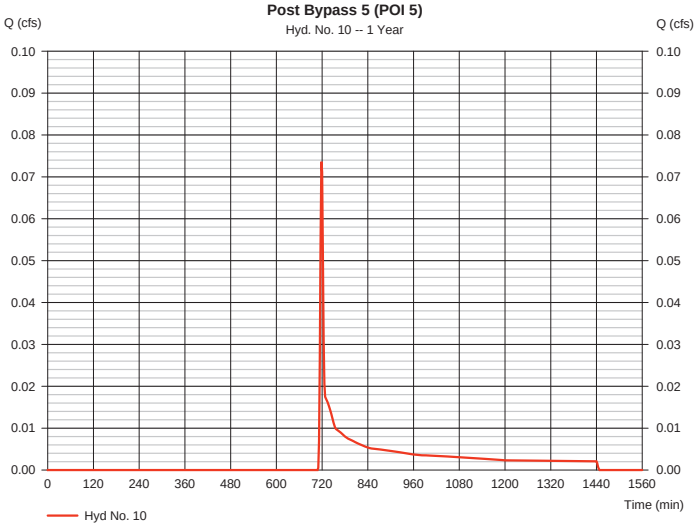
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post Bypass 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.074 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 210 cuft
Drainage area	= 0.230 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



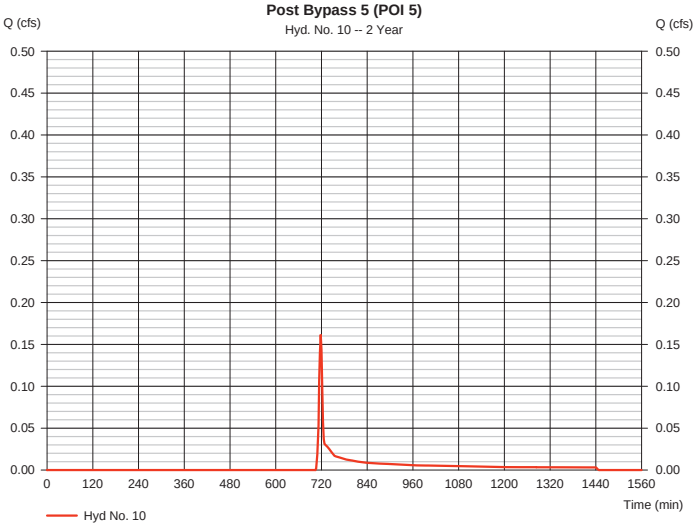
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post Bypass 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.162 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 368 cuft
Drainage area	= 0.230 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



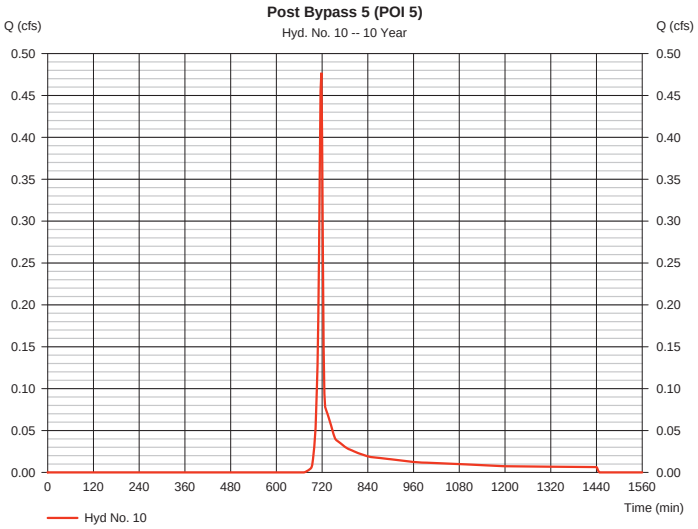
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post Bypass 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.477 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 964 cuft
Drainage area	= 0.230 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



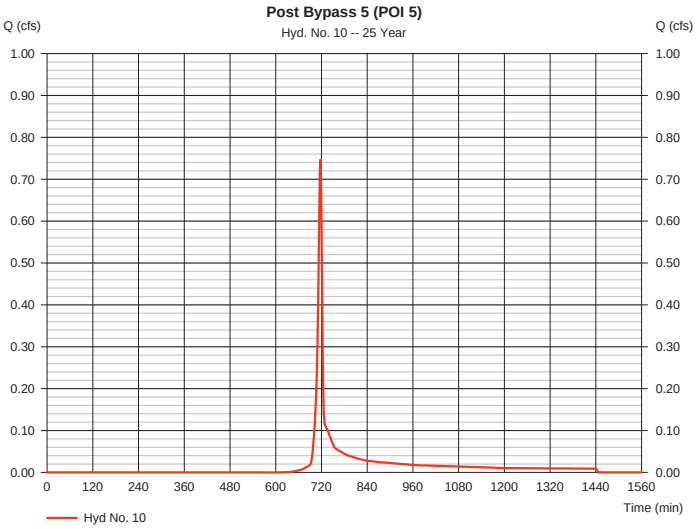
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post Bypass 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.748 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,496 cuft
Drainage area	= 0.230 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



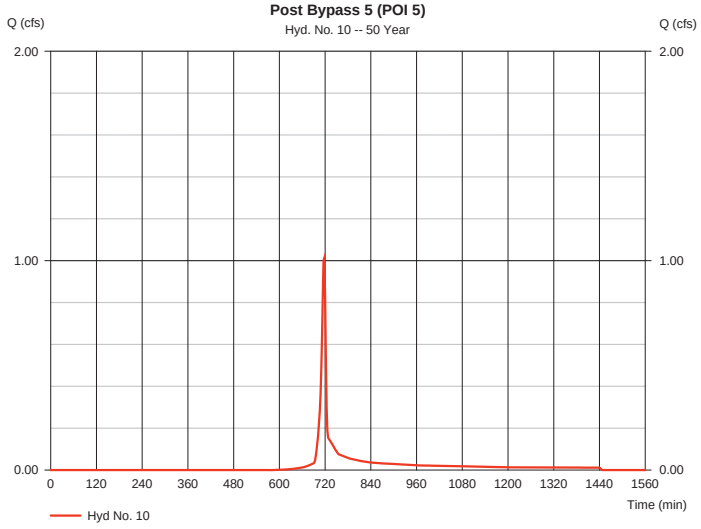
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post Bypass 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.014 cfs
Storm frequency	= 50 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,030 cuft
Drainage area	= 0.230 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



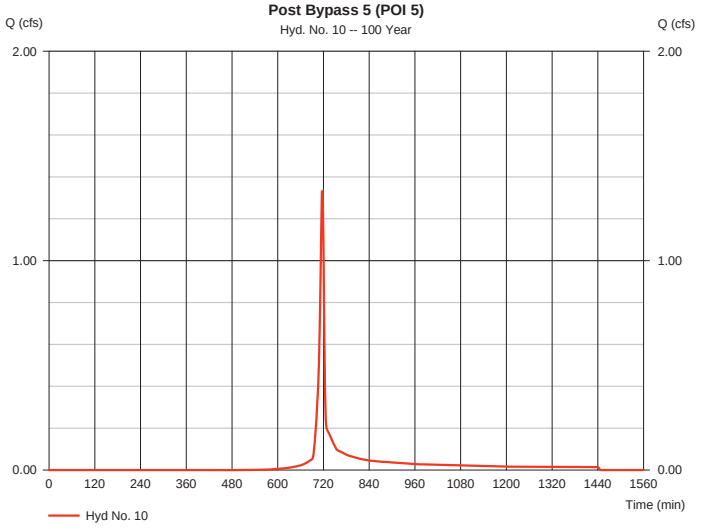
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post Bypass 5 (POI 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.333 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 2,685 cuft
Drainage area	= 0.230 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



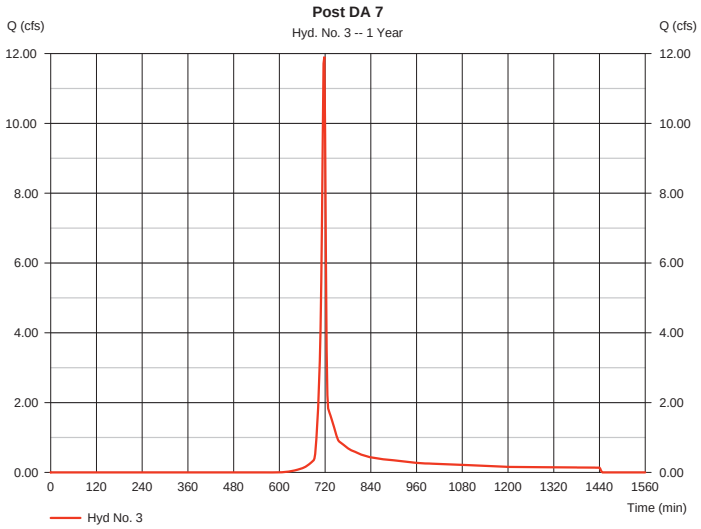
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Post DA 7

Hydrograph type	= SCS Runoff	Peak discharge	= 11.91 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 23,824 cuft
Drainage area	= 7.450 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



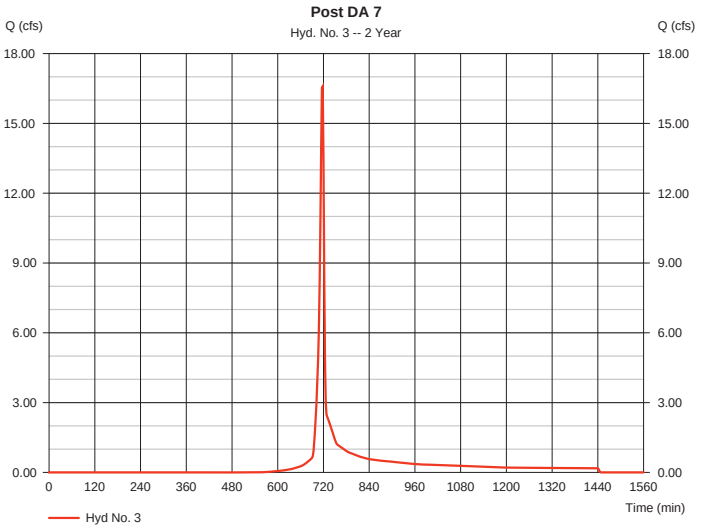
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Post DA 7

Hydrograph type	= SCS Runoff	Peak discharge	= 16.59 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 33,373 cuft
Drainage area	= 7.450 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



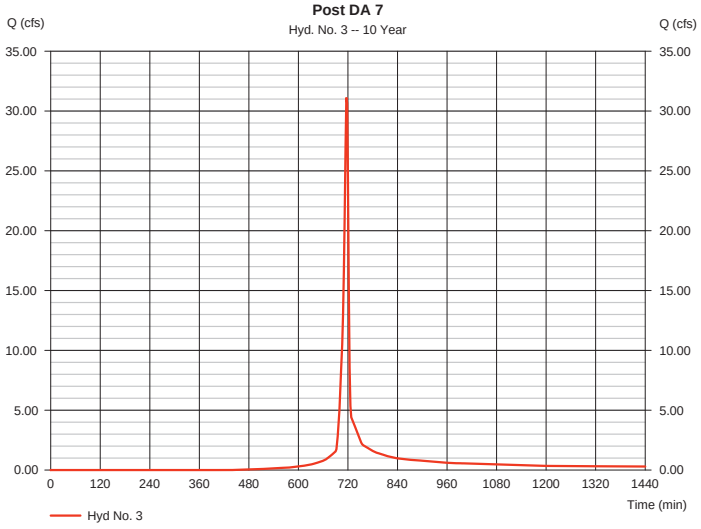
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Post DA 7

Hydrograph type	= SCS Runoff	Peak discharge	= 31.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 63,289 cuft
Drainage area	= 7.450 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



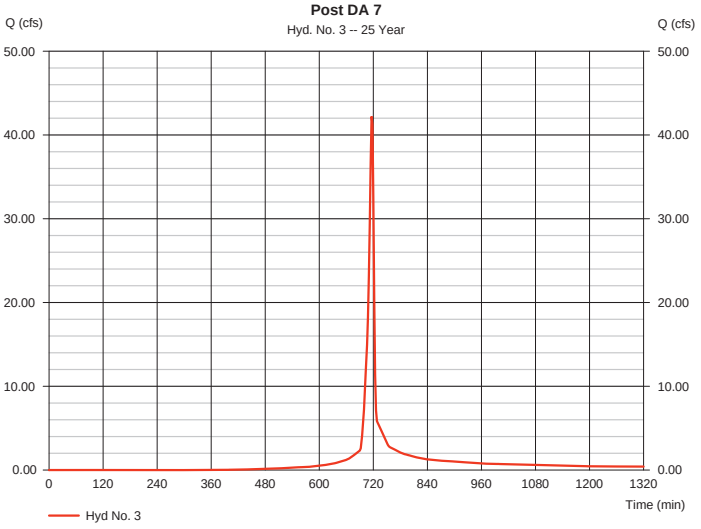
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Post DA 7

Hydrograph type	= SCS Runoff	Peak discharge	= 42.21 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 86,736 cuft
Drainage area	= 7.450 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



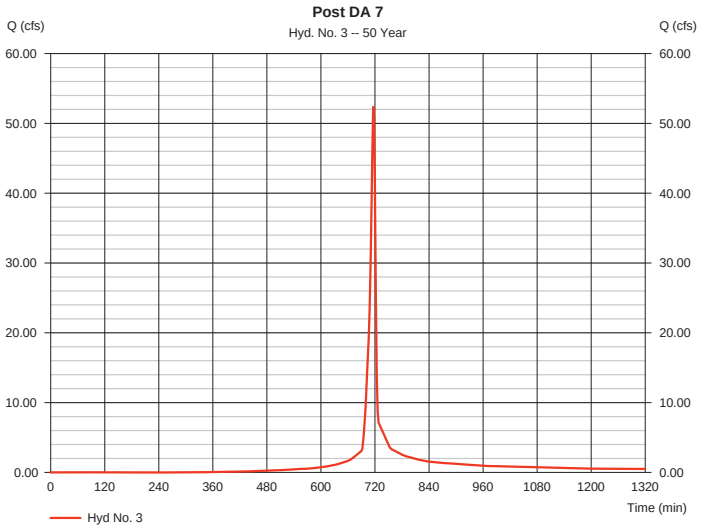
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Post DA 7

Hydrograph type	= SCS Runoff	Peak discharge	= 52.41 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 108,810 cuft
Drainage area	= 7.450 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



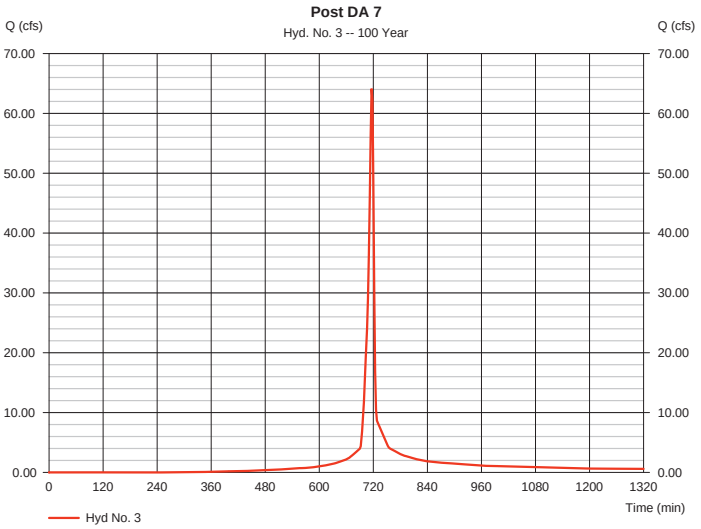
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Post DA 7

Hydrograph type	= SCS Runoff	Peak discharge	= 64.14 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 134,651 cuft
Drainage area	= 7.450 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 1 - BMP 7

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 425.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	425.00	13,542	0	0
1.00	426.00	15,032	14,279	14,279
2.00	427.00	16,578	15,797	30,076
3.00	428.00	18,181	17,372	47,448
4.00	429.00	19,841	19,003	66,451
5.00	430.00	21,557	20,691	87,142
6.00	431.00	23,329	22,435	109,577

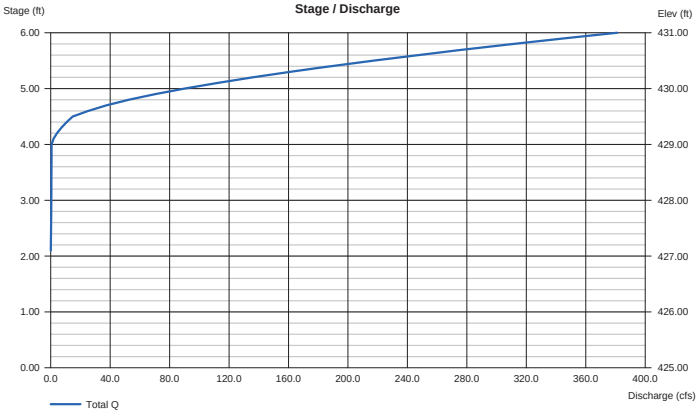
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 423.00	427.00	0.00	0.00
Length (ft)	= 32.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	75.00	0.00	0.00
Crest El. (ft)	= 429.00	429.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



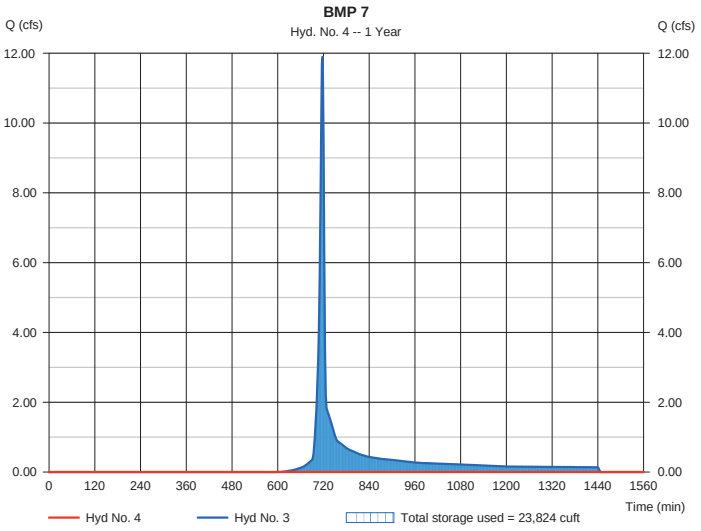
Hydrograph Report

Hyd. No. 4

BMP 7

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - Post DA 7	Max. Elevation	= 426.60 ft
Reservoir name	= BMP 7	Max. Storage	= 23,824 cuft

Storage Indication method used.



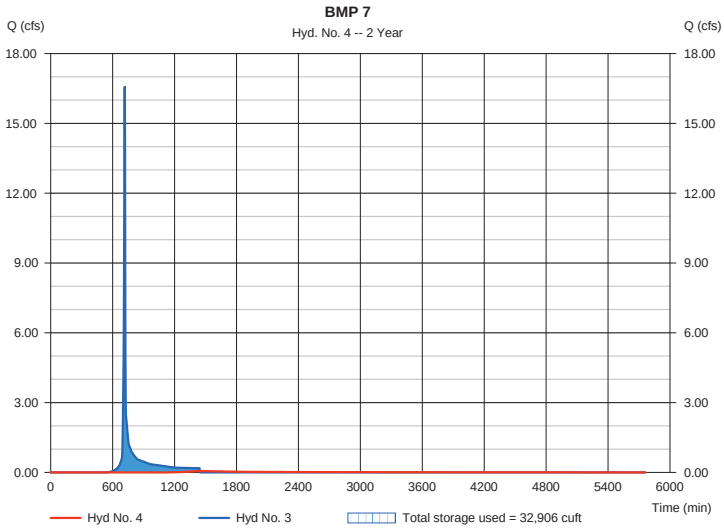
Hydrograph Report

Hyd. No. 4

BMP 7

Hydrograph type	= Reservoir	Peak discharge	= 0.061 cfs
Storm frequency	= 2 yrs	Time to peak	= 1444 min
Time interval	= 2 min	Hyd. volume	= 3,224 cuft
Inflow hyd. No.	= 3 - Post DA 7	Max. Elevation	= 427.16 ft
Reservoir name	= BMP 7	Max. Storage	= 32,906 cuft

Storage Indication method used.



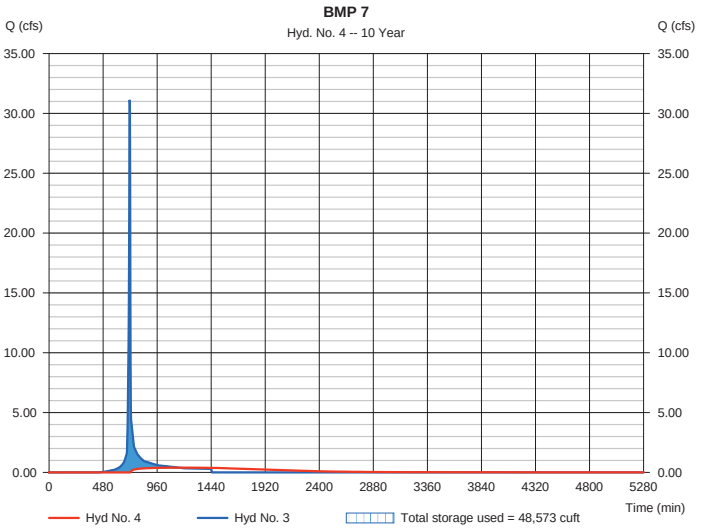
Hydrograph Report

Hyd. No. 4

BMP 7

Hydrograph type	= Reservoir	Peak discharge	= 0.397 cfs
Storm frequency	= 10 yrs	Time to peak	= 1152 min
Time interval	= 2 min	Hyd. volume	= 33,026 cuft
Inflow hyd. No.	= 3 - Post DA 7	Max. Elevation	= 428.06 ft
Reservoir name	= BMP 7	Max. Storage	= 48,573 cuft

Storage Indication method used.



Hydrograph Report

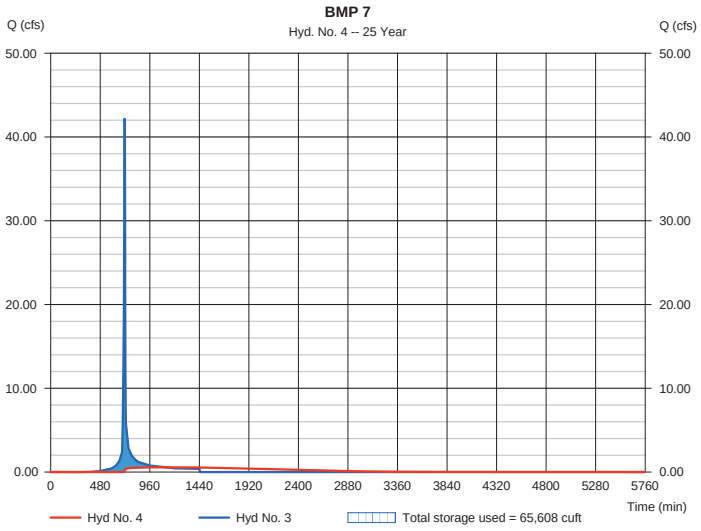
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

BMP 7

Hydrograph type	= Reservoir	Peak discharge	= 0.562 cfs
Storm frequency	= 25 yrs	Time to peak	= 1118 min
Time interval	= 2 min	Hyd. volume	= 56,360 cuft
Inflow hyd. No.	= 3 - Post DA 7	Max. Elevation	= 428.96 ft
Reservoir name	= BMP 7	Max. Storage	= 65,608 cuft

Storage Indication method used.



Hydrograph Report

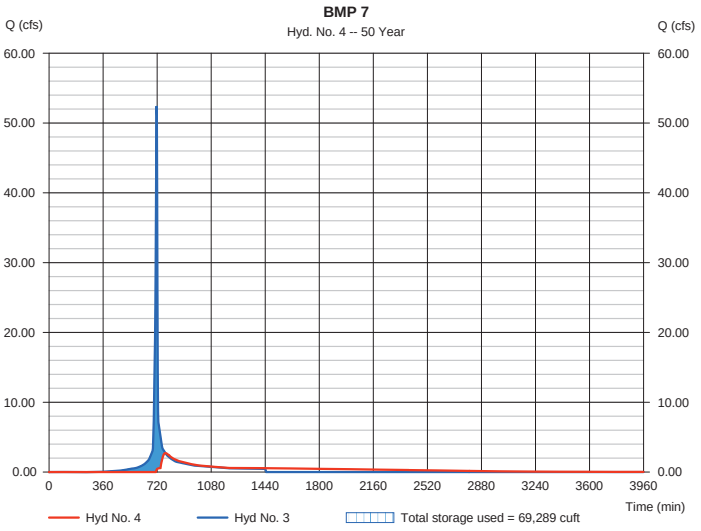
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

BMP 7

Hydrograph type	= Reservoir	Peak discharge	= 2.712 cfs
Storm frequency	= 50 yrs	Time to peak	= 776 min
Time interval	= 2 min	Hyd. volume	= 78,418 cuft
Inflow hyd. No.	= 3 - Post DA 7	Max. Elevation	= 429.14 ft
Reservoir name	= BMP 7	Max. Storage	= 69,289 cuft

Storage Indication method used.



Hydrograph Report

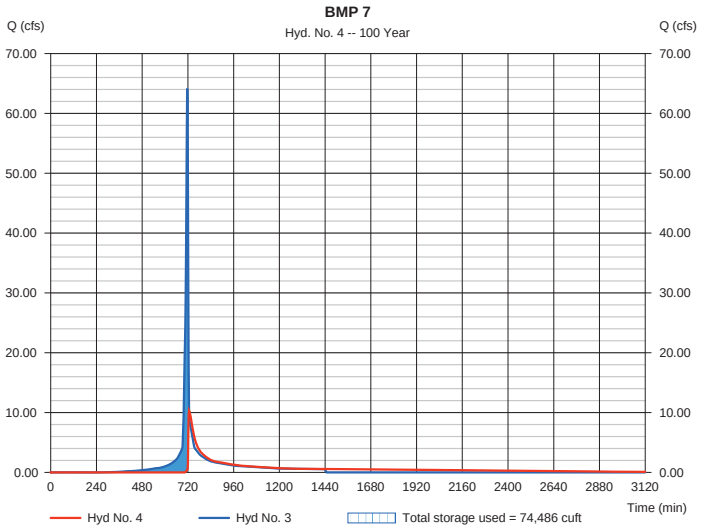
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 4

BMP 7

Hydrograph type	= Reservoir	Peak discharge	= 10.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 104,251 cuft
Inflow hyd. No.	= 3 - Post DA 7	Max. Elevation	= 429.39 ft
Reservoir name	= BMP 7	Max. Storage	= 74,486 cuft

Storage Indication method used.



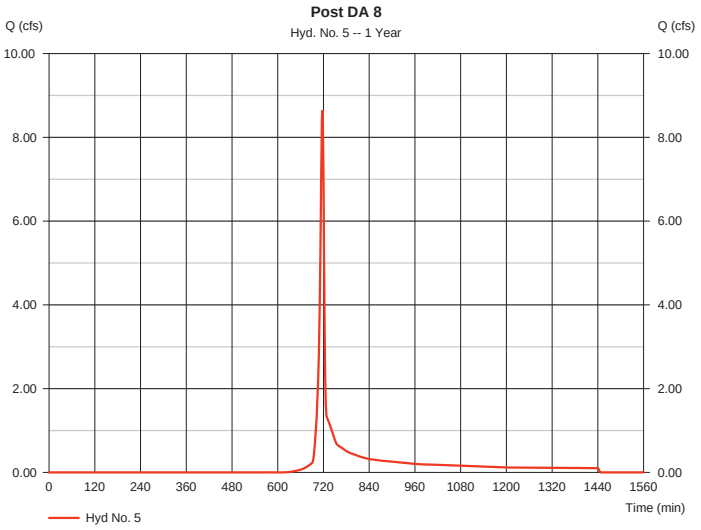
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 8

Hydrograph type	= SCS Runoff	Peak discharge	= 8.653 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 17,303 cuft
Drainage area	= 5.740 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



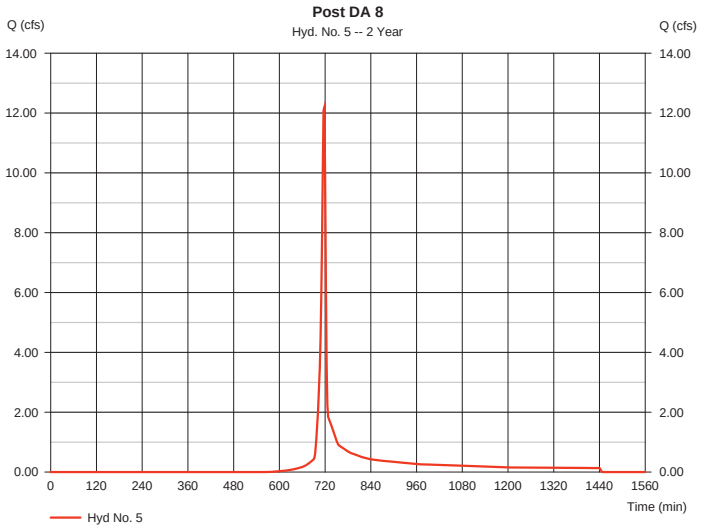
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 8

Hydrograph type	= SCS Runoff	Peak discharge	= 12.19 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 24,462 cuft
Drainage area	= 5.740 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



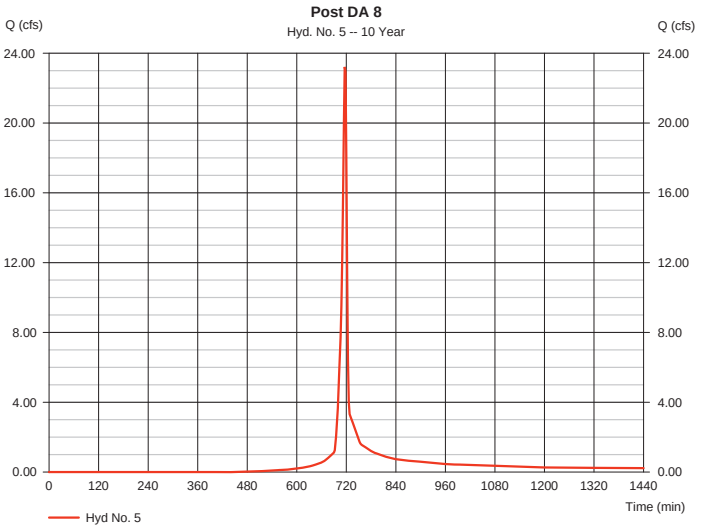
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 8

Hydrograph type	= SCS Runoff	Peak discharge	= 23.21 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 47,082 cuft
Drainage area	= 5.740 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



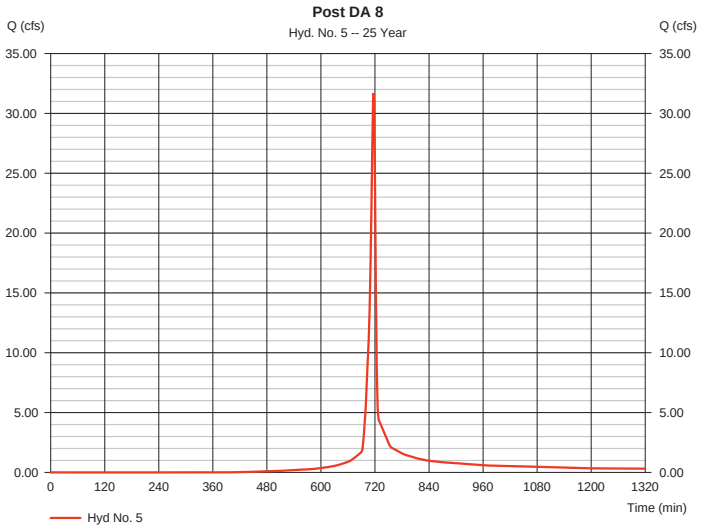
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 8

Hydrograph type	= SCS Runoff	Peak discharge	= 31.71 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 64,920 cuft
Drainage area	= 5.740 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



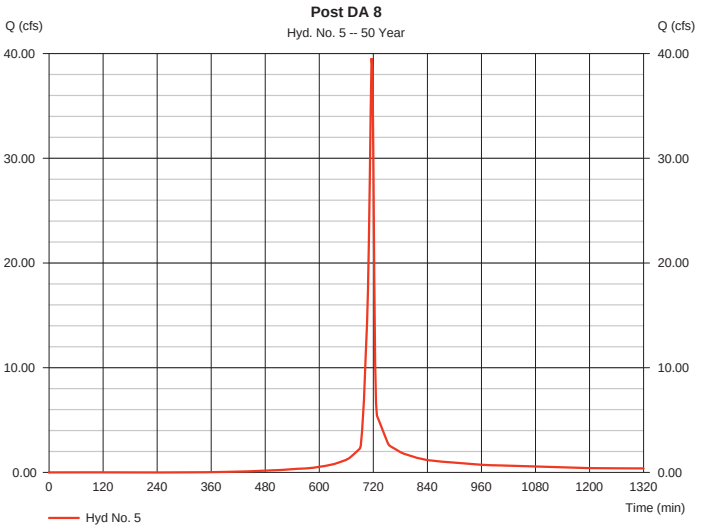
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 5

Post DA 8

Hydrograph type	= SCS Runoff	Peak discharge	= 39.56 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 81,762 cuft
Drainage area	= 5.740 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

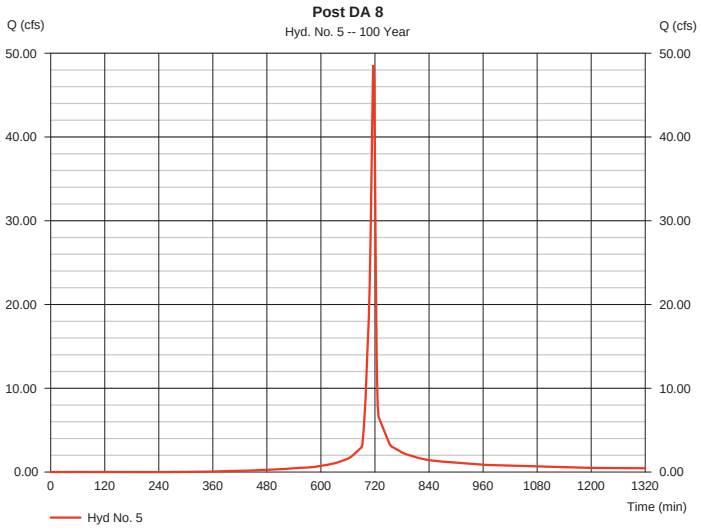


Hydrograph Report

Hyd. No. 5

Post DA 8

Hydrograph type	= SCS Runoff	Peak discharge	= 48.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 101,519 cuft
Drainage area	= 5.740 ac	Curve number	= 81
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Pond No. 2 - BMP 8

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 416.33 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	416.33	7,858	0	0
0.67	417.00	8,851	5,594	5,594
1.67	418.00	10,389	9,609	15,202
2.00	418.33	10,914	3,514	18,717
2.67	419.00	11,982	7,667	26,383
3.67	420.00	13,633	12,797	39,181
4.67	421.00	15,340	14,477	53,657
5.00	421.33	15,921	5,157	58,815

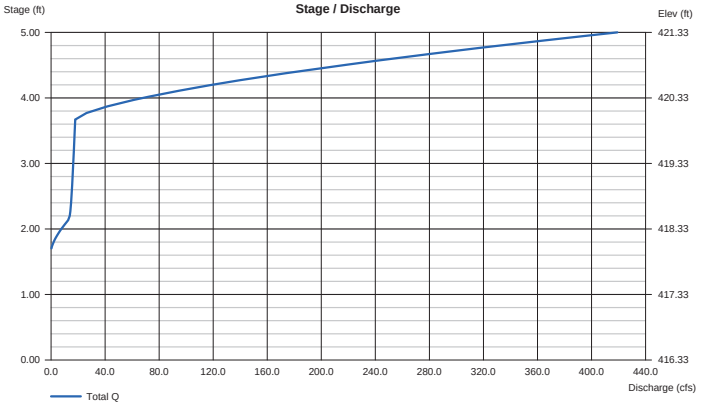
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 414.83	0.00	0.00	0.00
Length (ft)	= 29.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	100.00	0.00	0.00
Crest El. (ft)	= 418.00	420.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



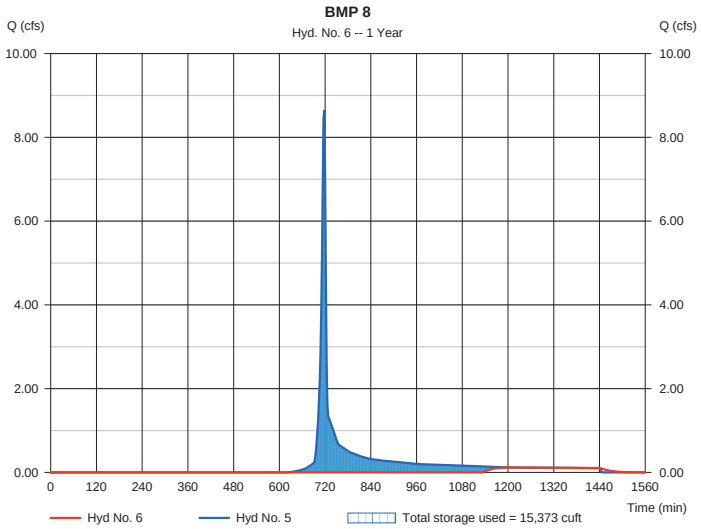
Hydrograph Report

Hyd. No. 6

BMP 8

Hydrograph type	= Reservoir	Peak discharge	= 0.117 cfs
Storm frequency	= 1 yrs	Time to peak	= 1210 min
Time interval	= 2 min	Hyd. volume	= 2,099 cuft
Inflow hyd. No.	= 5 - Post DA 8	Max. Elevation	= 418.02 ft
Reservoir name	= BMP 8	Max. Storage	= 15,373 cuft

Storage Indication method used.



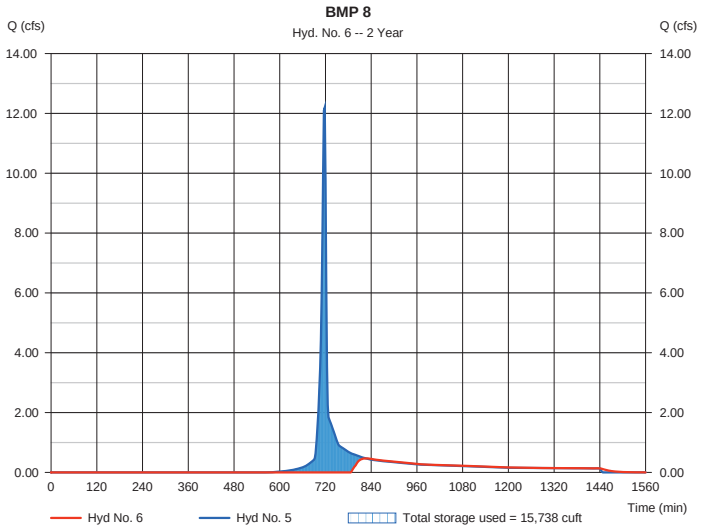
Hydrograph Report

Hyd. No. 6

BMP 8

Hydrograph type	= Reservoir	Peak discharge	= 0.469 cfs
Storm frequency	= 2 yrs	Time to peak	= 826 min
Time interval	= 2 min	Hyd. volume	= 9,258 cuft
Inflow hyd. No.	= 5 - Post DA 8	Max. Elevation	= 418.05 ft
Reservoir name	= BMP 8	Max. Storage	= 15,738 cuft

Storage Indication method used.



Hydrograph Report

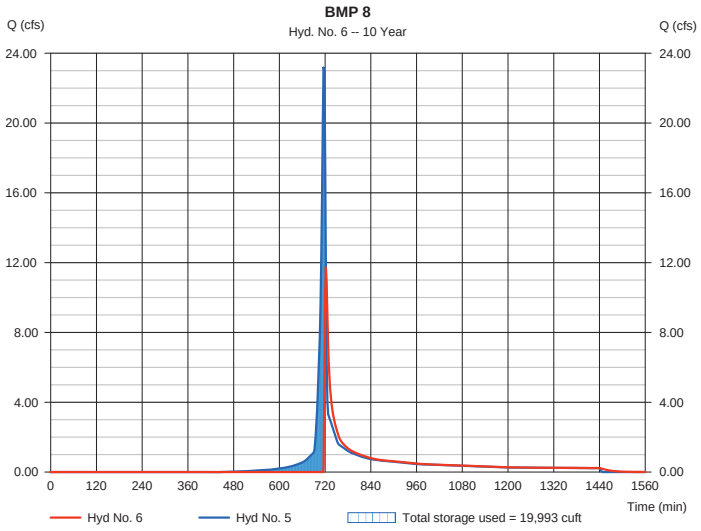
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 8

Hydrograph type	= Reservoir	Peak discharge	= 11.75 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 31,878 cuft
Inflow hyd. No.	= 5 - Post DA 8	Max. Elevation	= 418.44 ft
Reservoir name	= BMP 8	Max. Storage	= 19,993 cuft

Storage Indication method used.



Hydrograph Report

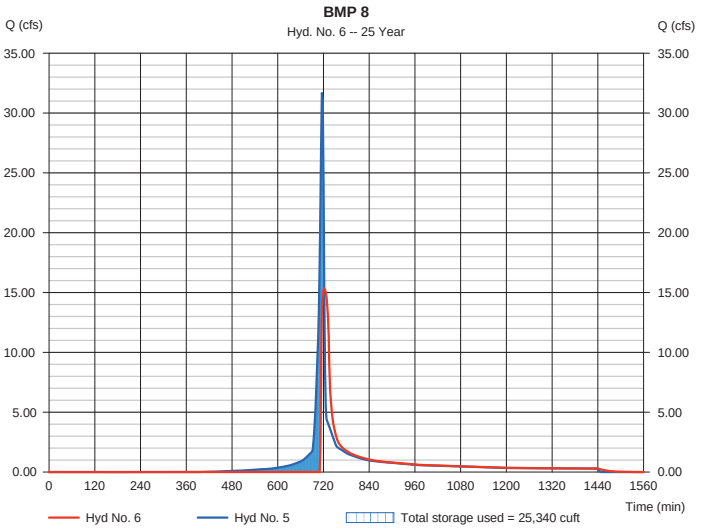
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 8

Hydrograph type	= Reservoir	Peak discharge	= 15.34 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 49,716 cuft
Inflow hyd. No.	= 5 - Post DA 8	Max. Elevation	= 418.91 ft
Reservoir name	= BMP 8	Max. Storage	= 25,340 cuft

Storage Indication method used.



Hydrograph Report

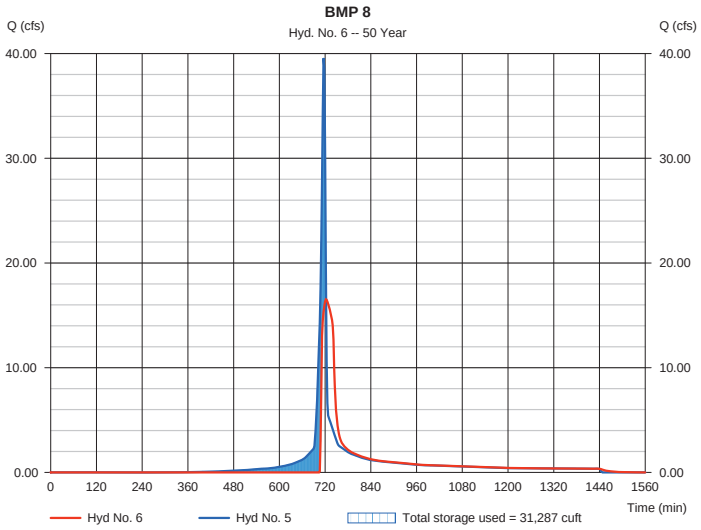
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 8

Hydrograph type	= Reservoir	Peak discharge	= 16.52 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 66,558 cuft
Inflow hyd. No.	= 5 - Post DA 8	Max. Elevation	= 419.40 ft
Reservoir name	= BMP 8	Max. Storage	= 31,287 cuft

Storage Indication method used.



Hydrograph Report

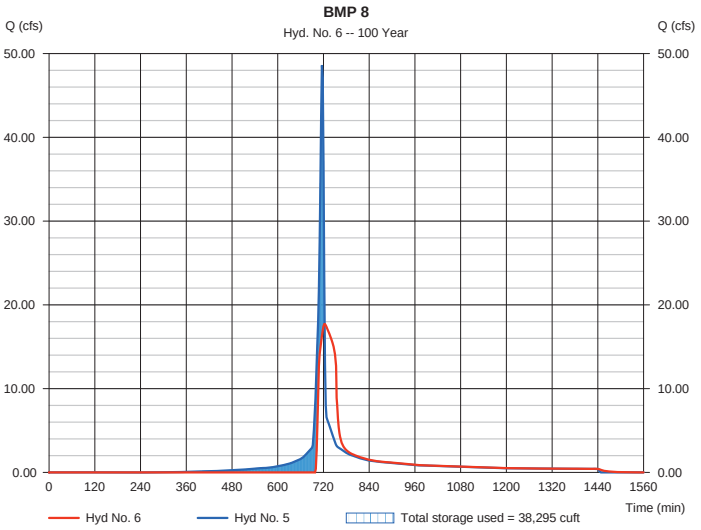
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 6

BMP 8

Hydrograph type	= Reservoir	Peak discharge	= 17.70 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 86,315 cuft
Inflow hyd. No.	= 5 - Post DA 8	Max. Elevation	= 419.95 ft
Reservoir name	= BMP 8	Max. Storage	= 38,295 cuft

Storage Indication method used.



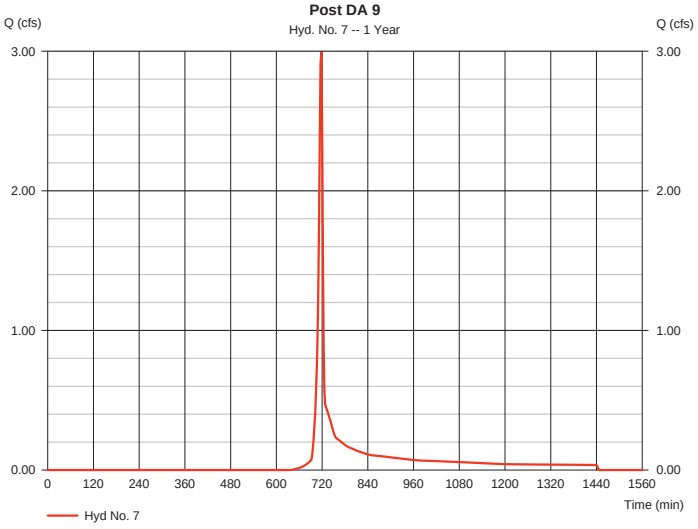
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Post DA 9

Hydrograph type	= SCS Runoff	Peak discharge	= 2.993 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 5,989 cuft
Drainage area	= 2.110 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



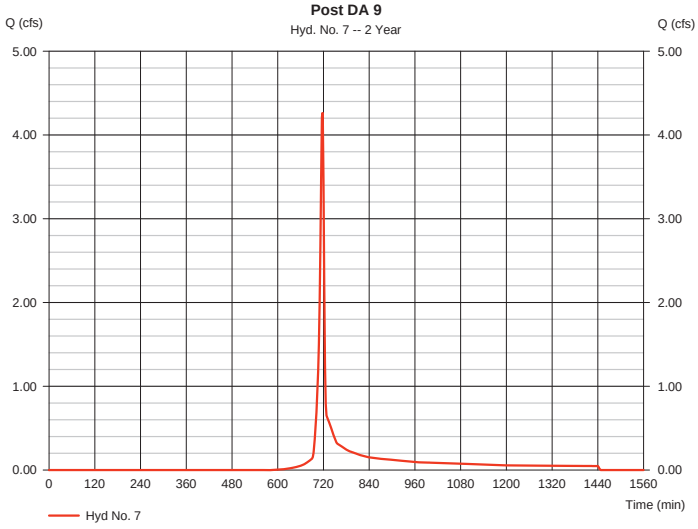
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Post DA 9

Hydrograph type	= SCS Runoff	Peak discharge	= 4.268 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 8,547 cuft
Drainage area	= 2.110 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



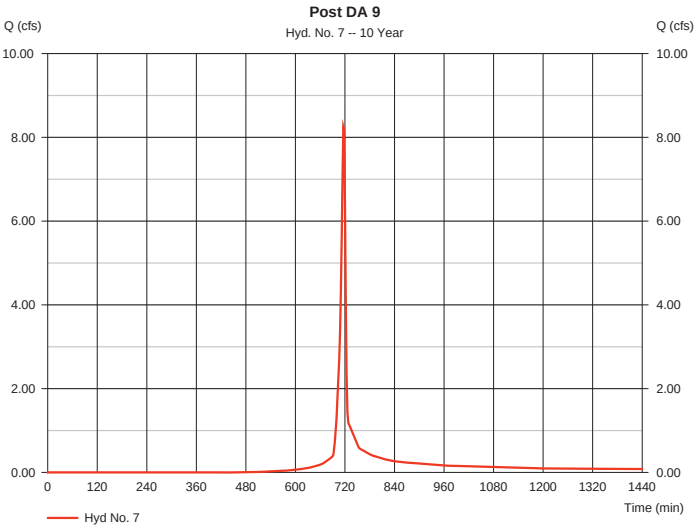
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Post DA 9

Hydrograph type	= SCS Runoff	Peak discharge	= 8.250 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 16,701 cuft
Drainage area	= 2.110 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



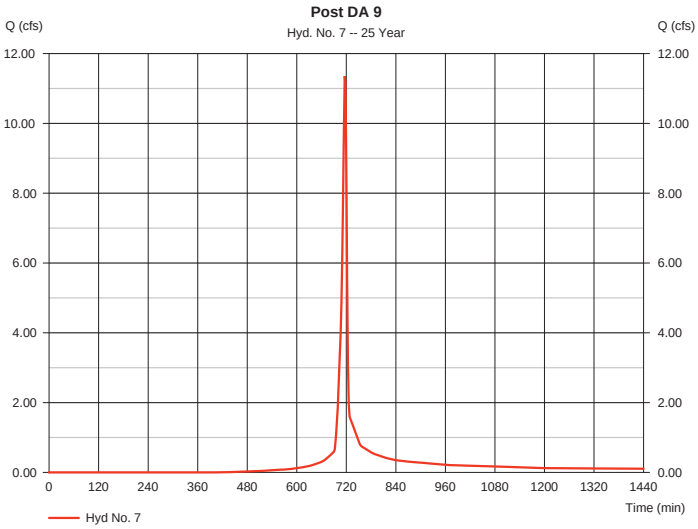
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Post DA 9

Hydrograph type	= SCS Runoff	Peak discharge	= 11.35 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 23,171 cuft
Drainage area	= 2.110 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



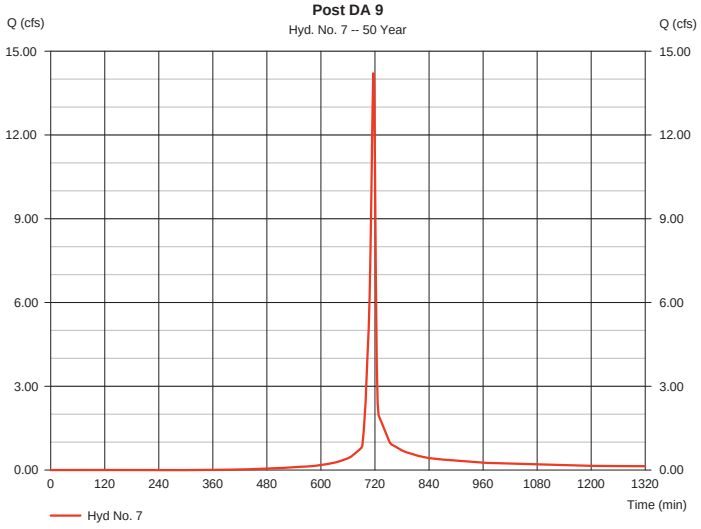
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Post DA 9

Hydrograph type	= SCS Runoff	Peak discharge	= 14.23 cfs
Storm frequency	= 50 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 29,299 cuft
Drainage area	= 2.110 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



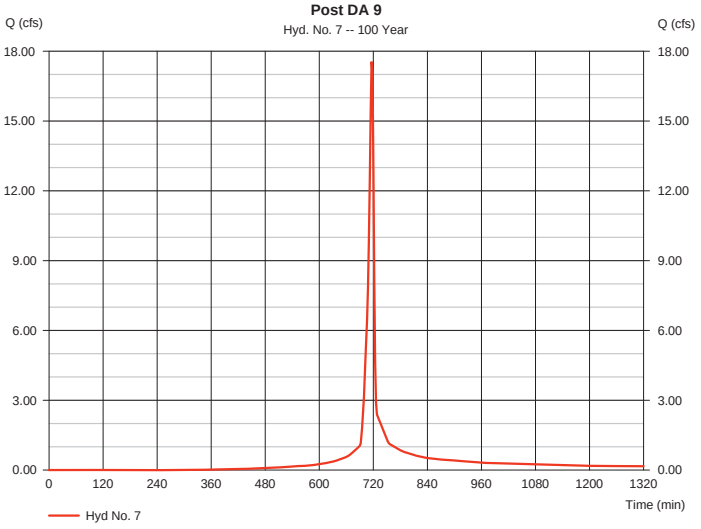
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 7

Post DA 9

Hydrograph type	= SCS Runoff	Peak discharge	= 17.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 36,502 cuft
Drainage area	= 2.110 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Pond No. 3 - BMP 9

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 457.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	457.00	4,208	0	0
1.00	458.00	5,164	4,677	4,677
2.00	459.00	6,186	5,667	10,344
3.00	460.00	7,251	6,711	17,055
4.00	461.00	8,373	7,804	24,859

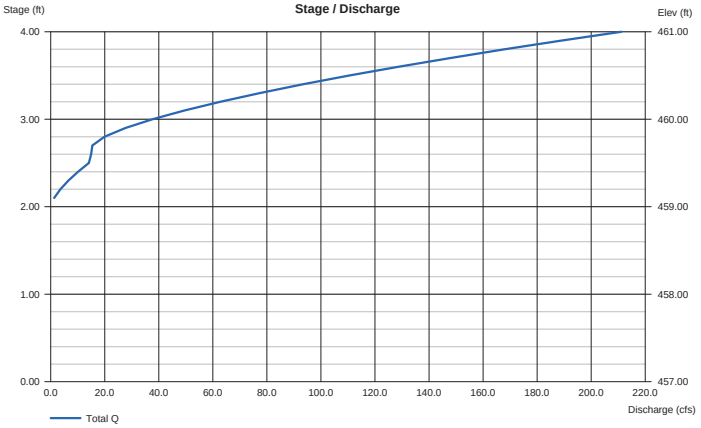
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 455.50	0.00	0.00	0.00
Length (ft)	= 32.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	50.00	0.00	0.00
Crest El. (ft)	= 459.00	459.70	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

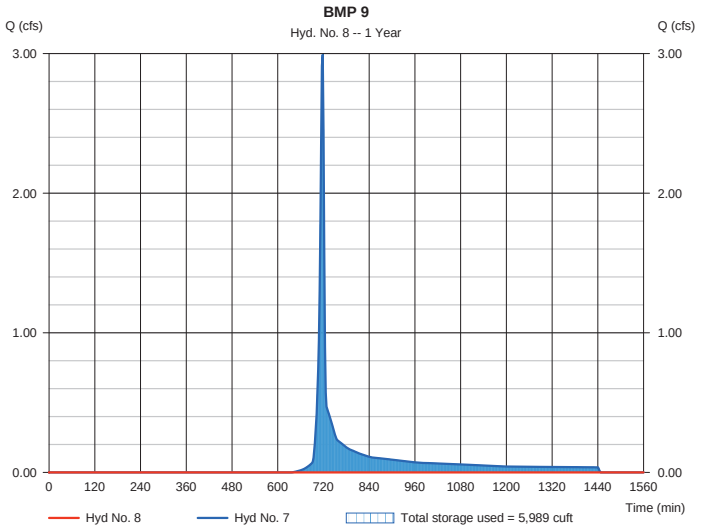
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

BMP 9

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 7 - Post DA 9	Max. Elevation	= 458.23 ft
Reservoir name	= BMP 9	Max. Storage	= 5,989 cuft

Storage Indication method used.



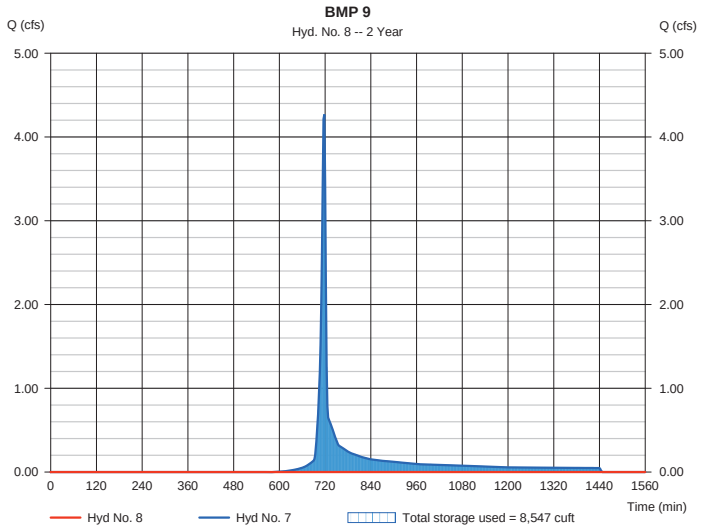
Hydrograph Report

Hyd. No. 8

BMP 9

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 7 - Post DA 9	Max. Elevation	= 458.68 ft
Reservoir name	= BMP 9	Max. Storage	= 8,547 cuft

Storage Indication method used.



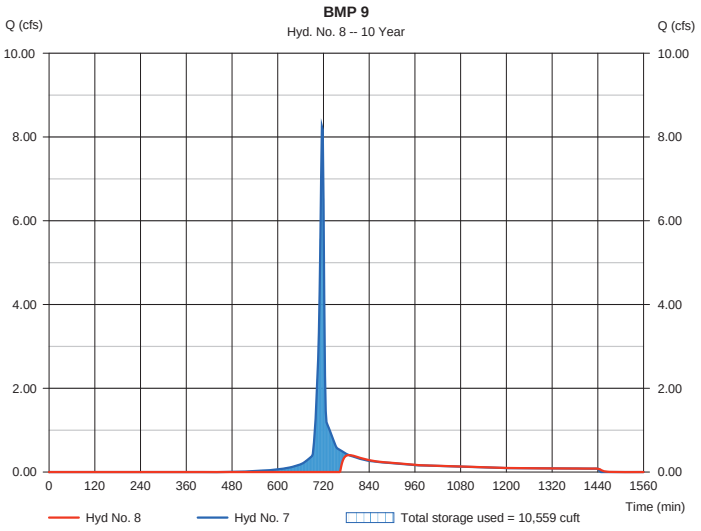
Hydrograph Report

Hyd. No. 8

BMP 9

Hydrograph type	= Reservoir	Peak discharge	= 0.404 cfs
Storm frequency	= 10 yrs	Time to peak	= 786 min
Time interval	= 2 min	Hyd. volume	= 6,356 cuft
Inflow hyd. No.	= 7 - Post DA 9	Max. Elevation	= 459.03 ft
Reservoir name	= BMP 9	Max. Storage	= 10,559 cuft

Storage Indication method used.



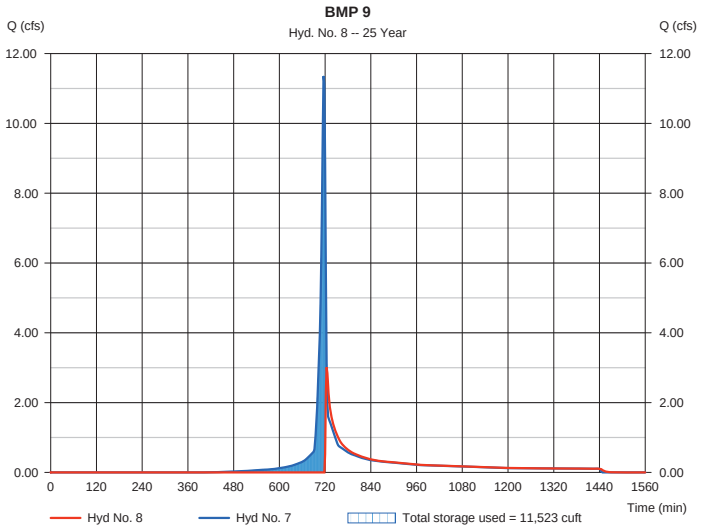
Hydrograph Report

Hyd. No. 8

BMP 9

Hydrograph type	= Reservoir	Peak discharge	= 3.013 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 12,826 cuft
Inflow hyd. No.	= 7 - Post DA 9	Max. Elevation	= 459.18 ft
Reservoir name	= BMP 9	Max. Storage	= 11,523 cuft

Storage Indication method used.



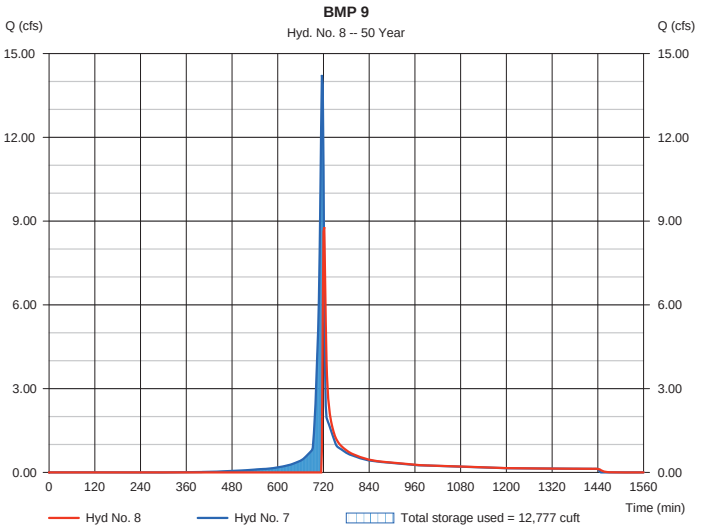
Hydrograph Report

Hyd. No. 8

BMP 9

Hydrograph type	= Reservoir	Peak discharge	= 8.784 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 18,954 cuft
Inflow hyd. No.	= 7 - Post DA 9	Max. Elevation	= 459.38 ft
Reservoir name	= BMP 9	Max. Storage	= 12,777 cuft

Storage Indication method used.



Hydrograph Report

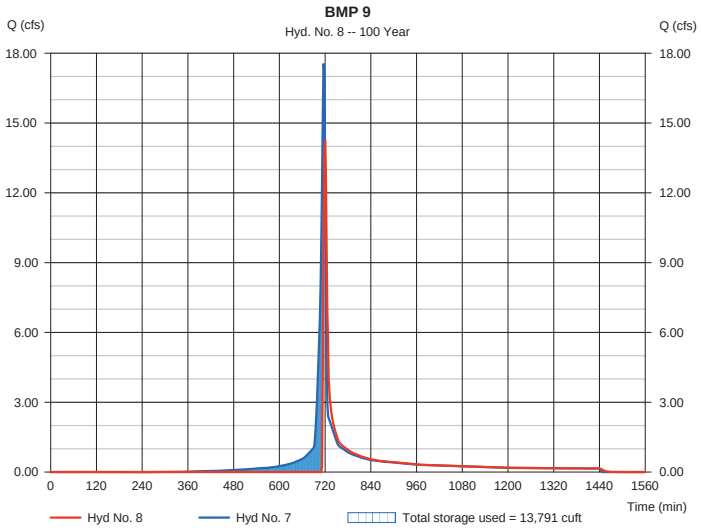
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 8

BMP 9

Hydrograph type	= Reservoir	Peak discharge	= 14.24 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 26,158 cuft
Inflow hyd. No.	= 7 - Post DA 9	Max. Elevation	= 459.52 ft
Reservoir name	= BMP 9	Max. Storage	= 13,791 cuft

Storage Indication method used.



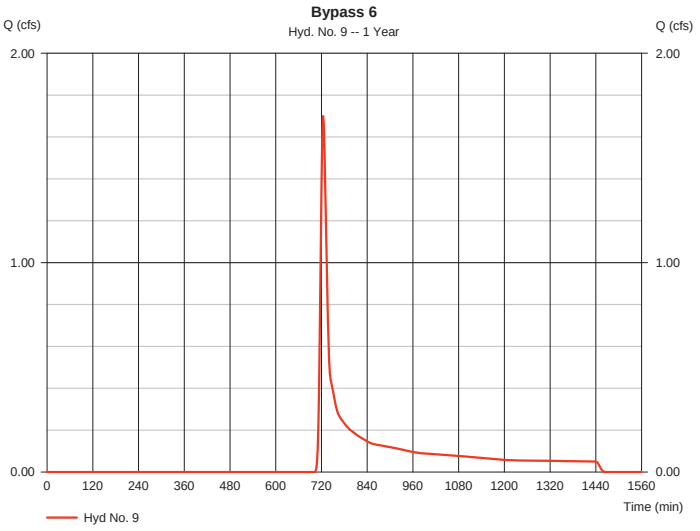
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Bypass 6

Hydrograph type	= SCS Runoff	Peak discharge	= 1.702 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 6,075 cuft
Drainage area	= 4.110 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 2.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



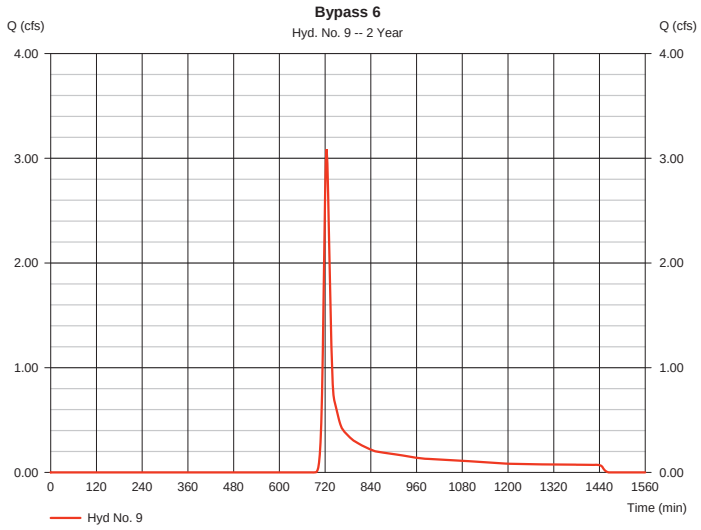
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Bypass 6

Hydrograph type	= SCS Runoff	Peak discharge	= 3.087 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 9,750 cuft
Drainage area	= 4.110 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 2.92 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



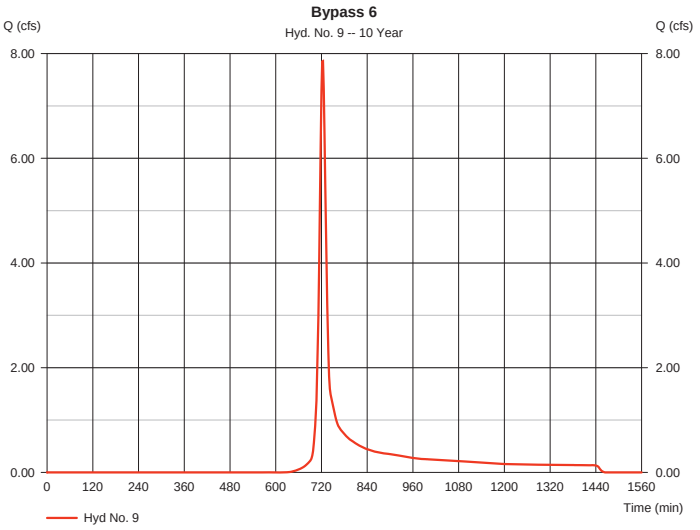
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Bypass 6

Hydrograph type	= SCS Runoff	Peak discharge	= 7.856 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 22,713 cuft
Drainage area	= 4.110 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



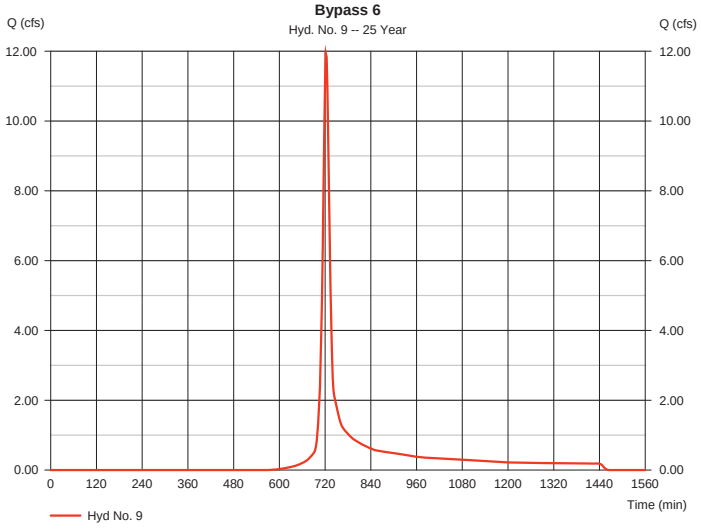
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Bypass 6

Hydrograph type	= SCS Runoff	Peak discharge	= 11.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 33,781 cuft
Drainage area	= 4.110 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 5.38 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



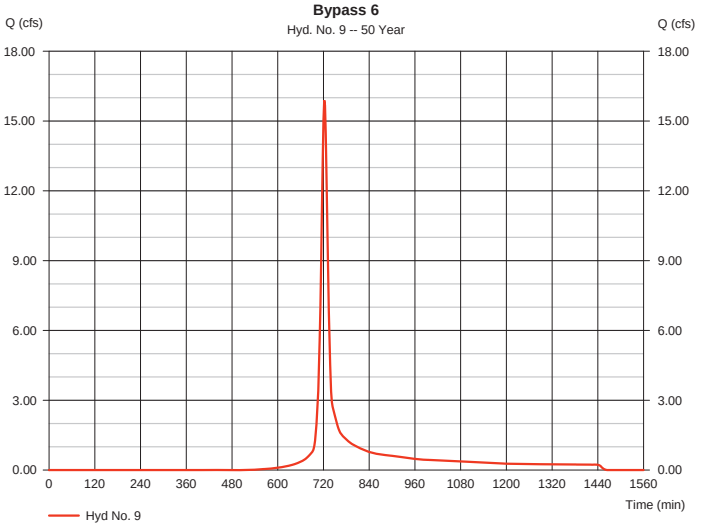
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Bypass 6

Hydrograph type	= SCS Runoff	Peak discharge	= 15.89 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 44,647 cuft
Drainage area	= 4.110 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 6.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



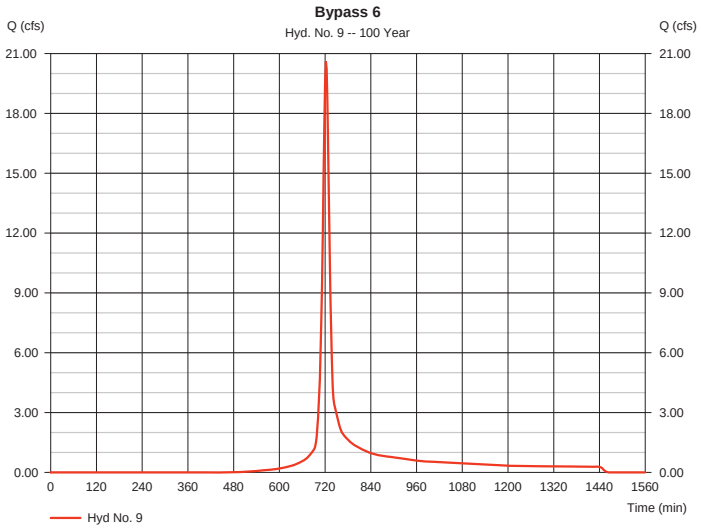
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 9

Bypass 6

Hydrograph type	= SCS Runoff	Peak discharge	= 20.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 57,752 cuft
Drainage area	= 4.110 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 13.80 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



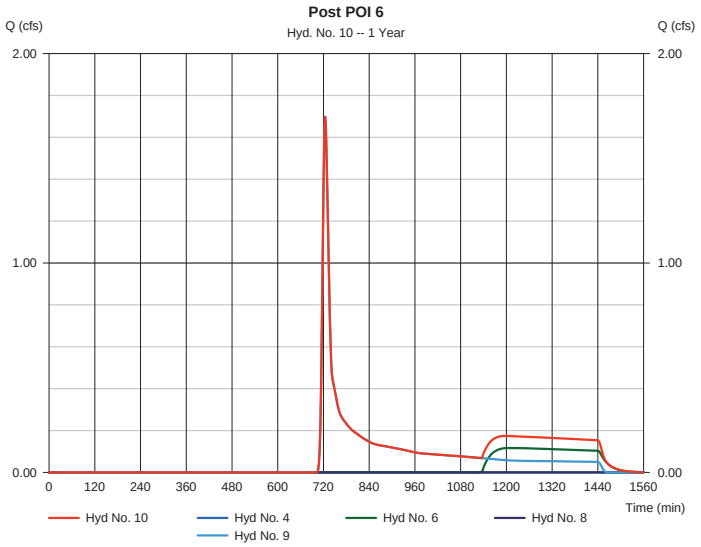
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post POI 6

Hydrograph type	= Combine	Peak discharge	= 1.702 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 8,174 cuft
Inflow hyds.	= 4, 6, 8, 9	Contrib. drain. area	= 4.110 ac



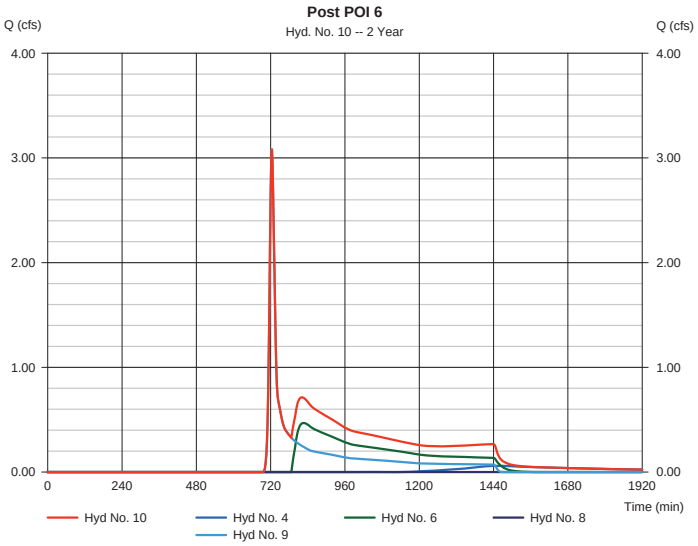
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post POI 6

Hydrograph type	= Combine	Peak discharge	= 3.087 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 22,233 cuft
Inflow hyds.	= 4, 6, 8, 9	Contrib. drain. area	= 4.110 ac



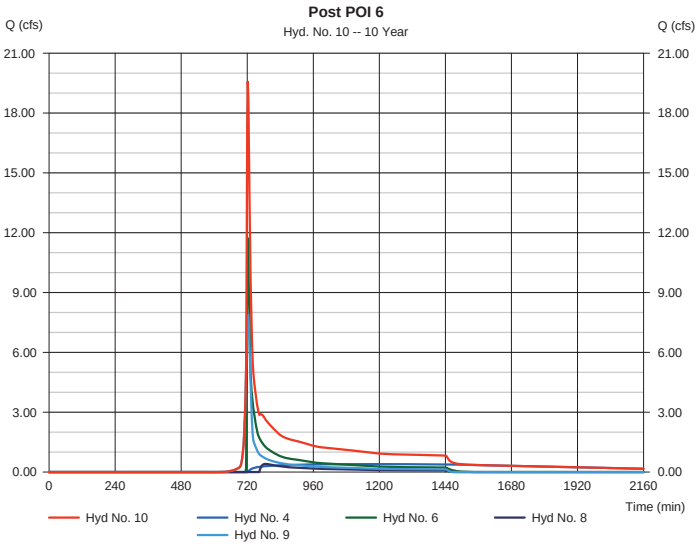
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post POI 6

Hydrograph type	= Combine	Peak discharge	= 19.61 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 93,974 cuft
Inflow hyds.	= 4, 6, 8, 9	Contrib. drain. area	= 4.110 ac



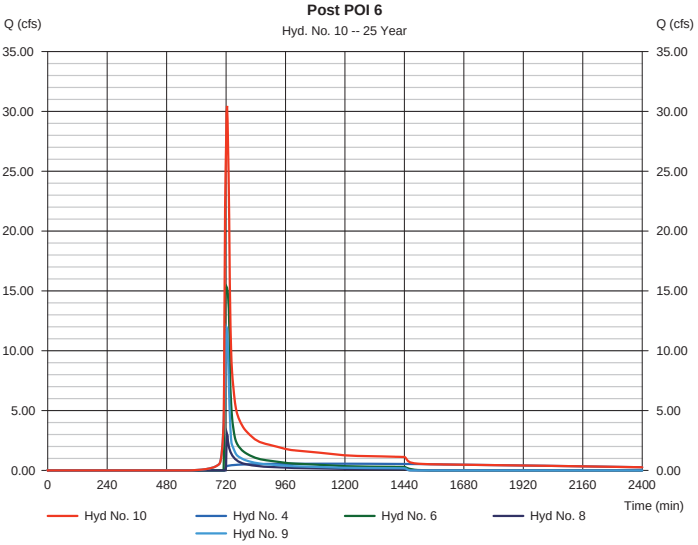
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post POI 6

Hydrograph type	= Combine	Peak discharge	= 30.46 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 152,683 cuft
Inflow hyds.	= 4, 6, 8, 9	Contrib. drain. area	= 4.110 ac



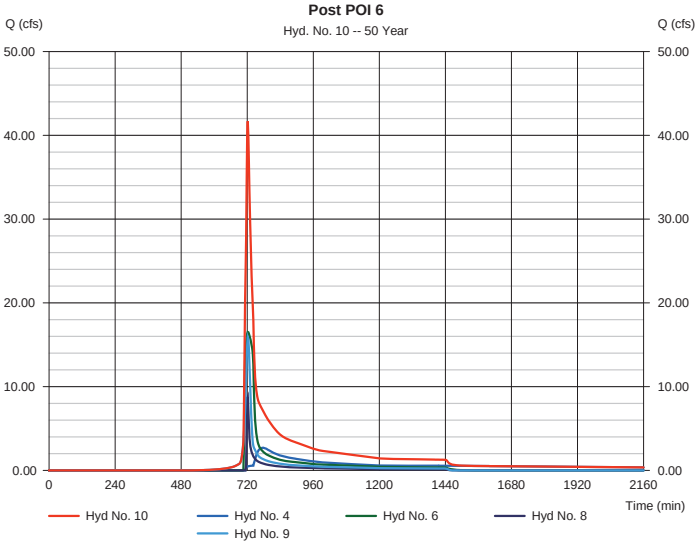
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post POI 6

Hydrograph type	= Combine	Peak discharge	= 41.69 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 208,578 cuft
Inflow hyds.	= 4, 6, 8, 9	Contrib. drain. area	= 4.110 ac



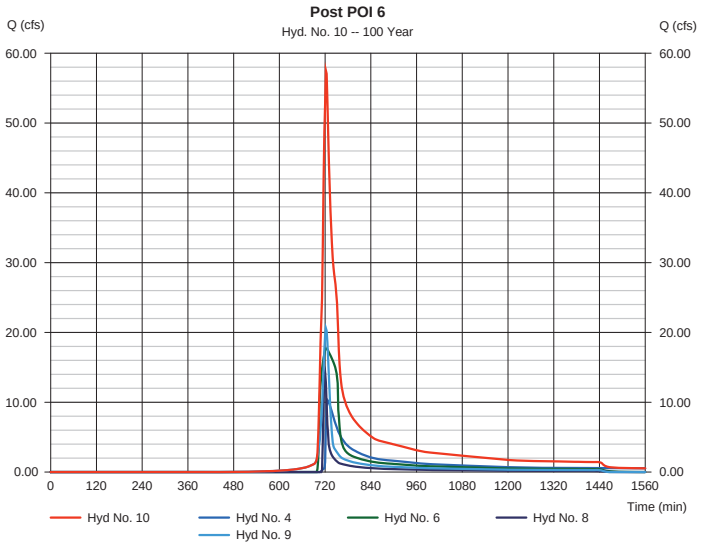
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Post POI 6

Hydrograph type	= Combine	Peak discharge	= 57.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 274,475 cuft
Inflow hyds.	= 4, 6, 8, 9	Contrib. drain. area	= 4.110 ac



Appendix E
Stormwater Conveyance Calculations

NOAA Atlas 14, Volume 2, Version 3
Location name: Susquehanna Twp, Pennsylvania, USA*
Latitude: 40.299°, Longitude: -76.8547°
Elevation: 488.34 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**3.89** (3.50-4.31)	**4.63** (4.16-5.15)	**5.47** (4.91-6.08)	**6.06** (5.44-6.73)	**6.82** (6.07-7.55)	**7.36** (6.54-8.14)	**7.90** (7.01-8.75)	**8.45** (7.45-9.35)	**9.12** (7.98-10.1)	**9.65** (8.38-10.7)
10-min	**3.10** (2.78-3.43)	**3.70** (3.32-4.10)	**4.35** (3.91-4.84)	**4.82** (4.31-5.35)	**5.40** (4.82-5.98)	**5.83** (5.18-6.45)	**6.25** (5.54-6.91)	**6.64** (5.85-7.34)	**7.15** (6.25-7.91)	**7.52** (6.53-8.34)
15-min	**2.57** (2.32-2.86)	**3.08** (2.77-3.43)	**3.65** (3.28-4.06)	**4.05** (3.63-4.50)	**4.54** (4.05-5.03)	**4.89** (4.35-5.42)	**5.24** (4.65-5.81)	**5.56** (4.90-6.15)	**5.99** (5.24-6.63)	**6.29** (5.46-6.97)
30-min	**1.75** (1.58-1.95)	**2.12** (1.90-2.36)	**2.58** (2.32-2.87)	**2.92** (2.61-3.24)	**3.34** (2.98-3.70)	**3.66** (3.26-4.05)	**3.98** (3.53-4.41)	**4.29** (3.78-4.75)	**4.71** (4.12-5.21)	**5.04** (4.37-5.59)
60-min	**1.09** (0.982-1.21)	**1.33** (1.19-1.48)	**1.65** (1.48-1.84)	**1.89** (1.70-2.10)	**2.22** (1.98-2.46)	**2.47** (2.20-2.74)	**2.73** (2.42-3.02)	**3.00** (2.64-3.32)	**3.36** (2.94-3.72)	**3.66** (3.17-4.05)
2-hr	**0.633** (0.571-0.704)	**0.769** (0.692-0.855)	**0.968** (0.872-1.08)	**1.13** (1.01-1.25)	**1.36** (1.21-1.50)	**1.56** (1.38-1.72)	**1.77** (1.56-1.95)	**2.00** (1.75-2.21)	**2.35** (2.03-2.59)	**2.64** (2.26-2.92)
3-hr	**0.461** (0.415-0.515)	**0.558** (0.503-0.624)	**0.704** (0.634-0.786)	**0.822** (0.738-0.916)	**0.991** (0.884-1.10)	**1.14** (1.01-1.26)	**1.29** (1.14-1.43)	**1.47** (1.28-1.62)	**1.72** (1.49-1.91)	**1.95** (1.66-2.16)
6-hr	**0.286** (0.257-0.320)	**0.346** (0.311-0.388)	**0.434** (0.389-0.486)	**0.508** (0.453-0.567)	**0.617** (0.547-0.687)	**0.711** (0.627-0.790)	**0.817** (0.714-0.906)	**0.934** (0.809-1.03)	**1.11** (0.949-1.23)	**1.26** (1.07-1.40)
12-hr	**0.173** (0.154-0.198)	**0.209** (0.186-0.238)	**0.263** (0.234-0.300)	**0.310** (0.274-0.352)	**0.381** (0.334-0.431)	**0.444** (0.386-0.500)	**0.515** (0.443-0.580)	**0.595** (0.507-0.668)	**0.719** (0.603-0.807)	**0.829** (0.685-0.931)
24-hr	**0.101** (0.093-0.112)	**0.122** (0.112-0.134)	**0.153** (0.141-0.169)	**0.181** (0.165-0.199)	**0.224** (0.203-0.246)	**0.264** (0.237-0.288)	**0.309** (0.275-0.336)	**0.362** (0.319-0.392)	**0.446** (0.387-0.481)	**0.523** (0.446-0.562)
2-day	**0.058** (0.053-0.065)	**0.070** (0.064-0.078)	**0.088** (0.080-0.098)	**0.104** (0.094-0.116)	**0.128** (0.116-0.142)	**0.150** (0.134-0.166)	**0.175** (0.155-0.193)	**0.204** (0.179-0.224)	**0.250** (0.216-0.274)	**0.291** (0.248-0.319)
3-day	**0.041** (0.038-0.046)	**0.050** (0.046-0.055)	**0.062** (0.057-0.069)	**0.073** (0.067-0.081)	**0.090** (0.082-0.099)	**0.106** (0.095-0.116)	**0.123** (0.110-0.135)	**0.143** (0.126-0.156)	**0.175** (0.152-0.191)	**0.203** (0.174-0.222)
4-day	**0.033** (0.030-0.036)	**0.040** (0.036-0.044)	**0.049** (0.045-0.054)	**0.058** (0.053-0.064)	**0.071** (0.065-0.078)	**0.083** (0.075-0.091)	**0.097** (0.087-0.106)	**0.113** (0.100-0.122)	**0.137** (0.120-0.149)	**0.160** (0.137-0.173)
7-day	**0.022** (0.020-0.024)	**0.026** (0.024-0.029)	**0.033** (0.030-0.036)	**0.038** (0.035-0.042)	**0.047** (0.043-0.051)	**0.054** (0.049-0.059)	**0.063** (0.056-0.068)	**0.072** (0.064-0.078)	**0.087** (0.077-0.095)	**0.101** (0.088-0.109)
10-day	**0.018** (0.017-0.019)	**0.021** (0.020-0.023)	**0.026** (0.024-0.028)	**0.030** (0.028-0.032)	**0.036** (0.033-0.039)	**0.041** (0.038-0.045)	**0.047** (0.043-0.051)	**0.054** (0.049-0.058)	**0.064** (0.057-0.069)	**0.073** (0.064-0.078)
20-day	**0.012** (0.011-0.013)	**0.014** (0.013-0.015)	**0.017** (0.016-0.018)	**0.019** (0.018-0.021)	**0.023** (0.021-0.024)	**0.025** (0.023-0.027)	**0.028** (0.026-0.030)	**0.031** (0.029-0.034)	**0.036** (0.033-0.039)	**0.040** (0.036-0.043)
30-day	**0.010** (0.009-0.011)	**0.012** (0.011-0.013)	**0.014** (0.013-0.015)	**0.015** (0.014-0.016)	**0.018** (0.017-0.019)	**0.020** (0.018-0.021)	**0.022** (0.020-0.023)	**0.024** (0.022-0.025)	**0.027** (0.025-0.029)	**0.030** (0.027-0.032)
45-day	**0.008** (0.008-0.009)	**0.010** (0.009-0.010)	**0.011** (0.011-0.012)	**0.012** (0.012-0.013)	**0.014** (0.013-0.015)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.020** (0.019-0.021)	**0.022** (0.020-0.023)
60-day	**0.008** (0.007-0.008)	**0.009** (0.008-0.009)	**0.010** (0.010-0.011)	**0.011** (0.010-0.012)	**0.012** (0.012-0.013)	**0.013** (0.013-0.014)	**0.014** (0.014-0.015)	**0.016** (0.015-0.016)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)

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

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Post Development Inlet Drainage Area

Drainage Area	Impervious (ac)	Open Space (ac)	Total (ac)	Runoff Coefficient
I-2	0.14	0.04	0.19	0.81
I-3	0.12	0.00	0.12	0.97
I-5	0.22	0.03	0.25	0.89
I-100	0.00	0.00	0.00	0.26
I-102	0.06	0.06	0.12	0.61
I-103	0.06	0.04	0.10	0.71
I-104	0.09	0.14	0.24	0.54
I-105	0.12	0.05	0.17	0.75
I-106	0.10	0.08	0.17	0.65
I-107	0.10	0.00	0.10	0.97
I-108	0.06	0.04	0.10	0.68
I-109	0.03	0.09	0.12	0.46
I-110	0.04	0.00	0.04	0.97
I-111	0.03	0.04	0.06	0.55
I-112	0.04	0.01	0.05	0.89
I-113	0.05	0.03	0.08	0.67
I-114	0.05	0.03	0.08	0.71
I-115	0.05	0.04	0.09	0.64
I-116	0.00	0.00	0.00	0.97
I-117	0.10	0.01	0.10	0.92
I-118	0.11	0.01	0.12	0.90
I-119	0.07	0.01	0.09	0.85
I-120	0.10	0.02	0.12	0.87
I-121	0.15	0.06	0.20	0.77
I-122	0.04	0.00	0.04	0.97
I-123	0.04	0.15	0.20	0.42
I-124	0.25	0.00	0.25	0.97
I-125	0.21	0.05	0.26	0.84
I-202	0.15	0.02	0.18	0.88
I-203	0.07	0.01	0.08	0.88
I-204	0.20	0.05	0.26	0.82
I-205	0.07	0.02	0.09	0.84
I-206	0.08	0.06	0.14	0.68
I-207	0.15	0.01	0.16	0.93
I-208	0.02	0.00	0.02	0.97
I-209	0.05	0.00	0.05	0.96
I-210	0.04	0.01	0.05	0.83
I-211	0.04	0.01	0.05	0.85
I-212	0.02	0.01	0.03	0.81
I-213	0.09	0.02	0.11	0.85
I-214	0.09	0.13	0.22	0.55
I-215	0.09	0.11	0.20	0.58
I-216	0.05	0.01	0.05	0.89
I-217	0.08	0.01	0.09	0.89
I-218	0.21	0.06	0.28	0.81
I-219	0.05	0.00	0.05	0.93
I-220	0.14	0.05	0.19	0.78
I-221	0.05	0.01	0.06	0.81
I-222	0.05	0.00	0.05	0.93
I-223	0.06	0.01	0.07	0.88
I-224	0.11	0.05	0.15	0.76
YD-225	0.00	0.05	0.05	0.27
YD-226	0.00	0.06	0.06	0.26
YD-227	0.00	0.10	0.10	0.26

Land Use	Runoff Coefficient
Impervious	0.97
Open Space	0.26

Post Development Inlet Drainage Area

Drainage Area	Impervious (ac)	Open Space (ac)	Total (ac)	Runoff Coefficient
YD-228	0.00	0.11	0.11	0.26
YD-229	0.00	0.08	0.08	0.26
I-302	0.09	0.03	0.12	0.81
I-303	0.03	0.00	0.03	0.97
YD-304	0.00	0.16	0.16	0.26
I-403	0.00	0.16	0.17	0.28
I-404	0.18	0.03	0.21	0.87
I-405	0.02	0.01	0.03	0.71
I-406	0.03	0.02	0.06	0.68
I-407	0.12	0.00	0.12	0.96
I-408	0.14	0.05	0.19	0.77
I-503	0.03	0.02	0.05	0.75
I-504	0.05	0.03	0.08	0.70
I-505	0.11	0.15	0.26	0.57
I-506	0.08	0.03	0.11	0.80
I-507	0.08	0.01	0.09	0.89
I-508	0.08	0.04	0.12	0.73
I-509	0.05	0.00	0.05	0.97
I-510	0.04	0.06	0.10	0.56
I-511	0.01	0.00	0.01	0.97
I-512	0.26	0.10	0.36	0.77
I-513	0.24	0.05	0.28	0.85
I-514	0.00	0.00	0.00	0.97
I-515	0.00	0.00	0.00	0.97
I-516	0.15	0.02	0.17	0.90
I-603	0.30	0.04	0.34	0.89
I-604	0.12	0.00	0.12	0.97
I-605	0.04	0.06	0.10	0.55
I-606	0.04	0.02	0.05	0.75
I-607	0.07	0.09	0.16	0.55
I-608	0.14	0.02	0.16	0.87
I-609	0.12	0.07	0.19	0.72
I-610	0.10	0.00	0.10	0.97
I-611	0.19	0.03	0.22	0.88
I-612	0.05	0.00	0.05	0.97
I-613	0.04	0.03	0.08	0.66
I-615	0.00	0.12	0.12	0.26
I-616	0.14	0.04	0.18	0.81
I-617	0.11	0.01	0.12	0.93
I-618	0.15	0.10	0.25	0.68
I-619	0.08	0.23	0.30	0.44
YD-614	0.04	0.06	0.09	0.55
YD-620	0.02	0.02	0.05	0.59
I-705	0.10	0.01	0.11	0.90
I-706	0.11	0.01	0.13	0.90
I-707	0.02	0.00	0.02	0.97
I-708	0.03	0.00	0.03	0.89
I-709	0.11	0.05	0.16	0.76
I-710	0.23	0.09	0.32	0.77
I-711	0.05	0.00	0.05	0.97
I-712	0.06	0.00	0.06	0.97
I-715	0.06	0.12	0.19	0.50
I-716	0.09	0.11	0.20	0.58
I-717	0.17	0.03	0.19	0.88

Land Use	Runoff Coefficient
Impervious	0.97
Open Space	0.26

Post Development Inlet Drainage Area

Drainage Area	Impervious (ac)	Open Space (ac)	Total (ac)	Runoff Coefficient
I-718	0.16	0.02	0.19	0.88
I-719	0.08	0.08	0.15	0.61
I-720	0.22	0.04	0.26	0.86
I-721	0.01	0.00	0.01	0.97
I-723	0.10	0.06	0.16	0.71
I-724	0.09	0.06	0.16	0.68
I-725	0.21	0.50	0.71	0.47
I-728	0.09	0.04	0.14	0.73
I-729	0.15	0.02	0.17	0.89
I-730	0.11	0.03	0.14	0.84
I-731	0.09	0.01	0.10	0.89
I-732	0.17	0.03	0.20	0.86
I-733	0.17	0.04	0.21	0.84
I-734	0.07	0.04	0.11	0.69
I-735	0.21	0.07	0.28	0.80
YD-722	0.06	0.05	0.12	0.64
YD-736	0.08	0.07	0.15	0.63
YD-737	0.05	0.09	0.14	0.52
YD-738	0.01	0.03	0.04	0.43
I-803	0.48	0.23	0.71	0.74
I-804	0.14	0.02	0.16	0.86
I-805	0.06	0.05	0.10	0.64
I-806	0.13	0.02	0.15	0.87
I-807	0.18	0.05	0.23	0.82
I-808	0.24	0.05	0.29	0.85
I-809	0.20	0.04	0.24	0.86
I-810	0.30	0.05	0.35	0.86
I-811	0.16	0.03	0.19	0.86
I-812	0.11	0.02	0.13	0.88
I-813	0.11	0.05	0.16	0.74
I-816	0.15	0.06	0.21	0.77
I-817	0.07	0.04	0.11	0.72
I-818	0.05	0.06	0.12	0.58
I-819	0.14	0.08	0.22	0.70
I-820	0.10	0.18	0.28	0.52
YD-814	0.08	0.13	0.21	0.52
YD-815	0.06	0.08	0.14	0.58
YD-823	0.09	0.09	0.18	0.61
YD-821	0.17	0.27	0.43	0.53
YD-822	0.02	0.06	0.08	0.46
I-903	0.00	0.00	0.00	0.97
I-904	0.19	0.06	0.25	0.81
I-905	0.12	0.05	0.17	0.75
I-906	0.11	0.02	0.13	0.87
I-907	0.10	0.01	0.11	0.90
I-908	0.08	0.01	0.09	0.92
I-909	0.05	0.02	0.07	0.80

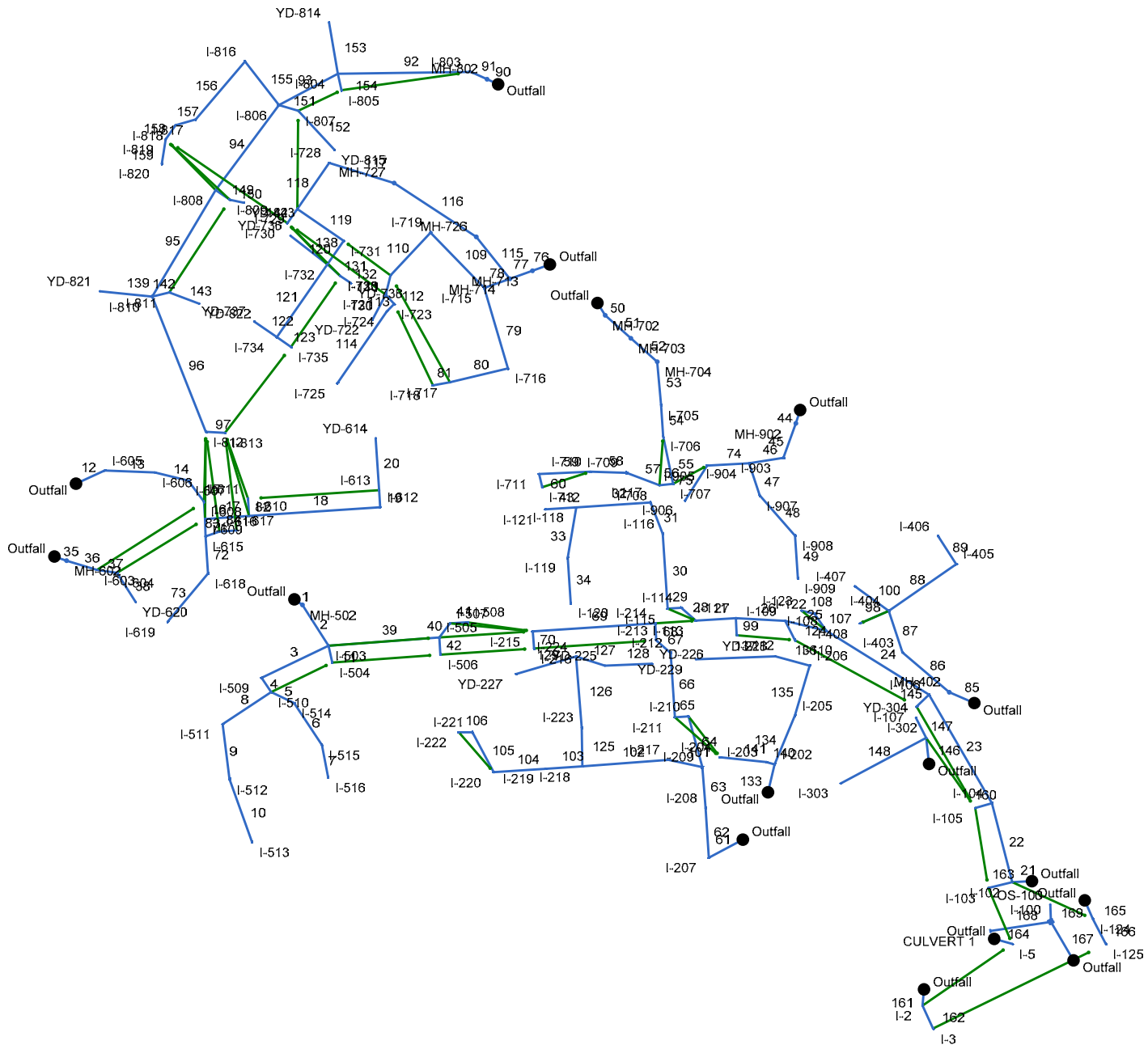
Land Use	Runoff Coefficient
Impervious	0.97
Open Space	0.26

Post Development Roof Drainage Area

Drainage Area	Impervious (ac)	Open Space (ac)	Total (ac)	Runoff Coefficient
RD TO I-116	0.09	0.00	0.09	0.97
RD TO I-119	0.09	0.00	0.09	0.97
RD-1 TO I-120	0.09	0.00	0.09	0.97
RD-2 TO I-120	0.09	0.00	0.09	0.97
RD TO I-205	0.09	0.00	0.09	0.97
RD TO I-207	0.09	0.00	0.09	0.97
RD TO I-217	0.09	0.00	0.09	0.97
RD-1 TO I-223	0.09	0.00	0.09	0.97
RD-2 TO I-223	0.09	0.00	0.09	0.97
RD TO YD-225	0.05	0.00	0.05	0.97
RD TO YD-226	0.05	0.00	0.05	0.97
RD-1 TO YD-227	0.05	0.00	0.05	0.97
RD-2 TO YD-227	0.05	0.00	0.05	0.97
RD TO YD-228	0.05	0.00	0.05	0.97
RD TO YD-229	0.05	0.00	0.05	0.97
RD TO I-303	0.09	0.00	0.09	0.97
RD TO YD-304	0.09	0.00	0.09	0.97
RD TO I-405	0.09	0.00	0.09	0.97
RD TO MH-402	0.09	0.00	0.09	0.97
RD TO I-513	0.09	0.00	0.09	0.97
RD TO I-514	0.09	0.00	0.09	0.97
RD TO I-515	0.09	0.00	0.09	0.97
RD TO I-516	0.09	0.00	0.09	0.97
RD-1 TO I-705	0.09	0.00	0.09	0.97
RD-2 TO I-705	0.09	0.00	0.09	0.97
RD TO I-706	0.09	0.00	0.09	0.97
RD TO I-904	0.09	0.00	0.09	0.97
RD TO I-907	0.09	0.00	0.09	0.97
RD TO I-909	0.09	0.00	0.09	0.97

Land Use	Runoff Coefficient
Impervious	0.97
Open Space	0.26

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: 2344001.stm	Number of lines: 169	Date: 11/5/2022

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
169	167	28.328	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	5.89	8.08	4.95	18	0.49	409.36	409.50	410.31	410.45	415.49	413.50	OS-100 TO EW-1
168	167	98.807	0.00	0.00	0.00	0.00	0.00	20.0	20.0	0.0	37.70	273.9	6.42	48	3.10	408.34	411.40	410.31	413.23	415.49	416.15	CULV 1 TO I-100
167	End	72.723	0.01	0.01	0.26	0.00	0.00	5.0	20.5	4.8	43.60	256.1	5.70	48	2.71	406.37	408.34	409.36	410.31	414.96	415.49	I-100 TO CULV 2
166	165	45.877	0.26	0.26	0.84	0.22	0.22	5.0	5.0	7.9	1.72	7.88	2.74	18	0.48	411.17	411.39	411.88	411.88	413.99	413.75	I-125 TO I-124
165	End	33.036	0.25	0.51	0.97	0.24	0.46	5.0	5.8	7.6	3.50	8.16	3.37	18	0.51	411.00	411.17	412.11	411.88	412.75	413.99	I-124 TO EW-102
164	End	30.359	0.25	0.25	0.89	0.22	0.22	5.0	5.0	7.9	1.75	2.80	2.93	12	0.53	412.48	412.64	413.26	413.30	415.60	414.82	I-5 TO EW-4
163	21	39.978	0.10	0.10	0.71	0.07	0.07	5.0	5.0	7.9	0.56	8.13	2.55	18	0.50	415.67	415.87	415.94	416.15	419.38	419.50	I-103 TO I-102
162	161	40.996	0.12	0.12	0.97	0.12	0.12	5.0	5.0	7.9	0.92	7.95	2.24	18	0.49	424.82	425.02	425.35	425.38	429.52	429.39	I-3 TO I-2
161	End	26.457	0.19	0.31	0.81	0.15	0.27	5.0	6.3	7.4	2.01	7.97	2.57	18	0.49	424.69	424.82	425.71	425.35	427.85	429.52	I-2 TO EW-1
160	22	27.986	0.17	0.17	0.75	0.13	0.13	5.0	5.0	7.9	1.01	8.13	3.01	18	0.50	425.18	425.32	425.54	425.69	428.89	428.88	I-105 TO I-104
159	158	40.289	0.28	0.28	0.52	0.15	0.15	5.0	5.0	7.9	1.15	36.35	1.95	18	10.00	427.12	431.15	428.17	431.55	430.28	438.10	I-820 TO I-819
158	157	27.978	0.22	0.50	0.70	0.15	0.30	5.0	6.0	7.5	2.25	8.05	1.27	18	0.50	426.44	426.58	428.14	428.15	430.28	430.28	I-819 TO I-818
157	156	34.124	0.12	0.62	0.58	0.07	0.37	5.0	6.4	7.4	2.73	8.26	1.55	18	0.53	426.26	426.44	428.08	428.10	434.18	430.28	I-818 TO I-817
156	155	123.928	0.11	0.73	0.72	0.08	0.45	5.0	6.7	7.3	3.27	17.33	1.04	24	0.50	425.13	425.75	428.04	428.07	435.00	434.18	I-817 TO I-816
155	93	89.979	0.21	0.94	0.77	0.16	0.61	5.0	8.6	6.8	4.12	17.33	1.31	24	0.50	424.68	425.13	427.98	428.00	434.96	435.00	I-816 TO I-806
154	92	27.500	0.10	0.10	0.64	0.06	0.06	5.0	5.0	7.9	0.50	8.20	2.49	18	0.51	429.73	429.87	429.98	430.13	433.65	433.64	I-805 TO I-804
153	92	84.975	0.21	0.21	0.52	0.11	0.11	5.0	5.0	7.9	0.86	4.96	2.97	15	0.51	429.97	430.40	430.32	430.76	433.65	433.08	YD-814 TO I-804
152	151	86.712	0.14	0.14	0.58	0.08	0.08	5.0	5.0	7.9	0.64	4.91	2.72	15	0.50	430.95	431.38	431.25	431.69	434.72	434.78	YD-815 TO I-807
151	93	32.569	0.23	0.37	0.82	0.19	0.27	5.0	7.8	7.0	1.88	8.06	3.59	18	0.49	430.53	430.69	431.03	431.21	434.96	434.72	I-807 TO I-806
150	149	22.608	0.18	0.18	0.61	0.11	0.11	5.0	5.0	7.9	0.87	12.09	4.32	15	3.01	434.81	435.49	435.04	435.85	437.52	439.34	YD-823 TO I-809
149	94	27.986	0.24	0.42	0.86	0.21	0.32	5.0	5.5	7.7	2.43	8.13	3.87	18	0.50	433.76	433.90	434.33	434.49	437.52	437.52	I-809 TO I-808
148	146	156.744	0.03	0.03	0.97	0.03	0.03	5.0	5.0	7.9	0.92	28.15	5.05	18	6.00	436.68	446.08	436.87	446.44	440.58	449.98	I-303 TO I-302

Project File: 2344001.stm

Number of lines: 169

Run Date: 11/5/2022

NOTES:Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
147	146	36.492	0.16	0.16	0.26	0.04	0.04	5.0	5.0	7.9	1.02	25.67	4.97	18	4.99	436.68	438.50	436.88	438.88	440.58	440.64	YD-304 TO I-302
146	End	42.748	0.12	0.31	0.81	0.10	0.17	5.0	10.1	6.4	2.46	8.06	2.82	18	0.49	432.00	432.21	433.05	432.80	433.64	440.58	I-302 TO EW-301
145	23	27.980	0.10	0.10	0.97	0.10	0.10	5.0	5.0	7.9	0.76	8.13	2.79	18	0.50	438.38	438.52	438.69	438.84	442.05	442.06	I-107 TO I-106
144	118	27.977	0.14	0.14	0.84	0.12	0.12	5.0	5.0	7.9	0.93	8.13	0.52	18	0.50	439.76	439.90	441.65	441.66	443.50	443.50	I-730 TO I-729
143	142	51.968	0.08	0.08	0.46	0.04	0.04	5.0	5.0	7.9	0.29	4.93	2.18	15	0.50	443.83	444.09	444.04	444.30	450.42	447.45	YD-822 TO I-811
142	95	28.434	0.19	0.27	0.86	0.16	0.20	5.0	8.7	6.7	1.35	8.07	2.15	18	0.49	443.43	443.57	444.39	444.00	451.24	450.42	I-811 TO I-810
141	140	75.162	0.26	0.26	0.82	0.21	0.21	5.0	5.0	7.9	1.68	11.48	3.13	18	1.00	445.52	446.27	446.07	446.76	450.51	450.73	I-204 TO I-203
140	133	14.053	0.08	0.34	0.88	0.07	0.28	5.0	6.3	7.4	2.10	21.46	5.63	18	3.49	445.03	445.52	445.35	446.07	449.76	450.51	I-203 TO I-202
139	95	85.480	0.43	0.43	0.53	0.23	0.23	5.0	5.0	7.9	1.80	4.94	3.66	15	0.50	446.09	446.52	446.61	447.05	451.24	449.42	YD-821 TO I-810
138	120	75.662	0.15	0.15	0.63	0.09	0.09	5.0	5.0	7.9	0.75	9.85	2.25	15	2.00	448.19	449.70	448.67	450.04	451.76	452.62	YD-734 TO I-730
137	136	128.967	0.08	0.08	0.26	0.02	0.02	5.0	5.0	7.9	0.54	4.95	2.06	15	0.50	448.32	448.97	448.73	449.26	452.20	451.42	YD-229 TO YD-22
136	135	57.813	0.11	0.19	0.26	0.03	0.05	5.0	9.8	6.5	1.08	4.94	3.16	15	0.50	448.03	448.32	448.43	448.73	450.81	452.20	YD-228 TO I-206
135	134	84.754	0.14	0.33	0.68	0.10	0.14	5.0	10.9	6.2	1.66	8.09	2.86	18	0.50	446.63	447.05	447.26	447.53	451.65	450.81	I-206 TO I-205
134	133	86.288	0.09	0.42	0.84	0.08	0.22	5.0	12.2	6.0	2.76	8.21	4.04	18	0.51	446.19	446.63	446.79	447.26	449.76	451.65	I-205 TO I-202
133	End	46.671	0.18	0.94	0.88	0.16	0.66	5.0	13.1	5.8	5.30	8.07	3.81	18	0.49	435.00	435.23	436.20	436.25	436.64	449.76	I-202 TO EW-201
132	131	20.663	0.04	0.04	0.43	0.02	0.02	5.0	5.0	7.9	0.14	5.09	1.50	15	0.53	448.64	448.75	448.82	448.89	452.12	453.60	YD-738 TO I-733
131	120	28.292	0.21	0.25	0.84	0.18	0.19	5.0	8.1	6.9	1.33	8.37	3.16	18	0.53	448.24	448.39	448.67	448.82	451.76	452.12	I-733 TO I-732
130	111	46.255	0.12	0.12	0.64	0.08	0.08	5.0	5.0	7.9	0.61	4.92	0.50	15	0.50	451.61	451.84	453.01	453.01	459.17	454.30	YD-722 TO I-721
129	126	101.658	0.10	0.10	0.26	0.03	0.03	5.0	5.0	7.9	0.90	6.95	3.08	15	0.99	452.53	453.54	452.88	453.91	456.31	456.20	YD-227 TO I-224
128	127	76.168	0.06	0.06	0.26	0.02	0.02	5.0	5.0	7.9	0.50	4.92	2.04	15	0.50	452.77	453.15	453.15	453.43	456.22	456.45	YD-226 TO YD-22
127	126	49.024	0.05	0.11	0.27	0.01	0.03	5.0	8.1	6.9	0.96	4.88	3.05	15	0.49	452.53	452.77	452.91	453.15	456.31	456.22	YD-225 TO I-224
126	125	116.306	0.15	0.36	0.76	0.11	0.17	5.0	9.1	6.6	2.57	11.48	4.51	18	1.00	451.11	452.27	451.59	452.88	456.21	456.31	I-224 TO I-223

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES:Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
125	102	63.257	0.07	0.43	0.88	0.06	0.23	5.0	10.4	6.3	4.29	24.87	3.51	24	1.01	449.97	450.61	450.93	451.34	454.82	456.21	I-223 TO I-218
124	25	35.156	0.04	0.04	0.97	0.04	0.04	5.0	5.0	7.9	0.31	7.99	1.17	18	0.48	453.84	454.01	454.98	454.21	459.08	457.68	I-110 TO I-109
123	121	28.008	0.28	0.28	0.80	0.22	0.22	5.0	5.0	7.9	1.77	8.13	3.54	18	0.50	454.09	454.23	454.57	454.73	457.87	457.87	I-735 TO I-734
122	121	44.723	0.14	0.14	0.52	0.07	0.07	5.0	5.0	7.9	0.57	5.00	2.65	15	0.51	454.34	454.57	454.63	454.87	457.87	457.35	YD-737 TO I-734
121	120	144.105	0.11	0.53	0.69	0.08	0.37	5.0	6.6	7.3	2.73	22.98	3.16	18	4.00	447.76	453.52	448.67	454.15	451.76	457.87	I-734 TO I-732
120	119	46.594	0.20	1.13	0.86	0.17	0.83	5.0	8.7	6.7	5.62	27.00	4.84	18	5.52	445.19	447.76	446.15	448.67	450.43	451.76	I-732 TO I-731
119	118	91.451	0.10	1.23	0.89	0.09	0.92	5.0	8.9	6.7	6.17	29.30	4.31	18	6.50	439.25	445.19	441.65	446.15	443.50	450.43	I-731 TO I-729
118	117	91.161	0.17	1.54	0.89	0.15	1.19	5.0	9.3	6.6	7.85	8.17	4.41	18	0.50	438.79	439.25	440.72	441.14	443.00	443.50	I-729 TO I-728
117	116	110.519	0.14	1.68	0.73	0.10	1.29	5.0	9.6	6.5	8.43	8.11	4.87	18	0.50	438.24	438.79	439.67	440.17	445.31	443.00	I-728 TO MH-727
116	115	159.630	0.00	1.68	0.00	0.00	1.29	5.0	9.9	6.4	8.32	8.14	4.94	18	0.50	437.44	438.24	438.84	439.55	448.00	445.31	MH-727 TO MH-7
115	77	87.396	0.00	1.68	0.00	0.00	1.29	5.0	10.5	6.3	8.17	8.06	5.16	18	0.49	437.01	437.44	438.26	438.69	449.95	448.00	MH-726 TO MH-7
114	113	141.753	0.71	0.71	0.47	0.33	0.33	5.0	5.0	7.9	2.63	8.13	3.59	18	0.50	454.78	455.49	455.47	456.10	460.45	459.49	I-725 TO I-724
113	112	17.116	0.16	0.87	0.71	0.11	0.45	5.0	6.6	7.3	3.28	7.86	3.85	18	0.47	454.70	454.78	455.47	455.47	460.87	460.45	I-724 TO I-723
112	111	20.293	0.16	1.03	0.71	0.11	0.56	5.0	6.7	7.3	4.09	8.46	4.57	18	0.54	454.59	454.70	455.33	455.47	459.17	460.87	I-723 TO I-721
111	110	32.390	0.01	1.16	0.97	0.01	0.65	5.0	6.9	7.2	4.69	8.08	2.63	18	0.49	451.19	451.35	452.80	452.86	457.86	459.17	I-721 TO I-720
110	109	95.252	0.26	1.42	0.86	0.22	0.87	5.0	7.1	7.2	6.26	8.16	3.53	18	0.50	450.71	451.19	452.38	452.64	455.05	457.86	I-720 TO I-719
109	78	125.360	0.15	1.57	0.61	0.09	0.96	5.0	7.5	7.1	6.79	8.15	5.12	18	0.50	450.09	450.72	451.14	451.77	463.32	455.05	I-719 TO I-715
108	107	21.967	0.20	0.20	0.42	0.08	0.08	5.0	5.0	7.9	0.66	8.13	2.68	18	0.50	455.69	455.80	455.98	456.10	459.57	459.58	I-123 TO I-122
107	24	33.162	0.04	0.24	0.97	0.04	0.12	5.0	6.0	7.5	0.93	29.27	5.16	18	6.48	451.01	453.16	451.19	453.52	454.72	459.57	I-122 TO I-108
106	105	22.033	0.05	0.05	0.93	0.05	0.05	5.0	5.0	7.9	0.37	8.12	2.26	18	0.50	458.17	458.28	458.39	458.50	462.58	462.65	I-222 TO I-221
105	104	73.603	0.06	0.11	0.81	0.05	0.10	5.0	6.8	7.3	0.69	25.70	2.05	18	5.00	451.20	454.88	451.67	455.19	456.00	462.58	I-221 TO I-220
104	103	84.946	0.19	0.30	0.78	0.15	0.24	5.0	9.7	6.5	1.58	8.18	3.17	18	0.51	450.77	451.20	451.27	451.67	455.81	456.00	I-220 TO I-219

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES:Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
103	102	59.463	0.05	0.35	0.93	0.05	0.29	5.0	11.1	6.2	1.79	8.03	3.53	18	0.49	450.48	450.77	450.96	451.27	454.82	455.81	I-219 TO I-218
102	101	140.092	0.28	1.06	0.81	0.23	0.75	5.0	11.9	6.0	7.34	17.47	4.70	24	0.50	449.27	449.97	450.30	450.93	455.42	454.82	I-218 TO I-217
101	63	56.253	0.09	1.15	0.89	0.08	0.83	5.0	12.8	5.9	8.37	17.44	5.29	24	0.50	448.99	449.27	449.97	450.30	454.32	455.42	I-217 TO I-209
100	87	67.778	0.12	0.12	0.96	0.12	0.12	5.0	5.0	7.9	0.91	30.43	1.96	18	7.01	459.88	464.63	460.60	464.98	467.38	469.92	I-407 TO I-404
99	26	27.972	0.05	0.05	0.89	0.04	0.04	5.0	5.0	7.9	0.35	8.13	2.24	18	0.50	460.44	460.58	460.65	460.80	464.16	464.16	I-112 TO I-111
98	87	50.702	0.19	0.19	0.77	0.15	0.15	5.0	5.0	7.9	1.15	8.07	3.12	18	0.49	462.00	462.25	462.38	462.65	467.38	466.37	I-408 TO I-404
97	96	30.935	0.16	0.16	0.74	0.12	0.12	5.0	5.0	7.9	0.93	19.93	2.34	18	3.01	462.82	463.75	463.32	464.11	466.65	467.30	I-813 TO I-812
96	95	237.031	0.13	0.29	0.88	0.11	0.23	5.0	6.0	7.5	1.75	30.41	6.35	18	7.00	446.23	462.82	446.48	463.32	451.24	466.65	I-812 TO I-810
95	94	201.793	0.35	1.34	0.86	0.30	0.96	5.0	9.8	6.5	6.21	28.16	4.33	18	6.00	431.32	443.43	433.83	444.39	437.52	451.24	I-810 TO I-808
94	93	172.574	0.29	2.05	0.85	0.25	1.52	5.0	10.7	6.3	9.56	8.11	5.37	18	0.50	430.46	431.32	431.97	433.16	434.96	437.52	I-808 TO I-806
93	92	108.309	0.15	3.51	0.87	0.13	2.54	5.0	11.2	6.2	15.64	17.46	4.95	24	0.50	424.14	424.68	426.70	427.13	433.65	434.96	I-806 TO I-804
92	91	216.173	0.16	3.98	0.86	0.14	2.85	5.0	11.5	6.1	17.37	17.47	6.30	24	0.50	423.06	424.14	424.69	425.77	430.36	433.65	I-804 TO I-803
91	90	28.591	0.71	4.69	0.74	0.53	3.37	5.0	12.1	6.0	20.18	78.19	14.07	24	10.00	419.50	422.36	420.20	423.97	424.59	430.36	I-803 TO MH-802
90	End	19.759	0.00	4.69	0.00	0.00	3.37	5.0	12.2	6.0	20.14	17.59	6.67	24	0.51	416.33	416.43	418.14	418.27	418.49	424.59	MH-802 TO EW-8
89	88	54.023	0.06	0.06	0.68	0.04	0.04	5.0	5.0	7.9	0.32	25.70	1.52	18	5.00	465.67	468.37	466.06	468.58	469.55	472.55	I-406 TO I-405
88	87	133.322	0.03	0.09	0.71	0.02	0.06	5.0	10.0	6.4	1.09	18.19	4.30	18	2.51	462.33	465.67	462.58	466.06	467.38	469.55	I-405 TO I-404
87	86	71.401	0.21	0.61	0.87	0.18	0.51	5.0	13.4	5.8	3.61	30.39	4.17	18	6.99	454.89	459.88	455.64	460.60	459.75	467.38	I-404 TO I-403
86	85	99.799	0.17	0.78	0.28	0.05	0.55	5.0	13.8	5.7	3.84	8.14	4.42	18	0.50	454.39	454.89	455.12	455.64	460.28	459.75	I-403 TO MH-402
85	End	44.324	0.00	0.78	0.00	0.00	0.55	5.0	14.4	5.6	4.47	8.10	3.81	18	0.50	449.00	449.22	450.16	450.03	450.64	460.28	MH-402 TO EW-4
84	83	27.995	0.12	0.12	0.93	0.11	0.11	5.0	5.0	7.9	0.88	8.13	2.21	18	0.50	468.83	468.97	469.35	469.32	472.64	472.64	I-617 TO I-616
83	71	23.891	0.18	0.30	0.81	0.15	0.26	5.0	5.9	7.5	1.94	8.15	2.31	18	0.50	468.71	468.83	470.19	469.35	472.42	472.64	I-616 TO I-615
82	17	27.989	0.22	0.22	0.88	0.19	0.19	5.0	5.0	7.9	1.53	8.13	3.39	18	0.50	469.18	469.32	469.62	469.78	473.04	473.04	I-611 TO I-610

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Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
81	80	27.995	0.19	0.19	0.88	0.17	0.17	5.0	5.0	7.9	1.32	8.13	2.56	18	0.50	469.35	469.49	469.96	469.92	473.35	473.34	I-718 TO I-717
80	79	96.921	0.19	0.38	0.88	0.17	0.33	5.0	5.6	7.7	2.56	14.06	3.41	18	1.50	467.90	469.35	468.63	469.96	471.55	473.35	I-717 TO I-716
79	78	136.663	0.20	0.58	0.58	0.12	0.45	5.0	6.7	7.3	3.28	19.72	8.18	15	8.01	456.96	467.90	457.30	468.63	463.32	471.55	I-716 TO I-715
78	77	44.143	0.19	2.34	0.50	0.10	1.51	5.0	8.1	6.9	10.41	95.73	12.67	24	15.00	442.73	449.35	443.18	450.50	449.95	463.32	I-715 TO MH-714
77	76	38.949	0.00	4.02	0.00	0.00	2.80	5.0	10.8	6.3	17.51	95.73	14.95	24	14.99	430.66	436.50	431.24	438.01	436.97	449.95	MH-714 TO MH-7
76	End	30.121	0.00	4.02	0.00	0.00	2.80	5.0	10.9	6.2	17.45	17.44	5.99	24	0.50	425.00	425.15	426.75	426.88	427.16	436.97	MH-713 TO EW-7
75	74	66.623	0.13	0.13	0.87	0.11	0.11	5.0	5.0	7.9	0.89	19.92	1.66	18	3.00	470.65	472.65	472.23	473.00	474.59	478.80	I-906 TO I-905
74	46	68.170	0.17	0.30	0.75	0.13	0.24	5.0	7.2	7.1	1.72	8.12	0.97	18	0.50	470.31	470.65	472.20	472.21	474.59	474.59	I-905 TO I-904
73	72	102.306	0.30	0.30	0.44	0.13	0.13	5.0	5.0	7.9	1.04	22.98	2.37	18	4.00	470.70	474.79	471.25	475.17	475.37	478.10	I-619 TO I-618
72	71	60.702	0.25	0.55	0.68	0.17	0.30	5.0	7.9	6.9	2.10	23.00	2.39	18	4.00	468.27	470.70	470.19	471.25	472.42	475.37	I-618 TO I-615
71	16	28.328	0.12	0.97	0.26	0.03	0.59	5.0	8.7	6.7	3.98	8.08	2.23	18	0.49	468.13	468.27	470.04	470.07	473.09	472.42	I-615 TO I-609
70	69	27.991	0.05	0.05	0.89	0.04	0.04	5.0	5.0	7.9	0.35	8.13	1.57	18	0.50	471.50	471.64	471.90	471.86	475.29	475.29	I-216 TO I-215
69	68	199.080	0.20	0.25	0.58	0.12	0.16	5.0	7.4	7.1	1.14	18.16	2.65	18	2.50	466.53	471.50	467.02	471.90	470.43	475.29	I-215 TO I-214
68	67	27.987	0.22	0.47	0.55	0.12	0.28	5.0	12.1	6.0	1.69	18.18	3.08	18	2.50	465.83	466.53	466.39	467.02	470.44	470.43	I-214 TO I-213
67	66	30.939	0.11	0.58	0.85	0.09	0.38	5.0	12.5	5.9	2.22	28.18	3.60	18	6.01	463.97	465.83	464.55	466.39	468.54	470.44	I-213 TO I-212
66	65	105.117	0.03	0.61	0.81	0.02	0.40	5.0	12.8	5.9	2.34	36.35	4.57	18	10.00	453.46	463.97	453.90	464.55	457.37	468.54	I-212 TO I-211
65	64	21.987	0.05	0.66	0.85	0.04	0.44	5.0	13.9	5.7	2.51	8.13	3.91	18	0.50	453.19	453.30	453.76	453.90	457.39	457.37	I-211 TO I-210
64	63	85.682	0.05	0.71	0.83	0.04	0.48	5.0	14.1	5.6	2.73	16.24	3.67	18	2.00	448.51	450.22	449.20	450.85	454.32	457.39	I-210 TO I-209
63	62	67.014	0.05	1.91	0.96	0.05	1.36	5.0	14.8	5.5	11.03	17.61	5.64	24	0.51	447.67	448.01	448.86	449.20	454.69	454.32	I-209 TO I-208
62	61	80.996	0.02	1.93	0.97	0.02	1.38	5.0	15.1	5.5	11.08	24.72	6.63	24	1.00	446.86	447.67	447.80	448.86	451.56	454.69	I-208 TO I-207
61	End	62.664	0.16	2.09	0.93	0.15	1.53	5.0	15.4	5.4	12.51	51.57	3.78	36	0.49	435.00	435.31	437.07	436.43	438.28	451.56	I-207 TO EW-202
60	59	21.940	0.06	0.06	0.97	0.06	0.06	5.0	5.0	7.9	0.46	18.20	1.98	18	2.51	472.49	473.04	472.82	473.29	477.72	477.78	I-712 TO I-711

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Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
59	58	83.390	0.05	0.11	0.97	0.05	0.11	5.0	6.4	7.4	0.79	18.15	2.00	18	2.49	470.41	472.49	470.98	472.82	474.48	477.72	I-711 TO I-710
58	57	58.601	0.32	0.43	0.77	0.25	0.35	5.0	9.4	6.6	2.32	8.22	3.39	18	0.51	470.11	470.41	470.77	470.98	474.48	474.48	I-710 TO I-709
57	56	57.258	0.16	0.59	0.76	0.12	0.47	5.0	10.0	6.4	3.05	8.04	3.98	18	0.49	469.83	470.11	470.51	470.77	476.99	474.48	I-709 TO I-708
56	55	22.074	0.03	0.62	0.89	0.03	0.50	5.0	10.5	6.3	3.17	8.11	4.04	18	0.50	469.72	469.83	470.41	470.51	476.79	476.99	I-708 TO I-707
55	54	79.422	0.02	0.64	0.97	0.02	0.52	5.0	10.7	6.3	3.27	8.16	4.23	18	0.50	469.32	469.72	469.98	470.41	474.48	476.79	I-707 TO I-706
54	53	50.951	0.13	0.77	0.90	0.12	0.64	5.0	11.3	6.1	4.61	17.32	4.44	24	0.49	468.57	468.82	469.28	469.57	474.42	474.48	I-706 TO I-705
53	52	70.652	0.11	0.88	0.90	0.10	0.74	5.0	11.8	6.0	6.53	65.43	8.97	24	7.01	462.51	467.46	462.94	468.36	468.81	474.42	I-705 TO MH-704
52	51	57.430	0.00	0.88	0.00	0.00	0.74	5.0	12.3	6.0	6.46	95.77	10.96	24	15.01	446.85	455.47	447.20	456.37	452.00	468.81	MH-704 TO MH-7
51	50	56.155	0.00	0.88	0.00	0.00	0.74	5.0	12.7	5.9	6.40	95.78	10.93	24	15.01	429.94	438.37	430.29	439.26	434.73	452.00	MH-703 TO MH-7
50	End	23.648	0.00	0.88	0.00	0.00	0.74	5.0	13.1	5.8	6.35	17.61	3.64	24	0.51	425.00	425.12	426.45	426.01	427.16	434.73	MH-702 TO EW-7
49	48	69.545	0.07	0.07	0.80	0.06	0.06	5.0	5.0	7.9	1.13	8.15	2.64	18	0.50	473.95	474.30	474.44	474.70	479.77	479.73	I-909 TO I-908
48	47	87.412	0.09	0.16	0.92	0.08	0.14	5.0	6.8	7.3	1.70	8.16	2.83	18	0.50	473.51	473.95	474.17	474.44	478.60	479.77	I-908 TO I-907
47	46	55.193	0.11	0.27	0.90	0.10	0.24	5.0	8.3	6.8	3.01	28.15	2.85	18	6.00	470.20	473.51	472.20	474.17	474.59	478.60	I-907 TO I-904
46	45	56.484	0.25	0.82	0.81	0.20	0.68	5.0	8.8	6.7	6.64	8.24	5.15	18	0.51	470.02	470.31	471.04	471.33	475.60	474.59	I-904 TO I-903
45	44	59.587	0.01	0.83	0.97	0.01	0.69	5.0	9.0	6.6	6.66	30.41	9.50	18	7.00	461.40	465.57	461.88	466.57	466.24	475.60	I-903 TO MH-902
44	End	22.912	0.00	0.83	0.00	0.00	0.69	5.0	9.3	6.6	6.62	7.96	4.29	18	0.48	457.00	457.11	458.25	458.30	458.64	466.24	MH-902 TO EW-9
43	32	50.015	0.20	0.20	0.77	0.15	0.15	5.0	5.0	7.9	1.21	8.13	0.71	18	0.50	474.46	474.71	476.03	476.04	479.76	479.63	I-121 TO I-118
42	39	28.013	0.11	0.11	0.80	0.09	0.09	5.0	5.0	7.9	0.69	8.13	1.79	18	0.50	474.79	474.93	475.44	475.24	478.79	478.79	I-506 TO I-505
41	40	27.988	0.12	0.12	0.73	0.09	0.09	5.0	5.0	7.9	0.69	8.13	2.15	18	0.50	474.93	475.07	475.36	475.38	478.65	478.65	I-508 TO I-507
40	39	28.664	0.09	0.21	0.89	0.08	0.17	5.0	6.2	7.5	1.25	8.32	2.40	18	0.52	474.79	474.94	475.44	475.36	478.79	478.65	I-507 TO I-505
39	2	180.201	0.26	0.58	0.57	0.15	0.40	5.0	6.9	7.3	2.93	8.12	2.89	18	0.50	473.89	474.79	475.18	475.44	482.90	478.79	I-505 TO I-503
38	37	56.234	0.05	0.05	0.59	0.03	0.03	5.0	5.0	7.9	0.23	4.92	2.05	15	0.50	476.01	476.29	476.19	476.48	479.45	479.35	YD-620 TO I-604

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES:Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
37	36	32.748	0.12	0.17	0.97	0.12	0.15	5.0	9.9	6.4	0.94	8.03	2.94	18	0.49	475.59	475.75	475.94	476.11	480.24	479.45	I-604 TO I-603
36	35	51.504	0.34	0.51	0.89	0.30	0.45	5.0	10.8	6.3	2.80	25.68	6.70	18	4.99	470.45	473.02	470.79	473.65	475.00	480.24	I-603 TO MH-602
35	End	21.025	0.00	0.51	0.00	0.00	0.45	5.0	11.2	6.2	2.76	8.31	2.98	18	0.52	466.50	466.61	467.57	467.24	468.14	475.00	MH-602 TO EW-6
34	33	74.039	0.12	0.12	0.87	0.10	0.10	5.0	5.0	7.9	2.20	8.13	3.18	18	0.50	476.12	476.49	476.82	477.05	480.53	480.69	I-120 TO I-119
33	32	83.002	0.09	0.21	0.85	0.08	0.18	5.0	6.0	7.5	3.43	16.26	3.06	18	2.00	474.46	476.12	476.03	476.82	479.76	480.53	I-119 TO I-118
32	31	121.000	0.12	0.53	0.90	0.11	0.44	5.0	6.7	7.3	5.30	8.09	3.38	18	0.50	473.86	474.46	475.37	475.57	479.54	479.76	I-118 TO I-117
31	30	54.856	0.10	0.63	0.92	0.09	0.53	5.0	7.4	7.1	5.87	8.21	4.88	18	0.51	473.58	473.86	474.57	474.80	479.72	479.54	I-117 TO I-116
30	29	122.127	0.01	0.64	0.97	0.01	0.54	5.0	7.6	7.0	6.58	28.14	5.23	18	5.99	466.26	473.58	467.27	474.57	470.79	479.72	I-16 TO I-115
29	28	21.993	0.09	0.73	0.64	0.06	0.60	5.0	8.2	6.9	6.90	28.16	5.32	18	6.00	464.94	466.26	465.98	467.27	470.79	470.79	I-115 TO I-114
28	27	31.746	0.08	0.81	0.71	0.06	0.66	5.0	8.3	6.8	7.27	28.19	5.46	18	6.02	463.03	464.94	464.10	465.98	468.24	470.79	I-114 TO I-113
27	26	65.186	0.08	0.89	0.67	0.05	0.71	5.0	8.4	6.8	7.61	28.15	5.55	18	6.00	459.12	463.03	460.22	464.10	464.16	468.24	I-113 TO I-111
26	25	80.094	0.06	1.00	0.55	0.03	0.79	5.0	8.7	6.7	8.09	28.17	8.21	18	6.01	454.31	459.12	454.98	460.22	459.08	464.16	I-111 TO I-109
25	24	68.330	0.12	1.16	0.46	0.06	0.88	5.0	8.9	6.7	8.66	28.16	7.50	18	6.00	449.74	453.84	450.54	454.98	454.72	459.08	I-109 TO I-108
24	23	196.835	0.10	1.50	0.68	0.07	1.07	5.0	9.2	6.6	9.87	29.31	6.29	18	6.50	436.53	449.33	437.80	450.54	442.05	454.72	I-108 TO I-106
23	22	204.327	0.17	1.77	0.65	0.11	1.28	5.0	9.8	6.5	11.07	29.30	6.76	18	6.50	423.25	436.53	424.58	437.80	428.89	442.05	I-106 TO I-104
22	21	132.891	0.24	2.18	0.54	0.13	1.54	5.0	10.3	6.4	12.54	29.31	11.66	18	6.50	414.61	423.25	415.30	424.58	419.38	428.89	I-104 TO I-102
21	End	32.000	0.12	2.40	0.61	0.07	1.68	5.0	10.6	6.3	13.34	17.48	4.93	24	0.50	411.00	411.16	412.66	412.71	413.16	419.38	I-102 TO EW-101
20	19	84.818	0.09	0.09	0.55	0.05	0.05	5.0	5.0	7.9	0.39	4.91	2.36	15	0.50	476.77	477.19	477.01	477.43	480.80	480.20	YD-614 TO I-613
19	18	27.997	0.08	0.17	0.66	0.05	0.10	5.0	9.4	6.6	0.67	8.13	2.32	18	0.50	476.37	476.51	476.73	476.81	480.80	480.80	I-613 TO I-612
18	17	213.224	0.05	0.22	0.97	0.05	0.15	5.0	10.5	6.3	0.95	21.50	2.19	18	3.50	468.91	476.37	469.49	476.73	473.04	480.80	I-612 TO I-610
17	16	71.839	0.10	0.54	0.97	0.10	0.44	5.0	16.0	5.4	2.36	8.14	2.53	18	0.50	468.55	468.91	470.04	469.49	473.09	473.04	I-610 TO I-609
16	15	28.148	0.19	1.70	0.72	0.14	1.17	5.0	16.6	5.3	6.15	8.11	3.45	18	0.50	467.66	467.80	469.58	469.66	473.00	473.09	I-609 TO I-608

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES:Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
15	14	42.847	0.16	1.86	0.87	0.14	1.31	5.0	16.7	5.2	6.86	8.24	3.85	18	0.51	467.44	467.66	469.22	469.37	469.75	473.00	I-608 TO I-607
14	13	56.013	0.16	2.02	0.55	0.09	1.40	5.0	16.9	5.2	7.30	8.13	4.10	18	0.50	467.16	467.44	468.72	468.94	472.14	469.75	I-607 TO I-606
13	12	81.386	0.05	2.07	0.75	0.04	1.43	5.0	17.0	5.2	7.46	8.06	4.24	18	0.49	466.76	467.16	468.27	468.58	470.88	472.14	I-606 TO I-605
12	End	51.285	0.10	2.17	0.55	0.06	1.49	5.0	17.3	5.2	7.70	8.18	4.87	18	0.51	466.50	466.76	467.79	467.98	468.14	470.88	I-605 TO EW-602
11	2	27.990	0.08	0.08	0.70	0.06	0.06	5.0	5.0	7.9	0.44	8.13	2.39	18	0.50	479.00	479.14	479.24	479.39	482.90	482.88	I-504 TO I-503
10	9	108.865	0.28	0.28	0.85	0.24	0.24	5.0	5.0	7.9	2.57	8.10	2.67	18	0.50	483.12	483.66	484.48	484.27	488.84	488.25	I-513 TO I-512
9	8	90.442	0.36	0.64	0.77	0.28	0.52	5.0	6.3	7.4	4.52	8.20	2.66	18	0.51	482.66	483.12	484.30	484.42	489.58	488.84	I-512 TO I-511
8	4	94.336	0.01	0.65	0.97	0.01	0.52	5.0	6.8	7.3	4.50	8.11	2.53	18	0.50	482.19	482.66	484.05	484.17	485.92	489.58	I-511 TO I-510
7	6	53.764	0.17	0.17	0.90	0.15	0.15	5.0	5.0	7.9	1.90	7.99	3.15	18	0.48	483.37	483.63	483.98	484.15	487.63	487.65	I-516 TO I-515
6	5	82.000	0.01	0.18	0.97	0.01	0.16	5.0	5.8	7.6	2.61	8.13	3.56	18	0.50	482.96	483.37	483.65	483.98	488.00	487.63	I-515 TO I-514
5	4	41.302	0.01	0.19	0.97	0.01	0.17	5.0	6.8	7.3	3.33	8.20	3.09	18	0.51	482.75	482.96	484.05	483.65	485.92	488.00	I-514 TO I-510
4	3	27.988	0.10	0.94	0.56	0.06	0.75	5.0	7.4	7.1	8.09	8.13	5.20	18	0.50	482.05	482.19	483.28	483.42	485.92	485.92	I-510 TO I-509
3	2	120.680	0.05	0.99	0.97	0.05	0.80	5.0	7.5	7.0	8.41	18.18	7.96	18	2.50	479.03	482.05	479.75	483.17	482.90	485.92	I-509 TO I-503
2	1	79.001	0.05	1.70	0.75	0.04	1.30	5.0	8.6	6.8	11.56	22.99	10.01	18	4.00	470.73	473.89	471.49	475.18	474.85	482.90	I-503 TO MH-502
1	End	15.755	0.00	1.70	0.00	0.00	1.30	5.0	8.8	6.7	11.49	8.19	6.56	18	0.51	469.00	469.08	470.40	470.58	470.64	474.85	MH-502 TO EW-5

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES:Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
169	OS-100	5.89*	0.00	0.00	5.89	None	0.0	0.00	0.00	0.00	0.00	0.000	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
168	CULVERT 1	37.70*	0.00	37.70	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
167	I-100	0.02	0.00	0.02	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.15	0.13	0.02	0.13	2.0	Off
166	I-125	1.72	0.03	1.76	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.14	4.07	0.31	4.07	2.0	Off
165	I-124	1.91	0.00	1.91	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	4.59	0.32	4.59	2.0	Off
164	I-5	1.75	0.10	1.85	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	4.38	0.31	4.38	2.0	Off
163	I-103	0.56	0.05	0.61	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.11	2.47	0.18	0.24	2.0	164
162	I-3	0.92	0.00	0.88	0.03	Comb	4.0	4.00	0.00	4.00	2.00	0.060	2.00	0.050	0.020	0.013	0.13	3.45	0.20	0.76	2.0	166
161	I-2	1.21	0.00	1.12	0.09	Comb	4.0	4.00	0.00	4.00	2.00	0.060	2.00	0.050	0.020	0.013	0.14	4.08	0.22	1.11	2.0	164
160	I-105	1.01	0.02	0.98	0.05	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.13	3.60	0.21	0.84	2.0	163
159	I-820	1.15	0.00	1.15	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	1.97	0.26	1.97	2.0	Off
158	I-819	1.21	0.86	1.68	0.39	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.17	5.68	0.26	1.96	2.0	Off
157	I-818	0.55	0.00	0.55	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.11	2.55	0.18	0.24	2.0	Off
156	I-817	0.62	0.00	0.62	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.01	1.32	0.18	1.32	2.0	Off
155	I-816	1.28	0.00	1.28	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	2.39	0.27	2.39	2.0	Off
154	I-805	0.50	0.33	0.74	0.09	Comb	4.0	4.00	0.00	4.00	2.00	0.013	2.00	0.050	0.020	0.013	0.16	5.05	0.24	1.45	2.0	91
153	YD-814	0.86	0.00	0.86	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	1.97	0.26	1.97	2.0	Off
152	YD-815	0.64	0.00	0.64	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.05	1.62	0.22	1.62	2.0	Off
151	I-807	1.49	0.07	1.23	0.33	Comb	4.0	4.00	0.00	4.00	2.00	0.013	2.00	0.050	0.020	0.013	0.20	6.83	0.28	2.88	2.0	154
150	YD-823	0.87	0.00	0.87	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	1.98	0.26	1.98	2.0	Off
149	I-809	1.63	0.05	1.43	0.25	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.16	5.11	0.25	1.65	2.0	158
148	I-303	0.92*	0.00	0.92	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.00	0.27	2.00	2.0	Off
147	YD-304	1.02*	0.00	1.02	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	2.69	0.28	2.69	2.0	Off

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
146	I-302	0.77	0.00	0.75	0.01	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.12	2.95	0.19	0.50	2.0	160
145	I-107	0.76	0.00	0.75	0.01	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.12	2.95	0.19	0.50	2.0	160
144	I-730	0.93	0.28	1.14	0.07	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.13	3.73	0.21	0.93	2.0	158
143	YD-822	0.29	0.00	0.29	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.04	0.96	0.13	0.96	2.0	Off
142	I-811	1.29	0.00	1.23	0.05	Comb	4.0	4.00	0.00	4.00	2.00	0.115	2.00	0.050	0.020	0.013	0.13	3.48	0.21	0.80	2.0	149
141	I-204	1.68	0.00	1.68	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.14	3.83	0.30	3.83	2.0	Off
140	I-203	0.56	0.00	0.56	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.04	1.55	0.21	1.55	2.0	Off
139	YD-821	1.80	0.00	1.80	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.18	6.09	0.35	6.09	2.0	Off
138	YD-736	0.75	0.00	0.75	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.07	1.79	0.24	1.79	2.0	Off
137	YD-229	0.54*	0.00	0.54	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.03	1.45	0.19	1.45	2.0	Off
136	YD-228	0.61*	0.00	0.61	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.04	1.56	0.21	1.56	2.0	Off
135	I-206	0.75	0.00	0.75	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.08	1.84	0.25	1.84	2.0	Off
134	I-205	1.29*	0.00	1.29	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	2.43	0.28	2.43	2.0	Off
133	I-202	1.25	0.00	1.25	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	2.31	0.27	2.31	2.0	Off
132	YD-738	0.14	0.00	0.14	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.09	0.58	0.08	0.58	2.0	Off
131	I-733	1.39	0.25	1.46	0.18	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.15	4.46	0.23	1.33	2.0	144
130	YD-722	0.61	0.00	0.61	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.04	1.56	0.21	1.56	2.0	Off
129	YD-227	0.90*	0.00	0.90	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.09	0.27	2.09	2.0	Off
128	YD-226	0.50*	0.00	0.50	0.00	Grate	0.0	0.00	3.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.01	1.14	0.15	1.14	2.0	Off
127	YD-225	0.49*	0.00	0.49	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.01	1.35	0.18	1.35	2.0	Off
126	I-224	0.90	0.00	0.90	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.00	0.27	2.00	2.0	Off
125	I-223	1.87*	0.00	1.87	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	4.44	0.32	4.44	2.0	Off
124	I-110	0.31	0.00	0.31	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.08	1.69	0.17	0.00	2.0	145

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
123	I-735	1.77	0.12	1.63	0.25	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.16	4.80	0.24	1.51	2.0	131
122	YD-737	0.57	0.00	0.57	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.03	1.51	0.20	1.51	2.0	Off
121	I-734	0.60	0.00	0.60	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.11	2.26	0.17	0.00	2.0	120
120	I-732	1.36	0.00	1.26	0.10	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.14	4.01	0.22	1.07	2.0	144
119	I-731	0.70	0.24	0.92	0.02	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.12	3.19	0.20	0.63	2.0	118
118	I-729	1.19	0.02	1.15	0.07	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.14	3.76	0.21	0.94	2.0	151
117	I-728	0.81	0.00	0.81	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.04	1.56	0.21	1.56	2.0	Off
116	MH-727	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
115	MH-726	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
114	I-725	2.63	0.00	2.63	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.20	6.78	0.36	6.78	2.0	Off
113	I-724	0.90	0.00	0.90	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.06	1.67	0.22	1.67	2.0	Off
112	I-723	0.90	0.09	0.96	0.03	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.13	3.29	0.20	0.69	2.0	111
111	I-721	0.08	0.03	0.11	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.06	1.10	0.17	0.00	2.0	144
110	I-720	1.76	0.09	1.61	0.24	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.16	4.76	0.24	1.50	2.0	119
109	I-719	0.72	0.00	0.72	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.03	1.45	0.19	1.45	2.0	Off
108	I-123	0.66	0.00	0.66	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.134	2.00	0.050	0.020	0.013	0.10	1.98	0.17	0.00	2.0	24
107	I-122	0.31	0.00	0.31	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.134	2.00	0.050	0.020	0.013	0.07	1.48	0.17	0.00	2.0	24
106	I-222	0.37	0.00	0.37	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.118	2.00	0.050	0.020	0.013	0.08	1.63	0.17	0.00	2.0	104
105	I-221	0.38	0.00	0.38	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.118	2.00	0.050	0.020	0.013	0.08	1.65	0.17	0.00	2.0	104
104	I-220	1.17	0.00	1.17	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.00	0.27	2.00	2.0	Off
103	I-219	0.37	0.00	0.37	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.00	1.23	0.16	1.23	2.0	Off
102	I-218	1.79	0.00	1.79	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.14	4.19	0.31	4.19	2.0	Off
101	I-217	1.32*	0.00	1.32	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	2.57	0.28	2.57	2.0	Off

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
100	I-407	0.91	0.00	0.91	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.00	0.27	2.00	2.0	Off
99	I-112	0.35	0.00	0.35	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.09	1.78	0.17	0.00	2.0	124
98	I-408	1.15	0.26	1.41	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.12	2.90	0.28	2.90	2.0	Off
97	I-813	0.93	0.30	1.12	0.12	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.15	4.35	0.23	1.24	2.0	123
96	I-812	0.90	0.49	1.24	0.16	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.15	4.64	0.24	1.40	2.0	95
95	I-810	2.37	0.16	2.04	0.49	Comb	4.0	4.00	0.00	4.00	2.00	0.077	2.00	0.050	0.020	0.013	0.17	5.63	0.27	1.97	2.0	94
94	I-808	1.94	0.49	1.89	0.54	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.18	6.13	0.28	2.53	2.0	158
93	I-806	1.03	0.00	0.88	0.14	Comb	4.0	4.00	0.00	4.00	2.00	0.013	2.00	0.050	0.020	0.013	0.17	5.62	0.25	1.74	2.0	92
92	I-804	1.09	0.14	1.02	0.21	Grate	0.0	0.00	0.00	4.00	2.00	0.013	2.00	0.050	0.020	0.013	0.18	6.12	0.27	1.99	2.0	91
91	I-803	4.14	0.30	4.44	0.00	Comb	4.0	8.00	12.00	8.00	2.00	Sag	2.00	0.050	0.020	0.013	0.21	7.73	0.38	7.73	2.0	Off
90	MH-802	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
89	I-406	0.32	0.00	0.32	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.01	1.14	0.15	1.14	2.0	Off
88	I-405	0.86*	0.00	0.86	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	1.98	0.26	1.98	2.0	Off
87	I-404	1.44	0.00	1.18	0.26	Grate	0.0	0.00	0.00	4.00	2.00	0.020	2.00	0.050	0.020	0.013	0.18	5.94	0.27	1.99	2.0	98
86	I-403	0.38	0.00	0.38	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.04	0.94	0.12	0.94	2.0	Off
85	MH-402	0.69*	0.00	0.00	0.69	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
84	I-617	0.88	0.00	0.84	0.04	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.13	3.55	0.21	0.82	2.0	97
83	I-616	1.15	0.00	1.06	0.09	Comb	4.0	4.00	0.00	4.00	2.00	0.050	2.00	0.050	0.020	0.013	0.14	4.17	0.22	1.15	2.0	96
82	I-611	1.53	0.00	1.29	0.23	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.17	5.28	0.25	1.71	2.0	97
81	I-718	1.32	0.00	1.23	0.09	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.14	3.94	0.22	1.05	2.0	112
80	I-717	1.32	0.00	1.23	0.09	Comb	4.0	4.00	0.00	4.00	2.00	0.080	2.00	0.050	0.020	0.013	0.14	3.94	0.22	1.05	2.0	110
79	I-716	0.91	0.00	0.91	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.06	1.70	0.23	1.70	2.0	Off
78	I-715	0.75	0.00	0.75	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.03	1.49	0.20	1.49	2.0	Off

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
77	MH-714	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
76	MH-713	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
75	I-906	0.89	0.00	0.89	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.00	0.27	2.00	2.0	Off
74	I-905	1.01	0.00	1.01	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.07	1.81	0.24	1.81	2.0	Off
73	I-619	1.04	0.00	1.04	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.08	1.85	0.25	1.85	2.0	Off
72	I-618	1.34	0.00	1.18	0.17	Grate	0.0	0.00	0.00	4.00	2.00	0.040	2.00	0.050	0.020	0.013	0.16	4.82	0.24	1.48	2.0	71
71	I-615	0.25	0.17	0.41	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.03	1.00	0.13	1.00	2.0	Off
70	I-216	0.35	0.04	0.39	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.11	2.64	0.18	0.29	2.0	67
69	I-215	0.91	0.18	0.96	0.14	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.16	5.01	0.24	1.52	2.0	68
68	I-214	0.95	0.14	0.96	0.13	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.16	5.00	0.24	1.51	2.0	27
67	I-213	0.74	0.00	0.69	0.05	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.14	4.04	0.22	1.02	2.0	66
66	I-212	0.19	0.05	0.24	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.108	2.00	0.050	0.020	0.013	0.07	1.41	0.17	0.00	2.0	65
65	I-211	0.34	0.00	0.34	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.108	2.00	0.050	0.020	0.013	0.08	1.60	0.17	0.00	2.0	141
64	I-210	0.33	0.00	0.33	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.108	2.00	0.050	0.020	0.013	0.08	1.58	0.17	0.00	2.0	141
63	I-209	0.38	0.00	0.38	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.00	1.25	0.17	1.25	2.0	Off
62	I-208	0.15	0.00	0.15	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.07	0.73	0.10	0.73	2.0	Off
61	I-207	1.86*	0.00	1.86	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	4.44	0.32	4.44	2.0	Off
60	I-712	0.46	0.00	0.46	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.053	2.00	0.050	0.020	0.013	0.10	2.14	0.17	0.00	2.0	58
59	I-711	0.38	0.00	0.38	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.053	2.00	0.050	0.020	0.013	0.10	1.92	0.17	0.00	2.0	58
58	I-710	1.94	0.00	1.94	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	4.68	0.32	4.68	2.0	Off
57	I-709	0.96	0.00	0.96	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.07	1.75	0.23	1.75	2.0	Off
56	I-708	0.21	0.00	0.21	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.055	2.00	0.050	0.020	0.013	0.08	1.52	0.17	0.00	2.0	54
55	I-707	0.15	0.00	0.15	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.055	2.00	0.050	0.020	0.013	0.07	1.35	0.17	0.00	2.0	74

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
54	I-706	1.61*	0.00	1.61	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.13	3.59	0.30	3.59	2.0	Off
53	I-705	2.16*	0.00	2.16	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.17	5.37	0.33	5.37	2.0	Off
52	MH-704	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
51	MH-703	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
50	MH-702	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
49	I-909	1.13*	0.00	1.13	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.00	0.27	2.00	2.0	Off
48	I-908	0.65	0.00	0.65	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.06	1.70	0.23	1.70	2.0	Off
47	I-907	1.47*	0.00	1.47	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.12	3.11	0.29	3.11	2.0	Off
46	I-904	2.29*	0.00	2.29	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.18	5.76	0.34	5.76	2.0	Off
45	I-903	0.08	0.00	0.08	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.10	0.48	0.06	0.48	2.0	Off
44	MH-902	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
43	I-121	1.21	0.00	1.21	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	2.18	0.27	2.18	2.0	Off
42	I-506	0.69	0.00	0.66	0.04	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.14	3.91	0.21	0.95	2.0	70
41	I-508	0.69	0.00	0.67	0.02	Comb	4.0	4.00	0.00	4.00	2.00	0.044	2.00	0.050	0.020	0.013	0.12	3.16	0.20	0.60	2.0	69
40	I-507	0.63	0.00	0.62	0.01	Comb	4.0	4.00	0.00	4.00	2.00	0.044	2.00	0.050	0.020	0.013	0.12	2.97	0.19	0.50	2.0	69
39	I-505	1.17	0.00	1.01	0.16	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.16	5.18	0.25	1.61	2.0	69
38	YD-620	0.23	0.00	0.23	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.06	0.82	0.11	0.82	2.0	Off
37	I-604	0.92	0.00	0.86	0.06	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.14	4.01	0.22	1.04	2.0	16
36	I-603	2.39	0.00	1.81	0.57	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.19	6.54	0.29	2.97	2.0	15
35	MH-602	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
34	I-120	2.20*	0.00	2.20	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.17	5.50	0.34	5.50	2.0	Off
33	I-119	1.29*	0.00	1.29	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	2.46	0.28	2.46	2.0	Off
32	I-118	0.85	0.00	0.85	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.10	1.97	0.26	1.97	2.0	Off

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
31	I-117	0.73	0.00	0.73	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.07	1.80	0.24	1.80	2.0	Off
30	I-116	0.77*	0.00	0.76	0.01	Comb	4.0	4.00	0.00	4.00	2.00	0.076	2.00	0.050	0.020	0.013	0.12	2.81	0.19	0.41	2.0	29
29	I-115	0.45	0.01	0.46	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.076	2.00	0.050	0.020	0.013	0.10	1.93	0.17	0.00	2.0	27
28	I-114	0.45	0.00	0.45	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.076	2.00	0.050	0.020	0.013	0.10	1.90	0.17	0.00	2.0	27
27	I-113	0.42	0.13	0.56	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.11	2.30	0.17	0.09	2.0	26
26	I-111	0.26	0.00	0.26	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.08	1.59	0.17	0.00	2.0	25
25	I-109	0.44	0.00	0.44	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.10	1.93	0.17	0.00	2.0	24
24	I-108	0.54	0.00	0.54	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.10	2.23	0.17	0.09	2.0	23
23	I-106	0.87	0.00	0.85	0.02	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.12	3.23	0.20	0.65	2.0	22
22	I-104	1.02	0.02	1.00	0.05	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.13	3.63	0.21	0.86	2.0	21
21	I-102	0.58	0.05	0.63	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.066	2.00	0.050	0.020	0.013	0.11	2.54	0.18	0.23	2.0	165
20	YD-614	0.39	0.00	0.39	0.00	Grate	0.0	0.00	3.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.01	1.17	0.16	1.17	2.0	Off
19	I-613	0.42	0.00	0.42	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.11	2.32	0.17	0.00	2.0	82
18	I-612	0.38	0.00	0.38	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.10	2.15	0.17	0.00	2.0	17
17	I-610	0.76	0.00	0.73	0.03	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.13	3.60	0.21	0.82	2.0	97
16	I-609	1.08	0.06	1.02	0.12	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.15	4.53	0.23	1.32	2.0	96
15	I-608	1.10	0.57	1.39	0.29	Comb	4.0	4.00	0.00	4.00	2.00	0.036	2.00	0.050	0.020	0.013	0.17	5.52	0.26	1.84	2.0	96
14	I-607	0.69	0.00	0.69	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.02	1.41	0.19	1.41	2.0	Off
13	I-606	0.30	0.00	0.30	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.06	0.80	0.11	0.80	2.0	Off
12	I-605	0.43	0.00	0.43	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	-0.03	1.03	0.14	1.03	2.0	Off
11	I-504	0.44	0.00	0.44	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.12	2.91	0.19	0.42	2.0	42
10	I-513	2.57*	0.00	2.57	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.19	6.60	0.36	6.60	2.0	Off
9	I-512	2.19	0.00	2.19	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.17	5.45	0.34	5.45	2.0	Off

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
8	I-511	0.08	0.00	0.08	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.040	2.00	0.050	0.020	0.013	0.06	1.11	0.17	0.00	2.0	4
7	I-516	1.90*	0.00	1.90	0.00	Comb	4.0	4.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	4.54	0.32	4.54	2.0	Off
6	I-515	0.77*	0.00	0.77	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.03	1.51	0.20	1.51	2.0	Off
5	I-514	0.77*	0.00	0.77	0.00	Grate	0.0	0.00	6.00	4.00	2.00	Sag	2.00	0.050	0.020	0.013	0.03	1.51	0.20	1.51	2.0	Off
4	I-510	0.44	0.00	0.44	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.040	2.00	0.050	0.020	0.013	0.11	2.34	0.17	0.16	2.0	11
3	I-509	0.38	0.00	0.38	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.040	2.00	0.050	0.020	0.013	0.10	2.06	0.17	0.00	2.0	2
2	I-503	0.30	0.00	0.30	0.00	Comb	4.0	4.00	0.00	4.00	2.00	0.023	2.00	0.050	0.020	0.013	0.10	2.10	0.17	0.00	2.0	39
1	MH-502	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off

Project File: 2344001.stm | Number of lines: 169 | Run Date: 11/5/2022

NOTES: Inlet N-Values = 0.016; Intensity = 43.65 / (Inlet time + 8.60) ^ 0.66; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Land Use	Curve Number
Impervious	98
Open Space (HSG B)	61
Open Space (HSG C)	74
Open Space (HSG D)	80

Post-Development Channel Drainage Areas

Cover Type	Channel 5A	Channel 6A	Channel 6B	Channel 6C	Channel 7A	Channel 7B	Channel 7C	Channel 7D	Channel 7E	Channel 7F	Channel 7G	Channel 8A	Channel 8B	Channel 8C	Channel 9A
Impervious (ac)	0.00	0.08	0.04	0.04	0.00	0.05	0.02	0.08	0.09	0.07	0.07	0.10	0.09	0.16	0.00
Open Space (HSG B) (ac)	0.17	0.23	0.06	0.05	0.31	0.07	0.05	0.08	0.06	0.13	0.08	0.18	0.09	0.13	0.24
Open Space (HSG C) (ac)	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Open Space (HSG D) (ac)	0.00	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (ac)	0.17	0.30	0.09	0.17	0.35	0.12	0.07	0.15	0.16	0.19	0.15	0.28	0.18	0.29	0.24
Curve Number	61	70	76	76	64	76	70	79	83	74	79	74	79	82	61
Tc (min)	7.0	11.2	6*	6*	7.4	6.9	6*	6*	6*	8.4	8.0	6.8	9.3	7.5	13.6

*Minimum Tc Assumed

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	5A	5A		6A	6A
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.17	0.17		0.30	0.30
Multiplier (1.6, 2.25, or 2.75)[1]	2.75	-		2.75	-
Q_R (Required Capacity) (cfs)	0.47	0.81		0.83	1.72
Q (Calculated at Flow Depth 'd') (cfs)	0.47	0.81		0.83	1.72
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.080		0.065	0.050
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.66	0.72		1.16	1.80
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.15	0.23		0.37	0.49
Channel Bottom Width (ft)	15.00	15.00		7.50	7.50
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	21	21		13.5	13.5
d (Calculated Flow Depth) (ft)	0.05	0.07		0.09	0.12
Channel Top Width @ Flow Depth d (ft)	15.28	15.40		8.05	8.23
Bottom Width : Flow Depth Ratio (12:1 max)	319.15	214.29		83.33	62.50
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.71	1.12		0.72	0.96
R (Hydraulic Radius)	0.046	0.070		0.089	0.116
S (Bed Slope)[3] (ft/ft)	0.050	0.050		0.065	0.065
S_C (Critical Slope) (ft/ft)	0.196	0.264		0.150	0.076
$.7S_C$ (ft/ft)	0.137	0.185		0.105	0.053
$1.3S_C$ (ft/ft)	0.255	0.343		0.195	0.099
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.01	0.02		0.02	0.03
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	6B	6B		6C	6C
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.09	0.09		0.17	0.17
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	0.30	0.69		0.58	1.31
Q (Calculated at Flow Depth 'd') (cfs)	0.30	0.69		0.58	1.31
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.100		0.065	0.060
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.62	0.64		0.96	1.39
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.12	0.26		0.33	0.50
Channel Bottom Width (ft)	6.80	6.80		15.00	15.00
Channel Side Slopes (H:V)	7.00	7.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	20.8	20.8		21	21
d (Calculated Flow Depth) (ft)	0.07	0.14		0.04	0.06
Channel Top Width @ Flow Depth d (ft)	7.73	8.74		15.24	15.37
Bottom Width : Flow Depth Ratio (12:1 max)	103.03	48.92		375.00	250.00
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.48	1.08		0.61	0.94
R (Hydraulic Radius)	0.060	0.123		0.040	0.060
S (Bed Slope)[3] (ft/ft)	0.030	0.030		0.130	0.130
S_C (Critical Slope) (ft/ft)	0.185	0.368		0.187	0.134
$.7S_C$ (ft/ft)	0.130	0.258		0.131	0.094
$1.3S_C$ (ft/ft)	0.241	0.478		0.243	0.174
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.02	0.03		0.01	0.02
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	7A	7A		7B	7B
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.35	0.35		0.12	0.12
Multiplier (1.6, 2.25, or 2.75)[1]	2.75	-		-	-
Q_R (Required Capacity) (cfs)	0.96	1.84		0.38	0.87
Q (Calculated at Flow Depth 'd') (cfs)	0.96	1.84		0.38	0.87
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.070		0.065	0.080
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.65	0.80		0.76	0.86
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.15	0.23		0.18	0.32
Channel Bottom Width (ft)	40.00	40.00		4.50	4.50
Channel Side Slopes (H:V)	3.00	3.00		8.00	8.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	46	46		20.5	20.5
d (Calculated Flow Depth) (ft)	0.04	0.06		0.10	0.17
Channel Top Width @ Flow Depth d (ft)	40.22	40.34		6.03	7.25
Bottom Width : Flow Depth Ratio (12:1 max)	1000.00	666.67		46.88	26.47
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	1.49	2.29		0.50	1.01
R (Hydraulic Radius)	0.037	0.057		0.080	0.139
S (Bed Slope)[3] (ft/ft)	0.065	0.065		0.030	0.030
S_C (Critical Slope) (ft/ft)	0.208	0.209		0.164	0.212
$.7S_C$ (ft/ft)	0.146	0.146		0.115	0.148
$1.3S_C$ (ft/ft)	0.270	0.272		0.213	0.276
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.01	0.02		0.02	0.04
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	7C	7C		7D	7D
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.07	0.07		0.15	0.15
Multiplier (1.6, 2.25, or 2.75)[1]	2.75	-		-	-
Q_R (Required Capacity) (cfs)	0.19	0.47		0.57	1.23
Q (Calculated at Flow Depth 'd') (cfs)	0.19	0.47		0.57	1.23
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.090		0.065	0.080
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.57	0.65		0.92	1.05
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.10	0.20		0.22	0.39
Channel Bottom Width (ft)	4.00	4.00		4.50	4.50
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	10	10		10.5	10.5
d (Calculated Flow Depth) (ft)	0.08	0.16		0.13	0.23
Channel Top Width @ Flow Depth d (ft)	4.47	4.98		5.26	5.85
Bottom Width : Flow Depth Ratio (12:1 max)	50.00	24.69		35.43	19.91
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.33	0.73		0.62	1.17
R (Hydraulic Radius)	0.074	0.145		0.117	0.197
S (Bed Slope)[3] (ft/ft)	0.020	0.020		0.028	0.028
S_C (Critical Slope) (ft/ft)	0.181	0.288		0.148	0.192
$.7S_C$ (ft/ft)	0.127	0.202		0.104	0.134
$1.3S_C$ (ft/ft)	0.235	0.374		0.192	0.250
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.02	0.04		0.03	0.06
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	7E	7E		7F	7F
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.16	0.16		0.19	0.19
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	0.69	1.40		0.56	1.32
Q (Calculated at Flow Depth 'd') (cfs)	0.69	1.40		0.56	1.32
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.060		0.065	0.080
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	1.07	1.47		0.89	1.06
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.37	0.53		0.21	0.40
Channel Bottom Width (ft)	12.00	12.00		5.00	5.00
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	18	18		11	11
d (Calculated Flow Depth) (ft)	0.05	0.08		0.12	0.22
Channel Top Width @ Flow Depth d (ft)	12.32	12.47		5.71	6.32
Bottom Width : Flow Depth Ratio (12:1 max)	240.00	150.00		41.67	22.73
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.65	0.95		0.63	1.24
R (Hydraulic Radius)	0.053	0.076		0.109	0.190
S (Bed Slope)[3] (ft/ft)	0.110	0.110		0.029	0.029
S_C (Critical Slope) (ft/ft)	0.172	0.126		0.151	0.192
$.7S_C$ (ft/ft)	0.120	0.088		0.106	0.134
$1.3S_C$ (ft/ft)	0.224	0.164		0.196	0.250
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.01	0.02		0.03	0.06
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	7G	7G		8A	8A
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.15	0.15		0.28	0.28
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	0.53	1.16		0.82	1.95
Q (Calculated at Flow Depth 'd') (cfs)	0.53	1.16		0.82	1.95
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.080		0.065	0.055
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.77	0.90		1.27	1.96
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.18	0.32		0.46	0.70
Channel Bottom Width (ft)	7.50	7.50		7.30	7.30
Channel Side Slopes (H:V)	6.00	6.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	19.5	19.5		13.3	13.3
d (Calculated Flow Depth) (ft)	0.09	0.15		0.09	0.13
Channel Top Width @ Flow Depth d (ft)	8.53	9.34		7.81	8.08
Bottom Width : Flow Depth Ratio (12:1 max)	87.21	49.02		81.11	56.15
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.69	1.29		0.65	0.10
R (Hydraulic Radius)	0.080	0.138		0.080	0.123
S (Bed Slope)[3] (ft/ft)	0.033	0.033		0.086	0.086
S_C (Critical Slope) (ft/ft)	0.167	0.215		0.150	0.089
$.7S_C$ (ft/ft)	0.117	0.151		0.105	0.062
$1.3S_C$ (ft/ft)	0.217	0.280		0.195	0.116
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.02	0.04		0.02	0.03
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	8B	8B		8C	8C
Temporary (T) or Permanent (P)	P	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.18	0.18		0.29	0.29
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	0.64	1.39		1.15	2.37
Q (Calculated at Flow Depth 'd') (cfs)	0.64	1.39		1.15	2.37
Protective Lining[2]	Straw with Net	Vegetation - Class C		Straw with Net	Vegetation - Class C
n (Manning's Coefficient)[2]	0.065	0.080		0.065	0.050
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.96	1.08		1.54	2.34
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00		1.45	1.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.29	0.50		0.61	0.80
Channel Bottom Width (ft)	5.50	5.50		4.00	4.00
Channel Side Slopes (H:V)	10.00	10.00		3.50	3.50
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	25.5	25.5		11	11
d (Calculated Flow Depth) (ft)	0.10	0.18		0.16	0.21
Channel Top Width @ Flow Depth d (ft)	7.54	9.05		5.14	5.49
Bottom Width : Flow Depth Ratio (12:1 max)	53.92	30.90		25.00	19.05
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.67	1.29		0.75	1.01
R (Hydraulic Radius)	0.088	0.143		0.144	0.180
S (Bed Slope)[3] (ft/ft)	0.045	0.045		0.060	0.060
S_C (Critical Slope) (ft/ft)	0.154	0.202		0.126	0.065
$.7S_C$ (ft/ft)	0.108	0.141		0.088	0.046
$1.3S_C$ (ft/ft)	0.200	0.263		0.164	0.085
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.03	0.04		0.04	0.05
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: RES Date: 11/3/2022

Checked By: Date:

Channel or Channel Section	9A	9A			
Temporary (T) or Permanent (P)	P	P			
Design Storm (2, 5, or 10 yr)	10	100			
Acres (ac)	0.24	0.24			
Multiplier (1.6, 2.25, or 2.75)[1]	2.75	-			
Q_R (Required Capacity) (cfs)	0.66	0.90			
Q (Calculated at Flow Depth 'd') (cfs)	0.66	0.90			
Protective Lining[2]	Straw with Net	Vegetation - Class C			
n (Manning's Coefficient)[2]	0.065	0.110			
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	0.63	0.50			
τ_a (Max Allowable Shear Stress) (lb/ft^2)	1.45	1.00			
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.11	0.18			
Channel Bottom Width (ft)	8.00	8.00			
Channel Side Slopes (H:V)	7.00	7.00			
D (Total Depth) (ft)	1.00	1.00			
Channel Top Width @ D (ft)	22	22			
d (Calculated Flow Depth) (ft)	0.12	0.19			
Channel Top Width @ Flow Depth d (ft)	9.65	10.68			
Bottom Width : Flow Depth Ratio (12:1 max)	66.67	42.11			
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	1.04	1.79			
R (Hydraulic Radius)	0.108	0.167			
S (Bed Slope)[3] (ft/ft)	0.015	0.015			
S_C (Critical Slope) (ft/ft)	0.161	0.434			
$.7S_C$ (ft/ft)	0.113	0.304			
$1.3S_C$ (ft/ft)	0.209	0.564			
Stable Flow? (Y/N)	Y	Y			
Freeboard Based on Unstable Flow (ft)	---	---			
Freeboard Based on Stable Flow (ft)	0.03	0.05			
Minimum Required Freeboard[4] (ft)	0.50	0.50			
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	0.017	0.059	-------	-------	0.250	0.424	0.598	0.811	Channel 5A
2	SCS Runoff	------	0.146	0.263	-------	-------	0.663	0.997	1.327	1.720	Channel 6A
3	SCS Runoff	------	0.098	0.147	-------	-------	0.304	0.432	0.552	0.692	Channel 6B
4	SCS Runoff	------	0.184	0.278	-------	-------	0.575	0.815	1.043	1.307	Channel 6C
5	SCS Runoff	------	0.078	0.191	-------	-------	0.628	1.010	1.388	1.844	Channel 7A
6	SCS Runoff	------	0.119	0.181	-------	-------	0.381	0.543	0.696	0.874	Channel 7B
7	SCS Runoff	------	0.045	0.077	-------	-------	0.186	0.276	0.362	0.467	Channel 7C
8	SCS Runoff	------	0.200	0.288	-------	-------	0.566	0.785	0.989	1.225	Channel 7D
9	SCS Runoff	------	0.271	0.373	-------	-------	0.690	0.929	1.148	1.400	Channel 7E
10	SCS Runoff	------	0.160	0.253	-------	-------	0.558	0.805	1.043	1.322	Channel 7F
11	SCS Runoff	------	0.185	0.269	-------	-------	0.534	0.742	0.937	1.161	Channel 7G
12	SCS Runoff	------	0.236	0.373	-------	-------	0.822	1.187	1.537	1.949	Channel 8A
13	SCS Runoff	------	0.221	0.322	-------	-------	0.641	0.891	1.124	1.394	Channel 8B
14	SCS Runoff	------	0.432	0.605	-------	-------	1.145	1.556	1.935	2.371	Channel 8C
15	SCS Runoff	------	0.018	0.060	-------	-------	0.266	0.459	0.654	0.897	Channel 9A

TR55 Tc Worksheet

Hyd. No. 1

Channel 5A

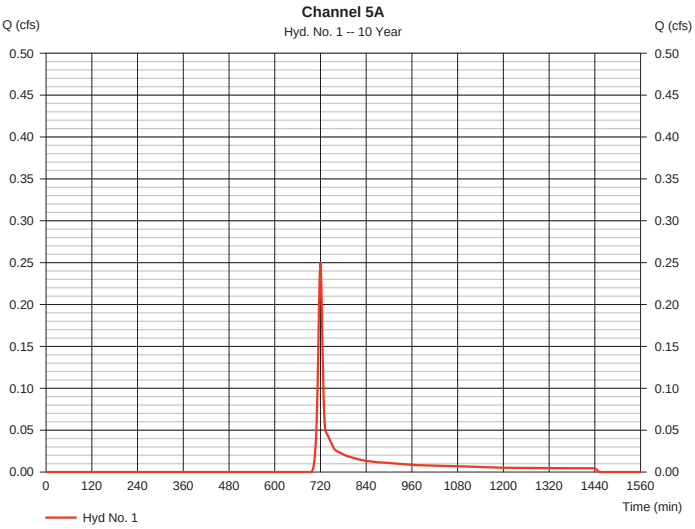
Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	0.00	0.00	
Land slope (%)	= 5.50	0.00	0.00	
Travel Time (min)	**= 6.84**	**+ 0.00**	**+ 0.00**	**= 6.84**
Shallow Concentrated Flow				
Flow length (ft)	= 28.00	0.00	0.00	
Watercourse slope (%)	= 5.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.78	0.00	0.00	
Travel Time (min)	**= 0.12**	**+ 0.00**	**+ 0.00**	**= 0.12**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Total Travel Time, Tc				**7.00 min**

Hydrograph Report

Hyd. No. 1

Channel 5A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.250 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 612 cuft
Drainage area	= 0.170 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

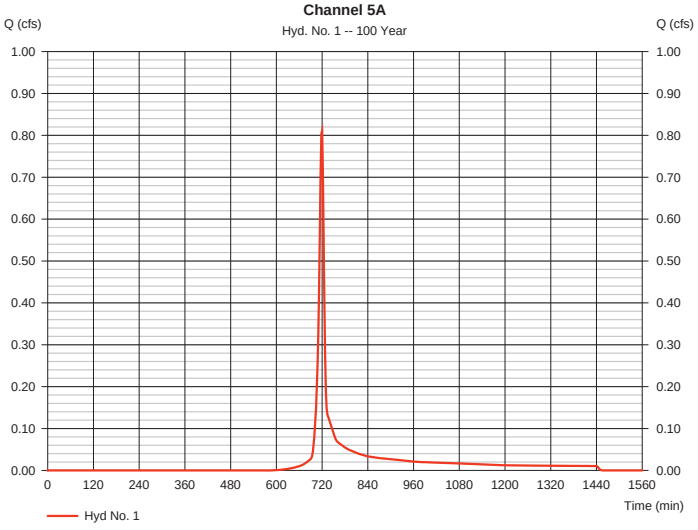


Hydrograph Report

Hyd. No. 1

Channel 5A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.811 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 1,857 cuft
Drainage area	= 0.170 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 2

Channel 6A

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.150	0.150	
Flow length (ft)	= 30.0	40.0	30.0	
Two-year 24-hr precip. (in)	= 2.92	2.92	2.92	
Land slope (%)	= 25.00	16.50	0.50	
Travel Time (min)	**= 1.43**	**+ 2.12**	**+ 6.82**	**= 10.36**
Shallow Concentrated Flow				
Flow length (ft)	= 60.00	0.00	0.00	
Watercourse slope (%)	= 0.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.14	0.00	0.00	
Travel Time (min)	**= 0.88**	**+ 0.00**	**+ 0.00**	**= 0.88**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Total Travel Time, Tc				**11.20 min**

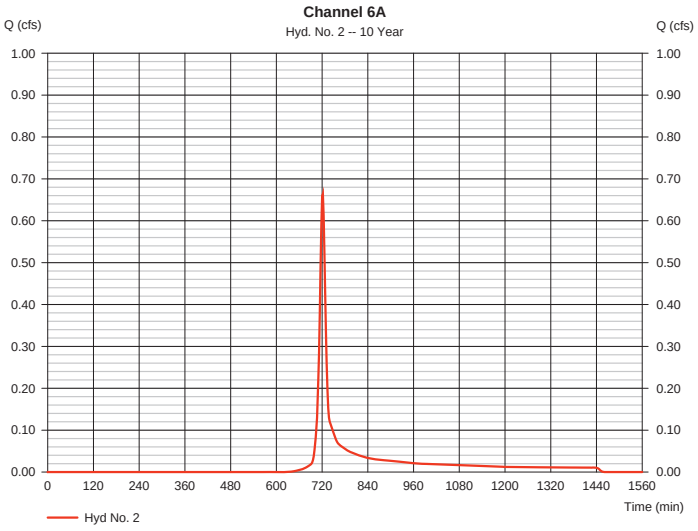
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 2

Channel 6A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.663 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 1,754 cuft
Drainage area	= 0.300 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



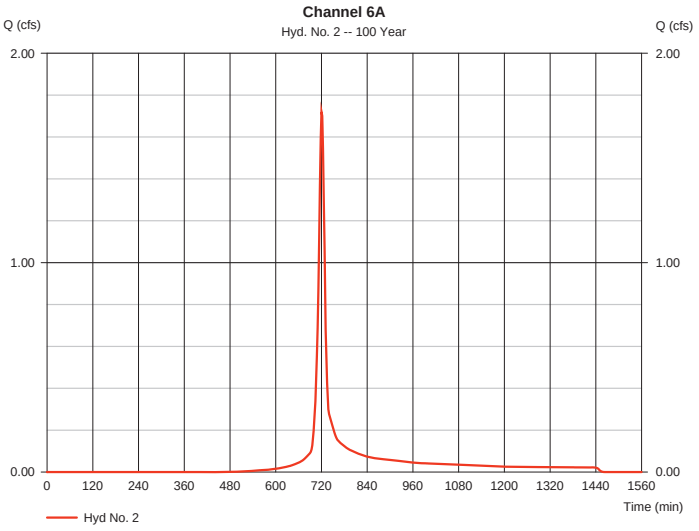
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 2

Channel 6A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.720 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 4,459 cuft
Drainage area	= 0.300 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 11.20 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



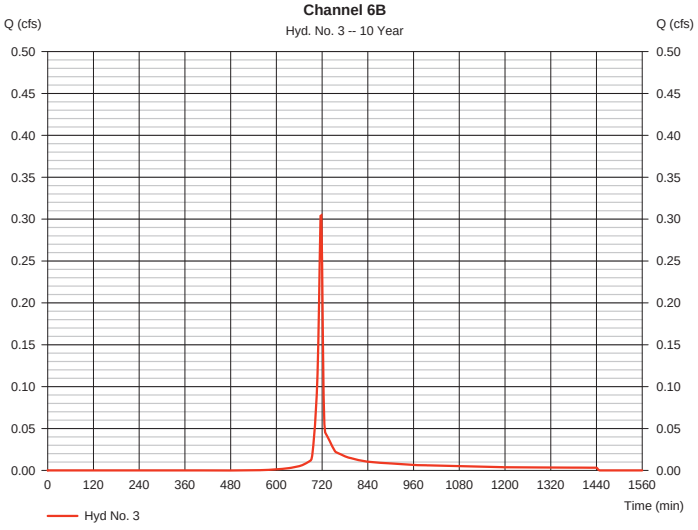
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Channel 6B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.304 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 613 cuft
Drainage area	= 0.090 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



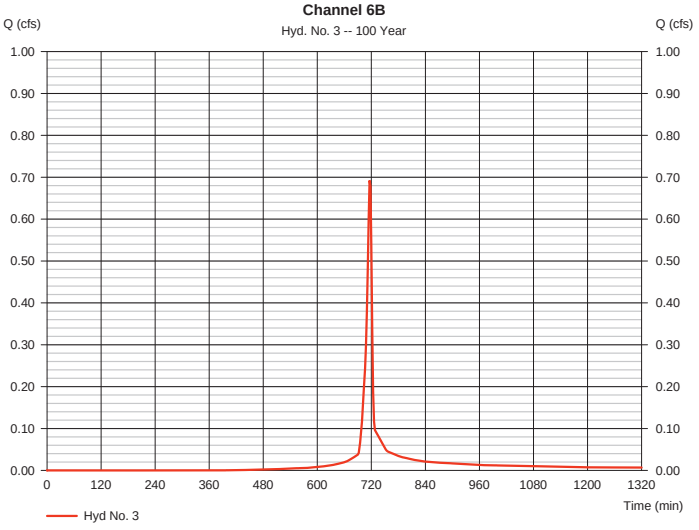
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 3

Channel 6B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.692 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,419 cuft
Drainage area	= 0.090 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



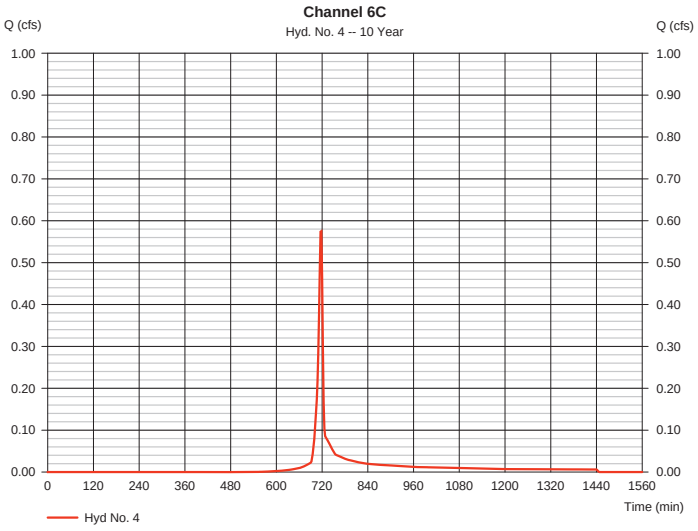
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 4

Channel 6C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.575 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,159 cuft
Drainage area	= 0.170 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



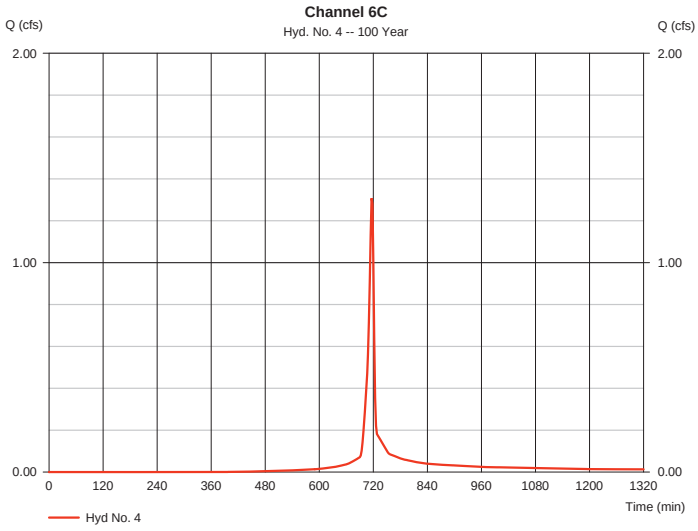
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 4

Channel 6C

Hydrograph type	= SCS Runoff	Peak discharge	= 1.307 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 2,680 cuft
Drainage area	= 0.170 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 5

Channel 7A

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	0.00	0.00	
Land slope (%)	= 5.50	0.00	0.00	
Travel Time (min)	**= 6.84 +**	**0.00 +**	**0.00 =**	**6.84**
Shallow Concentrated Flow				
Flow length (ft)	= 130.00	0.00	0.00	
Watercourse slope (%)	= 5.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.78	0.00	0.00	
Travel Time (min)	**= 0.57 +**	**0.00 +**	**0.00 =**	**0.57**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 7.40 min

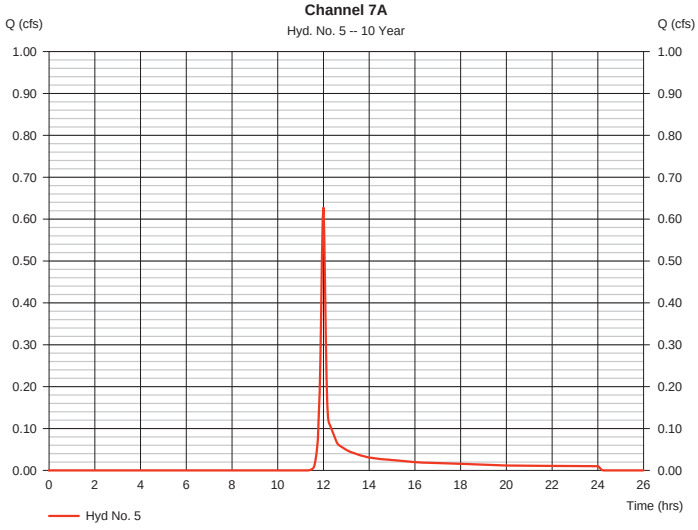
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 5

Channel 7A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.628 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 1,486 cuft
Drainage area	= 0.350 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

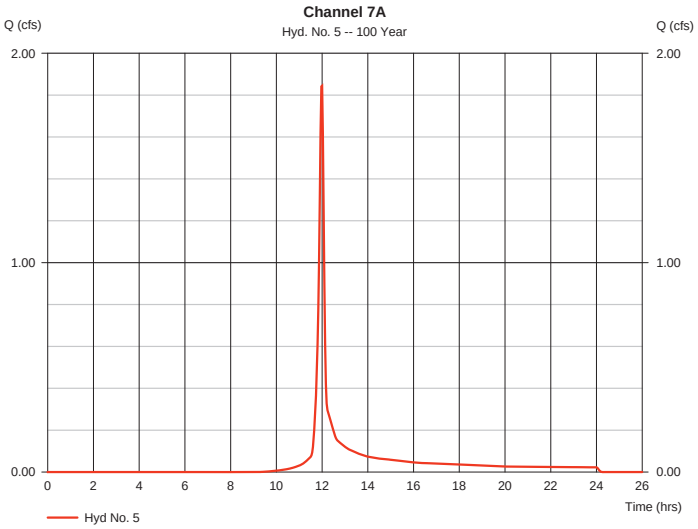


Hydrograph Report

Hyd. No. 5

Channel 7A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.844 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 4,224 cuft
Drainage area	= 0.350 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.40 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 6

Channel 7B

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	0.00	0.00	
Land slope (%)	= 5.50	0.00	0.00	
Travel Time (min)	**= 6.84**	**+ 0.00**	**+ 0.00**	**= 6.84**
Shallow Concentrated Flow				
Flow length (ft)	= 23.00	0.00	0.00	
Watercourse slope (%)	= 5.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.78	0.00	0.00	
Travel Time (min)	**= 0.10**	**+ 0.00**	**+ 0.00**	**= 0.10**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

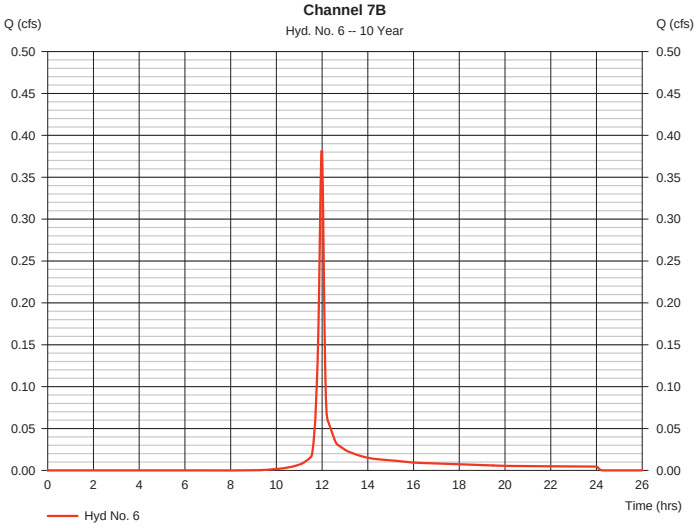
Total Travel Time, Tc ..... 6.90 min

Hydrograph Report

Hyd. No. 6

Channel 7B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.381 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 872 cuft
Drainage area	= 0.120 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.90 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

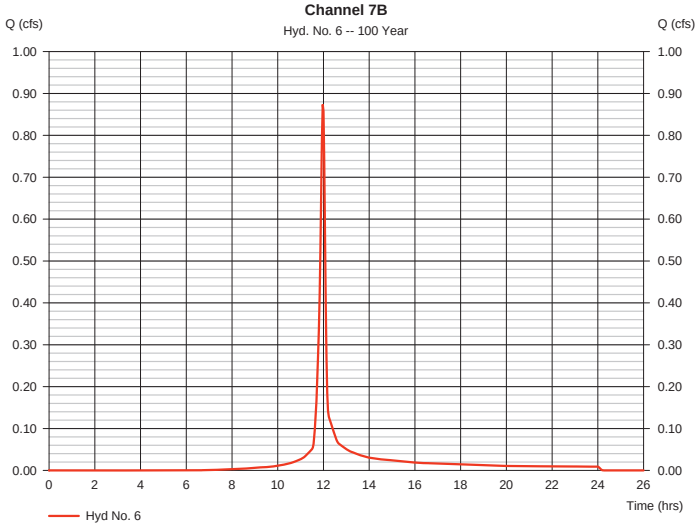


Hydrograph Report

Hyd. No. 6

Channel 7B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.874 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 2,018 cuft
Drainage area	= 0.120 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.90 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



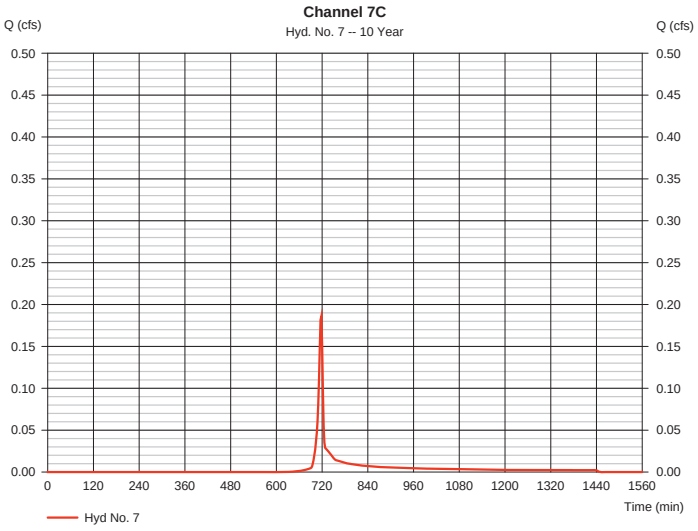
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 7

Channel 7C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.186 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 372 cuft
Drainage area	= 0.070 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



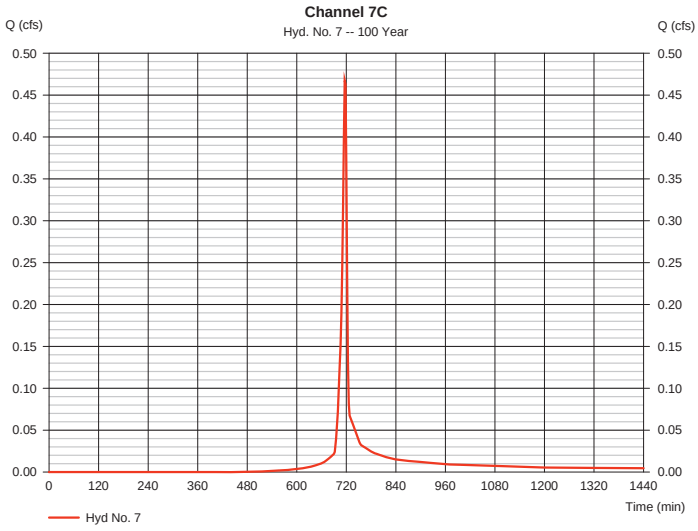
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 7

Channel 7C

Hydrograph type	= SCS Runoff	Peak discharge	= 0.467 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 946 cuft
Drainage area	= 0.070 ac	Curve number	= 70
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



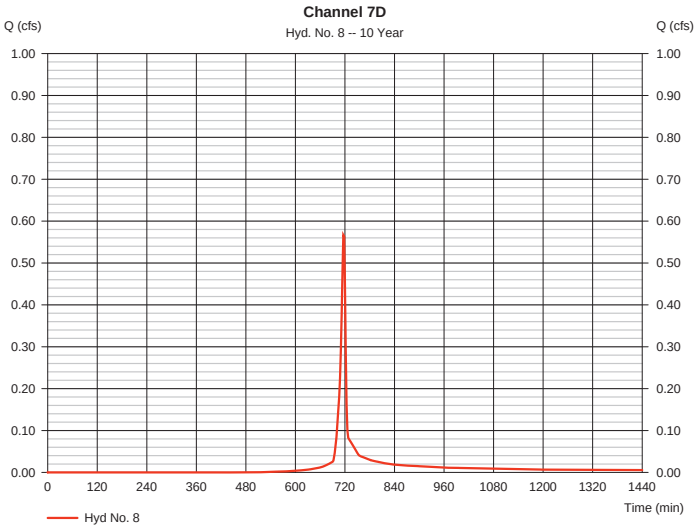
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 8

Channel 7D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.566 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,145 cuft
Drainage area	= 0.150 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



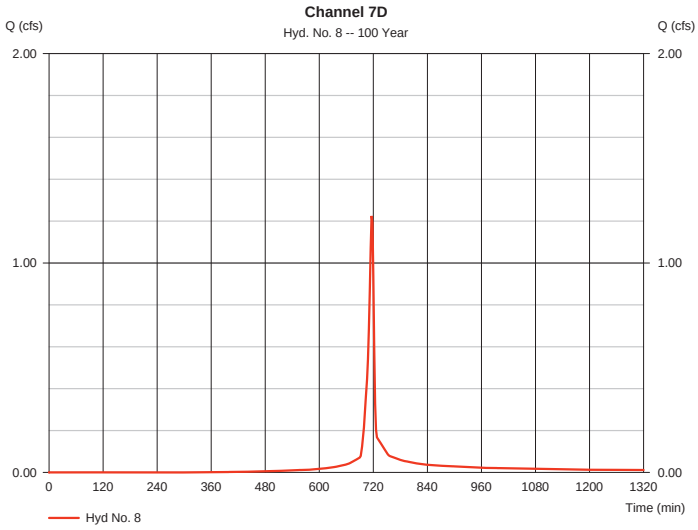
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 8

Channel 7D

Hydrograph type	= SCS Runoff	Peak discharge	= 1.225 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 2,537 cuft
Drainage area	= 0.150 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



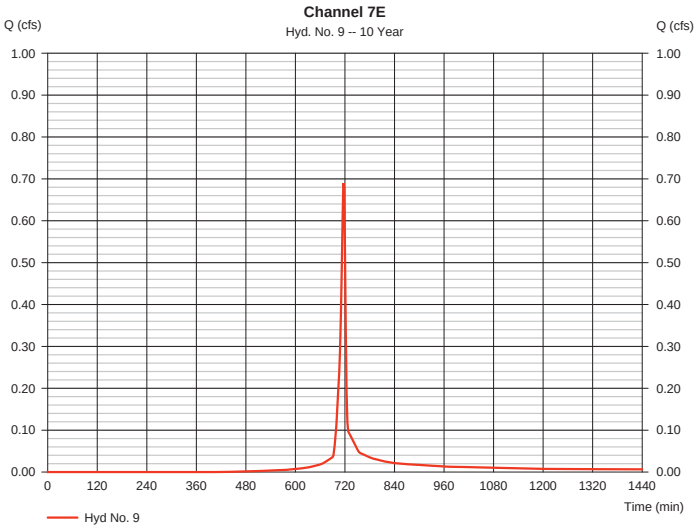
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 9

Channel 7E

Hydrograph type	= SCS Runoff	Peak discharge	= 0.690 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 1,407 cuft
Drainage area	= 0.160 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



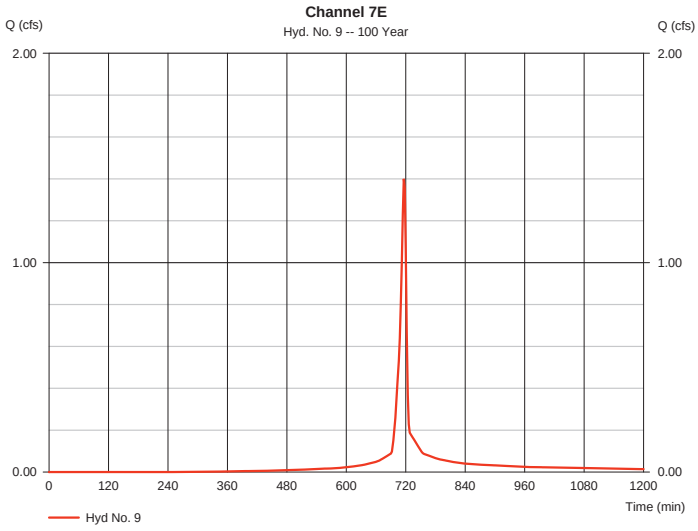
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 9

Channel 7E

Hydrograph type	= SCS Runoff	Peak discharge	= 1.400 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 2,954 cuft
Drainage area	= 0.160 ac	Curve number	= 83
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 10

Channel 7F

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.150	0.011	
Flow length (ft)	= 15.0	85.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	2.92	0.00	
Land slope (%)	= 33.00	3.00	0.00	
Travel Time (min)	**= 0.73 +**	**7.66 +**	**0.00 =**	**8.39**
Shallow Concentrated Flow				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 8.40 min

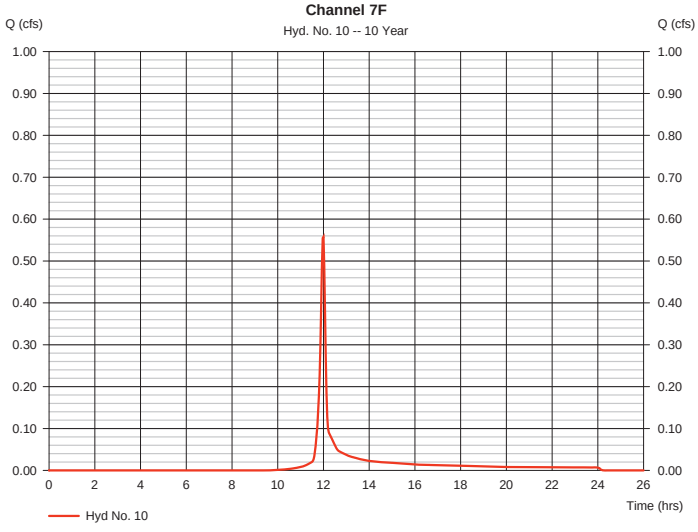
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 — Monday, 11 / 7 / 2022

Hyd. No. 10

Channel 7F

Hydrograph type	= SCS Runoff	Peak discharge	= 0.558 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 1,276 cuft
Drainage area	= 0.190 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.40 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



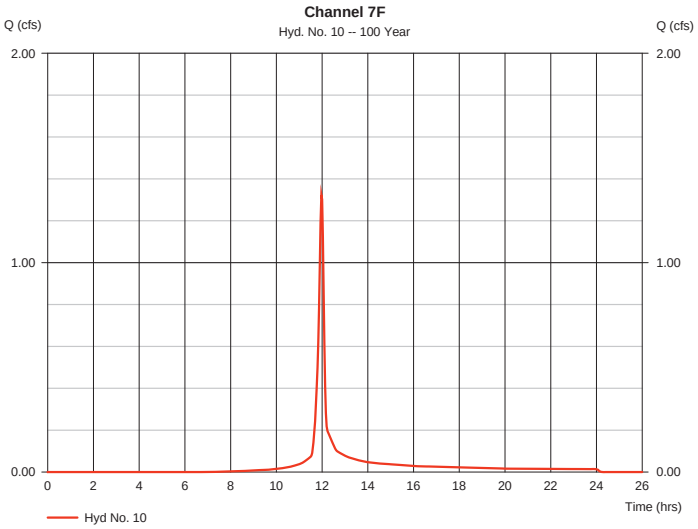
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 10

Channel 7F

Hydrograph type	= SCS Runoff	Peak discharge	= 1.322 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 3,042 cuft
Drainage area	= 0.190 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.40 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 11

Channel 7G

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 2.92		0.00		0.00		
Land slope (%)	= 4.00		0.00		0.00		
Travel Time (min)	**= 7.77**	**+**	**0.00**	**+**	**0.00**	**=**	**7.77**
Shallow Concentrated Flow							
Flow length (ft)	= 53.00		0.00		0.00		
Watercourse slope (%)	= 4.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=3.23		0.00		0.00		
Travel Time (min)	**= 0.27**	**+**	**0.00**	**+**	**0.00**	**=**	**0.27**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00		0.00		0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 8.00 min

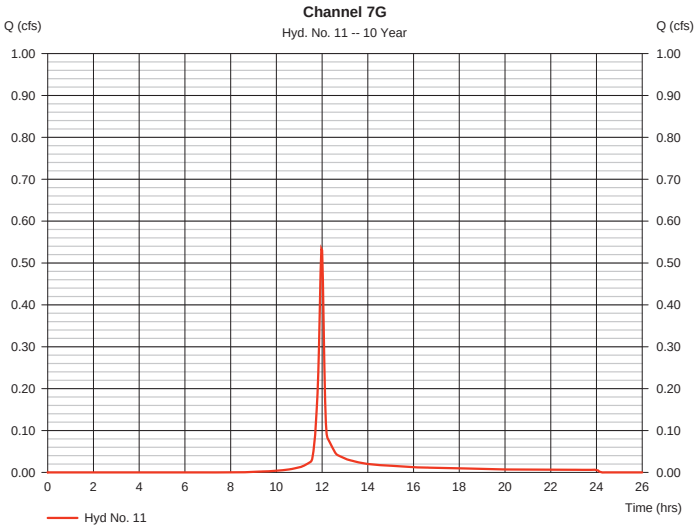
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 11

Channel 7G

Hydrograph type	= SCS Runoff	Peak discharge	= 0.534 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 1,221 cuft
Drainage area	= 0.150 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.00 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



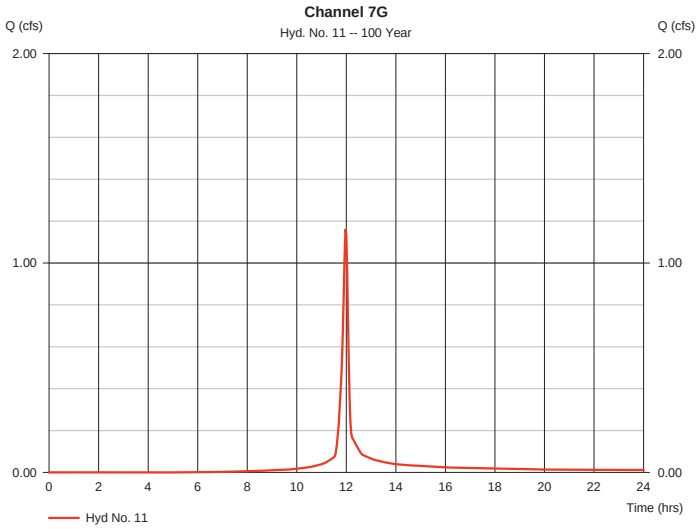
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 11

Channel 7G

Hydrograph type	= SCS Runoff	Peak discharge	= 1.161 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 2,706 cuft
Drainage area	= 0.150 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.00 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 12

Channel 8A

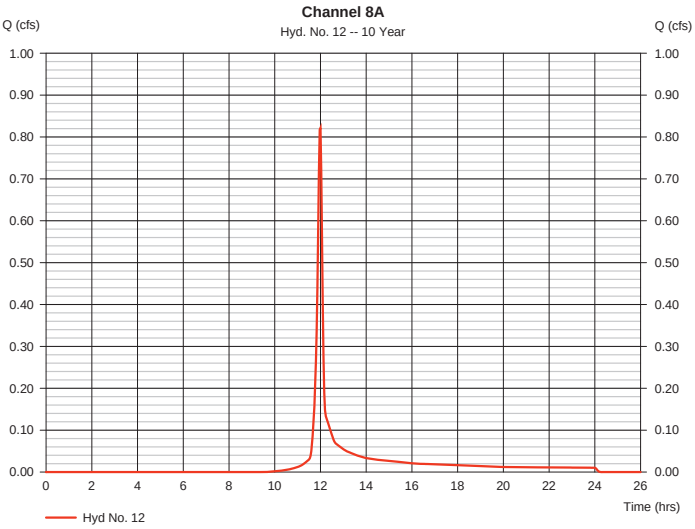
Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	0.00	0.00	
Land slope (%)	= 6.50	0.00	0.00	
Travel Time (min)	**= 6.40**	**+ 0.00**	**+ 0.00**	**= 6.40**
Shallow Concentrated Flow				
Flow length (ft)	= 90.00	0.00	0.00	
Watercourse slope (%)	= 6.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=4.11	0.00	0.00	
Travel Time (min)	**= 0.36**	**+ 0.00**	**+ 0.00**	**= 0.36**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Total Travel Time, Tc				**6.80 min**

Hydrograph Report

Hyd. No. 12

Channel 8A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.822 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 1,880 cuft
Drainage area	= 0.280 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.80 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

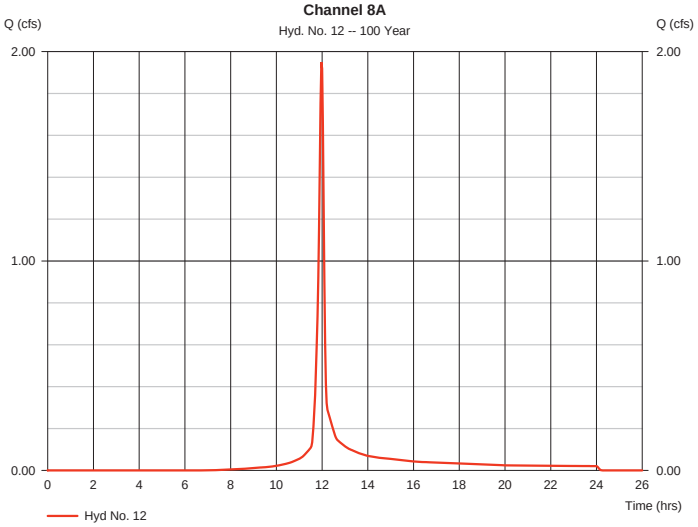


Hydrograph Report

Hyd. No. 12

Channel 8A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.949 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 4,483 cuft
Drainage area	= 0.280 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.80 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 13

Channel 8B

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	0.00	0.00	
Land slope (%)	= 4.00	0.00	0.00	
Travel Time (min)	**= 7.77**	**+ 0.00**	**+ 0.00**	**= 7.77**
Shallow Concentrated Flow				
Flow length (ft)	= 40.00	64.00	0.00	
Watercourse slope (%)	= 0.50	0.50	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	=1.14	1.14	0.00	
Travel Time (min)	**= 0.58**	**+ 0.93**	**+ 0.00**	**= 1.52**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Total Travel Time, Tc				**9.30 min**

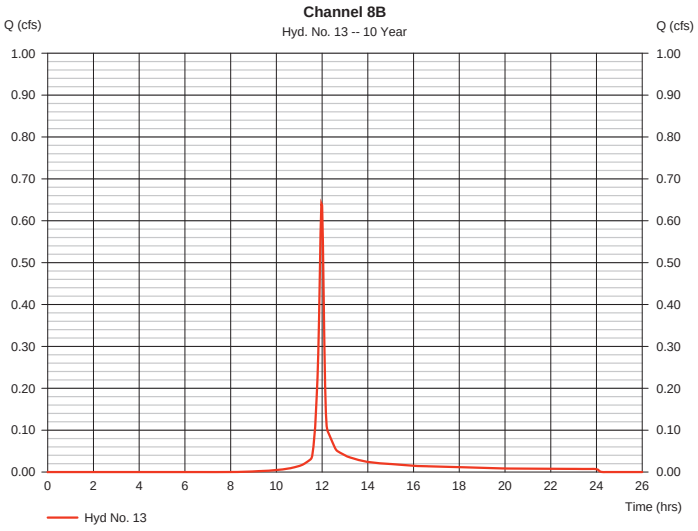
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Channel 8B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.641 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 1,465 cuft
Drainage area	= 0.180 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.30 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



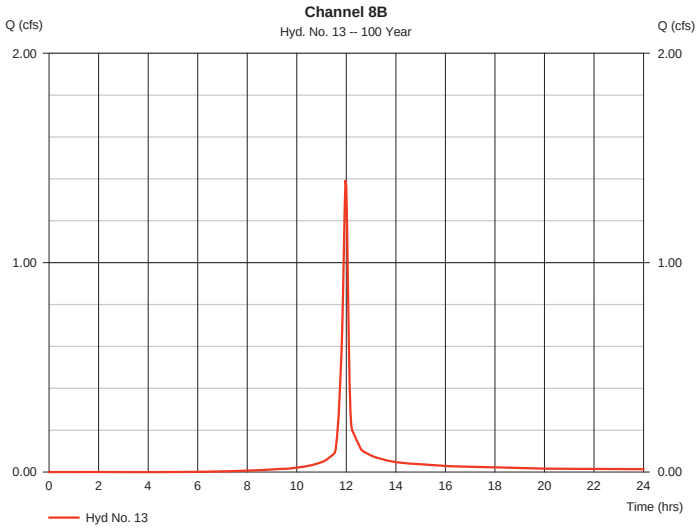
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 13

Channel 8B

Hydrograph type	= SCS Runoff	Peak discharge	= 1.394 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 3,248 cuft
Drainage area	= 0.180 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.30 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 14

Channel 8C

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.150	0.011	
Flow length (ft)	= 26.0	74.0	0.0	
Two-year 24-hr precip. (in)	= 2.92	2.92	0.00	
Land slope (%)	= 30.00	5.50	0.00	
Travel Time (min)	**= 1.18 +**	**5.38 +**	**0.00 =**	**6.56**
Shallow Concentrated Flow				
Flow length (ft)	= 216.00	0.00	0.00	
Watercourse slope (%)	= 5.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.78	0.00	0.00	
Travel Time (min)	**= 0.95 +**	**0.00 +**	**0.00 =**	**0.95**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 7.50 min

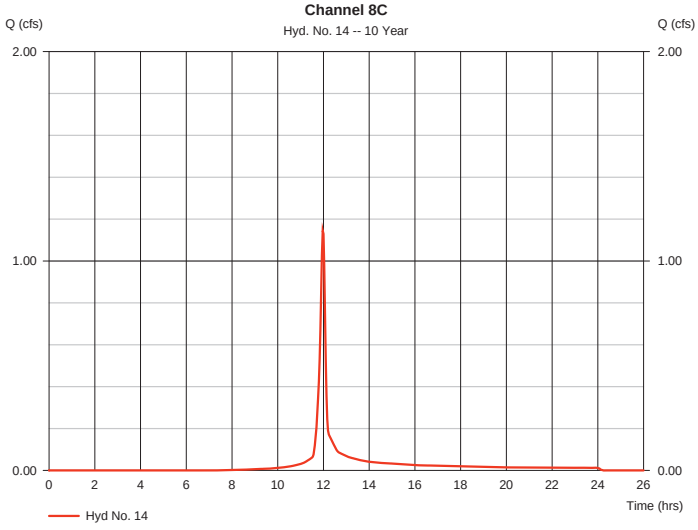
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021 Monday, 11 / 7 / 2022

Hyd. No. 14

Channel 8C

Hydrograph type	= SCS Runoff	Peak discharge	= 1.145 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 2,628 cuft
Drainage area	= 0.290 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

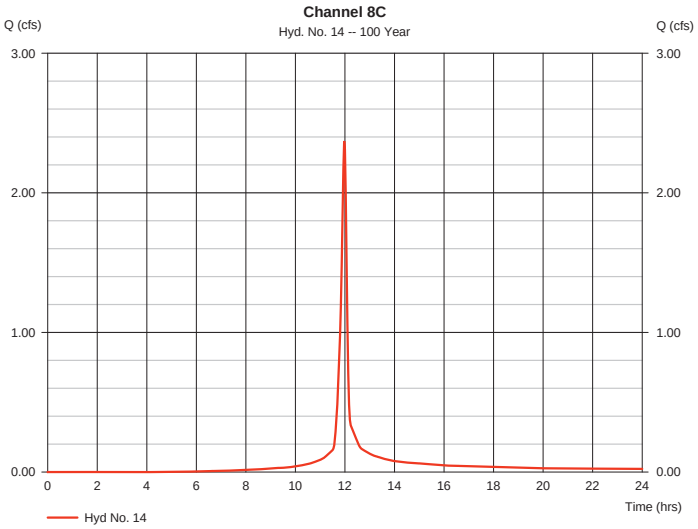


Hydrograph Report

Hyd. No. 14

Channel 8C

Hydrograph type	= SCS Runoff	Peak discharge	= 2.371 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 5,591 cuft
Drainage area	= 0.290 ac	Curve number	= 82
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.50 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hyd. No. 15

Channel 9A

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.150	0.150	0.150	
Flow length (ft)	= 20.0	10.0	70.0	
Two-year 24-hr precip. (in)	= 2.92	2.92	2.92	
Land slope (%)	= 1.00	30.00	1.50	
Travel Time (min)	**= 3.73**	**+ 0.55**	**+ 8.65**	**= 12.94**
Shallow Concentrated Flow				
Flow length (ft)	= 74.00	0.00	0.00	
Watercourse slope (%)	= 1.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.98	0.00	0.00	
Travel Time (min)	**= 0.62**	**+ 0.00**	**+ 0.00**	**= 0.62**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00			
		0.00		
			0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

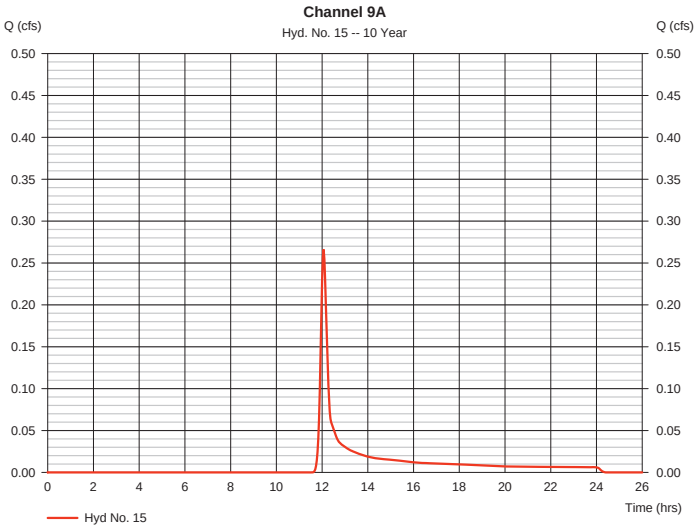
Total Travel Time, Tc ..... 13.60 min

Hydrograph Report

Hyd. No. 15

Channel 9A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.266 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 842 cuft
Drainage area	= 0.240 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 4.34 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

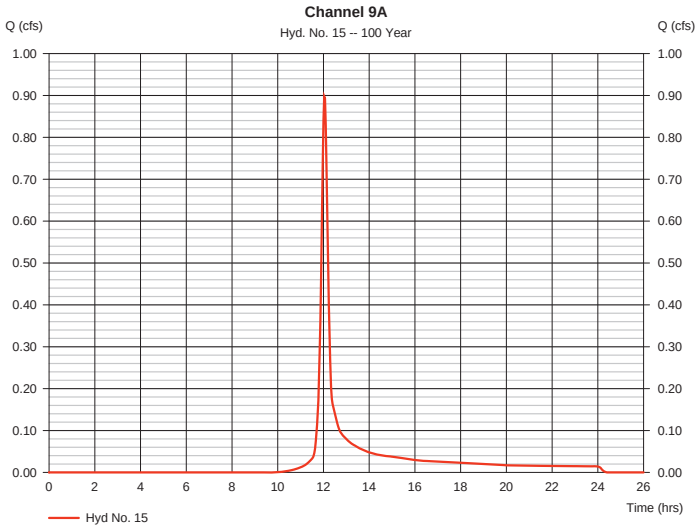


Hydrograph Report

Hyd. No. 15

Channel 9A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.897 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 2,556 cuft
Drainage area	= 0.240 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.60 min
Total precip.	= 7.42 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Appendix F
BMP Design and Calculations

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Development**

Application Type: **PAG-02 NOI**

County: **Dauphin**

Municipality: **Susquehanna Township**

Project Type: **Multi-Family Housing**

(●) New Project ( ) Minor / Major Amendment

Area: **47.03** acres
(In Watershed)

Total Earth Disturbance: **17.03** acres
(In Watershed)

No. of Post-Construction Discharge Points: **2**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	10.92	10.81	0.97	6.10	Tributary 10141 to Paxton Creek	WWF, MF	Yes
002	3.31	3.14	0.56	1.90	Tributary 10141 to Paxton Creek	WWF, MF	Yes
Undetained Areas	8.15	3.08	0.00	0.41	Tributary 10141 to Paxton Creek	WWF, MF	
Totals:	**22.38**	**17.03**	**1.53**	**8.41**			

Volume Management

Project: Martina Drive Multifamily Residential Development

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.92** inches

Alternative 2-Year / 24-Hour Storm Event: inches

Alternative Source:

Pre-Construction Conditions: *No. Rows:* **4**

☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Forested (Good Condition)	1.38	B	55	1.636	0.17	872
Impervious as Meadow	0.31	B	58	1.448	0.25	280
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	1.23	N/A	98	0.041	2.69	12,004
Pervious as Meadow	13.92	B	58	1.448	0.25	12,561
TOTAL (ACRES):	**16.84**				**TOTAL (CF):**	**25,717**

Post-Construction Conditions: *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	7.00	B	61	1.279	0.34	8,519
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	8.35	N/A	98	0.041	2.69	81,493
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.68	B	58	1.448	0.25	1,516
TOTAL (ACRES):	**17.03**				**TOTAL (CF):**	**91,529**

ET CHANGE IN VOLUME TO MANAGE (CF): **65,811**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **5** *Start BMP Numbering at:* **1**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Infiltration Basin	-	Off-Site	4.34	24,873	13,939	0.50	72	Yes	0.5	24,873	**24,873**	**0**
001	2	Infiltration Basin	-	Off-Site	4.54	28,967	8,861	0.50	72	Yes	0.5	20,590	**23,925**	**1,520**
001	3	Rain Garden / Bioretention	-	Off-Site	0.71	3,572	1,535	0.50	72	Yes	0.5	3,572	**3,572**	**0**
001	4	Rain Garden / Bioretention	-	Off-Site	1.22	7,144	1,694	0.50	72	Yes	0.5	2,296	**3,058**	**291**
002	5	Infiltration Basin	-	Off-Site	3.14	19,907	6,141	0.50	72	Yes	0.5	14,610	**16,581**	**1,053**
												Totals:	**72,009**	**2,863**

INFILTRATION & ET CREDITS (CF): **74,872**

NET CHANGE IN VOLUME TO MANAGE (CF): **65,811**

TOTAL CREDITS (CF): **74,872**

VOLUME REQUIREMENT SATISFIED

Water Quality

Project: Martina Drive Multifamily Residential Development

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	1.38	B	872	45.0	0.13	1.05	2.45	0.01	0.06
Impervious as Meadow	Grassland/Herbaceous	0.31	B	280	48.8	0.22	2.30	0.85	0.00	0.04
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	1.23	N/A	12,004	65.0	0.29	2.05	48.72	0.22	1.54
Pervious as Meadow	Grassland/Herbaceous	13.92	B	12,561	48.8	0.22	2.30	38.28	0.17	1.80
	TOTAL (ACRES):	**16.84**					**TOTALS:**	**90.30**	**0.40**	**3.44**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	7.00	B	8,519	78.0	0.25	1.25	41.49	0.13	0.66
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	8.35	N/A	81,493	65.0	0.29	2.05	330.76	1.48	10.43
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.68	B	1,516	48.8	0.22	2.30	4.62	0.02	0.22
	TOTAL (ACRES):	**17.03**					**TOTALS:**	**376.88**	**1.63**	**11.31**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**286.57**	**1.23**	**7.88**

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No	BMP	BMP Name	?	BMP DA	Vol. Routed	Inf. & ET	Capture & Buffer	Outflow	Outflow Conc. (mg/L)	Pollutant Loads (lbs)

DP No.	No.	BMP Name	IMR	DA (acres)	to BMP (CF)	Credits (CF)	Buffer Credits (CF)	(CF)	TSS	TP	TN	TSS	TP	TN
001	1	Infiltration Basin	-	4.34	24,873	24,873		0	10.00	0.24	0.96	0.00	0.00	0.00
001	2	Infiltration Basin	-	4.54	28,967	25,444		3,523	10.00	0.24	0.96	2.20	0.05	0.21
001	3	Rain Garden / Bioretention	-	0.71	3,572	3,572		0	10.00	0.24	0.96	0.00	0.00	0.00
001	4	Rain Garden / Bioretention	-	1.22	7,144	3,349		3,795	10.00	0.24	0.96	2.37	0.06	0.23
002	5	Infiltration Basin	-	3.14	19,907	17,634		2,273	10.00	0.24	0.96	1.42	0.03	0.14

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**5.99**	**0.14**	**0.57**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**29.09**	**0.13**	**0.87**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**35.08**	**0.27**	**1.45**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**90.30**	**0.40**	**3.44**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Brent Bingham	11/3/2022
Spreadsheet User Name	Date

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Development**

Application Type: **PAG-02 NOI**

County: **Dauphin**

Municipality: **Susquehanna Township**

Project Type: **Multi-Family Housing**

(●) New Project ( ) Minor / Major Amendment

Area: **47.03** acres
(In Watershed)

Total Earth Disturbance: **4.26** acres
(In Watershed)

No. of Post-Construction Discharge Points: **3**

Start DP Numbering at: **003**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
003	3.72	3.72	0.00	1.91	Tributary 1054 to Paxton Creek	WWF, MF	Yes
004	0.06	0.06	0.00	0.00	Tributary 1054 to Paxton Creek	WWF, MF	No
005	1.43	0.23	0.00	0.24	Tributary 1054 to Paxton Creek	WWF, MF	No
Undetained Areas	0.29	0.25	0.00	0.00	Tributary 1054 to Paxton Creek	WWF, MF	
Totals:	**5.50**	**4.26**		**2.15**			

Volume Management

Project: Martina Drive Multifamily Residential Development

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.92** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **4** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Forested (Good Condition)	2.28	B	55	1.636	0.17	1,441
Impervious as Meadow	0.01	B	58	1.448	0.25	9
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	0.03	N/A	98	0.041	2.69	293
Pervious as Meadow	4.15	B	58	1.448	0.25	3,745
TOTAL (ACRES):	**6.47**				**TOTAL (CF):**	**5,487**

Post-Construction Conditions: *No. Rows:* **3**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	1.64	B	61	1.279	0.34	1,996
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	2.15	N/A	98	0.041	2.69	20,983
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.47	B	58	1.448	0.25	424
TOTAL (ACRES):	**4.26**				**TOTAL (CF):**	**23,403**

ET CHANGE IN VOLUME TO MANAGE (CF): **17,916**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* **1** *Start BMP Numbering at:* **6**

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
003	6	Infiltration Basin	-	Off-Site	3.72	22,259	7,121	0.50	72	Yes	0.5	18,516	**19,227**	**1,221**
												Totals:	**19,227**	**1,221**

INFILTRATION & ET CREDITS (CF): **20,448**

NET CHANGE IN VOLUME TO MANAGE (CF): **17,916**

TOTAL CREDITS (CF): **20,448**

VOLUME REQUIREMENT SATISFIED

Water Quality

Project: Martina Drive Multifamily Residential Development

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	2.28	B	1,441	45.0	0.13	1.05	4.05	0.01	0.09
Impervious as Meadow	Grassland/Herbaceous	0.01	B	9	48.8	0.22	2.30	0.03	0.00	0.00
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	0.03	N/A	293	65.0	0.29	2.05	1.19	0.01	0.04
Pervious as Meadow	Grassland/Herbaceous	4.15	B	3,745	48.8	0.22	2.30	11.41	0.05	0.54
	TOTAL (ACRES):	**6.47**				**TOTALS:**		**16.68**	**0.07**	**0.67**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	1.64	B	1,996	78.0	0.25	1.25	9.72	0.03	0.16
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	2.15	N/A	20,983	65.0	0.29	2.05	85.17	0.38	2.69
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.47	B	424	48.8	0.22	2.30	1.29	0.01	0.06
	TOTAL (ACRES):	**4.26**				**TOTALS:**		**96.18**	**0.42**	**2.90**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**79.50**	**0.35**	**2.23**

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No	BMP	BMP Name	RC?	BMP DA	Vol. Routed	Inf. & ET	Capture & Buffer	Outflow	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN

DP No.	No.	BMP Name	MR	DA (acres)	to BMP (CF)	Credits (CF)	Buffer Credits (CF)	(CF)	TSS	TP	TN	TSS	TP	TN
003	6	Infiltration Basin	-	3.72	22,259	20,448		1,811	10.00	0.24	0.96	1.13	0.03	0.11

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**1.13**	**0.03**	**0.11**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**4.70**	**0.02**	**0.14**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**5.83**	**0.05**	**0.25**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**16.68**	**0.07**	**0.67**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Brent Bingham	11/6/2022
Spreadsheet User Name	Date

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Development**

Application Type: **PAG-02 NOI**

County: **Dauphin**

Municipality: **Susquehanna Township**

Project Type: **Multi-Family Housing**

(●) New Project ( ) Minor / Major Amendment

Area: **19.37** acres
(In Watershed)

Total Earth Disturbance: **16.42** acres
(In Watershed)

No. of Post-Construction Discharge Points: **1**

Start DP Numbering at: **006**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
006	15.13	14.89	0.00	7.51	Tributary 10166 to Paxton Creek	WWF, MF	Yes
Undetained Areas	4.24	1.53	0.00	0.06	Tributary 10166 to Paxton Creek	WWF, MF	
Totals:	**19.37**	**16.42**		**7.57**			

Volume Management

Project: Martina Drive Multifamily Residential Development

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **2.92** inches

Alternative 2-Year / 24-Hour Storm Event: inches

Alternative Source:

Pre-Construction Conditions: *No. Rows:* 6 ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Forested (Good Condition)	0.72	B	55	1.636	0.17	458
Forested (Good Condition)	0.63	C	70	0.857	0.67	1,543
Forested (Good Condition)	2.15	D	77	0.597	1.02	7,920
Pervious as Meadow	10.59	B	58	1.448	0.25	9,556
Pervious as Meadow	0.10	C	71	0.817	0.71	258
Pervious as Meadow	0.62	D	78	0.564	1.07	2,404
TOTAL (ACRES):	**14.81**				**TOTAL (CF):**	**22,139**

Post-Construction Conditions: *No. Rows:* 7

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	7.57	N/A	98	0.041	2.69	73,869
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	4.63	B	61	1.279	0.34	5,635
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.28	C	74	0.703	0.86	884
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.33	D	80	0.500	1.19	1,421
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.22	B	58	1.448	0.25	1,105
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	0.45	C	71	0.817	0.71	1,167
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	1.94	D	78	0.564	1.07	7,546
TOTAL (ACRES):	**16.42**				**TOTAL (CF):**	**91,626**

ET CHANGE IN VOLUME TO MANAGE (CF): **69,487**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* 3 *Start BMP Numbering at:* 7

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)

006	7	Infiltration Basin	-	Off-Site	7.20	42,427	13,542	0.50	72	Yes	0.5	30,076	**36,170**	**2,322**
006	8	Infiltration Basin	-	Off-Site	5.40	32,234	7,858	0.50	72	Yes	1.0	18,717	**21,217**	**2,412**
006	9	Infiltration Basin	-	Off-Site	2.11	11,979	4,208	0.50	72	Yes	0.5	10,344	**11,362**	**617**
												Totals:	**68,748**	**5,352**

INFILTRATION & ET CREDITS (CF):	**74,100**
NET CHANGE IN VOLUME TO MANAGE (CF):	**69,487**
TOTAL CREDITS (CF):	**74,100**

VOLUME REQUIREMENT SATISFIED

Water Quality

Project: Martina Drive Multifamily Residential Development

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.72	B	458	45.0	0.13	1.05	1.29	0.00	0.03
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	0.63	C	1,543	45.0	0.13	1.05	4.34	0.01	0.10
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	2.15	D	7,920	45.0	0.13	1.05	22.25	0.06	0.52
Pervious as Meadow	Grassland/Herbaceous	10.59	B	9,556	48.8	0.22	2.30	29.12	0.13	1.37
Pervious as Meadow	Grassland/Herbaceous	0.10	C	258	48.8	0.22	2.30	0.79	0.00	0.04
Pervious as Meadow	Grassland/Herbaceous	0.62	D	2,404	48.8	0.22	2.30	7.33	0.03	0.35
	TOTAL (ACRES):	**14.81**					**TOTALS:**	**65.11**	**0.25**	**2.41**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	7.57	N/A	73,869	65.0	0.29	2.05	299.82	1.34	9.46
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	4.63	B	5,635	78.0	0.25	1.25	27.44	0.09	0.44
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.28	C	884	78.0	0.25	1.25	4.31	0.01	0.07
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.33	D	1,421	78.0	0.25	1.25	6.92	0.02	0.11
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.22	B	1,105	48.8	0.22	2.30	3.37	0.02	0.16
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	0.45	C	1,167	48.8	0.22	2.30	3.56	0.02	0.17
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	Grassland/Herbaceous	1.94	D	7,546	48.8	0.22	2.30	22.99	0.10	1.08
	TOTAL (ACRES):	**16.42**					**TOTALS:**	**368.40**	**1.60**	**11.49**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**303.29**	**1.35**	**9.08**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **4**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	**0.07**	**N/A**	**98**	**0.041**	**2.69**	**683**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**1.53**	**B**	**58**	**1.448**	**0.25**	**1,381**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**0.11**	**C**	**71**	**0.817**	**0.71**	**285**
Meadow-Continuous Grass, Protected from Grazing and Generally Mowed for Hay	**0.47**	**D**	**78**	**0.564**	**1.07**	**1,829**

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
006	7	Infiltration Basin	-	7.20	42,427	38,492		3,935	10.00	0.24	0.96	2.46	0.06	0.24
006	8	Infiltration Basin	-	5.40	32,234	23,629		8,605	10.00	0.24	0.96	5.37	0.13	0.52
006	9	Infiltration Basin	-	2.11	11,979	11,979		0	10.00	0.24	0.96	0.00	0.00	0.00

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**7.83**	**0.19**	**0.75**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**13.42**	**0.06**	**0.59**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**21.25**	**0.25**	**1.34**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**65.11**	**0.25**	**2.41**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Rebecca Hess, PE	11/3/2022
Spreadsheet User Name	Date

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/3/2022

Runoff Volume Calculations

2-YEAR RAINFALL (in) = 2.92

BMP 1

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	2.02	61	6.39	1.28	0.03	0.061	2657
Impervious	-	2.32	98	0.20	0.04	0.22	0.510	22216
	TOTAL	4.34					TOTAL	24873

BMP 2

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	1.76	61	6.39	1.28	0.03	0.053	2309
Impervious	-	2.78	98	0.20	0.04	0.22	0.612	26659
	TOTAL	4.54					TOTAL	28967

BMP 3

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	0.39	61	6.39	1.28	0.03	0.012	523
Impervious	-	0.32	98	0.20	0.04	0.22	0.070	3049
	TOTAL	0.71					TOTAL	3572

BMP 4

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	0.55	61	6.39	1.28	0.03	0.017	741
Impervious	-	0.67	98	0.20	0.04	0.22	0.147	6403
	TOTAL	1.22					TOTAL	7144

BMP 5

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	1.23	61	6.39	1.28	0.03	0.037	1612
Impervious	-	1.91	98	0.20	0.04	0.22	0.420	18295
	TOTAL	3.14					TOTAL	19907

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/3/2022

Runoff Volume Calculations

2-YEAR RAINFALL (in) = 2.92

BMP 6

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	1.62	61	6.39	1.28	0.03	0.049	2134
Impervious	-	2.10	98	0.20	0.04	0.22	0.462	20125
	TOTAL	3.72					TOTAL	22259

BMP 7

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	2.01	61	6.39	1.28	0.03	0.060	2614
Open Space	D	0.16	80	2.50	0.50	0.10	0.016	697
Meadow	B	0.33	58	7.24	1.45	0.02	0.007	305
Meadow	D	1.40	78	2.82	0.56	0.09	0.126	5489
Impervious	-	3.48	98	0.20	0.04	0.22	0.765	33323
	TOTAL	7.38					TOTAL	42427

BMP 8

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	1.65	61	6.39	1.28	0.03	0.050	2178
Open Space	D	0.13	80	2.50	0.50	0.10	0.013	566
Meadow	B	0.30	58	7.24	1.45	0.02	0.006	261
Meadow	C	0.34	71	4.08	0.82	0.06	0.020	871
Meadow	D	0.06	78	2.82	0.56	0.09	0.006	261
Impervious	-	2.93	98	0.20	0.04	0.22	0.645	28096
	TOTAL	5.40					TOTAL	32234

BMP 9

LAND COVER CLASSIFICATION	SOIL TYPE (HSG)	AREA* (AC)	CN	S	Ia (0.2*S)	Q RUNOFF[1] (FT)	RUNOFF VOLUME (AC-FT)	RUNOFF VOLUME (CUFT)
Open Space	B	0.61	61	6.39	1.28	0.03	0.018	784
Meadow	B	0.37	58	7.24	1.45	0.02	0.007	305
Impervious	-	1.13	98	0.20	0.04	0.22	0.250	10890
	TOTAL	2.11					TOTAL	11979

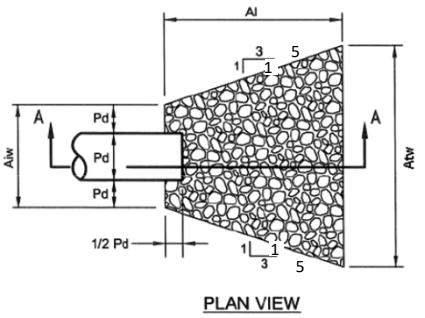
Appendix G
Miscellaneous Calculations

Standard E&S Worksheet #20

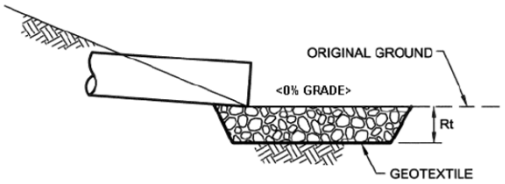
Riprap Apron Outlet Protection

Project Name:	Martina Drive Multifamily Residential Development		
Location:	Susquehanna Township, Dauphin County		
Prepared By:	RLH	DATE:	11/5/2022
CHECKED BY:		DATE:	

Riprap Apron at Pipe Outlet Without Flared Endwall

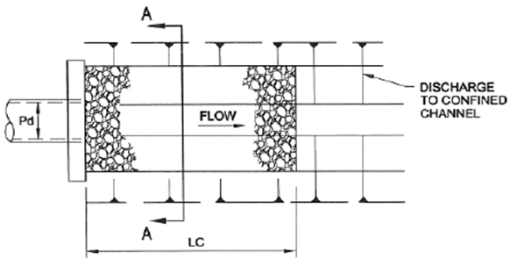


PLAN VIEW

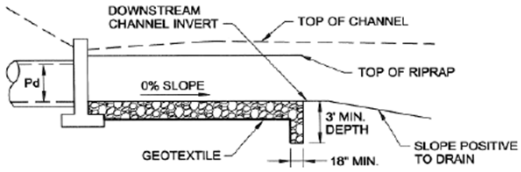


SECTION A - A

Riprap Apron at Pipe Outlet to an Existing Channel



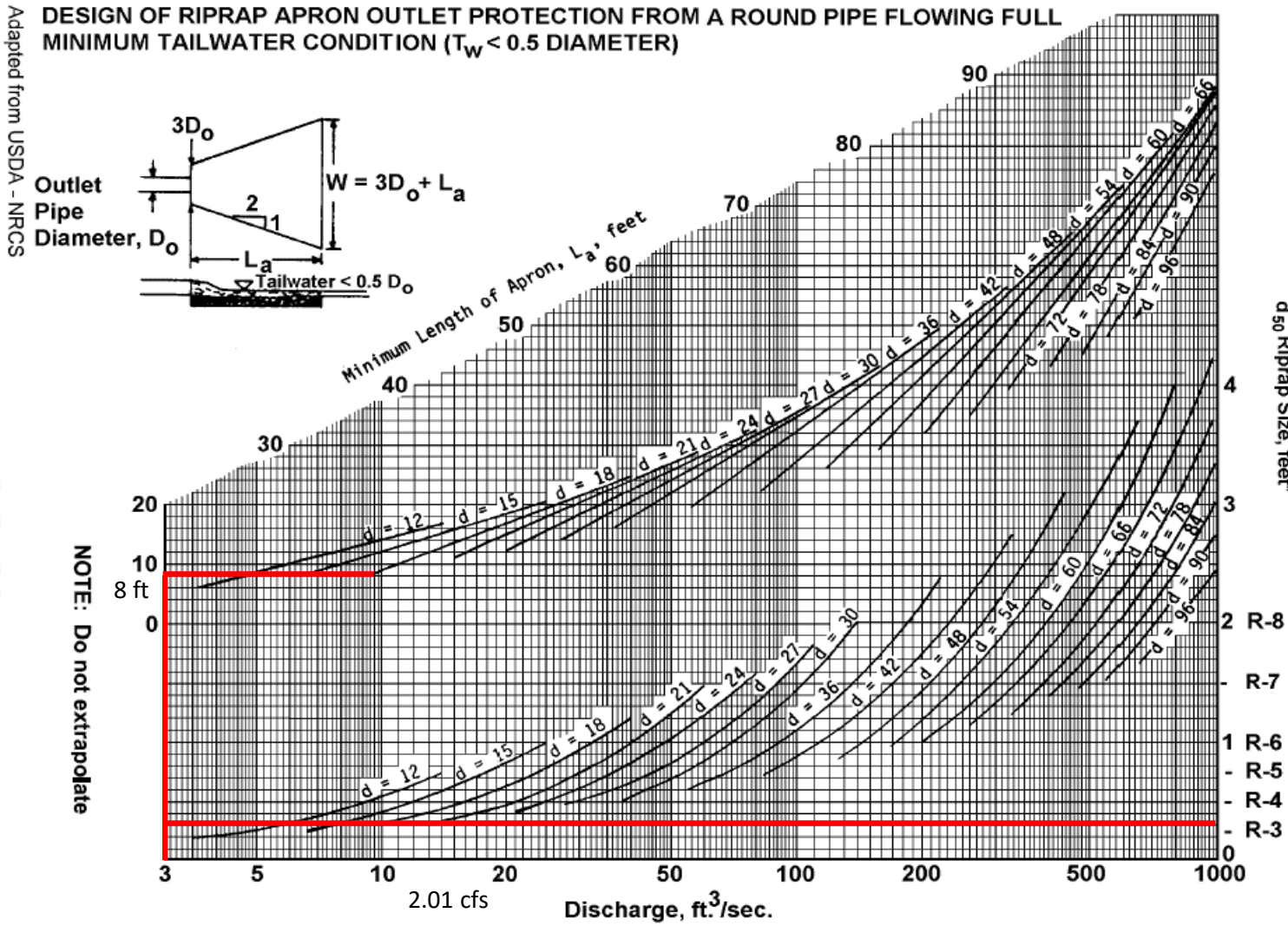
PLAN VIEW



ELEVATION

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN. "n" FOR PIPE	PIPE SLOPE (ft/ft)	Q (cfs)	V* (fps)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
EW-1	18	Min	0.012	0.005	2.01	3.79	R-3	9	8	4.50	12.50
EW-4	12	Max	0.012	0.005	1.75	3.71	R-3	9	4	3.00	4.60
EW-101	24	Max	0.012	0.005	13.34	6.17	R-3	9	9	6.00	9.60
EW-102	18	Max	0.012	0.005	3.50	4.41	R-3	9	7	4.50	7.30
EW-200	18	Min	0.012	0.005	7.97	5.20	R-3	9	8	4.50	12.50
EW-201	18	Max	0.012	0.005	5.30	4.89	R-3	9	8	4.50	7.70
EW-202	36	Max	0.012	0.005	12.51	6.15	R-3	9	13	9.00	14.20
EW-300	18	Min	0.012	0.005	0.63	2.93	R-3	9	8	4.50	12.50
EW-301	18	Max	0.012	0.005	2.46	4.14	R-3	9	7	4.50	7.30
EW-400	18	Min	0.012	0.010	8.15	7.08	R-4	18	8	4.50	12.50
EW-401	18	Max	0.012	0.005	4.47	4.70	R-3	9	7	4.50	7.30
EW-500	18	Min	0.012	0.005	8.09	5.21	R-3	9	8	4.50	12.50
EW-501	18	Max	0.012	0.005	11.49	6.50	R-4	18	12	4.50	9.30
EW-600	18	Min	0.012	0.005	11.76	6.65	R-4	18	10	4.50	14.50
EW-601	18	Max	0.012	0.005	2.76	4.18	R-3	9	7	4.50	7.30
EW-602	18	Max	0.012	0.005	7.70	5.21	R-3	9	7	4.50	7.30
EW-700	18	Min	0.012	0.005	10.32	5.84	R-3	9	10	4.50	14.50
EW-701	24	Max	0.012	0.005	6.35	5.24	R-3	9	9	6.00	9.60
EW-702	24	Max	0.012	0.005	17.45	6.33	R-3	9	9	6.00	9.60
EW-800	18	Min	0.012	0.005	17.70	10.02	R-5	27	15	4.50	19.50
EW-801	24	Max	0.012	0.005	20.14	6.41	R-3	9	9	6.00	9.60
EW-900	18	Min	0.012	0.005	14.24	8.06	R-4	18	13	4.50	17.50
EW-901	18	Max	0.012	0.005	6.62	5.09	R-3	9	7	4.50	7.30

*: The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes ≥ 0.05 ft/ft.



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

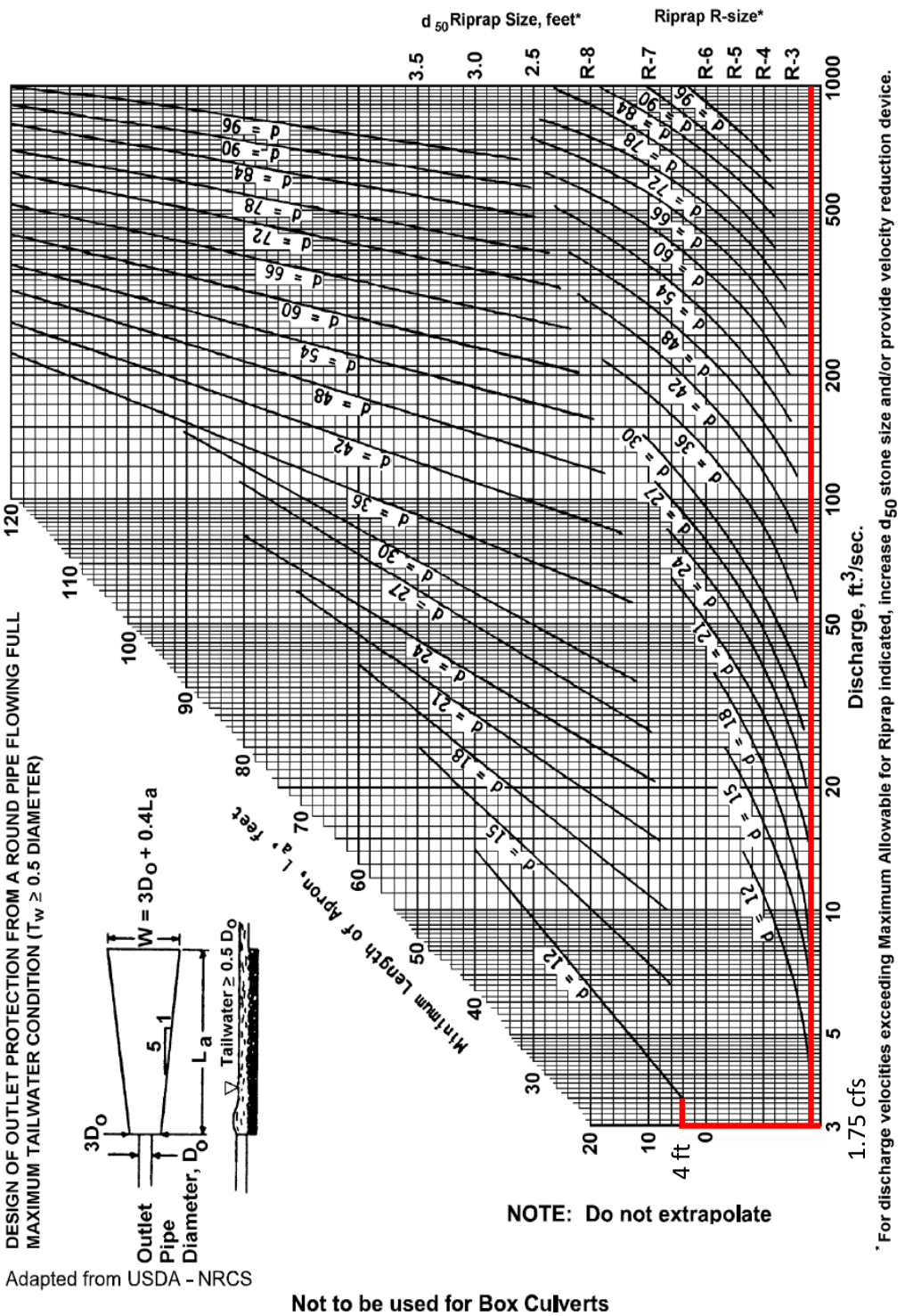
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-1

Velocity = 3.79 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



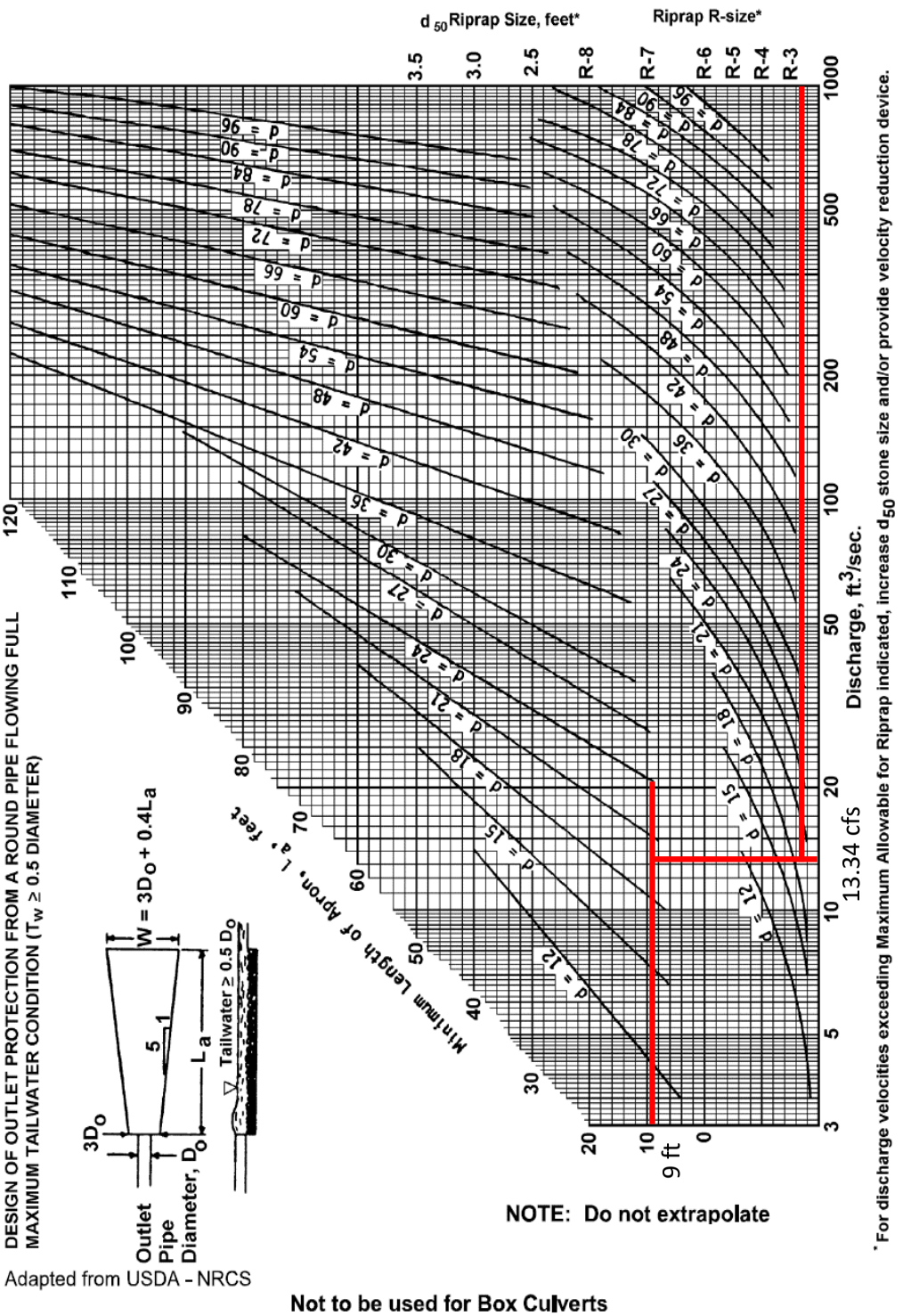
Adapted from USDA - NRCS

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-4

Velocity = 3.71 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



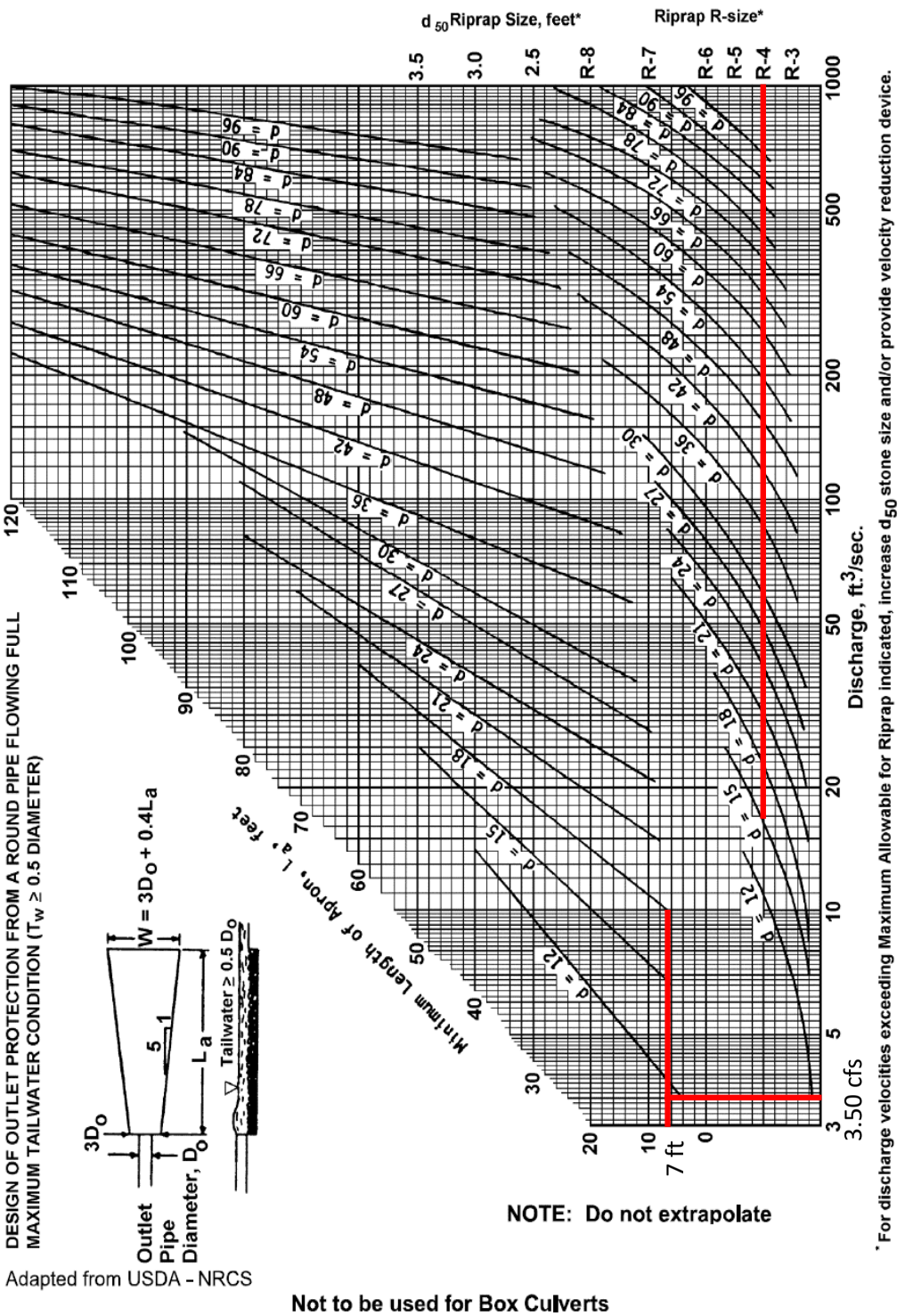
*For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-101

Velocity = 6.17 fps

Not to be used for Box Culverts

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



Adapted from USDA - NRCS

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-102

Velocity = 4.41 fps

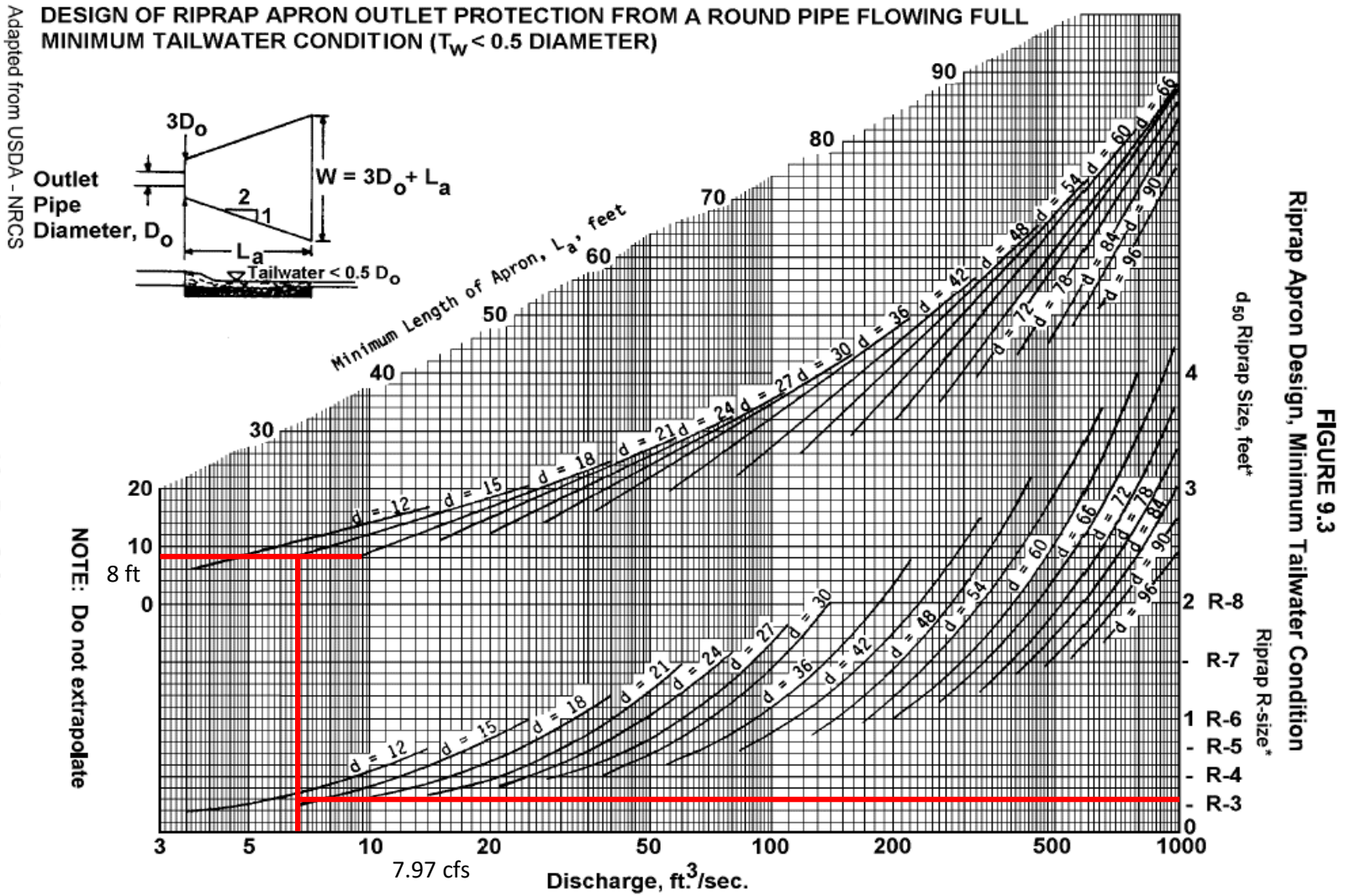


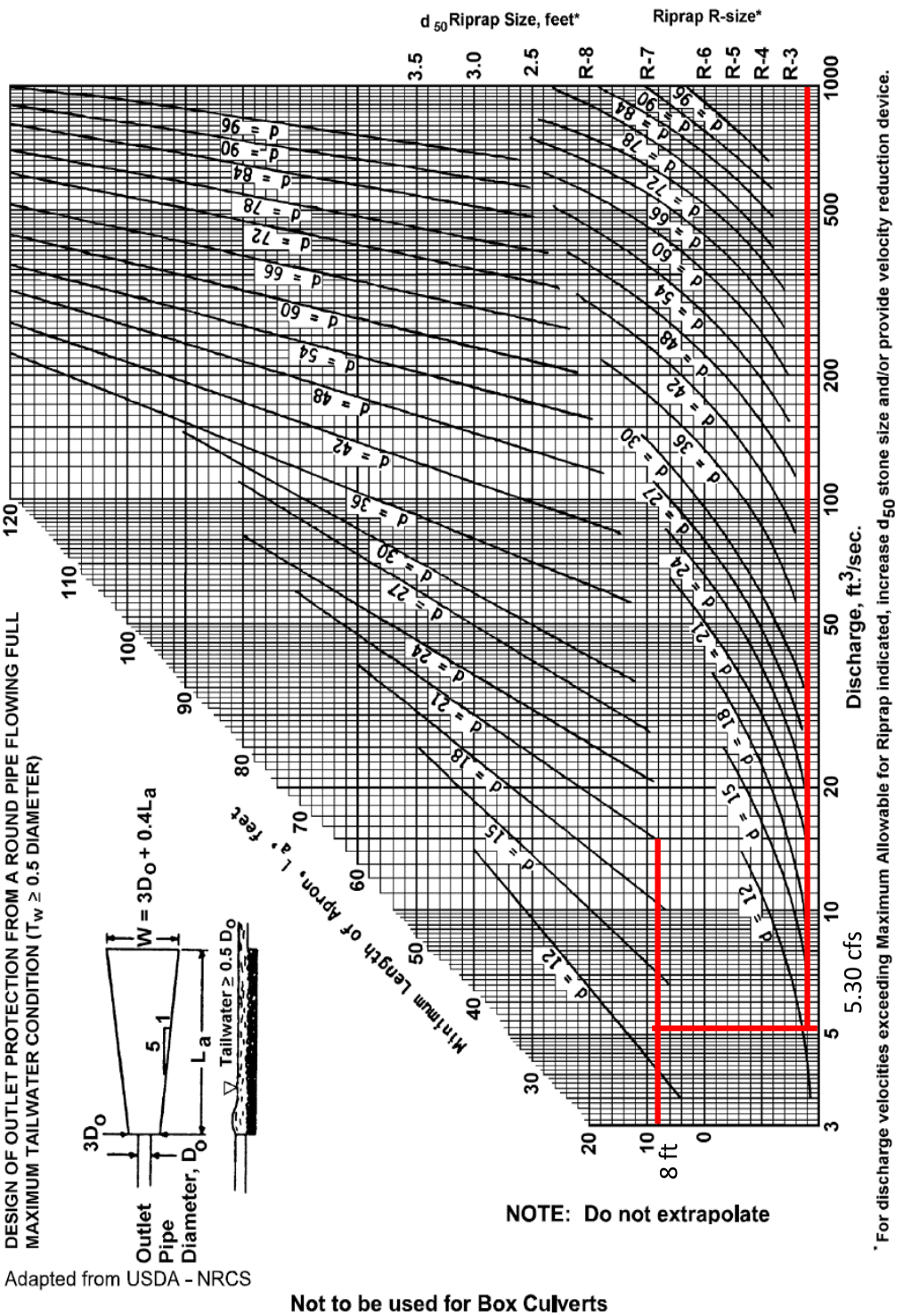
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-200

Velocity = 5.20 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



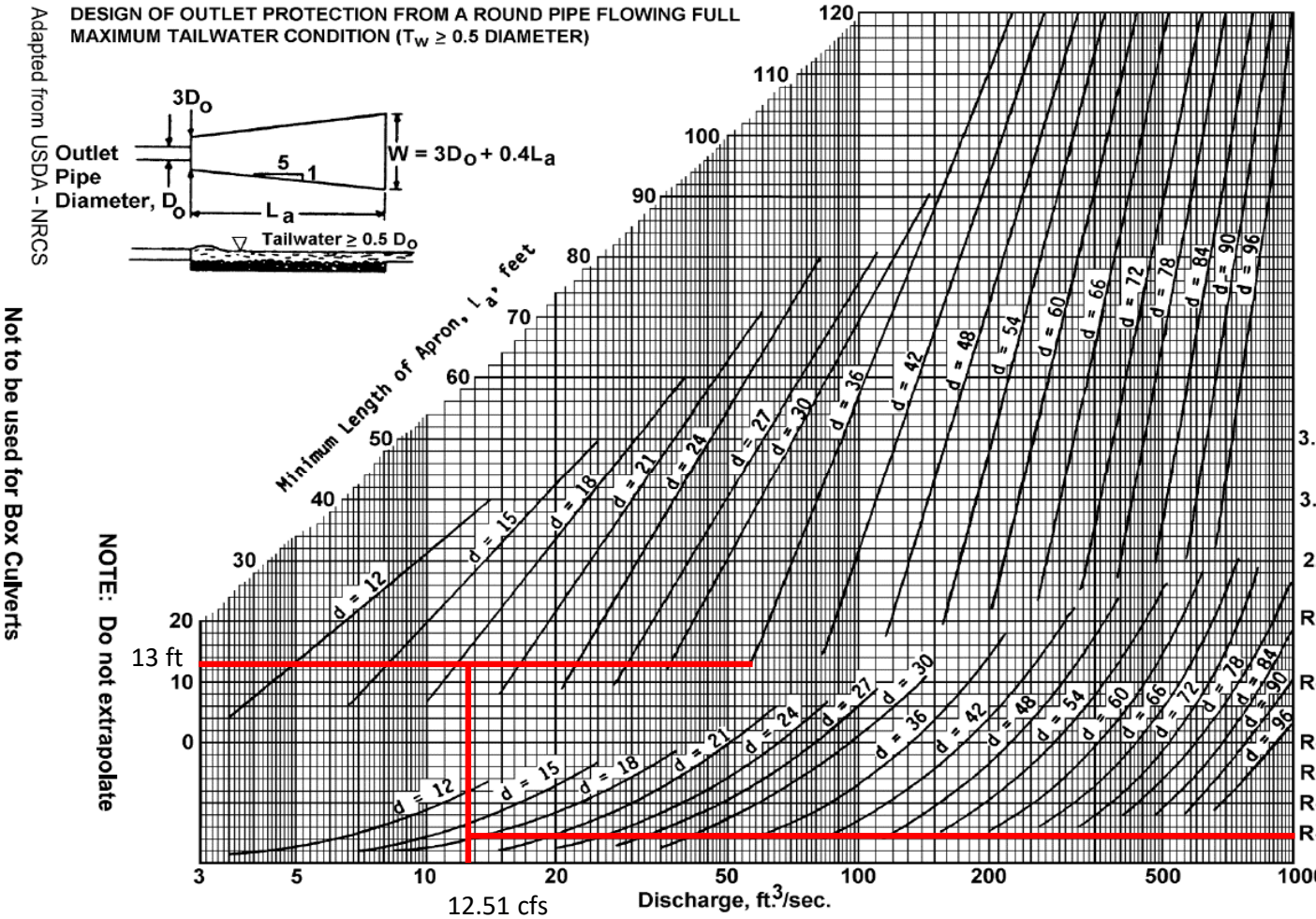
Adapted from USDA - NRCS

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-201

Velocity = 4.89 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



*For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-202

Velocity = 6.15 fps

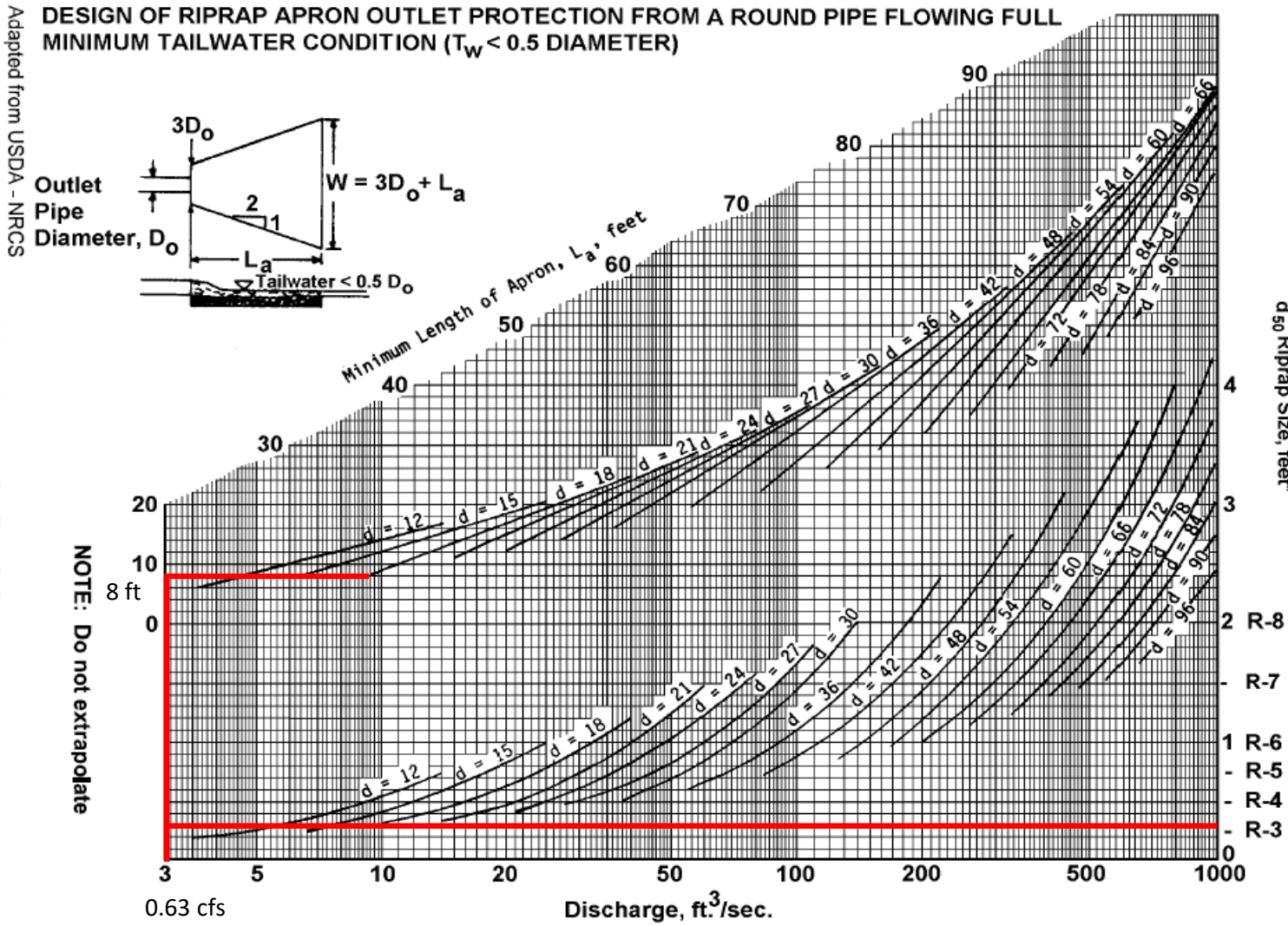


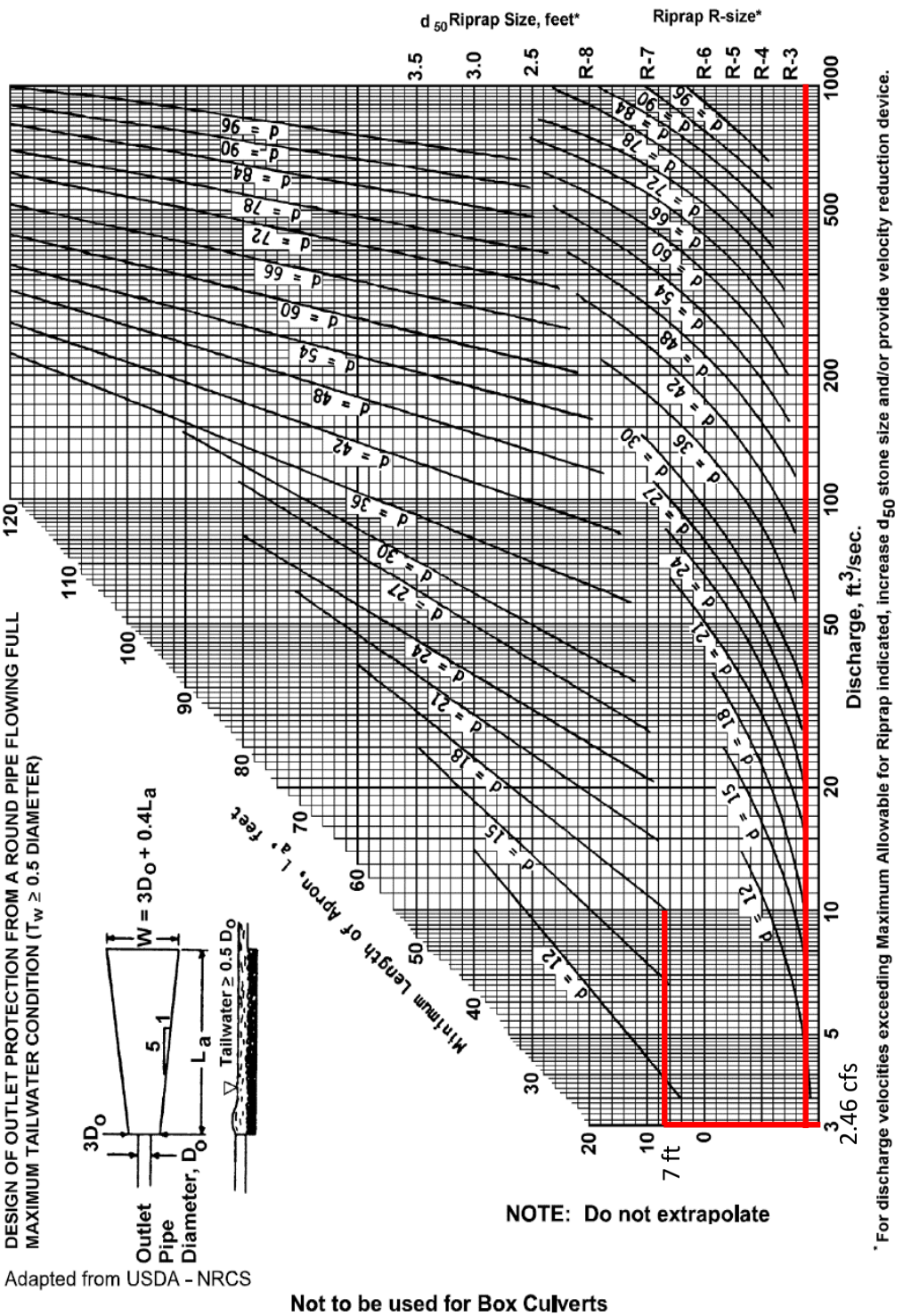
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-300

Velocity = 2.93 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



RIP-RAP APRON FOR EW-301

Velocity = 4.14 fps

Adapted from USDA - NRCS

Not to be used for Box Culverts

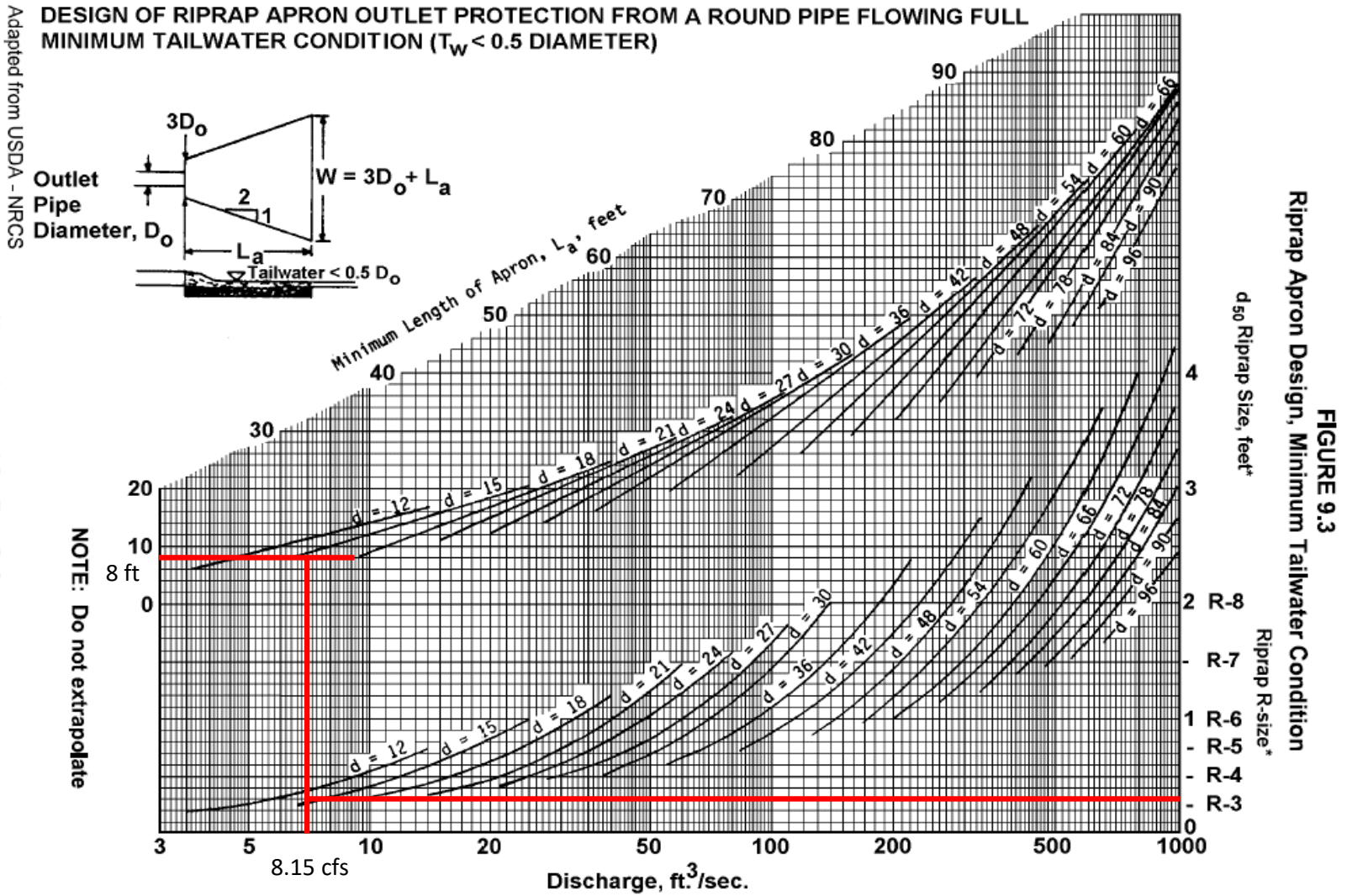


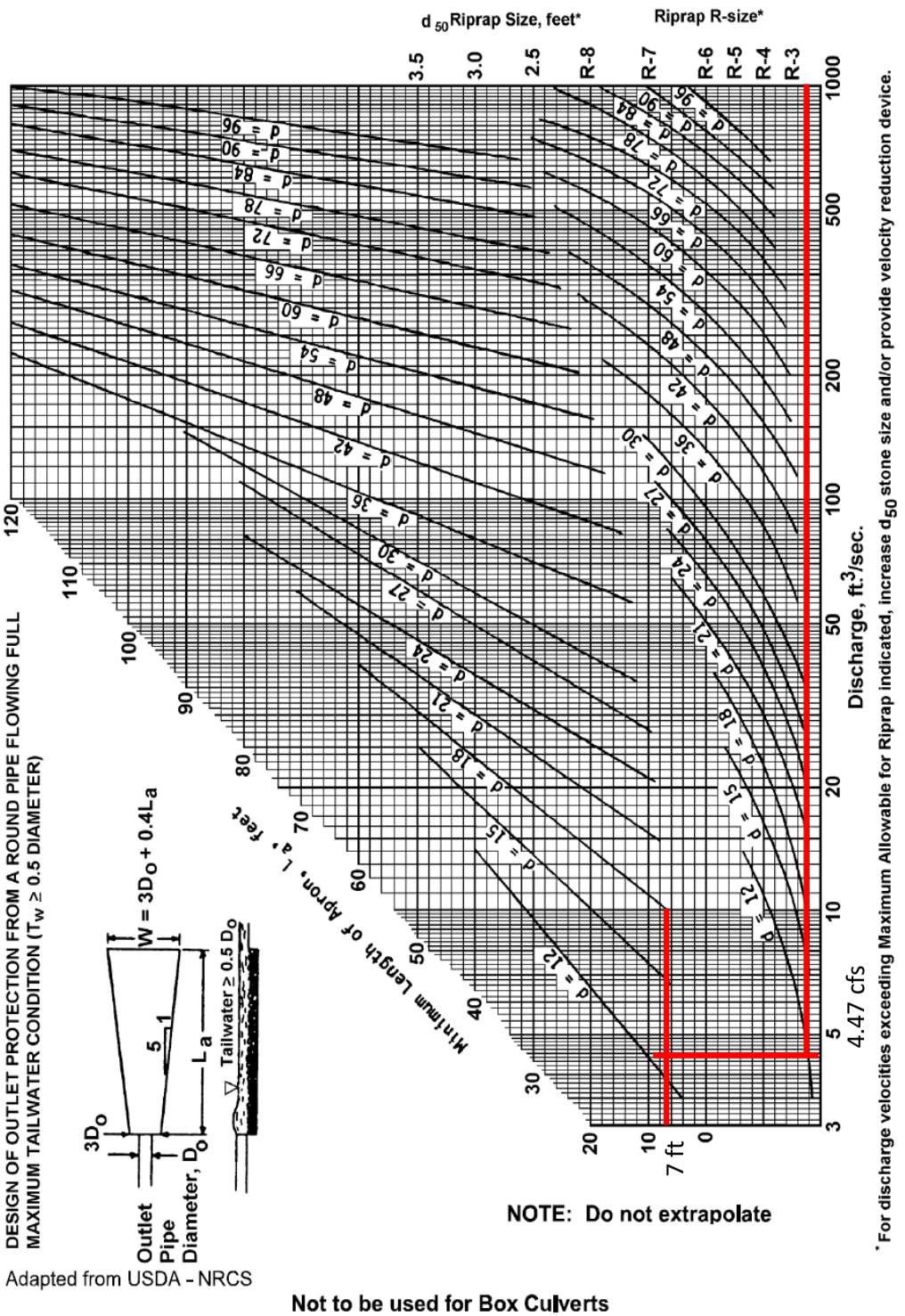
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-400

Velocity = 7.08 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



Adapted from USDA - NRCS

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-401

Velocity = 4.70 fps

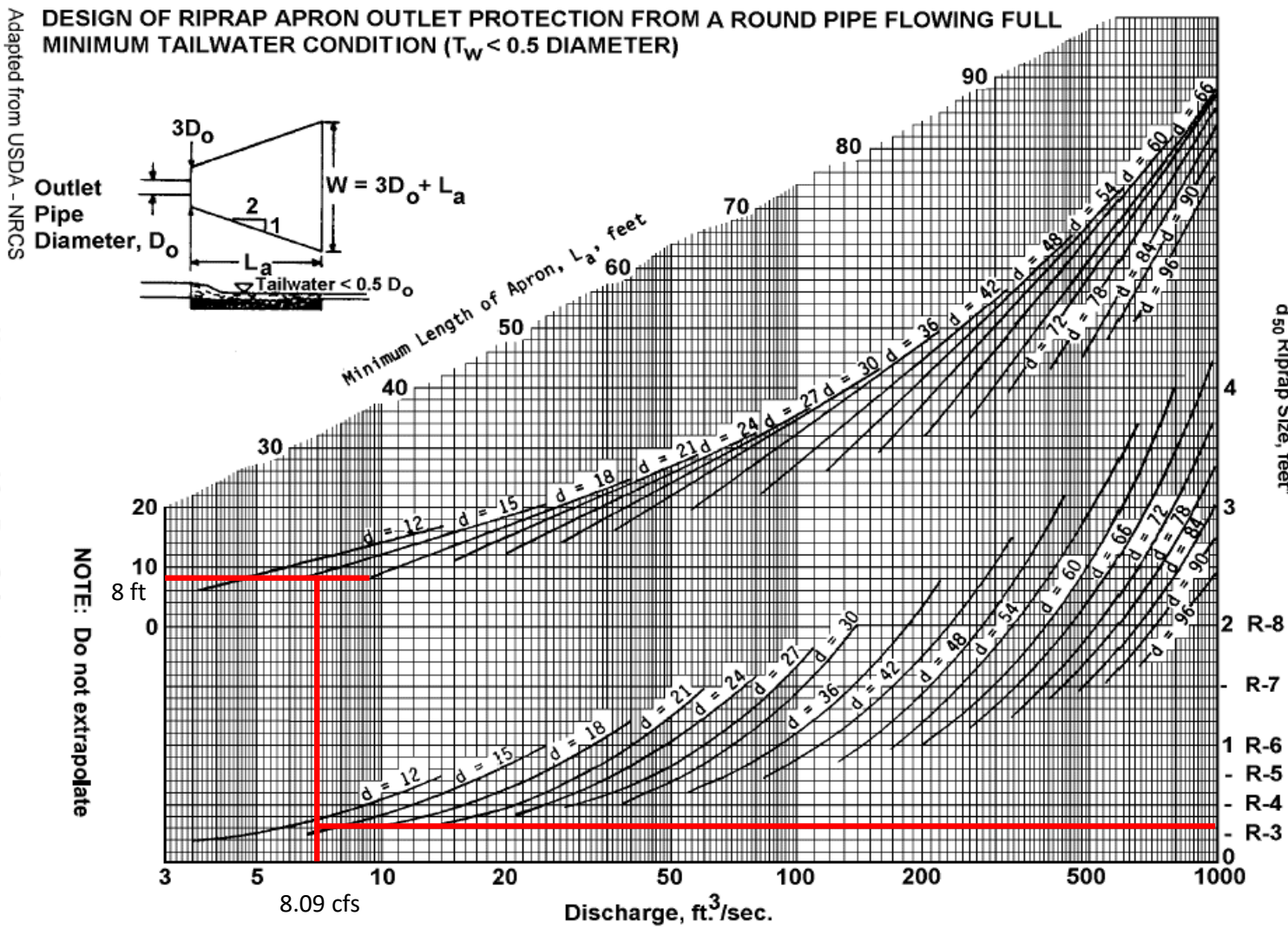


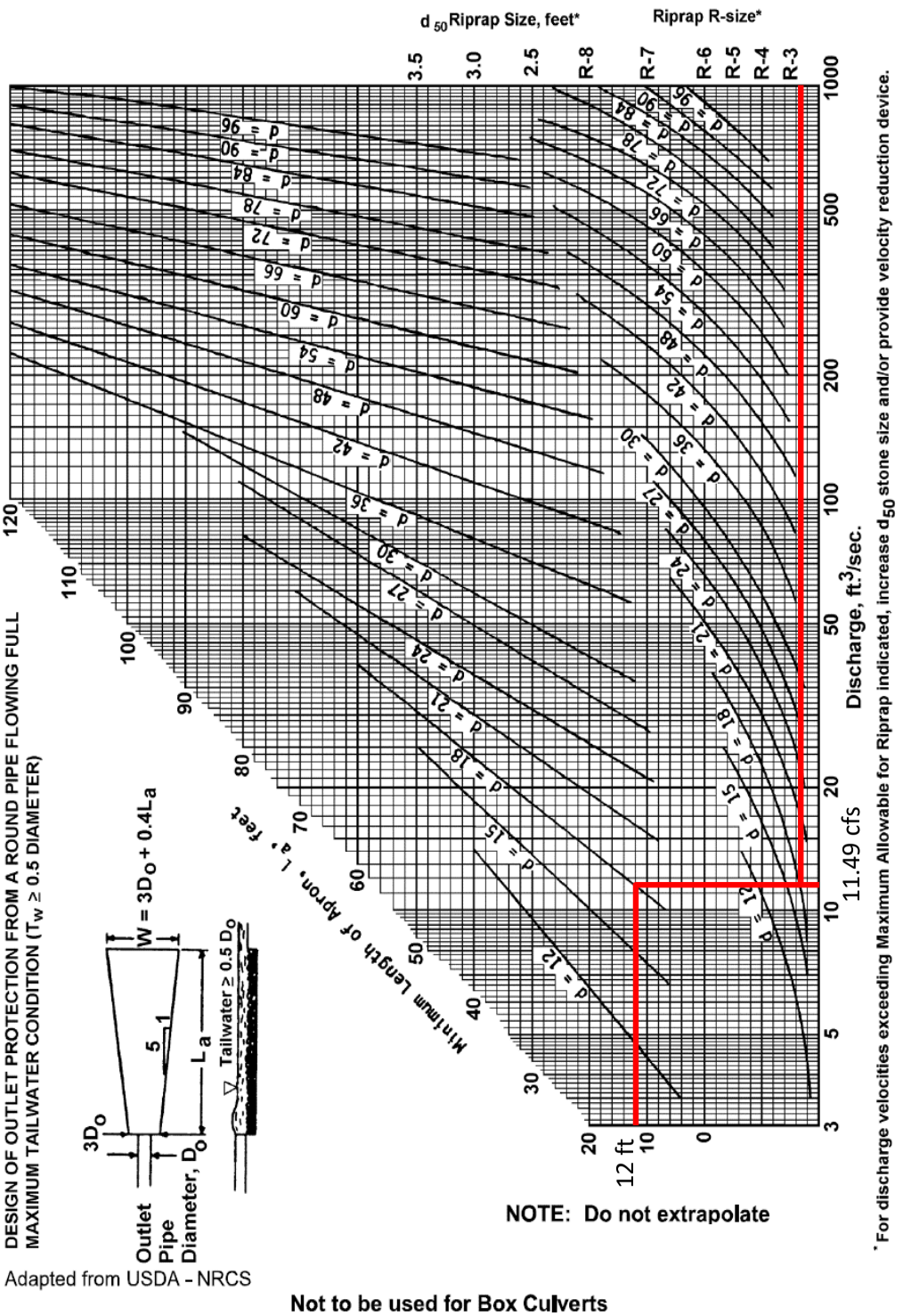
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-500

Velocity = 5.21 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



RIP-RAP APRON FOR EW-501

Velocity = 6.50 fps

Not to be used for Box Culverts

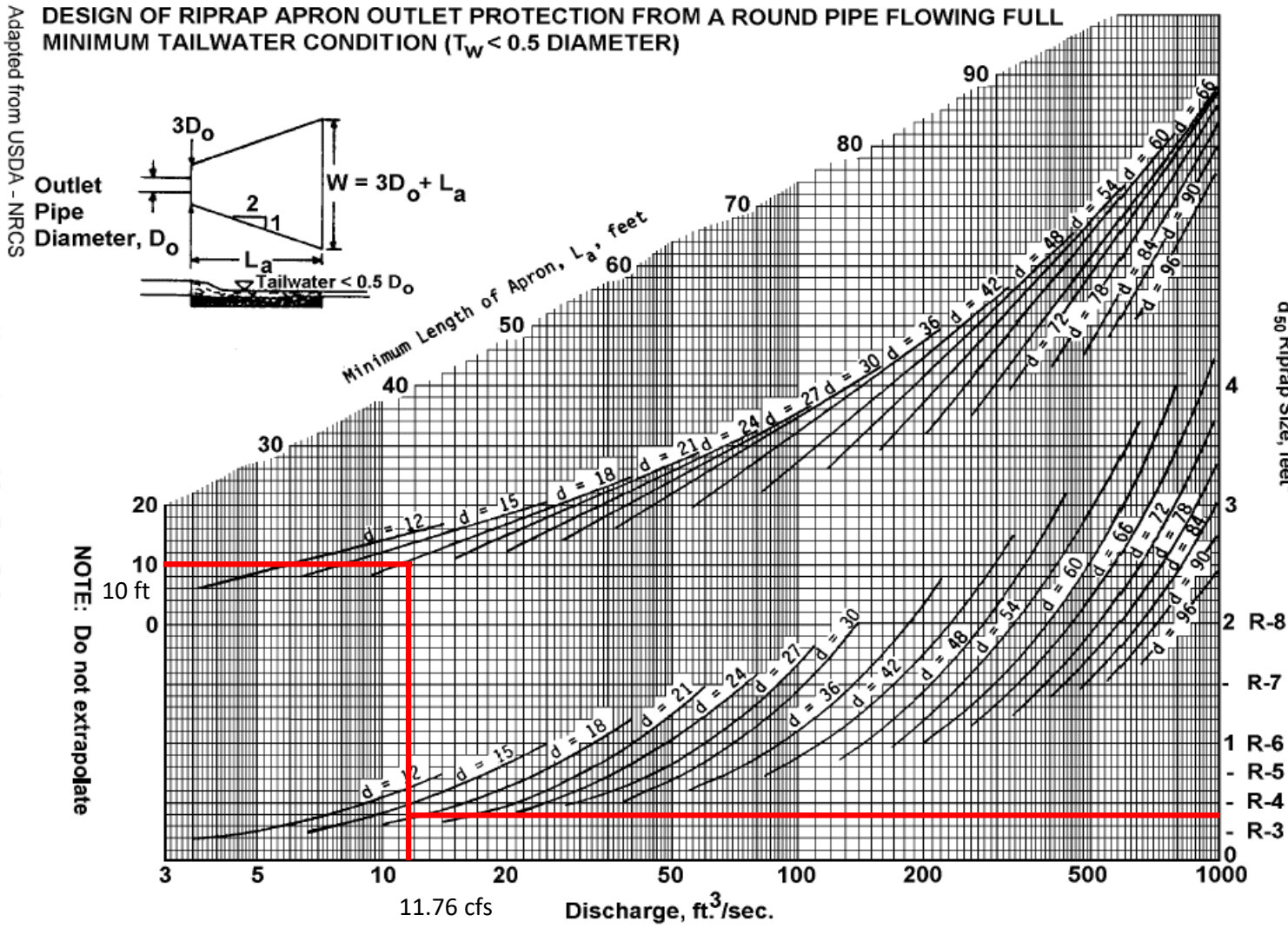


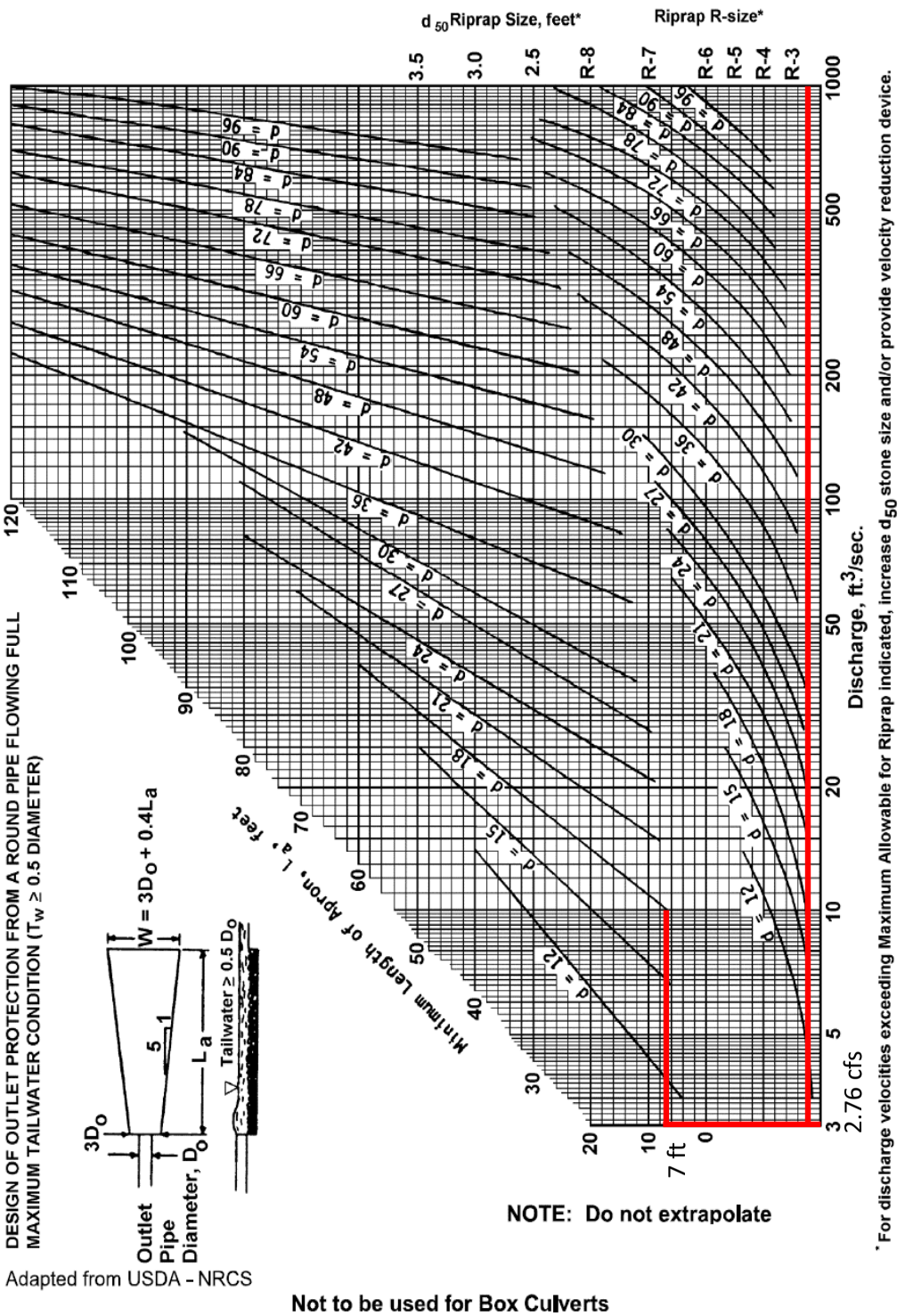
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-600

Velocity = 6.65 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



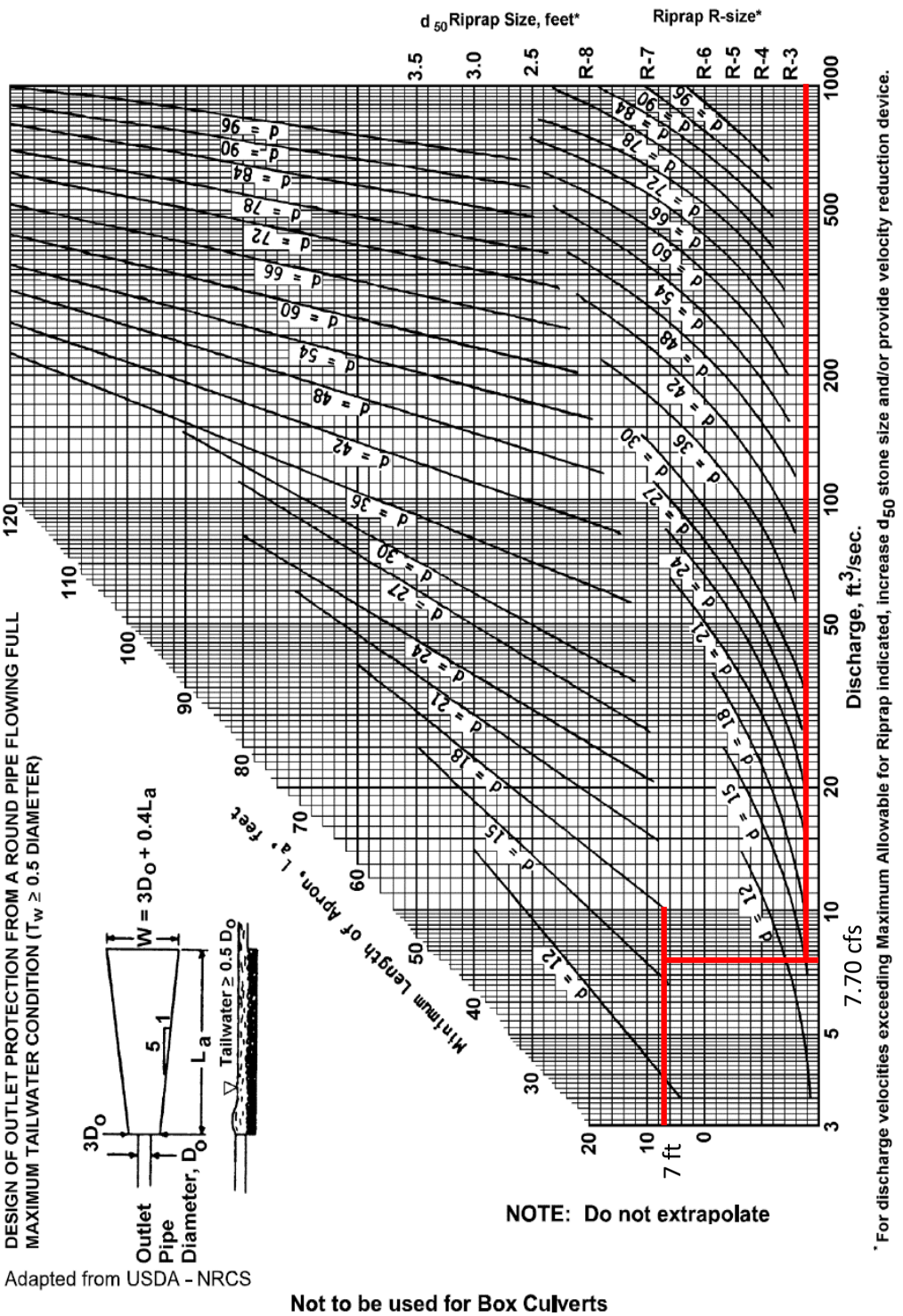
Adapted from USDA - NRCS

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-601

Velocity = 4.18 fps

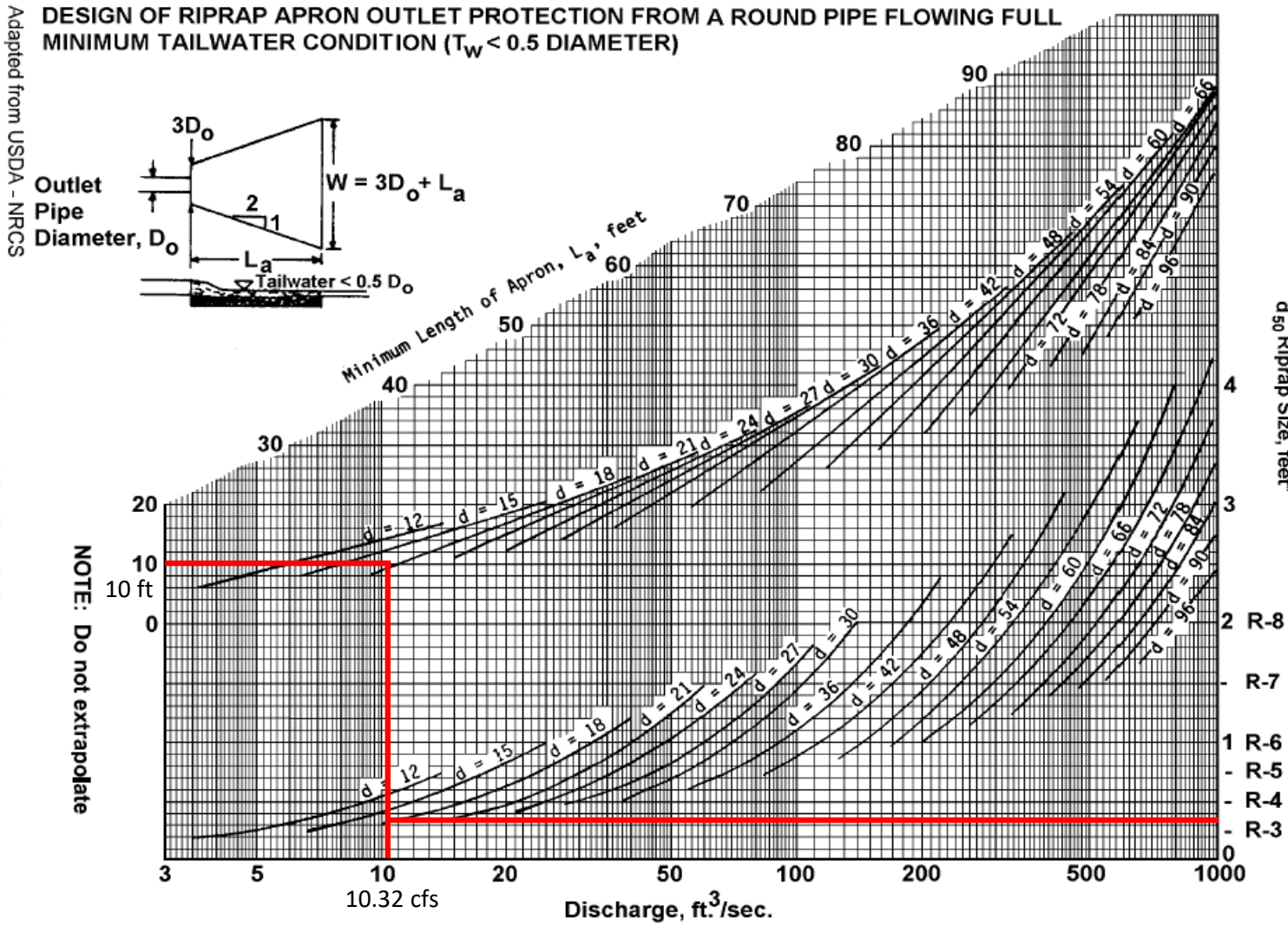
FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



RIP-RAP APRON FOR EW-602

Velocity = 5.21 fps

Not to be used for Box Culverts



Not to be used for Box Culverts

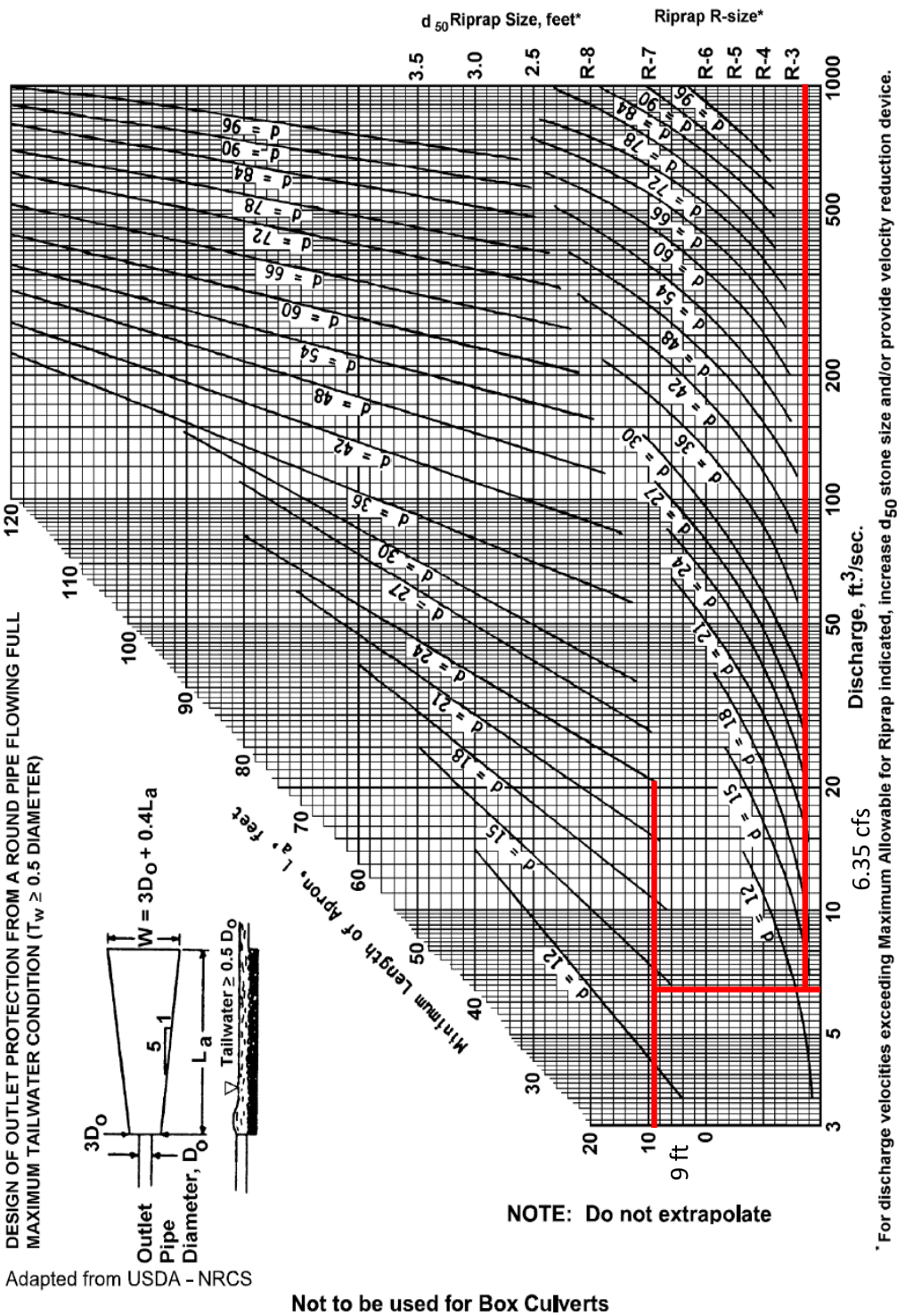
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-700

Velocity = 5.84 fps

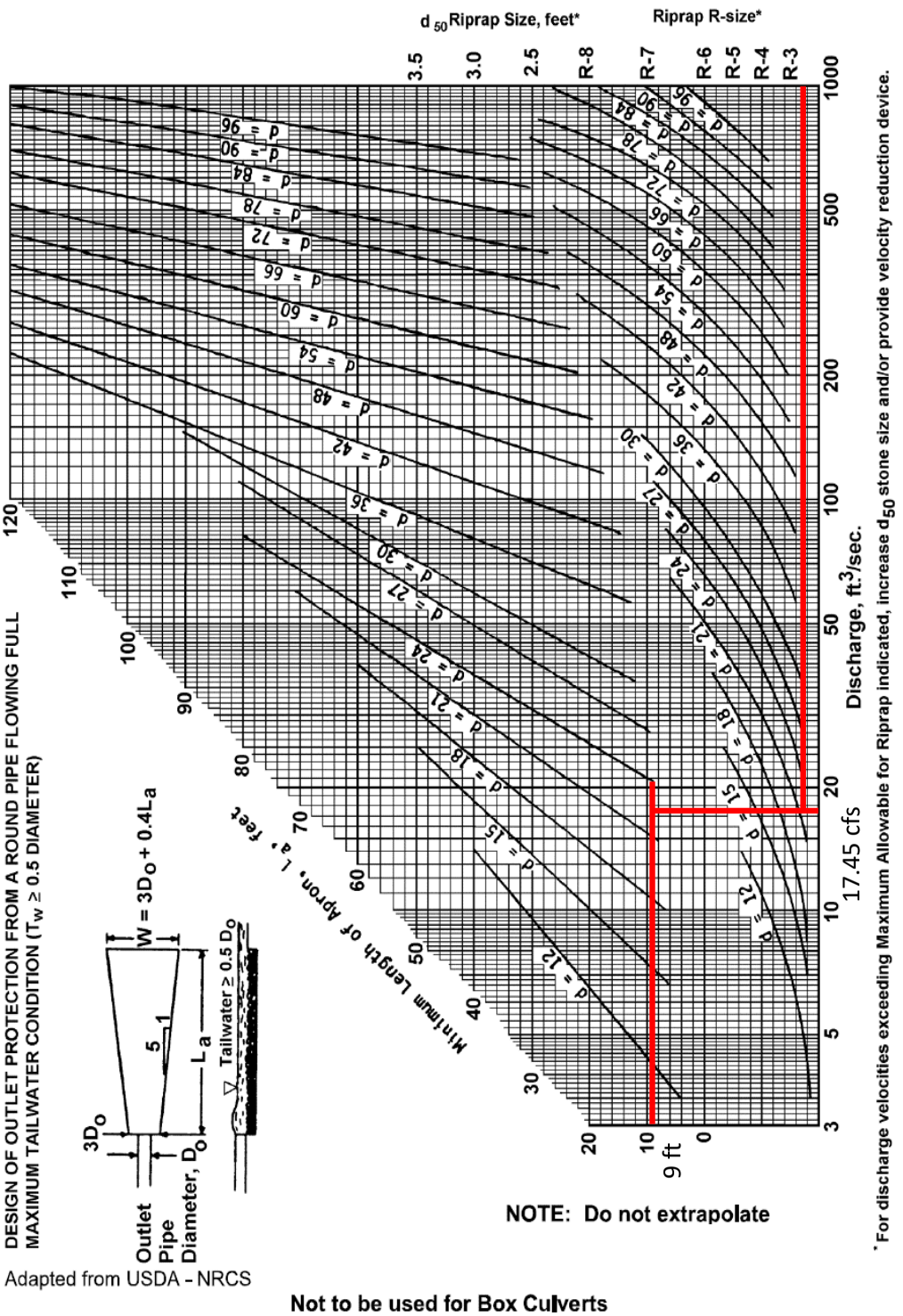
FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



RIP-RAP APRON FOR EW-701

Velocity = 5.24 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



RIP-RAP APRON FOR EW-702

Velocity = 6.33 fps

Not to be used for Box Culverts

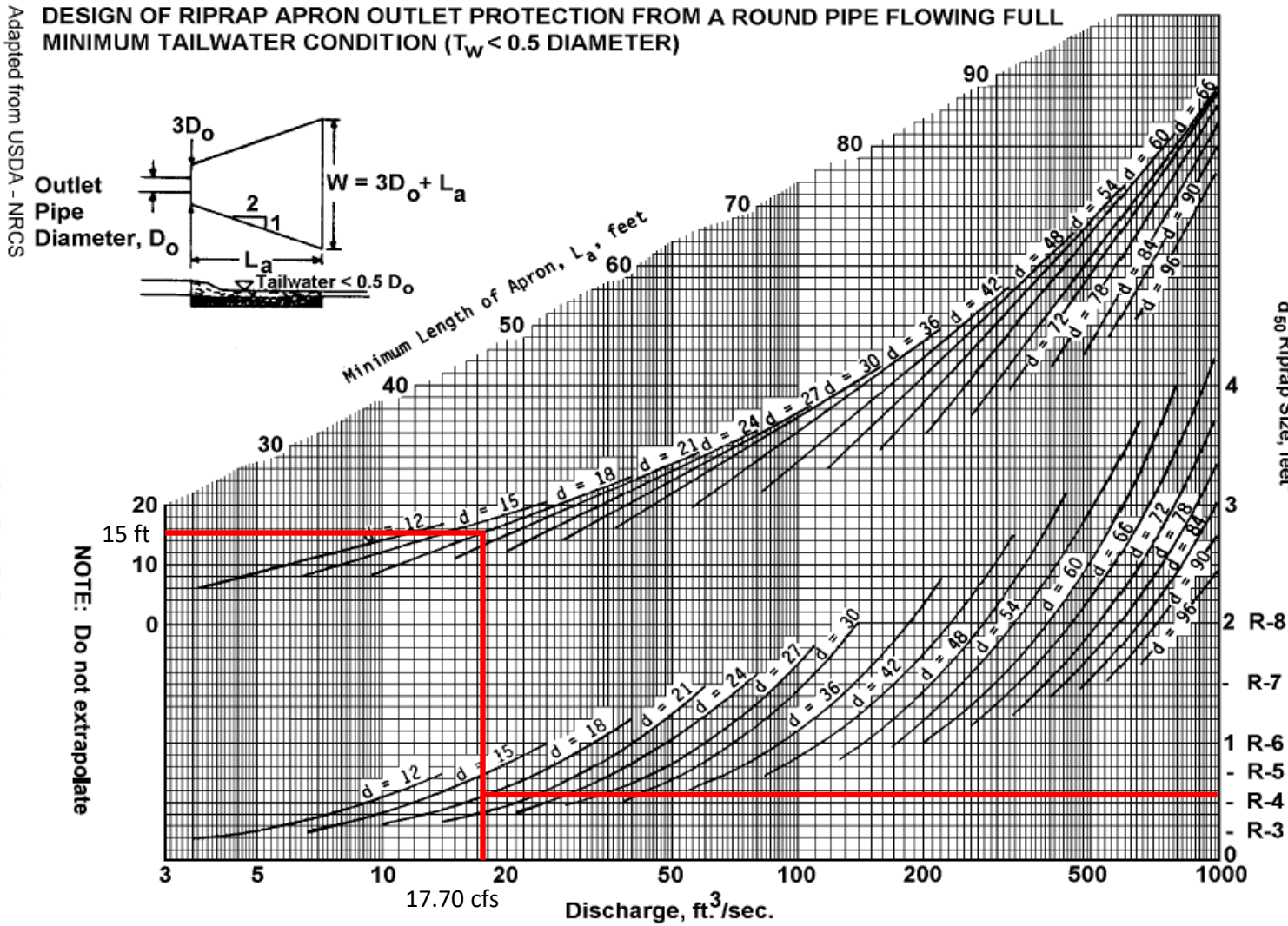


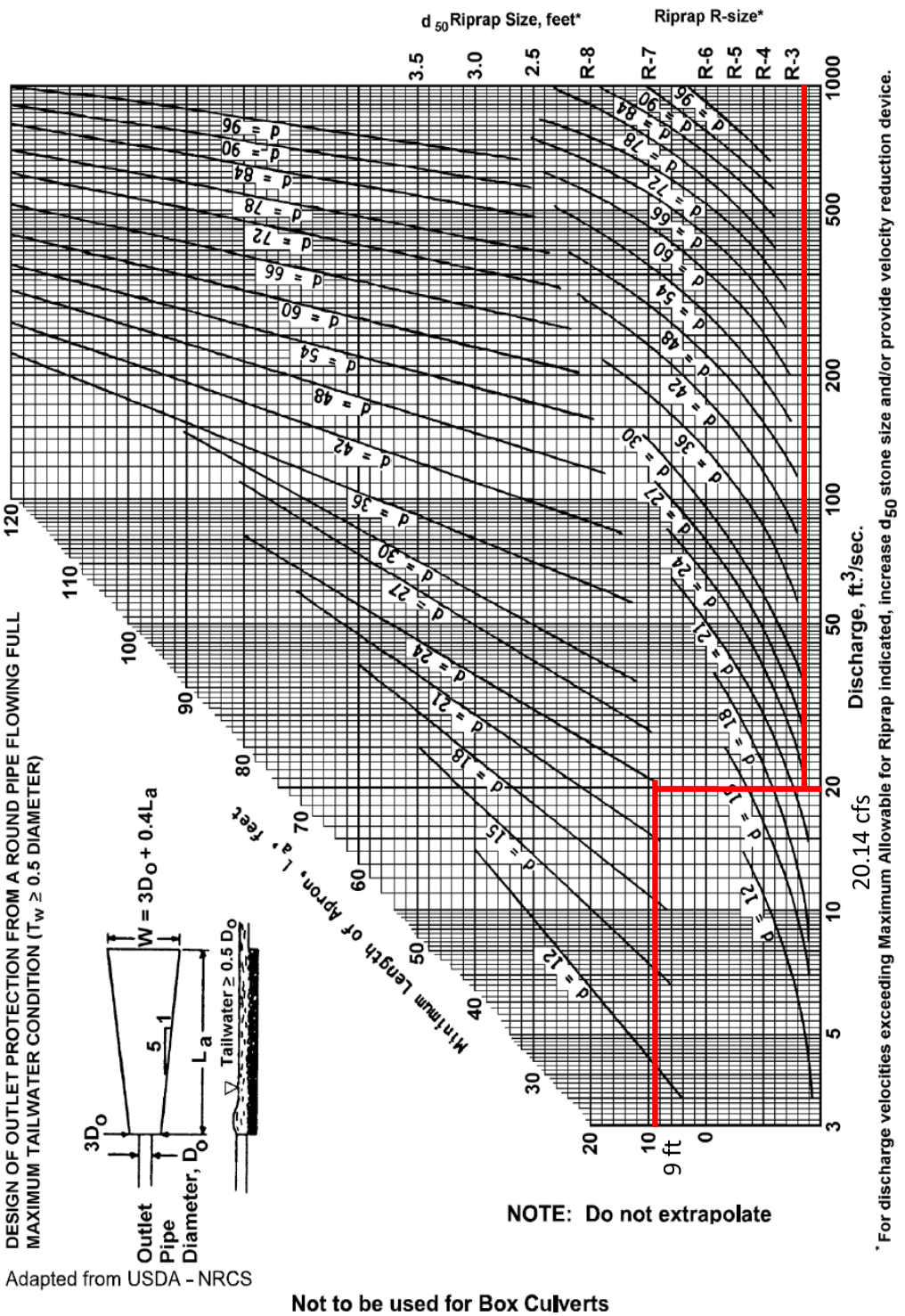
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-800

Velocity = 10.02 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



RIP-RAP APRON FOR EW-801

Velocity = 6.41 fps

Not to be used for Box Culverts

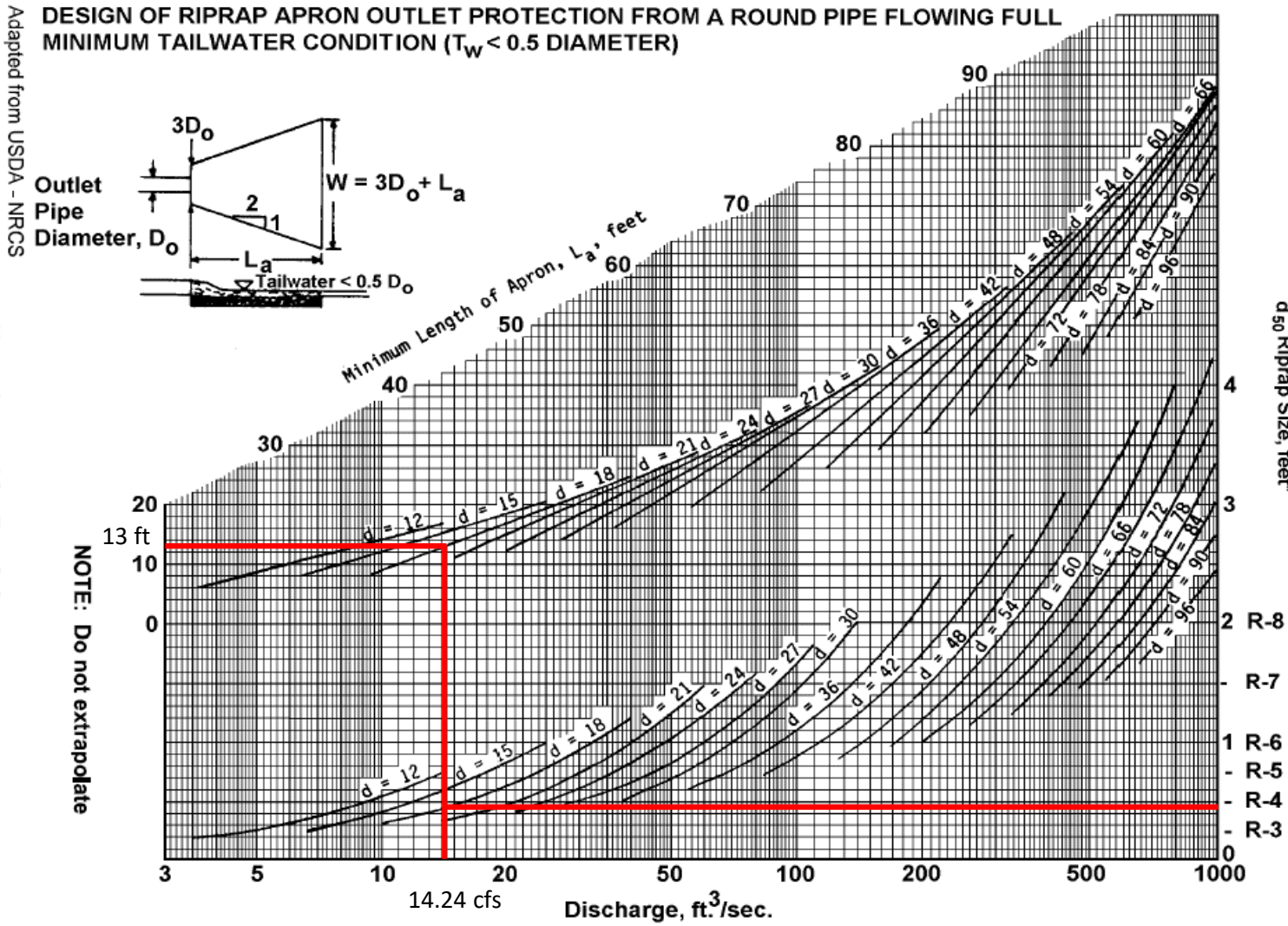


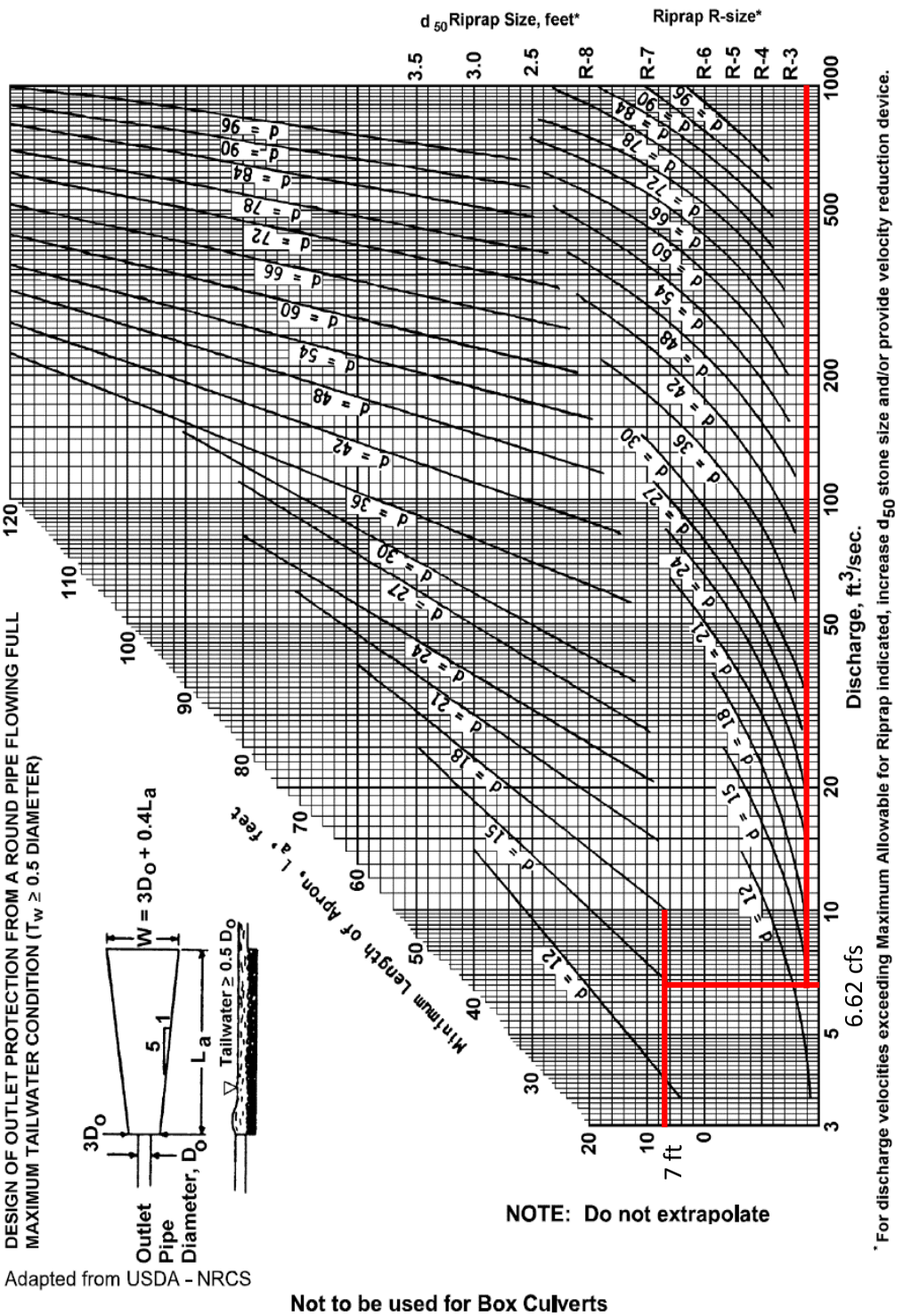
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

RIP-RAP APRON FOR EW-900

Velocity = 8.06 fps

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



Adapted from USDA - NRCS

Not to be used for Box Culverts

RIP-RAP APRON FOR EW-901

Velocity = 5.09 fps

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/2/2022

Emergency Spillway Freeboard Calculations

$Q = CLH^{3/2}$

$C = 2.6$

Basin Facility	Length (ft)	Head (ft)	Flow (cfs)	Spillway Elev.	Berm Elev.	Freeboard (ft)
BMP 1	30	0.43	22.1	414.55	416.00	1.02
BMP 2	85	0.39	54.74	439.60	441.00	1.01
BMP 3	50	0.12	5.53	434.88	436.00	1.00
BMP 4	70	0.15	10.33	451.85	453.00	1.00
BMP 5	16	0.78	28.5	473.20	475.00	1.02
BMP 6	85	0.28	32.03	469.72	471.00	1.00
BMP 7	75	0.47	62.77	429.50	431.00	1.03
BMP 8	100	0.33	48.59	420.00	421.33	1.00
BMP 9	50	0.26	17.55	459.70	461.00	1.04

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: BWB Date: 11/6/2022

Checked By: Date:

Channel or Channel Section	Spillway 1	Spillway 1		Spillway 2	Spillway 2
Temporary (T) or Permanent (P)	T	P		P	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	4.47	4.47		4.54	4.54
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	17.48	37.18		20.18	40.34
Q (Calculated at Flow Depth 'd') (cfs)	17.48	37.18		20.18	40.34
Protective Lining[2]	P300 Unveg.	P300 Veg.		P300 Unveg.	P300 Veg.
n (Manning's Coefficient)[2]	0.034	0.050		0.034	0.050
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	2.62	3.34		1.97	2.47
τ_a (Max Allowable Shear Stress) (lb/ft^2)	3.00	8.00		3.00	8.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	2.17	4.28		1.26	2.41
Channel Bottom Width (ft)	30.00	30.00		85.00	85.00
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	36	36		91	91
d (Calculated Flow Depth) (ft)	0.10	0.21		0.06	0.12
Channel Top Width @ Flow Depth d (ft)	30.63	31.24		85.38	85.74
Bottom Width : Flow Depth Ratio (12:1 max)	288.46	145.63		1393.44	732.76
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	3.16	6.30		5.18	9.92
R (Hydraulic Radius)	0.103	0.201		0.061	0.116
S (Bed Slope)[3] (ft/ft)	0.333	0.333		0.333	0.333
S_C (Critical Slope) (ft/ft)	0.028	0.052		0.034	0.064
$.7S_C$ (ft/ft)	0.020	0.037		0.024	0.045
$1.3S_C$ (ft/ft)	0.037	0.068		0.045	0.083
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.03	0.05		0.02	0.03
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: BWB Date: 11/6/2022

Checked By: Date:

Channel or Channel Section	Spillway 3	Spillway 3		Spillway 4	Spillway 4
Temporary (T) or Permanent (P)	T	P		T	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	0.69	0.69		1.20	1.20
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	2.51	5.53		5.01	10.33
Q (Calculated at Flow Depth 'd') (cfs)	2.51	5.53		5.01	10.33
Protective Lining[2]	P300 Unveg.	P300 Veg.		P300 Unveg.	P300 Veg.
n (Manning's Coefficient)[2]	0.034	0.050		0.034	0.050
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	1.32	1.71		1.47	1.87
τ_a (Max Allowable Shear Stress) (lb/ft^2)	3.00	8.00		3.00	8.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	0.81	1.66		1.00	1.94
Channel Bottom Width (ft)	35.00	35.00		50.00	50.00
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	41	41		56	56
d (Calculated Flow Depth) (ft)	0.03	0.05		0.03	0.06
Channel Top Width @ Flow Depth d (ft)	35.16	35.32		50.19	50.37
Bottom Width : Flow Depth Ratio (12:1 max)	1346.15	660.38		1562.50	806.45
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	0.92	1.88		1.61	3.12
R (Hydraulic Radius)	0.026	0.053		0.032	0.062
S (Bed Slope)[3] (ft/ft)	0.500	0.500		0.500	0.500
S_C (Critical Slope) (ft/ft)	0.045	0.081		0.041	0.077
$.7S_C$ (ft/ft)	0.031	0.057		0.029	0.054
$1.3S_C$ (ft/ft)	0.058	0.105		0.054	0.099
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.01	0.01		0.01	0.02
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: BWB Date: 11/6/2022

Checked By: Date:

Channel or Channel Section	Spillway 5	Spillway 5		Spillway 6	Spillway 6
Temporary (T) or Permanent (P)	T	P		T	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	3.31	3.31		3.72	3.72
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	13.83	28.50		15.54	32.03
Q (Calculated at Flow Depth 'd') (cfs)	13.83	28.50		15.54	32.03
Protective Lining[2]	P300 Unveg.	P300 Veg.		P300 Unveg.	P300 Veg.
n (Manning's Coefficient)[2]	0.034	0.050		0.034	0.050
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	6.43	3.66		1.80	2.29
τ_a (Max Allowable Shear Stress) (lb/ft^2)	3.00	8.00		3.00	8.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	2.73	5.29		1.44	2.80
Channel Bottom Width (ft)	16.00	16.00		85.00	85.00
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	22	22		91	91
d (Calculated Flow Depth) (ft)	0.13	0.25		0.05	0.09
Channel Top Width @ Flow Depth d (ft)	16.79	17.53		85.28	85.54
Bottom Width : Flow Depth Ratio (12:1 max)	122.14	62.99		1847.83	944.44
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	2.15	4.27		3.92	7.65
R (Hydraulic Radius)	0.128	0.242		0.046	0.089
S (Bed Slope)[3] (ft/ft)	0.333	0.333		0.500	0.500
S_C (Critical Slope) (ft/ft)	0.026	0.049		0.036	0.067
$.7S_C$ (ft/ft)	0.018	0.035		0.025	0.047
$1.3S_C$ (ft/ft)	0.034	0.064		0.047	0.087
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.03	0.06		0.01	0.02
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: BWB Date: 11/6/2022

Checked By: Date:

Channel or Channel Section	Spillway 7	Spillway 7		Spillway 8	Spillway 8
Temporary (T) or Permanent (P)	T	P		T	P
Design Storm (2, 5, or 10 yr)	10	100		10	100
Acres (ac)	7.45	7.45		5.74	5.74
Multiplier (1.6, 2.25, or 2.75)[1]	-	-		-	-
Q_R (Required Capacity) (cfs)	31.13	64.14		23.21	48.59
Q (Calculated at Flow Depth 'd') (cfs)	31.13	64.14		23.21	48.59
Protective Lining[2]	P300 Unveg.	P300 Veg.		P300 Unveg.	P300 Veg.
n (Manning's Coefficient)[2]	0.034	0.050		0.034	0.050
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	2.36	3.00		1.95	2.49
τ_a (Max Allowable Shear Stress) (lb/ft^2)	3.00	8.00		3.00	8.00
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	2.34	4.56		1.65	3.25
Channel Bottom Width (ft)	75.00	75.00		100.00	100.00
Channel Side Slopes (H:V)	3.00	3.00		3.00	3.00
D (Total Depth) (ft)	1.00	1.00		1.00	1.00
Channel Top Width @ D (ft)	81	81		106	106
d (Calculated Flow Depth) (ft)	0.08	0.15		0.05	0.10
Channel Top Width @ Flow Depth d (ft)	75.45	75.88		100.32	100.63
Bottom Width : Flow Depth Ratio (12:1 max)	1000.00	513.70		1886.79	961.54
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	5.63	11.04		5.29	10.46
R (Hydraulic Radius)	0.075	0.145		0.053	0.104
S (Bed Slope)[3] (ft/ft)	0.500	0.500		0.500	0.500
S_C (Critical Slope) (ft/ft)	0.030	0.056		0.034	0.063
$.7S_C$ (ft/ft)	0.021	0.039		0.024	0.044
$1.3S_C$ (ft/ft)	0.039	0.073		0.045	0.082
Stable Flow? (Y/N)	Y	Y		Y	Y
Freeboard Based on Unstable Flow (ft)	---	---		---	---
Freeboard Based on Stable Flow (ft)	0.02	0.04		0.01	0.03
Minimum Required Freeboard[4] (ft)	0.50	0.50		0.50	0.50
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET #11

Channel Design Data

Project Name: Martina Drive Multifamily Residential Development

Location: Susquehanna Township, Dauphin County

Prepared By: BWB Date: 11/6/2022

Checked By: Date:

Channel or Channel Section	Spillway 9	Spillway 9			
Temporary (T) or Permanent (P)	T	P			
Design Storm (2, 5, or 10 yr)	10	100			
Acres (ac)	2.11	2.11			
Multiplier (1.6, 2.25, or 2.75)[1]	-	-			
Q_R (Required Capacity) (cfs)	8.25	17.55			
Q (Calculated at Flow Depth 'd') (cfs)	8.25	17.55			
Protective Lining[2]	P300 Unveg.	P300 Veg.			
n (Manning's Coefficient)[2]	0.034	0.050			
V_a (Allowable Velocity) (ft/s)	-	-		-	-
V (Calculated at Flow Depth 'd') (ft/s)	1.74	2.23			
τ_a (Max Allowable Shear Stress) (lb/ft^2)	3.00	8.00			
τ_d (Calc'd Shear Stress at Flow Depth 'd') (lb/ft^2)	1.01	2.01			
Channel Bottom Width (ft)	50.00	50.00			
Channel Side Slopes (H:V)	3.00	3.00			
D (Total Depth) (ft)	1.00	1.00			
Channel Top Width @ D (ft)	56	56			
d (Calculated Flow Depth) (ft)	0.05	0.10			
Channel Top Width @ Flow Depth d (ft)	50.29	50.58			
Bottom Width : Flow Depth Ratio (12:1 max)	1020.41	515.46			
d_{50} Stone Size (in)	---	---		---	---
A (Cross-Sectional Area) (ft^2)	2.45	4.86			
R (Hydraulic Radius)	0.049	0.096			
S (Bed Slope)[3] (ft/ft)	0.333	0.333			
S_C (Critical Slope) (ft/ft)	0.037	0.068			
$.7S_C$ (ft/ft)	0.026	0.048			
$1.3S_C$ (ft/ft)	0.048	0.088			
Stable Flow? (Y/N)	Y	Y			
Freeboard Based on Unstable Flow (ft)	---	---			
Freeboard Based on Stable Flow (ft)	0.01	0.02			
Minimum Required Freeboard[4] (ft)	0.50	0.50			
Design Method for Protective Lining[5] Permissible	S	S		S	S

1) Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2) Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3) Slopes may not be averaged.
4) Minimum Freeboard is 0.5 ft. or 1/4 Total Channel Depth, whichever is greater.
5) Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ P300® Permanent Erosion Control Blanket

DESCRIPTION

The permanent erosion control blanket shall be a machine-produced mat of 100% UV stable polypropylene fiber. The matting shall be of consistent thickness with the synthetic fibers evenly distributed over the entire area of the mat. The matting shall be covered on the top side with black heavyweight UV-stabilized polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh. The bottom net shall also be UV-stabilized polypropylene with a 0.63 x 0.63 inch (1.57 x 1.57 cm) mesh size. The blanket shall be sewn together on 1.5 inch (3.81 cm) centers with non-degradable thread. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats. The P300 shall meet Type 5A, 5B, specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

Material Content		
Matrix	100% UV stable Polypropylene Fiber	0.7 lbs/sq yd (0.38 kg/sm)
Netting	Top: UV-stabilized Polypropylene	5 lbs/1000 sq ft (24.4 g/sm)
	Bottom: UV-stabilized Polypropylene	3 lbs/1000 sq ft (14.7 g/sm)
Thread	Polypropylene, UV stable	

Standard Roll Sizes		
Width	6.5 ft (2.0 m)	8 ft (2.44 m)
Length	108 ft (32.92 m)	112 ft (35.14 m)
Weight ± 10%	61 lbs (27.66 kg)	76.25 lbs (34.59 kg)
Area	80 sq yd (66.0 sm)	100 sq yd (83.61 sm)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.001	0.029	0.082
20-50 ft	0.036	0.060	0.086
≥ 50 ft (15.2 m)	0.070	0.090	0.110

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.47 in. (11.94 mm)
Resiliency	ASTM D6524	91.5%
Density	ASTM D792	0.916 g/cm^3
Mass/Unit Area	ASTM 6566	13.03 oz/sy (443 g/m2)
UV Stability	ASTM D4355/ 1000 hr	90%
Porosity	ECTC Guidelines	95.89%
Stiffness	ASTM D1388	0.94 in-lb (1085378 mg-cm)
Light Penetration	ASTM D6567	17.9%
Tensile Strength - MD	ASTM D6818	438 lbs/ft (6.49 kN/m)
Elongation - MD	ASTM D6818	28.1%
Tensile Strength - TD	ASTM D6818	291.9 lbs/ft (4.32 kN/m)
Elongation - TD	ASTM D6818	26.7%
Biomass Improvement	ASTM D7322	497%

Design Permissible Shear Stress		
	Short Duration	**Long Duration**
Phase 1: Unvegetated	3.0 psf (144 Pa)	2.0 psf (96 Pa)
Phase 2: Partially Veg.	8.0 psf (383 Pa)	8.0 psf (383 Pa)
Phase 3: Fully Veg.	8.0 psf (383 Pa)	8.0 PSF (383 Pa)
Unvegetated Velocity	9.0 fps (2.7 m/s)	
Vegetaged Velocity	16 fps (4.9 m/s)	

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.034
0.50 – 2.0 ft	0.034-0.020
≥ 2.0 ft (0.60 m)	0.020

NORTH AMERICAN GREEN®

North American Green
5401 St. Wendel-Cynthiana Road
Poseyville, Indiana 47633

nagreen.com
800-772-2040

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/4/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 1**

Maximum W.S.E. (ft) =	413.57
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	409.50
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	29.07
Calculated Path Length Goal (ft) =	33.44

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.1		
Calculated collar Extension from Barrel Diameter (in) =	13.20		
Maximum Allowable Collar Spacing (ft) =	15.4		
Minimum Allowable Collar Spacing (ft) =	5.5		
Dimensions of Anti-Seep Collar (ft x ft) =	**3.70**	**x**	**3.70**
Dimensions of Anti-Seep Collar (in x in) =	**44.40**	**x**	**44.40**

Actual Provided Length of Flow Path (ft) =	33.47

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/4/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 2**

Maximum W.S.E. (ft) =	438.87
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	433.50
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	38.36
Calculated Path Length Goal (ft) =	44.12

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.45		
Calculated collar Extension from Barrel Diameter (in) =	17.40		
Maximum Allowable Collar Spacing (ft) =	20.3		
Minimum Allowable Collar Spacing (ft) =	7.25		
Dimensions of Anti-Seep Collar (ft x ft) =	**4.40**	**x**	**4.40**
Dimensions of Anti-Seep Collar (in x in) =	**52.80**	**x**	**52.80**

Actual Provided Length of Flow Path (ft) =	44.16

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/4/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 3**

Maximum W.S.E. (ft) =	434.70
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	430.50
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	30.00
Calculated Path Length Goal (ft) =	34.50

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.13		
Calculated collar Extension from Barrel Diameter (in) =	13.56		
Maximum Allowable Collar Spacing (ft) =	15.82		
Minimum Allowable Collar Spacing (ft) =	5.65		
Dimensions of Anti-Seep Collar (ft x ft) =	**3.76**	**x**	**3.76**
Dimensions of Anti-Seep Collar (in x in) =	**45.12**	**x**	**45.12**

Actual Provided Length of Flow Path (ft) =	34.52

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/4/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 4**

Maximum W.S.E. (ft) =	451.85
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	442.37
Basin Outlet Barrel Slope (ft/ft) =	0.0100
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	69.13
Calculated Path Length Goal (ft) =	79.50

Number of Collars =	**3**

Calculated collar Extension from Barrel Diameter (ft) =	1.73
Calculated collar Extension from Barrel Diameter (in) =	20.76
Maximum Allowable Collar Spacing (ft) =	24.22
Minimum Allowable Collar Spacing (ft) =	8.65
Dimensions of Anti-Seep Collar (ft x ft) =	**4.96 x 4.96**
Dimensions of Anti-Seep Collar (in x in) =	**59.52 x 59.52**

Actual Provided Length of Flow Path (ft) =	79.51

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/4/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 5**

Maximum W.S.E. (ft) =	472.65
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	467.50
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	36.79
Calculated Path Length Goal (ft) =	42.31

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.39
Calculated collar Extension from Barrel Diameter (in) =	16.68
Maximum Allowable Collar Spacing (ft) =	19.46
Minimum Allowable Collar Spacing (ft) =	6.95
Dimensions of Anti-Seep Collar (ft x ft) =	**4.28 x 4.28**
Dimensions of Anti-Seep Collar (in x in) =	**51.36 x 51.36**

Actual Provided Length of Flow Path (ft) =	42.35

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** BWB **DATE:** 11/4/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 6**

Maximum W.S.E. (ft) =	469.72
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	465.00
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	33.71
Calculated Path Length Goal (ft) =	38.78

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.27		
Calculated collar Extension from Barrel Diameter (in) =	15.24		
Maximum Allowable Collar Spacing (ft) =	17.78		
Minimum Allowable Collar Spacing (ft) =	6.35		
Dimensions of Anti-Seep Collar (ft x ft) =	**4.04**	**x**	**4.04**
Dimensions of Anti-Seep Collar (in x in) =	**48.48**	**x**	**48.48**

Actual Provided Length of Flow Path (ft) =	38.79

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** RLH **DATE:** 11/3/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 7**

Maximum W.S.E. (ft) =	429.39
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	423.00
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	45.64
Calculated Path Length Goal (ft) =	52.49

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.72		
Calculated collar Extension from Barrel Diameter (in) =	20.64		
Maximum Allowable Collar Spacing (ft) =	24.08		
Minimum Allowable Collar Spacing (ft) =	8.6		
Dimensions of Anti-Seep Collar (ft x ft) =	**4.94**	**x**	**4.94**
Dimensions of Anti-Seep Collar (in x in) =	**59.28**	**x**	**59.28**

Actual Provided Length of Flow Path (ft) =	52.52

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** RLH **DATE:** 11/3/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 8**

Maximum W.S.E. (ft) =	419.98
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	414.83
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	36.79
Calculated Path Length Goal (ft) =	42.31

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.39		
Calculated collar Extension from Barrel Diameter (in) =	16.68		
Maximum Allowable Collar Spacing (ft) =	19.46		
Minimum Allowable Collar Spacing (ft) =	6.95		
Dimensions of Anti-Seep Collar (ft x ft) =	**4.28**	**x**	**4.28**
Dimensions of Anti-Seep Collar (in x in) =	**51.36**	**x**	**51.36**

Actual Provided Length of Flow Path (ft) =	42.35

DESIGNING ENVIRONMENTS

PROJECT: Martina Drive Multifamily Residential Development
LOCATION: Susquehanna Township, Dauphin County

K&W PROJECT #: 2344.001 **BY:** RLH **DATE:** 11/3/2022

Anti-Seep Collar Calculation

Basin Designation:	**BMP 9**

Maximum W.S.E. (ft) =	459.52
Slope Ratio of Basin Interior Slope (X:1)=	3.0
Upstream Invert of Basin Outlet Barrel (ft) =	455.50
Basin Outlet Barrel Slope (ft/ft) =	0.0050
Basin Outlet Barrel Diameter (in) =	18.00
Basin Outlet Barrel Diameter (ft) =	1.50
Increase in Seepage Flow Path Length (10% for Temporary Basin, 15% for Permanent Basin) (%) =	15%

Calculated Length of Barrel within Phreatic Zone (ft) =	28.71
Calculated Path Length Goal (ft) =	33.03

Number of Collars =	**2**

Calculated collar Extension from Barrel Diameter (ft) =	1.08		
Calculated collar Extension from Barrel Diameter (in) =	12.96		
Maximum Allowable Collar Spacing (ft) =	15.12		
Minimum Allowable Collar Spacing (ft) =	5.4		
Dimensions of Anti-Seep Collar (ft x ft) =	**3.66**	**x**	**3.66**
Dimensions of Anti-Seep Collar (in x in) =	**43.92**	**x**	**43.92**

Actual Provided Length of Flow Path (ft) =	33.03

Appendix H
Plan Preparer's Experience

PCSM WORKSHEET
PLAN PREPARER RECORD OF TRAINING AND EXPERIENCE IN POST CONSTRUCTION STORMWATER MANAGEMENT METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Rebecca L. Hess, PE
EMAIL ADDRESS: bhess@kandwengineers.com

FORMAL EDUCATION:

Name of College or Technical Institute: The Pennsylvania State University
Curriculum or Program: Civil Engineering
Dates of Attendance: **From:** August 2010 **To:** May 2014
Degree Received: Bachelor of Science in Civil Engineering

OTHER TRAINING:

Name of Training:	Water Quality Stormwater Management Systems	Buried Structures for Storm Water Management Systems
Presented By:	Contech Engineered Solutions	Lane Enterprises, Inc.
Date:	March 21, 2019	June 21, 2018

EMPLOYMENT HISTORY:

Current Employer: Kurowski & Wilson, LLC
Telephone: (717) 635-2835

Former Employer: Witman Engineers & Consultants, LLC
Telephone: (610) 913-5680

RECENT PCSM PLANS PREPARED:

Name of Project:	East Pennsboro School District Turf Fields	Soccer Competition & Practice Field (PSU Hbg) - Phased	Wilson High School Additions, Renovations & Athletic Facility Improvements
County:	Cumberland	Dauphin	Berks
Municipality:	East Pennsboro Township	Lower Swatara Township	Spring Township
Permit Number:	PAC210174	PAC220076	PAC060360
Approving Agency:	Cumberland County Conservation District	Dauphin County Conservation District	Berks County Conservation District