Town of Rolesville, NC
Department of Planning

502 Southtown Circle
Rolesville, NC 27571
Phone: (919) 556-3506

Comments on #SDP-26-0003 - Planning & Zoning: Site Development Plan

Application Number: #SDP-26-0003
Application Type: Site Development Plan
Date: August 13, 2026
Address: 748 S MAIN ST, ROLESVILLE, NC 27571
Parcel: 1758465891

THIS DOCUMENT IS NOT AN APPROVAL.

The Town of Rolesville Technical Review Committee has reviewed your Site Development Plan Application and provided a set of comments requiring your attention. These comments must be addressed in full before approval is issued.

Reviewing this document on the GovWell, our online portal, will allow you to view interactive markups on the document. If you are viewing this as a PDF or offline, a list of all comments will be provided below in this cover sheet. These comments must be addressed before approval is granted.

After you have addressed all comments, please upload corrected versions of the plans by clicking here or by visiting https://app.govwell.com/record/89352cf7-cca5-40b1-ba4d-9e0c3f44c0a0.

Contacts

Austin Bain City of Raleigh Engineer	(919) 996-3468 austin.bain@raleighnc.gov	Approved
Jacqueline Thompson On-Call Civil Engineer	jacqueline.thompson@bolton-menk.com	Updates Requested
Michael Elabarger Assistant Planning Director	melabarger@rolesvillenc.gov	Updates Requested
Stephen Wensman Planning Director	swensman@rolesvillenc.gov	Approved

Comments on Plan

Reviewer feedback tied to specific locations on the plan. The number on each comment corresponds to a matching number marked on the plan page. Each comment must be resolved in GovWell.

1 ME Michael Elabarger
Assistant Planning Director

ADDRESS- Per IMAPS, it is 810. The application lists it as '748 S MAIN ST' and there (Cover Sheet C000) it lists the project address as '800 S. MAIN ST.'. Please correct this discrepancy so the address is consistent across the application form and the plans.

V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 1 • August 11, 2026, 4:00pm

2 ME Michael Elabarger
Assistant Planning Director

You have Proposed IC as acreage, and the MAX IC as a percentage - there is no way to compare the two. For Proposed, calculate and include the PErcentage, and for MAX, calculate the acreage based off 85% max of the lot size, which appears to be 1.09 acres.

V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 1 • August 11, 2026, 4:06pm

3 ME Michael Elabarger
Assistant Planning Director

The Zoning Classification is listed as 'GC-CZ' on the Cover Sheet (Sheet C000) and the application form, but here under SITE INFO: it is 'GI-CZ'. Please update the plans to consistently reflect the correct zoning district.

V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 2 • August 11, 2026, 4:03pm

4 JT Jacqueline Thompson
On-Call Civil Engineer

Please include a bike rack detail in the plans.

V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 4 • August 12, 2026, 9:24am

PNC BANK
800 S. MAIN ST. ROLESVILLE, NC 27571

SITE DEVELOPMENT PLAN

SDP-26-0003, PU-032343-2026, SWF-175396-2026, SEC-175450-2026

APRIL 30TH, 2026

PROJECT TEAM

CONTACTS:

CIVIL ENGINEER
WOOLPERT
ALICIA RUEBELMAN, PE
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CHARLOTTE, NC 28277
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PROJECT ARCHITECT
NIC BRADFORD
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CHARLOTTE, NC 28023
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NICHOLAS.BRADFORD@RSANDH.COM

WATER AND SEWER
CITY OF RALEIGH
CHRIS WORTHY
CHRISTOPHER.WORTHY@RALEIGHNC.GOV
919.996.2311

ELECTRIC
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CAROLINASNEWCONSTRUCTION@DUKE-ENERGY.COM
800.636.0581

STORMWATER
WAKE COUNTY
WAYNE.MILES@RALEIGHNC.GOV
919.554.8517

DEVELOPER/OWNER
CROSLAND SOUTHEAST
AUSTIN WILLIAMS
AWILLIAMS@CSERE.COM
704.621.6430

TENANT CONTACT
PNC BANK
THOMAS OLSEN
THOMAS.OLSEN@PNC.COM
919.788.5773

SITE INFO:

TOWNSHIP: WAKE FOREST
COUNTY: WAKE COUNTY
STATE: NORTH CAROLINA

TOTAL PROJECT AREA: 1.09 ACRES

PARCEL ID: 1758465891

ZONING CLASSIFICATION: GC-CZ; GENERAL COMMERCIAL; CONDITIONAL ZONING DISTRICT
LAND USE: BANKS/CREDIT UNIONS, FINANCIAL SERVICES (INCLUDING DRIVE-THROUGH)

DISTURBED AREA: 0.77 ACRES

LEGAL DESCRIPTION: LOI9 WALLBROOK PARIS TR SUB BM2026-01244

WATERSHED: UPPER NEUSE

RIVER BASIN: NEUSE

CURRENT USE (EXISTING): VACANT LOT

CURRENT IMPERVIOUS (EXISTING): 0.11 ACRES

PROPOSED IMPERVIOUS: 0.55 ACRES

MAXIMUM IMPERVIOUS AREA: 85%

MINIMUM FRONT BUILDING SETBACK (S. MAIN): 20 FEET
MINIMUM SIDE BUILDING SETBACK: 15 FEET
MINIMUM REAR BUILDING SETBACK: 35 FEET
MINIMUM CORNER BUILDING SETBACK (VIRGINIA WATER DR): 25 FEET

MINIMUM LOT WIDTH: 100 FEET

PARKING DATA: SEE SHEET C-201 FOR DETAILS

MINIMUM MAIN STREET LANDSCAPE BUFFER: 30 FEET
MINIMUM REAR LANDSCAPE BUFFER: 25 FEET
MINIMUM INTERIOR LOT LANDSCAPE BUFFER: 0 FEET

TREE COVERAGE DATA: SITE TO BE CLEARED AND GRUBBED

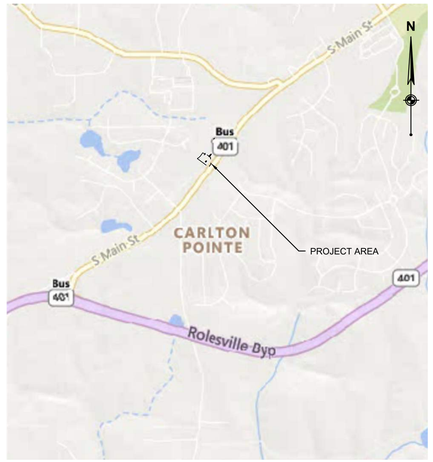
BUILDING HEIGHT: MAXIMUM 35 FEET, PROVIDED 18 FEET

BUILDING SQUARE FOOTAGE: 3000 SF

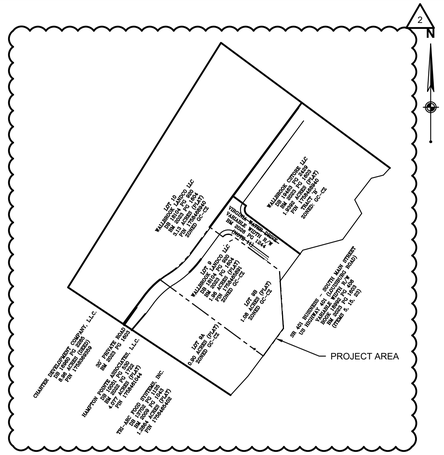
FEMA NOTE: ZONE X, 3720175800K, EFF. 7/19/2022

FLOODPLAIN: N/A

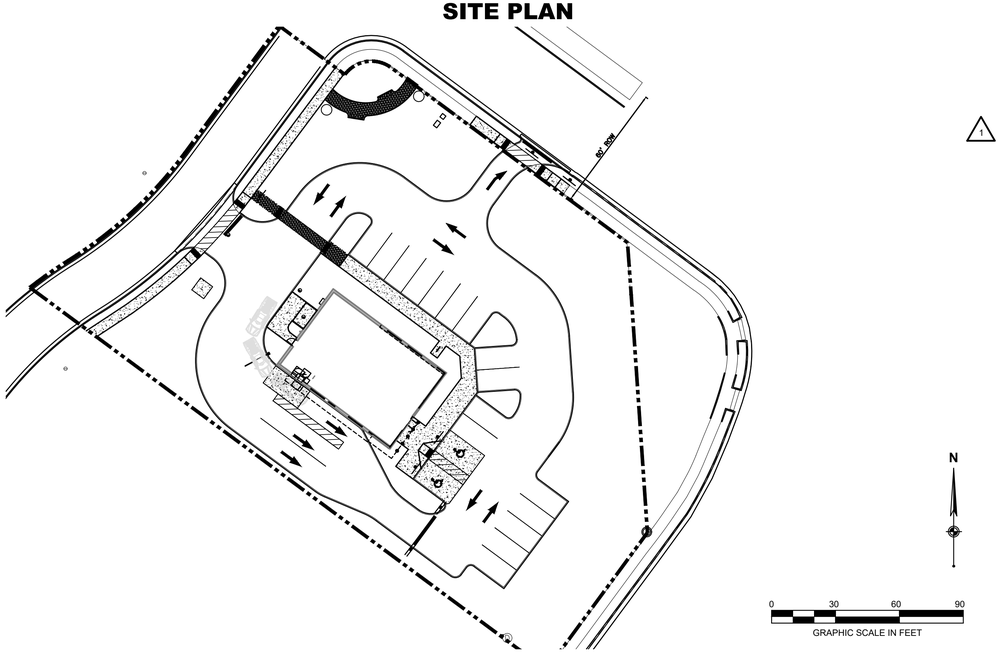
VICINITY MAP



DEVELOPMENT MAP



SITE PLAN



SHEET INDEX

SHEET NUMBER		SHEET TITLE	REVISION DATE
1	C000	COVER SHEET	07/31/2026
2	C001	GENERAL NOTES AND LEGEND	07/31/2026
3	C101	EXISTING CONDITIONS PLAN	07/31/2026
4	C201	SITE PLAN	07/31/2026
5	C301	GRADING & DRAINAGE PLAN	07/31/2026
6	C302	EROSION CONTROL PLAN	07/31/2026
7	C303	EROSION CONTROL DETAILS	07/31/2026
8	C304	EROSION CONTROL DETAILS	07/31/2026
9	C401	UTILITY PLAN	07/31/2026
10	C801	DETAILS	07/31/2026
11	C802	DETAILS	07/31/2026
12	C803	DETAILS	07/31/2026
13	LP101	LANDSCAPE PLAN	06/30/2026
14	LP102	LANDSCAPE PLAN	06/30/2026
15	IR-1	IRRIGATION PLAN	07/01/2026
16	E100	ELECTRICAL SITE PLAN	07/01/2026
17	E601	ELECTRICAL SITE PHOTOMETRICS	07/01/2026
18	E602	ELECTRICAL ATM PHOTOMETRICS	07/01/2026
19	E603	ELECTRICAL COMCHECK	07/01/2026
20	AS101	ARCHITECTURAL SITE PLAN	07/01/2026
21	A121	ROOF PLAN	07/01/2026
22	A201	BUILDING ELEVATIONS	07/01/2026
23	A202	BUILDING ELEVATIONS	07/01/2026
24	A311	WALL SECTIONS	07/01/2026
25	A313	WALL SECTIONS	07/01/2026
26	A501	WALL DETAILS	07/01/2026

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North Carolina License Nos. 50073 *
F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER:
10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
COVER SHEET

SHEET ID:
C000

PROJECT STATUS:
100% DESIGN DOCUMENTS

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9/15/2025 12:32:03 PM Autodesk Docs://20030368266_PNC NC Wendell Falls Ground Up/20030368266_PNC NC Wendell Falls GU_A_R24.rvt

V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 1

1 Michael Elabarger
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You have Proposed IC as acreage, and the MAX IC as a percentage - there is no way to compare the two. For Proposed, calculate and include the PErcentage, and for MAX, calculate the acreage based off 85% max of the lot size, which appears to be 1.09 acres.

GENERAL NOTES

1. EXISTING CONDITIONS AS DEPICTED ON THESE PLANS ARE GENERAL AND ILLUSTRATIVE IN NATURE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE SITE AND BE FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING ON THIS PROJECT. IF CONDITIONS ENCOUNTERED DURING EXAMINATION ARE SIGNIFICANTLY DIFFERENT FROM THOSE SHOWN, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER/CONSTRUCTION MANAGER IMMEDIATELY.
2. EXISTING SITE INFORMATION AND TOPOGRAPHIC SURVEY WAS PREPARED BY WOOLPERT, DATED JANUARY, 2026 AND FUTURE SITE INFORMATION FROM ARK CONSULTING GROUP. ANY SITE CHANGES/MODIFICATIONS MADE AFTER THIS SURVEY ARE NOT REFLECTED IN THESE PLANS. CONTRACTOR TO NOTIFY WOOLPERT, INC. OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION. ITEMS INDICATED AS PER RECORDS AND OUTSIDE THE SURVEY LIMITS ARE BASED ON VARIOUS RECORD DRAWINGS PROVIDED BY THE OWNER. WOOLPERT IS NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN.
3. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES (INCLUDING THOSE LABELED PER RECORDS) PRIOR TO THE BEGINNING OF CONSTRUCTION OR EARTH MOVING OPERATIONS. INFORM ARCHITECT/ENGINEER/CONSTRUCTION MANAGER OF ANY CONFLICTS DETRIMENTAL TO THE DESIGN INTENT.
4. PRIOR TO COMMENCEMENT OF DIGGING, CONTRACTOR SHALL NOTIFY THE FOLLOWING AGENCIES: THE NORTH CAROLINA UTILITY PROTECTION SERVICES 811, AND ALL OTHER AGENCIES THAT MAY HAVE UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS AND ARE NON-MEMBERS OF NORTH CAROLINA UNDERGROUND PROTECTION SERVICES.
5. THE CONTRACTOR AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR COMPLYING WITH APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SUBCONTRACTORS TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK. FOR ACCESSIBILITY ITEMS AND REFERENCES TO THE AMERICAN WITH DISABILITIES ACT, THE APPLICABLE ACCESSIBILITY CODE FOR THIS PROJECT IS THE 2021 IBC AND THE ICC A117.1-2017 BY REFERENCE.
6. THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND OWNER'S REPRESENTATIVE FOR ANY AND ALL INJURIES AND/OR DAMAGES TO PERSONNEL, EQUIPMENT AND/OR EXISTING FACILITIES OCCURRING IN THE COURSE OF THE DEMOLITION AND CONSTRUCTION DESCRIBED IN THE PLANS AND SPECIFICATIONS.
7. CONTRACTOR SHALL OBTAIN A PERMIT FOR ALL CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH LOCAL, STATE, & FEDERAL REGULATIONS.
8. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL CODES, OBTAIN ALL APPLICABLE PERMITS, AND PAY ALL REQUIRED FEES PRIOR TO COMMENCING WORK.
9. ANY WORK PERFORMED IN WAKE COUNTY RIGHT OF WAYS SHALL BE IN ACCORDANCE WITH THE APPLICABLE WAKE COUNTY REQUIREMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE NECESSARY PERMITS FOR THE WORK, SCHEDULE NECESSARY INSPECTIONS, AND PROVIDE THE NECESSARY TRAFFIC CONTROL MEASURES AND DEVICES, ETC., FOR WORK PERFORMED IN THE RIGHT OF WAYS.
10. THE CONTRACTOR IS TO PERFORM ALL INSPECTIONS AS REQUIRED BY THE NORTH CAROLINA ENVIRONMENTAL PROTECTION AGENCY FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND FURNISH OWNER'S REPRESENTATIVE WITH WRITTEN REPORTS. OWNER WILL OBTAIN NPDES PERMIT.
11. CONTRACTOR SHALL IMPLEMENT ALL SOIL AND EROSION CONTROL PRACTICES REQUIRED BY THE TOWN OF ROLESVILLE AND THE NORTH CAROLINA EPA.
12. ALL GROUND SURFACE AREAS THAT HAVE BEEN EXPOSED OR LEFT BARE AS A RESULT OF CONSTRUCTION AND ARE TO FINAL GRADE AND ARE TO REMAIN SO, SHALL BE SEEDED AND MULCHED AS SOON AS PRACTICAL IN ACCORDANCE WITH SPECIFICATIONS.
13. ITEM NUMBERS REFER TO THE NORTH CAROLINA CONSTRUCTION AND MATERIAL SPECIFICATIONS, AND ALL CONSTRUCTION WORK SHALL BE DONE ACCORDING TO SAID SPECIFICATIONS AND IN ACCORDANCE WITH APPLICABLE STANDARDS OF THE TOWN OF ROLESVILLE WHEN IN CONFLICT, THE COUNTY REQUIREMENTS SHALL PREVAIL.
14. ALL WORK PERFORMED BY THE CONTRACTOR SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
15. THE CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS CONSTRUCTION SET FOR OTHER PERTINENT INFORMATION. IT IS NOT THE ENGINEER'S INTENT THAT ANY SINGLE PLAN SHEET IN THIS SET OF DOCUMENTS FULLY DEPICT ALL WORK ASSOCIATED WITH THE PROJECT.
16. BEFORE INSTALLATION OF STORM SEWER, SANITARY SEWER, ELECTRICAL CONDUIT, WATERLINE OR ANY OTHER UTILITY, THE CONTRACTOR SHALL VERIFY ALL CROSSINGS, BY EXCAVATION WHERE NECESSARY, AND INFORM THE OWNER AND THE ARCHITECT/ENGINEER/CONSTRUCTION MANAGER OF ANY CONFLICTS. THE DESIGN ENGINEER SHALL BE HELD HARMLESS IF NOT NOTIFIED OF DESIGN CONFLICTS PRIOR TO CONSTRUCTION.
17. ADJUST OR RECONSTRUCT ALL EXISTING CASTINGS, CLEANOUTS, ETC. WITHIN PROJECT AREA TO MEET PROPOSED GRADE AS REQUIRED.
18. CONTRACTOR TO REMOVE & REPLACE PAVEMENT AS SPECIFIED.
19. THE CONTRACTOR SHALL CHECK EXISTING GRADES, DIMENSIONS, AND INVERTS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE PRIOR TO BEGINNING WORK.
20. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES. TAKE CARE TO PROTECT UTILITIES THAT ARE TO REMAIN. RELOCATE EXISTING UTILITIES AS INDICATED, OR AS NECESSARY FOR CONSTRUCTION.
21. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
22. PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING PAVEMENT AND NEW PAVEMENT. FIELD ADJUSTMENT OF FINAL GRADES MAY BE NECESSARY. INSTALL ALL UTILITIES PRIOR TO INSTALLATION OF PAVED SURFACES.
23. SITE WORK CONCRETE WALKS AND PADS SHALL HAVE A BROOM FINISH TO ALL SURFACES. SITE WORK CONCRETE SHALL BE CLASS B (4000 PSI @ 28 DAYS) UNLESS OTHERWISE NOTED.
24. ALL DAMAGE TO EXISTING PAVEMENT, SIDEWALK, CURB, LANDSCAPING, UTILITIES, AND ANY OTHER ITEMS TO REMAIN, WHICH RESULTS FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED WITH LIKE MATERIALS AT THE CONTRACTOR'S EXPENSE.
25. SITE DIMENSIONS SHOWN ARE TO THE FACE OF CURB, BUILDING, WALL, EDGE OF PAVEMENT, OR COLUMN LINE UNLESS OTHERWISE NOTED.
26. COORDINATES ARE FOR BUILDING COLUMNS, EXTERIOR BUILDING WALLS, CENTERS OF DRIVEWAYS, CENTER OF SANITARY SEWER MANHOLES, AND CENTER OF STRUCTURES PLACED SIX INCHES INSIDE FACE OF CURB FOR DRAIN INLETS, UNLESS OTHERWISE NOTED.
27. CONTRACTOR SHALL MAINTAIN ONE SET OF AS-BUILT/RECORD DRAWINGS ON-SITE DURING CONSTRUCTION FOR DISTRIBUTION TO THE OWNER AND/OR OWNER'S REPRESENTATIVE UPON COMPLETION.
28. REFER TO THE ARCHITECTURAL, PLUMBING & ELECTRICAL DRAWINGS FOR EXACT DIMENSIONS AND LOCATIONS OF UTILITY SERVICE ENTRY LOCATIONS AND PRECISE BUILDING DIMENSIONS.
29. THIS SITE LAYOUT IS SPECIFIC TO THE APPROVALS NECESSARY FOR THE CONSTRUCTION IN ACCORDANCE WITH THE TOWN OF ROLESVILLE. NO CHANGES TO THE SITE LAYOUT ARE ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. CHANGES MADE TO THE SITE LAYOUT WITHOUT APPROVAL ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR. CHANGES INCLUDE BUT ARE NOT LIMITED TO, INCREASED IMPERVIOUS PAVEMENT, ADDITION/DELETION OF PARKING SPACES, MOVEMENT OF CURB LINES, CHANGES TO DRAINAGE STRUCTURES AND PATTERNS, LANDSCAPING, ETC.
30. SITE SIGNAGE AND STRIPING SHALL BE IN ACCORDANCE WITH THE NORTH CAROLINA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

DEMOLITION NOTES

1. ALL EXISTING ABOVE AND BELOW GROUND STRUCTURES WITHIN THE LIMITS OF CONSTRUCTION SHALL BE REMOVED UNLESS OTHERWISE SPECIFIED WITHIN THIS CONSTRUCTION SET AND/OR PROJECT MANUAL. THIS INCLUDES WALLS AND FOOTINGS. CAVITIES LEFT BY STRUCTURE REMOVAL SHALL BE BACKFILLED WITH SATISFACTORY MATERIALS AND COMPACTED TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATION.
2. NO TREES SHALL BE REMOVED, NOR VEGETATION DISTURBED BEYOND THE LIMITS OF CONSTRUCTION WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
3. TREE PROTECTION FENCING SHALL BE IN ACCORDANCE WITH THE TOWN OF ROLESVILLE STANDARDS - OR - IN ACCORDANCE WITH THE DETAILED DRAWINGS. DO NOT OPERATE OR STORE EQUIPMENT, NOR HANDLE OR STORE MATERIALS WITHIN THE DRIP LINES OF THE TREES SHOWN TO REMAIN.
4. PROTECTION OF EXISTING TREES AND VEGETATION: PROTECT EXISTING TREES AND OTHER VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIALS OR EXCAVATED MATERIALS WITHIN DRIP LINE, EXCESS FOOT OR VEHICULAR TRAFFIC, OR PARKING OF VEHICLES WITHIN DRIP LINE. PROVIDE TEMPORARY GUARDS TO PROTECT TREES AND VEGETATION TO BE LEFT STANDING.
5. ALL DEMOLITION WASTE AND CONSTRUCTION DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED. ALL DEBRIS SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OF OFFSITE IN A STATE APPROVED WASTE SITE AND IN ACCORDANCE WITH ALL LOCAL AND STATE CODES AND PERMIT REQUIREMENTS. TAKE CARE TO PROTECT UTILITIES THAT ARE TO REMAIN. REPAIR DAMAGE ACCORDING TO THE APPROPRIATE UTILITY COMPANY STANDARDS AND AT THE CONTRACTOR'S EXPENSE.
6. ALL UTILITY DISCONNECTION, REMOVAL, RELOCATION, CUTTING, CAPPING AND/OR ABANDONMENT SHALL BE COORDINATED WITH THE APPROPRIATE UTILITY COMPANY OR AGENCY. LOCAL UTILITY CONTACTS ARE PROVIDED ON THIS SHEET.
7. THE BURNING OF CLEARED MATERIAL AND DEBRIS SHALL NOT BE ALLOWED UNLESS CONTRACTOR OBTAINS PRIOR LEGAL WRITTEN AUTHORIZATION FROM THE LOCAL AUTHORITIES.
8. EROSION & SEDIMENT CONTROL MEASURES AROUND AREAS OF DEMOLITION SHALL BE PROPERLY INSTALLED AND FUNCTIONING PROPERLY PRIOR TO INITIALIZATION OF DEMOLITION ACTIVITIES.
9. ASBESTOS OR HAZARDOUS MATERIAL ARE NOT EXPECTED. IF FOUND ON SITE, SUCH MATERIALS SHALL BE REMOVED BY A LICENSED HAZARDOUS MATERIALS CONTRACTOR. CONTRACTOR SHALL NOTIFY OWNER IMMEDIATELY IF HAZARDOUS MATERIALS ARE ENCOUNTERED.
10. CONTRACTOR SHALL ADHERE TO ALL LOCAL, STATE, FEDERAL AND OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS DURING ALL DEMOLITION AND CONSTRUCTION ACTIVITIES.
11. CONTRACTOR SHALL PROTECT ALL CORNER PINS, MONUMENTS, PROPERTY CORNERS AND BENCHMARKS DURING DEMOLITION ACTIVITIES. IF DISTURBED, CONTRACTOR SHALL HAVE DISTURBED ITEMS RESET BY A LICENSED SURVEYOR AT NO ADDITIONAL COST TO THE OWNER.
12. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES, STRUCTURES, AND FEATURES TO REMAIN. ANY ITEMS TO REMAIN THAT HAVE BEEN DISTURBED OR DAMAGED AS A RESULT OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT CONTRACTOR'S EXPENSE.
13. CONTRACTOR SHALL PROVIDE AND MAINTAIN TRAFFIC CONTROL MEASURES IN ACCORDANCE WITH STATE DEPARTMENT OF TRANSPORTATION REGULATIONS, FAA REGULATIONS, AND AS REQUIRED BY LOCAL AGENCIES WHEN WORKING IN AND/OR ALONG STREETS, ROADS, HIGHWAYS, ETC.. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN APPROVAL AND COORDINATE WITH LOCAL AND/OR STATE AGENCIES REGARDING THE NEED, EXTENT AND LIMITATIONS ASSOCIATED WITH INSTALLING AND MAINTAINING TRAFFIC CONTROL MEASURES.
14. PROVIDE STRAIGHT, FULL DEPTH, AND NEAT SAW CUTS OF EXISTING PAVEMENT WHERE INDICATED ALONG LIMITS OF PAVEMENT DEMOLITION.
15. ALL UTILITY AND STRUCTURE REMOVAL, RELOCATION, CUTTING, CAPPING AND/OR ABANDONMENT SHALL BE COORDINATED AND PROPERLY DOCUMENTED BY A CERTIFIED PROFESSIONAL, WHEN APPLICABLE, WITH THE APPROPRIATE UTILITY COMPANY, MUNICIPALITY AND/OR AGENCY. DEMOLITION OF REGULATED ITEMS MAY INCLUDE, BUT NOT LIMITED TO WELLS, ASBESTOS, UNDERGROUND STORAGE TANKS, SEPTIC TANKS AND ELECTRIC TRANSFORMERS. DEMOLITION CONTRACTOR SHALL REFER TO ANY ENVIRONMENTAL STUDIES FOR DEMOLITION RECOMMENDATIONS AND GUIDANCE. AVAILABLE ENVIRONMENTAL STUDIES MAY INCLUDE, BUT ARE NOT LIMITED TO PHASE I ESA, PHASE II ESA, WETLAND AND STREAM DELINEATION AND ASBESTOS SURVEYS. ALL APPLICABLE ENVIRONMENTAL STUDIES SHALL BE MADE AVAILABLE UPON REQUEST.
16. ALL PAVEMENT, BASE COURSES, SIDEWALKS, CURBS, BUILDINGS, FOUNDATIONS, ETC., WITHIN THE AREA THAT ARE INDICATED TO BE DEMOLISHED SHALL BE REMOVED TO FULL DEPTH. EXISTING BASE COURSE MATERIALS MAY BE WORKED INTO THE NEW PAVEMENT OR BUILDING SUBGRADE IF THE GRADATION, CONSISTENCY, COMPACTION, SUBGRADE CONDITION, ETC., ARE IN ACCORDANCE WITH THE SPECIFICATIONS AND RECOMMENDATIONS OF THE GEOTECHNICAL REPORT. BASE COURSE MATERIALS SHALL NOT BE WORKED INTO THE SUBGRADE AREAS TO RECEIVE LANDSCAPING.
17. THE CONTRACTOR SHALL USE SUITABLE METHODS TO CONTROL DUST AND DIRT CAUSED BY THE DEMOLITION ACTIVITIES.

SITE EARTHWORK NOTES

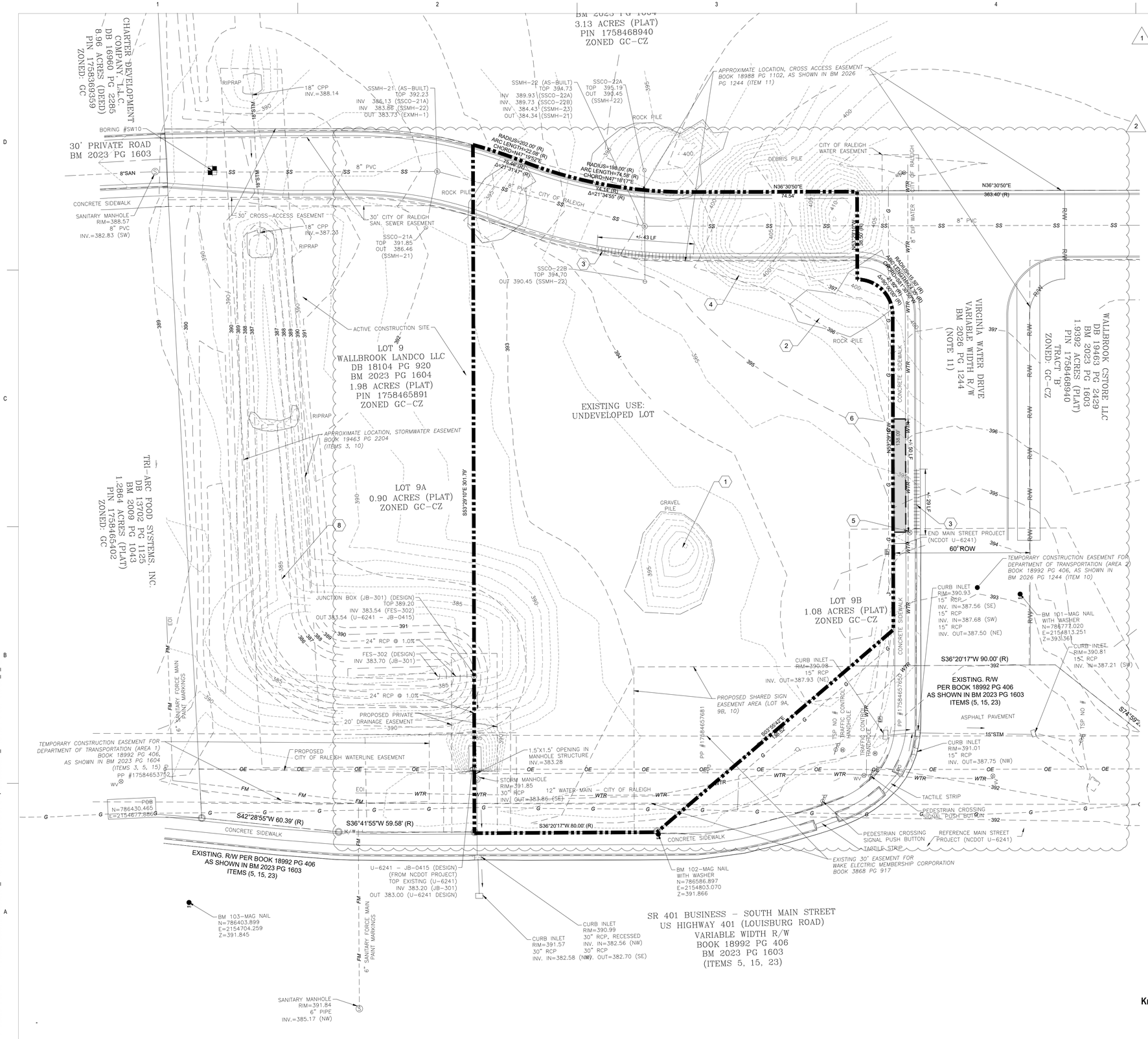
1. ALL PROPOSED GRADES SHOWN ARE FINAL GRADES, TOP OF GROUND LEVEL, OR TOP OF PAVEMENT, OR GRATE ELEVATION AT THE DRAWDOWN POINT, UNLESS INDICATED OTHERWISE.
2. REFER TO AND FOLLOW THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED FOR THIS PROJECT PREPARED FOR THIS PROJECT BY TERRACON TITLED "PNC BANK - ROLESVILLE GEOTECHNICAL ENGINEERING REPORT" AND DATED 09/29/2025.
3. SITE BUILDING PAD EXCAVATION AND CONSTRUCTION TO BE PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. BUILDING PAD PREPARATION SHALL BEGIN BY CLEARING AND REMOVAL OF UNSUITABLE MATERIAL FROM PAD SITE, THEN PLACEMENT AND COMPACTION OF BACKFILL MATERIAL PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
4. ALL FILL UNDER PAVEMENT SHALL BE COMPACTED TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
5. ALL ELEVATIONS SHOWN ARE FINISHED GRADE ELEVATIONS.
6. CONTRACTOR SHALL STRICTLY ADHERE TO THE EROSION & SEDIMENT CONTROL PLAN PREPARED FOR THIS PROJECT.
7. EARTHWORK SHALL INCLUDE CLEARING AND GRUBBING, STRIPPING AND STOCKPILING TOPSOIL, MASS GRADING, EXCAVATION, FILLING, UNDERCUT AND REPLACEMENT, IF REQUIRED, AND COMPACTION.
8. CONTRACTOR TO REFILL UNDERCUT AREAS WITH SUITABLE MATERIAL AND COMPACT AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
9. PLACE TOPSOIL OVER THE SUBGRADE OF UNPAVED, DISTRIBUTED AREAS TO A DEPTH INDICATED ON THE LANDSCAPE PLANS (4" MINIMUM).
10. PAVEMENT SLOPES ACROSS ACCESSIBLE PARKING STALLS AND ADJOINING ACCESS AISLES SHALL BE MAXIMUM 2% AND SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
11. ALL AREAS NOT PAVED SHALL BE STABILIZED IN ACCORDANCE WITH THE EROSION & SEDIMENT CONTROL PLAN, UNLESS NOTED OTHERWISE.
12. COMPACTED FILLS ARE TO BE MADE TO A MINIMUM OF THREE FEET ABOVE THE CROWN OF ANY PROPOSED SEWER PRIOR TO CUTTING OF TRENCHES FOR PLACEMENT OF SAID SEWERS. ALL FILLS SHALL BE CONTROLLED, COMPACTED, AND INSPECTED BY AN APPROVED TESTING LABORATORY OR AN INSPECTOR FROM THE APPROPRIATE GOVERNMENTAL AGENCY.
13. ALL EXCESS SOIL MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED AND SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OF OFFSITE AT NO ADDITIONAL COST TO THE OWNER IN ACCORDANCE WITH ALL LOCAL AND STATE CODES AND PERMIT REQUIREMENTS.
14. THE CONTRACTOR IS RESPONSIBLE FOR BALANCING THE SITE EARTHWORK BY IMPORTING OR EXPORTING AS NECESSARY TO ACHIEVE DESIGN GRADES AND SPECIFICATIONS.

STORM DRAINAGE NOTES

1. DISTANCES SHOWN ON PIPING ARE HORIZONTAL DISTANCES FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE, UNLESS OTHERWISE NOTED, CONTRACTOR RESPONSIBLE FOR ACTUAL FIELD CUT LENGTH.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE INSTALLATION, INSPECTION, TESTING AND FINAL ACCEPTANCE OF ALL NEW STORMWATER MANAGEMENT FACILITIES CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH ALL APPLICABLE REGULATING AGENCIES CONCERNING INSTALLATION, INSPECTION AND APPROVAL OF THE STORM DRAINAGE SYSTEM CONSTRUCTION.
3. ALL STORMWATER MANAGEMENT FACILITIES, INCLUDING COLLECTION AND CONVEYANCE STRUCTURES SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE CODES AND REGULATIONS.
4. ANY FIELD TILE CUT IN EXCAVATION, WHICH DRAINS AN OFFSITE AREA, MUST BE TIED INTO THE STORM DRAINAGE SYSTEM.
5. FOR EXACT LOCATION OF DOWNSPOUTS AND ROOF DRAINS, CONTRACTOR IS TO COORDINATE WITH ARCHITECTURAL AND PLUMBING DRAWINGS.
6. ALL PROPOSED STORM SEWERS, SURFACE OR OTHER DRAINAGE FACILITIES ARE TO BE PRIVATE AND MAINTAINED BY THE OWNER.
7. THE CONTRACTOR IS TO CONSTRUCT CURBS, CATCH BASINS, DOWNSPOUTS, PIPING AND CONNECTION ETC. AS REQUIRED TO CONVEY THE ROOF AND PAVED SURFACE DRAINAGE TO THE DETENTION BASIN.
8. ALL STORM STRUCTURES ARE NORTH CAROLINA DOT TYPES UNLESS OTHERWISE INDICATED.
9. ALL CATCH BASINS AND MANHOLES WITH A DEPTH GREATER THAN 4-FEET SHALL BE PROVIDED WITH STEPS. STEPS SHALL MEET THE REQUIREMENTS OF NORTH CAROLINA DOT SPECIFICATION.
10. STORM SEWER PIPE LABELED "SD" SHALL BE ONE OF THE FOLLOWING: HIGH DENSITY POLYETHYLENE PER NORTH CAROLINA DOT, OR REINFORCED CONCRETE PIPE, NORTH CAROLINA DOT. ALL STORM SEWER TO BE SMOOTH WALLED, WITH A MANNINGS COEFFICIENT OF 0.012-0.013. STORM SEWER PIPE LABELED "RCP" SHALL BE REINFORCED CONCRETE PIPE, NORTH CAROLINA DOT. ALL STORM SEWER IS TO BE INSTALLED PER NORTH CAROLINA DOT.
11. STORM SEWER IS TO BE BEDDED WITH CLEAN GRANULAR MATERIAL-AGGREGATES NOT TO BE LARGER THAN 3/4" AND NOT SMALLER THAN NO. 8 SIEVE, FREE OF SILT AND FINES, AASHTO M43 SIZE #67, 7 OR 8. BEDDING TO BE MINIMUM OF 6" BELOW & 12" ABOVE THE PIPE.

UTILITY NOTES

1. ALL PROPOSED UTILITY LINES AND EXTENSIONS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF RALEIGH SPECIFICATIONS. CONTRACTOR SHALL COORDINATE UTILITY DISCONNECTIONS WITH THE APPROPRIATE AGENCIES.
2. THE CONTRACTOR IS PARTICULARLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF THE EXISTING UTILITIES SHOWN HEREON IS BASED ON TOPOGRAPHIC SURVEYS AND RECORD DRAWINGS. THE CONTRACTOR SHALL NOT RELY UPON THIS INFORMATION AS BEING EXACT OR COMPLETE. SHOULD UNCHARTED UTILITIES BE ENCOUNTERED DURING EXCAVATION OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AS SOON AS POSSIBLE FOR INSTRUCTIONS. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION AND REQUEST FIELD VERIFICATION OF UTILITY LOCATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO RELOCATE EXISTING UTILITIES CONFLICTING WITH IMPROVEMENTS SHOWN HEREON IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS GOVERNING SUCH OPERATIONS.
3. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. MAINTAIN MINIMUM 10-FOOT HORIZONTAL AND MINIMUM 18-INCH VERTICAL SEPARATION BETWEEN SANITARY SEWER, STORM SEWER AND WATER SUPPLY LINE, UNLESS OTHERWISE INDICATED.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE SEQUENCING OF CONSTRUCTION FOR ALL UTILITY LINES SO THAT WATER LINES, GAS LINES, AND UNDERGROUND ELECTRIC DO NOT CONFLICT WITH SANITARY SEWERS OR STORM SEWERS. INSTALL UTILITIES PRIOR TO PAVEMENT CONSTRUCTION.
6. ALL TRENCH SPOILS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED.
7. SANITARY SEWER SHALL BE PVC-SDR 35 PER ASTM D-3034 OR APPROVED EQUAL (CONFORMING TO TOWN OF ROLESVILLE SPECIFICATIONS) INSTALLED AT A MINIMUM SLOPE OF ONE-HALF PERCENT (0.50%) UNLESS OTHERWISE NOTED. SANITARY SERVICE SHALL BE INSTALLED AT A MINIMUM DEPTH OF FOUR FEET (4') UNLESS OTHERWISE NOTED. A MINIMUM OF 18" CLEARANCE SHALL BE MAINTAINED AT ALL WATERLINE & STORM SEWER CROSSINGS. SANITARY SERVICE JOINTS SHALL CONFORM TO ASTM D-3212.
8. SANITARY SEWER IS TO BE BEDDED WITH CLEAN GRANULAR MATERIAL-AGGREGATES NOT TO BE LARGER THAN 3/4" AND NOT SMALLER THAN NO. 8 SIEVE, FREE OF SILT AND FINES, AASHTO M43 SIZE #67, 7 OR 8. BEDDING TO BE MINIMUM OF 6" BELOW & 12" ABOVE THE PIPE.
9. DISTANCES SHOWN FOR BOTH SANITARY AND STORM SEWER PIPES ARE MEASURED FROM CENTER OF STRUCTURE. CONTRACTOR RESPONSIBLE FOR ACTUAL FIELD CUT LENGTH. COORDINATES FOR STORM & SANITARY STRUCTURES ARE SHOWN TO THE CENTER STRUCTURE. UNLESS OTHERWISE NOTED.
10. ROOF DRAINS, FOUNDATION DRAINS AND ALL OTHER CLEAR WATER CONNECTIONS TO THE SANITARY SEWER SYSTEMS ARE PROHIBITED.
11. ADJUST ALL EXISTING UTILITY SURFACE FEATURES INCLUDING BUT NOT LIMITED TO CASTINGS, VALVE BOXES, PEDESTALS, CLEANOUTS, ETC. TO MATCH PROPOSED FINISHED GRADES, UNLESS OTHERWISE INDICATED.
12. THE CONTRACTOR SHALL PROVIDE RECORD DRAWINGS OF ALL IMPROVEMENTS. INCLUDE AT LEAST TWO DIMENSIONS TO EACH VALVE AND MANHOLE FROM KNOWN SITE FEATURES. DRAWINGS SHALL INCLUDE HORIZONTAL AND VERTICAL INFORMATION ON ALL NEW UTILITIES AS WELL AS EXISTING UTILITIES ENCOUNTERED.
13. MECHANICAL/ELECTRICAL CONTRACTORS SHALL BRING ALL UTILITIES 5' OUTSIDE BUILDING WALL. COORDINATE WITH CONSTRUCTION MANAGER/ARCHITECT/ENGINEER/OWNER.
14. ALL WATERLINE CROSSINGS SHALL MAINTAIN A VERTICAL SEPARATION OF 18" MINIMUM. SANITARY SEWER SHALL BE LOCATED A MINIMUM OF 18" BELOW WATERLINE AT ALL CROSSINGS. WATERLINE SHALL BE LOCATED A MINIMUM OF 10' HORIZONTALLY FROM ANY SANITARY SEWER OR STORM SEWER. ALL MEASUREMENTS SHALL BE TAKEN FROM OUTSIDE OF SEWER PIPE TO THE OUTSIDE OF WATERLINE PIPE. ONE FULL LENGTH OF WATERLINE PIPE SHALL BE LOCATED AT ALL CROSSINGS TO ENABLE BOTH JOINTS TO BE LOCATED AS FAR FROM SEWER AS POSSIBLE.
15. ALL WATER SERVICE PIPE SIZES 3" THRU 12" SHALL BE DUCTILE IRON PIPE CLASS, PVC C-900 OR PVC C909 PIPE PER LOCAL JURISDICTION, FROM WATERMAIN THRU METER SETTING(S) INCLUDING THE METER BYPASS.
16. ALL WATER SERVICE PIPE, 2" AND SMALLER, SHALL BE K SOFT COPPER.
17. ALL WATER SERVICE PIPE, 2" AND SMALLER, SHALL BE K SOFT COPPER FROM WATERMAIN THRU CURB STOP. K SOFT COPPER OR TOWN OF ROLESVILLE APPROVED POLYTUBING FROM CURB STOP THRU METER SETTING IN BUILDING.
18. WATERLINE IS TO BE BEDDED WITH CLEAN GRANULAR MATERIAL-AGGREGATES NOT TO BE LARGER THAN 3/4" AND NOT SMALLER THAN NO. 8 SIEVE, FREE OF SILT AND FINES, AASHTO M43 SIZE #67, 7 OR 8. BEDDING TO BE MINIMUM OF 6" BELOW & 12" ABOVE THE PIPE
19. ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH RALEIGH WATER DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: RALEIGH WATER HANDBOOK, CURRENT EDITION)
20. UTILITY SEPARATION REQUIREMENTS:
    - 20.1. A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE E LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
    - 20.2. WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE RALEIGH WATER DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER OUTSIDE DIAMETER.
    - 20.3. WHERE IS IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
    - 20.4. 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
    - 20.5. MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATION CANNOT BE ACHIEVED, SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 6" MIN. CLEARANCE (PER RALEIGH WATER DETAILS W-41 & S-29).
    - 20.6. ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.
21. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY RALEIGH WATER PRIOR TO CONSTRUCTION.
22. DEVELOPER SHALL PROVIDE 30 DAYS ADVANCE WRITTEN NOTICE TO OWNER FOR ANY WORK REQUIRED WITHIN AN EXISTING CITY OF RALEIGH UTILITY EASEMENT TRAVERSING PRIVATE PROPERTY.
23. CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTION SHALL BE PRECEDED BY A 24-HOUR ADVANCE NOTICE TO RALEIGH WATER.
24. SEWER BYPASS PUMPING - A BYPASS PLAN SEALED BY AN NC PROFESSIONAL ENGINEER SHALL BE PROVIDED TO RALEIGH WATER PRIOR



EXISTING LEGEND

- PROPERTY BOUNDARY
- 799 — 1' CONTOUR
- 800 — 5' CONTOUR
- EASEMENT
- 30"STM — 30" STORM
- 18"STM — 18" STORM
- SD — STORM
- WTR — WATER
- 8"SAN — 8" GRAVITY SANITARY
- FM — SANITARY FORCEMAIN
- OE — OVERHEAD ELECTRIC
- 701 — FUTURE 1' CONTOUR
- 700 — FUTURE 5' CONTOUR
- SANITARY MANHOLE
- SANITARY CLEANOUT
- STORM MANHOLE
- CATCH BASIN
- CURB INLET
- HEADWALL
- FIRE HYDRANT
- WATER METER PIT
- WATER VALVE
- ELECTRIC PULLBOX
- TRANSFORMER
- ELECTRIC METER
- POWER POLE
- LIGHT POLE
- TELEPHONE PEDESTAL
- GAS VALVE
- SIGN
- BENCHMARK MAG NAIL
- PEDESTRIAN CROSSING SYMBOL
- TRAFFIC CONTROL HANDHOLE

DEMOLITION LEGEND

- SAWCUT LINE
- TO BE REMOVED
- TO BE ABANDONED
- ASPHALT PAVEMENT TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED

NOTES

A. SEE SHEET C-001 FOR GENERAL NOTES.

B. CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS CONSTRUCTION SET FOR OTHER PERTINENT INFORMATION. IT IS NOT THE ENGINEER'S INTENT THAT ANY SINGLE PLAN SHEET WITHIN THIS SET OF DOCUMENTS FULLY DEPICT ALL WORK ASSOCIATED WITH THE PROJECT.

C. CONTRACTOR TO LOCATE EXISTING UTILITY SERVICES AND INVESTIGATE POTENTIAL FOR REUSE. IF IT IS NOT TO BE REUSED, IT SHALL BE REMOVED OR ABANDONED IN PLACE PER AGENCY REQUIREMENTS.

D. SITE AND ADJACENT PROPERTIES ARE ZONED GC-CZ.

E. DEED BOOK/PAGE: 018104/00920

F. FUTURE CONTOURS INDICATE EXISTING GRADE WHEN FUTURE CONSTRUCTION IS COMPLETED BEFORE CONSTRUCTION BEGINS FOR THIS PROJECT.

KEYNOTES (X)

1. REMOVE GRAVEL PILE
2. REMOVE ROCK PILE
3. REMOVE CURB
4. REMOVE DEBRIS PILE
5. EXISTING GAS VALVE TO REMAIN IN PLACE. CONTRACTOR TO PROTECT DURING CONSTRUCTION.
6. REMOVE EXISTING SIDEWALK TO THE NEAREST JOINT.
7. BASIN TO REMAIN. PRIMARY USAGE IS STORMWATER CONVEYANCE TO STRUCTURES ON US 401

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER:
10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
EXISTING CONDITIONS PLAN

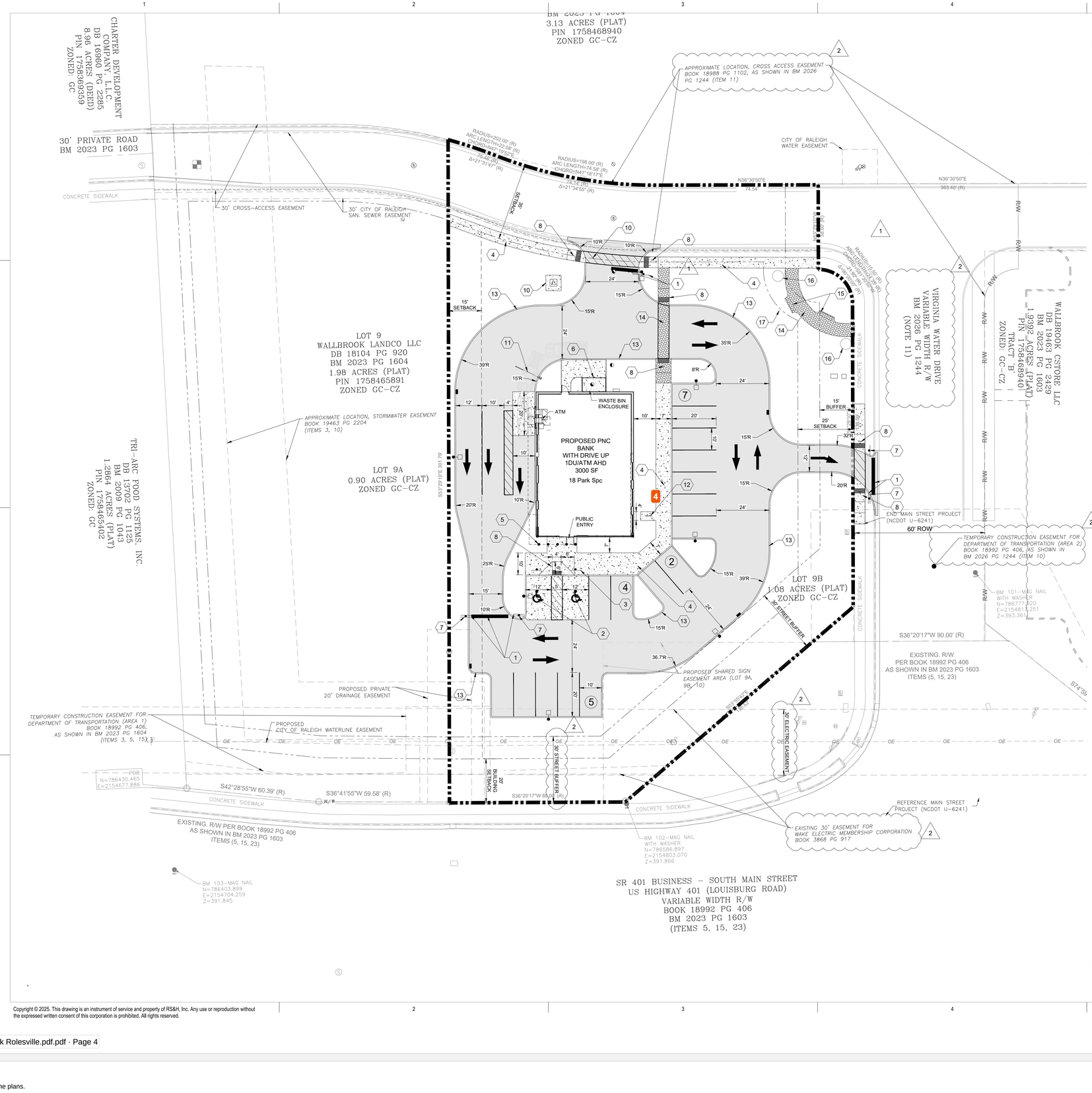
SHEET ID:
C101

PROJECT STATUS:
100% DESIGN DOCUMENTS

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LEGEND

- PROPOSED CONCRETE
- PROPOSED ASPHALT PAVEMENT
- LEASE LINE
- PROPOSED LIGHT POLE

NOTES

1. SEE SHEET C001 FOR GENERAL NOTES AND LEGEND.
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3. ALL DIMENSIONS, RADII AND COORDINATES ARE TO BACK OF CURB WHERE APPLICABLE. ALL CURB RADII SHALL BE 3' UNLESS INDICATED OTHERWISE.

KEYNOTES (X)

1. "STOP SIGN", R1-1 AND STOP BAR. SEE DETAIL ON SHEET C801.
2. VAN ACCESSIBLE PARKING SPACE. SEE DETAIL ON SHEET C801.
3. VAN ACCESSIBLE PARKING SIGNAGE. SEE DETAIL ON SHEET C801.
4. CONCRETE WALK. SEE DETAIL ON SHEET C801.
5. BOLLARD, TYP.
6. SCREENED TRASH ENCLOSURE.
7. "DO NOT ENTER" SIGN, R5-1. SEE DETAIL ON SHEET C801.
8. ADA RAMP, SEE DETAIL ON SHEET C801.
9. CROSSWALK, SEE DETAIL ON SHEET C803.
10. PROPOSED TRANSFORMER PAD.
11. CLEARANCE BAR.
12. PROPOSED BIKE RACK.
13. 6" CONCRETE CURB. SEE DETAIL ON SHEET C801.
14. PEDESTRIAN AMENITY #1: STAMPED CONCRETE CROSSWALK AND SIDEWALK. SEE DETAIL ON SHEET C801.
15. PEDESTRIAN AMENITY #2: BENCHES. SEE DETAIL ON LANDSCAPING SHEET LP101.
16. PEDESTRIAN AMENITY #3: PLANTERS. SEE DETAIL ON LANDSCAPING SHEET LP101.
17. PEDESTRIAN AMENITY #4: POCKET GARDEN. SEE LANDSCAPING SHEET LP101.

SITE DATA

ZONING	GENERAL COMMERCIAL CONDITIONAL ZONING
TOTAL SITE AREA	1.09 ACRES
PROPOSED USE	BANKS/CREDIT UNIONS, FINANCIAL INSTITUTION
PARKING SPACE SIZE REQUIRED	9' X 19'
PARKING SPACE SIZE PROVIDED	10' X 20'
TYPICAL PARKING AISLE (TWO WAY)	24' WIDE
PARKING SPACES REQUIRED 2.5 SPACES PER 1,000 SQ. FT. =	8 SPACES
STANDARD PARKING SPACES PROVIDED	16 SPACES
ADA SPACES PROVIDED STANDARD ADA SPACES VAN SPACES	0 SPACES 2 SPACES
TOTAL PARKING SPACES PROVIDED	18 SPACES
MAXIMUM IMPERVIOUS AREA	85%

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WOOLPERT

PNC BANK

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PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

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800 S. MAIN ST.
ROLESVILLE, NC 27571

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DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
SITE PLAN

SHEET ID:
C201

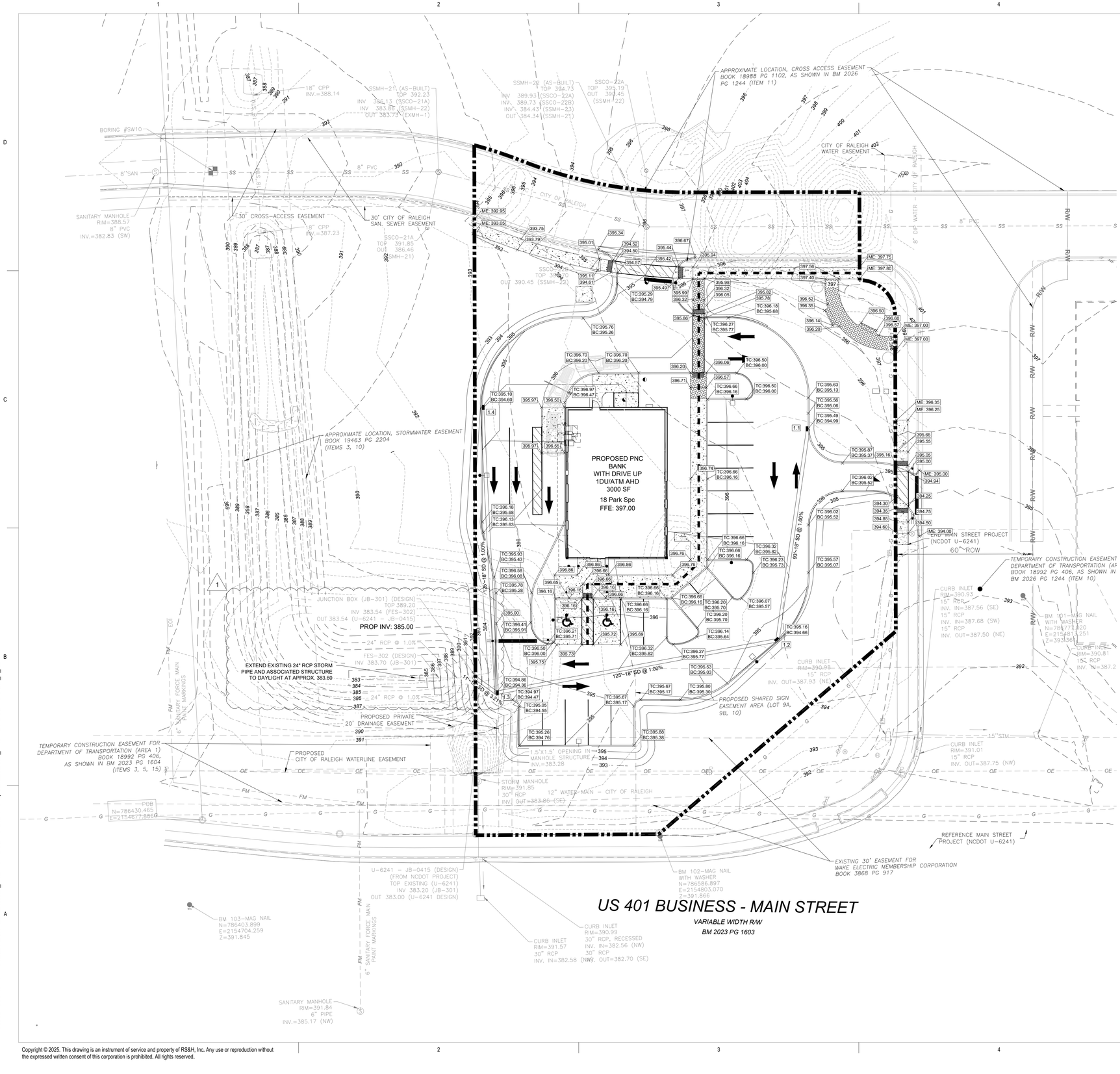
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4 **Jacqueline Thompson**
Please include a bike rack detail in the plans.



GRADING LEGEND

701	EXISTING 1' CONTOUR
700	EXISTING 5' CONTOUR
701	PROPOSED 1' CONTOUR
700	PROPOSED 5' CONTOUR
701	FUTURE 1' CONTOUR
700	FUTURE 5' CONTOUR
XX"-XX" SD	PROPOSED STORM PIPE
	PROPOSED STORM STRUCTURES
1.1	PROPOSED STORM STRUCTURE ID
5301.00	PROPOSED SPOT ELEVATION
TC:5301.50 BC:5301.00	PROPOSED TOP/BOTTOM ELEVATION
ME:5301.00	PROPOSED ELEVATION MATCH EXISTING
ADA ACCESSIBLE PATH 1	

NOTES

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3. FUTURE CONTOURS INDICATE EXISTING GRADE WHEN FUTURE CONSTRUCTION IS COMPLETED BEFORE CONSTRUCTION BEGINS FOR THIS PROJECT.
4. CONTRACTOR TO VERIFY ACCESSIBLE PATH DOES NOT HAVE GAPS GREATER THAN 0.5" WIDTH. FILL GAPS WITH SONNEBORNE SL1 SELF LEVELING SEALANT OR APPROVED EQUAL. COLOR TO MATCH CONCRETE.
5. ACCESSIBLE PATH SHALL HAVE A 5.0% MAXIMUM RUNNING SLOPE AND A 2.0% MAXIMUM CROSS SLOPE.
6. CONTRACTOR SHALL VERIFY ACCESSIBLE PATH DOES NOT HAVE CHANGE IN ELEVATION GREATER THAN 0.25" VERTICAL/ GRIND CONCRETE UNTIL PAVEMENT IS FLUSH.

STORM STRUCTURE TABLE

STRUCTURE ID	DESCRIPTION	RIM/GRATE	INVERTS
EXISTING MANHOLE	CONNECT TO EXISTING	390.59	18" = 385.00 (E) 30" = 383.86 (SE)
1.1	CURB INLET	394.99	18" = 391.49 (SE)
1.2	CURB INLET	394.66	18" = 390.56 (NW) 18" = 390.56 (SW)
1.3	CURB INLET	394.36	18" = 389.31 (NE) 18" = 389.85 (NW) 18" = 385.36 (W)
1.4	CURB INLET	394.60	18" = 391.10 (SE)

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PNC NC ROLESVILLE

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

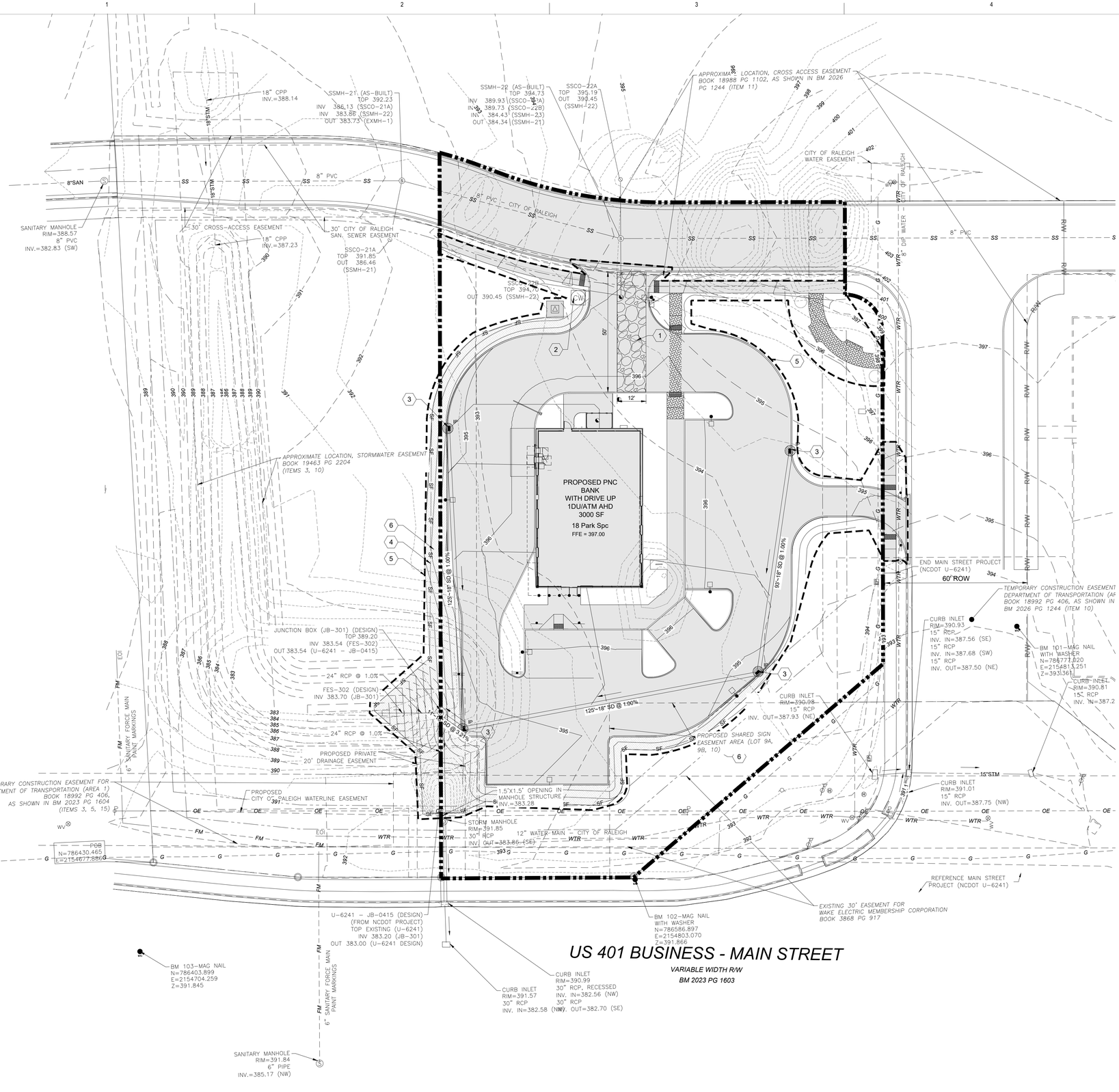
SHEET TITLE:
GRADING & DRAINAGE PLAN

SHEET ID:
C301

PROJECT STATUS:
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LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- 1' CONTOUR
- 5' CONTOUR
- FUTURE 1' CONTOUR
- FUTURE 5' CONTOUR
- TEMPORARY SILT FENCE
- LIMITS OF DISTURBANCE
- CATCH BASIN
- INLET PROTECTION
- TEMPORARY CONSTRUCTION ENTRANCE
- TEMPORARY CONCRETE WASHOUT
- EROSION CONTROL BLANKET
- IMPERVIOUS SURFACE

NOTES

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3. CONSTRUCTION FENCE AND SILT FENCE ARE SHOWN ON PLAN SCHEMATICALLY. ADJUST AS NECESSARY.
4. EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED AND INSPECTED PRIOR TO ANY GRADING ON SITE.

KEYNOTES (X)

1. TEMPORARY CONSTRUCTION ACCESS, MIN 12' W X 50' L. SEE DETAIL ON SHEET C303.
2. CONCRETE WASHOUT. SEE DETAIL ON SHEET C304.
3. INLET PROTECTION. SEE DETAIL ON SHEET C304.
4. SILT FENCE. SEE DETAIL ON SHEET C304
5. LIMITS OF DISTURBANCE.
6. EROSION CONTROL BLANKET. SEE DETAIL ON SHEET C304

IMPERVIOUS COVERAGE

PARCEL AREA:	1.09 ACRES
EXISTING:	0.11 ACRES
PROPOSED:	0.55 ACRES
MAXIMUM:	85% (40,358.3 SQ. FT.)
% COVERAGE:	60% (28,421.1 SQ. FT.)
TOTAL SITE AREA:	1.09 ACRES
DISTURBED AREA:	0.77 ACRES

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0 20 40 60
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F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH
PROJECT NUMBER:	10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
EROSION CONTROL PLAN

SHEET ID:
C302

PROJECT STATUS:
100% DESIGN DOCUMENTS

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DATE: PAGE:

CONSIDERATIONS FOR CONSTRUCTION SCHEDULING

CONSTRUCTION ACTIVITY	SCHEDULE CONSIDERATION
CONSTRUCTION ACCESS: Construction entrance, construction routes, equipment parking areas.	First land-disturbing activity- Stabilize bare areas immediately with gravel and temporary vegetation as construction takes place.
SEDIMENT TRAPS AND BARRIERS: Basin traps, sediment fences, and outlet protection.	Install principal basins after construction site is accessed. Install additional traps and barriers as needed during grading.
RUNOFF CONTROL: Diversions, perimeter dikes, water bars, and outlet protection.	Install key practices after principal sediment traps and before land grading. Install additional runoff-control measures during grading.
RUNOFF CONVEYANCE SYSTEM: Stabilize streambanks, storm drains, channels, inlet and outlet protection, and slope drains.	Where necessary, stabilize streambanks as early as possible. Install principal runoff conveyance system with runoff-control measures. Install remainder of system after grading.
LANDING CLEARING AND GRADING: Site preparation- cutting, filling and grading, sediment traps, barriers, diversions, drains, and surface roughening.	Begin major clearing and grading **AFTER** principal sediment and key runoff-control measures are installed. Clear borrow and disposal areas only as needed. Install additional control measures as grading progresses. Mark trees and buffer areas for preservation.
SURFACE STABILIZATION: Temporary and permanent seeding, mulching, sodding and riprap.	Apply temporary or permanent stabilization measures immediately on all disturbed areas where work is delayed or complete.
BUILDING CONSTRUCTION: Buildings, utilities, and paving.	Install necessary additional erosion and sedimentation control practices as work takes place.
LANDSCAPE AND FINAL STABILIZATION: Topsoiling, trees and shrubs, permanent seeding, mulching, sodding, and riprap.	Last construction phase: Stabilize all open areas, including borrow and spoil areas. Remove and stabilize all temporary control areas.

NOTE: The above are the main aspects of a typical construction sequence in general terms. A detailed Construction Sequence should be site specific based on your project and site needs. As a minimum, the construction sequence schedule should show the following:

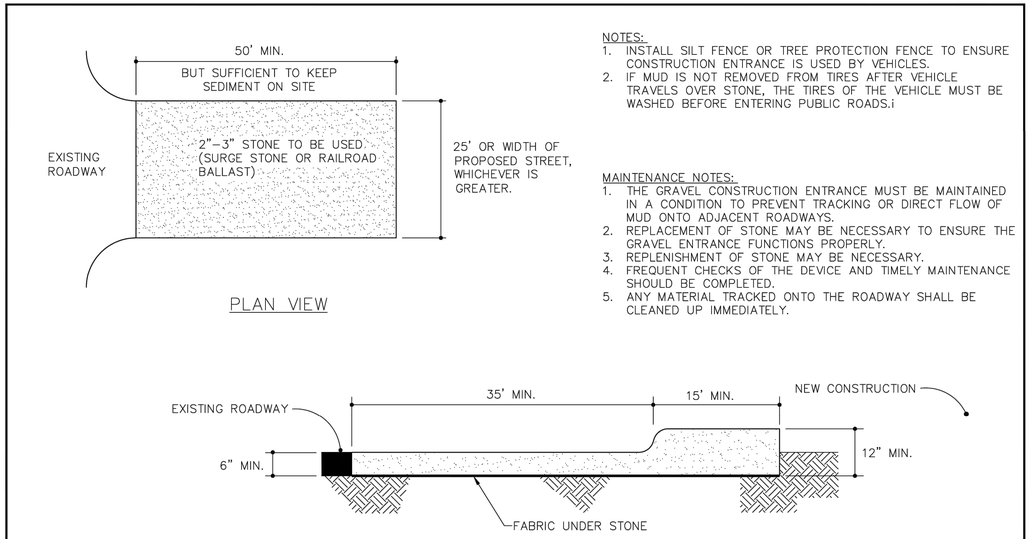
- The erosion and sedimentation control practices to be installed,
- Principal development activities,
- What measures should be in place before other activities are begun, and
- Compatibility with the general construction schedule of the contract.

Many timely construction techniques can reduce the erosion potential of a site, such as (1) shaping earthen fills daily to prevent overflows and (2) constructing temporary diversions ahead of anticipated storms. These types of activities cannot be put on the construction sequence schedule, but should be used whenever possible.

DEQ

CONSTRUCTION SEQUENCING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates



NOTES:
1. INSTALL SILT FENCE OR TREE PROTECTION FENCE TO ENSURE CONSTRUCTION ENTRANCE IS USED BY VEHICLES.
2. IF MUD IS NOT REMOVED FROM TIRES AFTER VEHICLE TRAVELS OVER STONE, THE TIRES OF THE VEHICLE MUST BE WASHED BEFORE ENTERING PUBLIC ROADS.i

MAINTENANCE NOTES:
1. THE GRAVEL CONSTRUCTION ENTRANCE MUST BE MAINTAINED IN A CONDITION TO PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO ADJACENT ROADWAYS.
2. REPLACEMENT OF STONE MAY BE NECESSARY TO ENSURE THE GRAVEL ENTRANCE FUNCTIONS PROPERLY.
3. REPLENISHMENT OF STONE MAY BE NECESSARY.
4. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE SHOULD BE COMPLETED.
5. ANY MATERIAL TRACKED ONTO THE ROADWAY SHALL BE CLEANED UP IMMEDIATELY.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD CONSTRUCTION ENTRANCE

DATE: PAGE:

SPACING GUIDE FOR SLOPE BREAKS		
	SLOPE	SPACING (FT)
Steep Slopes	2:1	20
	3:1	35
	4:1	45
Long Slopes	15-25%	50
	10-15%	80
	6-10%	125
	3-6%	200
	<3%	300

Use slope breaks, such as diversions, wattles, or benches, as appropriate, to reduce the length of cut-and-fill slope to limit sheet and rill erosion and prevent gullying.

MAINTENANCE:
1. Periodically check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls.
2. Promptly remove all sediment from diversions and other water-disposal practices.
3. If washouts or breaks occur, repair immediately.
4. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

NOTES:
1. Construct and maintain all erosion and sediment control practices and measures in accordance with the approved sedimentation control plan and construction schedule.
2. Remove good topsoil from areas to be graded and filled, and preserve it for use in finishing the grading of all critical areas.
3. Scarify areas to be topsoiled to a minimum depth of 2 inches before placing topsoil.
4. Clear and grub areas to be filled by removing trees, vegetation, roots, or other objectionable material that would affect the planned stability of the fill.
5. Ensure that fill material is free of brush, rubbish, rocks, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.
6. Place all fill in layers not to exceed 9 inches in thickness, and compact the layers as required to reduce erosion, slippage, settlement, or other related problems.
7. Do not incorporate frozen, soft, mucky, or highly compressible materials into fill slopes.
8. Do not place fill on a frozen foundation, due to possible subsidence and slippage.
9. Keep diversions and other water conveyance measures free of sediment during all phases of development.
10. Handle seeps or springs encountered during construction in accordance with approved methods (subsurface drain).
11. Permanently stabilize all graded areas immediately after final grading is completed on each area in the grading plan. Apply temporary stabilization measures on all graded areas when work is to be interrupted or delayed for 30 days or longer.
12. Show topsoil, stockpiles, borrow areas, and spoil areas on the plans, and make sure they are adequately protected from erosion. Include final stabilization of these areas in the plan.

DEQ

LAND GRADING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:

TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding Dates
Mountains—Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER

Seeding Mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding Dates
Mountains — May 15 - Aug. 15
Piedmont — May 1 - Aug. 15
Coastal Plain — Apr. 15 - Aug. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding Dates
Mountains — Aug. 15 - Dec. 15
Coastal Plain and Piedmont — Aug. 15 - Dec. 31

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1-1½ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700 - 1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

DEQ

TEMPORARY SEEDING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

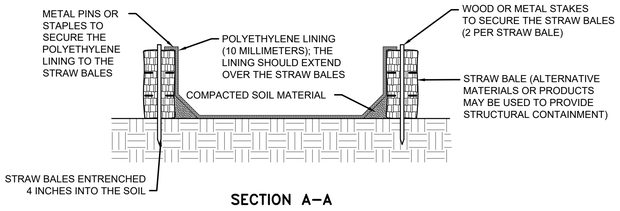
SHEET TITLE:
EROSION CONTROL DETAILS

SHEET ID:
C303

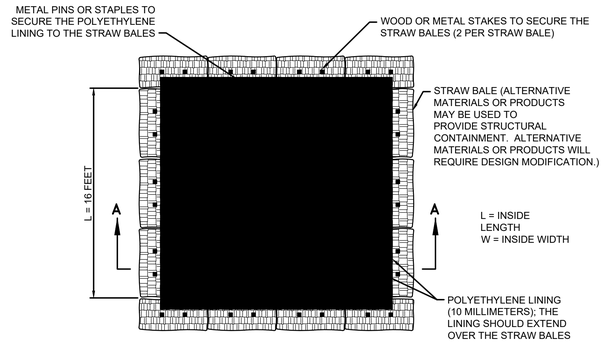
PROJECT STATUS:
100% DESIGN DOCUMENTS

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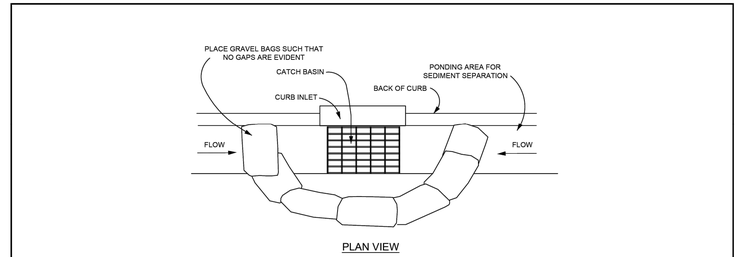
SECTION A–A



PLAN VIEW

CONCRETE WASHOUT

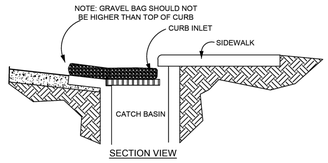
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PLAN VIEW

NOTES:

1. PLACE GRAVEL BAG BARRIER ON GENTLY SLOPING STREET, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNNOFF.
2. USE SAND BAGS OF WOVEN GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH ¾ INCH (OR SMALLER) GRAVEL. BAGS MUST BE LAYERED SUCH THAT NO GAPS ARE EVIDENT.
3. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.
4. WHEN INSTALLING CURB INLET PROTECTION DEVICES, **NEVER** BLOCK THE CURB INLET.

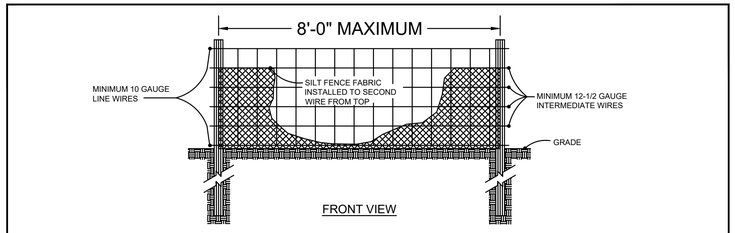


SECTION VIEW

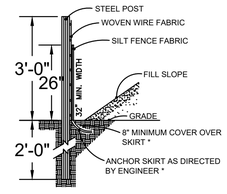
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 10/15/2025

STANDARD GRAVEL BAG CURB INLET PROTECTION



FRONT VIEW



SIDE VIEW

MAINTENANCE NOTES:

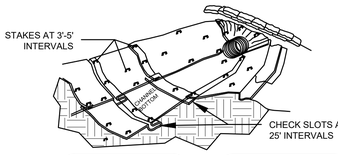
1. INSPECT BAG **AFTER EACH SIGNIFICANT RAINFALL OF 1 INCHES OR GREATER, OVER A 24–HOUR PERIOD**.L. MAKE ANY REPAIRS IMMEDIATELY.
2. INSPECT THE SILT FENCE TO BE SURE THE BOTTOM OF THE
3. GEOTEXTILE IS KEYED IN PROPERLY.
4. AT A MINIMUM, REMOVE AND DISPOSE OF ALL SILT ACCUMULATIONS WHEN DEPTH REACHES 1/2 THE HEIGHT OF THE GEOTEXTILE. DO NOT UNDERMINE THE FENCE DURING CLEANOUT.
5. DISPOSE OF SEDIMENT BY HAULING IT TO AN APPROVED WASTE SITE WITH APPROPRIATE PERIMETER PROTECTION.
6. REMOVE AND REPLACE DETERIORATED OR CLOGGED SILT FENCE.
7. REPLACE SILT FENCE REMOVED FOR ACCESS AT THE END OF EACH DAY'S OPERATION.
8. INSTALL ADDITIONAL POSTS OR WIRE BACKING IF FENCE IS SAGGING.

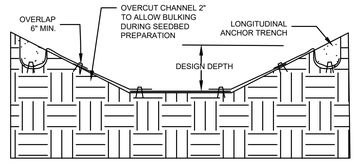
WAKE COUNTY NORTH CAROLINA

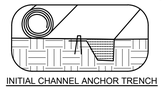
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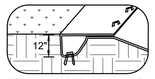
STANDARD TEMPORARY SILT FENCE

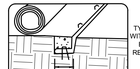
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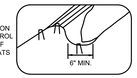


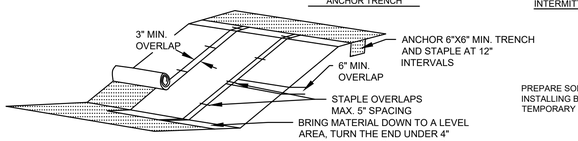


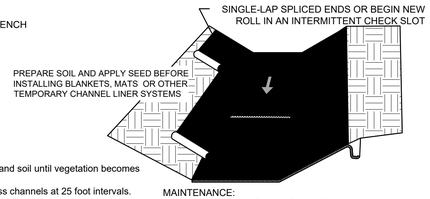




TYPICAL INSTALLATION WITH EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS







NOTES:

1. Lime, fertilize and seed before installation. Planting of shrubs, trees, etc. should occur after installation.
2. Slope surface shall be smooth before placement for proper soil contact.
3. Design velocities exceeding 2 feet/second require temporary blankets, mats or similar liners to protect seed and soil until vegetation becomes established.
4. Terminal anchor trenches are required at RECP ends and intermittent check slots must be constructed across channels at 25 foot intervals.
5. Terminal anchor trenches should be a minimum of 12 inches in depth and 6 inches in width. Intermittent check slots should be 6 inches deep and 6 inches wide.
6. For installation on a slope, place RECP 2-3 feet over the top of the slope and into an excavated end trench measuring approximately 12 inches deep by 6 inches wide. Pin the RECP at 1 foot intervals along the bottom of the trench, backfill and compact. Unroll the RECP down the slope maintaining direct contact between the soil and RECP. Secure using staples or pins in a 3 foot center-to-center pattern.
7. 11 gauge, at least 6 inch by 1 inch staples or 12 inch minimum length wooden stakes are recommended for anchoring.
8. Grass-lined channels with design velocities exceeding 6 feet/second should include turf reinforcement mats
9. Check slots to be constructed per manufacturers specifications.
10. Staking or stapling layout per manufacturers specification.
11. If there is a berm at the top of slope, anchor up-slope of the berm.
12. Do not stretch blankets/matting tight, allow the rolls to conform to any irregularities.
13. For slopes less than 3H:1V, rolls may be placed in horizontal strips.

MAINTENANCE:

1. Inspect Rolled Erosion Control Products at least weekly and after each rainfall of 1.0 inch or greater; repair immediately.
2. Good contact with the ground must be maintained, and erosion must not occur beneath the RECP.
3. Any areas of the RECP that are damaged or not in close contact with the ground shall be repaired and stapled.
4. If erosion occurs due to poorly controlled drainage, the problem shall be fixed and the eroded area protected.
5. Monitor and repair the RECP as necessary until ground cover is established.

NORTH CAROLINA DEQ

ROLLED EROSION CONTROL PRODUCTS

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

RS&H
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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD

7/30/2026

SHEET TITLE:
EROSION CONTROL DETAILS

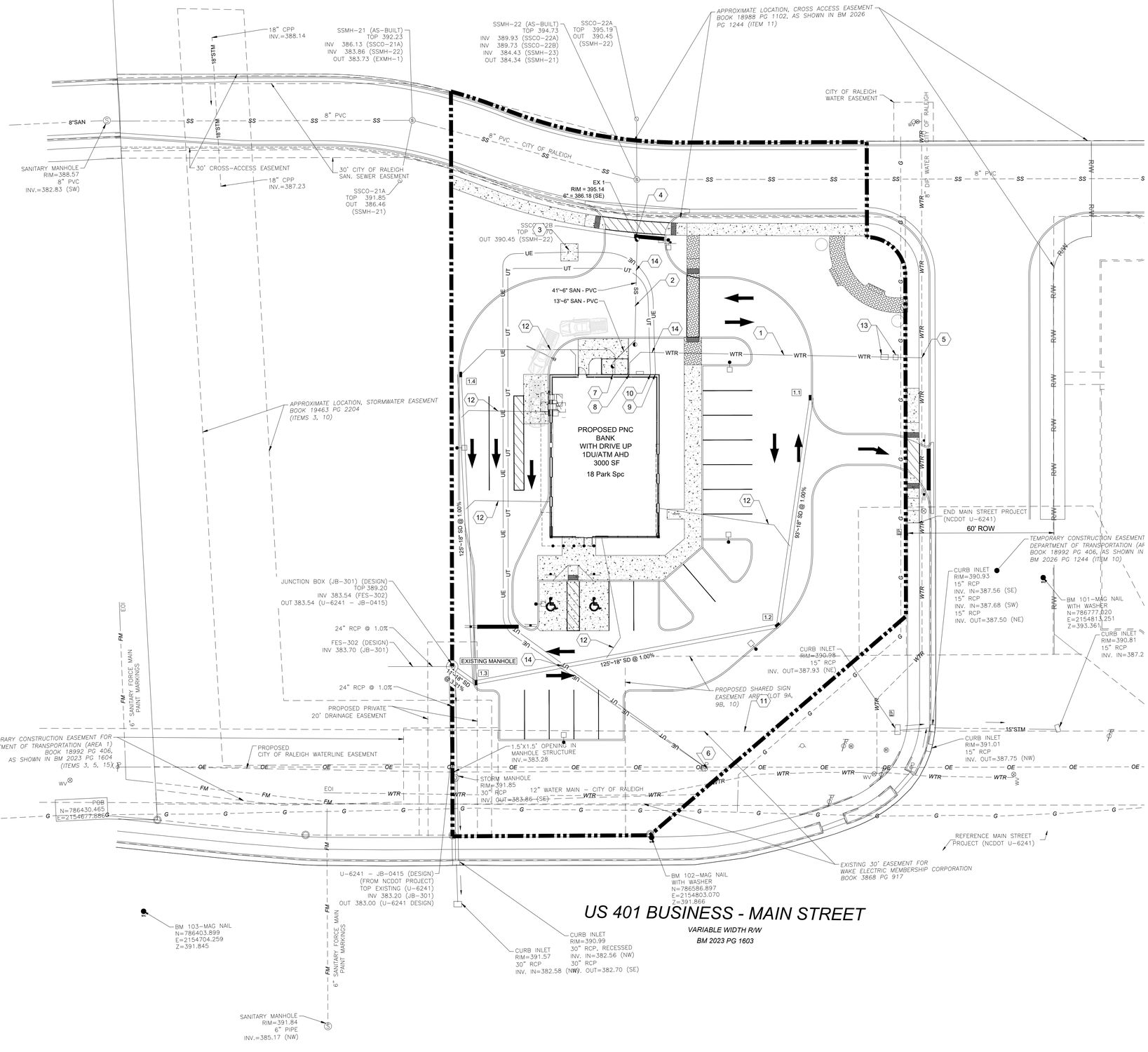
SHEET ID:
C304

PROJECT STATUS:
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UTILITY LEGEND

1.1	PROPOSED STORM STRUCTURE ID
2.1	PROPOSED SANITARY SEWER STRUCTURE ID
	PROPOSED CLEANOUT

KEYNOTES (X)

1. 1-1/2" COPPER K DOMESTIC WATER SERVICE LINE.
2. 6" SANITARY SEWER LINE AT 0.50% MINIMUM SLOPE.
3. PROPOSED TRANSFORMER. CONTRACTOR TO COORDINATE WITH ELECTRIC COMPANY.
4. CONNECT TO FUTURE SANITARY SEWER. CONTRACTOR TO VERIFY LOCATION AND ELEVATION.
5. CONTRACTOR TO CONNECT TO FUTURE WATER SERVICE LINE PER AGENCY REQUIREMENTS.
6. CONTRACTOR TO CONNECT ELECTRICAL AND TELECOMMUNICATION SERVICE TO EXISTING POWER POLE.
7. SANITARY SEWER SERVICE BUILDING CONNECTION. SEE PLUMBING PLANS FOR DETAILS.
8. WATER SERVICE BUILDING CONNECTION. SEE PLUMBING PLANS FOR DETAILS.
9. ELECTRICAL SERVICE BUILDING CONNECTION. SEE ELECTRICAL PLANS FOR DETAILS.
10. COMMUNICATIONS LINE BUILDING CONNECTION. SEE ELECTRICAL PLANS FOR DETAILS.
11. EXISTING 30' EASEMENT TO WAKE ELECTRIC MEMBERSHIP CORP.
12. BUILDING/DOWNSPOUT CONNECTION. SEE ARCHITECTURAL PLANS FOR DETAILS.
13. WATER SERVICE VALVE AND METER BOX. SEE SHEET C803 FOR DETAILS.
14. MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES. (1)

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PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH
PROJECT NUMBER:	10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

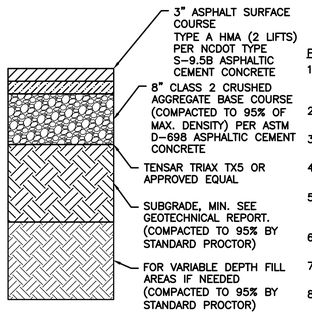
SHEET TITLE:
UTILITY PLAN

SHEET ID:
C401

PROJECT STATUS:
100% DESIGN DOCUMENTS

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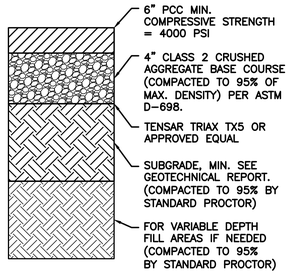
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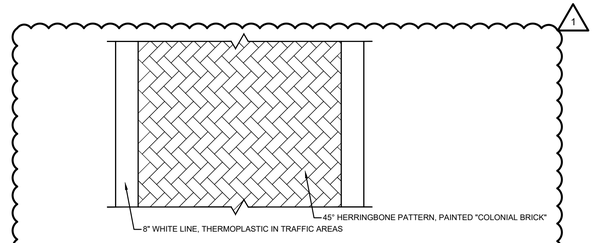
PAVEMENT SECTION CONSTRUCTION NOTES:

1. COORDINATE WITH GEOTECHNICAL REPORT FOR PAVEMENT SECTION, DENSIFICATION, SUBGRADE PREPARATION, AND ENGINEERED FILL PLACEMENT RECOMMENDATIONS. SHOULD A CONFLICT EXIST, NOTIFY ENGINEER PRIOR TO CONSTRUCTION.
2. UNDERCUT ANY UNSUITABLE MATERIAL UP TO 24" AS REQUIRED AND REPLACE WITH SELECT MATERIAL AS DETERMINED BY LICENSED GEOTECHNICAL ENGINEER.
3. NO BASE COURSE SHALL BE PLACED ON MULCH, PINE CLAY, ORGANIC MATTER OR OTHER UNSUITABLE MATERIAL.
4. WHEN CURBING IS NOT SPECIFIED, BASE COURSE SHALL EXTEND A MINIMUM OF 12" BEYOND EDGE OF ASPHALT.
5. THE PAVEMENT DESIGN SHOWN REPRESENTS THE MINIMUM THICKNESS OF SURFACE AND BASE COURSE TO BE USED. SUBGRADE SOILS TESTS MAY DETERMINE HEAVIER PAVEMENT DESIGNS ARE REQUIRED.
6. ALL MATERIALS SHALL MEET THE REQUIREMENTS SET FORTH IN THE LATEST DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS.
7. CONTRACTOR SHALL NOTIFY ENGINEER IF SATURATED SUBGRADE IS ENCOUNTERED DURING CONSTRUCTION AS ADDITIONAL DRAINAGE MEASURES MAY BE REQUIRED.
8. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.

LIGHT DUTY ASPHALT PAVEMENT SECTION
N.T.S.

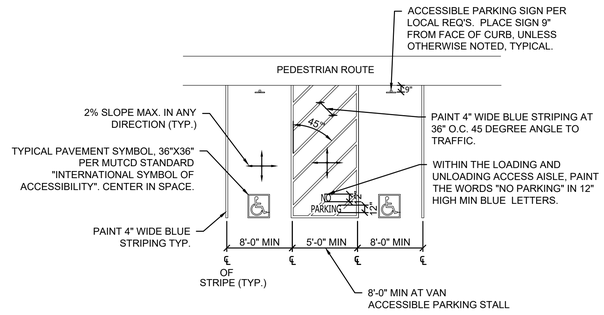


CONCRETE PAVEMENT
N.T.S.



NOTES:
1.) CONTROL JOINTS 5'-0" O.C. MAX.
2.) EXPANSION JOINTS 20'-0" O.C. MAX.
3.) USE CONCRETE PAVEMENT DETAIL (THIS SHEET) IN AREAS OF VEHICULAR USE.

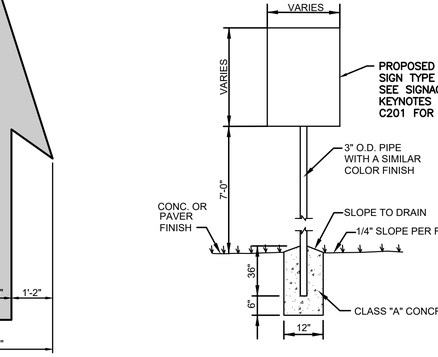
STAMPED CONCRETE CROSSWALK DETAIL
N.T.S.



NOTES:

1. THE INFORMATION AND DIMENSIONS PROVIDED ON THE SITE PLAN SHALL APPLY UNLESS OTHERWISE NOTED.
2. VAN ACCESSIBLE SPACES SHALL BE 16' WIDE (SPACE AND ACCESS AISLE). VAN ACCESSIBLE SPACE CAN BE 11' MIN PARKING SPACE WITH 5' ACCESS AISLE OR 8' MIN PARKING SPACE WITH AN 8' MIN ACCESS AISLE.

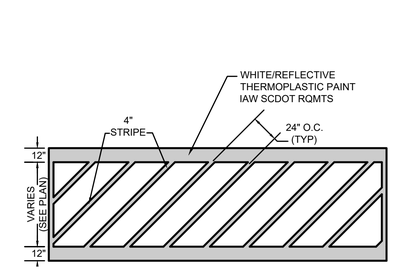
ACCESSIBLE PARKING STALLS
N.T.S.



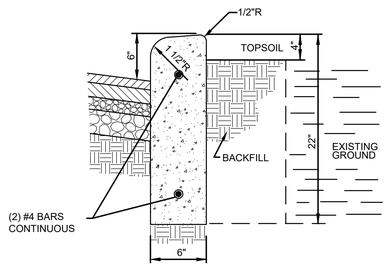
NOTES:

1. BOLLARD NOT REQUIRED IF ACCESSIBLE SIGNAGE IS LOCATED IN GRASS AND OVER THREE (3) FEET BEYOND THE BACK OF CURB.
2. FOR NON-VAN ACCESSIBLE PARKING SIGNAGE, ALIGN TOP OF THE SIGN WITH VAN ACCESSIBLE PARKING.
3. SIGNS LOCATED WITHIN A CIRCULATION PATH SHALL BE A MINIMUM OF 80 INCHES ABOVE THE FINISH FLOOR OR GROUND SURFACE MEASURED TO THE BOTTOM OF THE SIGN.

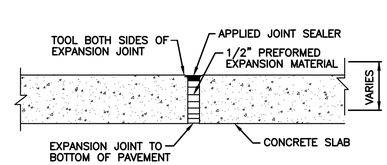
ADA PARKING SIGN
N.T.S.



PEDESTRIAN CROSSWALK
N.T.S.

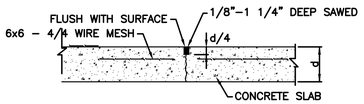


6" CONCRETE CURB
N.T.S.



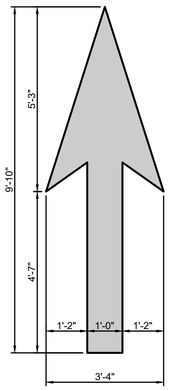
NOTE:
FOR LANDSIDE AND SIDEWALK APPLICATIONS ONLY. SEE SHEET C-518 AIRFIELD PAVING JOINTS.

EXPANSION JOINT
N.T.S.



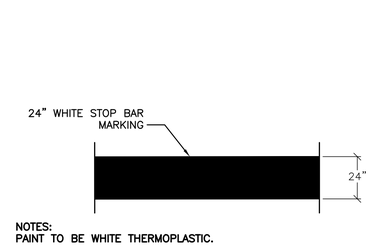
CONTROL JOINT
N.T.S.

NOTES:
1.) CONTRACTION JOINTS SHALL BE PLACED EVERY 20' MAX. TO A DEPTH OF 1 1/2".
2.) FULL DEPTH SEPARATORS ARE NOT PERMITTED EXCEPT AT EXPANSION JOINTS.
3.) EXPANSION JOINTS TO BE PLACED @ 100' MAXIMUM.



TRAFFIC ONE-WAY ARROW
N.T.S.
NOTE: ALL ARROWS TO BE PAINTED REFLECTIVE THERMOPLASTIC WHITE

SIGNAGE DETAIL
N.T.S.



NOTES:
PAINT TO BE WHITE THERMOPLASTIC.

ROADWAY STOP BAR MARKING
N.T.S.

Know what's **below.** **Call** before you dig.

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North Carolina License Nos. 50073 * F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

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SDP-26-0003

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ROLESVILLE, NC 27571

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SHEET TITLE:
DETAILS

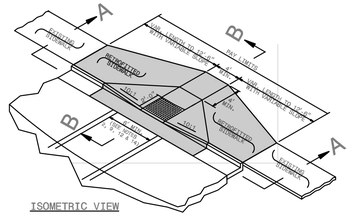
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PROJECT STATUS:
100% DESIGN DOCUMENTS

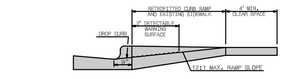
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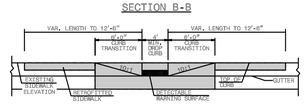
V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 10



ISOMETRIC VIEW



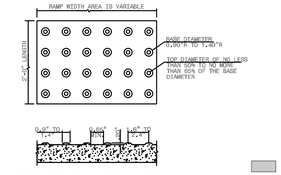
SECTION B-B



SECTION A-A

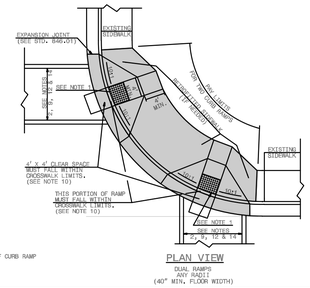
NOTES:
DETECTABLE WARNING SURFACE SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.

DETECTABLE WARNING SURFACE SHALL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING SURFACE

PAY LIMITS OF CURB RAMP



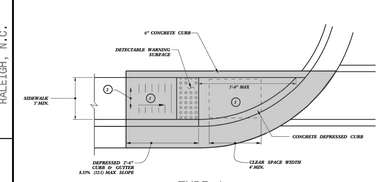
PLAN VIEW

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

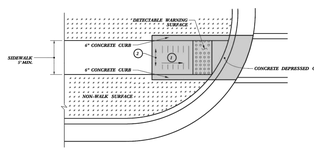
1-24

ROADWAY STANDARD DRAWING FOR
CURB RAMP
CURB RAMP AND EXISTING SIDEWALK ADJACENT TO CURB

SHEET 3 OF 13
848.06



TYPE 1

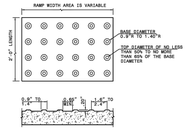


TYPE 1 MODIFIED

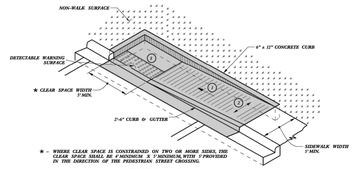
1. 4.0% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.0%
3. MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.0%.

NOTES:
DETECTABLE WARNING SURFACE SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.

DETECTABLE WARNING SURFACE SHALL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING SURFACE



★ - WHERE CLEAR SPACE IS CONSTRAINED ON TWO OR MORE SIDES, THE CLEAR SPACE SHALL BE 4'-0"MINIMUM, 5'-0"PREFERRED, WITH 5'PROVIDED IN THE DIRECTION OF THE PEDESTRIAN STREET CROSSING.

TYPE 1A

PAY LIMITS FOR 1 CURB RAMP

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CURB RAMP
DIRECTIONAL RAMP

SHEET 4 OF 13
848.06

NOTES:

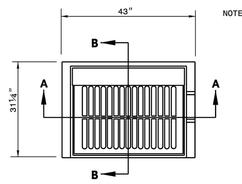
1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4'x4' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' FROM THE BACK OF PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT CLEAR SPACES FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT CLEAR SPACES FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. IF CONSTRAINED ON TWO OR MORE SIDES, THE THE CLEAR SPACE SHALL BE 4' MINIMUM X 5' MINIMUM, WITH 5' PROVIDED IN THE DIRECTION OF THE PEDESTRIAN STREET CROSSING.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGH THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5'X5' CLEAR SPACE AT THE TOP OF RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP, WHERE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE, OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01.
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. DETECTABLE WARNING SURFACES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
19. DETECTABLE WARNING SURFACES WILL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CURB RAMP
NOTES

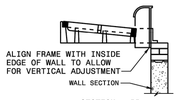
SHEET 2 OF 13
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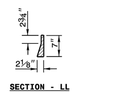
PLAN

FRAME,GRATE, & HOOD ASS'Y

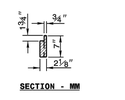
NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.



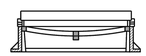
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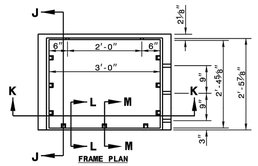
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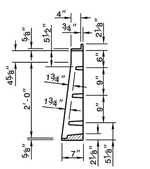


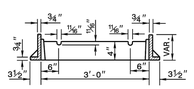
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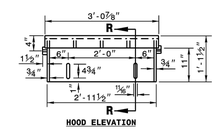
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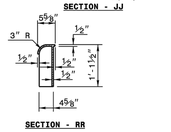






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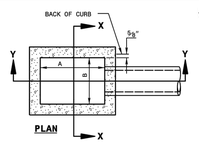


STATE OF NORTH CAROLINA
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RALEIGH, N.C.

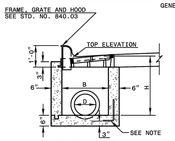
1-24

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 1 OF 2
840.03



PLAN



SECTION X-X

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

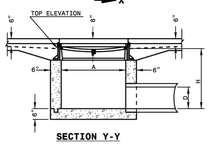
FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

MAXIMUM DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 16'-0". STD. NO. 840.45 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.

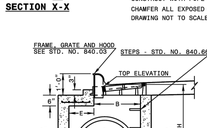
CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

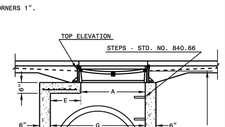


SECTION Y-Y



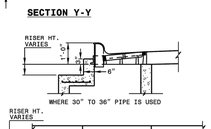
SECTION J-J

WHERE 30" TO 36" PIPE IS USED

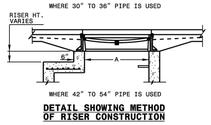


SECTION M-M

WHERE 42" TO 54" PIPE IS USED

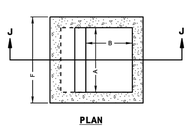


WHERE 30" TO 36" PIPE IS USED

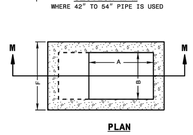


WHERE 42" TO 54" PIPE IS USED

DETAIL SHOWING METHOD OF RISER CONSTRUCTION



PLAN



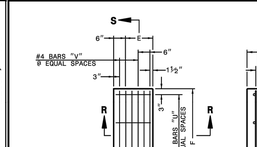
PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

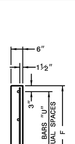
1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

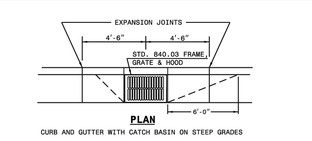
SHEET 1 OF 2
840.02



PLAN OF TOP SLAB

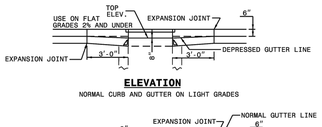


SECTION S-S



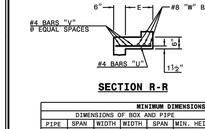
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES

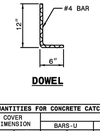


ELEVATION

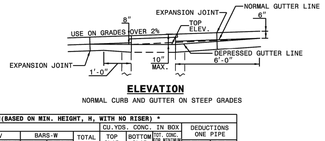
NORMAL CURB AND GUTTER ON LIGHT GRADES



SECTION R-R



DOWEL



ELEVATION

NORMAL CURB AND GUTTER ON STEEP GRADES

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

DIMENSIONS OF BOX AND PIPE							COVER DIMENSION		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT				NO.	LENGTH	NO.	LENGTH	NO.	LENGTH		TOP SLAB	BOTTOM SLAB	CU. CONC. IN BOTTOM SLAB	C.M.	R.C.
D	A	B	C	G	H		E	F												
12"	3'-0"	2'-2"	--	--	2'-9"		--	--	--	--	--	--	--	--	--	--	0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			3'-0"												0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			3'-3"												0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"												0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"		1'-2"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.123	0.321	1.433	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"		1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-5"	5'-3"		1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.738	0.180	0.243
48"	3'-0"	2'-2"		5'-0"	5'-9"		2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"		2'-7"	3'-2"	4	2'-10"	5	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401

* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 2 OF 2
840.02

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F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
DETAILS

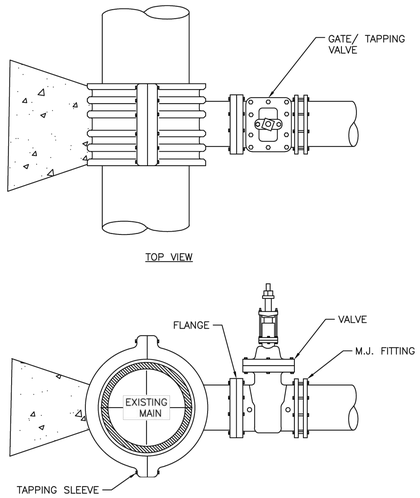
SHEET ID:
C802

PROJECT STATUS:
100% DESIGN DOCUMENTS

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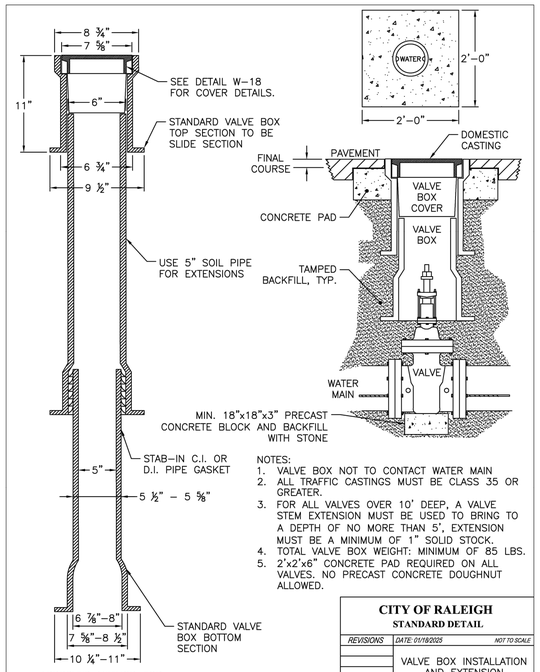
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NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE DETAIL W-10 & W-11 (REACTION BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
3. 3,000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.
4. FULL CIRCUMFERENCE SLEEVE, STAINLESS STEEL MATERIAL REQUIRED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	4"–24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY	
	W-14	

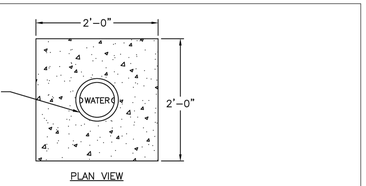


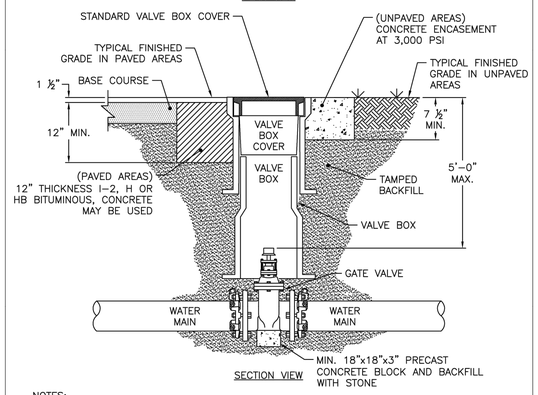
APPROVED METHOD FOR EXTENSION OF VALVE BOX

NOTES:
1. VALVE BOX NOT TO CONTACT WATER MAIN
2. ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
3. FOR ALL VALVES OVER 10' DEEP, A VALVE STEM EXTENSION MUST BE USED TO BRING TO A DEPTH OF NO MORE THAN 5', EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK.
4. TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.
5. 2'x2'x6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	VALVE BOX INSTALLATION AND EXTENSION	
	W-17	

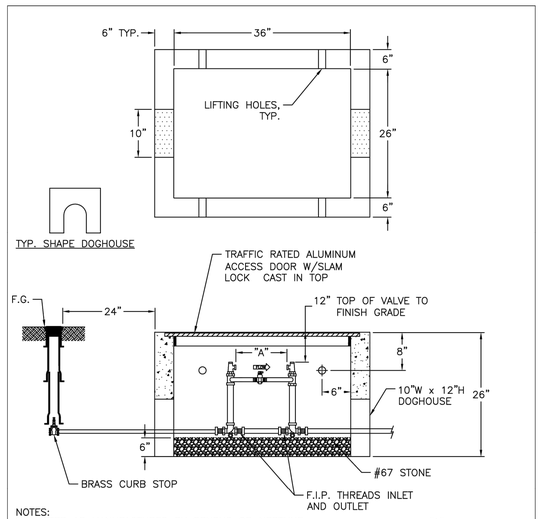




NOTES:
1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. VALVE OPERATING NUT MUST BE EXTENDED SO THAT THE DEPTH IS NO GREATER THAN 5' FROM THE SURFACE USING A MANUFACTURER APPROVED EXTENSION KIT.
3. PRECAST CONCRETE ENCASEMENT IS ALLOWED OUTSIDE OF PAVED AREAS.
4. VALVE BOX SHOULD NOT CONTACT MAIN OR VALVE.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	VALVE AND BOX INSTALLATION	
	W-17A	



NOTES:
1. METER AS MANUFACTURED BY SENSUS OR NEPTUNE. METER TO BE PROVIDED BY RALEIGH WATER.
2. BACKFILL TAMPED IN 6" LIFTS.
3. REINFORCEMENT: #4 @ 6" O.C.E.W.
4. CONCRETE: 4,000 PSI @ 28 DAYS.
5. ALL RPZ BACKFLOW PREVENTION DEVICES MUST BE INSTALLED PRIOR TO METER BEING SET.
6. ALL COPPER SETTERS ARE TO HAVE A BALL TYPE SHUT OFF VALVE ON BOTH SIDES OF COPPER SETTER WITH HIGH RISE BYPASS THAT IS MANUFACTURED BY FORD, MUELLER, OR AY McDONALD (NO EXCEPTIONS).
7. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

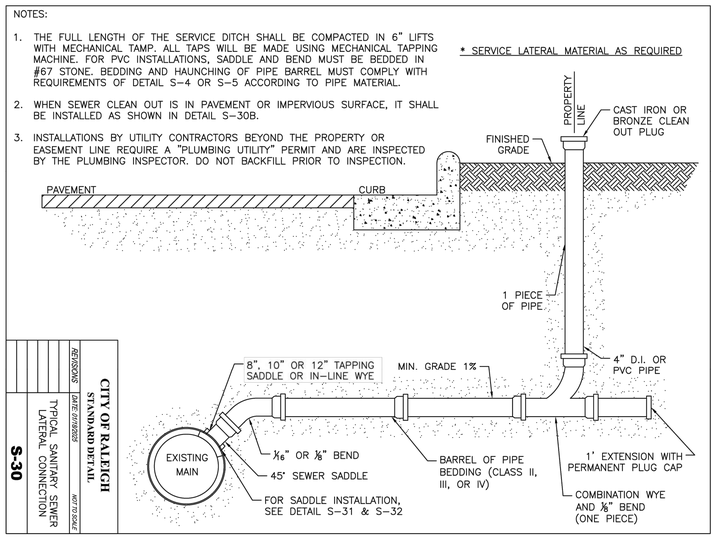
"A"	
1 ½" METER	13 ¼"
2" METER	17 ¼"

** TRAFFIC RATED VAULT WALL THICKNESS

CITY OF RALEIGH
STANDARD DETAIL

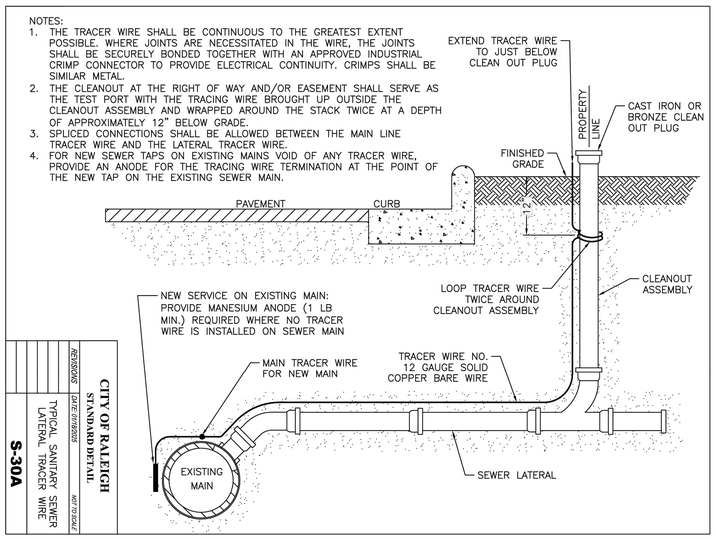
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	TYPICAL 1 ½"–2" WATER METER BOX INSTALLATION	
	W-31	

NOTES:
1. THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6" LIFTS WITH MECHANICAL TAMP. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING MACHINE. FOR PVC INSTALLATIONS, SADDLE AND BEND MUST BE BEDDED IN #67 STONE. BEDDING AND HAUNCHING OF PIPE BARREL MUST COMPLY WITH REQUIREMENTS OF DETAIL S-4 OR S-5 ACCORDING TO PIPE MATERIAL.
2. WHEN SEWER CLEAN OUT IS IN PAVEMENT OR IMPERVIOUS SURFACE, IT SHALL BE INSTALLED AS SHOWN IN DETAIL S-30B.
3. INSTALLATIONS BY UTILITY CONTRACTORS BEYOND THE PROPERTY OR EASEMENT LINE REQUIRE A "PLUMBING UTILITY" PERMIT AND ARE INSPECTED BY THE PLUMBING INSPECTOR. DO NOT BACKFILL PRIOR TO INSPECTION.



CITY OF RALEIGH
STANDARD DETAIL
REVISIONS | DATE: 01/18/2025 | NOT TO SCALE
TYPICAL SANITARY SEWER LATERAL CONNECTION
S-30

NOTES:
1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. WHERE JOINTS ARE NECESSITATED IN THE WIRE, THE JOINTS SHALL BE SECURELY BONDED TOGETHER WITH AN APPROVED INDUSTRIAL CRIMP CONNECTOR TO PROVIDE ELECTRICAL CONTINUITY. CRIMPS SHALL BE SIMILAR METAL.
2. THE CLEANOUT AT THE RIGHT OF WAY AND/OR EASEMENT SHALL SERVE AS THE TEST PORT WITH THE TRACING WIRE BROUGHT UP OUTSIDE THE CLEANOUT ASSEMBLY AND WRAPPED AROUND THE STACK TWICE AT A DEPTH OF APPROXIMATELY 12" BELOW GRADE.
3. SPLICED CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN LINE TRACER WIRE AND THE LATERAL TRACER WIRE.
4. FOR NEW SEWER TAPS ON EXISTING MAINS VOID OF ANY TRACER WIRE, PROVIDE AN ANODE FOR THE TRACING WIRE TERMINATION AT THE POINT OF THE NEW TAP ON THE EXISTING SEWER MAIN.



CITY OF RALEIGH
STANDARD DETAIL
REVISIONS | DATE: 01/18/2025 | NOT TO SCALE
TYPICAL SANITARY SEWER LATERAL TRACER WIRE
S-30A

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH
PROJECT NUMBER:	**10020503.29**

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
DETAILS

SHEET ID:
C803

PROJECT STATUS:
100% DESIGN DOCUMENTS

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PNC BANK
800 S. MAIN ST. ROLESVILLE, NC 27571

SITE DEVELOPMENT PLAN

SDP-26-0003, PU-032343-2026, SWF-175396-2026, SEC-175450-2026

APRIL 30TH, 2026

PROJECT TEAM

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919.554.6517

DEVELOPER/OWNER
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AUSTIN WILLIAMS
AWILLIAMS@CSERE.COM
704.621.6430

TENANT CONTACT
PNC BANK
THOMAS OLSEN
THOMAS.OLSEN@PNC.COM
919.788.5773

SITE INFO:

TOWNSHIP: WAKE FOREST
COUNTY: WAKE COUNTY
STATE: NORTH CAROLINA

TOTAL PROJECT AREA: 1.09 ACRES

PARCEL ID: 1758465891

ZONING CLASSIFICATION: GC-CZ; GENERAL COMMERCIAL, CONDITIONAL ZONING DISTRICT
LAND USE: BANKS/CREDIT UNIONS, FINANCIAL SERVICES (INCLUDING DRIVE-THROUGH)

DISTURBED AREA: 0.77 ACRES

LEGAL DESCRIPTION: LO9B WALLBROOK PARIS TR SUB BM2026-01244

WATERSHED: UPPER NEUSE

RIVER BASIN: NEUSE

CURRENT USE (EXISTING): VACANT LOT

CURRENT IMPERVIOUS (EXISTING): 0.11 ACRES

PROPOSED IMPERVIOUS: 0.55 ACRES

MAXIMUM IMPERVIOUS AREA: 85%

MINIMUM FRONT BUILDING SETBACK (S. MAIN): 20 FEET
MINIMUM SIDE BUILDING SETBACK: 15 FEET
MINIMUM REAR BUILDING SETBACK: 35 FEET
MINIMUM CORNER BUILDING SETBACK (VIRGINIA WATER DR): 25 FEET

MINIMUM LOT WIDTH: 100 FEET

PARKING DATA: SEE SHEET C-201 FOR DETAILS

MINIMUM MAIN STREET LANDSCAPE BUFFER: 30 FEET
MINIMUM REAR LANDSCAPE BUFFER: 25 FEET
MINIMUM INTERIOR LOT LANDSCAPE BUFFER: 0 FEET

TREE COVERAGE DATA: SITE TO BE CLEARED AND GRUBBED

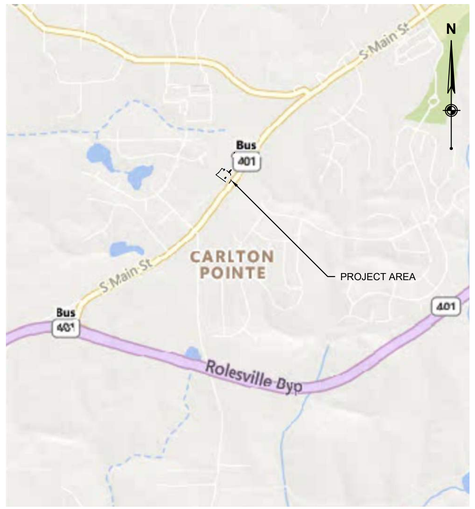
BUILDING HEIGHT: MAXIMUM 35 FEET, PROVIDED 18 FEET

BUILDING SQUARE FOOTAGE: 3000 SF

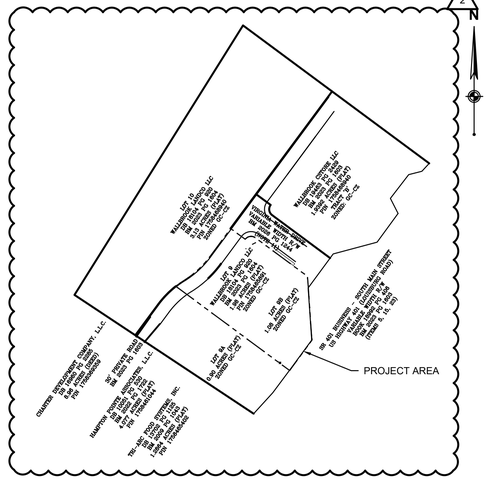
FEMA NOTE: ZONE X, 3720175800K, EFF. 7/19/2022

FLOODPLAIN: N/A

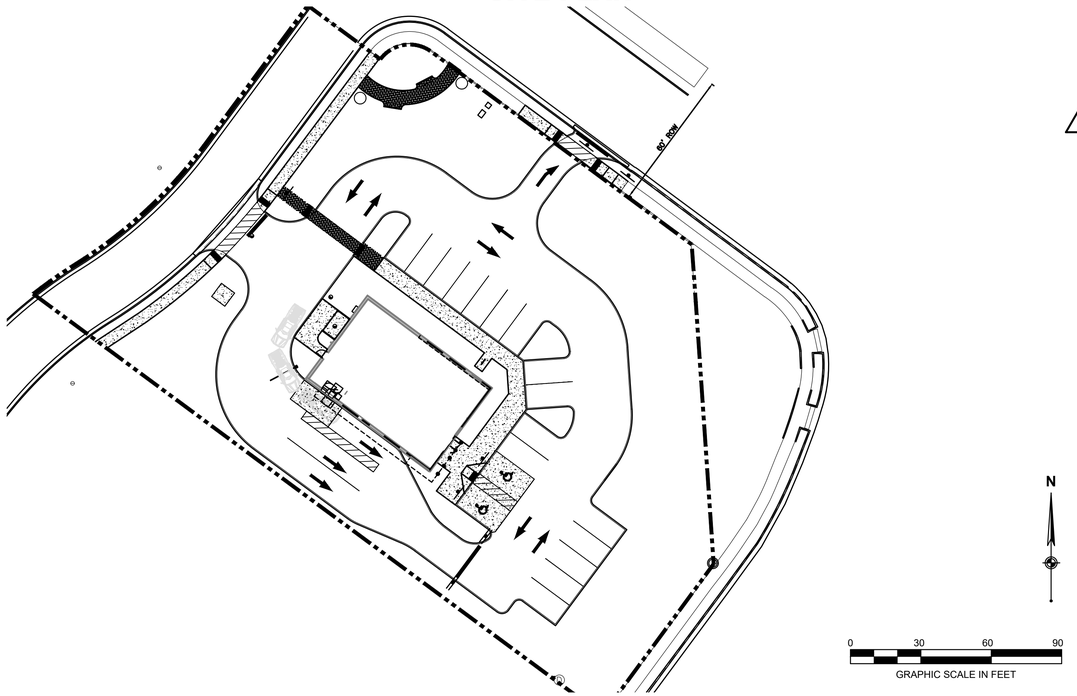
VICINITY MAP



DEVELOPMENT MAP



SITE PLAN



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6	C302	EROSION CONTROL PLAN	07/31/2026
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15	IR-1	IRRIGATION PLAN	07/01/2026
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19	E603	ELECTRICAL COMCHECK	07/01/2026
20	AS101	ARCHITECTURAL SITE PLAN	07/01/2026
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24	A311	WALL SECTIONS	07/01/2026
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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD

7/30/2026

SHEET TITLE:
COVER SHEET

SHEET ID:
C000

PROJECT STATUS:
100% DESIGN DOCUMENTS

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V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 1

GENERAL NOTES

1. EXISTING CONDITIONS AS DEPICTED ON THESE PLANS ARE GENERAL AND ILLUSTRATIVE IN NATURE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE SITE AND BE FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING ON THIS PROJECT. IF CONDITIONS ENCOUNTERED DURING EXAMINATION ARE SIGNIFICANTLY DIFFERENT FROM THOSE SHOWN, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER/CONSTRUCTION MANAGER IMMEDIATELY.
2. EXISTING SITE INFORMATION AND TOPOGRAPHIC SURVEY WAS PREPARED BY WOOLPERT, DATED JANUARY, 2026 AND FUTURE SITE INFORMATION FROM ARK CONSULTING GROUP. ANY SITE CHANGES/MODIFICATIONS MADE AFTER THIS SURVEY ARE NOT REFLECTED IN THESE PLANS. CONTRACTOR TO NOTIFY WOOLPERT, INC. OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION. ITEMS INDICATED AS PER RECORDS AND OUTSIDE THE SURVEY LIMITS ARE BASED ON VARIOUS RECORD DRAWINGS PROVIDED BY THE OWNER, WOOLPERT IS NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN.
3. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES (INCLUDING THOSE LABELED PER RECORDS) PRIOR TO THE BEGINNING OF CONSTRUCTION OR EARTH MOVING OPERATIONS. INFORM ARCHITECT/ENGINEER/CONSTRUCTION MANAGER OF ANY CONFLICTS DETRIMENTAL TO THE DESIGN INTENT.
4. PRIOR TO COMMENCEMENT OF DIGGING, CONTRACTOR SHALL NOTIFY THE FOLLOWING AGENCIES: THE NORTH CAROLINA UTILITY PROTECTION SERVICES 811, AND ALL OTHER AGENCIES THAT MAY HAVE UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS AND ARE NON-MEMBERS OF NORTH CAROLINA UNDERGROUND PROTECTION SERVICES.
5. THE CONTRACTOR AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR COMPLYING WITH APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SUBCONTRACTORS TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK. FOR ACCESSIBILITY ITEMS AND REFERENCES TO THE AMERICAN WITH DISABILITIES ACT, THE APPLICABLE ACCESSIBILITY CODE FOR THIS PROJECT IS THE 2021 IBC AND THE ICC A117.1-2017 BY REFERENCE.
6. THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND OWNER'S REPRESENTATIVE FOR ANY AND ALL INJURIES AND/OR DAMAGES TO PERSONNEL, EQUIPMENT AND/OR EXISTING FACILITIES OCCURRING IN THE COURSE OF THE DEMOLITION AND CONSTRUCTION DESCRIBED IN THE PLANS AND SPECIFICATIONS.
7. CONTRACTOR SHALL OBTAIN A PERMIT FOR ALL CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH LOCAL, STATE, & FEDERAL REGULATIONS.
8. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL CODES, OBTAIN ALL APPLICABLE PERMITS, AND PAY ALL REQUIRED FEES PRIOR TO COMMENCING WORK.
9. ANY WORK PERFORMED IN WAKE COUNTY RIGHT OF WAYS SHALL BE IN ACCORDANCE WITH THE APPLICABLE WAKE COUNTY REQUIREMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE NECESSARY PERMITS FOR THE WORK, SCHEDULE NECESSARY INSPECTIONS, AND PROVIDE THE NECESSARY TRAFFIC CONTROL MEASURES AND DEVICES, ETC., FOR WORK PERFORMED IN THE RIGHT OF WAYS.
10. THE CONTRACTOR IS TO PERFORM ALL INSPECTIONS AS REQUIRED BY THE NORTH CAROLINA ENVIRONMENTAL PROTECTION AGENCY FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND FURNISH OWNER'S REPRESENTATIVE WITH WRITTEN REPORTS. OWNER WILL OBTAIN NPDES PERMIT.
11. CONTRACTOR SHALL IMPLEMENT ALL SOIL AND EROSION CONTROL PRACTICES REQUIRED BY THE TOWN OF ROLESVILLE AND THE NORTH CAROLINA EPA.
12. ALL GROUND SURFACE AREAS THAT HAVE BEEN EXPOSED OR LEFT BARE AS A RESULT OF CONSTRUCTION AND ARE TO FINAL GRADE AND ARE TO REMAIN SO, SHALL BE SEEDED AND MULCHED AS SOON AS PRACTICAL IN ACCORDANCE WITH SPECIFICATIONS.
13. ITEM NUMBERS REFER TO THE NORTH CAROLINA CONSTRUCTION AND MATERIAL SPECIFICATIONS, AND ALL CONSTRUCTION WORK SHALL BE DONE ACCORDING TO SAID SPECIFICATIONS AND IN ACCORDANCE WITH APPLICABLE STANDARDS OF THE TOWN OF ROLESVILLE WHEN IN CONFLICT, THE COUNTY REQUIREMENTS SHALL PREVAIL.
14. ALL WORK PERFORMED BY THE CONTRACTOR SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
15. THE CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS CONSTRUCTION SET FOR OTHER PERTINENT INFORMATION. IT IS NOT THE ENGINEER'S INTENT THAT ANY SINGLE PLAN SHEET IN THIS SET OF DOCUMENTS FULLY DEPICT ALL WORK ASSOCIATED WITH THE PROJECT.
16. BEFORE INSTALLATION OF STORM SEWER, SANITARY SEWER, ELECTRICAL CONDUIT, WATERLINE OR ANY OTHER UTILITY, THE CONTRACTOR SHALL VERIFY ALL CROSSINGS, BY EXCAVATION WHERE NECESSARY, AND INFORM THE OWNER AND THE ARCHITECT/ENGINEER/CONSTRUCTION MANAGER OF ANY CONFLICTS. THE DESIGN ENGINEER SHALL BE HELD HARMLESS IF NOT NOTIFIED OF DESIGN CONFLICTS PRIOR TO CONSTRUCTION.
17. ADJUST OR RECONSTRUCT ALL EXISTING CASTINGS, CLEANOUTS, ETC. WITHIN PROJECT AREA TO MEET PROPOSED GRADE AS REQUIRED.
18. CONTRACTOR TO REMOVE & REPLACE PAVEMENT AS SPECIFIED.
19. THE CONTRACTOR SHALL CHECK EXISTING GRADES, DIMENSIONS, AND INVERTS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE PRIOR TO BEGINNING WORK.
20. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES. TAKE CARE TO PROTECT UTILITIES THAT ARE TO REMAIN. RELOCATE EXISTING UTILITIES AS INDICATED, OR AS NECESSARY FOR CONSTRUCTION.
21. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
22. PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING PAVEMENT AND NEW PAVEMENT. FIELD ADJUSTMENT OF FINAL GRADES MAY BE NECESSARY. INSTALL ALL UTILITIES PRIOR TO INSTALLATION OF PAVED SURFACES.
23. SITE WORK CONCRETE WALKS AND PADS SHALL HAVE A BROOM FINISH TO ALL SURFACES. SITE WORK CONCRETE SHALL BE CLASS B (4000 PSI @ 28 DAYS) UNLESS OTHERWISE NOTED.
24. ALL DAMAGE TO EXISTING PAVEMENT, SIDEWALK, CURB, LANDSCAPING, UTILITIES, AND ANY OTHER ITEMS TO REMAIN, WHICH RESULTS FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED WITH LIKE MATERIALS AT THE CONTRACTOR'S EXPENSE.
25. SITE DIMENSIONS SHOWN ARE TO THE FACE OF CURB, BUILDING, WALL, EDGE OF PAVEMENT, OR COLUMN LINE UNLESS OTHERWISE NOTED.
26. COORDINATES ARE FOR BUILDING COLUMNS, EXTERIOR BUILDING WALLS, CENTERS OF DRIVEWAYS, CENTER OF SANITARY SEWER MANHOLES, AND CENTER OF STRUCTURES PLACED SIX INCHES INSIDE FACE OF CURB FOR DRAIN INLETS, UNLESS OTHERWISE NOTED.
27. CONTRACTOR SHALL MAINTAIN ONE SET OF AS-BUILT/RECORD DRAWINGS ON-SITE DURING CONSTRUCTION FOR DISTRIBUTION TO THE OWNER AND/OR OWNER'S REPRESENTATIVE UPON COMPLETION.
28. REFER TO THE ARCHITECTURAL, PLUMBING & ELECTRICAL DRAWINGS FOR EXACT DIMENSIONS AND LOCATIONS OF UTILITY SERVICE ENTRY LOCATIONS AND PRECISE BUILDING DIMENSIONS.
29. THIS SITE LAYOUT IS SPECIFIC TO THE APPROVALS NECESSARY FOR THE CONSTRUCTION IN ACCORDANCE WITH THE TOWN OF ROLESVILLE. NO CHANGES TO THE SITE LAYOUT ARE ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. CHANGES MADE TO THE SITE LAYOUT WITHOUT APPROVAL ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR. CHANGES INCLUDE BUT ARE NOT LIMITED TO, INCREASED IMPERVIOUS PAVEMENT, ADDITION/DELETION OF PARKING SPACES, MOVEMENT OF CURB LINES, CHANGES TO DRAINAGE STRUCTURES AND PATTERNS, LANDSCAPING, ETC.
30. SITE SIGNAGE AND STRIPING SHALL BE IN ACCORDANCE WITH THE NORTH CAROLINA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

DEMOLITION NOTES

1. ALL EXISTING ABOVE AND BELOW GROUND STRUCTURES WITHIN THE LIMITS OF CONSTRUCTION SHALL BE REMOVED UNLESS OTHERWISE SPECIFIED WITHIN THIS CONSTRUCTION SET AND/OR PROJECT MANUAL. THIS INCLUDES WALLS AND FOOTINGS. CAVITIES LEFT BY STRUCTURE REMOVAL SHALL BE BACKFILLED WITH SATISFACTORY MATERIALS AND COMPACTED TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATION.
2. NO TREES SHALL BE REMOVED, NOR VEGETATION DISTURBED BEYOND THE LIMITS OF CONSTRUCTION WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
3. TREE PROTECTION FENCING SHALL BE IN ACCORDANCE WITH THE TOWN OF ROLESVILLE STANDARDS - OR - IN ACCORDANCE WITH THE DETAILED DRAWINGS. DO NOT OPERATE OR STORE EQUIPMENT, NOR HANDLE OR STORE MATERIALS WITHIN THE DRIP LINES OF THE TREES SHOWN TO REMAIN.
4. PROTECTION OF EXISTING TREES AND VEGETATION: PROTECT EXISTING TREES AND OTHER VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIALS OR EXCAVATED MATERIALS WITHIN DRIP LINE, EXCESS FOOT OR VEHICULAR TRAFFIC, OR PARKING OF VEHICLES WITHIN DRIP LINE. PROVIDE TEMPORARY GUARDS TO PROTECT TREES AND VEGETATION TO BE LEFT STANDING.
5. ALL DEMOLITION WASTE AND CONSTRUCTION DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED. ALL DEBRIS SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OF OFFSITE IN A STATE APPROVED WASTE SITE AND IN ACCORDANCE WITH ALL LOCAL AND STATE CODES AND PERMIT REQUIREMENTS. TAKE CARE TO PROTECT UTILITIES THAT ARE TO REMAIN. REPAIR DAMAGE ACCORDING TO THE APPROPRIATE UTILITY COMPANY STANDARDS AND AT THE CONTRACTOR'S EXPENSE.
6. ALL UTILITY DISCONNECTION, REMOVAL, RELOCATION, CUTTING, CAPPING AND/OR ABANDONMENT SHALL BE COORDINATED WITH THE APPROPRIATE UTILITY COMPANY OR AGENCY. LOCAL UTILITY CONTACTS ARE PROVIDED ON THIS SHEET.
7. THE BURNING OF CLEARED MATERIAL AND DEBRIS SHALL NOT BE ALLOWED UNLESS CONTRACTOR OBTAINS PRIOR LEGAL WRITTEN AUTHORIZATION FROM THE LOCAL AUTHORITIES.
8. EROSION & SEDIMENT CONTROL MEASURES AROUND AREAS OF DEMOLITION SHALL BE PROPERLY INSTALLED AND FUNCTIONING PROPERLY PRIOR TO INITIALIZATION OF DEMOLITION ACTIVITIES.
9. ASBESTOS OR HAZARDOUS MATERIAL ARE NOT EXPECTED. IF FOUND ON SITE, SUCH MATERIALS SHALL BE REMOVED BY A LICENSED HAZARDOUS MATERIALS CONTRACTOR. CONTRACTOR SHALL NOTIFY OWNER IMMEDIATELY IF HAZARDOUS MATERIALS ARE ENCOUNTERED.
10. CONTRACTOR SHALL ADHERE TO ALL LOCAL, STATE, FEDERAL AND OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS DURING ALL DEMOLITION AND CONSTRUCTION ACTIVITIES.
11. CONTRACTOR SHALL PROTECT ALL CORNER PINS, MONUMENTS, PROPERTY CORNERS AND BENCHMARKS DURING DEMOLITION ACTIVITIES. IF DISTURBED, CONTRACTOR SHALL HAVE DISTURBED ITEMS RESET BY A LICENSED SURVEYOR AT NO ADDITIONAL COST TO THE OWNER.
12. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES, STRUCTURES, AND FEATURES TO REMAIN. ANY ITEMS TO REMAIN THAT HAVE BEEN DISTURBED OR DAMAGED AS A RESULT OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR AT CONTRACTOR'S EXPENSE.
13. CONTRACTOR SHALL PROVIDE AND MAINTAIN TRAFFIC CONTROL MEASURES IN ACCORDANCE WITH STATE DEPARTMENT OF TRANSPORTATION REGULATIONS, FAA REGULATIONS, AND AS REQUIRED BY LOCAL AGENCIES WHEN WORKING IN AND/OR ALONG STREETS, ROADS, HIGHWAYS, ETC., IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN APPROVAL AND COORDINATE WITH LOCAL AND/OR STATE AGENCIES REGARDING THE NEED, EXTENT AND LIMITATIONS ASSOCIATED WITH INSTALLING AND MAINTAINING TRAFFIC CONTROL MEASURES.
14. PROVIDE STRAIGHT, FULL DEPTH, AND NEAT SAW CUTS OF EXISTING PAVEMENT WHERE INDICATED ALONG LIMITS OF PAVEMENT DEMOLITION.
15. ALL UTILITY AND STRUCTURE REMOVAL, RELOCATION, CUTTING, CAPPING AND/OR ABANDONMENT SHALL BE COORDINATED AND PROPERLY DOCUMENTED BY A CERTIFIED PROFESSIONAL, WHEN APPLICABLE, WITH THE APPROPRIATE UTILITY COMPANY, MUNICIPALITY AND/OR AGENCY. DEMOLITION OF REGULATED ITEMS MAY INCLUDE, BUT NOT LIMITED TO WELLS, ASBESTOS, UNDERGROUND STORAGE TANKS, SEPTIC TANKS AND ELECTRIC TRANSFORMERS. DEMOLITION CONTRACTOR SHALL REFER TO ANY ENVIRONMENTAL STUDIES FOR DEMOLITION RECOMMENDATIONS AND GUIDANCE. AVAILABLE ENVIRONMENTAL STUDIES MAY INCLUDE, BUT ARE NOT LIMITED TO PHASE I ESA, PHASE II ESA, WETLAND AND STREAM DELINEATION AND ASBESTOS SURVEYS. ALL APPLICABLE ENVIRONMENTAL STUDIES SHALL BE MADE AVAILABLE UPON REQUEST.
16. ALL PAVEMENT, BASE COURSES, SIDEWALKS, CURBS, BUILDINGS, FOUNDATIONS, ETC., WITHIN THE AREA THAT ARE INDICATED TO BE DEMOLISHED SHALL BE REMOVED TO FULL DEPTH. EXISTING BASE COURSE MATERIALS MAY BE WORKED INTO THE NEW PAVEMENT OR BUILDING SUBGRADE IF THE GRADATION, CONSISTENCY, COMPACTION, SUBGRADE CONDITION, ETC., ARE IN ACCORDANCE WITH THE SPECIFICATIONS AND RECOMMENDATIONS OF THE GEOTECHNICAL REPORT. BASE COURSE MATERIALS SHALL NOT BE WORKED INTO THE SUBGRADE AREAS TO RECEIVE LANDSCAPING.
17. THE CONTRACTOR SHALL USE SUITABLE METHODS TO CONTROL DUST AND DIRT CAUSED BY THE DEMOLITION ACTIVITIES.

SITE EARTHWORK NOTES

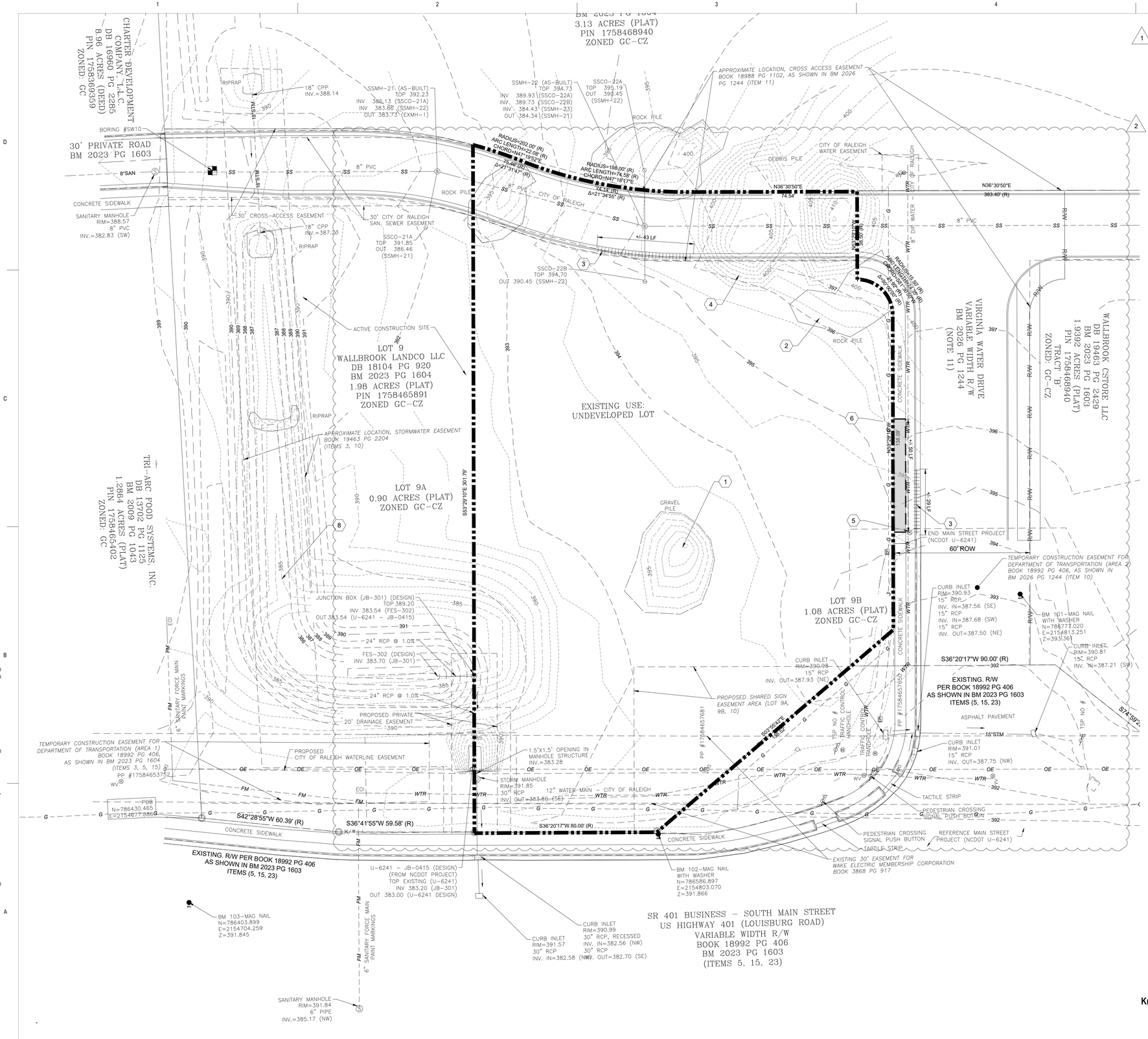
1. ALL PROPOSED GRADES SHOWN ARE FINAL GRADES, TOP OF GROUND LEVEL, OR TOP OF PAVEMENT, OR GRATE ELEVATION AT THE DRAWDOWN POINT, UNLESS INDICATED OTHERWISE.
2. REFER TO AND FOLLOW THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED FOR THIS PROJECT PREPARED FOR THIS PROJECT BY TERRACON TITLED "PNC BANK - ROLESVILLE GEOTECHNICAL ENGINEERING REPORT" AND DATED 09/29/2025.
3. SITE BUILDING PAD EXCAVATION AND CONSTRUCTION TO BE PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. BUILDING PAD PREPARATION SHALL BEGIN BY CLEARING AND REMOVAL OF UNSUITABLE MATERIAL FROM PAD SITE, THEN PLACEMENT AND COMPACTION OF BACKFILL MATERIAL PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
4. ALL FILL UNDER PAVEMENT SHALL BE COMPACTED TO THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
5. ALL ELEVATIONS SHOWN ARE FINISHED GRADE ELEVATIONS.
6. CONTRACTOR SHALL STRICTLY ADHERE TO THE EROSION & SEDIMENT CONTROL PLAN PREPARED FOR THIS PROJECT.
7. EARTHWORK SHALL INCLUDE CLEARING AND GRUBBING, STRIPPING AND STOCKPILING TOPSOIL, MASS GRADING, EXCAVATION, FILLING, UNDERCUT AND REPLACEMENT, IF REQUIRED, AND COMPACTION.
8. CONTRACTOR TO REFILL UNDERCUT AREAS WITH SUITABLE MATERIAL AND COMPACT AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
9. PLACE TOPSOIL OVER THE SUBGRADE OF UNPAVED, DISTRIBUTED AREAS TO A DEPTH INDICATED ON THE LANDSCAPE PLANS (4" MINIMUM).
10. PAVEMENT SLOPES ACROSS ACCESSIBLE PARKING STALLS AND ADJOINING ACCESS AISLES SHALL BE MAXIMUM 2% AND SHALL CONFORM TO THE LATEST REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT.
11. ALL AREAS NOT PAVED SHALL BE STABILIZED IN ACCORDANCE WITH THE EROSION & SEDIMENT CONTROL PLAN, UNLESS NOTED OTHERWISE.
12. COMPACTED FILLS ARE TO BE MADE TO A MINIMUM OF THREE FEET ABOVE THE CROWN OF ANY PROPOSED SEWER PRIOR TO CUTTING OF TRENCHES FOR PLACEMENT OF SAID SEWERS. ALL FILLS SHALL BE CONTROLLED, COMPACTED, AND INSPECTED BY AN APPROVED TESTING LABORATORY OR AN INSPECTOR FROM THE APPROPRIATE GOVERNMENTAL AGENCY.
13. ALL EXCESS SOIL MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED AND SHALL BE REMOVED BY THE CONTRACTOR AND DISPOSED OF OFFSITE AT NO ADDITIONAL COST TO THE OWNER IN ACCORDANCE WITH ALL LOCAL AND STATE CODES AND PERMIT REQUIREMENTS.
14. THE CONTRACTOR IS RESPONSIBLE FOR BALANCING THE SITE EARTHWORK BY IMPORTING OR EXPORTING AS NECESSARY TO ACHIEVE DESIGN GRADES AND SPECIFICATIONS.

STORM DRAINAGE NOTES

1. DISTANCES SHOWN ON PIPING ARE HORIZONTAL DISTANCES FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE, UNLESS OTHERWISE NOTED, CONTRACTOR RESPONSIBLE FOR ACTUAL FIELD CUT LENGTH.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE INSTALLATION, INSPECTION, TESTING AND FINAL ACCEPTANCE OF ALL NEW STORMWATER MANAGEMENT FACILITIES CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH ALL APPLICABLE REGULATING AGENCIES CONCERNING INSTALLATION, INSPECTION AND APPROVAL OF THE STORM DRAINAGE SYSTEM CONSTRUCTION.
3. ALL STORMWATER MANAGEMENT FACILITIES, INCLUDING COLLECTION AND CONVEYANCE STRUCTURES SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE CODES AND REGULATIONS.
4. ANY FIELD TILE CUT IN EXCAVATION, WHICH DRAINS AN OFFSITE AREA, MUST BE TIED INTO THE STORM DRAINAGE SYSTEM.
5. FOR EXACT LOCATION OF DOWNSPOUTS AND ROOF DRAINS, CONTRACTOR IS TO COORDINATE WITH ARCHITECTURAL AND PLUMBING DRAWINGS.
6. ALL PROPOSED STORM SEWERS, SURFACE OR OTHER DRAINAGE FACILITIES ARE TO BE PRIVATE AND MAINTAINED BY THE OWNER.
7. THE CONTRACTOR IS TO CONSTRUCT CURBS, CATCH BASINS, DOWNSPOUTS, PIPING AND CONNECTION ETC. AS REQUIRED TO CONVEY THE ROOF AND PAVED SURFACE DRAINAGE TO THE DETENTION BASIN.
8. ALL STORM STRUCTURES ARE NORTH CAROLINA DOT TYPES UNLESS OTHERWISE INDICATED.
9. ALL CATCH BASINS AND MANHOLES WITH A DEPTH GREATER THAN 4-FEET SHALL BE PROVIDED WITH STEPS. STEPS SHALL MEET THE REQUIREMENTS OF NORTH CAROLINA DOT SPECIFICATION.
10. STORM SEWER PIPE LABELED "SD" SHALL BE ONE OF THE FOLLOWING: HIGH DENSITY POLYETHYLENE PER NORTH CAROLINA DOT, OR REINFORCED CONCRETE PIPE, NORTH CAROLINA DOT. ALL STORM SEWER TO BE SMOOTH WALLED, WITH A MANNINGS COEFFICIENT OF 0.012-0.013. STORM SEWER PIPE LABELED "RCP" SHALL BE REINFORCED CONCRETE PIPE, NORTH CAROLINA DOT. ALL STORM SEWER IS TO BE INSTALLED PER NORTH CAROLINA DOT.
11. STORM SEWER IS TO BE BEDDED WITH CLEAN GRANULAR MATERIAL-AGGREGATES NOT TO BE LARGER THAN 3/4" AND NOT SMALLER THAN NO. 8 SIEVE, FREE OF SILT AND FINES, AASHTO M43 SIZE #67, 7 OR 8. BEDDING TO BE MINIMUM OF 6" BELOW & 12" ABOVE THE PIPE.

UTILITY NOTES

1. ALL PROPOSED UTILITY LINES AND EXTENSIONS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF RALEIGH SPECIFICATIONS. CONTRACTOR SHALL COORDINATE UTILITY DISCONNECTIONS WITH THE APPROPRIATE AGENCIES.
2. THE CONTRACTOR IS PARTICULARLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF THE EXISTING UTILITIES SHOWN HEREON IS BASED ON TOPOGRAPHIC SURVEYS AND RECORD DRAWINGS. THE CONTRACTOR SHALL NOT RELY UPON THIS INFORMATION AS BEING EXACT OR COMPLETE. SHOULD UNCHARTED UTILITIES BE ENCOUNTERED DURING EXCAVATION OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AS SOON AS POSSIBLE FOR INSTRUCTIONS. THE CONTRACTOR SHALL CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION AND REQUEST FIELD VERIFICATION OF UTILITY LOCATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO RELOCATE EXISTING UTILITIES CONFLICTING WITH IMPROVEMENTS SHOWN HEREON IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS GOVERNING SUCH OPERATIONS.
3. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. MAINTAIN MINIMUM 10-FOOT HORIZONTAL AND MINIMUM 18-INCH VERTICAL SEPARATION BETWEEN SANITARY SEWER, STORM SEWER AND WATER SUPPLY LINE, UNLESS OTHERWISE INDICATED.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE SEQUENCING OF CONSTRUCTION FOR ALL UTILITY LINES SO THAT WATER LINES, GAS LINES, AND UNDERGROUND ELECTRIC DO NOT CONFLICT WITH SANITARY SEWERS OR STORM SEWERS. INSTALL UTILITIES PRIOR TO PAVEMENT CONSTRUCTION.
6. ALL TRENCH SPOILS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED.
7. SANITARY SEWER SHALL BE PVC-SDR 35 PER ASTM D-3034 OR APPROVED EQUAL (CONFORMING TO TOWN OF ROLESVILLE SPECIFICATIONS) INSTALLED AT A MINIMUM SLOPE OF ONE-HALF PERCENT (0.50%) UNLESS OTHERWISE NOTED. SANITARY SERVICE SHALL BE INSTALLED AT A MINIMUM DEPTH OF FOUR FEET (4') UNLESS OTHERWISE NOTED. A MINIMUM OF 18" CLEARANCE SHALL BE MAINTAINED AT ALL WATERLINE & STORM SEWER CROSSINGS. SANITARY SERVICE JOINTS SHALL CONFORM TO ASTM D-3212.
8. SANITARY SEWER IS TO BE BEDDED WITH CLEAN GRANULAR MATERIAL-AGGREGATES NOT TO BE LARGER THAN 3/4" AND NOT SMALLER THAN NO. 8 SIEVE, FREE OF SILT AND FINES, AASHTO M43 SIZE #67, 7 OR 8. BEDDING TO BE MINIMUM OF 6" BELOW & 12" ABOVE THE PIPE.
9. DISTANCES SHOWN FOR BOTH SANITARY AND STORM SEWER PIPES ARE MEASURED FROM CENTER OF STRUCTURE, CONTRACTOR RESPONSIBLE FOR ACTUAL FIELD CUT LENGTH. COORDINATES FOR STORM & SANITARY STRUCTURES ARE SHOWN TO THE CENTER STRUCTURE. UNLESS OTHERWISE NOTED.
10. ROOF DRAINS, FOUNDATION DRAINS AND ALL OTHER CLEAR WATER CONNECTIONS TO THE SANITARY SEWER SYSTEMS ARE PROHIBITED.
11. ADJUST ALL EXISTING UTILITY SURFACE FEATURES INCLUDING BUT NOT LIMITED TO CASTINGS, VALVE BOXES, PEDESTALS, CLEANOUTS, ETC. TO MATCH PROPOSED FINISHED GRADES, UNLESS OTHERWISE INDICATED.
12. THE CONTRACTOR SHALL PROVIDE RECORD DRAWINGS OF ALL IMPROVEMENTS. INCLUDE AT LEAST TWO DIMENSIONS TO EACH VALVE AND MANHOLE FROM KNOWN SITE FEATURES. DRAWINGS SHALL INCLUDE HORIZONTAL AND VERTICAL INFORMATION ON ALL NEW UTILITIES AS WELL AS EXISTING UTILITIES ENCOUNTERED.
13. MECHANICAL/ELECTRICAL CONTRACTORS SHALL BRING ALL UTILITIES 5' OUTSIDE BUILDING WALL. COORDINATE WITH CONSTRUCTION MANAGER/ARCHITECT/ENGINEER/OWNER.
14. ALL WATERLINE CROSSINGS SHALL MAINTAIN A VERTICAL SEPARATION OF 18" MINIMUM. SANITARY SEWER SHALL BE LOCATED A MINIMUM OF 18" BELOW WATERLINE AT ALL CROSSINGS. WATERLINE SHALL BE LOCATED A MINIMUM OF 10' HORIZONTALLY FROM ANY SANITARY SEWER OR STORM SEWER. ALL MEASUREMENTS SHALL BE TAKEN FROM OUTSIDE OF SEWER PIPE TO THE OUTSIDE OF WATERLINE PIPE. ONE FULL LENGTH OF WATERLINE PIPE SHALL BE LOCATED AT ALL CROSSINGS TO ENABLE BOTH JOINTS TO BE LOCATED AS FAR FROM SEWER AS POSSIBLE.
15. ALL WATER SERVICE PIPE SIZES 3" THRU 12" SHALL BE DUCTILE IRON PIPE CLASS, PVC C-900 OR PVC C909 PIPE PER LOCAL JURISDICTION, FROM WATERMAIN THRU METER SETTING(S) INCLUDING THE METER BYPASS.
16. ALL WATER SERVICE PIPE, 2" AND SMALLER, SHALL BE K SOFT COPPER.
17. ALL WATER SERVICE PIPE, 2" AND SMALLER, SHALL BE K SOFT COPPER FROM WATERMAIN THRU CURB STOP; K SOFT COPPER OR TOWN OF ROLESVILLE APPROVED POLYTUBING FROM CURB STOP THRU METER SETTING IN BUILDING.
18. WATERLINE IS TO BE BEDDED WITH CLEAN GRANULAR MATERIAL-AGGREGATES NOT TO BE LARGER THAN 3/4" AND NOT SMALLER THAN NO. 8 SIEVE, FREE OF SILT AND FINES, AASHTO M43 SIZE #67, 7 OR 8. BEDDING TO BE MINIMUM OF 6" BELOW & 12" ABOVE THE PIPE
19. ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH RALEIGH WATER DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: RALEIGH WATER HANDBOOK, CURRENT EDITION)
20. UTILITY SEPARATION REQUIREMENTS:
    - 20.1. A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
    - 20.2. WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE RALEIGH WATER DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER OUTSIDE DIAMETER.
    - 20.3. WHERE IS IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
    - 20.4. 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
    - 20.5. MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATION CANNOT BE ACHIEVED, SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 6" MIN. CLEARANCE (PER RALEIGH WATER DETAILS W-41 & S-29).
    - 20.6. ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.
21. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY RALEIGH WATER PRIOR TO CONSTRUCTION.
22. DEVELOPER SHALL PROVIDE 30 DAYS ADVANCE WRITTEN NOTICE TO OWNER FOR ANY WORK REQUIRED WITHIN AN EXISTING CITY OF RALEIGH UTILITY EASEMENT TRAVERSING PRIVATE PROPERTY.
23. CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTION SHALL BE PRECEDED BY A 24-HOUR ADVANCE NOTICE TO RALEIGH WATER.
24. SEWER BYPASS PUMPING - A BYPASS PLAN SEALED BY AN NC PROFESSIONAL ENGINEER SHALL BE PROVIDED TO RALEIGH WATER PRIOR TO



EXISTING LEGEND

- PROPERTY BOUNDARY
- 799 — 1' CONTOUR
- 800 — 5' CONTOUR
- EASEMENT
- 30"STM — 30" STORM
- 18"STM — 18" STORM
- SD — STORM
- WTR — WATER
- 8"SAN — 8" GRAVITY SANITARY
- FM — SANITARY FORCEMAIN
- OE — OVERHEAD ELECTRIC
- 701 — FUTURE 1' CONTOUR
- 700 — FUTURE 5' CONTOUR
- SANITARY MANHOLE
- SANITARY CLEANOUT
- STORM MANHOLE
- CATCH BASIN
- CURB INLET
- HEADWALL
- FIRE HYDRANT
- WATER METER PIT
- WATER VALVE
- ELECTRIC PULLBOX
- TRANSFORMER
- ELECTRIC METER
- POWER POLE
- LIGHT POLE
- TELEPHONE PEDESTAL
- GAS VALVE
- SIGN
- BENCHMARK MAG NAIL
- PEDESTRIAN CROSSING SYMBOL
- TRAFFIC CONTROL HANDHOLE

DEMOLITION LEGEND

- SAWCUT LINE
- TO BE REMOVED
- TO BE ABANDONED
- ASPHALT PAVEMENT TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED

NOTES

A. SEE SHEET C-001 FOR GENERAL NOTES.

B. CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS CONSTRUCTION SET FOR OTHER PERTINENT INFORMATION. IT IS NOT THE ENGINEER'S INTENT THAT ANY SINGLE PLAN SHEET WITHIN THIS SET OF DOCUMENTS FULLY DEPICT ALL WORK ASSOCIATED WITH THE PROJECT.

C. CONTRACTOR TO LOCATE EXISTING UTILITY SERVICES AND INVESTIGATE POTENTIAL FOR REUSE. IF IT IS NOT TO BE REUSED, IT SHALL BE REMOVED OR ABANDONED IN PLACE PER AGENCY REQUIREMENTS.

D. SITE AND ADJACENT PROPERTIES ARE ZONED GC-CZ.

E. DEED BOOK/PAGE: 018104/00920

F. FUTURE CONTOURS INDICATE EXISTING GRADE WHEN FUTURE CONSTRUCTION IS COMPLETED BEFORE CONSTRUCTION BEGINS FOR THIS PROJECT.

KEYNOTES (X)

1. REMOVE GRAVEL PILE
2. REMOVE ROCK PILE
3. REMOVE CURB
4. REMOVE DEBRIS PILE
5. EXISTING GAS VALVE TO REMAIN IN PLACE. CONTRACTOR TO PROTECT DURING CONSTRUCTION.
6. REMOVE EXISTING SIDEWALK TO THE NEAREST JOINT.
7. BASIN TO REMAIN. PRIMARY USAGE IS STORMWATER CONVEYANCE TO STRUCTURES ON US 401

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F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER:
10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
EXISTING CONDITIONS PLAN

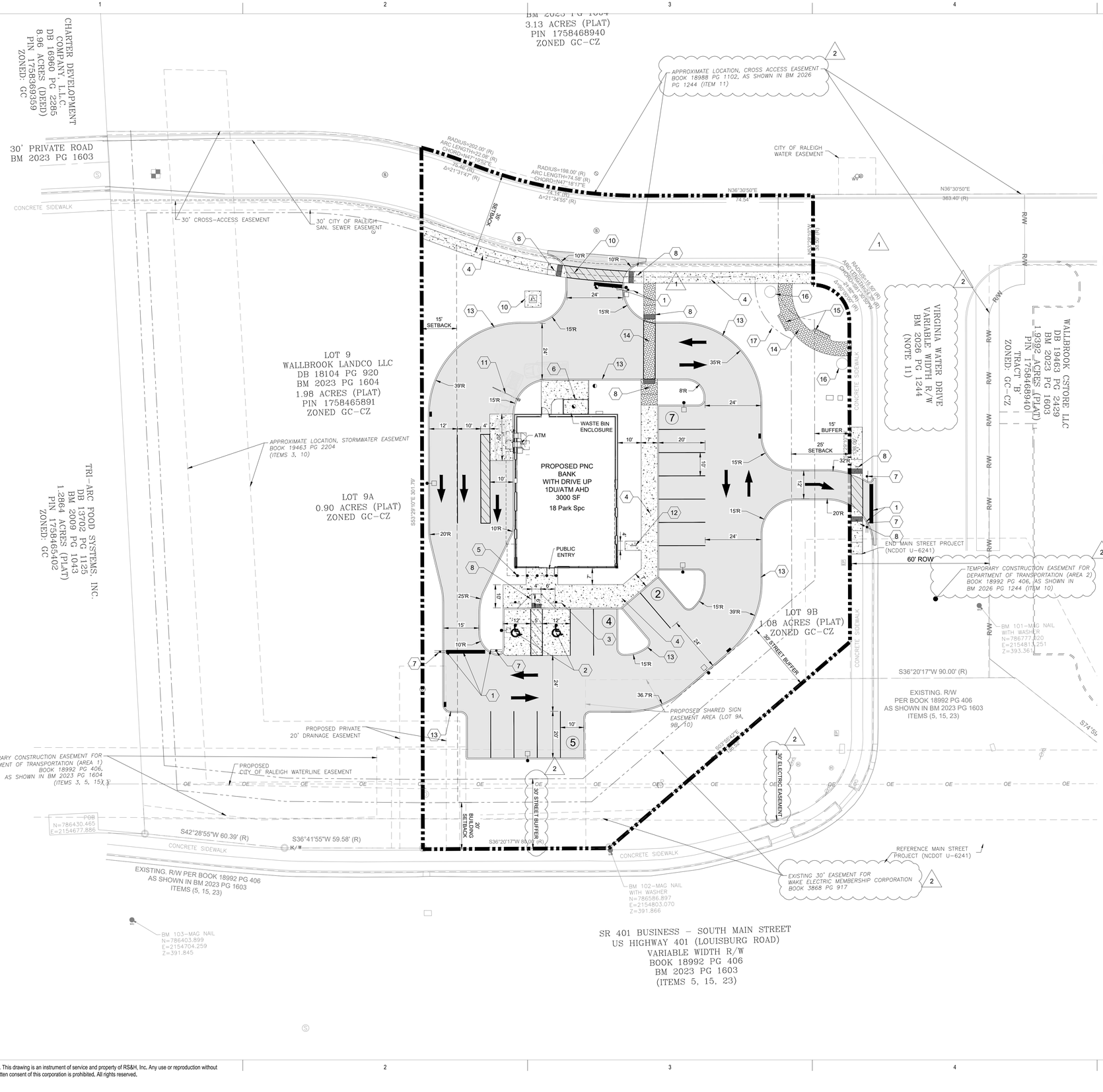
SHEET ID:
C101

PROJECT STATUS:
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V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 3



LEGEND

- PROPOSED CONCRETE
- PROPOSED ASPHALT PAVEMENT
- LEASE LINE
- PROPOSED LIGHT POLE

NOTES

1. SEE SHEET C001 FOR GENERAL NOTES AND LEGEND.
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3. ALL DIMENSIONS, RADII AND COORDINATES ARE TO BACK OF CURB WHERE APPLICABLE. ALL CURB RADII SHALL BE 3' UNLESS INDICATED OTHERWISE.

KEYNOTES (X)

1. "STOP SIGN", R1-1 AND STOP BAR. SEE DETAIL ON SHEET C801.
2. VAN ACCESSIBLE PARKING SPACE. SEE DETAIL ON SHEET C801.
3. VAN ACCESSIBLE PARKING SIGNAGE. SEE DETAIL ON SHEET C801.
4. CONCRETE WALK. SEE DETAIL ON SHEET C801.
5. BOLLARD, TYP.
6. SCREENED TRASH ENCLOSURE.
7. "DO NOT ENTER" SIGN, R5-1. SEE DETAIL ON SHEET C801.
8. ADA RAMP, SEE DETAIL ON SHEET C801.
9. CROSSWALK, SEE DETAIL ON SHEET C803.
10. PROPOSED TRANSFORMER PAD.
11. CLEARANCE BAR.
12. PROPOSED BIKE RACK.
13. 6" CONCRETE CURB. SEE DETAIL ON SHEET C801.
14. PEDESTRIAN AMENITY #1: STAMPED CONCRETE CROSSWALK AND SIDEWALK. SEE DETAIL ON SHEET C801.
15. PEDESTRIAN AMENITY #2: BENCHES. SEE DETAIL ON LANDSCAPING SHEET LP101.
16. PEDESTRIAN AMENITY #3: PLANTERS. SEE DETAIL ON LANDSCAPING SHEET LP101.
17. PEDESTRIAN AMENITY #4: POCKET GARDEN. SEE LANDSCAPING SHEET LP101.

SITE DATA

ZONING	GENERAL COMMERCIAL CONDITIONAL ZONING
TOTAL SITE AREA	1.09 ACRES
PROPOSED USE	BANKS/CREDIT UNIONS, FINANCIAL INSTITUTION
PARKING SPACE SIZE REQUIRED	9' X 19'
PARKING SPACE SIZE PROVIDED	10' X 20'
TYPICAL PARKING AISLE (TWO WAY)	24' WIDE
PARKING SPACES REQUIRED 2.5 SPACES PER 1,000 SQ. FT. =	8 SPACES
STANDARD PARKING SPACES PROVIDED	16 SPACES
ADA SPACES PROVIDED STANDARD ADA SPACES VAN SPACES	0 SPACES 2 SPACES
TOTAL PARKING SPACES PROVIDED	18 SPACES
MAXIMUM IMPERVIOUS AREA	85%

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST,
ROLESVILLE, NC 27571

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2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH

PROJECT NUMBER:
10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

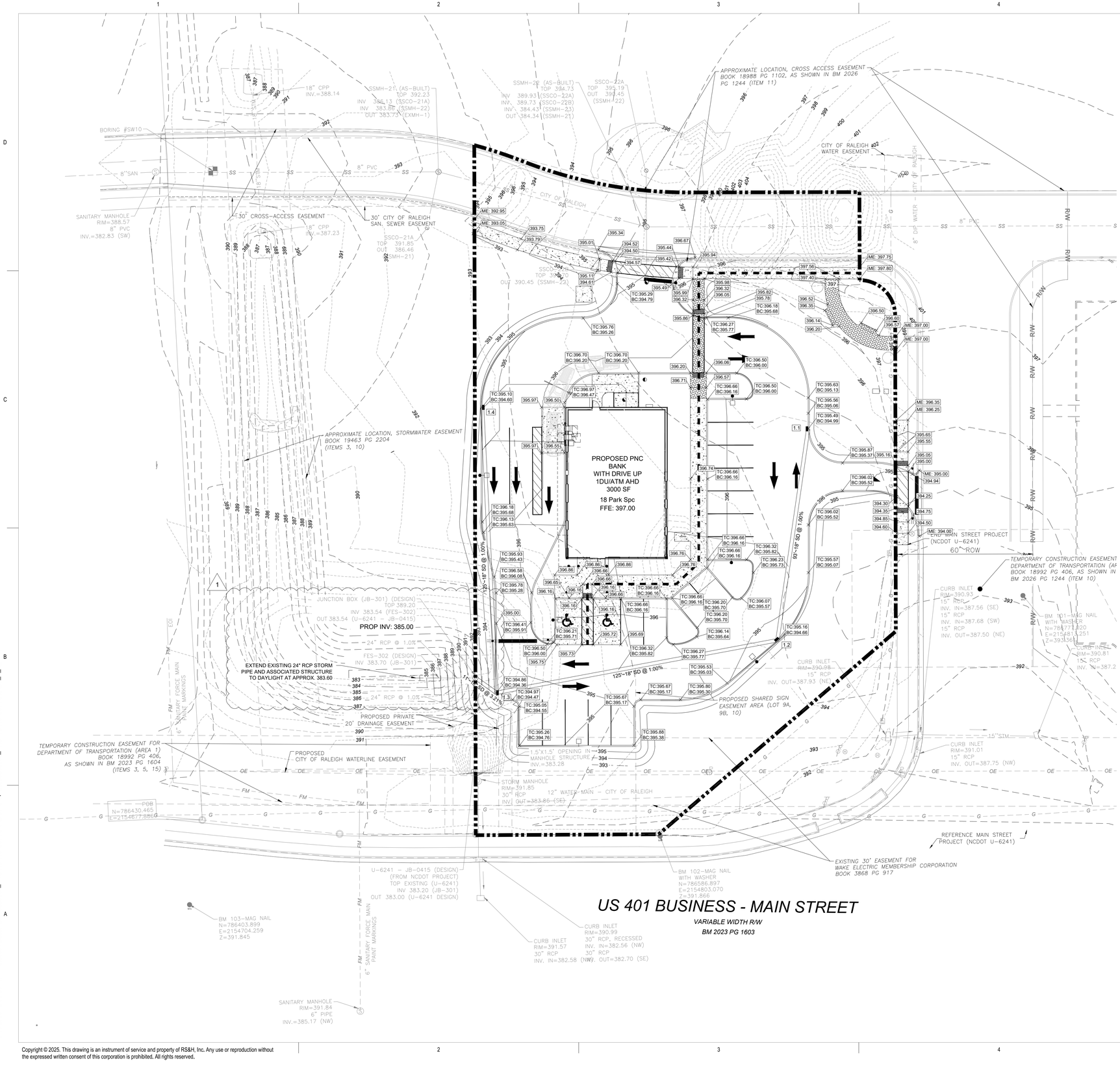
SHEET TITLE:
SITE PLAN

SHEET ID:
C201

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GRADING LEGEND

701	EXISTING 1' CONTOUR
700	EXISTING 5' CONTOUR
701	PROPOSED 1' CONTOUR
700	PROPOSED 5' CONTOUR
701	FUTURE 1' CONTOUR
700	FUTURE 5' CONTOUR
XX"-XX" SD	PROPOSED STORM PIPE
	PROPOSED STORM STRUCTURES
1.1	PROPOSED STORM STRUCTURE ID
5301.00	PROPOSED SPOT ELEVATION
TC:5301.50 BC:5301.00	PROPOSED TOP/BOTTOM ELEVATION
ME:5301.00	PROPOSED ELEVATION MATCH EXISTING
ADA ACCESSIBLE PATH 1	

NOTES

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3. FUTURE CONTOURS INDICATE EXISTING GRADE WHEN FUTURE CONSTRUCTION IS COMPLETED BEFORE CONSTRUCTION BEGINS FOR THIS PROJECT.
4. CONTRACTOR TO VERIFY ACCESSIBLE PATH DOES NOT HAVE GAPS GREATER THAN 0.5" WIDTH. FILL GAPS WITH SONNEBORNE SL1 SELF LEVELING SEALANT OR APPROVED EQUAL. COLOR TO MATCH CONCRETE.
5. ACCESSIBLE PATH SHALL HAVE A 5.0% MAXIMUM RUNNING SLOPE AND A 2.0% MAXIMUM CROSS SLOPE.
6. CONTRACTOR SHALL VERIFY ACCESSIBLE PATH DOES NOT HAVE CHANGE IN ELEVATION GREATER THAN 0.25" VERTICAL/ GRIND CONCRETE UNTIL PAVEMENT IS FLUSH.

STORM STRUCTURE TABLE

STRUCTURE ID	DESCRIPTION	RIM/GRATE	INVERTS
EXISTING MANHOLE	CONNECT TO EXISTING	390.59	18" = 385.00 (E) 30" = 383.86 (SE)
1.1	CURB INLET	394.99	18" = 391.49 (SE)
1.2	CURB INLET	394.66	18" = 390.56 (NW) 18" = 390.56 (SW)
1.3	CURB INLET	394.36	18" = 389.31 (NE) 18" = 389.85 (NW) 18" = 385.36 (W)
1.4	CURB INLET	394.60	18" = 391.10 (SE)

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WOOLPERT

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PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

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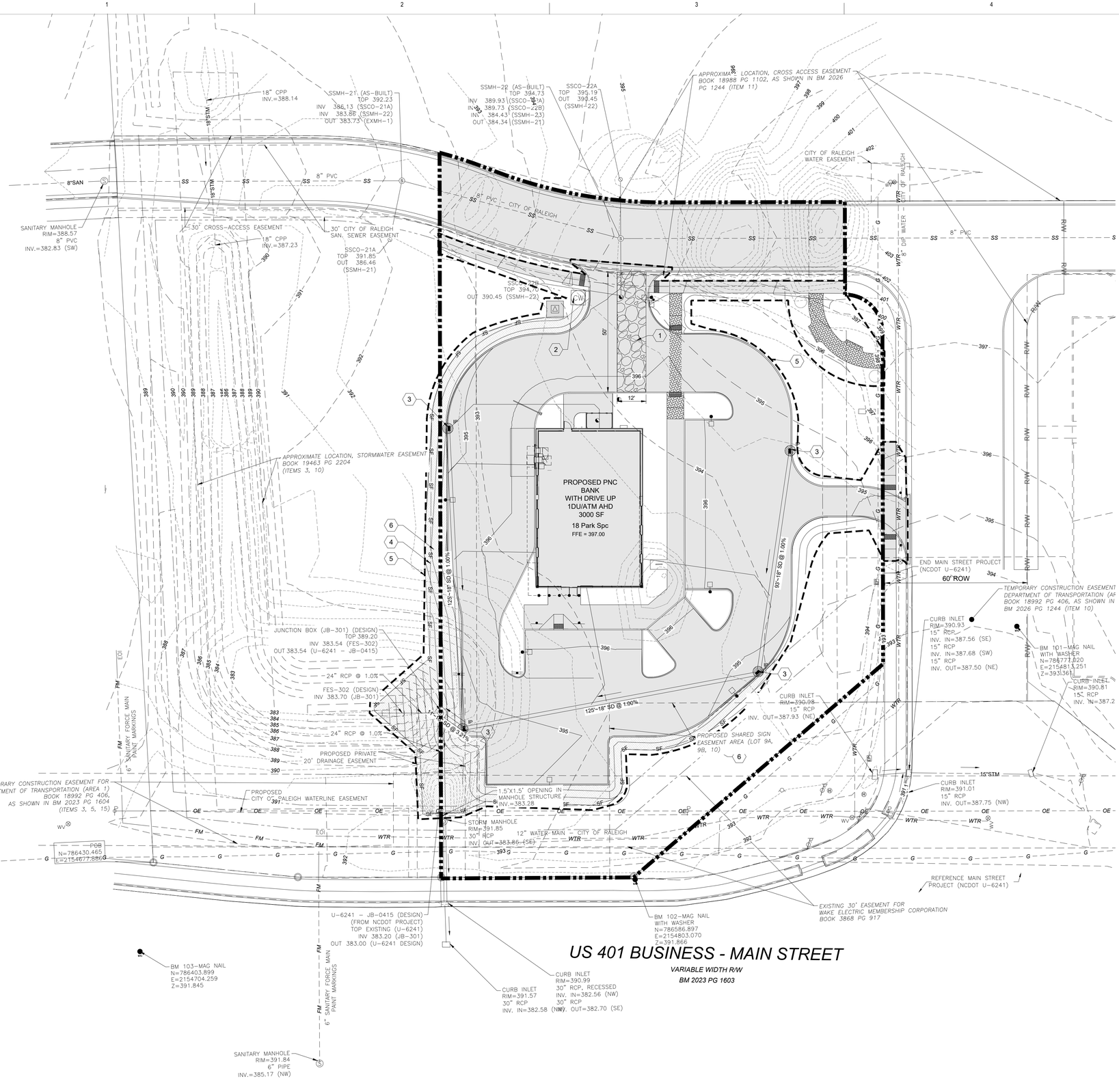
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GRADING & DRAINAGE PLAN

SHEET ID:
C301

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LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- 1' CONTOUR
- 5' CONTOUR
- FUTURE 1' CONTOUR
- FUTURE 5' CONTOUR
- TEMPORARY SILT FENCE
- LIMITS OF DISTURBANCE
- CATCH BASIN
- INLET PROTECTION
- TEMPORARY CONSTRUCTION ENTRANCE
- TEMPORARY CONCRETE WASHOUT
- EROSION CONTROL BLANKET
- IMPERVIOUS SURFACE

NOTES

1. SEE SHEET C001 FOR GENERAL NOTES.
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3. CONSTRUCTION FENCE AND SILT FENCE ARE SHOWN ON PLAN SCHEMATICALLY. ADJUST AS NECESSARY.
4. EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED AND INSPECTED PRIOR TO ANY GRADING ON SITE.

KEYNOTES (X)

1. TEMPORARY CONSTRUCTION ACCESS, MIN 12' W X 50' L. SEE DETAIL ON SHEET C303.
2. CONCRETE WASHOUT. SEE DETAIL ON SHEET C304.
3. INLET PROTECTION. SEE DETAIL ON SHEET C304.
4. SILT FENCE. SEE DETAIL ON SHEET C304
5. LIMITS OF DISTURBANCE.
6. EROSION CONTROL BLANKET. SEE DETAIL ON SHEET C304

IMPERVIOUS COVERAGE

PARCEL AREA:	1.09 ACRES
EXISTING:	0.11 ACRES
PROPOSED:	0.55 ACRES
MAXIMUM:	85% (40,358.3 SQ. FT.)
% COVERAGE:	60% (28,421.1 SQ. FT.)
TOTAL SITE AREA:	1.09 ACRES
DISTURBED AREA:	0.77 ACRES

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SHEET TITLE:
EROSION CONTROL PLAN

SHEET ID:
C302

PROJECT STATUS:
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DATE: PAGE:

CONSIDERATIONS FOR CONSTRUCTION SCHEDULING

CONSTRUCTION ACTIVITY	SCHEDULE CONSIDERATION
CONSTRUCTION ACCESS: Construction entrance, construction routes, equipment parking areas.	First land-disturbing activity- Stabilize bare areas immediately with gravel and temporary vegetation as construction takes place.
SEDIMENT TRAPS AND BARRIERS: Basin traps, sediment fences, and outlet protection.	Install principal basins after construction site is accessed. Install additional traps and barriers as needed during grading.
RUNOFF CONTROL: Diversions, perimeter dikes, water bars, and outlet protection.	Install key practices after principal sediment traps and before land grading. Install additional runoff-control measures during grading.
RUNOFF CONVEYANCE SYSTEM: Stabilize streambanks, storm drains, channels, inlet and outlet protection, and slope drains.	Where necessary, stabilize streambanks as early as possible. Install principal runoff conveyance system with runoff-control measures. Install remainder of system after grading.
LANDING CLEARING AND GRADING: Site preparation- cutting, filling and grading, sediment traps, barriers, diversions, drains, and surface roughening.	Begin major clearing and grading **AFTER** principal sediment and key runoff-control measures are installed. Clear borrow and disposal areas only as needed. Install additional control measures as grading progresses. Mark trees and buffer areas for preservation.
SURFACE STABILIZATION: Temporary and permanent seeding, mulching, sodding and riprap.	Apply temporary or permanent stabilization measures immediately on all disturbed areas where work is delayed or complete.
BUILDING CONSTRUCTION: Buildings, utilities, and paving.	Install necessary additional erosion and sedimentation control practices as work takes place.
LANDSCAPE AND FINAL STABILIZATION: Topsoiling, trees and shrubs, permanent seeding, mulching, sodding, and riprap.	Last construction phase: Stabilize all open areas, including borrow and spoil areas. Remove and stabilize all temporary control areas.

NOTE: The above are the main aspects of a typical construction sequence in general terms. A detailed Construction Sequence should be site specific based on your project and site needs. As a minimum, the construction sequence schedule should show the following:

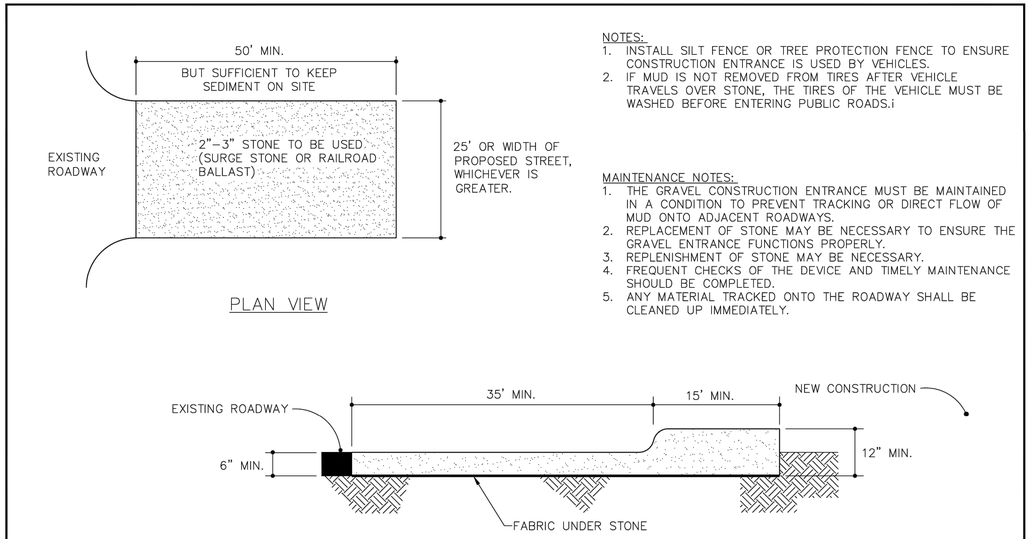
- The erosion and sedimentation control practices to be installed,
- Principal development activities,
- What measures should be in place before other activities are begun, and
- Compatibility with the general construction schedule of the contract.

Many timely construction techniques can reduce the erosion potential of a site, such as (1) shaping earthen fills daily to prevent overflows and (2) constructing temporary diversions ahead of anticipated storms. These types of activities cannot be put on the construction sequence schedule, but should be used whenever possible.

DEQ

CONSTRUCTION SEQUENCING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates



NOTES:
1. INSTALL SILT FENCE OR TREE PROTECTION FENCE TO ENSURE CONSTRUCTION ENTRANCE IS USED BY VEHICLES.
2. IF MUD IS NOT REMOVED FROM TIRES AFTER VEHICLE TRAVELS OVER STONE, THE TIRES OF THE VEHICLE MUST BE WASHED BEFORE ENTERING PUBLIC ROADS.i

MAINTENANCE NOTES:
1. THE GRAVEL CONSTRUCTION ENTRANCE MUST BE MAINTAINED IN A CONDITION TO PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO ADJACENT ROADWAYS.
2. REPLACEMENT OF STONE MAY BE NECESSARY TO ENSURE THE GRAVEL ENTRANCE FUNCTIONS PROPERLY.
3. REPLENISHMENT OF STONE MAY BE NECESSARY.
4. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE SHOULD BE COMPLETED.
5. ANY MATERIAL TRACKED ONTO THE ROADWAY SHALL BE CLEANED UP IMMEDIATELY.

WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 01/31/08

STANDARD CONSTRUCTION ENTRANCE

DATE: PAGE:

SPACING GUIDE FOR SLOPE BREAKS		
	SLOPE	SPACING (FT)
Steep Slopes	2:1	20
	3:1	35
	4:1	45
Long Slopes	15-25%	50
	10-15%	80
	6-10%	125
	3-6%	200
	<3%	300

Use slope breaks, such as diversions, wattles, or benches, as appropriate, to reduce the length of cut-and-fill slope to limit sheet and rill erosion and prevent gullying.

MAINTENANCE:
1. Periodically check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls.
2. Promptly remove all sediment from diversions and other water-disposal practices.
3. If washouts or breaks occur, repair immediately.
4. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

NOTES:
1. Construct and maintain all erosion and sediment control practices and measures in accordance with the approved sedimentation control plan and construction schedule.
2. Remove good topsoil from areas to be graded and filled, and preserve it for use in finishing the grading of all critical areas.
3. Scarify areas to be topsoiled to a minimum depth of 2 inches before placing topsoil.
4. Clear and grub areas to be filled by removing trees, vegetation, roots, or other objectionable material that would affect the planned stability of the fill.
5. Ensure that fill material is free of brush, rubbish, rocks, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.
6. Place all fill in layers not to exceed 9 inches in thickness, and compact the layers as required to reduce erosion, slippage, settlement, or other related problems.
7. Do not incorporate frozen, soft, mucky, or highly compressible materials into fill slopes.
8. Do not place fill on a frozen foundation, due to possible subsidence and slippage.
9. Keep diversions and other water conveyance measures free of sediment during all phases of development.
10. Handle seeps or springs encountered during construction in accordance with approved methods (subsurface drain).
11. Permanently stabilize all graded areas immediately after final grading is completed on each area in the grading plan. Apply temporary stabilization measures on all graded areas when work is to be interrupted or delayed for 30 days or longer.
12. Show topsoil, stockpiles, borrow areas, and spoil areas on the plans, and make sure they are adequately protected from erosion. Include final stabilization of these areas in the plan.

DEQ

LAND GRADING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

DATE: PAGE:

TEMPORARY SEEDING RECOMMENDATIONS FOR LATE WINTER AND EARLY SPRING

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding Dates
Mountains—Above 2500 feet: Feb. 15 - May 15
Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR SUMMER

Seeding Mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding Dates
Mountains — May 15 - Aug. 15
Piedmont — May 1 - Aug. 15
Coastal Plain — Apr. 15 - Aug. 15

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

TEMPORARY SEEDING RECOMMENDATIONS FOR FALL

Seeding Mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding Dates
Mountains — Aug. 15 - Dec. 15
Coastal Plain and Piedmont — Aug. 15 - Dec. 31

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

SEED BED PREPARATION:

LIMING- Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the rate of 1-1½ tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

FERTILIZER- Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700 - 1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

SURFACE ROUGHENING- If recent tillage operations have resulted in a loose surface additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by raking, harrowing, or other suitable methods for fine grading. The finished grade shall be a smooth even soil surface with a loosen uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Planting is to be done immediately after finished grades are obtained and seedbed preparation is completed.

DEQ

TEMPORARY SEEDING

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

Know what's **below.** **Call** before you dig.

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

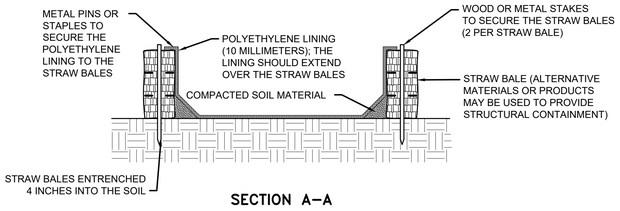
SHEET TITLE:
EROSION CONTROL DETAILS

SHEET ID:
C303

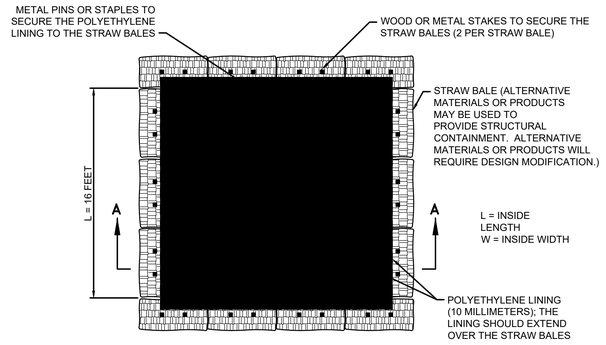
PROJECT STATUS:
100% DESIGN DOCUMENTS

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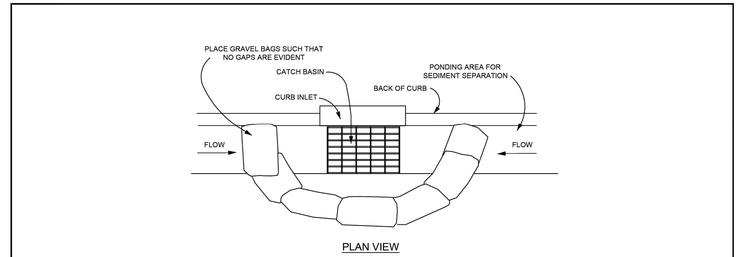
SECTION A–A



PLAN VIEW

CONCRETE WASHOUT

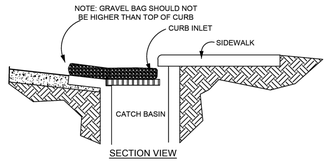
N.T.S



PLAN VIEW

NOTES:

1. PLACE GRAVEL BAG BARRIER ON GENTLY SLOPING STREET, WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNNOFF.
2. USE SAND BAGS OF WOVEN GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH ¾ INCH (OR SMALLER) GRAVEL. BAGS MUST BE LAYERED SUCH THAT NO GAPS ARE EVIDENT.
3. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.
4. WHEN INSTALLING CURB INLET PROTECTION DEVICES, **NEVER** BLOCK THE CURB INLET.

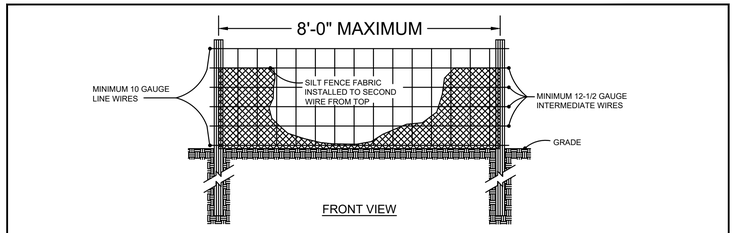


SECTION VIEW

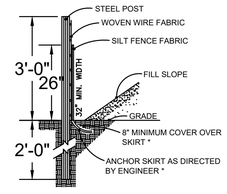
WAKE COUNTY NORTH CAROLINA

EFFECTIVE: 10/15/2025

STANDARD GRAVEL BAG CURB INLET PROTECTION



FRONT VIEW



SIDE VIEW

MAINTENANCE NOTES:

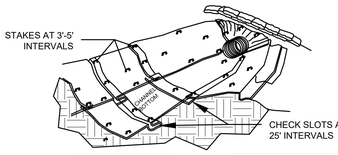
1. INSPECT BAG **AFTER EACH SIGNIFICANT RAINFALL OF 1 INCHES OR GREATER, OVER A 24–HOUR PERIOD**.L. MAKE ANY REPAIRS IMMEDIATELY.
2. INSPECT THE SILT FENCE TO BE SURE THE BOTTOM OF THE
3. GEOTEXTILE IS KEYED IN PROPERLY.
4. AT A MINIMUM, REMOVE AND DISPOSE OF ALL SILT ACCUMULATIONS WHEN DEPTH REACHES 1/2 THE HEIGHT OF THE GEOTEXTILE. DO NOT UNDERMINE THE FENCE DURING CLEANOUT.
5. DISPOSE OF SEDIMENT BY HAULING IT TO AN APPROVED WASTE SITE WITH APPROPRIATE PERIMETER PROTECTION.
6. REMOVE AND REPLACE DETERIORATED OR CLOGGED SILT FENCE.
7. REPLACE SILT FENCE REMOVED FOR ACCESS AT THE END OF EACH DAY'S OPERATION.
8. INSTALL ADDITIONAL POSTS OR WIRE BACKING IF FENCE IS SAGGING.

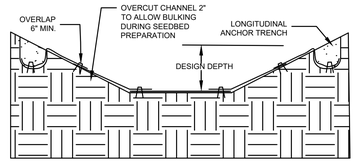
WAKE COUNTY NORTH CAROLINA

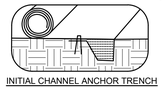
EFFECTIVE: 10/15/2025

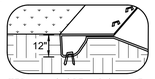
STANDARD TEMPORARY SILT FENCE

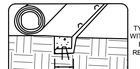
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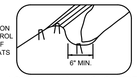


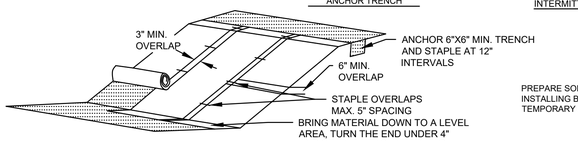


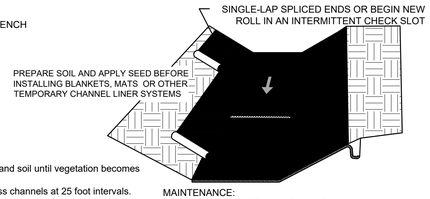




TYPICAL INSTALLATION WITH EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS







NOTES:

1. Lime, fertilize and seed before installation. Planting of shrubs, trees, etc. should occur after installation.
2. Slope surface shall be smooth before placement for proper soil contact.
3. Design velocities exceeding 2 feet/second require temporary blankets, mats or similar liners to protect seed and soil until vegetation becomes established.
4. Terminal anchor trenches are required at RECP ends and intermittent check slots must be constructed across channels at 25 foot intervals.
5. Terminal anchor trenches should be a minimum of 12 inches in depth and 6 inches in width. Intermittent check slots should be 6 inches deep and 6 inches wide.
6. For installation on a slope, place RECP 2-3 feet over the top of the slope and into an excavated end trench measuring approximately 12 inches deep by 6 inches wide. Pin the RECP at 1 foot intervals along the bottom of the trench, backfill and compact. Unroll the RECP down the slope maintaining direct contact between the soil and RECP. Secure using staples or pins in a 3 foot center-to-center pattern.
7. 11 gauge, at least 6 inch by 1 inch staples or 12 inch minimum length wooden stakes are recommended for anchoring.
8. Grass-lined channels with design velocities exceeding 6 feet/second should include turf reinforcement mats
9. Check slots to be constructed per manufacturers specifications.
10. Staking or stapling layout per manufacturers specification.
11. If there is a berm at the top of slope, anchor up-slope of the berm.
12. Do not stretch blankets/matting tight, allow the rolls to conform to any irregularities.
13. For slopes less than 3H:1V, rolls may be placed in horizontal strips.

MAINTENANCE:

1. Inspect Rolled Erosion Control Products at least weekly and after each rainfall of 1.0 inch or greater; repair immediately.
2. Good contact with the ground must be maintained, and erosion must not occur beneath the RECP.
3. Any areas of the RECP that are damaged or not in close contact with the ground shall be repaired and stapled.
4. If erosion occurs due to poorly controlled drainage, the problem shall be fixed and the eroded area protected.
5. Monitor and repair the RECP as necessary until ground cover is established.

NORTH CAROLINA DEQ

ROLLED EROSION CONTROL PRODUCTS

Effective Date: 9/1/2023
In accordance with the 2013 Design Manual Updates

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD

7/30/2026

SHEET TITLE:
EROSION CONTROL DETAILS

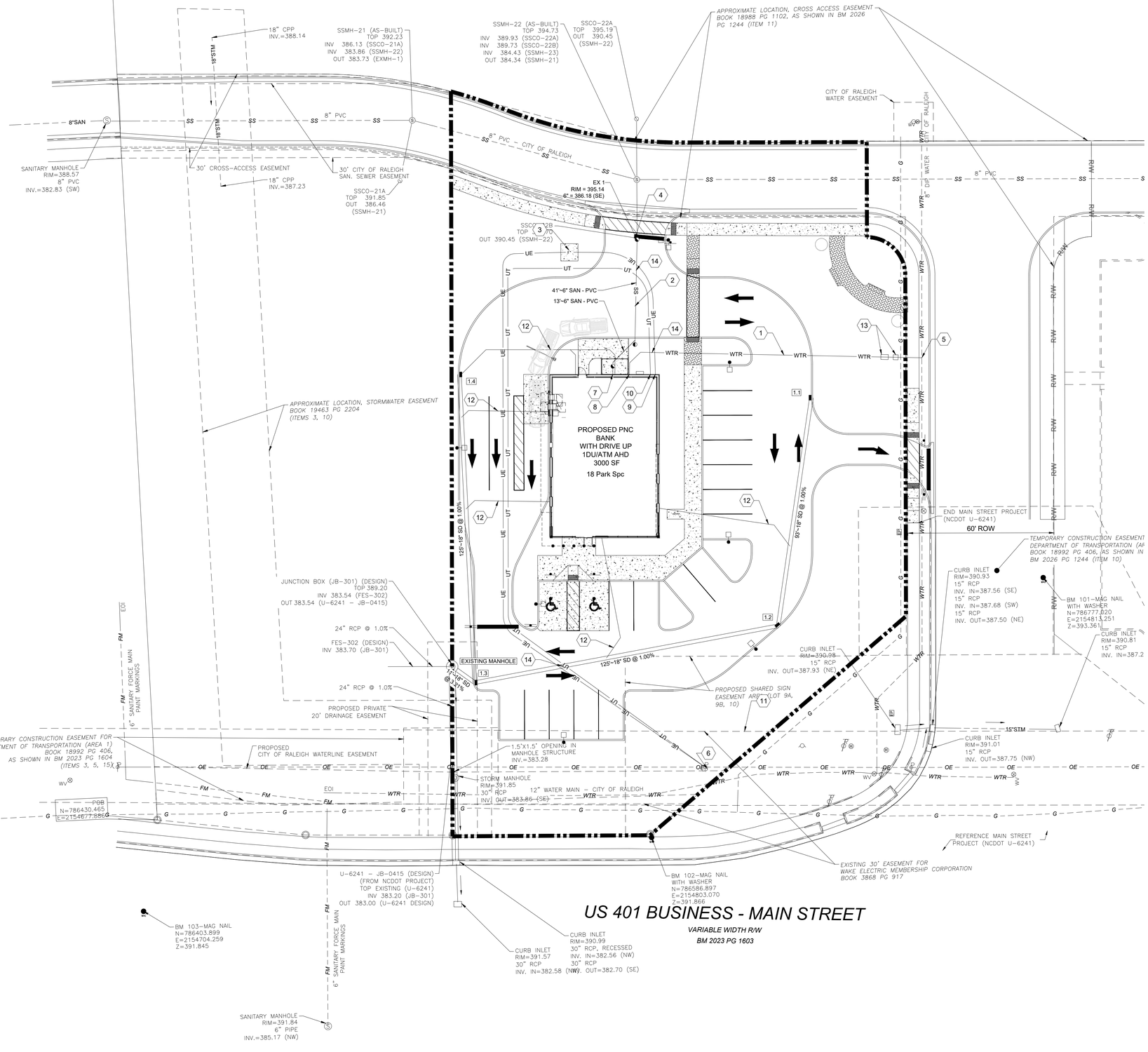
SHEET ID:
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PROJECT STATUS:
100% DESIGN DOCUMENTS

811 Know what's below. Call before you dig.

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UTILITY LEGEND

1.1	PROPOSED STORM STRUCTURE ID
2.1	PROPOSED SANITARY SEWER STRUCTURE ID
	PROPOSED CLEANOUT

KEYNOTES (X)

1. 1-1/2" COPPER K DOMESTIC WATER SERVICE LINE.
2. 6" SANITARY SEWER LINE AT 0.50% MINIMUM SLOPE.
3. PROPOSED TRANSFORMER. CONTRACTOR TO COORDINATE WITH ELECTRIC COMPANY.
4. CONNECT TO FUTURE SANITARY SEWER. CONTRACTOR TO VERIFY LOCATION AND ELEVATION.
5. CONTRACTOR TO CONNECT TO FUTURE WATER SERVICE LINE PER AGENCY REQUIREMENTS.
6. CONTRACTOR TO CONNECT ELECTRICAL AND TELECOMMUNICATION SERVICE TO EXISTING POWER POLE.
7. SANITARY SEWER SERVICE BUILDING CONNECTION. SEE PLUMBING PLANS FOR DETAILS.
8. WATER SERVICE BUILDING CONNECTION. SEE PLUMBING PLANS FOR DETAILS.
9. ELECTRICAL SERVICE BUILDING CONNECTION. SEE ELECTRICAL PLANS FOR DETAILS.
10. COMMUNICATIONS LINE BUILDING CONNECTION. SEE ELECTRICAL PLANS FOR DETAILS.
11. EXISTING 30' EASEMENT TO WAKE ELECTRIC MEMBERSHIP CORP.
12. BUILDING/DOWNSPOUT CONNECTION. SEE ARCHITECTURAL PLANS FOR DETAILS.
13. WATER SERVICE VALVE AND METER BOX. SEE SHEET C803 FOR DETAILS.
14. MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES. (1)

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0 20 40 60
GRAPHIC SCALE IN FEET

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WOOLPERT

PNC BANK

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PNC NC ROLESVILLE

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ROLESVILLE, NC 27571

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DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH
PROJECT NUMBER:	10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

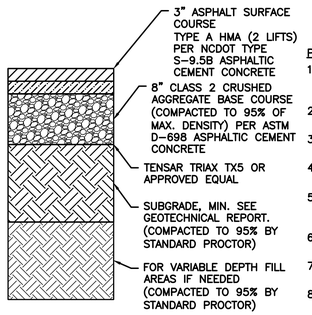
SHEET TITLE:
UTILITY PLAN

SHEET ID:
C401

PROJECT STATUS:
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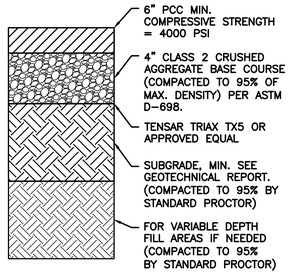
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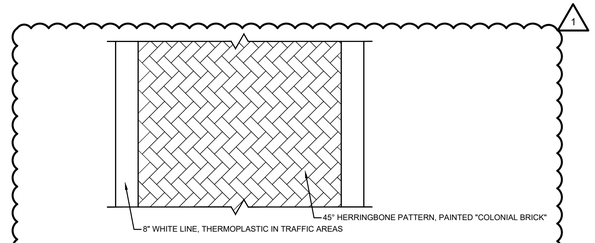
PAVEMENT SECTION CONSTRUCTION NOTES:

1. COORDINATE WITH GEOTECHNICAL REPORT FOR PAVEMENT SECTION, DENSIFICATION, SUBGRADE PREPARATION, AND ENGINEERED FILL PLACEMENT RECOMMENDATIONS. SHOULD A CONFLICT EXIST, NOTIFY ENGINEER PRIOR TO CONSTRUCTION.
2. UNDERCUT ANY UNSUITABLE MATERIAL UP TO 24" AS REQUIRED AND REPLACE WITH SELECT MATERIAL AS DETERMINED BY LICENSED GEOTECHNICAL ENGINEER.
3. NO BASE COURSE SHALL BE PLACED ON MULCH, PINE CLAY, ORGANIC MATTER OR OTHER UNSUITABLE MATERIAL.
4. WHEN CURBING IS NOT SPECIFIED, BASE COURSE SHALL EXTEND A MINIMUM OF 12" BEYOND EDGE OF ASPHALT.
5. THE PAVEMENT DESIGN SHOWN REPRESENTS THE MINIMUM THICKNESS OF SURFACE AND BASE COURSE TO BE USED. SUBGRADE SOILS TESTS MAY DETERMINE HEAVIER PAVEMENT DESIGNS ARE REQUIRED.
6. ALL MATERIALS SHALL MEET THE REQUIREMENTS SET FORTH IN THE LATEST DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS.
7. CONTRACTOR SHALL NOTIFY ENGINEER IF SATURATED SUBGRADE IS ENCOUNTERED DURING CONSTRUCTION AS ADDITIONAL DRAINAGE MEASURES MAY BE REQUIRED.
8. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.

LIGHT DUTY ASPHALT PAVEMENT SECTION
N.T.S.

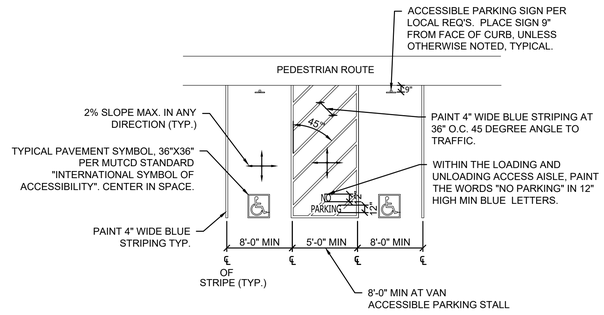


CONCRETE PAVEMENT
N.T.S.



NOTES:
1.) CONTROL JOINTS 5'-0" O.C. MAX.
2.) EXPANSION JOINTS 20'-0" O.C. MAX.
3.) USE CONCRETE PAVEMENT DETAIL (THIS SHEET) IN AREAS OF VEHICULAR USE.

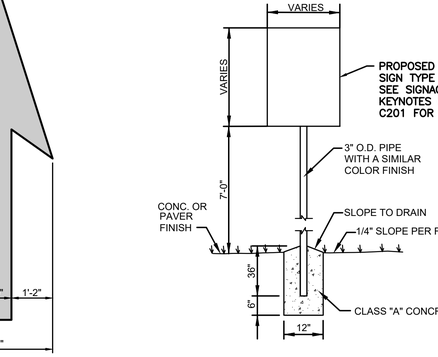
STAMPED CONCRETE CROSSWALK DETAIL
N.T.S.



NOTES:

1. THE INFORMATION AND DIMENSIONS PROVIDED ON THE SITE PLAN SHALL APPLY UNLESS OTHERWISE NOTED.
2. VAN ACCESSIBLE SPACES SHALL BE 16' WIDE (SPACE AND ACCESS AISLE). VAN ACCESSIBLE SPACE CAN BE 11' MIN PARKING SPACE WITH 5' ACCESS AISLE OR 8' MIN PARKING SPACE WITH AN 8' MIN ACCESS AISLE.

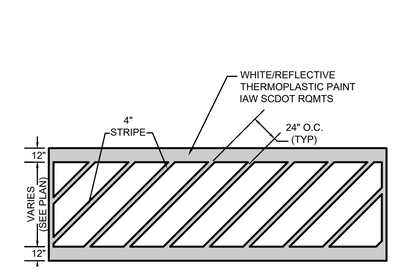
ACCESSIBLE PARKING STALLS
N.T.S.



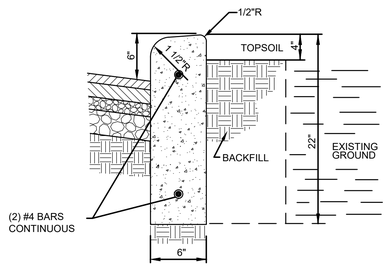
NOTES:

1. BOLLARD NOT REQUIRED IF ACCESSIBLE SIGNAGE IS LOCATED IN GRASS AND OVER THREE (3) FEET BEYOND THE BACK OF CURB.
2. FOR NON-VAN ACCESSIBLE PARKING SIGNAGE, ALIGN TOP OF THE SIGN WITH VAN ACCESSIBLE PARKING.
3. SIGNS LOCATED WITHIN A CIRCULATION PATH SHALL BE A MINIMUM OF 80 INCHES ABOVE THE FINISH FLOOR OR GROUND SURFACE MEASURED TO THE BOTTOM OF THE SIGN.

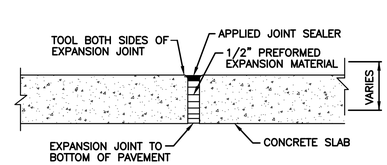
ADA PARKING SIGN
N.T.S.



PEDESTRIAN CROSSWALK
N.T.S.

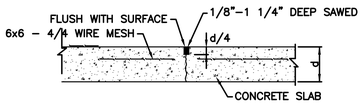


6" CONCRETE CURB
N.T.S.



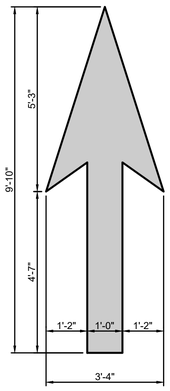
NOTE:
FOR LANDSIDE AND SIDEWALK APPLICATIONS ONLY. SEE SHEET C-518 AIRFIELD PAVING JOINTS.

EXPANSION JOINT
N.T.S.



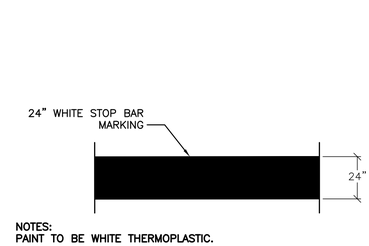
CONTROL JOINT
N.T.S.

NOTES:
1.) CONTRACTION JOINTS SHALL BE PLACED EVERY 20' MAX. TO A DEPTH OF 1 1/2".
2.) FULL DEPTH SEPARATORS ARE NOT PERMITTED EXCEPT AT EXPANSION JOINTS.
3.) EXPANSION JOINTS TO BE PLACED @ 100' MAXIMUM.



TRAFFIC ONE-WAY ARROW
N.T.S.
NOTE: ALL ARROWS TO BE PAINTED REFLECTIVE THERMOPLASTIC WHITE

SIGNAGE DETAIL
N.T.S.



NOTES:
PAINT TO BE WHITE THERMOPLASTIC.

ROADWAY STOP BAR MARKING
N.T.S.

Know what's **below.** **Call** before you dig.

RS&H
1520 South Blvd., Suite 200
Charlotte, NC 28203
Phone: 704-752-0610, Fax: 704-949-2672
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North Carolina License Nos. 50073 * F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH

PROJECT NUMBER:
10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
DETAILS

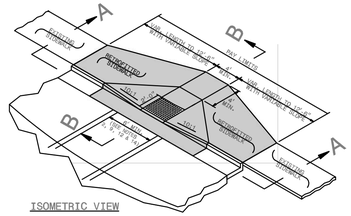
SHEET ID:
C801

PROJECT STATUS:
100% DESIGN DOCUMENTS

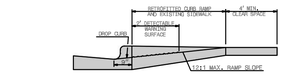
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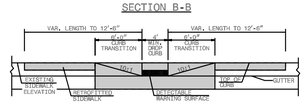
V3_SDP_PNC Bank Rolesville.pdf.pdf · Page 10



ISOMETRIC VIEW



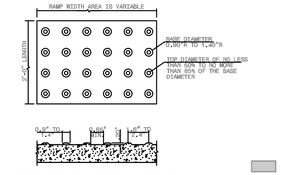
SECTION B-B



SECTION A-A

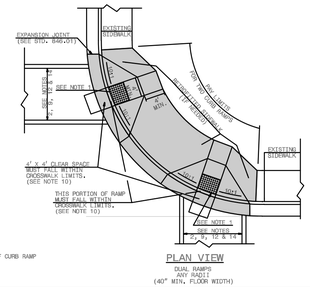
NOTES:
DETECTABLE WARNING SURFACE SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.

DETECTABLE WARNING SURFACE SHALL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING SURFACE

PAY LIMITS OF CURB RAMP



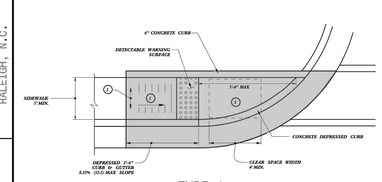
PLAN VIEW

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

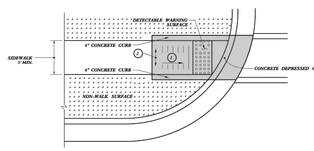
1-24

ROADWAY STANDARD DRAWING FOR
CURB RAMP
CURB RAMP AND EXISTING SIDEWALK ADJACENT TO CURB

SHEET 3 OF 13
848.06



TYPE 1

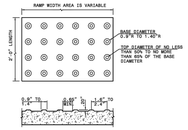


TYPE 1 MODIFIED

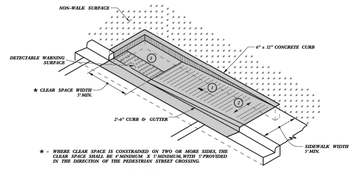
1. 4.0% (12:1) MAX RAMP SLOPE
2. CROSS SLOPE: 2.0%
3. MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.0%.

NOTES:
DETECTABLE WARNING SURFACE SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.

DETECTABLE WARNING SURFACE SHALL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING SURFACE



★ - WHERE CLEAR SPACE IS CONSTRAINED ON TWO OR MORE SIDES, THE CLEAR SPACE SHALL BE 4'-0"MINIMUM, 5'-0"PREFERRED, WITH 5'PROVIDED IN THE DIRECTION OF THE PEDESTRIAN STREET CROSSING.

TYPE 1A

PAY LIMITS FOR 1 CURB RAMP

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CURB RAMP
DIRECTIONAL RAMP

SHEET 4 OF 13
848.06

NOTES:

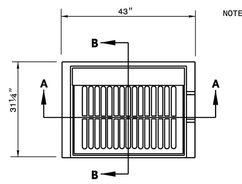
1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4'x4' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' FROM THE BACK OF PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT CLEAR SPACES FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT CLEAR SPACES FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. IF CONSTRAINED ON TWO OR MORE SIDES, THE THE CLEAR SPACE SHALL BE 4' MINIMUM X 5' MINIMUM, WITH 5' PROVIDED IN THE DIRECTION OF THE PEDESTRIAN STREET CROSSING.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGH THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5'X5' CLEAR SPACE AT THE TOP OF RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP, WHERE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE, OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01.
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. DETECTABLE WARNING SURFACES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
19. DETECTABLE WARNING SURFACES WILL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CURB RAMP
NOTES

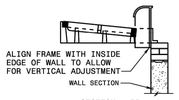
SHEET 2 OF 13
848.06



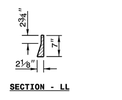
PLAN

FRAME,GRATE, & HOOD ASS'Y

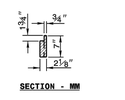
NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.



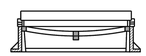
SECTION - BB



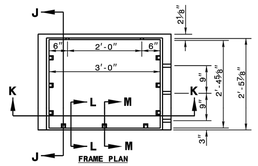
SECTION - LL

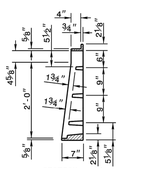


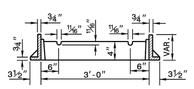
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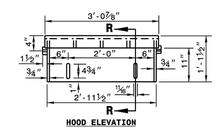
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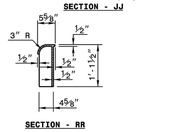






SECTION - KK



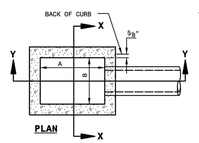


STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

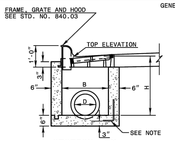
1-24

ROADWAY STANDARD DRAWING FOR
FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

SHEET 1 OF 2
840.03



PLAN



SECTION X-X

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

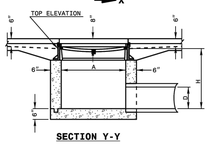
FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

MAXIMUM DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 16'-0". STD. NO. 840.45 CONTROLS MAXIMUM DEPTH IF PRECAST BOX IS USED.

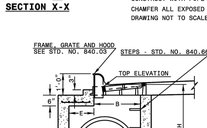
CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

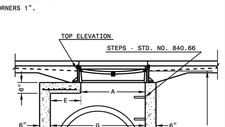


SECTION Y-Y



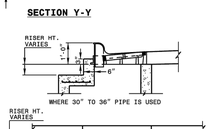
SECTION J-J

WHERE 30" TO 36" PIPE IS USED

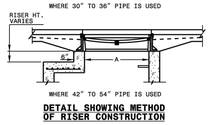


SECTION M-M

WHERE 42" TO 54" PIPE IS USED

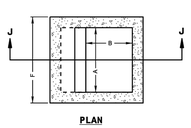


WHERE 30" TO 36" PIPE IS USED

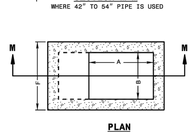


WHERE 42" TO 54" PIPE IS USED

DETAIL SHOWING METHOD OF RISER CONSTRUCTION



PLAN



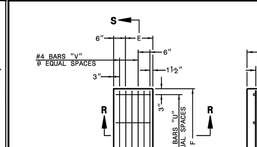
PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

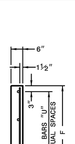
1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

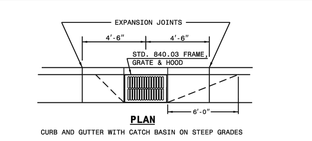
SHEET 1 OF 2
840.02



PLAN OF TOP SLAB

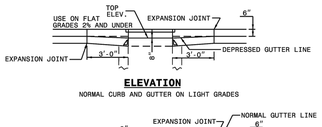


SECTION S-S



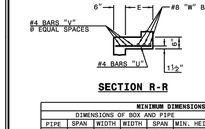
PLAN

CURB AND GUTTER WITH CATCH BASIN ON STEEP GRADES

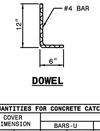


ELEVATION

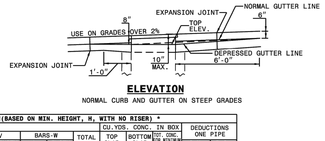
NORMAL CURB AND GUTTER ON LIGHT GRADES



SECTION R-R



DOWEL



ELEVATION

NORMAL CURB AND GUTTER ON STEEP GRADES

MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN(BASED ON MIN. HEIGHT, H, WITH NO RISER) *

DIMENSIONS OF BOX AND PIPE							COVER DIMENSION		BARS-U		BARS-V		BARS-W		TOTAL LBS.	CU.YDS. CONC. IN BOX		DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT				NO.	LENGTH	NO.	LENGTH	NO.	LENGTH		TOP SLAB	BOTTOM SLAB	CU. CONC. IN BOTTOM SLAB	C.M.	R.C.
D	A	B	C	G	H		E	F												
12"	3'-0"	2'-2"	--	--	2'-9"		--	--	--	--	--	--	--	--	--	--	0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			3'-0"												0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			3'-3"												0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"												0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"		1'-2"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.123	0.321	1.433	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"		1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-5"	5'-3"		1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.738	0.180	0.243
48"	3'-0"	2'-2"		5'-0"	5'-9"		2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"		2'-7"	3'-2"	4	2'-10"	5	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401

* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CONCRETE CATCH BASIN
12" THRU 54" PIPE

SHEET 2 OF 2
840.02

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
DRAWN BY: MEH
DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
DETAILS

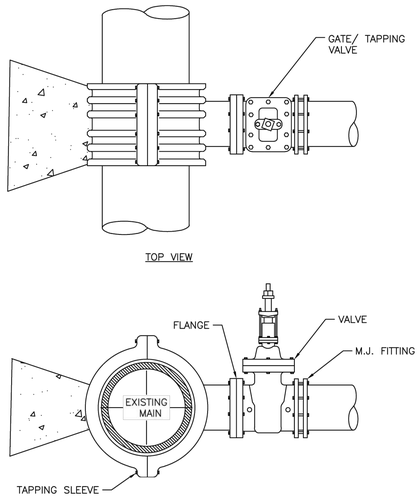
SHEET ID:
C802

PROJECT STATUS:
100% DESIGN DOCUMENTS

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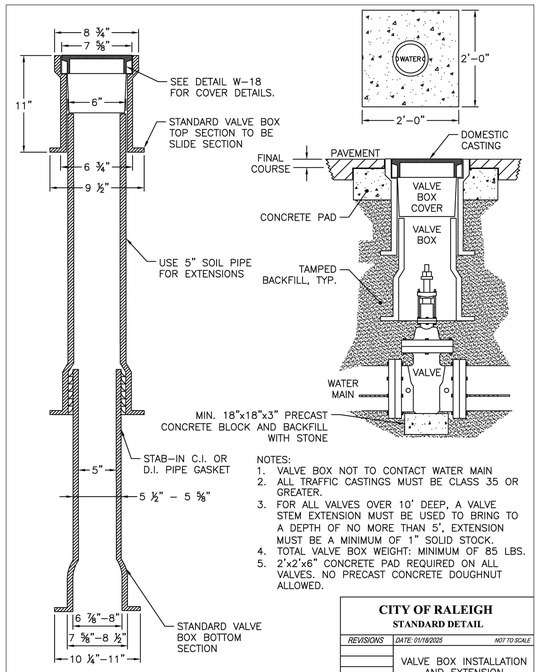
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NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE DETAIL W-10 & W-11 (REACTION BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
3. 3,000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.
4. FULL CIRCUMFERENCE SLEEVE, STAINLESS STEEL MATERIAL REQUIRED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	4"–24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY	
	W-14	

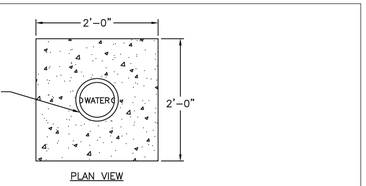


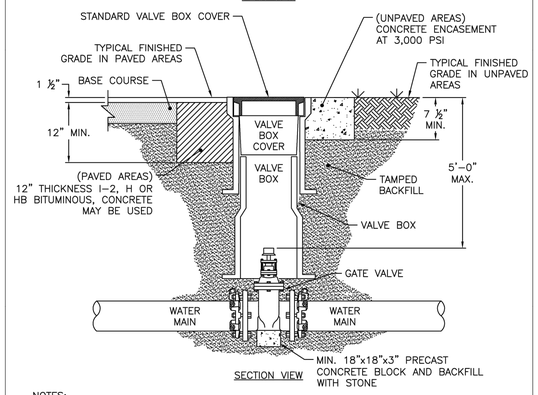
APPROVED METHOD FOR EXTENSION OF VALVE BOX

NOTES:
1. VALVE BOX NOT TO CONTACT WATER MAIN
2. ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
3. FOR ALL VALVES OVER 10' DEEP, A VALVE STEM EXTENSION MUST BE USED TO BRING TO A DEPTH OF NO MORE THAN 5', EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK.
4. TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.
5. 2'x2'x6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	VALVE BOX INSTALLATION AND EXTENSION	
	W-17	

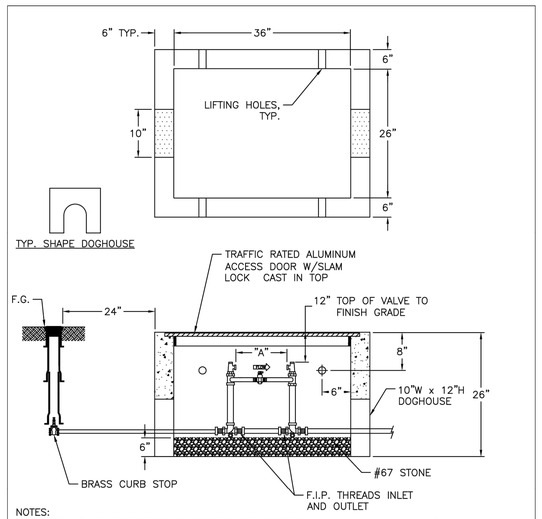




NOTES:
1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. VALVE OPERATING NUT MUST BE EXTENDED SO THAT THE DEPTH IS NO GREATER THAN 5' FROM THE SURFACE USING A MANUFACTURER APPROVED EXTENSION KIT.
3. PRECAST CONCRETE ENCASEMENT IS ALLOWED OUTSIDE OF PAVED AREAS.
4. VALVE BOX SHOULD NOT CONTACT MAIN OR VALVE.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	VALVE AND BOX INSTALLATION	
	W-17A	



NOTES:
1. METER AS MANUFACTURED BY SENSUS OR NEPTUNE. METER TO BE PROVIDED BY RALEIGH WATER.
2. BACKFILL TAMPED IN 6" LIFTS.
3. REINFORCEMENT: #4 @ 6" O.C.E.W.
4. CONCRETE: 4,000 PSI @ 28 DAYS.
5. ALL RPZ BACKFLOW PREVENTION DEVICES MUST BE INSTALLED PRIOR TO METER BEING SET.
6. ALL COPPER SETTERS ARE TO HAVE A BALL TYPE SHUT OFF VALVE ON BOTH SIDES OF COPPER SETTER WITH HIGH RISE BYPASS THAT IS MANUFACTURED BY FORD, MUELLER, OR AY McDONALD (NO EXCEPTIONS).
7. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

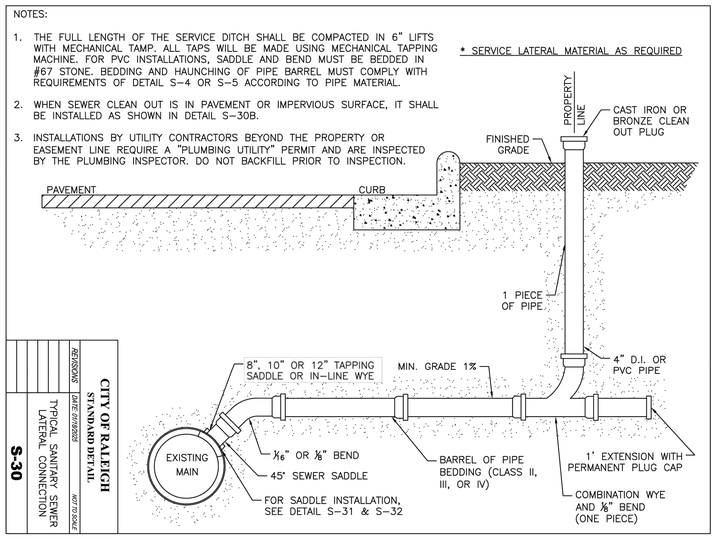
"A"	
1 ½" METER	13 ¼"
2" METER	17 ¼"

** TRAFFIC RATED VAULT WALL THICKNESS

CITY OF RALEIGH
STANDARD DETAIL

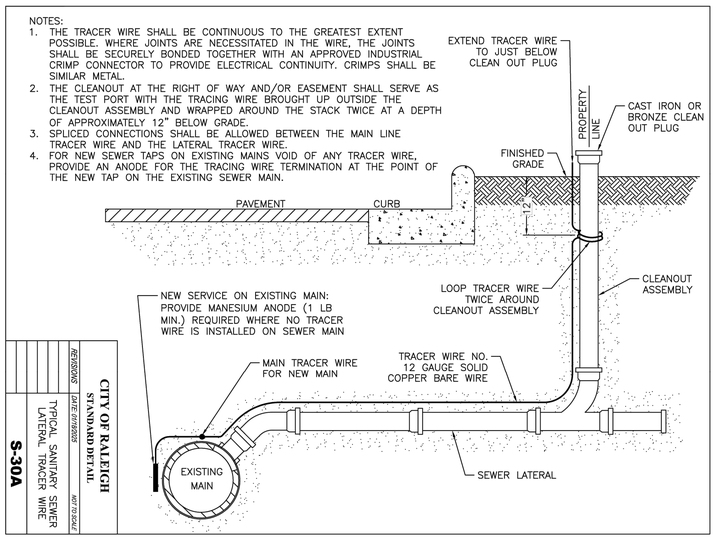
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	TYPICAL 1 ½"–2" WATER METER BOX INSTALLATION	
	W-31	

NOTES:
1. THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6" LIFTS WITH MECHANICAL TAMP. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING MACHINE. FOR PVC INSTALLATIONS, SADDLE AND BEND MUST BE BEDDED IN #67 STONE. BEDDING AND HAUNCHING OF PIPE BARREL MUST COMPLY WITH REQUIREMENTS OF DETAIL S-4 OR S-5 ACCORDING TO PIPE MATERIAL.
2. WHEN SEWER CLEAN OUT IS IN PAVEMENT OR IMPERVIOUS SURFACE, IT SHALL BE INSTALLED AS SHOWN IN DETAIL S-30B.
3. INSTALLATIONS BY UTILITY CONTRACTORS BEYOND THE PROPERTY OR EASEMENT LINE REQUIRE A "PLUMBING UTILITY" PERMIT AND ARE INSPECTED BY THE PLUMBING INSPECTOR. DO NOT BACKFILL PRIOR TO INSPECTION.



CITY OF RALEIGH
STANDARD DETAIL
REVISIONS | DATE: 01/18/2025 | NOT TO SCALE
TYPICAL SANITARY SEWER LATERAL CONNECTION
S-30

NOTES:
1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. WHERE JOINTS ARE NECESSITATED IN THE WIRE, THE JOINTS SHALL BE SECURELY BONDED TOGETHER WITH AN APPROVED INDUSTRIAL CRIMP CONNECTOR TO PROVIDE ELECTRICAL CONTINUITY. CRIMPS SHALL BE SIMILAR METAL.
2. THE CLEANOUT AT THE RIGHT OF WAY AND/OR EASEMENT SHALL SERVE AS THE TEST PORT WITH THE TRACING WIRE BROUGHT UP OUTSIDE THE CLEANOUT ASSEMBLY AND WRAPPED AROUND THE STACK TWICE AT A DEPTH OF APPROXIMATELY 12" BELOW GRADE.
3. SPLICED CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN LINE TRACER WIRE AND THE LATERAL TRACER WIRE.
4. FOR NEW SEWER TAPS ON EXISTING MAINS VOID OF ANY TRACER WIRE, PROVIDE AN ANODE FOR THE TRACING WIRE TERMINATION AT THE POINT OF THE NEW TAP ON THE EXISTING SEWER MAIN.



CITY OF RALEIGH
STANDARD DETAIL
REVISIONS | DATE: 01/18/2025 | NOT TO SCALE
TYPICAL SANITARY SEWER LATERAL TRACER WIRE
S-30A

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
2	TOWN COMMENTS 2	07/31/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH
PROJECT NUMBER:	**10020503.29**

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
DETAILS

SHEET ID:
C803

PROJECT STATUS:
100% DESIGN DOCUMENTS

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PNC BANK
800 S. MAIN ST. ROLESVILLE, NC 27571
SITE DEVELOPMENT PLAN
SDP-26-0003, PU-032343-2026, SWF-175396-2026, SEC-175450-2026
APRIL 30TH, 2026

PROJECT TEAM

CONTACTS:

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ALICIA.RUEBELMAN@WOOLPERT.COM

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NICHOLAS.BRADFORD@RSANDH.COM

WATER AND SEWER
CITY OF RALEIGH
CHRIS WORTHY
CHRISTOPHER.WORTHY@RALEIGHNC.GOV
919.996.2311

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CAROLINASNEWCONSTRUCTION@DUKE-ENERGY.COM
800.636.0581

STORMWATER
WAKE COUNTY
WAYNE.MILES@RALEIGHNC.GOV
919.554.6517

DEVELOPER/OWNER
CROSLAND SOUTHEAST
AUSTIN WILLIAMS
AWILLIAMS@CSERE.COM
704.621.6430

TENANT CONTACT
PNC BANK
THOMAS OLSEN
THOMAS.OLSEN@PNC.COM
919.788.5773

SITE INFO:

TOWNSHIP: WAKE FOREST
COUNTY: WAKE COUNTY
STATE: NORTH CAROLINA

TOTAL PROJECT AREA: 1.09 ACRES

PARCEL ID: 1758465891

ZONING CLASSIFICATION: GC-CZ; GENERAL COMMERCIAL, CONDITIONAL ZONING DISTRICT
LAND USE: BANKS/CREDIT UNIONS, FINANCIAL SERVICES (INCLUDING DRIVE-THROUGH)
DISTURBED AREA: 0.77 ACRES

LEGAL DESCRIPTION: LO9B WALLBROOK PARIS TR SUB BM2026-01244

WATERSHED: UPPER NEUSE

RIVER BASIN: NEUSE

CURRENT USE (EXISTING): VACANT LOT
CURRENT IMPERVIOUS (EXISTING): 0.11 ACRES

PROPOSED IMPERVIOUS: 0.55 ACRES
MAXIMUM IMPERVIOUS AREA: 85%

MINIMUM FRONT BUILDING SETBACK (S. MAIN): 20 FEET
MINIMUM SIDE BUILDING SETBACK: 15 FEET
MINIMUM REAR BUILDING SETBACK: 35 FEET
MINIMUM CORNER BUILDING SETBACK (VIRGINIA WATER DR): 25 FEET

MINIMUM LOT WIDTH: 100 FEET

PARKING DATA: SEE SHEET C-201 FOR DETAILS

MINIMUM MAIN STREET LANDSCAPE BUFFER: 30 FEET
MINIMUM REAR LANDSCAPE BUFFER: 25 FEET
MINIMUM INTERIOR LOT LANDSCAPE BUFFER: 0 FEET

TREE COVERAGE DATA: SITE TO BE CLEARED AND GRUBBED

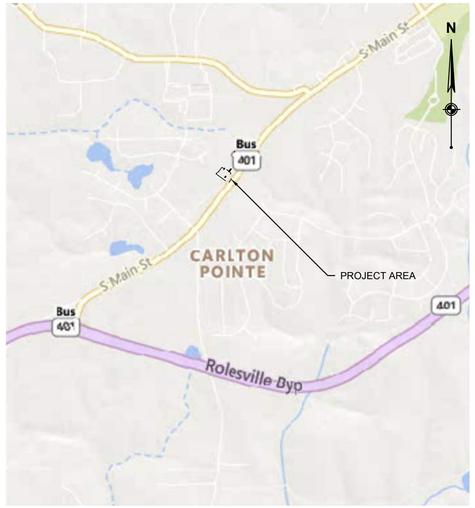
BUILDING HEIGHT: MAXIMUM 35 FEET, PROVIDED 18 FEET

BUILDING SQUARE FOOTAGE: 3000 SF

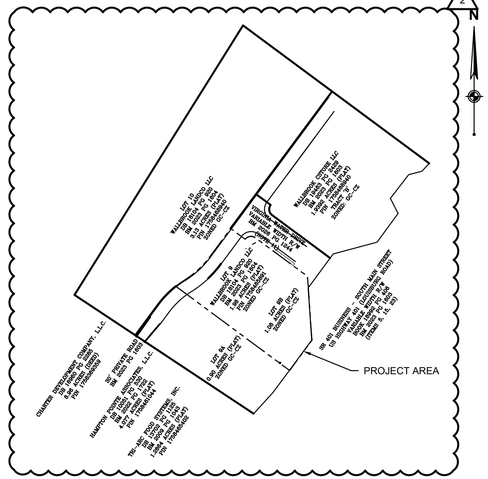
FEMA NOTE: ZONE X, 3720175800K, EFF. 7/19/2022

FLOODPLAIN: N/A

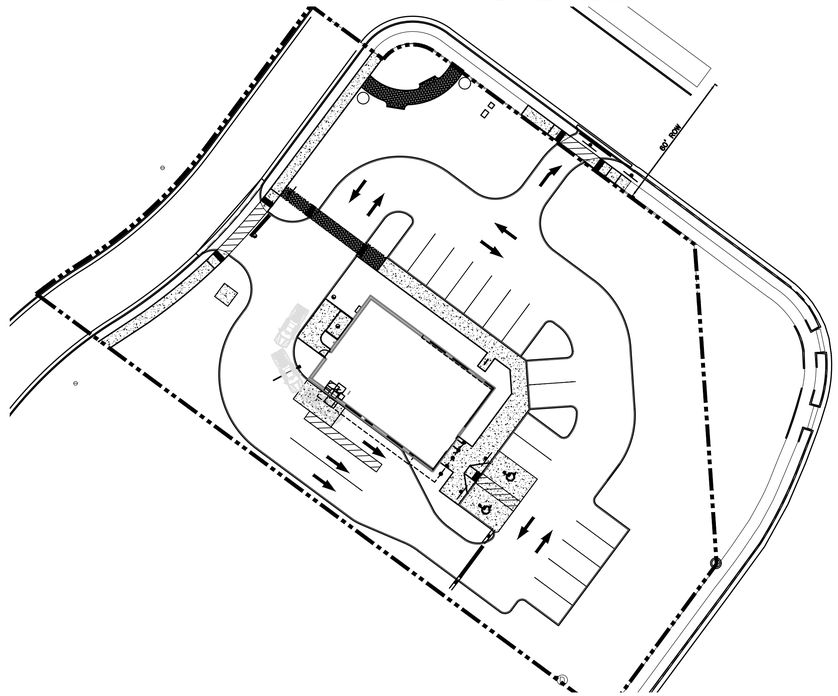
VICINITY MAP



DEVELOPMENT MAP



SITE PLAN



SHEET INDEX

SHEET NUMBER		SHEET TITLE	REVISION DATE
1	C000	COVER SHEET	07/31/2026
2	C001	GENERAL NOTES AND LEGEND	07/31/2026
3	C101	EXISTING CONDITIONS PLAN	07/31/2026
4	C201	SITE PLAN	07/31/2026
5	C301	GRADING & DRAINAGE PLAN	07/31/2026
6	C302	EROSION CONTROL PLAN	07/31/2026
7	C303	EROSION CONTROL DETAILS	07/31/2026
8	C304	EROSION CONTROL DETAILS	07/31/2026
9	C401	UTILITY PLAN	07/31/2026
10	C801	DETAILS	07/31/2026
11	C802	DETAILS	07/31/2026
12	C803	DETAILS	07/31/2026
13	LP101	LANDSCAPE PLAN	06/30/2026
14	LP102	LANDSCAPE PLAN	06/30/2026
15	IR-1	IRRIGATION PLAN	07/01/2026
16	E100	ELECTRICAL SITE PLAN	07/01/2026
17	E601	ELECTRICAL SITE PHOTOMETRICS	07/01/2026
18	E602	ELECTRICAL ATM PHOTOMETRICS	07/01/2026
19	E603	ELECTRICAL COMCHECK	07/01/2026
20	AS101	ARCHITECTURAL SITE PLAN	07/01/2026
21	A121	ROOF PLAN	07/01/2026
22	A201	BUILDING ELEVATIONS	07/01/2026
23	A202	BUILDING ELEVATIONS	07/01/2026
24	A311	WALL SECTIONS	07/01/2026
25	A313	WALL SECTIONS	07/01/2026
26	A501	WALL DETAILS	07/01/2026

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WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
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DATE ISSUED: 04/30/2026
REVIEWED BY: ANR
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DESIGNED BY: JFH
PROJECT NUMBER: 10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
COVER SHEET

SHEET ID:
C000

PROJECT STATUS:
100% DESIGN DOCUMENTS

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Cover Sheet from V3_SDP_PNC Bank Rolesville.pdf · Page 1

WOOLPERT

Storm Water Cover Letter

To:	Wake County, Watershed Management 336 Fayetteville Street, Raleigh, NC 27601
From:	Jackson Hardin, PE
Date:	July 15, 2026
Subject:	Proposed PNC Bank – 800 South Main Street – Storm Water Management Summary

INTRODUCTION

The proposed PNC Bank will be built on a vacant lot as part of the Wallbrook Development - Paris Tract. The purpose of this submittal is to seek approval from Wake County Watershed Management for the proposed site and its stormwater infrastructure.

SITE DESCRIPTION

1. The existing site consists of 1.09 acres of open space area that has been used as a stockpile area during the construction of the development and a private road. There is an existing storm manhole and 24" RCP pipe located on the southwest portion of the site running north-south which ties into the development system that currently drains the outparcel to the development storm sewer system and ultimately into the regional detention basin.

2. The proposed PNC Bank site located in the western part of the Wallbrook Paris Tract and includes a 3,000 sq. ft. building with associated parking, drive aisles and utilities. The development will include two drive entrances, one off the eastern access drive in the adjacent master development and the other off the northern drive aisle.

3. The existing regional detention basin located with the Wallbrook development was designed by Ark Consulting Group, PLLC. The Stormwater Management Plan dated January of 2023 and allows for 85% built-upon area. The proposed site has 60%.

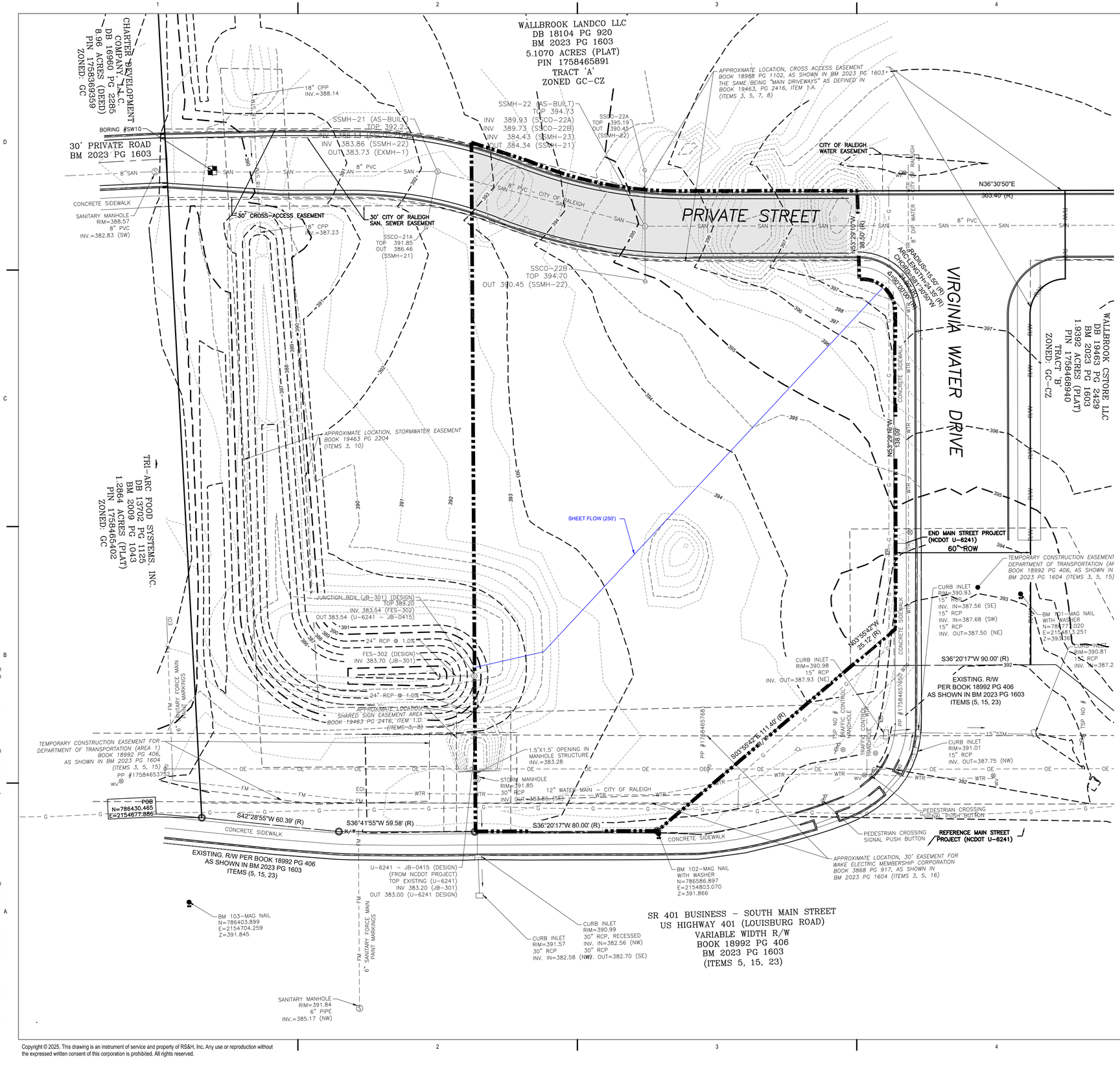
STORM SEWER DESIGN

The storm sewer piping is sized to convey the peak flow from the 100-yr storm event with the hydraulic grade line not surcharging the top of the structure. All pipes are HDPE and have a Mannings n value of 0.012. Pipes were sized using the Hydraflow Storm Sewers extension software in Autodesk Civil 3D. See calculations attached at the end of this memo for additional details on the storm sewer capacity calculations.



Reviewed by MTF
7/30/2026

Woolpert, Inc.
13860 Ballantyne Corporate Place, Suite 425
Charlotte, NC 28277
704.525.6284



GRADING LEGEND

- 701 — EXISTING 1' CONTOUR
- 700 — EXISTING 5' CONTOUR
- 701 — PROPOSED 1' CONTOUR
- 700 — PROPOSED 5' CONTOUR
- 701 — FUTURE 1' CONTOUR
- 700 — FUTURE 5' CONTOUR
- COMMERCIAL LAND USE - PARKING LOT
- COMMERCIAL LAND USE - ROOF
- COMMERCIAL LAND USE - OPEN

NOTES

1. SEE SHEET C001 FOR GENERAL NOTES AND LEGEND.
2. CONTRACTOR SHALL REFER TO OTHER PLANS WITHIN THIS CONSTRUCTION SET FOR OTHER PERTINENT INFORMATION. IT IS NOT THE ENGINEER'S INTENT THAT ANY SINGLE PLAN SHEET WITHIN THIS SET OF DOCUMENTS FULLY DEPICT ALL WORK ASSOCIATED WITH THE PROJECT.
3. FUTURE CONTOURS INDICATE EXISTING GRADE WHEN FUTURE CONSTRUCTION IS COMPLETED BEFORE CONSTRUCTION BEGINS FOR THIS PROJECT.

Know what's below. Call before you dig.

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F-0493 * C-28

WOOLPERT

PNC BANK

PROJECT TITLE:
PNC NC ROLESVILLE

APPLICATION REF. NO.
SDP-26-0003

PROJECT ADDRESS:
800 S. MAIN ST.
ROLESVILLE, NC 27571

REVISIONS

NO.	DESCRIPTION	DATE
1	TOWN COMMENTS	07/02/2026

DATE ISSUED:	04/30/2026
REVIEWED BY:	ANR
DRAWN BY:	MEH
DESIGNED BY:	JFH
PROJECT NUMBER:	10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059104 ENGINEER MICHAEL TODD FORD
7/30/2026

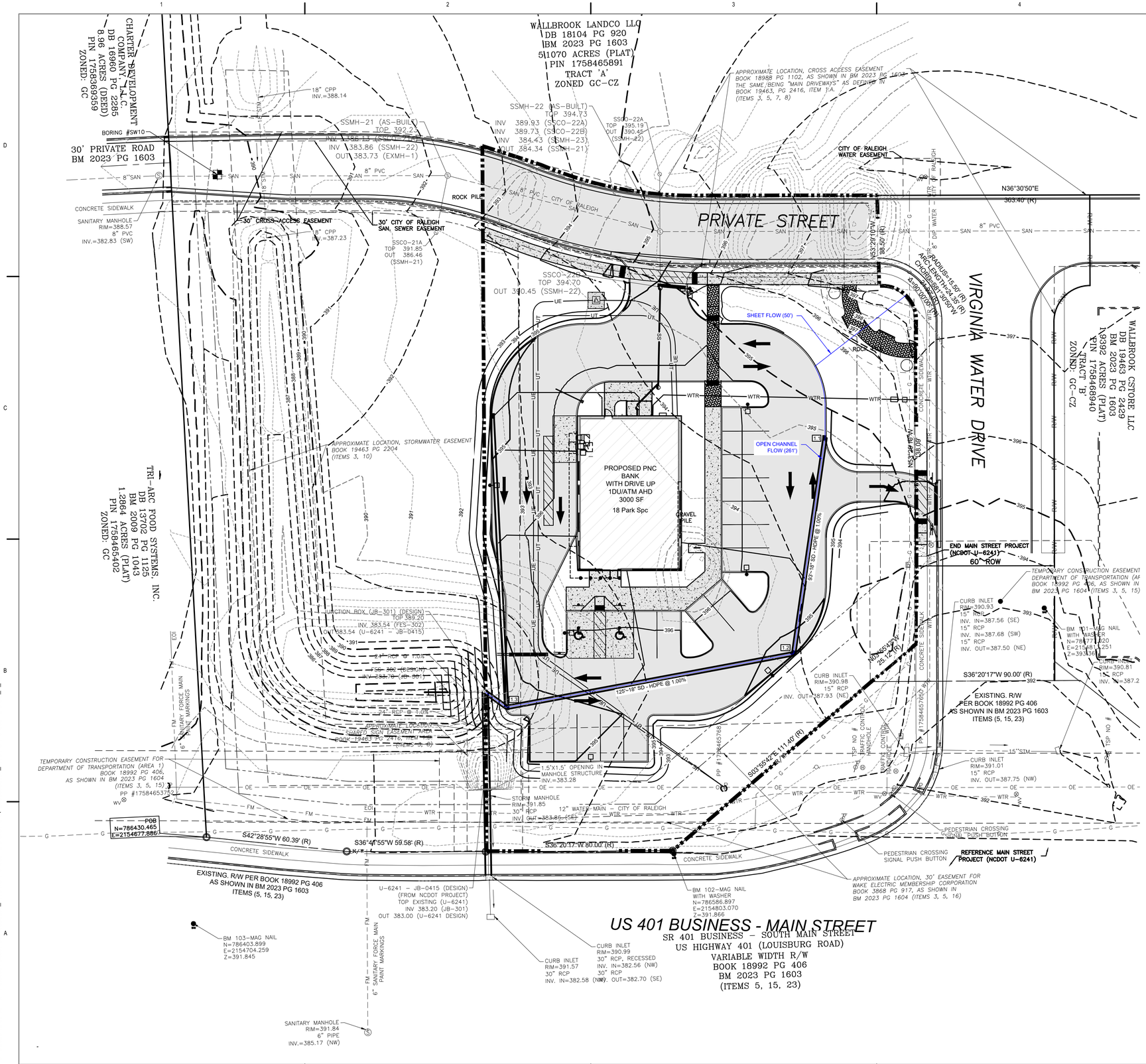
SHEET TITLE:
PRE-DEVELOPMENT DRAINAGE PLAN

SHEET ID:
1 OF 2

PROJECT STATUS:
100% DESIGN DOCUMENTS

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LEGEND

- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- FUTURE 1' CONTOUR
- FUTURE 5' CONTOUR
- PROPOSED STORM PIPE
- PROPOSED STORM STRUCTURES
- COMMERCIAL LAND USE - PARKING LOT
- COMMERCIAL LAND USE - ROOF
- COMMERCIAL LAND USE - OPEN

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DESIGNED BY:	JFH
PROJECT NUMBER:	10020503.29

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SEAL:
NORTH CAROLINA PROFESSIONAL SEAL 059304 ENGINEER MICHAEL TODD FORD
7/30/2026

SHEET TITLE:
POST-DEVELOPMENT DRAINAGE PLAN

SHEET ID:
2 OF 2

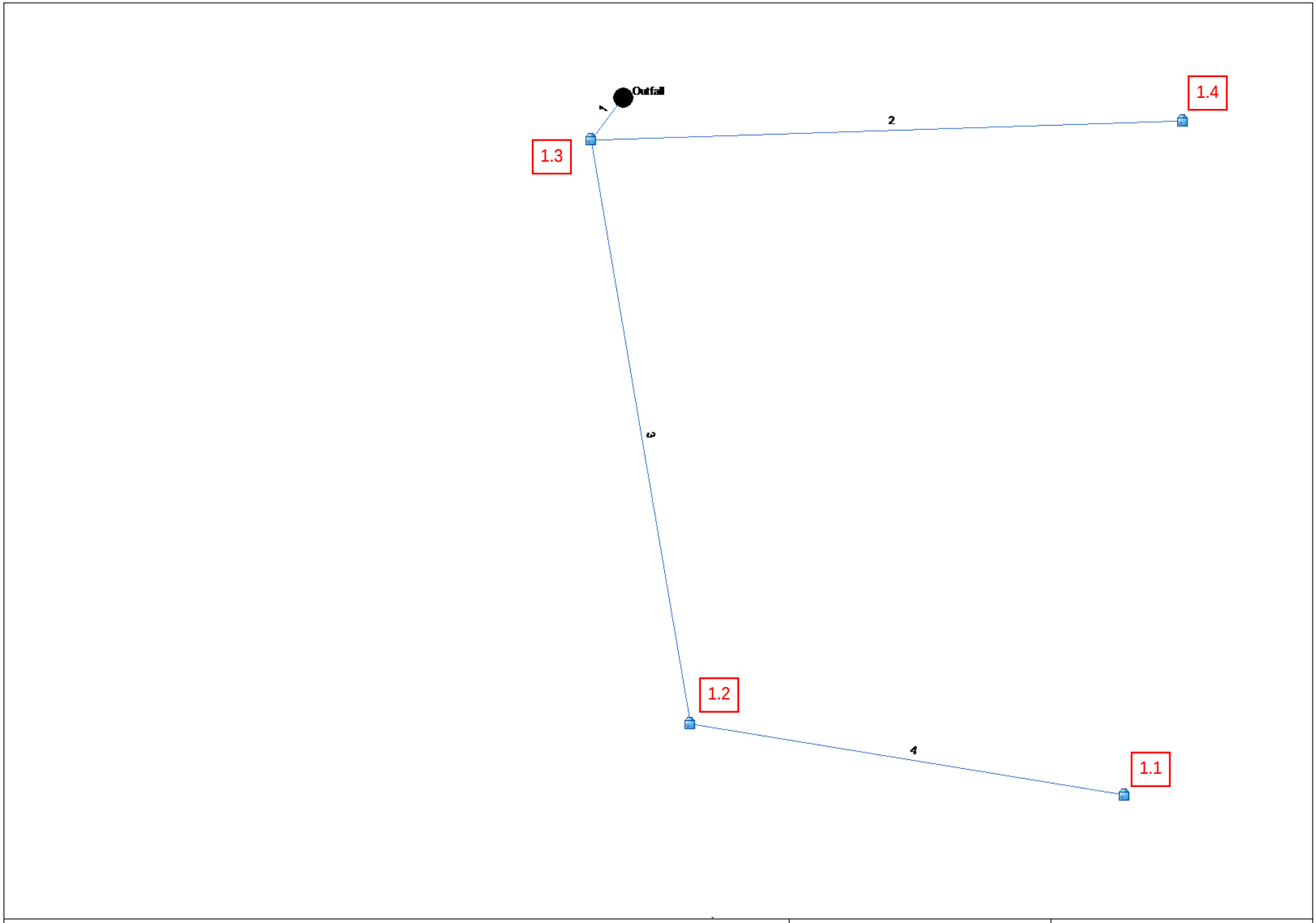
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PNC Bank Rolesville Stormwater Report to Wake County.pdf · Page 3

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: New.stm	Number of lines: 4	Date: 7/15/2026

Storm Sewers v2024.00

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	11.231	0.19	0.54	0.91	0.17	0.47	5.0	10.5	7.4	3.49	20.37	4.22	18	3.21	385.00	385.36	385.71	386.07	390.59	394.36	Pipe - (20)
2	1	125.000	0.15	0.15	0.88	0.13	0.13	5.0	5.0	9.1	1.21	11.38	3.63	18	1.00	389.85	391.10	390.18	391.51	394.36	394.60	Pipe - (19)
3	1	125.070	0.08	0.20	0.85	0.07	0.17	5.0	8.0	8.1	1.35	11.37	3.75	18	1.00	389.31	390.56	389.66	391.00	394.36	394.66	Pipe - (18)
4	3	93.000	0.12	0.12	0.83	0.10	0.10	5.0	5.0	9.1	0.91	11.38	2.49	18	1.00	390.56	391.49	391.00	391.85	394.66	394.99	Pipe - (16)

Project File: New.stm | Number of lines: 4 | Run Date: 7/15/2026

NOTES:Intensity = 51.76 / (Inlet time + 9.10) ^ 0.65; Return period =Yrs. 100 ; c = cir e = ellip b = box

PNC Bank Rolesville Stormwater Report to Wake County.pdf · Page 5

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	3.49	385.00	385.71	0.71	0.82	4.23	0.28	385.99	0.000	11.231	385.36	386.07	0.71**	0.83	4.22	0.28	386.35	0.000	0.000	n/a	1.00	0.28
2	18	1.21	389.85	390.18	0.33*	0.29	4.19	0.15	390.33	0.000	125.000	391.10	391.51	0.41**	0.39	3.08	0.15	391.66	0.000	0.000	n/a	1.00	0.15
3	18	1.35	389.31	389.66	0.35*	0.31	4.32	0.16	389.82	0.000	125.070	390.56	391.00	0.44**	0.43	3.17	0.16	391.15	0.000	0.000	n/a	0.96	0.15
4	18	0.91	390.56	391.00	0.44	0.32	2.14	0.13	391.12	0.000	93.000	391.49	391.85 j	0.36**	0.32	2.85	0.13	391.97	0.000	0.000	n/a	1.00	0.13

Project File: 10020503.29 Rolesville Storm Sizing.stm | Number of lines: 4 | Run Date: 7/30/2026

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

PNC Bank Rolesville Stormwater Report to Wake County.pdf · Page 6

PNC Waxhaw Runoff Coefficient Calculations

STR #: 1.10

Cover Type	C Value	Area (ac.)
Pervious	0.20	0.02
Impervious	0.95	0.10
	Total Area =	0.12

Weighted C Value = 0.83

STR #: 1.20

Cover Type	C Value	Area (ac.)
Pervious	0.25	0.01
Impervious	0.95	0.07
	Total Area =	0.08

Weighted C Value = 0.85

STR #: 1.30

Cover Type	C Value	Area (ac.)
Pervious	0.25	0.01
Impervious	0.95	0.13
	Total Area =	0.15

Weighted C Value = 0.88

STR #: 1.40

Cover Type	C Value	Area (ac.)
Pervious	0.25	0.01
Impervious	0.95	0.18
	Total Area =	0.19

Weighted C Value = 0.91

NOAA Atlas 14, Volume 2, Version 3
Location name: Rolesville, North Carolina, USA*
Latitude: 35.9103°, Longitude: -78.4775°
Elevation: 397 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	**4.84** (4.43-5.29)	**5.62** (5.16-6.14)	**6.41** (5.88-7.00)	**7.19** (6.58-7.85)	**7.98** (7.27-8.70)	**8.60** (7.80-9.37)	**9.16** (8.26-9.97)	**9.64** (8.64-10.5)	**10.2** (9.05-11.1)	**10.7** (9.40-11.7)
10-min	**3.86** (3.54-4.22)	**4.49** (4.12-4.91)	**5.13** (4.70-5.60)	**5.75** (5.26-6.28)	**6.36** (5.79-6.93)	**6.85** (6.21-7.46)	**7.27** (6.56-7.92)	**7.64** (6.85-8.34)	**8.05** (7.16-8.80)	**8.40** (7.40-9.19)
15-min	**3.22** (2.95-3.52)	**3.77** (3.46-4.12)	**4.33** (3.97-4.72)	**4.85** (4.44-5.29)	**5.37** (4.89-5.86)	**5.78** (5.24-6.30)	**6.13** (5.52-6.68)	**6.43** (5.76-7.02)	**6.76** (6.00-7.38)	**7.03** (6.20-7.69)
30-min	**2.21** (2.02-2.41)	**2.60** (2.39-2.84)	**3.07** (2.82-3.36)	**3.51** (3.21-3.83)	**3.98** (3.62-4.34)	**4.35** (3.95-4.74)	**4.69** (4.23-5.11)	**5.00** (4.48-5.46)	**5.38** (4.78-5.87)	**5.69** (5.02-6.23)
60-min	**1.38** (1.26-1.50)	**1.63** (1.50-1.78)	**1.97** (1.81-2.15)	**2.29** (2.09-2.50)	**2.65** (2.41-2.89)	**2.95** (2.68-3.21)	**3.23** (2.91-3.52)	**3.51** (3.14-3.83)	**3.86** (3.43-4.21)	**4.15** (3.66-4.54)
2-hr	**0.804** (0.731-0.887)	**0.957** (0.874-1.05)	**1.17** (1.06-1.28)	**1.37** (1.24-1.50)	**1.61** (1.45-1.76)	**1.82** (1.64-1.99)	**2.02** (1.80-2.21)	**2.23** (1.97-2.44)	**2.50** (2.19-2.73)	**2.73** (2.38-2.99)
3-hr	**0.567** (0.516-0.628)	**0.676** (0.617-0.746)	**0.828** (0.753-0.913)	**0.979** (0.888-1.08)	**1.16** (1.05-1.28)	**1.32** (1.19-1.45)	**1.48** (1.32-1.63)	**1.65** (1.46-1.81)	**1.88** (1.64-2.06)	**2.08** (1.80-2.29)
6-hr	**0.341** (0.311-0.377)	**0.406** (0.372-0.448)	**0.499** (0.455-0.548)	**0.590** (0.537-0.647)	**0.703** (0.636-0.770)	**0.805** (0.723-0.880)	**0.907** (0.808-0.990)	**1.01** (0.894-1.11)	**1.16** (1.01-1.26)	**1.29** (1.11-1.41)
12-hr	**0.200** (0.183-0.220)	**0.238** (0.219-0.261)	**0.293** (0.269-0.322)	**0.349** (0.318-0.382)	**0.419** (0.380-0.458)	**0.483** (0.434-0.525)	**0.548** (0.488-0.595)	**0.618** (0.543-0.670)	**0.713** (0.618-0.774)	**0.801** (0.684-0.871)
24-hr	**0.119** (0.110-0.128)	**0.143** (0.134-0.155)	**0.180** (0.168-0.194)	**0.210** (0.195-0.226)	**0.249** (0.231-0.268)	**0.281** (0.260-0.303)	**0.314** (0.289-0.338)	**0.348** (0.319-0.374)	**0.394** (0.359-0.425)	**0.431** (0.391-0.465)
2-day	**0.069** (0.064-0.074)	**0.083** (0.077-0.089)	**0.103** (0.096-0.111)	**0.119** (0.111-0.129)	**0.141** (0.131-0.152)	**0.159** (0.147-0.171)	**0.177** (0.163-0.190)	**0.195** (0.179-0.210)	**0.220** (0.201-0.238)	**0.240** (0.218-0.260)
3-day	**0.048** (0.045-0.052)	**0.058** (0.054-0.062)	**0.072** (0.067-0.078)	**0.083** (0.078-0.090)	**0.099** (0.091-0.106)	**0.111** (0.102-0.119)	**0.123** (0.114-0.132)	**0.136** (0.125-0.146)	**0.153** (0.140-0.165)	**0.167** (0.152-0.180)
4-day	**0.038** (0.036-0.041)	**0.046** (0.043-0.049)	**0.057** (0.053-0.061)	**0.066** (0.061-0.070)	**0.077** (0.072-0.083)	**0.087** (0.080-0.093)	**0.096** (0.089-0.103)	**0.106** (0.098-0.114)	**0.120** (0.110-0.129)	**0.131** (0.119-0.141)
7-day	**0.025** (0.024-0.027)	**0.030** (0.028-0.032)	**0.037** (0.034-0.039)	**0.042** (0.039-0.045)	**0.050** (0.046-0.053)	**0.055** (0.051-0.059)	**0.061** (0.057-0.066)	**0.067** (0.062-0.072)	**0.076** (0.070-0.081)	**0.083** (0.075-0.089)
10-day	**0.020** (0.019-0.021)	**0.024** (0.022-0.025)	**0.029** (0.027-0.031)	**0.033** (0.031-0.035)	**0.038** (0.035-0.040)	**0.042** (0.039-0.045)	**0.046** (0.043-0.049)	**0.051** (0.047-0.054)	**0.056** (0.052-0.060)	**0.061** (0.056-0.065)
20-day	**0.013** (0.012-0.014)	**0.016** (0.015-0.017)	**0.019** (0.018-0.020)	**0.021** (0.020-0.022)	**0.024** (0.023-0.026)	**0.027** (0.025-0.028)	**0.029** (0.027-0.031)	**0.032** (0.029-0.034)	**0.035** (0.033-0.038)	**0.038** (0.035-0.041)
30-day	**0.011** (0.010-0.012)	**0.013** (0.012-0.014)	**0.015** (0.014-0.016)	**0.017** (0.016-0.018)	**0.019** (0.018-0.020)	**0.021** (0.019-0.022)	**0.022** (0.021-0.024)	**0.024** (0.023-0.026)	**0.026** (0.025-0.028)	**0.028** (0.026-0.030)
45-day	**0.009** (0.009-0.010)	**0.011** (0.010-0.011)	**0.012** (0.012-0.013)	**0.014** (0.013-0.014)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.019** (0.018-0.020)	**0.021** (0.019-0.022)	**0.022** (0.020-0.023)
60-day	**0.008** (0.008-0.009)	**0.010** (0.009-0.010)	**0.011** (0.010-0.012)	**0.012** (0.011-0.013)	**0.013** (0.013-0.014)	**0.014** (0.014-0.015)	**0.015** (0.014-0.016)	**0.016** (0.015-0.017)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)

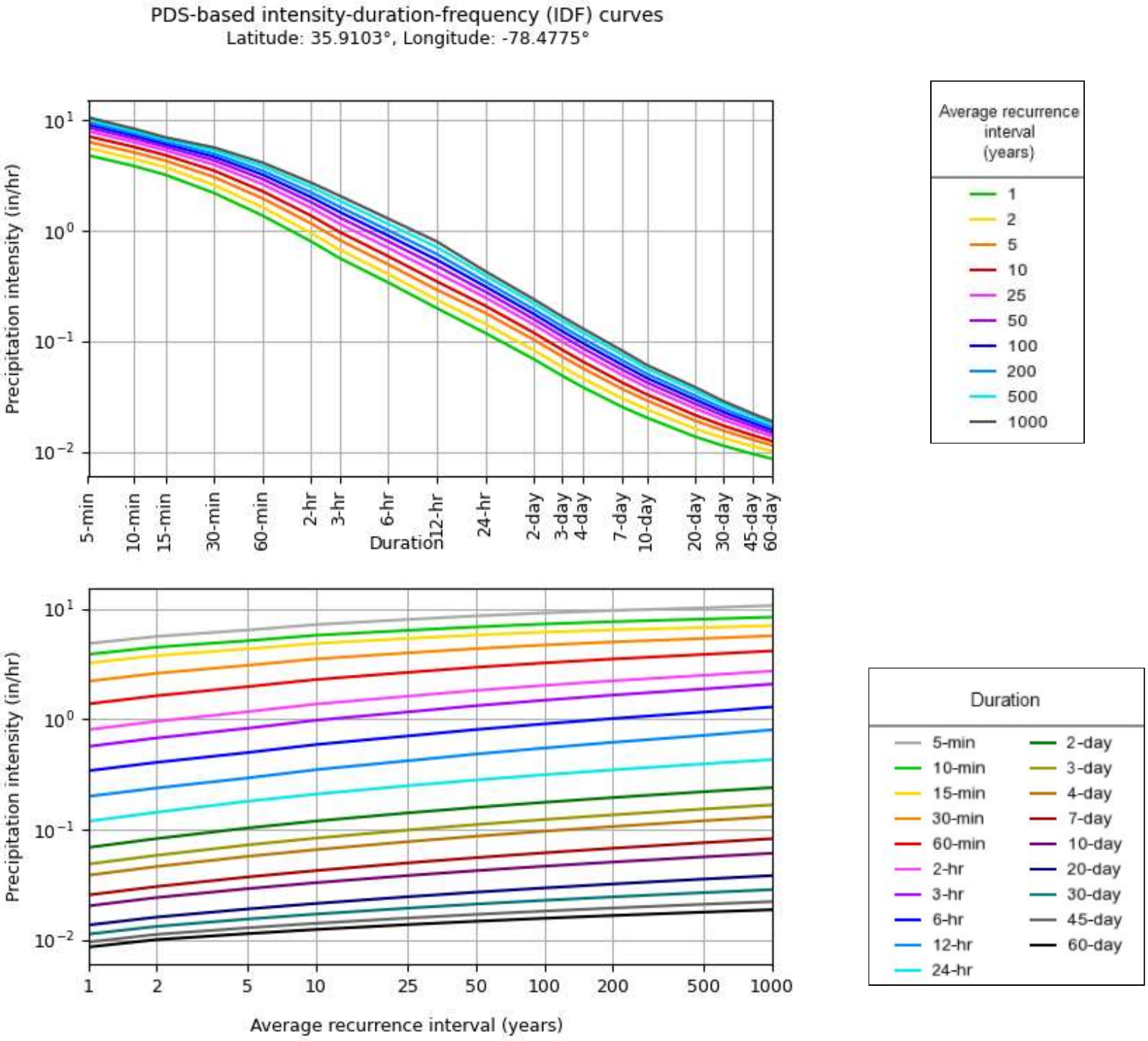
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

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PF graphical



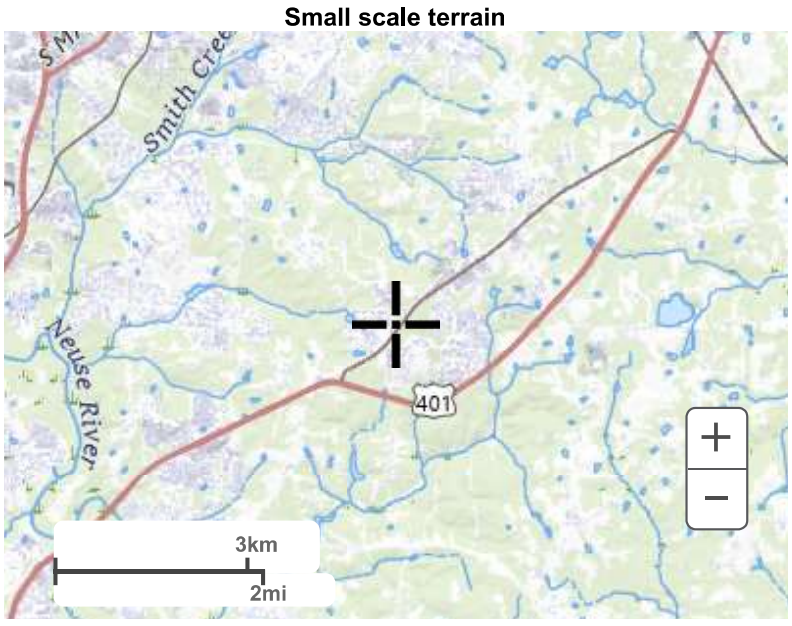
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Maps & aerials

Small scale terrain



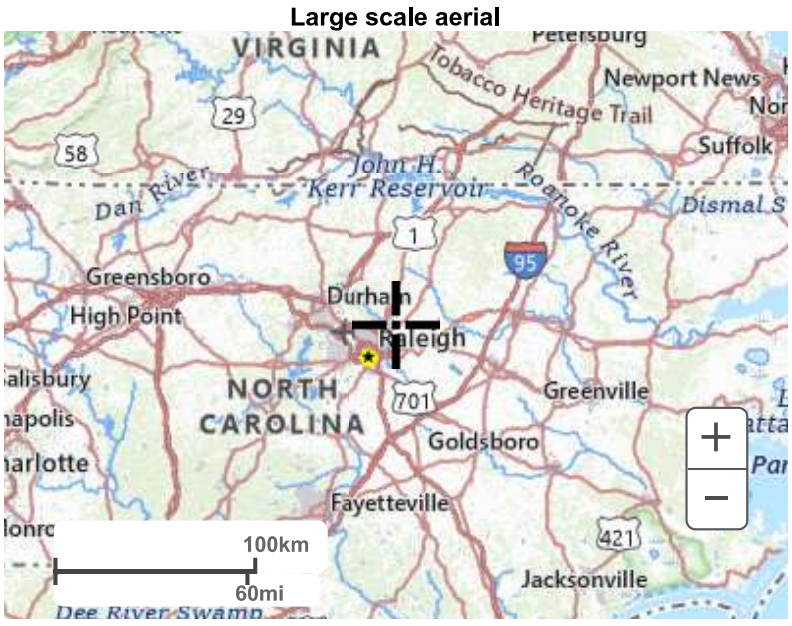
Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
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Disclaimer

United States Department of Agriculture

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 Wake County, North Carolina



July 15, 2026

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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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.

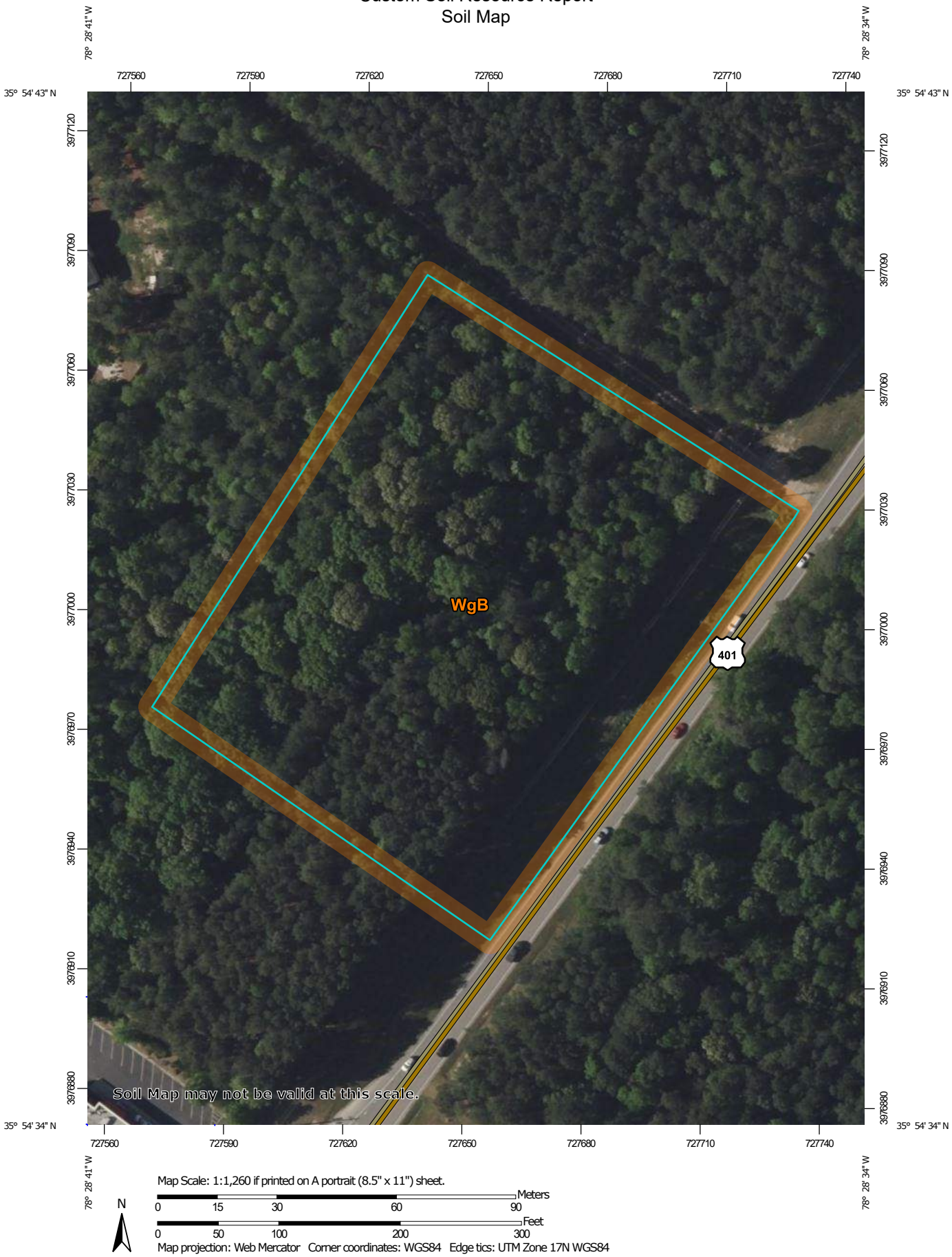
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.



Map Scale: 1:1,260 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N 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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Wake County, North Carolina
Survey Area Data: Version 27, Aug 27, 2025

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

Date(s) aerial images were photographed: Apr 24, 2022—May 9, 2022

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
WgB	Wedowee-Urban land complex, 2 to 6 percent slopes	3.5	100.0%
Totals for Area of Interest		**3.5**	**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.

Wake County, North Carolina

WgB—Wedowee-Urban land complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2xn43
Landscape: Uplands, piedmonts
Elevation: 70 to 560 feet
Mean annual precipitation: 39 to 47 inches
Mean annual air temperature: 55 to 63 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Wedowee and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wedowee

Setting

Landscape: Uplands, piedmonts
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Saprolite residuum weathered from granite and gneiss and/or saprolite residuum weathered from schist

Typical profile

Ap - 0 to 4 inches: sandy loam
E - 4 to 7 inches: sandy loam
BC - 23 to 35 inches: clay loam
C - 35 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 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: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F136XY820GA - Acidic upland forest, moist
Hydric soil rating: No

Description of Urban Land

Setting

Anthropogenic Feature: Urban land
Parent material: Impervious layers over human transported material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Udorthents, loamy

Percent of map unit: 5 percent
Landscape: Piedmonts, uplands
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

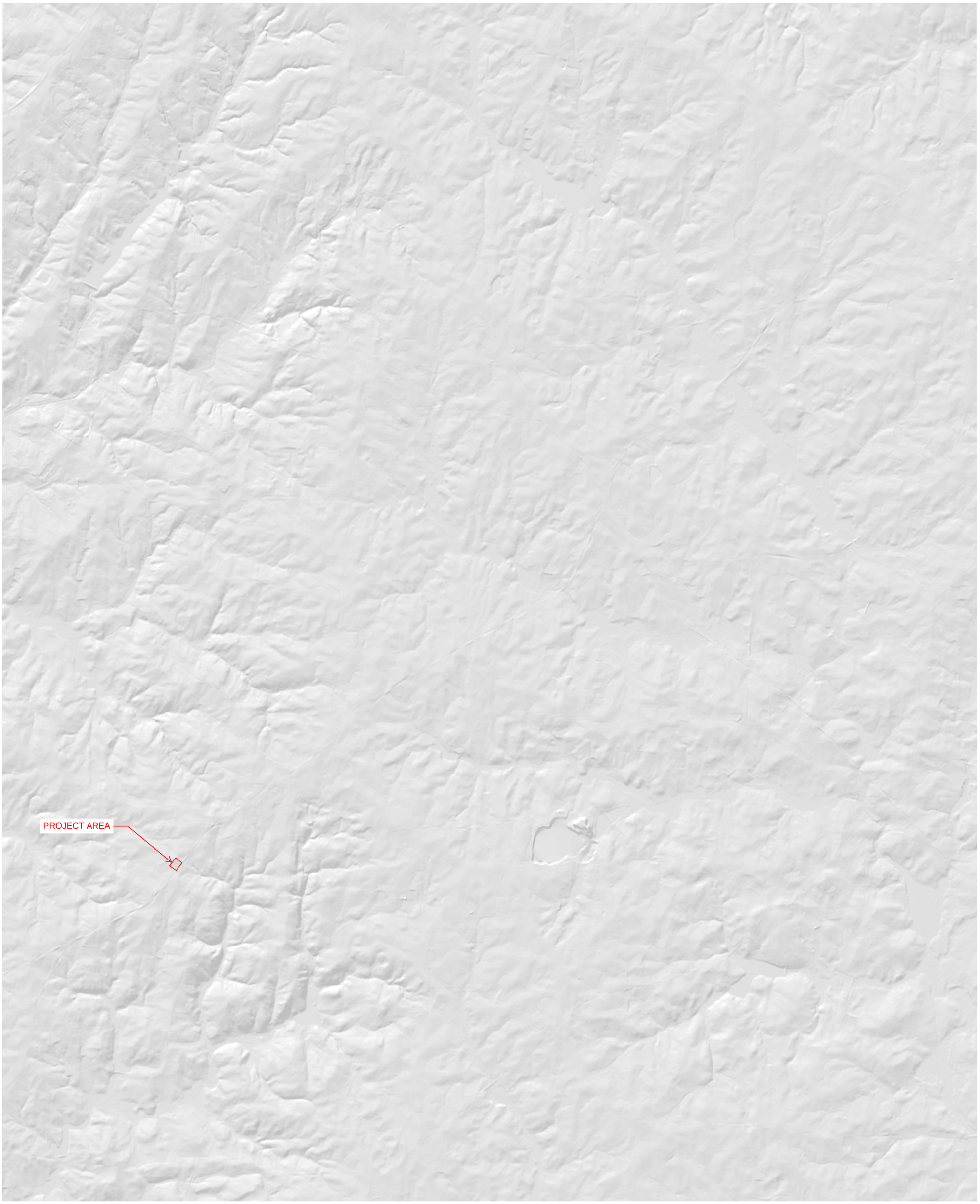
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

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US Topo



NSN.

WALLBROOK

ROLESVILLE, WAKE COUNTY, NORTH CAROLINA

STORMWATER MANAGEMENT PLAN

PREPARED BY:

ARK CONSULTING GROUP, PLLC

JANUARY 2023

WALLBROOK

ROLESVILLE, WAKE COUNTY, NORTH CAROLINA

STORMWATER MANAGEMENT PLAN

DRAWING NO. D-1219



9/26/2023

BRYAN C. FAGUNDUS, P.E.

January 31, 2023 Rev. June 29, 2023 Rev. August 28, 2023 Rev. September 25, 2023

OWNER/DEVELOPER

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3 KEEL ST., SUITE 2
WRIGHTSVILLE BEACH, NC 28480-1709
(704) 621-6430

ARK CONSULTING GROUP, PLLC

2755-B CHARLES BLVD
GREENVILLE, NC 27858
(252) 558-0888
NCBELS LICENSE NO. P-1199

WALLBROOK
STORMWATER MANAGEMENT PLAN
ROLESVILLE, WAKE COUNTY, NORTH CAROLINA
JANUARY 2023

LOCATION:

The proposed project site consists of Wake County Tax Parcel Numbers 1758469017, 175856963, 1758454702, 1758465891, & 1758468940. Parcel numbers 1758469017, 1758563963, & 1758454702 are located along the south side of South Main Street, while Parcel Numbers 1758465891 and 1758468940 are located on the north side of South Main Street in the Town of Rolesville, Wake County, North Carolina. The site is located within the Neuse River Basin, drains to Harris Creek (C;NSW), and is subject to the Town of Rolesville's Post-Construction Stormwater Ordinance.

DESCRIPTION:

The project site consists of a 30.48 acre assemblage of three parcels along South Main Street, with a total of 36.90 acres included within this master stormwater management plan. The properties are currently undeveloped, with existing wooded vegetation.

The property assemblage to the south of South Main Street (1758469017, 1758563963, and 1758454702) is bound on the north and west by South Main Street; on the east by Carlton Pointe Subdivision and a future Townhome development (Lot 6 as shown on the Wallbrook Preliminary Plat (PR 21-04)); and on the south by The Townes at Carlton Pointe and a Wake County ABC Store.

The property assemblage to the north of South Main Street (1758465891 and 1758468940), is bound by Bojangles Restaurant and Rolesville Charter Academy to the south; Hampton Pointe to the west; City of Raleigh property to the north, South Main Street and an undeveloped lot owned by Grand Park Properties, LLC to the east.

The native soil types found on the property are Rawlings-Rion Complex (RgC), Wedowee-Urban land complex (WgB), Rawlings-Rion complex (RgB), Wedowee-Saw complex (WfB), Rawlings-Rion complex (RgD), Wake-Rolesville complex (WaE), Urban land (Ur) as indicated on the NRCS / USDA Wake County Soils Survey.

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PROPOSED PROJECT:

The proposed project is a commercial subdivision comprised of multiple commercial parcels that will develop in phases. Included appurtenant improvements are new public streets, utility improvements, buildings, and parking areas. While the multiple parcels included in this stormwater management plan will be developed / constructed in phases, the stormwater control measure will be constructed in its entirety with the first phase of development. The total area included in this stormwater management plan is 36.90 acres with 34.86 acres being routed through the proposed wet detention pond.

The first construction / development phase will consist of the Grocery store anchored development as shown on the Site Plan entitled Publix at Wallbrook (SDP 23-05). The Grocery store development occurs on Lots 1A, 1B, 1C and 2 as shown on the Wallbrook Preliminary Plat (PR 21-04). Also included in the first phase of construction is the extension of Virginia Water Drive from its current terminus in Carlton Pointe Subdivision to a new signalized intersection at South Main Street (CID 23-01).

The following is a listing of parcels developing in future phases that will be served by the proposed stormwater control measure.

- Lots 9, 10, and 11 as shown on the Wallbrook Preliminary Plat (PR 21-04), referred to as the Paris Tract.
- Lots 3 and 4 as shown on the Wallbrook Preliminary Plat (PR 21-04).
- Lot 5 as shown on the Wallbrook Preliminary Plat (PR 21-04), referred to as the Boat Tract
- Wallbrook Drive
- Virginia Water Drive
- Portion of Wallbrook Townhomes – Lot 6 as shown on the Wallbrook Preliminary Plat (PR 21-04)
- A portion of the South Main Street Improvements being constructed under NCDOT U-6241 will have drainage that is routed through the proposed stormwater control measure.

The table below summarizes the parcel areas and built upon areas included in this Stormwater Management Plan.

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Parcel ID	Lot Number on PR 21-04	Parcel Area (AC)	Built Upon Area (AC)
Publix	1A, 1B, 1C	10.97	8.05
Publix	2	1.97	1.33
Wallbrook Dr. & Va. Water Dr.	n/a	2.49	2.20
Paris Tract	9, 10, 11	7.06	6.00 (85% BUA)
Boat Tract	5	5.07	4.31 (85% BUA)
Outparcel	3	0.70	0.60 (85% BUA)
Outparcel	4	1.81	1.54 (85% BUA)
NCDOT Roadway – U-6241	n/a	6.45	4.96
Portion of Wallbrook Townhomes	6	0.37	0.28
Total BUA to SCM			29.27
Total BUA Bypass			0.56

See the attached Area & Coverage Calculations for further details.

STORMWATER MANAGEMENT REQUIREMENTS:

The project is within the Town of Rolesville limits and is subject to the Town's Post-Construction Stormwater Ordinance. Stormwater management is provided in accordance with the Town of Rolesville requirements and will utilize a wet detention pond designed to the Minimum Design Criteria in the NCDEQ Stormwater Design Manual to achieve 85% TSS removal, nitrogen treatment, and peak flow reduction.

The pre-development peak flows have been calculated utilizing Hydraflow Hydrographs and named "Overall Pre-Development" in the attachments. Hydrograph 1 (Pre – Wallbrook Lots 1 & 2) is comprised of 12.94 acres consisting of Lots 1A, 1B, 1C and 2 as shown on the Wallbrook Preliminary Plat (PR 21-04) with a curve number of 79 for Woods in fair condition of Hydrological Soil Group D and a time of concentration of 6.7 minutes.

Hydrograph 2 (Pre – New Roadways (Wallbrook Dr/ Va Water Dr)) is comprised of 2.49 acres representing the proposed roadway and right-of-way areas with a curve number of 79 for Woods in fair condition of Hydrological Soil Group D and a time of concentration of 8.4 minutes.

Hydrograph 3 (Pre – Boat Tract) is comprised of the 5.07 acre parcel (Lot 5 as shown on the Wallbrook Preliminary Plat (PR 21-04)) with a curve number of 73 for Woods in fair condition of Hydrological Soil Group C and a time of concentration of 10.5 minutes.

Hydrograph 4 (Pre – Paris Tract) is comprised of the 7.06 acre parcel (Lots 9, 10, and 11 as shown on the Wallbrook Preliminary Plat (PR 21-04)) with a curve number of 79 for Woods in fair condition of Hydrological Soil Group D and a time of concentration of 5 minutes. (Wake County Tax Parcel Number 1758467822)

Hydrograph 5 (Pre – DOT Roadway) is comprised of 6.45 acres with a curve number of 80 for Open Space in good condition of Hydrological Soil Group D and a time of concentration of 5 minutes. This hydrograph represents the pre-development area of the area within the South Main Street public right of way that will be routed through the stormwater control measure.

Hydrograph 6 (Pre – Lots 3 & 4) is comprised of the combined 2.51 acre parcels (Lots 3 & 4 as shown on the Wallbrook Preliminary Plat (PR 21-04)) with a curve number of 79 for Woods in fair condition of Hydrological Soil Group D and a time of concentration of 7.5 minutes.

Hydrograph 7 (Pre – Wallbrook Townhomes) is comprised of a 0.37 acre portion of the Wallbrook Townhome development (CD 22-02) with a curve number of 79 for Woods in fair condition of Hydrological Soil Group D and a time of concentration of 5 minutes. This represents the pre-development area of the area within the Wallbrook Townhomes (Lot 6 as shown on the Wallbrook Preliminary Plat (PR 21-04)) that will be routed through the stormwater control measure.

Hydrographs 1-4 are totaled into Hydrograph 8 (Pre-Development) and Hydrographs 5-7 are totaled into Hydrograph 9 (Pre-Development). Hydrographs 8 and 9 are then totaled into Hydrograph 10 (Pre-Development Total).

The post-development peak flows have been calculated utilizing Hydraflow Hydrographs and named “Overall Post-Development” in the attachments. Hydrograph 1 (Post –

Wallbrook Lots 1 & 2) is comprised of 11.35 acres with a composite curve number of 95 and a time of concentration of 5 minutes.

Hydrograph 2 (Post – New Roadways (Wallbrook Dr / Va Water Dr)) is comprised of 2.05 acres of the proposed roadway and right-of-way areas with a composite curve number of 96 and a time of concentration of 5 minutes.

Hydrograph 3 (Post – Boat Tract) is comprised of the 5.07 acre parcel (Lot 5 as shown on the Wallbrook Preliminary Plat (PR 21-04)) with a composite curve number of 94 and a time of concentration of 5 minutes. This models the future site with 85% built upon area.

Hydrograph 4 (Post – Paris Tract) is comprised of the 7.06 acre parcel (Lots 9, 10, and 11 as shown on the Wallbrook Preliminary Plat (PR 21-04)) with a composite curve number of 95 and a time of concentration of 5 minutes. This models the future site with 85% built upon area. (Wake County Tax Parcel Number 1758467822)

Hydrograph 5 (Post – DOT Roadway) is comprised of 6.45 acres with a composite curve number of 94 and a time of concentration of 5 minutes. This hydrograph represents the area of the proposed DOT improvements associated with NCDOT U-6241 that will be routed through the stormwater control measure.

Hydrograph 7 (Post – Lots 3 & 4) is comprised of the combined 2.51 acre parcels (Lots 3 & 4 as shown on the Wallbrook Preliminary Plat (PR 21-04)) with a composite curve number of 95 and a time of concentration of 5 minutes. This models the future sites with combined 85% built upon area.

Hydrograph 6 (Post – Direct Release) is comprised of 2.04 acres with a composite curve number of 85 and a time of concentration of 5 minutes. This models all areas that will be directly released offsite and will not be routed through the stormwater control measure.

Hydrograph 8 (Post – Wallbrook Townhomes) is comprised of a 0.37 acre portion of Wallbrook Townhome development (CD 22-02) with a composite curve number of 94 and a time of concentration of 5 minutes. This represents the post-development area within the Wallbrook Townhomes (Lot 6 as shown on the Wallbrook Preliminary Plat (PR 21-04)) that will be routed through the stormwater control measure.

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Hydrographs 1, 2, 3, 4, 5, and 7 are totaled to create Hydrograph 9 (Post – Total). Hydrograph 9 is added to Hydrograph 8 to create Hydrograph 10 (Post – Total with Townhomes). Hydrograph 10 is then routed through the proposed wet detention pond creating Hydrograph 11 (Post- Route), and then added to Hydrograph 6 creating Hydrograph 12 (Post-Development Total).

The peak flow rates in the post-development condition are less than the peak flow rates in the pre-development condition. See the table below and the attached Hydraflow Hydrograph calculations for further details.

	1-yr Peak Flow (cfs)	2-yr Peak Flow (cfs)	10-yr Peak Flow (cfs)	100-yr Peak Flow (cfs)
Pre-Development	57.26	81.75	151.63	266.24
Post-Development	44.09	62.28	86.96	111.72

STORMWWATER MANAGEMENT CALCULATIONS FOR LOTS 3 & 4:

Lots 3 & 4 as shown on the Wallbrook Preliminary Plat (PR 21-04) will be cleared and mass graded as part of this project. To comply with Wake County and Town of Rolesville stormwater regulations, an analysis was performed comparing the pre-development peak flow rates to the cleared and graded condition peak flow rates for the 1-yr, 2-yr, 10-yr, and 100-yr 24-hour storms. The descriptions and table below summarize the analysis and conclusions.

Hydrograph 1 (Pre-Dev Lots 3 & 4) is comprised of the 3.91 acre drainage area that is currently draining to the point of analysis along Jonesville Road adjacent to Wake County parcel number 1758453307. Using Table 4 from the NCDEQ Stormwater Design Manual, a curve number of 77 for Woods in good condition (Woods are protected from grazing, and litter and brush adequately cover the soil) of Hydrological Soil Group D was utilized. Using the Kirpich equation to calculate time of concentration with a length of 503', height of 14', and a flow path multiplier of 2 for overland flow in grassy/wooded condition, yielded a time of concentration of 7.5 minutes for the analysis.

Hydrograph 2 (Post-Dev Lots 3 & 4) is comprised of the 2.34 acre drainage area that will be draining to the point of analysis along Jonesville Road adjacent to Wake County parcel number 1758453307 in the mass graded/cleared condition associated with this plan and permit. Using Table 4 from the NCDEQ Stormwater Design Manual, curve number of 80 for Open Space / Lawn (>75% grass cover) in good condition of

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Hydrological Soil Group D was utilized. Using the Kirpich equation to calculate time of concentration with a length of 470', height of 12', and a flow path multiplier of 2 for overland flow in grassy/wooded condition, yielded a time of concentration of 7.3 minutes for the analysis.

Hydrograph 1 is then compared to Hydrograph 2 showing no net increase in peak flow leaving the area from the pre-development condition.

	1-yr Peak Flow (cfs)	2-yr Peak Flow (cfs)	10-yr Peak Flow (cfs)	100-yr Peak Flow (cfs)
Pre-Development (Hydrograph 1)	5.679	8.235	15.60	27.79
Interim Graded Condition (Hydrograph 2)	4.051	5.675	10.24	17.62

Future site development plans showing further development from the cleared/graded condition to finish grade with associated infrastructure for these lots will be submitted showing the site is in compliance with the requirements set forth in this stormwater permit: The impervious area must be less than or equal to 85% of the site area. Refer to table on page 3 for impervious limitations.

ATTACHMENTS:

The following sets of calculations and supporting information are included for demonstrating compliance with the pertinent regulations:

- Wet Detention Pond Calculations
- Anti-Flotation Calculations
- Peak Flow and routing calculations for pre-development and post-development peak for the 1-yr, 2-yr, 10-yr, 25-yr, and 100-yr 24-hour storms
- Peak Flow and routing calculations pre-development and interim mass graded condition peak for the 1-yr, 2-yr, 10-yr, 25-yr, and 100-yr 24-hour storms for Lots 3 & 4
- Time of Concentration Calculations utilizing the Kirpich Equation
- Rational C / Curve Number Area & Coverage Calculations
- Rational C / Curve Number Area & Coverage Calculations for Lots 3 & 4 in the mass graded condition
- Wake County Municipal Stormwater Tool
- Rip Rap Apron sizing calculations

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- NOAA Atlas 14 Neuse 2 NE Station rainfall data
- Wake County Soil Survey Map
- USGS Quad Map
- Drainage Area Map

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WALLBROOK

ROLESVILLE, WAKE COUNTY, NORTH CAROLINA

STORMWATER MANAGEMENT PLAN

DRAWING NO. D-1219

SUPPORTING DOCUMENTS & CALCULATIONS

NOAA Atlas 14, Volume 2, Version 3
Location name: Raleigh, North Carolina, USA*
Latitude: 35.9167°, Longitude: -78.5667°
Elevation: 243.35 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	**4.82** (4.42-5.28)	**5.62** (5.15-6.13)	**6.42** (5.89-7.01)	**7.18** (6.56-7.82)	**7.94** (7.24-8.66)	**8.53** (7.74-9.30)	**9.06** (8.16-9.86)	**9.50** (8.53-10.4)	**10.0** (8.90-10.9)	**10.4** (9.20-11.4)
10-min	**3.85** (3.53-4.21)	**4.49** (4.12-4.91)	**5.15** (4.72-5.62)	**5.74** (5.25-6.26)	**6.33** (5.77-6.90)	**6.79** (6.16-7.40)	**7.19** (6.49-7.84)	**7.54** (6.76-8.23)	**7.92** (7.04-8.64)	**8.22** (7.25-8.99)
15-min	**3.21** (2.94-3.51)	**3.76** (3.45-4.11)	**4.34** (3.98-4.74)	**4.84** (4.43-5.28)	**5.35** (4.87-5.83)	**5.74** (5.20-6.25)	**6.06** (5.47-6.60)	**6.34** (5.68-6.92)	**6.64** (5.91-7.25)	**6.88** (6.06-7.52)
30-min	**2.20** (2.02-2.41)	**2.60** (2.38-2.84)	**3.08** (2.83-3.36)	**3.51** (3.21-3.82)	**3.96** (3.61-4.32)	**4.32** (3.92-4.71)	**4.64** (4.19-5.06)	**4.93** (4.42-5.38)	**5.29** (4.70-5.77)	**5.57** (4.91-6.09)
60-min	**1.37** (1.26-1.50)	**1.63** (1.50-1.78)	**1.98** (1.81-2.16)	**2.28** (2.09-2.49)	**2.64** (2.40-2.88)	**2.93** (2.65-3.19)	**3.20** (2.88-3.48)	**3.46** (3.10-3.78)	**3.79** (3.37-4.14)	**4.07** (3.59-4.44)
2-hr	**0.800** (0.728-0.883)	**0.956** (0.872-1.05)	**1.17** (1.06-1.28)	**1.36** (1.24-1.50)	**1.60** (1.44-1.75)	**1.80** (1.61-1.97)	**1.99** (1.77-2.17)	**2.18** (1.93-2.38)	**2.43** (2.13-2.65)	**2.64** (2.30-2.89)
3-hr	**0.565** (0.514-0.625)	**0.675** (0.616-0.744)	**0.829** (0.755-0.913)	**0.974** (0.884-1.07)	**1.15** (1.04-1.26)	**1.31** (1.17-1.43)	**1.46** (1.30-1.60)	**1.62** (1.43-1.77)	**1.83** (1.60-2.00)	**2.01** (1.74-2.21)
6-hr	**0.340** (0.311-0.375)	**0.407** (0.373-0.447)	**0.500** (0.457-0.549)	**0.588** (0.536-0.644)	**0.699** (0.632-0.764)	**0.796** (0.716-0.869)	**0.893** (0.796-0.973)	**0.994** (0.877-1.08)	**1.13** (0.985-1.23)	**1.25** (1.08-1.37)
12-hr	**0.200** (0.183-0.220)	**0.239** (0.220-0.261)	**0.295** (0.270-0.323)	**0.349** (0.318-0.381)	**0.417** (0.378-0.455)	**0.478** (0.431-0.519)	**0.540** (0.481-0.586)	**0.606** (0.534-0.657)	**0.697** (0.604-0.754)	**0.778** (0.664-0.843)
24-hr	**0.119** (0.111-0.128)	**0.144** (0.134-0.154)	**0.180** (0.168-0.193)	**0.209** (0.194-0.224)	**0.248** (0.230-0.266)	**0.279** (0.258-0.299)	**0.310** (0.286-0.333)	**0.343** (0.315-0.368)	**0.387** (0.355-0.415)	**0.422** (0.385-0.454)
2-day	**0.069** (0.064-0.074)	**0.083** (0.078-0.089)	**0.103** (0.096-0.111)	**0.119** (0.111-0.128)	**0.141** (0.131-0.151)	**0.158** (0.146-0.169)	**0.175** (0.162-0.188)	**0.192** (0.177-0.207)	**0.217** (0.199-0.233)	**0.235** (0.215-0.254)
3-day	**0.049** (0.046-0.052)	**0.059** (0.055-0.063)	**0.073** (0.068-0.078)	**0.083** (0.078-0.089)	**0.098** (0.092-0.105)	**0.110** (0.102-0.118)	**0.122** (0.113-0.131)	**0.134** (0.124-0.144)	**0.151** (0.139-0.162)	**0.165** (0.150-0.177)
4-day	**0.039** (0.036-0.041)	**0.046** (0.043-0.049)	**0.057** (0.054-0.061)	**0.066** (0.061-0.070)	**0.077** (0.072-0.082)	**0.086** (0.080-0.092)	**0.096** (0.089-0.102)	**0.105** (0.097-0.113)	**0.119** (0.109-0.127)	**0.129** (0.118-0.138)
7-day	**0.026** (0.024-0.027)	**0.031** (0.029-0.032)	**0.037** (0.035-0.040)	**0.042** (0.040-0.045)	**0.050** (0.046-0.053)	**0.055** (0.052-0.059)	**0.061** (0.057-0.065)	**0.067** (0.062-0.072)	**0.075** (0.069-0.080)	**0.082** (0.075-0.087)
10-day	**0.020** (0.019-0.022)	**0.024** (0.023-0.026)	**0.029** (0.027-0.031)	**0.033** (0.031-0.035)	**0.038** (0.036-0.041)	**0.042** (0.039-0.045)	**0.046** (0.043-0.049)	**0.050** (0.047-0.054)	**0.056** (0.052-0.060)	**0.060** (0.056-0.065)
20-day	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.019** (0.018-0.020)	**0.021** (0.020-0.023)	**0.024** (0.023-0.026)	**0.027** (0.025-0.029)	**0.029** (0.027-0.031)	**0.032** (0.030-0.034)	**0.035** (0.033-0.038)	**0.038** (0.035-0.041)
30-day	**0.011** (0.011-0.012)	**0.013** (0.013-0.014)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.019** (0.018-0.021)	**0.021** (0.020-0.022)	**0.023** (0.021-0.024)	**0.024** (0.023-0.026)	**0.027** (0.025-0.028)	**0.028** (0.026-0.030)
45-day	**0.010** (0.009-0.010)	**0.011** (0.011-0.012)	**0.013** (0.012-0.014)	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.019** (0.018-0.020)	**0.021** (0.020-0.022)	**0.022** (0.021-0.023)
60-day	**0.009** (0.008-0.009)	**0.010** (0.010-0.011)	**0.011** (0.011-0.012)	**0.012** (0.012-0.013)	**0.014** (0.013-0.014)	**0.015** (0.014-0.015)	**0.016** (0.015-0.016)	**0.017** (0.016-0.017)	**0.018** (0.017-0.019)	**0.019** (0.018-0.020)

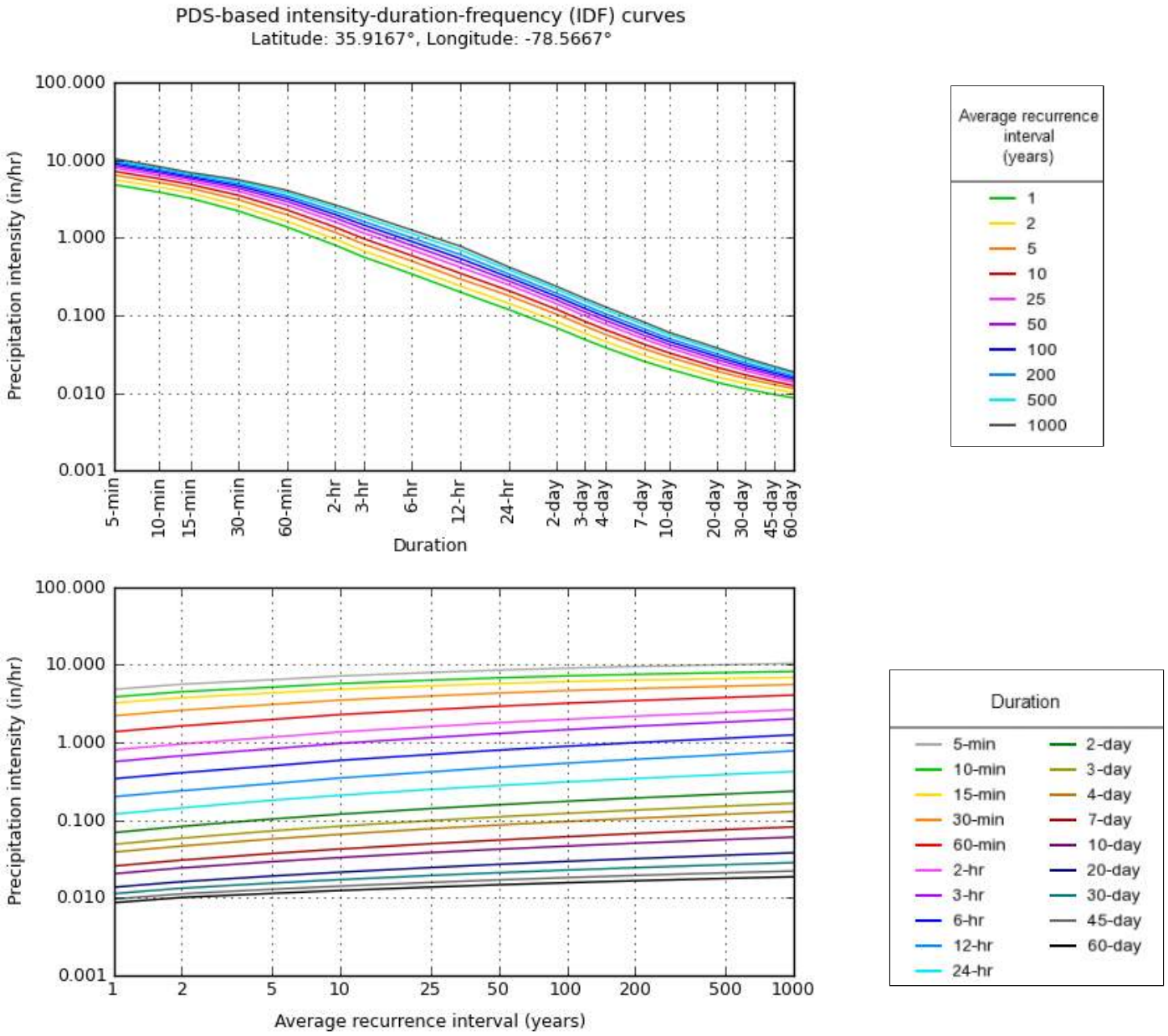
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

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PF graphical



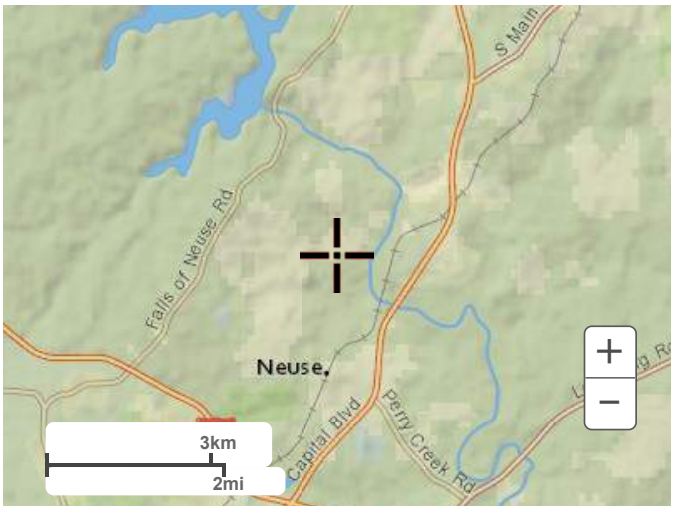
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Fri Jan 6 13:04:06 2023

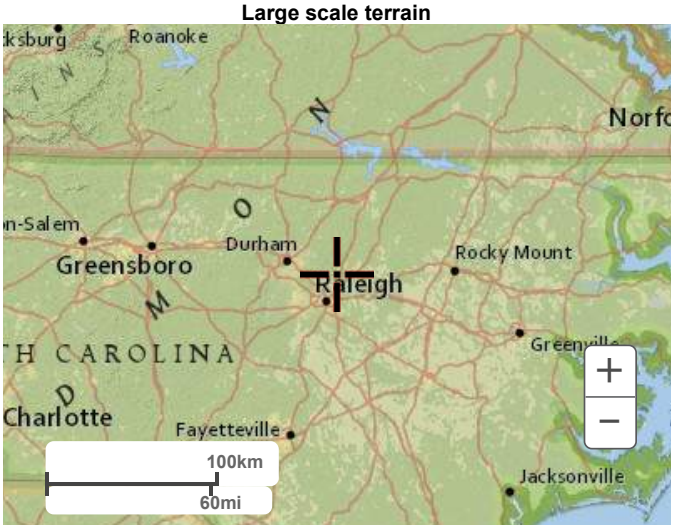
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Maps & aerials

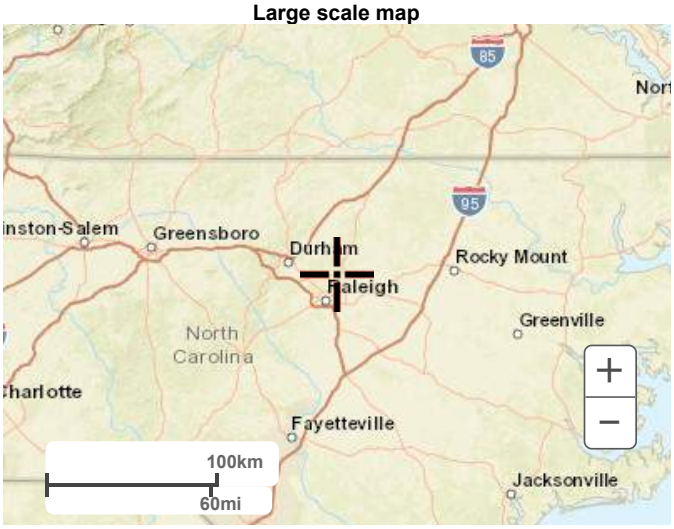
Small scale terrain



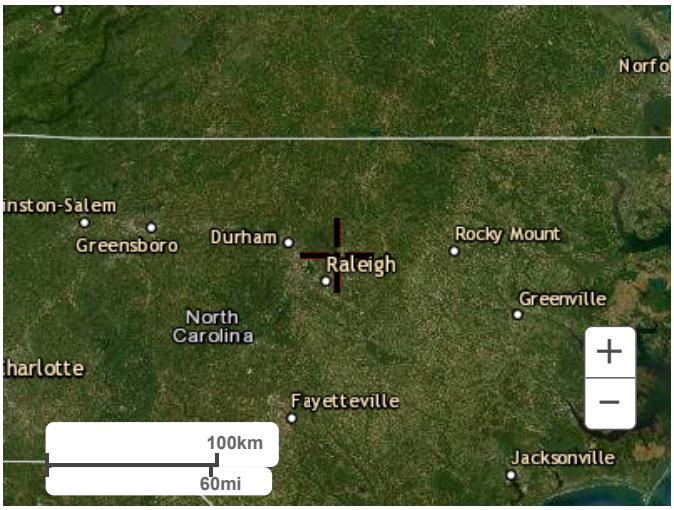
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

HEC14, Section 10 and NCDOT 876.02 Rip Rap Outlet Design

Pipe Properties																	NCDOT 876.02 Dimension Ratios			Selected Pad Dimensions				
From	To	Type	Manning's N	Slope (ft/ft)	Diameter (in)	Ditch Outlet?	Vfull (ft/s)	Qfull (cfs)	Diameter (ft)	Tailwater Depth TW/D	Tailwater Depth TW (ft)	Rip Rap Size D50 (in)	Apron Length La/D	Apron Length La (ft)	Rip Rap Size Selected D50 (in)	Apron Depth Da/D50	Apron Depth Da (in)	Pad Entry	Pad Exit	Pad Length	Pad Entry (ft)	Pad Exit (ft)	Pad Length (ft)	Pad Depth (in)	Class
201	200	RCP	0.013	0.0200	42	No Ditch	14.8	142.7	3.50	0.4	1.4	23.76	8	28	22	2	48	2	4	4	7	14	28	48	6
301	300	RCP	0.013	0.0200	36	No Ditch	13.4	94.6	3.00	0.4	1.2	19.68	7	21	20	2	40	2	4	4	6	12	21	40	5
401	400	RCP	0.013	0.0100	30	No Ditch	8.4	41.1	2.50	0.4	1	9.92	5	12.5	10	2.4	24	2	4	4	5	10	13	24	3
501A	500	RCP	0.013	0.0100	15	No Ditch	5.3	6.5	1.25	0.4	0.5	4.25	4	5	5	3.5	15	2	4	4	3	5	5	15	1
601	600	RCP	0.013	0.0030	15	No Ditch	2.9	3.5	1.25	0.4	0.5	1.91	4	5	5	3.5	7	2	4	4	3	5	5	7	1
SCM	100	RCP	0.013	0.0100	30	No Ditch	8.4	41.1	2.50	0.4	1	9.92	5	12.5	10	2.4	24	2	4	4	5	10	13	24	3

Runoff & Coverages Calculation

Pre-Development - Lot 5 (Boat Tract)

	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	220,849	5.07	0.46	73
D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	220,849	5.07	0.46	73.00

Pre-Development - Wallbrook Lot 1A, 1B, & 1C

	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	477,918	10.97	0.58	79
TOTAL/COMPOSITE	477,918	10.97	0.58	79.00

Pre-Development - Wallbrook Lot 2

	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	85,907	1.97	0.58	79
TOTAL/COMPOSITE	85,907	1.97	0.58	79.00

Pre-Development - Lots 3 & 4

	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	109,239	2.51	0.58	79
TOTAL/COMPOSITE	109,239	2.51	0.58	79.00

Runoff & Coverages Calculation

Post-Development - Lot 5 (Boat Tract)

	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - C soils	37,544	0.86	0.96	98
Trans. Imp. - C soils	150,177	3.45	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	33,127	0.76	0.48	74
Remaining - D Soils - Good Condition Lawn	-	0.00	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	220,849	5.07	0.89	94.40

Post-Development - Wallbrook Lot 1A, 1B, & 1C

	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	77,757	1.79	0.96	98
Trans. Imp. - D soils	272,876	6.26	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	86,661	1.99	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
Direct Release - D Soils - Good Condition Lawn	40,624	0.93	0.60	80
Direct Release - Trans. Imp.	-	0.00	0.96	98
TOTAL/COMPOSITE	477,918	10.97	0.89	94.43

Post-Development - Wallbrook Lot 2

	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	11,900	0.27	0.96	98
Trans. Imp. - D soils	38,828	0.89	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	6,610	0.15	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
Direct Release - D Soils - Good Condition Lawn	21,164	0.49	0.60	80
Direct Release - Trans. Imp.	7,405	0.17	0.96	98
TOTAL/COMPOSITE	85,907	1.97	0.92	95.92

Post-Development - Lots 3 & 4

	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	13,928	0.32	0.96	98
Trans. Imp. - D soils	78,925	1.81	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	16,386	0.38	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	109,239	2.51	0.91	95.30

Pre-Development - Paris Tract (Lots 9, 10, & 11)	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	307,534	7.06	0.58	79
TOTAL/COMPOSITE	307,534	7.06	0.58	79.00

Post-Development - Paris Tract (Lots 9, 10, & 11)	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	52,281	1.20	0.96	98
Trans. Imp. - D soils	209,123	4.80	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	46,130	1.06	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	307,534	7.06	0.91	95.30

Pre-Development - New Roadways (VA Water & Wallbrook)	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	108,464	2.49	0.58	79
TOTAL/COMPOSITE	108,464	2.49	0.58	79.00

Post-Development - New Roadways (VA Water & Wallbrook)	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	-	0.00	0.96	98
Trans. Imp. - D soils	79,263	1.82	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	9,863	0.23	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
Direct Release - D Soils - Good Condition Lawn	2,578	0.06	0.60	80
Direct Release - Trans. Imp.	16,760	0.38	0.96	98
TOTAL/COMPOSITE	108,464	2.49	0.76	96.0

Post-Development - DOT Roadway (Main St.)	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	281,175	6.45	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	281,175	6.45	0.60	80.00

Post-Development - DOT Roadway (Main St.)	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	-	0.00	0.96	98
Trans. Imp. - D soils	216,200	4.96	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	64,975	1.49	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	281,175	6.45	0.88	93.84

Post-Development - Wallbrook Townhomes (Lot 6)	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	16,117	0.37	0.58	79
TOTAL/COMPOSITE	16,117	0.37	0.58	79.00

Post-Development - Wallbrook Townhomes (Lot 6)	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	12,088	0.28	0.96	98
Trans. Imp. - D soils	-	0.00	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	4,029	0.09	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	16,117	0.37	0.87	93.50

Runoff & Coverages Calculation

Pre-Development - Lots 3 & 4	Area (SF)	Area (AC)	C	CN
A Soils - Open Space	-	0.00	0.20	39
B Soils - Open Space	-	0.00	0.22	61
C Soils - Open Space	-	0.00	0.48	74
D Soils - Open Space	-	0.00	0.60	80
A Soils - Woods	-	0.00	0.15	36
B Soils - Woods	-	0.00	0.20	60
C Soils - Woods	-	0.00	0.46	73
D Soils - Woods	170,237	3.91	0.58	77
TOTAL/COMPOSITE	170,237	3.91	0.58	77.00

Pre-Development - Lots 3 & 4		
Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	503	ft
Height of watershed, H	14	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	7.5	min
Time of concentration, tc	7.5	min

Runoff & Coverages Calculation

Interim Grading Condition - Lots 3 & 4	Area (SF)	Area (AC)	C	CN
Bldg. Imp. - D soils	-	0.00	0.96	98
Trans. Imp. - D soils	-	0.00	0.96	98
Remaining - A Soils - Good Condition Lawn	-	0.00	0.20	39
Remaining - B Soils - Good Condition Lawn	-	0.00	0.22	61
Remaining - C Soils - Good Condition Lawn	-	0.00	0.48	74
Remaining - D Soils - Good Condition Lawn	102,017	2.34	0.60	80
Remaining - A Soils - Woods	-	0.00	0.15	36
Remaining - B Soils - Woods	-	0.00	0.20	60
Remaining - C Soils - Woods	-	0.00	0.46	73
Remaining - D Soils - Woods	-	0.00	0.58	79
TOTAL/COMPOSITE	102,017	2.34	0.60	80.00

Interim Grading Condtion - Lots 3 & 4		
Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	470	ft
Height of watershed, H	12	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	7.3	min
Time of concentration, tc	7.3	min

Towns of Rolesville, Wendell and Zebulon Stormwater Tool Directions

The Wake County Municipal Stormwater Tool is required for all stormwater submittals in Rolesville Wendell, and Zebulon. Engineer will input all data requested that is highlighted in **blue**. Engineer may follow provided links to view calculations used in this tool. Calculations for peak flow, runoff, time of concentration, etc. are for individual drainage areas. Engineer should complete a worksheet for each drainage area within a project limit.

1	Complete SITE DATA worksheet. SITE DATA worksheet should be submitted with preliminary plan submittals and modified and submitted for construction plan submittals. The 2-yr, 24-hr rainfall input will be used for projects requesting LID classification further into the tool. The 10-year, 24-hour rainfall input will be used for potential Downstream Impact Analyses (DIA). Stormwater Narrative should describe the site conditions in pre- and post-development conditions including a description of site improvements and proposed stormwater BMPs.
2	Complete DA worksheets. Most of the site data is inputted by the engineer on the DA worksheets. DA worksheets are designed essentially to account for Ultra-Low, Low, and High Density project requirements per Ordinance standards. DA Worksheets will calculate runoff, time of concentration, peak flow, and volume to be managed per drainage area. Inputs will also be used to calculate the site composite curve numbers for pre and post development, Target Curve Number (TCN), and total nitrogen loading (TN) calculations. This sheet will also calculate required volume management for the 1st inch rainfall for high density projects. 1st inch of runoff should be handled by each DA BMP for High Density projects. Disconnected Impervious - This area will be used to provide an adjusted post development composite curve number ($CN_{adjusted}$) to allow a credit for the use of disconnected impervious. Site plans should clearly indicate areas of disconnected impervious.
3	SITE SUMMARY worksheet summarizes the pre and post runoff, Tc, and peak flow per drainage area based on inputs from DA worksheets. This worksheet denotes the volume required for management per drainage area based on high density requirements. TCN and composite curve numbers for pre and post development are also calculated and summarized. If the TCN is exceeded, this worksheet will calculate total volume to be managed for the entire site based on TCN requirements. Nitrogen Loading: Nitrogen Loading Rate for the site is calculated based on the Hydrologic Soil Groups and site acreages imputed on DA worksheets. This worksheet calculates the total amount of nitrogen loading. Nitrogen total will be used on following BMP worksheets. Note: There are no engineer inputs on this sheet and all exeedances from DA worksheets will be flagged in **red**.
4	DA BMP worksheets require engineer to input proposed BMP information. BMPs are categorized by sub-basins within the drainage area. Engineer should input BMP device name, type, and volume provided. BMP requirements are automatically imported from previous inputs. Engineer should input land uses by sub-basin. Off-site drainage to the sub-basin may also be inputted to allow credit for nitrogen removal (if said drainage is routed through the BMP). BMPs are required in each DA where post-development peak flow is higher than pre-development peak flow. Only under special circumstances will a BMP not be required. In these cases, the engineer must show the following: 1. Total runoff volume for the DA must be less than 10% of the entire site runoff. 2. TN must be handled for the site elsewhere. 3. Runoff must not leave the DA at an erosive velocity. 4. Proposed design must comply with all state and federal regulations. DA BMP worksheets will ensure that proposed BMPs meet requirements for peak flow, TCN, and for Nitrogen. Engineer must input post-BMP discharge. Note: Engineers are required to input post BMP peak flow for the 1-year, 2-year, and 10-year storms for each DA. The SW Design Tool uses the TR-55 method. The TR-55 method is preferred for post BMP calculations. If engineer uses a method/model other than TR-55 for the post-BMP peak discharge and runoff, engineer must also provide pre-development calculations from the method/model (in addition to the SW Design Tool) and pre-development calculations must be within 10% of results computed by the SW Design Tool). A summary sheet should be attached with the submittal to for all inputs used in design.
5	BMP SUMMARY worksheet summarizes the pre and post BMP runoff, and peak flow per drainage area based on inputs from DA BMP worksheets. Nitrogen Loading: Nitrogen mitigated for the site is calculated based on the inputs on DA BMP worksheets. This worksheet calculates the total amount of nitrogen left to be mitigated for the site (Wendell only). Site expansions use the apportioning method. Note: There are no engineer inputs on this sheet and all exeedances from DA BMP worksheets will be flagged in **red**.
6	LID worksheet summarizes the pre and post runoff, Tc, and peak flow per drainage area for the 2-year, 24-hour storm based on inputs from DA and BMP worksheets. This worksheet will determine if design calculations provided meet LID classification. Engineers may wish to modify site design or mitigate with additional BMPs to meet LID Requirements. In that case, DA and BMP worksheets should be modified to meet these requirements and the LID sheet will be updated automatically. If calculation requirements for LID are met, Engineer should complete the *LID CHECKLIST* on **LID** worksheet and provide associated documentation to determine if project meets ALL LID requirements.
7	Downstream Impact Analysis DIA worksheet presents requirements for a downstream impact analysis. Based on engineer inputs, this sheet will report if a DIA is required for the project based on the 10-year storm discharge leaving each discharge point. This stormwater tool does NOT complete the actual downstream impact analyses. A DIA shall be performed at the outlet(s) of the site, and downstream at each tributary junction to the point(s) in the conveyance system where the area of the portion of the site draining into the system is less than or equal to 10 percent of the total drainage area above that point. The outflow hydrograph at these points is to be determined for the pre-development condition. Then, the outflow hydrograph at each of these points is to be determined for the conditions after the site in question has been developed. All hydrographs and inputs should be provided with plan submittal.

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SITE DATA

Project Information	
Project Name:	**21089 - Wallbrook**
Applicant:	Ark Consulting Group, PLLC
Applicant Contact Name:	Bryan C. Fagundus, P.E.
Applicant Contact Number:	252-565-1024
Contact Email:	bryan@arkconsultinggroup.com
Municipal Jurisdiction (Select from dropdown menu):	Rolesville
Last Updated:	Tuesday, September 19, 2023
Site Data:	
Total Site Area (Ac):	36.90
Existing Lake/Pond Area (Ac):	0.00
Proposed Disturbed Area (Ac):	36.90
Impervious Surface Area (acre):	29.27
Type of Development (Select from Dropdown menu):	Non-Residential
Percent Built Upon Area (BUA):	79%
Project Density:	High
Is the proposed project a site expansion?	No
Number of Drainage Areas on Site:	8
NOAA **1-Year, 24-Hour Storm (inches) (See NOAA Website):**	2.86
2-Year, 24-Hour Storm (inches) (See NOAA Website):	3.45
10-Year, 24-Hour Storm (inches) (See NOAA Website):	5.01
Lot Data (if applicable):	
Total Acreage in Lots:	
Number of Lots:	
Average Lot Size (SF):	
Total Impervious Surface Area on Lots (SF):	
Average Impervious Surface Area Per Lot (SF):	
Stormwater Narrative (limit to 1,200 characters - attach additional pages with submittal if necessary):	

See Stormwater Management Narrative. Due to multiple tracts of land having separate drainage pattens, Time of Concentration calculations have been attached in the narrative submittal. All post-development Time of Concentrations have been assumed as 5 minutes. See attached Hydraflow Hydrograph for Pre-Development and Post-Development Peak Flows.

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Project Name: 21089 - Wallbrook

DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	5.07				5.07			
Site Acreage within Drainage=	5.07				5.07			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=	0.00				0.00			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition			5.07					
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition							0.76	
Reforestation (in dedicated OS)								
Connected Impervious							4.31	
Disconnected Impervious								

SITE FLOW	PRE-DEVELOPMENT T_c	POST-DEVELOPMENT Tc
Sheet Flow		
Length (ft)=		
Slope (ft/ft)=		
Surface Cover:		
n-value=		
T_t (hrs)=		
Shallow Flow		
Length (ft)=		
Slope (ft/ft)=		
Surface Cover:		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 1		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		

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DRAINAGE AREA 1
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.18	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

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DRAINAGE AREA 2
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	10.97				10.97			
Site Acreage within Drainage=	10.97				10.97			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition				10.97				
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								2.92
Reforestation (in dedicated OS)								
Connected Impervious								8.05
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 2
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.11	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

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DRAINAGE AREA 3
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	1.97				1.97			
Site Acreage within Drainage=	1.97				1.97			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=	0.00				0.00			
Lake/Pond Area not in the Tc flow path (Acres)=	0.00				0.00			
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition				1.97				
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								0.64
Reforestation (in dedicated OS)								
Connected Impervious								1.33
Disconnected Impervious								

SITE FLOW	PRE-DEVELOPMENT T_c	POST-DEVELOPMENT Tc
Sheet Flow		
Length (ft)=		
Slope (ft/ft)=		
Surface Cover:		
n-value=		
T_t (hrs)=		
Shallow Flow		
Length (ft)=		
Slope (ft/ft)=		
Surface Cover:		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 1		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		

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DRAINAGE AREA 3
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.11	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

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DRAINAGE AREA 4
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	2.51				2.51			
Site Acreage within Drainage=	2.51				2.51			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition				2.51				
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								0.38
Reforestation (in dedicated OS)								
Connected Impervious								2.13
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 4
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.15	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	77	95
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**95**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	7,414	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.98	2.34
Volume of runoff (ft^3) =	8,885	21,320
Volume change (ft^3) =	12,435	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	3.061	9.743
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.39	2.92
Volume of runoff (ft^3) =	12,696	26,589
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	4.374	12.152
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.63	4.46
Volume of runoff (ft^3) =	23,975	40,635
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	8.260	18.571

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DRAINAGE AREA 5
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	7.06				7.06			
Site Acreage within Drainage=	7.06				7.06			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition				7.06				
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								1.06
Reforestation (in dedicated OS)								
Connected Impervious								6.00
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 5
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.08	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	77	95
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**95**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	20,883	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.98	2.34
Volume of runoff (ft^3) =	24,992	60,044
Volume change (ft^3) =	35,052	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	10.793	27.441
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.39	2.92
Volume of runoff (ft^3) =	35,712	74,870
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	15.422	34.217
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.63	4.46
Volume of runoff (ft^3) =	67,436	114,382
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	29.123	52.275

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DRAINAGE AREA 6
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	2.49				2.49			
Site Acreage within Drainage=	2.49				2.49			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition				2.49				
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								0.29
Reforestation (in dedicated OS)								
Connected Impervious								2.20
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 6
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.14	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	77	96
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**96**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	7,639	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.98	2.40
Volume of runoff (ft^3) =	8,814	21,729
Volume change (ft^3) =	12,915	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	3.098	9.931
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.39	2.99
Volume of runoff (ft^3) =	12,595	26,982
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	4.426	12.331
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.63	4.53
Volume of runoff (ft^3) =	23,784	40,955
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	8.358	18.717

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DRAINAGE AREA 7
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	6.45				6.45			
Site Acreage within Drainage=	6.45				6.45			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition				6.45				1.49
Reforestation (in dedicated OS)								
Connected Impervious								4.96
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 7
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.08	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	80	94
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**94**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	17,375	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	1.15	2.20
Volume of runoff (ft^3) =	26,832	51,500
Volume change (ft^3) =	24,668	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	12.263	23.536
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.60	2.77
Volume of runoff (ft^3) =	37,386	64,871
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	17.086	29.647
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.90	4.30
Volume of runoff (ft^3) =	67,936	100,681
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	31.048	46.013

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DRAINAGE AREA 8
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=	0.37				0.37			
Site Acreage within Drainage=	0.37				0.37			
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition				0.37				
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								0.09
Reforestation (in dedicated OS)								
Connected Impervious								0.28
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 8
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.08	0.08
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=	77	94
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=	**94**	
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =	982	
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=	0.98	2.18
Volume of runoff (ft^3) =	1,310	2,926
Volume change (ft^3) =	1,616	
Peak Discharge (cfs)= $Q_{1\text{-}year}$=	0.566	1.337
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=	1.39	2.75
Volume of runoff (ft^3) =	1,872	3,691
Peak Discharge (cfs)= $Q_{2\text{-}year}$=	0.808	1.687
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=	2.63	4.28
Volume of runoff (ft^3) =	3,534	5,743
Peak Discharge (cfs)= $Q_{10\text{-}year}$=	1.526	2.625

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DRAINAGE AREA 9
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=								
Site Acreage within Drainage=								
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious								
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 9
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.00	0.00
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

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DRAINAGE AREA 10
STORMWATER PRE-POST CALCULATIONS

LAND USE & SITE DATA	PRE-DEVELOPMENT				POST-DEVELOPMENT			
Drainage Area (Acres)=								
Site Acreage within Drainage=								
One-year, 24-hour rainfall (in)=	2.86							
Two-year, 24-hour rainfall (in)=	3.45							
Ten-year, 24-hour storm (in)=	5.01							
Total Lake/Pond Area (Acres)=								
Lake/Pond Area not in the Tc flow path (Acres)=								
Site Land Use (acres):	A	B	C	D	A	B	C	D
Pasture								
Woods, Poor Condition								
Woods, Fair Condition								
Woods, Good Condition								
Open Space, Poor Condition								
Open Space, Fair condition								
Open Space, Good Condition								
Reforestation (in dedicated OS)								
Connected Impervious								
Disconnected Impervious								
SITE FLOW	**PRE-DEVELOPMENT T_c**				**POST-DEVELOPMENT Tc**			
Sheet Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
n-value=								
T_t (hrs)=								
Shallow Flow								
Length (ft)=								
Slope (ft/ft)=								
Surface Cover:								
Average Velocity (ft/sec)=								
T_t (hrs)=								
Channel Flow 1								
Length (ft)=								
Slope (ft/ft)=								
Cross Sectional Flow Area (ft^2)=								
Wetted Perimeter (ft)=								
Channel Lining:								
n-value=								
Hydraulic Radius (ft)=								
Average Velocity (ft/sec)=								
T_t (hrs)=								

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DRAINAGE AREA 10
STORMWATER PRE-POST CALCULATIONS

Channel Flow 2		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Channel Flow 3		
Length (ft)=		
Slope (ft/ft)=		
Cross Sectional Flow Area (ft^2)=		
Wetted Perimeter (ft)=		
Channel Lining:		
n-value=		
Hydraulic Radius (ft)=		
Average Velocity (ft/sec)=		
T_t (hrs)=		
Tc (hrs)=	0.00	0.00
RESULTS	**PRE-DEVELOPMENT**	**POST-DEVELOPMENT**
Composite Curve Number=		
Disconnected Impervious Adjustment		
Disconnected impervious area (acre) =		
$CN_{adjusted\ (1\text{-}year)}$=		
High Density Only		
Volume of runoff from 1" rainfall for DA HIGH DENSITY REQUIREMENT = (ft^3) =		
1-year, 24-hour storm (Peak Flow)		
Runoff (inches) = $Q^*_{1\text{-}year}$=		
Volume of runoff (ft^3) =		
Volume change (ft^3) =		
Peak Discharge (cfs)= $Q_{1\text{-}year}$=		
2-year, 24-hour storm (LID)		
Runoff (inches) = $Q^*_{2\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{2\text{-}year}$=		
10-year, 24-hour storm (DIA)		
Runoff (inches) = $Q^*_{10\text{-}year}$=		
Volume of runoff (ft^3) =		
Peak Discharge (cfs)= $Q_{10\text{-}year}$=		

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DA SITE SUMMARY
STORMWATER PRE-POST CALCULATIONS

SITE SUMMARY										
DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development (1-year, 24-hour storm)										
Runoff (in) = $Q_{pre,1\text{-}year}$ =				0.98	0.98	0.98	1.15	0.98		
Peak Flow (cfs)=$Q_{1\text{-}year}$ =				3.061	10.793	3.098	12.263	0.566		
Post-Development (1-year, 24-hour storm)										
Proposed Impervious Surface (acre) =	4.31	8.05	1.33	2.13	6.00	2.20	4.96	0.28		
Runoff (in)=$Q_{1\text{-}year}$ =				2.34	2.34	2.40	2.20	2.18		
Peak Flow (cfs)=$Q_{1\text{-}year}$ =				9.743	27.441	9.931	23.536	1.337		
Increase in volume per DA (ft^3)_1-yr storm=				12,435	35,052	12,915	24,668	1,616		
Minimum Volume to be Managed for DA HIGH DENSITY REQUIREMENT = (ft^3) =				7,414	20,883	7,639	17,375	982		

TARGET CURVE NUMBER (TCN)

Site Data

SITE \SOIL COMPOSITION

HYDROLOGIC SOIL GROUP	Site Area	%	Target CN
A	0.00	0%	N/A
B	0.00	0%	N/A
C	5.07	14%	N/A
D	31.82	86%	N/A

Total Site Area (acres) =	36.89
Percent BUA (Includes Existing Lakes/Pond Areas) =	79%
Project Density =	High
Target Curve Number (TCN) =	N/A
$CN_{adjusted\ (1\text{-}year)}$=	49
Minimum Volume to be Managed (Total Site) Per TCN Requirement= ft^3 =	N/A

Site Nitrogen Loading Data

HSG	TN export coefficient (lbs/ac/yr)	Site Acreage	N Export
Pasture	1.2	0.00	0.00
Woods, Poor Condition	1.6	0.00	0.00
Woods, Fair Condition	1.2	0.00	0.00
Woods, Good Condition	0.8	0.00	0.00
Open Space, Poor Condition	1.0	0.00	0.00
Open Space, Fair Condition	0.8	0.00	0.00
Open Space, Good Condition	0.6	7.63	4.58
Reforestation (in dedicated OS)	0.6	0.00	0.00
Impervious	21.2	29.26	620.31
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	16.94		
Nitrogen Load (lbs/yr)=	624.89		
TOTAL SITE NITROGEN TO MITIGATE (lbs/yr)_Wendell Only=	492.09		

Site Nitrogen Loading Data For Expansions Only

	Existing	New
Impervious(acres)=	NA	NA
"Expansion Area" (acres=)		
Nitrogen Load (lbs/yr)=	NA	NA
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	NA	NA
Total Site loading rate (lbs/ac/yr)		
TOTAL SITE NITROGEN TO MITIGATE (lbs/yr)=	NA	

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Project Name:

DRAINAGE AREA 1
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA1 Site Acreage=	5.07			
DA1 Off-Site Acreage=				
Total Required Storage Volume for Site TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA1 1" Rainfall for High Density (ft^3)=				
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA1(a) (Ac)		Sub-DA1(b) (Ac)		Sub-DA1(c) (Ac)		Sub-DA1(d) (Ac)		Sub-DA1(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	0.76									
Reforestation (in dedicated OS)										
Impervious	4.31									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	15,001	99,381	25%	91.83	22.96	52.8
				0%	68.87	0.00	
				0%	68.87	0.00	
				0%	68.87	0.00	
				0%	68.87	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**68.87**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 1
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA1 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	22.96
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 2
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA2 Site Acreage=	10.97			
DA2 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA2 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA2(a) (Ac)		Sub-DA2(b) (Ac)		Sub-DA2(c) (Ac)		Sub-DA2(d) (Ac)		Sub-DA2(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	1.99		0.93							
Reforestation (in dedicated OS)										
Impervious	8.05									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	25,892	99,381	25%	171.85	42.96	52.8
				0%	128.89	0.00	
				0%	128.89	0.00	
				0%	128.89	0.00	
				0%	128.89	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**128.89**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
N/A - Direct Release		169		0%	0.56	0.00	
				0%	0.56	0.00	
				0%	0.56	0.00	
				0%	0.56	0.00	
				0%	0.56	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**0.56**					

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 2
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA2 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	42.96
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 3
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA3 Site Acreage=	1.97			
DA3 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA3 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA3(a) (Ac)		Sub-DA3(b) (Ac)		Sub-DA3(c) (Ac)		Sub-DA3(d) (Ac)		Sub-DA3(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	0.15		0.49							
Reforestation (in dedicated OS)										
Impervious	1.16		0.17							

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	2,758	99,381	25%	24.68	6.17	52.8
				0%	18.51	0.00	
				0%	18.51	0.00	
				0%	18.51	0.00	
				0%	18.51	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**18.51**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
N/A - Direct Release		306	0	0%	3.90	0.00	
				0%	3.90	0.00	
				0%	3.90	0.00	
				0%	3.90	0.00	
				0%	3.90	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**3.90**					

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 3
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
			0	0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA3 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	6.17
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 4
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA4 Site Acreage=	2.51			
DA4 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA4 1" Rainfall for High Density (ft3)=	7,414			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA4(a) (Ac)		Sub-DA4(b) (Ac)		Sub-DA4(c) (Ac)		Sub-DA4(d) (Ac)		Sub-DA4(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	0.38									
Reforestation (in dedicated OS)										
Impervious	2.13									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	7,414	99,381	25%	45.38	11.35	52.8
				0%	34.04	0.00	
				0%	34.04	0.00	
				0%	34.04	0.00	
				0%	34.04	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**34.04**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 4
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA4 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	11.35
1-year, 24-hour storm	
Post BMP Volume of Runoff ($ft^3_{(1\text{-year})}$)=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff $(ft3)_{(2\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.00
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff ($ft^3_{(10\text{-year})}$)=	0
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	0.00
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 5
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA5 Site Acreage=	7.06			
DA5 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA5 1" Rainfall for High Density (ft3)=	20,883			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA5(a) (Ac)		Sub-DA5(b) (Ac)		Sub-DA5(c) (Ac)		Sub-DA5(d) (Ac)		Sub-DA5(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	1.06									
Reforestation (in dedicated OS)										
Impervious	6.00									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	20,883	99,381	25%	127.84	31.96	52.8
				0%	95.88	0.00	
				0%	95.88	0.00	
				0%	95.88	0.00	
				0%	95.88	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**95.88**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 5
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA5 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	31.96
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.00
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	15,001
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	0.59
Post BMP $CN_{(10\text{-year})}$=	61
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 6
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA6 Site Acreage=	2.49			
DA6 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA6 1" Rainfall for High Density (ft3)=	7,639			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA6(a) (Ac)		Sub-DA6(b) (Ac)		Sub-DA6(c) (Ac)		Sub-DA6(d) (Ac)		Sub-DA6(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	0.23		0.06							
Reforestation (in dedicated OS)										
Impervious	1.82		0.38							

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	5,267	99,381	25%	38.72	9.68	52.8
				0%	29.04	0.00	
				0%	29.04	0.00	
				0%	29.04	0.00	
				0%	29.04	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**29.04**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
N/A - Direct Release		299		0%	8.09	0.00	
				0%	8.09	0.00	
				0%	8.09	0.00	
				0%	8.09	0.00	
				0%	8.09	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**8.09**					

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 6
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA6 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	9.68
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.00
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	0.00
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 7
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA7 Site Acreage=	6.45			
DA7 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA7 1" Rainfall for High Density (ft3)=	17,375			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA7(a) (Ac)		Sub-DA7(b) (Ac)		Sub-DA7(c) (Ac)		Sub-DA7(d) (Ac)		Sub-DA7(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	1.49									
Reforestation (in dedicated OS)										
Impervious	4.96									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	17,375	99,381	25%	106.05	26.51	52.8
				0%	79.53	0.00	
				0%	79.53	0.00	
				0%	79.53	0.00	
				0%	79.53	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**79.53**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 7
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA7 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	26.51
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.00
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	1,300
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	0.06
Post BMP $CN_{(10\text{-year})}$=	43
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 8
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA8 Site Acreage=	0.37			
DA8 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA8 1" Rainfall for High Density (ft3)=	982			
Will site use underground detention/cistern?	No	Enter % of the year water will be reused=	0%	Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA8(a) (Ac)		Sub-DA8(b) (Ac)		Sub-DA8(c) (Ac)		Sub-DA8(d) (Ac)		Sub-DA8(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition	0.09									
Reforestation (in dedicated OS)										
Impervious	0.28									

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
SCM 1	Wet Detention Basin	982	99,381	25%	5.99	1.50	52.8
				0%	4.49	0.00	
				0%	4.49	0.00	
				0%	4.49	0.00	
				0%	4.49	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):		**4.49**					

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 8
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA8 BMP SUMMARY	
Total Volume Treated (ft^3)=	99,381
Nitrogen Mitigated(lbs)=	1.50
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	0.00
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	0.00
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	60.610
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	0
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	0.00
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.850

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Project Name:

DRAINAGE AREA 9
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA9 Site Acreage=				
DA9 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA9 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?		Enter % of the year water will be reused=		Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA9(a) (Ac)		Sub-DA9(b) (Ac)		Sub-DA9(c) (Ac)		Sub-DA9(d) (Ac)		Sub-DA9(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious										

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 9
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA9 BMP SUMMARY	
Total Volume Treated (ft^3)=	
Nitrogen Mitigated(lbs)=	
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-}year)}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-}year)}$=	
Post BMP $CN_{(1\text{-}year)}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-}year}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-}year)}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-}year)}$=	
Post BMP $CN_{(2\text{-}year)}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-}year)}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-}year)}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-}year)}$=	
Post BMP $CN_{(10\text{-}year)}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-}year)}$=	

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Project Name:

DRAINAGE AREA 10
BMP CALCULATIONS

DRAINAGE AREA 1 - BMP DEVICES AND ADJUSTMENTS				
DA10 Site Acreage=				
DA10 Off-Site Acreage=				
Total Required Storage Volume TCN Requirement (ft^3)=	N/A			
Total Required Storage Volume for DA10 1" Rainfall for High Density (ft3)=				
Will site use underground detention/cistern?		Enter % of the year water will be reused=		Note: Supporting information/details should be submitted to demonstrate water usage.

ENTER ACREAGE FOR ALL SUB-DRAINAGE AREAS IN DA

HSG	Sub-DA10(a) (Ac)		Sub-DA10(b) (Ac)		Sub-DA10(c) (Ac)		Sub-DA10(d) (Ac)		Sub-DA10(e) (Ac)	
	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site	Site	Off-site
Pasture										
Woods, Poor Condition										
Woods, Fair Condition										
Woods, Good Condition										
Open Space, Poor Condition										
Open Space, Fair Condition										
Open Space, Good Condition										
Reforestation (in dedicated OS)										
Impervious										

Sub-DA1(a) BMP(s)

Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1(b) BMP(s)

If Sub-DA1(b) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

Sub-DA1 (c) BMP(s)

If Sub-DA1(c) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

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Project Name:

DRAINAGE AREA 10
BMP CALCULATIONS

Sub-DA1(d) BMP(s)							
If Sub-DA1(d) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							
Sub-DA1(e) BMP(s)							
If Sub-DA1(e) is connected to upstream subbasin(s), enter the nitrogen leaving the most upstream subbasin(lbs):							
Device Name (As Shown on Plan)	Device Type	Water Quality Volume for Sub-DA (ft^3)	Provided Volume that will drawdown 2-5 days (ft^3)	Nitrogen Removal Efficiency	Sub-DA Nitrogen (lbs)	Nitrogen Removed (lbs)	Drawdown Time (hours)
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
				0%	0.00	0.00	
Total Nitrogen remaining leaving the subbasin (lbs):							

DA10 BMP SUMMARY	
Total Volume Treated (ft^3)=	
Nitrogen Mitigated(lbs)=	
1-year, 24-hour storm	
Post BMP Volume of Runoff (ft^3)$_{(1\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=	
Post BMP $CN_{(1\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	
2-year, 24-hour storm (LID)	
Post BMP Volume of Runoff (ft3)$_{(2\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(2\text{-year})}$=	
Post BMP $CN_{(2\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-year})}$=	
10-year, 24-hour storm (DIA)	
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=	
Post BMP Runoff (inches) = $Q^*_{(10\text{-year})}$=	
Post BMP $CN_{(10\text{-year})}$=	
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	

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Project Name:

DA SITE SUMMARY
BMP CALCULATIONS

BMP SUMMARY										
DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development (1-year, 24-hour storm)										
Runoff (in)=$Q^*_{1\text{-year}}$ =				0.98	0.98	0.98	1.15	0.98		
Peak Flow (cfs)=$Q_{1\text{-year}}$ =				3.061	10.793	3.098	12.263	0.566		
Post-Development (1-year, 24-hour storm)										
Target Curve Number (TCN) =	NA									
Post BMP Runoff (inches) = $Q^*_{(1\text{-year})}$=										
Post BMP Peak Discharge (cfs)= $Q_{1\text{-year}}$=	41.550	41.550	41.550	41.550	41.550	41.550	41.550	41.550		
Post BMP $CN_{(1\text{-year})}$=										
Post-BMP Nitrogen Loading										
TOTAL SITE NITROGEN MITIGATED (lbs)=	153.09									
SITE NITROGEN LOADING RATE (lbs/ac/yr)=	12.79									
TOTAL SITE NITROGEN LEFT TO MITIGATE_Wendell Only (lbs)=	**339.00**									

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Project Name:	

LOW IMPACT DEVELOPMENT SUMMARY

DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development										
Runoff (in) = $Q_{pre_2\text{-}year}$ =				1.39	1.39	1.39	1.60	1.39		
Total Runoff Volume (ft^3)=				12,696	35,712	12,595	37,386	1,872		
Peak Flow (cfs)=$Q_{2\text{-}year}$ =				4.374	15.422	4.426	17.086	0.808		
Post-Development										
2-year, 24-hour storm (LID)										
Post BMP Runoff (inches) = $Q^*_{(2\text{-}year)}$=										
Post BMP Peak Discharge (cfs)= $Q_{(2\text{-}year)}$=	60.610	60.610	60.610	60.610	60.610	60.610	60.610	60.610		
Post BMP Volume of Runoff $(ft3)_{(2\text{-}year)}$=										
Does Runoff meet LID requirements?				Yes	Yes	Yes	Yes	Yes		
Does Peak Flow meet LID requirements?				No	No	No	No	No		
Does Runoff Volume meet LID requirements?				Yes	Yes	Yes	Yes	Yes		

SITE SUMMARY	
Site Data	
Target CN =	N/A
Post-Development CN =	0
Does CN meet LID requirements?	

LID CHECKLIST
Complete the below checklist if all requirements have been met above:

LID Narrative (limit to 600 characters - attach additional pages with submittal if necessary):
Describe in detail how the proposed development has utilized "Natural Site Design". Narrative should include the location of site buildings, roads and other land disturbances in the least environmentally-sensitive areas, preservation of steep slopes, and preservation of naturally well draining soils and other hydrologically valuable features.

LID Techniques (check all that apply)
At least **one** of the following techniques must be used to achieve LID classification:

☐	Bioretention
☐	On-site infiltration

Additional LID Techniques (check all that apply)
At least **two** (**one for Wendell**) of the following techniques must be used to achieve LID classification:

☐	Retention of 50% of vegetated area, including open space, landscaping or forests
☐	Use of permeable pavement for all private driveways, private roads, sidewalks and parking areas
☐	Installation of one rain cistern per lot or three rain barrels per lot
☐	Installation of vegetative roofs
☐	Increasing all buffers in the Riparian buffer zone or the Flood Protection Zone, whichever is greater, by 50 feet
☐	Use of reclaimed water for all buildings
☐	Use of innovative LID techniques subject to approval

Project Name:	

DOWNSTREAM IMPACT ANALYSIS SITE SUMMARY

DRAINAGE AREA SUMMARIES										
DRAINAGE AREA:	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10
Pre-Development										
Peak Discharge (cfs)=$Q_{10\text{-year}}$ =				8.26	29.12	8.36	31.05	1.53		
Volume of Runoff (ft^3)$_{(10\text{-year})}$ =				23,975	67,436	23,784	67,936	3,534		
Post-Development										
10-year, 24-hour storm (DIA)										
Post BMP Peak Discharge (cfs)= $Q_{(10\text{-year})}$=	85.85	85.85	85.85	85.85	85.85	85.85	85.85	85.85		
Post BMP Volume of Runoff (ft^3)$_{(10\text{-year})}$=					15,001		1,300			

CALCULATIONS AND REFERENCE

TARGET CURVE NUMBER				
MAXIMUM CURVE NUMBER AFTER DEVELOPMENT				
PROJECT DENSITY	**A**	**B**	**C**	**D**
Ultra-Low	43	63	76	81
Low	48	66	78	83
High	N/A	N/A	N/A	N/A

WEIGHTED CURVE NUMBER				
RUNOFF CURVE NUMBERS FOR URBAN AREAS				
LAND USE	**A**	**B**	**C**	**D**
Pasture	39	61	74	80
Woods, Poor Condition[1]	45	66	77	83
Woods, Fair Condition[2]	36	60	73	79
Woods, Good Condition[3]	30	55	70	77
Open Space, Poor Condition[4]	68	79	86	89
Open Space, Fair Condition[5]	49	69	79	84
Open Space, Good Condition[6]	39	61	74	80
Reforestation (in dedicated OS)[7]	30	55	70	77
Impervious[8]	98	98	98	98

Notes:
[1] Poor Condition = Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
[2] Fair Condition = Woods are grazed but not burned, and some forest litter covers the soil.
[3] Good Condition = Woods that are protected from grazing, litter, and brush adequately cover the soil
[4] Poor Condition = Grass Cover <50% (lawns, parks, golf courses, cemeteries, etc.)
[5] Fair Condition = Grass Cover = 50% - 75% (lawns, parks, golf courses, cemeteries, etc.)
[6] Good Condition = Grass Cover >75% (lawns, parks, golf courses, cemeteries, etc.)
[7] Includes paved/gravel/compacted soil driveways and roads, roofs, etc.
[8] Includes paved/gravel/compacted soil driveways and roads, roofs, etc.

SCS RUNOFF METHOD

$$Q^* = (P-.2S)^2/(P+.8S)$$

Where:
Q*= Runoff (in)
P= Precipitation (in)
S= Potential max retention after runoff begins (in) = (1000/CN)-10

Notes:
Calculations used on Drainage Area Sheets

DISCRETE RUNOFF METHOD (HIGH DENSITY ONLY)

$$Q^*_{High} = Q^*_{(imp)} \times DA_{(imp)} + Q^*_{(pervious)} \times DA_{(pervious)}$$

$Q^*_{(imp)}$ = Runoff from Impervious Area (in)
$DA_{(imp)}$ = Drainage from impervious area (acre)
$Q^*_{(pervious)}$ = Runoff from pervious area (in)
$DA_{(pervious)}$ = Drainage from pervious area (acre)

PEAK FLOW

Method: TR-55 Graphical Peak Discharge Method for Type II Distribution

$$Q_p = q_u A_m Q^* F_p$$

Where:
Q_p = Peak Discharge (cfs)
q_u = Unit peak discharge (csm/in) *TR-55 Appendix F*
A_m = Drainage Area (mi^2)
Q* = runoff (inches)
F_p = pond adjustment factor

$$\log(q_u) = C_o + C_1 \log(Tc) + C_2 [\log(Tc)]^2$$

Where:
C_o, C_1, C_2 = coefficient from Table F-1
T_c = time of concentration (hr)

Limitations:
The watershed must be hydrologically homogeneous
The watershed may have only one main stream or, if more than one, the branches must have nearly equal T_c's.
The Fp factor can be applied only for ponds or swamps that are not in the T_c flow path
This method should be used only if the weighted CN is greater than 40.
When this method is used to develop estimates of peak discharge for both pre and post development, use the same procedure for estimating Tc.
T_c values with this method may range from 0.1 to 10 hours.

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TIME OF CONCENTRATION

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor from seconds to hours

T_c = sum of T_t values for consecutive flow segments

$T_c = T_1 + T_2 + T_3 + \ldots T_m$

T_c = time of concentration (hr)
m = # of flow segments

Note: Minimal 5 minute Tc

SHEET FLOW (FOR FLOW LESS THAN 300 FEET)

$$T_t = \frac{0.0007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}$$

T_t =travel time (hr)
n = Manning's roughness coefficient (Table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

SHALLOW FLOW

Surface Cover

Unpaved: $V = 16.1345(s)^{0.5}$

Paved: $V = 20.3282(s)^{0.6}$

V=Average Velocity (ft/s)
s = slope of hydraulic grade line (watercourse slope, ft/ft)

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor from seconds to hours

OPEN CHANNEL FLOW

$$V = \frac{1.49r^{2/3}s^{1/2}}{n}$$

V=Average Velocity (ft/s)
r = hydraulic radius (ft)
s = slope of hydraulic grade line (channel slope, ft/ft)
n = Manning's roughness coefficient for open channel flow

$$r = \frac{a}{p_w}$$

a = cross sectional flow area (ft2)
p_w=wetted perimeter (ft)

$$T_t = \frac{L}{3600V}$$

T_t =travel time (hr)
L = flow length (ft)
V = average velocity (ft/s)
3600 = conversion factor (sec-hrs)

Modified Table 3-1 for Stormwater Tool

SURFACE DESCRIPTION	n
Paved, Gravel, or Bare Soil	0.011
Grass	0.24
Woods	0.40

TABLE 4-1, TR-55
I_a values for runoff curve numbers

CN	I_a (in)	CN	I_a (in)	CN	I_a (in)
40	3.000	60	1.333	80	0.500
41	2.878	61	1.279	81	0.469
42	2.762	62	1.226	82	0.439
43	2.651	63	1.175	83	0.410
44	2.545	64	1.125	84	0.381
45	2.444	65	1.077	85	0.353
46	2.348	66	1.030	86	0.326
47	2.255	67	0.985	87	0.299
48	2.167	68	0.941	88	0.273
49	2.082	69	0.899	89	0.247
50	2.000	70	0.857	90	0.222
51	1.922	71	0.817	91	0.198
52	1.846	72	0.778	92	0.174
53	1.774	73	0.740	93	0.151
54	1.704	74	0.703	94	0.128
55	1.636	75	0.667	95	0.105
56	1.571	76	0.632	96	0.083
57	1.509	77	0.597	97	0.062
58	1.448	78	0.564	98	0.041
59	1.390	79	0.532		

TABLE 3-9, TR-55
Rational Runoff Coefficients

CHANNEL LINING	n
Asphalt	0.016
Concrete, finished	0.012
Concrete, unfinished	0.014
Grass	0.035
Gravel Bottom/riprap sides	0.033
Weeds	0.040

DISCONNECTED IMPERVIOUS CALCULATION

$CN_{adjusted} = CN_p + [(P_{imp}/100)*(98-CN_p)*(1-(0.5*R))]$

Where:

$CN_{adjusted}$ = Composite Curve Number

CN_p = Pervious runoff curve number =(PostCN - (Pimp/100)*98)/(1 -(Pimp/100))

P_{imp} = Percent Imperviousness

R = ratio of unconnected impervious area to total impervious area

TABLE 4-1, SW BMP MANUAL
BMP ABILITY FOR SW QUANTITY CONTROL

BMP	TSS	TN
Bioretention without IWS	**85%**	**35%**
Bioretention with IWS	**85%**	**40%**
Stormwater Wetlands	**85%**	**40%**
Wet Detention Basin	**85%**	**25%**
Sand Filter	**85%**	**35%**
Filter Strip	**25-40%**	**20%**
Grass Swale	**35%**	**20%**
Restored Riparian Buffer	**60%**	**30%**
Infiltration Device	**85%**	**30%**
Dry Extended Detention Basin	**50%**	**10%**
Permeable Pavement	**0%**	**0%**
Rooftop Runoff Management (Excluding Cisterns)	**0%**	**0%**
Cistern/Underground Detention	**See Note**	**100%**

[1] Use of underground detention reduces total volume required for storage as well total nitrogen load. To receive total reduction,

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	engineer must show year-round use of reclaimed water. If water is not reused year-round, a percent of the total reduction may be given (See DA BMP sheets).

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Tim of Concentration (Tc)

Pre-Development - Lot 5 (Boat Tract)

Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	660	ft
Height of watershed, H	13	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	10.5	min
Time of concentration, tc	10.5	min

Pre-Development - Paris Tract (Lots 9, 10, & 11)

Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	300	ft
Height of watershed, H	12	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	4.4	min
Time of concentration, tc	5.0	min

Pre-Development - Lots 3 & 4

Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	503	ft
Height of watershed, H	14	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	7.5	min
Time of concentration, tc	7.5	min

Pre-Development - Wallbrook Lots 1A, 1B, 1C & 2

Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	675	ft
Height of watershed, H	44	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	6.7	min
Time of concentration, tc	6.7	min

Pre-Development - New Roadways (Wallbrook Dr/Va Water Dr)

Overland Flow (Grassy/Wooded)		
Hydraulic length of watershed, L	640	ft
Height of watershed, H	21	ft
Flow Path Multiplier, K	2	
Channelized Flow		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.01	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	8.4	min
Time of concentration, tc	8.4	min

Pre-Development - DOT Roadway (Main St Improvements)

Overland Flow (Paved)		
Hydraulic length of watershed, L	50	ft
Height of watershed, H	3	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Natural Channel)		
Hydraulic length of watershed, L	100	ft
Height of watershed, H	6	ft
Flow Path Multiplier, K	1	
Time of concentration, tc	1.0	min
Time of concentration, tc	5.0	min

Post-Development - Wallbrook Lots 1A, 1B, 1C, & 2

Overland Flow (Paved)		
Hydraulic length of watershed, L	100	ft
Height of watershed, H	1	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Piped)		
Hydraulic length of watershed, L	700	ft
Height of watershed, H	5.5	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	2.2	min
Time of concentration, tc	5.0	min

Post-Development - Paris Tract (Lots 9, 10, & 11)

Overland Flow (Paved)		
Hydraulic length of watershed, L	200	ft
Height of watershed, H	5	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Piped)		
Hydraulic length of watershed, L	600	ft
Height of watershed, H	27	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	1.5	min
Time of concentration, tc	5.0	min

Post-Development - Lot 5 (Boat Tract)

Overland Flow (Paved)		
Hydraulic length of watershed, L	150	ft
Height of watershed, H	2	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Piped)		
Hydraulic length of watershed, L	890	ft
Height of watershed, H	27	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	1.9	min
Time of concentration, tc	5.0	min

Post-Development - New Roadways (Wallbrook Dr/Va Water Dr)

Overland Flow (Paved)		
Hydraulic length of watershed, L	200	ft
Height of watershed, H	2	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Piped)		
Hydraulic length of watershed, L	1140	ft
Height of watershed, H	22	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	2.7	min
Time of concentration, tc	5.0	min

Post-Development - DOT Roadway (Main St Improvements)

Overland Flow (Paved)		
Hydraulic length of watershed, L	0	ft
Height of watershed, H	0.1	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Piped)		
Hydraulic length of watershed, L	2110	ft
Height of watershed, H	36	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	2.7	min
Time of concentration, tc	5.0	min

Post-Development - Lots 3 & 4

Overland Flow (Paved)		
Hydraulic length of watershed, L	100	ft
Height of watershed, H	2	ft
Flow Path Multiplier, K	0.4	
Channelized Flow (Piped)		
Hydraulic length of watershed, L	300	ft
Height of watershed, H	6	ft
Flow Path Multiplier, K	0.2	
Time of concentration, tc	1.1	min
Time of concentration, tc	5.0	min

WALLBROOK

ROLESVILLE, WAKE COUNTY, NORTH CAROLINA

STORMWATER MANAGEMENT PLAN

DRAWING NO. D-1219

STORMWATER CONTROL MEASURE CALCULATIONS

Ark Consulting Group, PLLC
2755-B Charles Boulevard
Greenville, NC 27858
252-558-0888

JOB 21089-Wallbrrok
DATE Sep-23
CALCULATED BY TGN
CHECKED BY BCF

Wet Pond Design
Surface Area Requirements

		Units	Symbols & Governing Equations
Site Calculations			
Total Site Catchment Area	34.86	ac	A_{site}
Roof Impervious	4.72	ac	A_{roof}
Transportation Impervious	24.00	ac	A_{trans}
Total Impervious Area	28.72	ac	$A_{impervious}$
Percent Impervious	82	%	$(A_{impervious} / A_{site})*100$
Average Depth Calculation			
Area of Bottom Shelf	27059	sq ft	A_{bot_shelf}
Area of Permanent Pool	31149	sq ft	A_{perm_pool}
Area of Bottom of Pond	15061	sq ft	A_{bot_pond}
Depth	9.0	ft	d
Main pool volume at permanent pool elevation	196328	cu ft	V_{pp}
Main pool area at permanent pool elevation	31149	sq ft	V_{pp}
Average Depth	6.3	ft	$d_{av} = V_{pp} / SA$ (Eq. 2)
Average Depth (Rounded to nearest 0.5 ft)	6.5	ft	d_{av}
Coastal Region? (Y or N)	N		
Surface Area/Drainage Area Ratio	1.76	%	SA/DA
Permanent Pool Surface Area Req'd	26786	sq ft	$SA/DA*A_{site}*43560/100$
Permanent Pool Surface Area Provided	31149	sq ft	A_{perm_pool}
Size of BMP (number times minimum size)	1.16		

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Wet Pond Design
Storage Volume Requirements

		Units	Symbols & Governing Equations
Site Calculations			
Total Site Area (Catchment 1)	34.86	ac	A_{site}
Roof Impervious	4.72	ac	A_{roof}
Transportation Impervious	24.00	ac	A_{trans}
Total Impervious Area	28.72	ac	$A_{impervious}$
Percent Impervious	82	%	$(A_{impervious} / A_{site})*100$
Runoff Volume - Simple Method			
Design Storm Rainfall Depth	1.00	in	R_D
Design Storm Runoff Volume	100155	cu ft	V (Simple Method Equation)
Storage Volume Provided	104312	cu ft	

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Wet Pond Design
Drawdown Time

		Units	Symbols & Governing Equation
Orifice Sizing			
Design Storage Volume	100155	cu ft	V
Desired Drawdown Time (2-5 Days)	2	days	T
Discharge	0.58	cfs	Q (V/T/24/3600)
Discharge Coefficient	0.60		C_D
Design Storm Stage	1.94	ft	H_O
Driving Head	0.65	ft	H_O = (TPE - PPE)/3
Appoximate Orifice Diameter	5.24	in	
Orifice Diameter	5.00	in	
Actual Discharge	0.53	cfs	Q (Orifice Equation)
Actual Drawdown Time	2.2	days	

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Forebay Sizing Calculations

Main Pool

Contour	Stage [ft]	Side Slope	Contour Area [sq ft]	Incremental Volume [cu ft]	Cumulative Volume [cu ft]
353.00	0	2.5:1	15061		0
357.00	4	2.5:1	20746	71614	71614
361.00	8	2.5:1	27059	95610	167224
362.00	9	6:1	31149	29104	196328

Forebay 1

Contour	Stage [ft]	Side Slope	Contour Area [sq ft]	Incremental Volume [cu ft]	Cumulative Volume [cu ft]	Percentage of Permanent Pool
358.00	0	3:1	4730		0	
360.00	2	3:1	7460	12190	12190	
362.00	4	3:1	10619	18079	30269	**18.1%**

* Acceptable range for Forebay Volume is 15%-20% of Main Pool Volume

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Stage-Storage Function

Contour ft MSL	Contour Area ft^2	Incremental Volume ft^3	Cumulative Volume, S ft^3	ln(S)	Stage, Z ft	ln(Z)	ln(Z), est.	Z, est. ft
362	42672	----	0	----	0	----	----	
363	55150	48911	48911	10.7977576	1	0	-0.01	0.99032282
364	56091	55620.5	104531.5	11.55724374	2	0.69315	0.70	2.01635307
365	57040	56565.5	161097	11.98976195	3	1.09861	1.11	3.02286428
366	57500	57270	218367	12.29393241	4	1.38629	1.39	4.01871719
367	57700	57600	275967	12.52803657	5	1.60944	1.61	5.00344203
368	57900	57800	333767	12.71819842	6	1.79176	1.79	5.97839158
369	58100	58000	391767	12.87842255	7	1.94591	1.94	6.94588912

Design Storm Runoff	100155	ft^3 (via simple method from SA/DA spreadsheet)
Design Storm Stage	1.94	ft
Design Storm El.	363.94	ft MSL
Surface Area at Design Storm	56017	

Regression Analysis ("linest" Excel Function):

Slope, m =	1.068172085
Intercept, b =	10.80814484

Coastal SA/DA Table

Items in bold from NCDEQ Stormwater Design Manual; others interpolated linearly.

% Impervious	Permanent Pool Average Depth										
Cover	**3**	3.5	**4**	4.5	**5**	5.5	**6**	6.5	**7**	7.5	**8**
10	**0.78**	0.70	**0.61**	0.53	**0.44**	0.22	**0.00**	0.00	**0.00**	0.00	**0.00**
11	0.85	0.75	0.65	0.57	0.48	0.28	0.07	0.06	0.05	0.04	0.04
12	0.92	0.81	0.70	0.61	0.53	0.33	0.14	0.12	0.10	0.09	0.07
13	0.99	0.86	0.74	0.65	0.57	0.39	0.21	0.18	0.16	0.13	0.11
14	1.06	0.92	0.78	0.70	0.61	0.45	0.28	0.24	0.21	0.17	0.14
15	1.13	0.98	0.83	0.74	0.66	0.50	0.35	0.31	0.26	0.22	0.18
16	1.20	1.03	0.87	0.78	0.70	0.56	0.42	0.37	0.31	0.26	0.21
17	1.27	1.09	0.91	0.83	0.74	0.62	0.49	0.43	0.36	0.30	0.25
18	1.34	1.15	0.95	0.87	0.78	0.67	0.56	0.49	0.42	0.35	0.28
19	1.41	1.20	1.00	0.91	0.83	0.73	0.63	0.55	0.47	0.39	0.32
20	**1.48**	1.26	**1.04**	0.96	**0.87**	0.79	**0.70**	0.61	**0.52**	0.44	**0.35**
21	1.55	1.33	1.10	1.01	0.92	0.83	0.74	0.65	0.56	0.47	0.39
22	1.62	1.39	1.16	1.07	0.97	0.88	0.79	0.69	0.59	0.51	0.42
23	1.69	1.46	1.22	1.12	1.02	0.93	0.83	0.73	0.63	0.54	0.46
24	1.76	1.52	1.28	1.18	1.07	0.97	0.87	0.77	0.66	0.58	0.49
25	1.83	1.59	1.35	1.24	1.13	1.02	0.92	0.81	0.70	0.61	0.53
26	1.90	1.65	1.41	1.29	1.18	1.07	0.96	0.84	0.73	0.65	0.56
27	1.97	1.72	1.47	1.35	1.23	1.11	1.00	0.88	0.77	0.68	0.60
28	2.04	1.78	1.53	1.40	1.28	1.16	1.04	0.92	0.80	0.72	0.63
29	2.11	1.85	1.59	1.46	1.33	1.21	1.09	0.96	0.84	0.75	0.67
30	**2.18**	1.92	**1.65**	1.52	**1.38**	1.26	**1.13**	1.00	**0.87**	0.79	**0.70**
31	2.26	1.98	1.71	1.57	1.43	1.29	1.16	1.02	0.88	0.79	0.71
32	2.34	2.05	1.77	1.62	1.47	1.33	1.18	1.04	0.89	0.80	0.72
33	2.41	2.12	1.83	1.67	1.52	1.36	1.21	1.05	0.90	0.81	0.72
34	2.49	2.19	1.89	1.73	1.56	1.40	1.23	1.07	0.91	0.82	0.73
35	2.57	2.26	1.96	1.78	1.61	1.43	1.26	1.09	0.92	0.83	0.74
36	2.65	2.33	2.02	1.83	1.65	1.47	1.29	1.11	0.92	0.84	0.75
37	2.73	2.40	2.08	1.89	1.70	1.50	1.31	1.12	0.93	0.84	0.76
38	2.80	2.47	2.14	1.94	1.74	1.54	1.34	1.14	0.94	0.85	0.76
39	2.88	2.54	2.20	1.99	1.79	1.57	1.36	1.16	0.95	0.86	0.77
40	**2.96**	2.61	**2.26**	2.05	**1.83**	1.61	**1.39**	1.18	**0.96**	0.87	**0.78**
41	3.03	2.68	2.32	2.10	1.88	1.66	1.43	1.21	1.00	0.95	0.90
42	3.10	2.74	2.38	2.16	1.93	1.71	1.48	1.25	1.03	1.02	1.02
43	3.17	2.81	2.44	2.21	1.99	1.75	1.52	1.29	1.07	1.10	1.13
44	3.24	2.87	2.50	2.27	2.04	1.80	1.57	1.33	1.10	1.18	1.25
45	3.31	2.94	2.57	2.33	2.09	1.85	1.61	1.37	1.14	1.25	1.37
46	3.37	3.00	2.63	2.38	2.14	1.90	1.65	1.41	1.17	1.33	1.49
47	3.44	3.07	2.69	2.44	2.19	1.95	1.70	1.45	1.21	1.41	1.61
48	3.51	3.13	2.75	2.50	2.25	1.99	1.74	1.49	1.24	1.48	1.72
49	3.58	3.20	2.81	2.55	2.30	2.04	1.79	1.53	1.28	1.56	1.84
50	**3.65**	3.26	**2.87**	2.61	**2.35**	2.09	**1.83**	1.57	**1.31**	1.64	**1.96**
51	3.72	3.32	2.91	2.65	2.39	2.13	1.87	1.61	1.35	1.62	1.88
52	3.79	3.37	2.96	2.70	2.44	2.18	1.92	1.66	1.40	1.60	1.79
53	3.86	3.43	3.00	2.74	2.48	2.22	1.96	1.70	1.44	1.58	1.71
54	3.93	3.49	3.05	2.78	2.52	2.26	2.00	1.74	1.48	1.56	1.63
55	4.00	3.55	3.09	2.83	2.57	2.31	2.05	1.79	1.53	1.54	1.55
56	4.68	3.91	3.13	2.87	2.61	2.35	2.09	1.83	1.57	1.52	1.46
57	4.14	3.66	3.18	2.91	2.65	2.39	2.13	1.87	1.61	1.50	1.38
58	4.21	3.72	3.22	2.96	2.69	2.43	2.17	1.91	1.65	1.48	1.30
59	4.28	3.77	3.27	3.00	2.74	2.48	2.22	1.96	1.70	1.46	1.21
60	**4.35**	3.83	**3.31**	3.05	**2.78**	2.52	**2.26**	2.00	**1.74**	1.44	**1.13**

61	4.44	3.90	3.37	3.10	2.82	2.56	2.29	2.02	1.75	1.45	1.15
62	4.52	3.98	3.43	3.15	2.87	2.59	2.31	2.04	1.76	1.46	1.17
63	4.61	4.05	3.49	3.20	2.91	2.63	2.34	2.05	1.77	1.48	1.18
64	4.70	4.13	3.55	3.26	2.96	2.66	2.36	2.07	1.78	1.49	1.20
65	4.79	4.20	3.62	3.31	3.00	2.70	2.39	2.09	1.79	1.50	1.22
66	4.87	4.27	3.68	3.36	3.04	2.73	2.42	2.11	1.79	1.52	1.24
67	4.96	4.35	3.74	3.41	3.09	2.77	2.44	2.12	1.80	1.53	1.26
68	5.05	4.42	3.80	3.47	3.13	2.80	2.47	2.14	1.81	1.54	1.27
69	5.13	4.50	3.86	3.52	3.18	2.84	2.49	2.16	1.82	1.56	1.29
70	**5.22**	4.57	**3.92**	3.57	**3.22**	2.87	**2.52**	2.18	**1.83**	1.57	**1.31**
71	5.29	4.64	3.98	3.62	3.26	2.90	2.55	2.19	1.84	1.59	1.34
72	5.36	4.70	4.04	3.67	3.31	2.94	2.57	2.21	1.85	1.60	1.36
73	5.43	4.77	4.10	3.72	3.35	2.97	2.60	2.23	1.85	1.62	1.39
74	5.50	4.83	4.16	3.78	3.39	3.01	2.62	2.24	1.86	1.64	1.41
75	5.57	4.90	4.22	3.83	3.44	3.04	2.65	2.26	1.87	1.66	1.44
76	5.64	4.96	4.28	3.88	3.48	3.08	2.68	2.28	1.88	1.67	1.47
77	5.71	5.03	4.34	3.93	3.52	3.11	2.70	2.29	1.89	1.69	1.49
78	5.78	5.09	4.40	3.98	3.56	3.15	2.73	2.31	1.89	1.71	1.52
79	5.85	5.16	4.46	4.03	3.61	3.18	2.75	2.33	1.90	1.72	1.54
80	**5.92**	5.22	**4.52**	4.09	**3.65**	3.22	**2.78**	2.35	**1.91**	1.74	**1.57**
81	5.98	5.28	4.57	4.14	3.70	3.25	2.80	2.38	1.96	1.78	1.59
82	6.04	5.33	4.63	4.19	3.76	3.29	2.82	2.42	2.02	1.81	1.60
83	6.10	5.39	4.68	4.24	3.81	3.32	2.83	2.45	2.07	1.85	1.62
84	6.16	5.45	4.73	4.30	3.86	3.36	2.85	2.49	2.12	1.88	1.64
85	6.23	5.51	4.79	4.35	3.92	3.39	2.87	2.52	2.18	1.92	1.66
86	6.29	5.56	4.84	4.40	3.97	3.43	2.89	2.56	2.23	1.95	1.67
87	6.35	5.62	4.89	4.46	4.02	3.46	2.91	2.59	2.28	1.99	1.69
88	6.41	5.68	4.94	4.51	4.07	3.50	2.92	2.63	2.33	2.02	1.71
89	6.47	5.73	5.00	4.56	4.13	3.53	2.94	2.66	2.39	2.06	1.72
90	**6.53**	5.79	**5.05**	4.62	**4.18**	3.57	**2.96**	2.70	**2.44**	2.09	**1.74**
91	6.59	5.86	5.14	4.69	4.25	3.65	3.05	2.76	2.47	2.11	1.75
92	6.65	5.94	5.22	4.77	4.32	3.73	3.13	2.82	2.51	2.13	1.76
93	6.71	6.01	5.31	4.85	4.39	3.80	3.22	2.88	2.54	2.15	1.77
94	6.77	6.08	5.40	4.93	4.46	3.88	3.31	2.94	2.58	2.18	1.78
95	6.83	6.16	5.49	5.01	4.53	3.96	3.40	3.00	2.61	2.20	1.79
96	6.89	6.23	5.57	5.08	4.59	4.04	3.48	3.06	2.64	2.22	1.79
97	6.95	6.30	5.66	5.16	4.66	4.12	3.57	3.12	2.68	2.24	1.80
98	7.01	6.38	5.75	5.24	4.73	4.19	3.66	3.18	2.71	2.26	1.81
99	7.07	6.45	5.83	5.32	4.80	4.27	3.74	3.24	2.75	2.28	1.82
100	**7.13**	6.53	**5.92**	5.40	**4.87**	4.35	**3.83**	3.31	**2.78**	2.31	**1.83**

Piedmont and Mountain SA/DA Table

Items in bold from NCDEQ Stormwater Design Manual; others interpolated linearly.

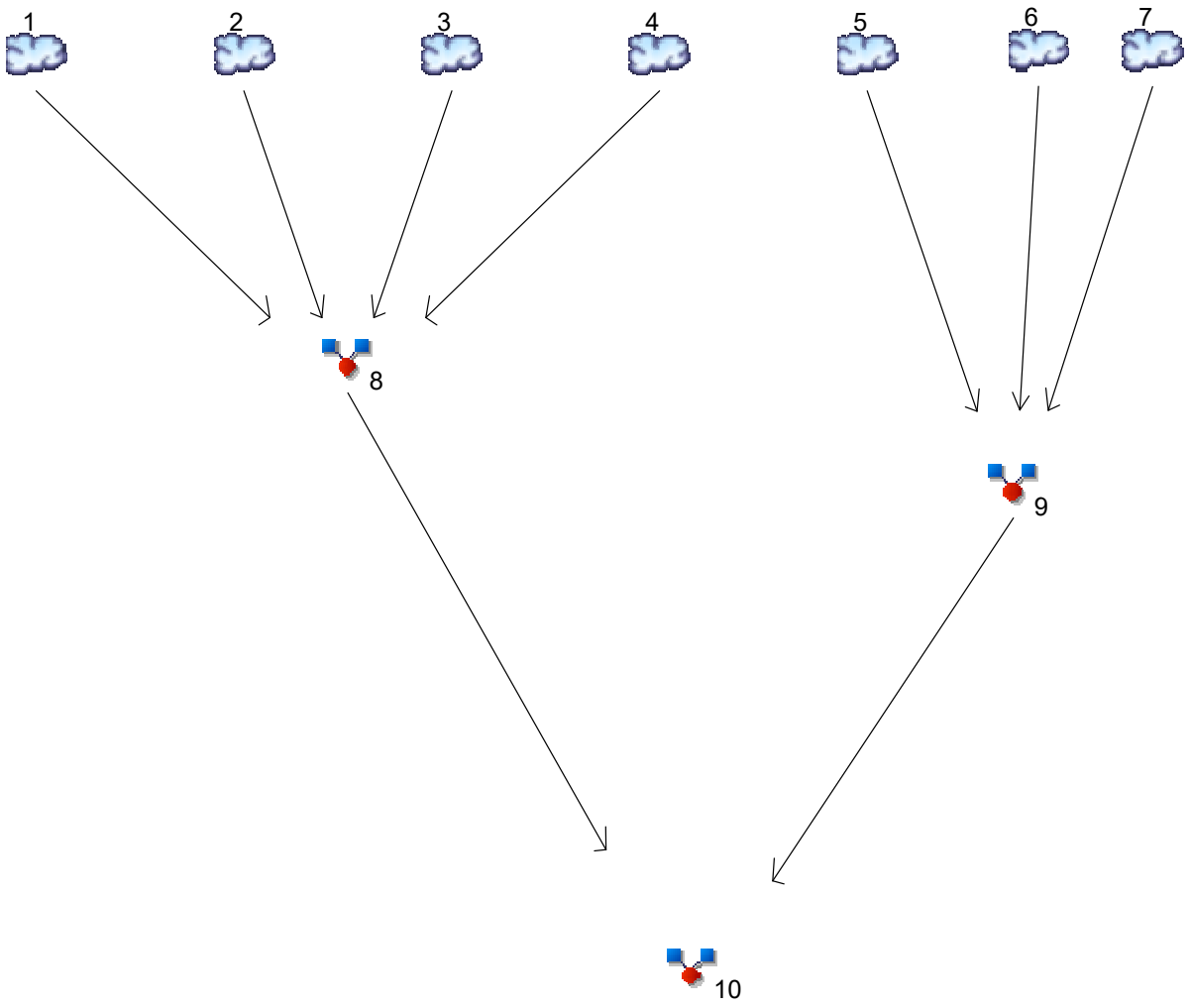
% Impervious	Permanent Pool Average Depth										
Cover	**3**	3.5	**4**	4.5	**5**	5.5	**6**	6.5	**7**	7.5	**8**
10	**0.51**	0.47	**0.43**	0.40	**0.37**	0.34	**0.30**	0.29	**0.27**	0.26	**0.25**
11	0.54	0.50	0.46	0.43	0.39	0.36	0.32	0.30	0.29	0.28	0.27
12	0.58	0.53	0.48	0.45	0.42	0.38	0.34	0.32	0.30	0.29	0.28
13	0.61	0.56	0.51	0.48	0.44	0.40	0.36	0.34	0.32	0.31	0.30
14	0.64	0.59	0.53	0.50	0.47	0.43	0.38	0.36	0.34	0.32	0.31
15	0.68	0.62	0.56	0.53	0.49	0.45	0.41	0.38	0.36	0.34	0.33
16	0.71	0.65	0.59	0.55	0.51	0.47	0.43	0.40	0.37	0.36	0.34
17	0.74	0.68	0.61	0.58	0.54	0.49	0.45	0.42	0.39	0.37	0.36
18	0.77	0.71	0.64	0.60	0.56	0.52	0.47	0.44	0.41	0.39	0.37
19	0.81	0.74	0.66	0.63	0.59	0.54	0.49	0.46	0.42	0.40	0.39
20	**0.84**	0.77	**0.69**	0.65	**0.61**	0.56	**0.51**	0.48	**0.44**	0.42	**0.40**
21	0.87	0.79	0.72	0.67	0.63	0.58	0.53	0.49	0.46	0.44	0.42
22	0.91	0.82	0.74	0.70	0.66	0.60	0.55	0.51	0.47	0.45	0.43
23	0.94	0.85	0.77	0.72	0.68	0.63	0.57	0.53	0.49	0.47	0.45
24	0.97	0.88	0.79	0.75	0.70	0.65	0.59	0.55	0.51	0.49	0.46
25	1.01	0.91	0.82	0.77	0.73	0.67	0.62	0.57	0.53	0.50	0.48
26	1.04	0.94	0.84	0.79	0.75	0.69	0.64	0.59	0.54	0.52	0.50
27	1.07	0.97	0.87	0.82	0.77	0.71	0.66	0.61	0.56	0.54	0.51
28	1.10	1.00	0.89	0.84	0.79	0.74	0.68	0.63	0.58	0.55	0.53
29	1.14	1.03	0.92	0.87	0.82	0.76	0.70	0.65	0.59	0.57	0.54
30	**1.17**	1.06	**0.94**	0.89	**0.84**	0.78	**0.72**	0.67	**0.61**	0.59	**0.56**
31	1.20	1.09	0.97	0.92	0.87	0.80	0.74	0.68	0.63	0.60	0.58
32	1.24	1.12	1.00	0.95	0.89	0.82	0.76	0.70	0.64	0.62	0.59
33	1.27	1.15	1.03	0.97	0.92	0.85	0.78	0.72	0.66	0.63	0.61
34	1.31	1.18	1.06	1.00	0.94	0.87	0.80	0.74	0.68	0.65	0.62
35	1.34	1.22	1.09	1.03	0.97	0.89	0.82	0.76	0.70	0.67	0.64
36	1.37	1.25	1.12	1.06	0.99	0.91	0.83	0.77	0.71	0.68	0.65
37	1.41	1.28	1.15	1.08	1.02	0.93	0.85	0.79	0.73	0.70	0.67
38	1.44	1.31	1.18	1.11	1.04	0.96	0.87	0.81	0.75	0.71	0.68
39	1.48	1.34	1.21	1.14	1.07	0.98	0.89	0.83	0.76	0.73	0.70
40	**1.51**	1.38	**1.24**	1.17	**1.09**	1.00	**0.91**	0.85	**0.78**	0.75	**0.71**
41	1.54	1.40	1.27	1.19	1.11	1.02	0.93	0.86	0.80	0.76	0.73
42	1.57	1.43	1.29	1.21	1.13	1.04	0.95	0.88	0.81	0.78	0.74
43	1.59	1.46	1.32	1.24	1.16	1.07	0.98	0.90	0.83	0.79	0.76
44	1.62	1.49	1.35	1.26	1.18	1.09	1.00	0.92	0.85	0.81	0.77
45	1.65	1.51	1.38	1.29	1.20	1.11	1.02	0.94	0.87	0.83	0.79
46	1.68	1.54	1.40	1.31	1.22	1.13	1.04	0.96	0.88	0.84	0.81
47	1.71	1.57	1.43	1.34	1.24	1.15	1.06	0.98	0.90	0.86	0.82
48	1.73	1.60	1.46	1.36	1.27	1.18	1.09	1.00	0.92	0.88	0.84
49	1.76	1.62	1.48	1.39	1.29	1.20	1.11	1.02	0.93	0.89	0.85
50	**1.79**	1.65	**1.51**	1.41	**1.31**	1.22	**1.13**	1.04	**0.95**	0.91	**0.87**
51	1.82	1.68	1.54	1.43	1.33	1.24	1.15	1.06	0.97	0.93	0.89
52	1.85	1.71	1.56	1.45	1.35	1.26	1.17	1.08	0.98	0.94	0.90
53	1.88	1.73	1.59	1.48	1.36	1.27	1.18	1.09	1.00	0.96	0.92
54	1.91	1.76	1.61	1.50	1.38	1.29	1.20	1.11	1.02	0.98	0.93
55	1.94	1.79	1.64	1.52	1.40	1.31	1.22	1.13	1.04	0.99	0.95
56	1.97	1.82	1.67	1.54	1.42	1.33	1.24	1.15	1.05	1.01	0.97
57	2.00	1.85	1.69	1.56	1.44	1.35	1.26	1.16	1.07	1.03	0.98
58	2.03	1.87	1.72	1.59	1.45	1.36	1.27	1.18	1.09	1.04	1.00
59	2.06	1.90	1.74	1.61	1.47	1.38	1.29	1.20	1.10	1.06	1.01
60	**2.09**	1.93	**1.77**	1.63	**1.49**	1.40	**1.31**	1.22	**1.12**	1.08	**1.03**

61	2.13	1.97	1.80	1.66	1.52	1.43	1.34	1.24	1.14	1.09	1.04
62	2.17	2.00	1.83	1.69	1.55	1.46	1.36	1.26	1.16	1.11	1.06
63	2.22	2.04	1.87	1.72	1.58	1.48	1.39	1.29	1.19	1.13	1.07
64	2.26	2.08	1.90	1.76	1.61	1.51	1.41	1.31	1.21	1.15	1.09
65	2.30	2.12	1.93	1.79	1.65	1.54	1.44	1.33	1.23	1.17	1.10
66	2.34	2.15	1.96	1.82	1.68	1.57	1.46	1.36	1.25	1.18	1.11
67	2.38	2.19	1.99	1.85	1.71	1.60	1.49	1.38	1.27	1.20	1.13
68	2.43	2.23	2.03	1.88	1.74	1.62	1.51	1.40	1.30	1.22	1.14
69	2.47	2.26	2.06	1.91	1.77	1.65	1.54	1.43	1.32	1.24	1.16
70	**2.51**	2.30	**2.09**	1.95	**1.80**	1.68	**1.56**	1.45	**1.34**	1.26	**1.17**
71	2.55	2.34	2.12	1.97	1.83	1.71	1.59	1.48	1.37	1.28	1.19
72	2.59	2.37	2.15	2.00	1.85	1.73	1.61	1.50	1.40	1.31	1.22
73	2.63	2.41	2.19	2.03	1.88	1.76	1.64	1.53	1.42	1.33	1.24
74	2.67	2.45	2.22	2.06	1.91	1.79	1.66	1.56	1.45	1.36	1.26
75	2.72	2.48	2.25	2.09	1.94	1.81	1.69	1.59	1.48	1.38	1.29
76	2.76	2.52	2.28	2.12	1.96	1.84	1.72	1.61	1.51	1.41	1.31
77	2.80	2.56	2.31	2.15	1.99	1.87	1.74	1.64	1.54	1.43	1.33
78	2.84	2.59	2.35	2.18	2.02	1.89	1.77	1.67	1.56	1.46	1.35
79	2.88	2.63	2.38	2.21	2.04	1.92	1.79	1.69	1.59	1.48	1.38
80	**2.92**	2.67	**2.41**	2.24	**2.07**	1.95	**1.82**	1.72	**1.62**	1.51	**1.40**
81	2.95	2.69	2.43	2.26	2.09	1.97	1.84	1.74	1.64	1.53	1.42
82	2.99	2.72	2.46	2.29	2.12	1.99	1.86	1.76	1.66	1.55	1.44
83	3.02	2.75	2.48	2.31	2.14	2.01	1.89	1.79	1.69	1.57	1.46
84	3.05	2.78	2.50	2.33	2.17	2.04	1.91	1.81	1.71	1.59	1.48
85	3.09	2.81	2.53	2.36	2.19	2.06	1.93	1.83	1.73	1.61	1.50
86	3.12	2.83	2.55	2.38	2.21	2.08	1.95	1.85	1.75	1.63	1.51
87	3.15	2.86	2.57	2.40	2.24	2.11	1.97	1.87	1.77	1.65	1.53
88	3.18	2.89	2.59	2.43	2.26	2.13	2.00	1.90	1.80	1.67	1.55
89	3.22	2.92	2.62	2.45	2.29	2.15	2.02	1.92	1.82	1.69	1.57
90	**3.25**	2.95	**2.64**	2.48	**2.31**	2.18	**2.04**	1.94	**1.84**	1.72	**1.59**
91	3.28	2.97	2.66	2.49	2.33	2.20	2.07	1.97	1.86	1.73	1.61
92	3.31	2.99	2.67	2.51	2.35	2.23	2.10	1.99	1.88	1.75	1.62
93	3.34	3.01	2.69	2.53	2.37	2.25	2.13	2.02	1.90	1.77	1.64
94	3.37	3.04	2.70	2.55	2.39	2.28	2.16	2.04	1.92	1.79	1.65
95	3.40	3.06	2.72	2.57	2.42	2.30	2.19	2.07	1.94	1.81	1.67
96	3.43	3.08	2.73	2.58	2.44	2.33	2.22	2.09	1.96	1.82	1.69
97	3.46	3.10	2.75	2.60	2.46	2.35	2.25	2.12	1.98	1.84	1.70
98	3.49	3.13	2.76	2.62	2.48	2.38	2.28	2.14	2.00	1.86	1.72
99	3.52	3.15	2.78	2.64	2.50	2.40	2.31	2.17	2.02	1.88	1.73
100	**3.55**	3.17	**2.79**	2.66	**2.52**	2.43	**2.34**	2.19	**2.04**	1.90	**1.75**

Ark Consulting Group, PLLC				JOB	21089 - Wallbrook		
2755-B Charles Boulevard				DATE	Jan-23		
Greenville, NC 27858				CALCULATED BY	TGN/JDW		
252-558-0888				CHECKED BY	BCF		
OUTLET STRUCTURE FLOTATION ANALYSIS:							
Calculate the weight of water displaced by the structure:							
	Circular Items: N/A						
		Outer Length (ft)	Inner Length (ft)	Height (ft)	Volume Displaced (ft^3)		
	Top				0.00		
	Riser				0.00		
	Base				0.00		
	Subtotal				0.00		
	Rectangular Items						
		Length (ft)	Width (ft)	Height (ft)	Volume Displaced (ft^3)		
	Top	11.00	7.00	0.50	38.50		
	Riser	11.00	7.00	13.00	1001.00		
	Base	11.00	7.00	0.50	38.50		
	Subtotal				1078.00		
	Unit weight of water =			62.4	pcf		
	Total volume displaced =			1078.0	ft^3		
	Total weight displaced =			67267.2	lbs		
Calculate the weight of structure and soil:							
	Circular Concrete Items: N/A						
		Outer Diameter (ft)	Inner Diameter (ft)	Height (ft)	Volume (ft^3)		
	Top				0.00		
	Riser				0.00		
	Base				0.00		
	Subtotal				0.00		
	Rectangular Concrete Items						
		Length (ft)	Width (ft)	Height (ft)	Volume (ft^3)		
	Top	11.00	7.00	0.50	38.50		
	Left Wall	7.00		13.00	91.00		
	Right Wall	7.00		13.00	91.00		
	Front Wall	11.00		13.00	143.00		
	Back Wall	11.00		13.00	143.00		
	Base	11.00	7.00	0.50	38.50		
	Subtotal				545.00		
	Unit weight of concrete =			150.0	pcf		
	Total volume concrete =			545.0	ft^3		
	Total weight concrete =			81750.0	lbs		
Calculate the uplift and factor of safety:							
	Total weight of displaced water =			67267	lbs		
	Total weight of concrete =			81750	lbs		
	Total weight of soil =			0	lbs		
	Total uplift =			14483	lbs		
	Factor of Safety =			1.22			
COMMENT: Recommended factor of safety is 1.15, plus or minus. However, this calculation is very conservative as it does not take into account frictional resistance between the soil and concrete.							

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	Pre - New Roadways (Wallbrook/Va Water)
3	SCS Runoff	Pre - Boat Tract (Lot 5)
4	SCS Runoff	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	Pre - DOT Roadway
6	SCS Runoff	Pre - Lots 3 & 4
7	SCS Runoff	Pre - Wallbrook Townhomes
8	Combine	Pre-Development
9	Combine	Pre-Development
10	Combine	Pre-Development Total

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	------	21.18	29.99	-------	43.71	54.97	70.42	83.00	95.65	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	------	4.075	5.770	-------	8.412	10.58	13.55	15.97	18.40	Pre - New Roadways (Wallbrook/Va
3	SCS Runoff	------	4.739	7.336	-------	11.55	15.12	20.12	24.28	28.49	Pre - Boat Tract (Lot 5)
4	SCS Runoff	------	12.53	17.59	-------	25.44	31.85	40.62	47.76	54.91	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	------	12.08	16.78	-------	24.03	29.93	37.97	44.50	51.04	Pre - DOT Roadway
6	SCS Runoff	------	4.108	5.817	-------	8.479	10.66	13.66	16.10	18.55	Pre - Lots 3 & 4
7	SCS Runoff	------	0.657	0.922	-------	1.333	1.669	2.129	2.503	2.878	Pre - Wallbrook Townhomes
8	Combine	1, 2, 3, 4,	40.68	58.43	-------	86.45	109.58	141.52	167.64	193.95	Pre-Development
9	Combine	5, 6, 7,	16.66	23.33	-------	33.64	42.05	53.56	62.91	72.30	Pre-Development
10	Combine	8, 9	57.26	81.75	-------	120.08	151.63	195.08	230.55	266.24	Pre-Development Total

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	21.18	2	720	52,755	------	------	------	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	4.075	2	720	10,151	------	------	------	Pre - New Roadways (Wallbrook/Va
3	SCS Runoff	4.739	2	722	14,321	------	------	------	Pre - Boat Tract (Lot 5)
4	SCS Runoff	12.53	2	718	25,904	------	------	------	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	12.08	2	718	24,947	------	------	------	Pre - DOT Roadway
6	SCS Runoff	4.108	2	720	10,233	------	------	------	Pre - Lots 3 & 4
7	SCS Runoff	0.657	2	718	1,358	------	------	------	Pre - Wallbrook Townhomes
8	Combine	40.68	2	720	103,132	1, 2, 3, 4,	------	------	Pre-Development
9	Combine	16.66	2	718	36,538	5, 6, 7,	------	------	Pre-Development
10	Combine	57.26	2	718	139,669	8, 9	------	------	Pre-Development Total

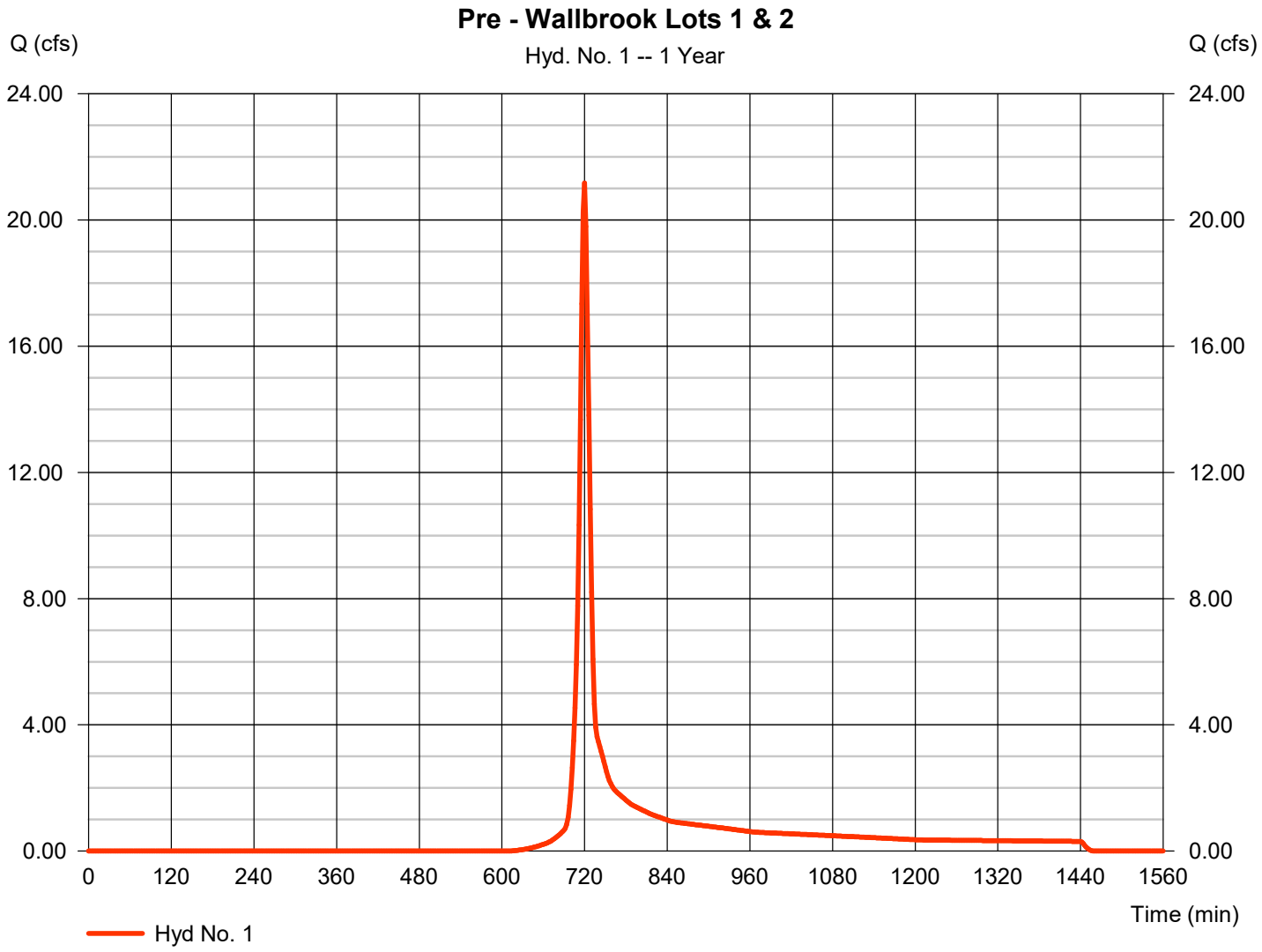
Hydrograph Report

Hyd. No. 1

Pre - Wallbrook Lots 1 & 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.18 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	52,755 cuft
Drainage area	=	12.940 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.70 min
Total precip.	=	2.86 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(10.970 x 79) + (1.970 x 79)] / 12.940

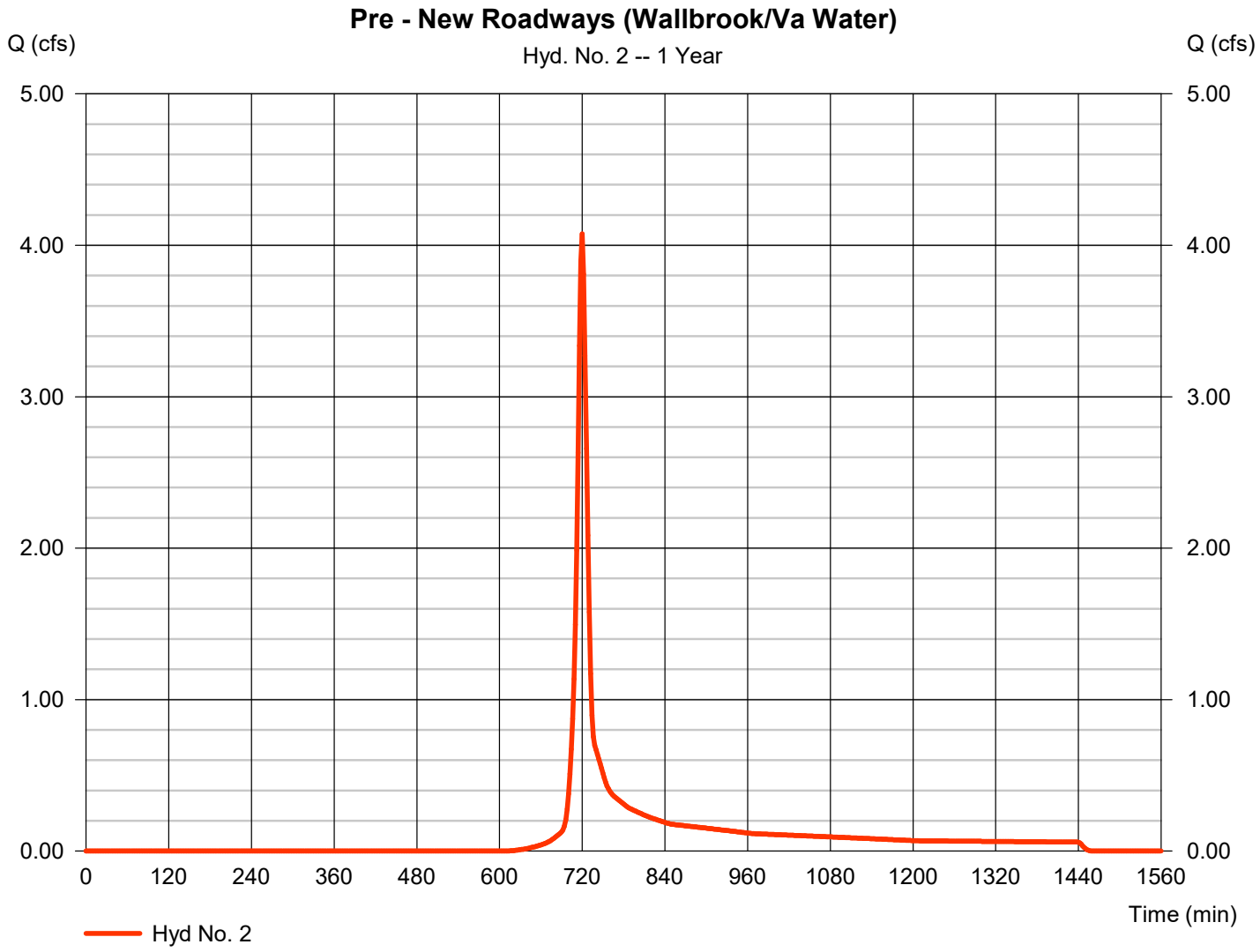


Hydrograph Report

Hyd. No. 2

Pre - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.075 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 10,151 cuft
Drainage area	= 2.490 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

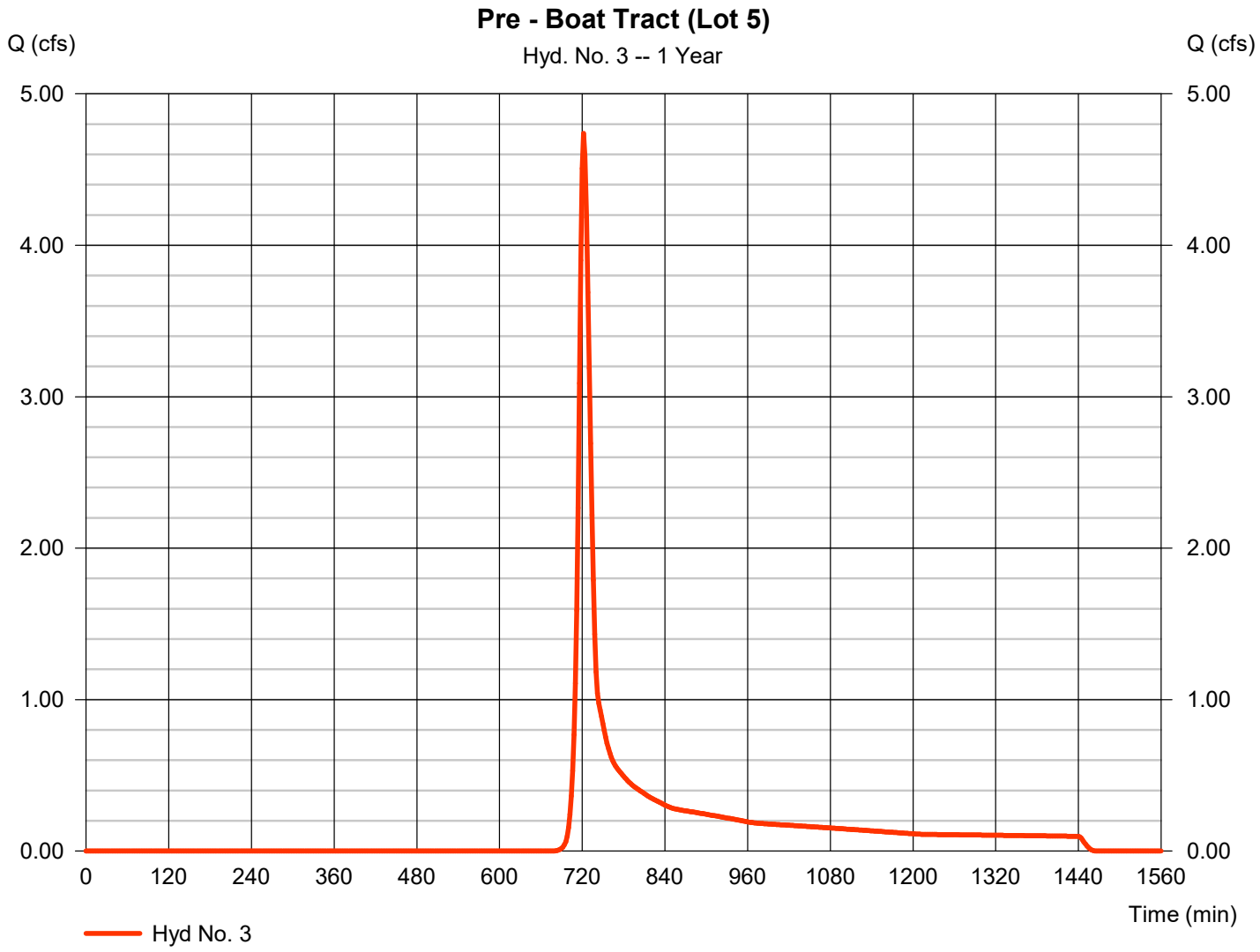


Hydrograph Report

Hyd. No. 3

Pre - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.739 cfs
Storm frequency	= 1 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 14,321 cuft
Drainage area	= 5.070 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

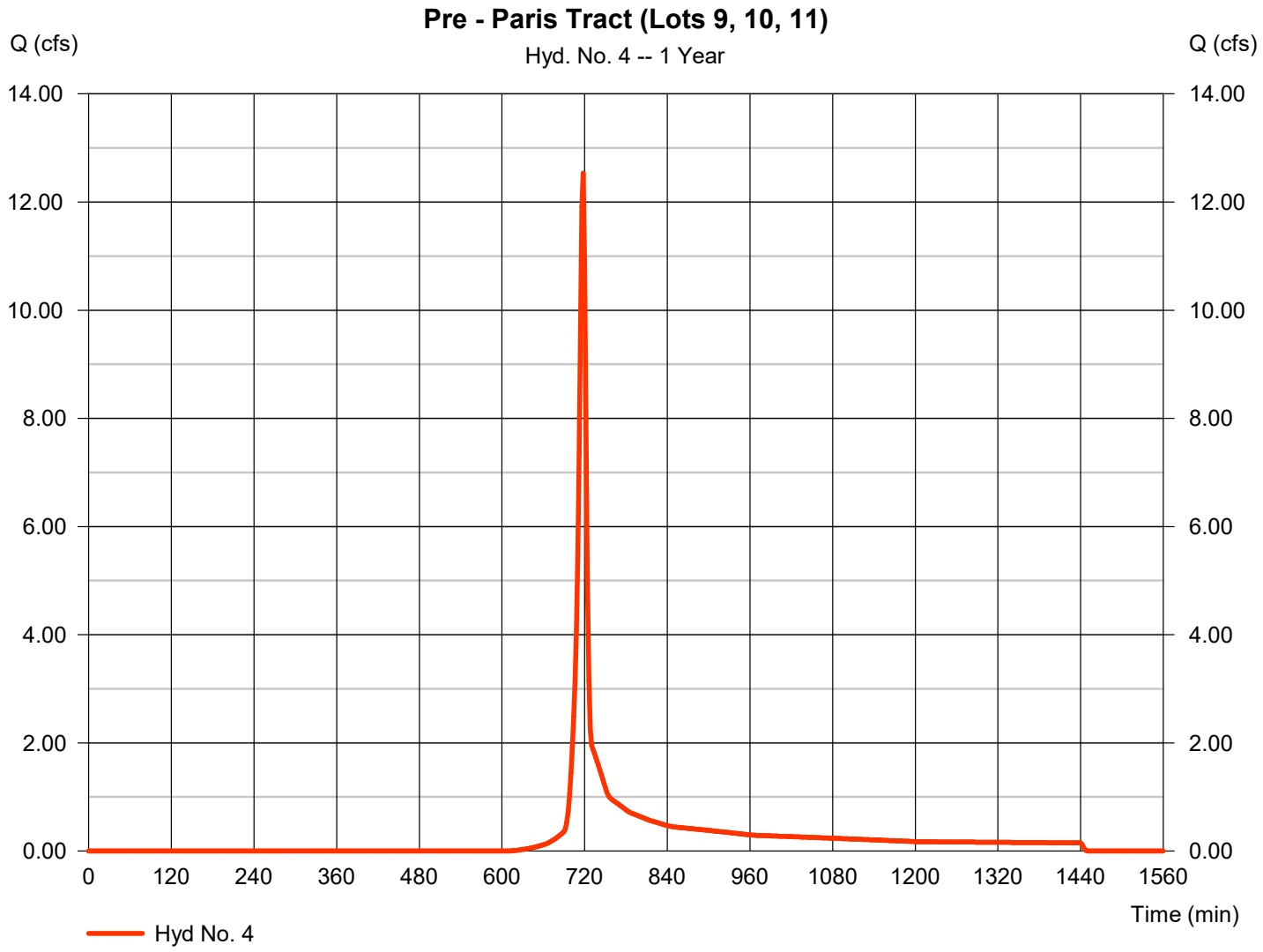


Hydrograph Report

Hyd. No. 4

Pre - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 12.53 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 25,904 cuft
Drainage area	= 7.060 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

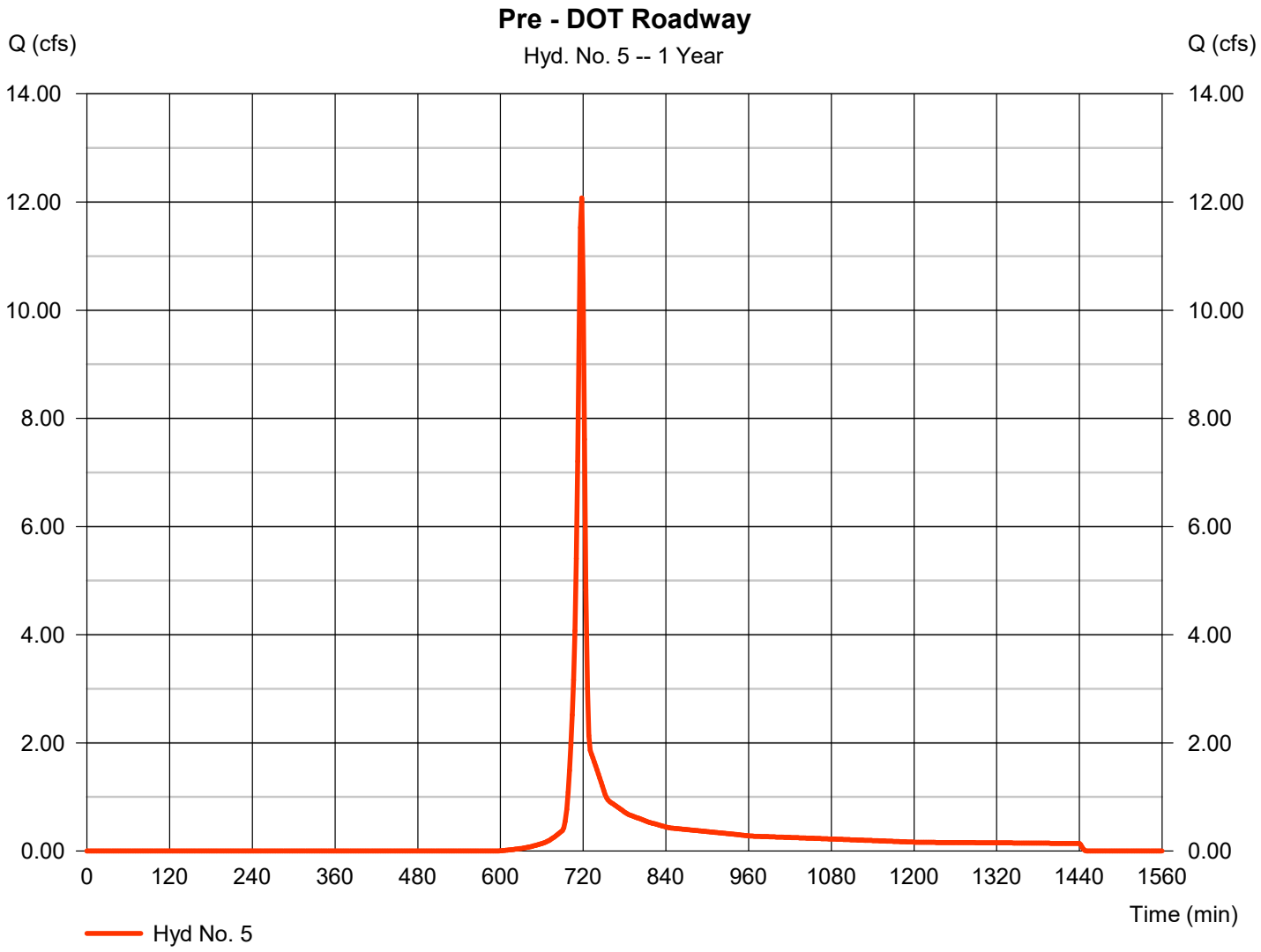


Hydrograph Report

Hyd. No. 5

Pre - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 12.08 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 24,947 cuft
Drainage area	= 6.450 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

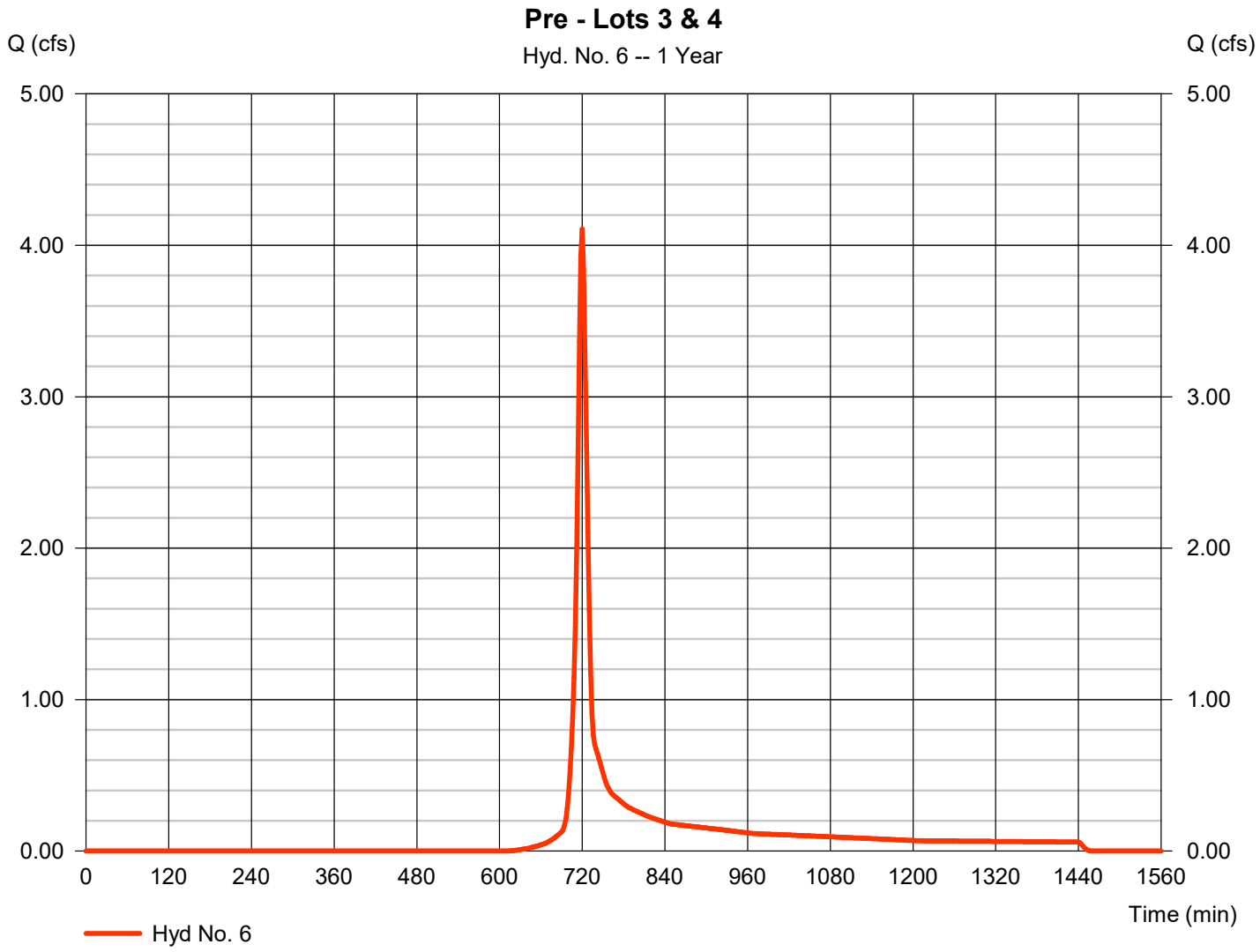


Hydrograph Report

Hyd. No. 6

Pre - Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 4.108 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 10,233 cuft
Drainage area	= 2.510 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

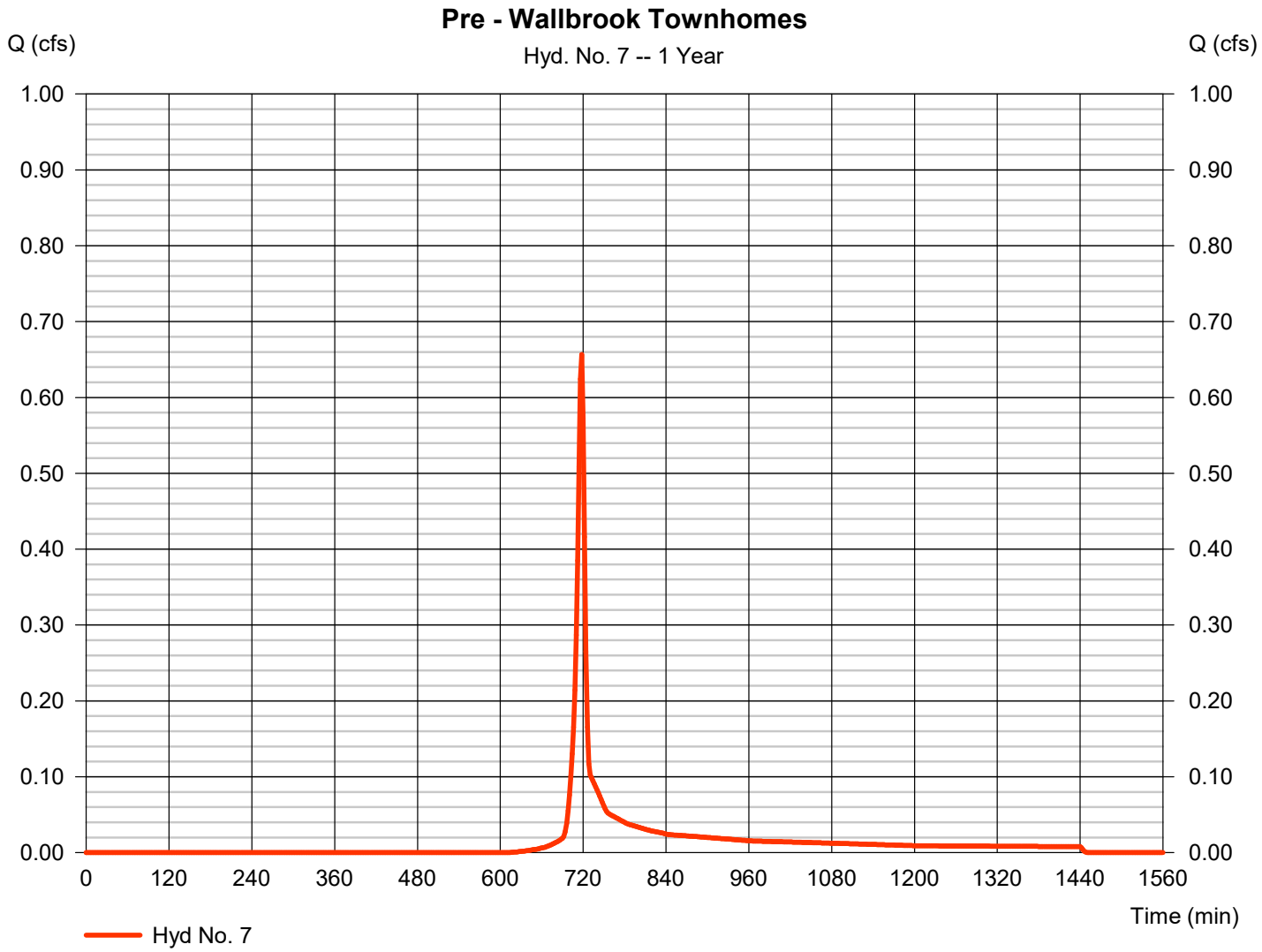


Hydrograph Report

Hyd. No. 7

Pre - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 0.657 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,358 cuft
Drainage area	= 0.370 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

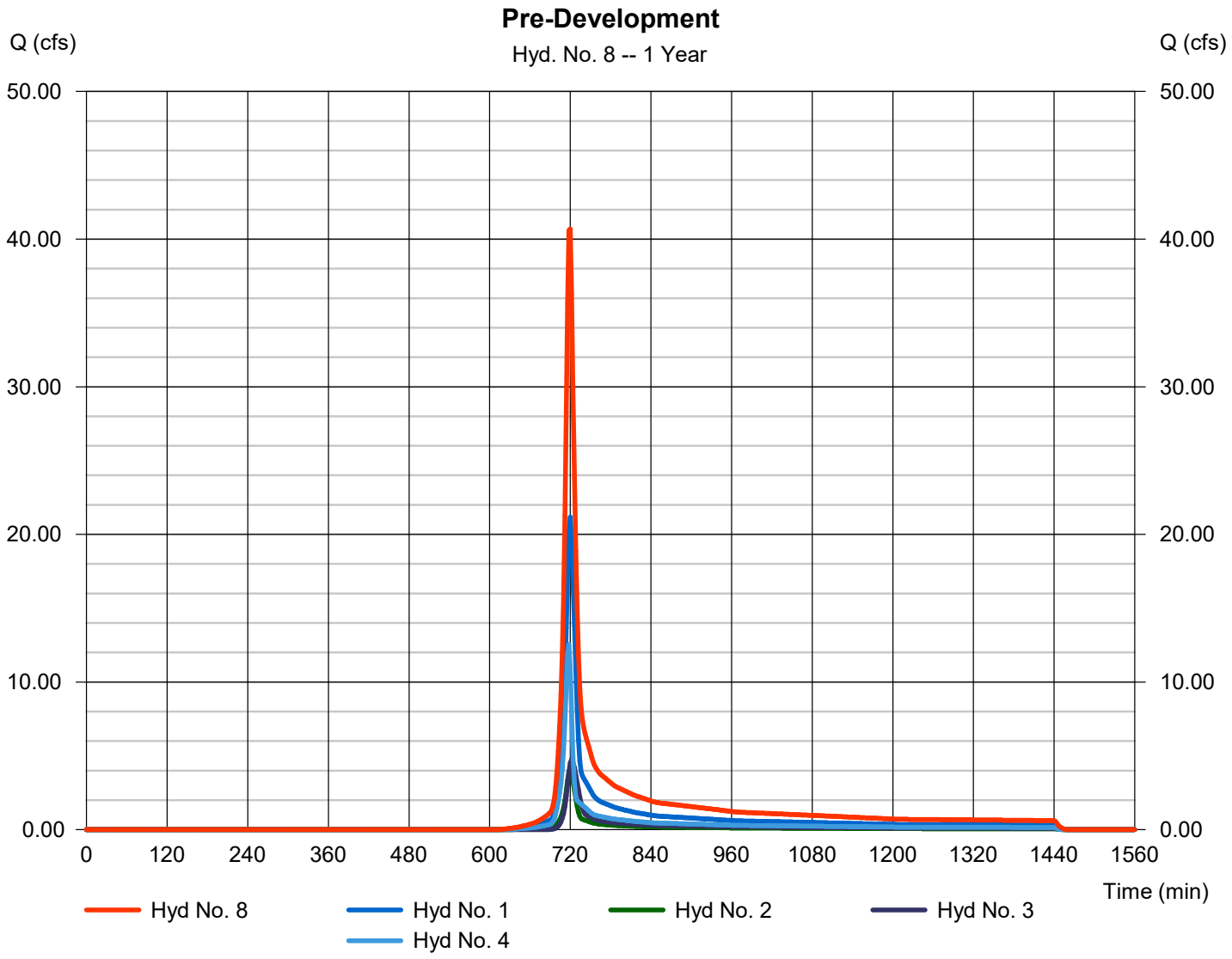


Hydrograph Report

Hyd. No. 8

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 40.68 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 103,132 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 27.560 ac

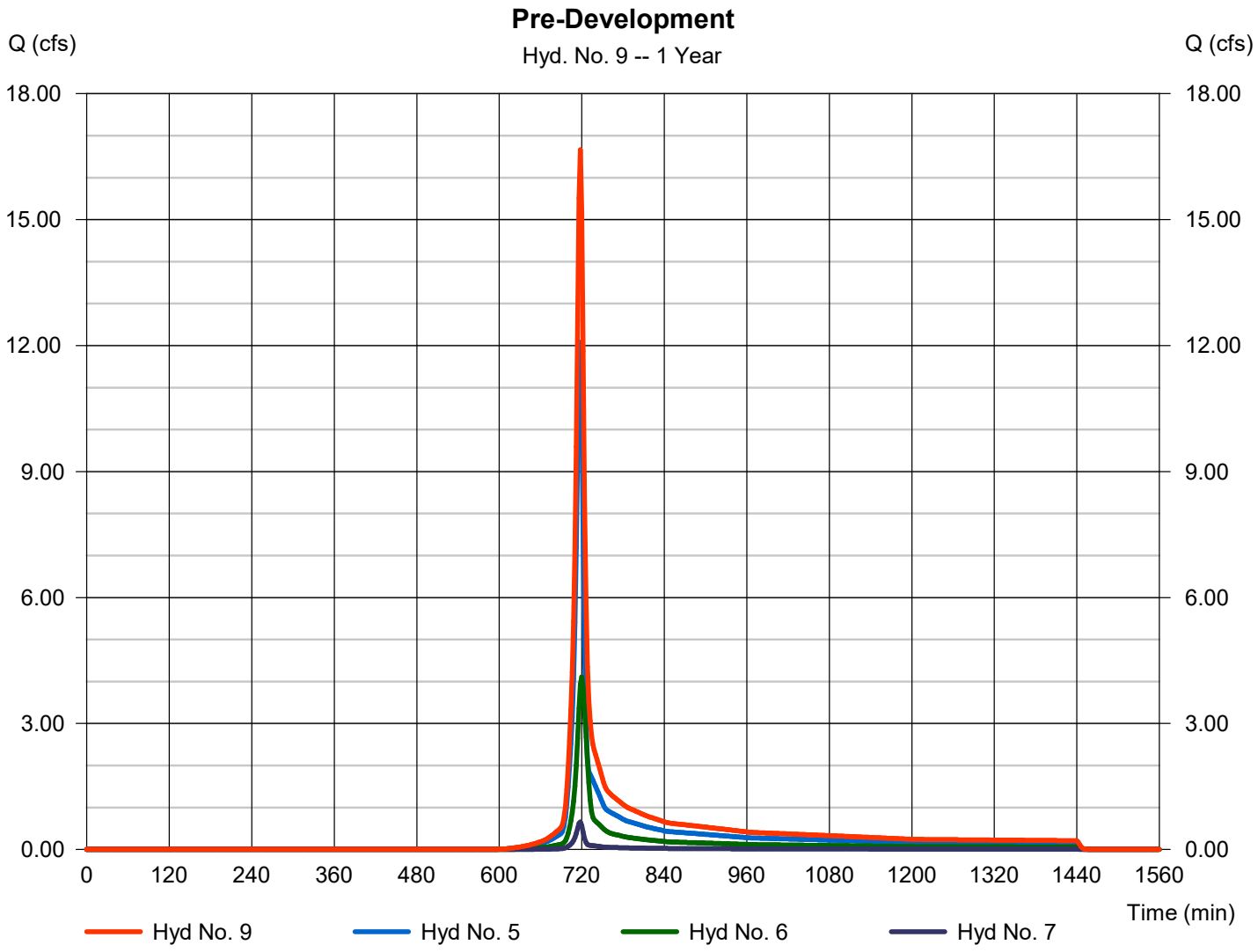


Hydrograph Report

Hyd. No. 9

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 16.66 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 36,538 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 9.330 ac

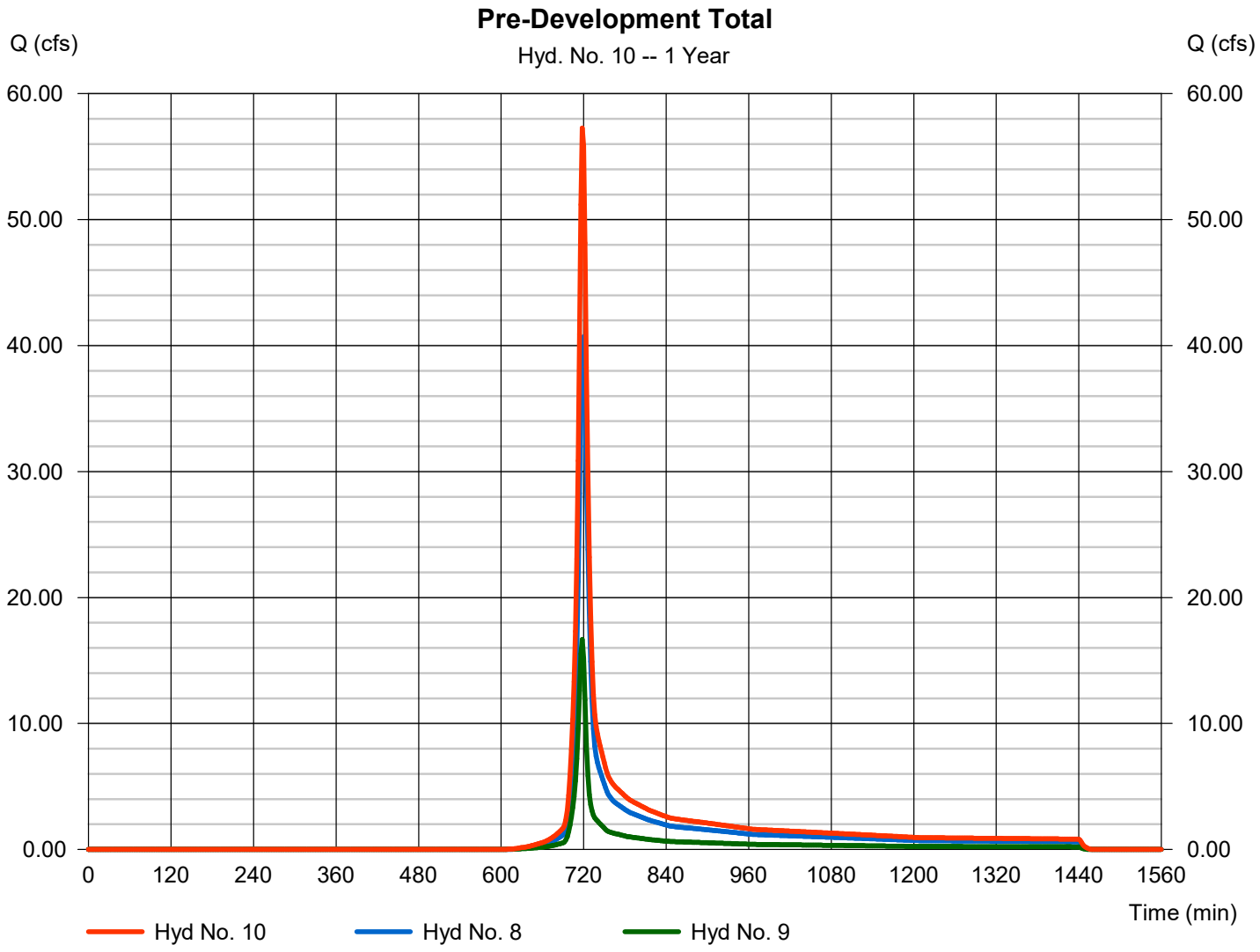


Hydrograph Report

Hyd. No. 10

Pre-Development Total

Hydrograph type	= Combine	Peak discharge	= 57.26 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 139,669 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	29.99	2	720	74,109	------	------	------	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	5.770	2	720	14,261	------	------	------	Pre - New Roadways (Wallbrook/Va
3	SCS Runoff	7.336	2	722	21,246	------	------	------	Pre - Boat Tract (Lot 5)
4	SCS Runoff	17.59	2	718	36,390	------	------	------	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	16.78	2	718	34,760	------	------	------	Pre - DOT Roadway
6	SCS Runoff	5.817	2	720	14,375	------	------	------	Pre - Lots 3 & 4
7	SCS Runoff	0.922	2	718	1,907	------	------	------	Pre - Wallbrook Townhomes
8	Combine	58.43	2	718	146,007	1, 2, 3, 4,	------	------	Pre-Development
9	Combine	23.33	2	718	51,042	5, 6, 7,	------	------	Pre-Development
10	Combine	81.75	2	718	197,049	8, 9	------	------	Pre-Development Total

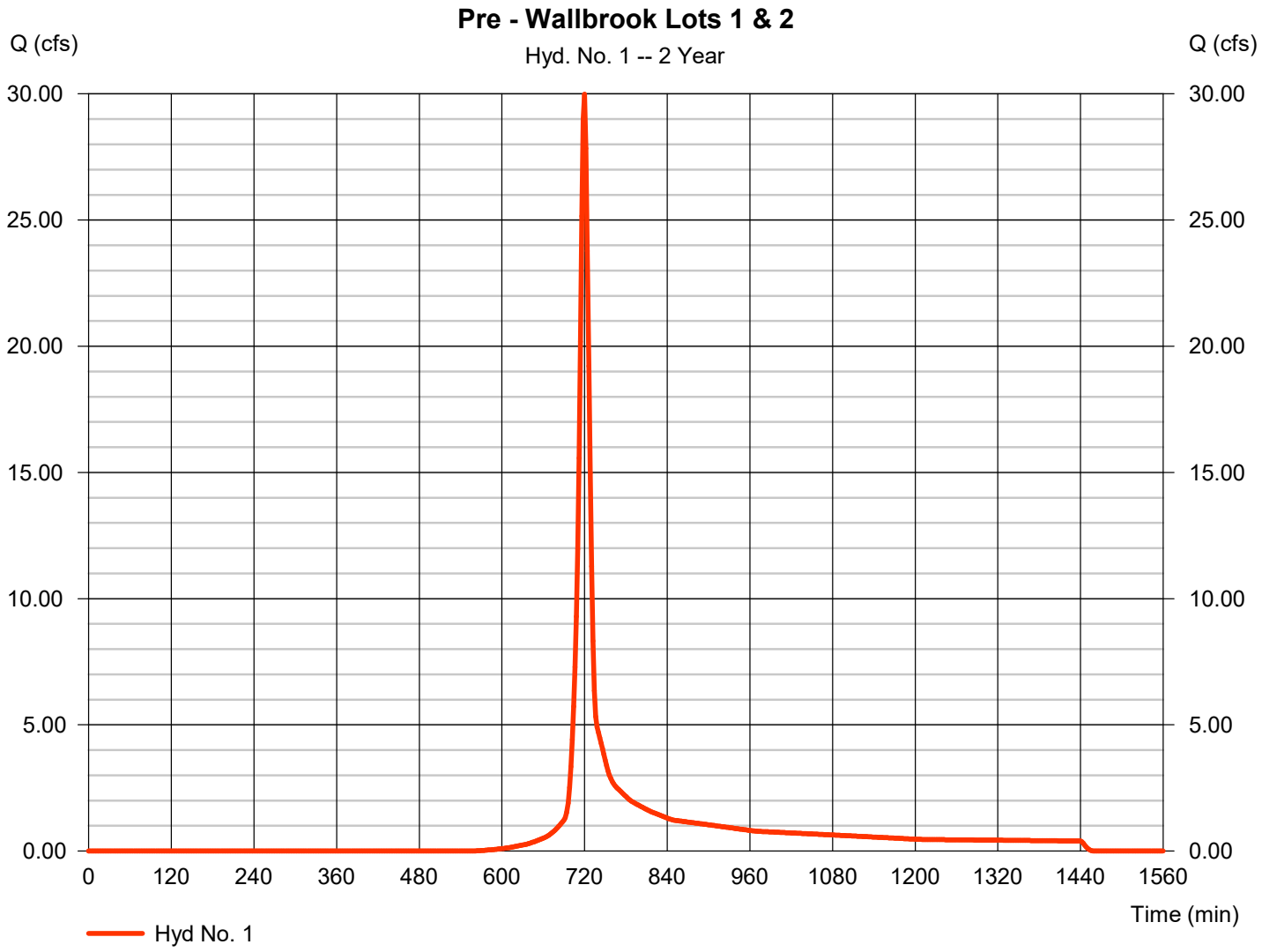
Hydrograph Report

Hyd. No. 1

Pre - Wallbrook Lots 1 & 2

Hydrograph type	= SCS Runoff	Peak discharge	= 29.99 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 74,109 cuft
Drainage area	= 12.940 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.70 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(10.970 x 79) + (1.970 x 79)] / 12.940

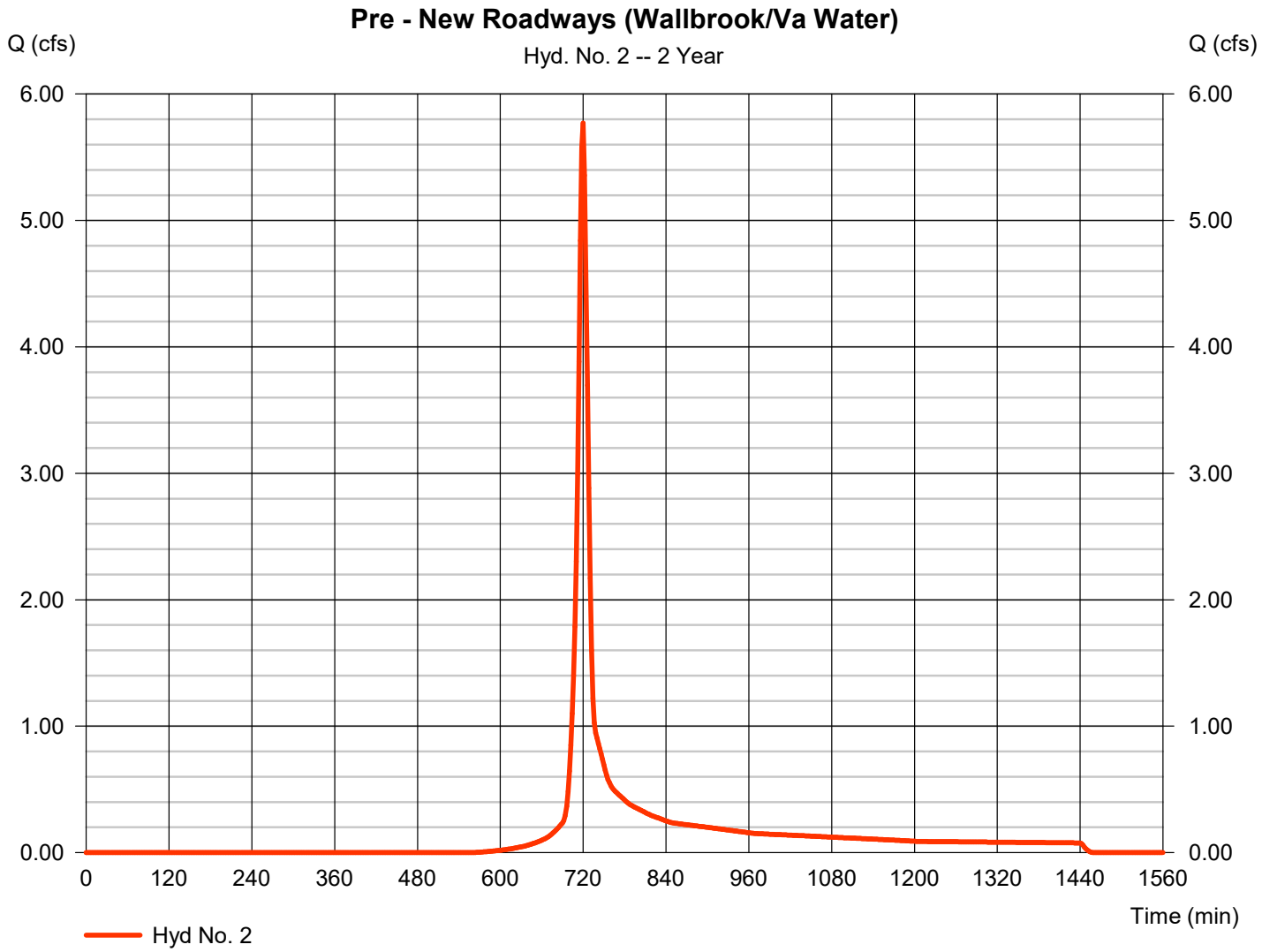


Hydrograph Report

Hyd. No. 2

Pre - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.770 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,261 cuft
Drainage area	= 2.490 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

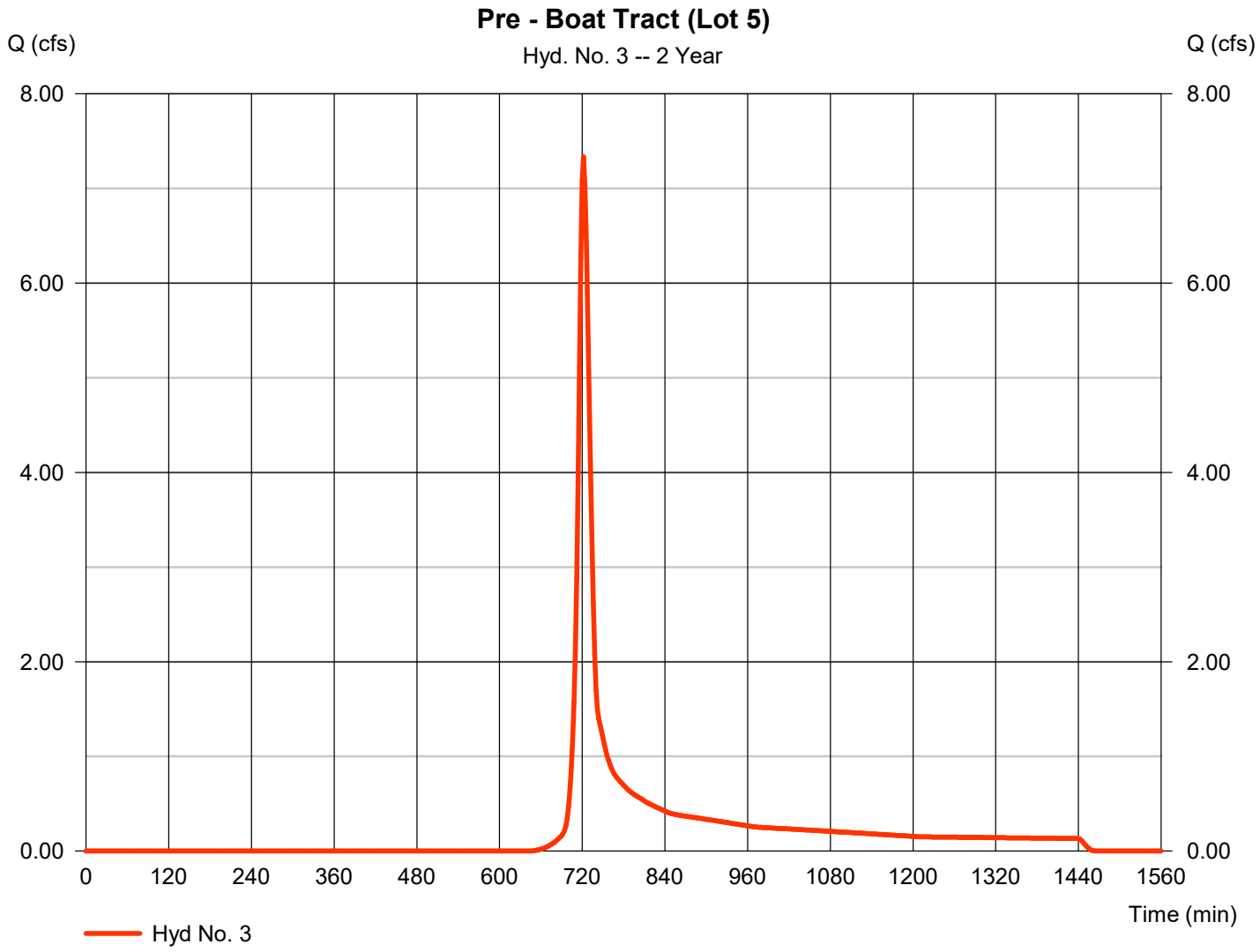


Hydrograph Report

Hyd. No. 3

Pre - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 7.336 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 21,246 cuft
Drainage area	= 5.070 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

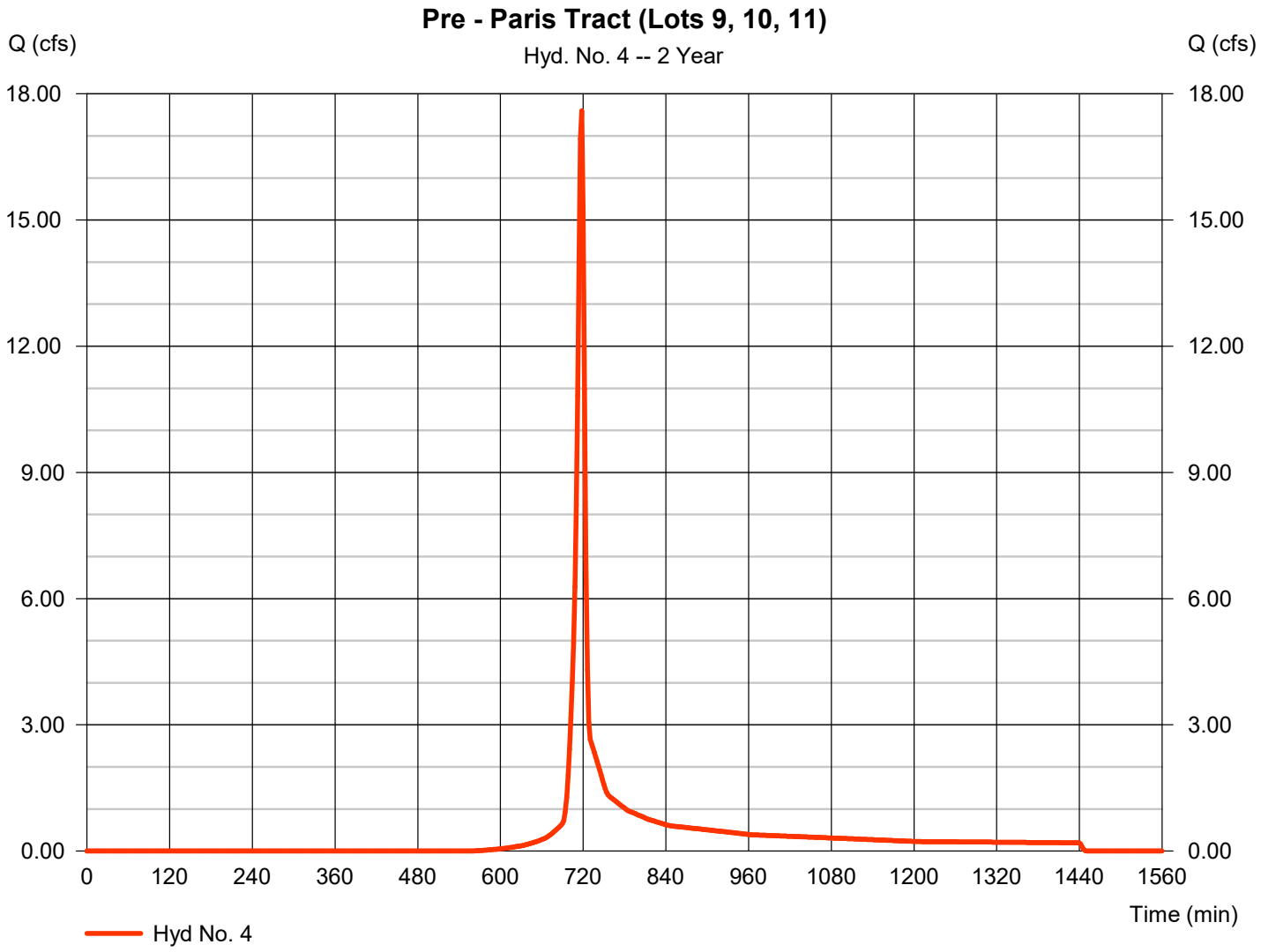


Hydrograph Report

Hyd. No. 4

Pre - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 17.59 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 36,390 cuft
Drainage area	= 7.060 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

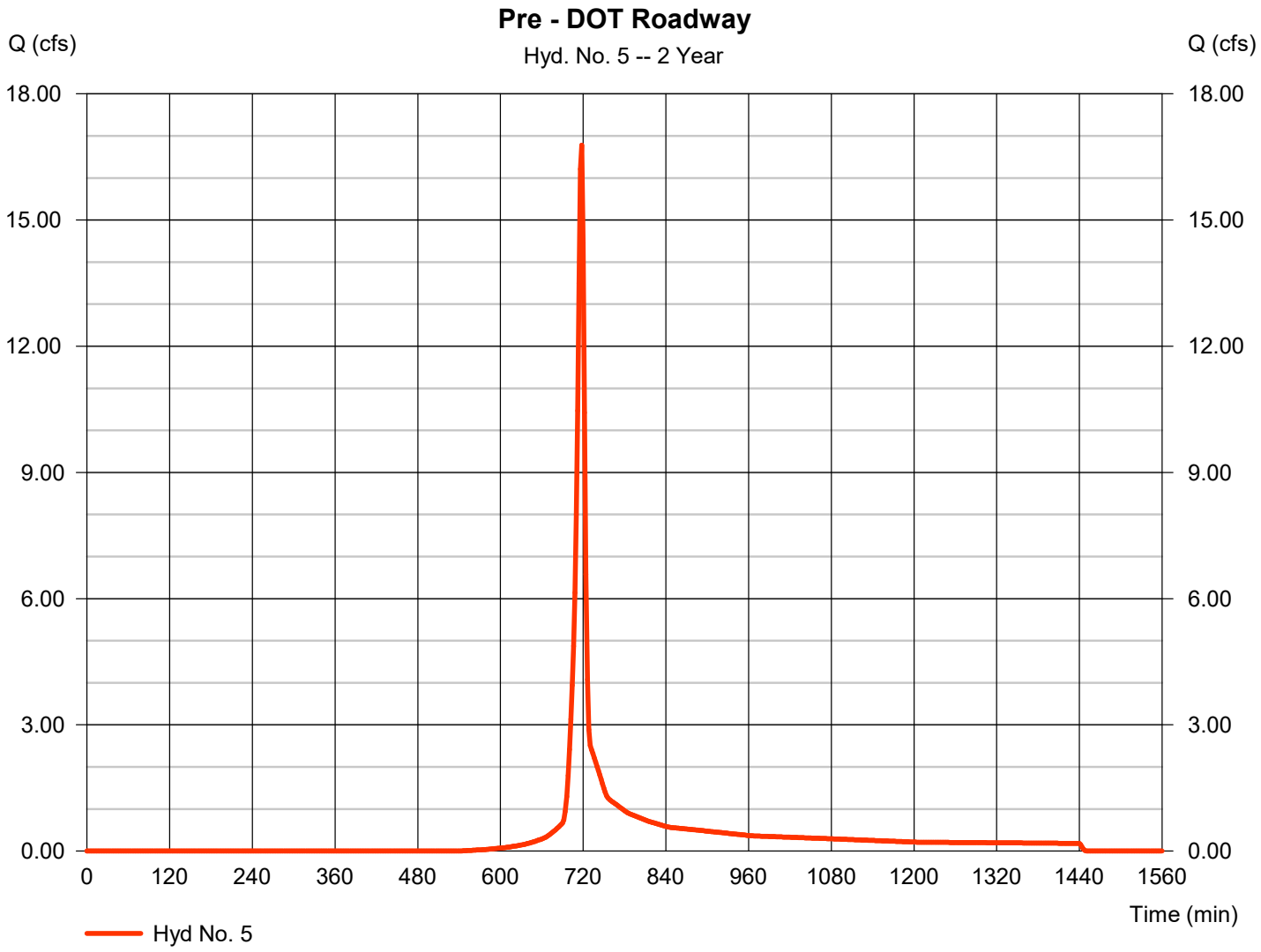


Hydrograph Report

Hyd. No. 5

Pre - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 16.78 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 34,760 cuft
Drainage area	= 6.450 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

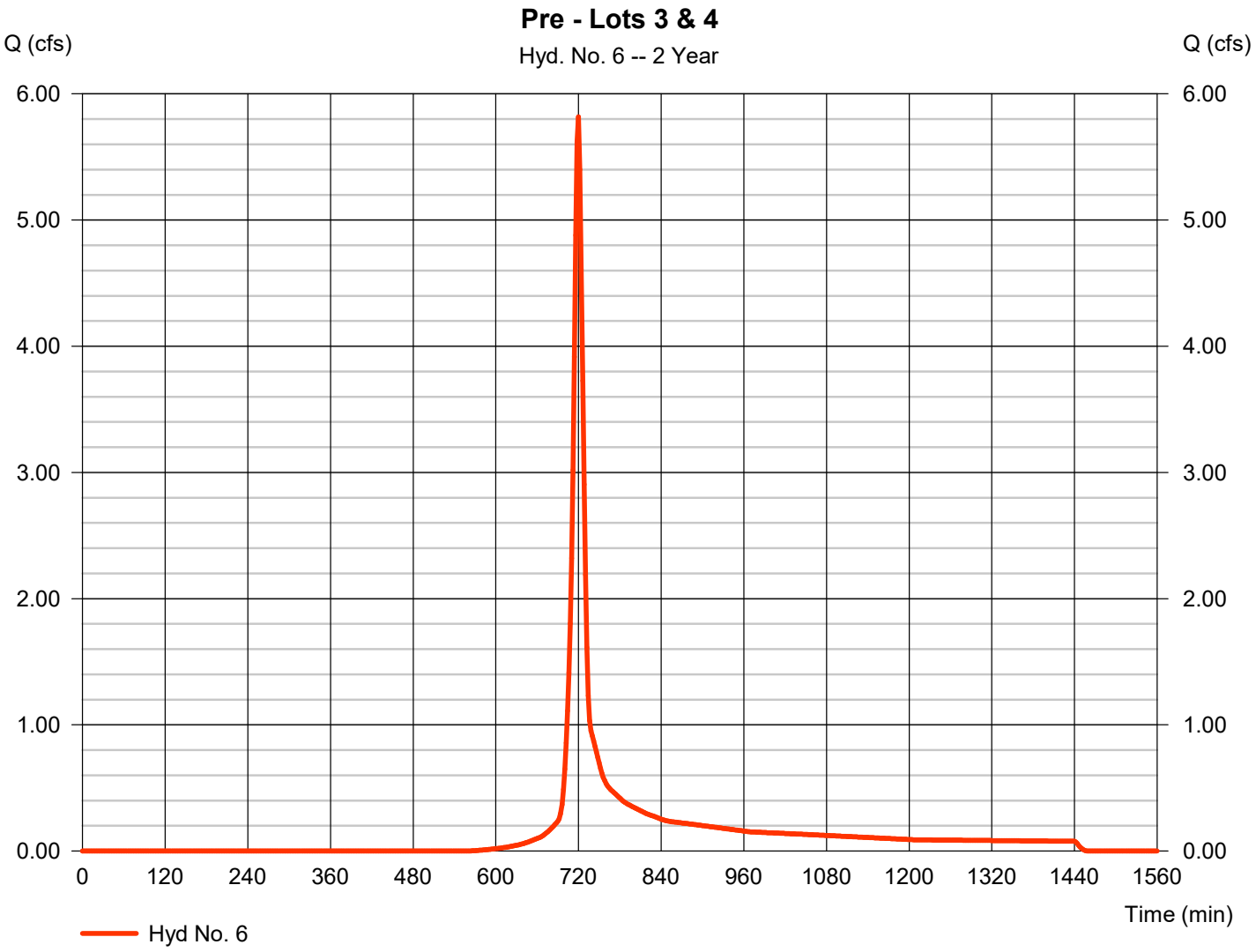


Hydrograph Report

Hyd. No. 6

Pre - Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 5.817 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,375 cuft
Drainage area	= 2.510 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

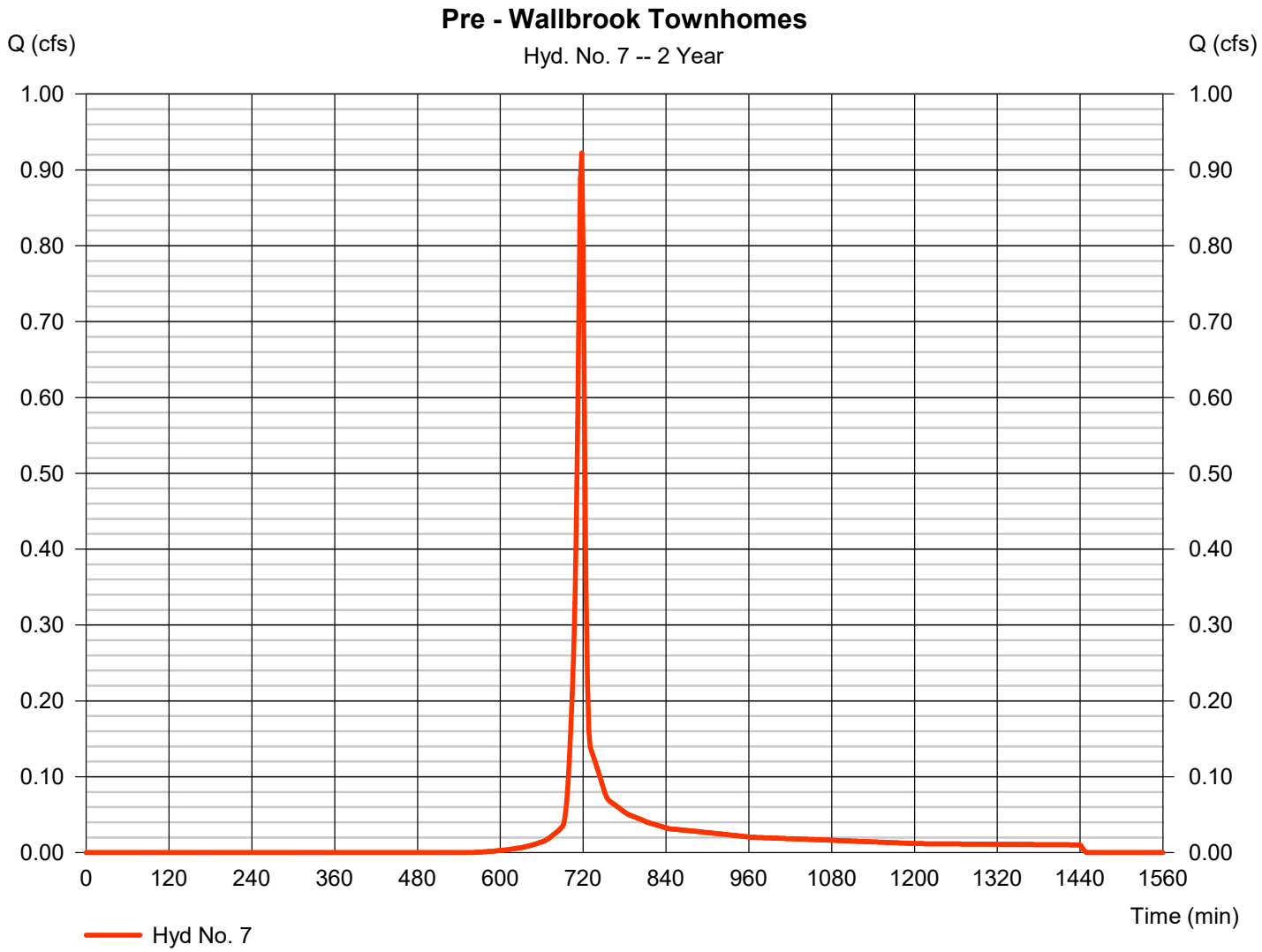


Hydrograph Report

Hyd. No. 7

Pre - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 0.922 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 1,907 cuft
Drainage area	= 0.370 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

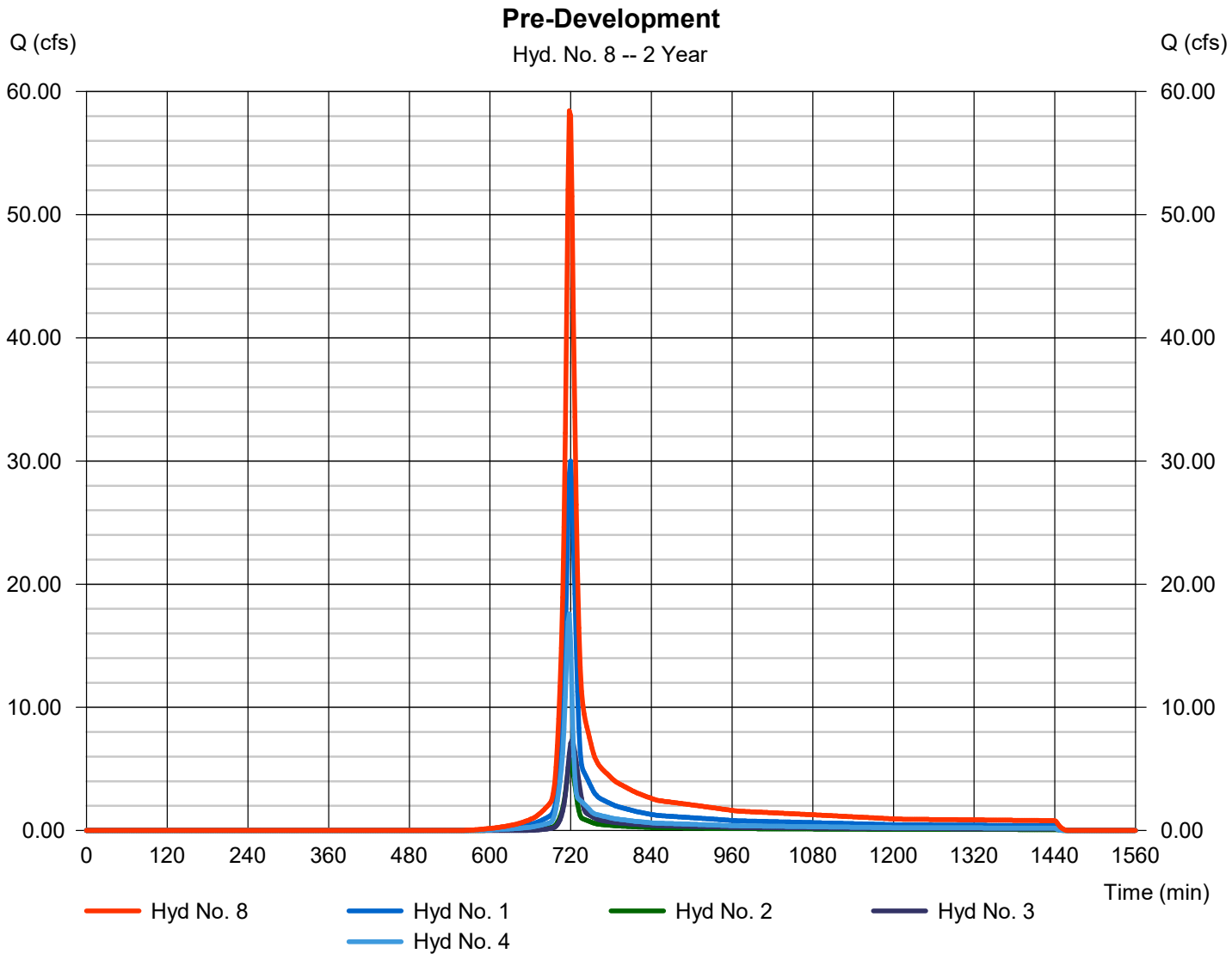


Hydrograph Report

Hyd. No. 8

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 58.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 146,007 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 27.560 ac

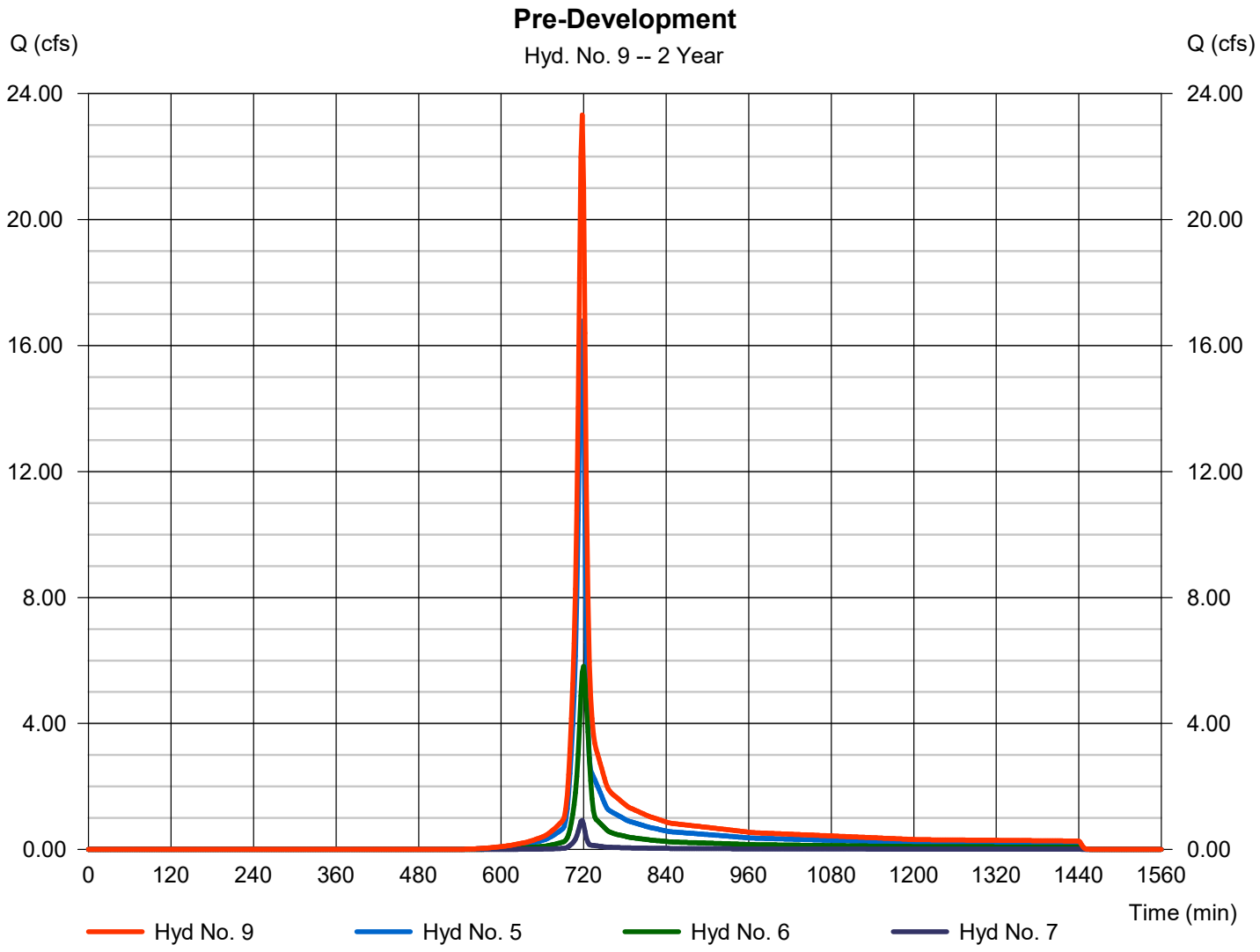


Hydrograph Report

Hyd. No. 9

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 23.33 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 51,042 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 9.330 ac

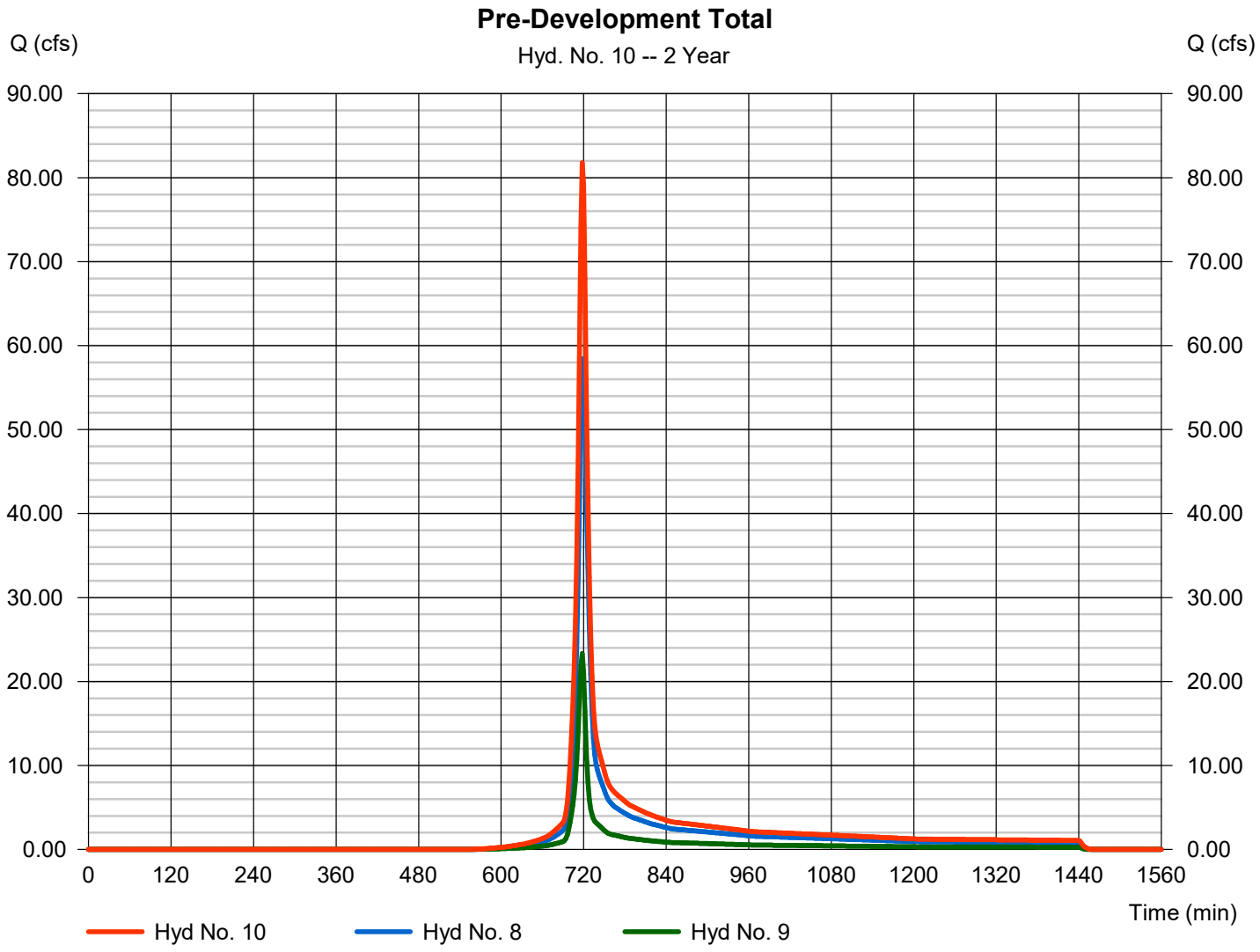


Hydrograph Report

Hyd. No. 10

Pre-Development Total

Hydrograph type	= Combine	Peak discharge	= 81.75 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 197,049 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	54.97	2	720	136,368	------	------	------	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	10.58	2	720	26,241	------	------	------	Pre - New Roadways (Wallbrook/Va
3	SCS Runoff	15.12	2	722	42,419	------	------	------	Pre - Boat Tract (Lot 5)
4	SCS Runoff	31.85	2	718	66,961	------	------	------	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	29.93	2	718	63,164	------	------	------	Pre - DOT Roadway
6	SCS Runoff	10.66	2	720	26,452	------	------	------	Pre - Lots 3 & 4
7	SCS Runoff	1.669	2	718	3,509	------	------	------	Pre - Wallbrook Townhomes
8	Combine	109.58	2	718	271,989	1, 2, 3, 4,	------	------	Pre-Development
9	Combine	42.05	2	718	93,125	5, 6, 7,	------	------	Pre-Development
10	Combine	151.63	2	718	365,113	8, 9	------	------	Pre-Development Total

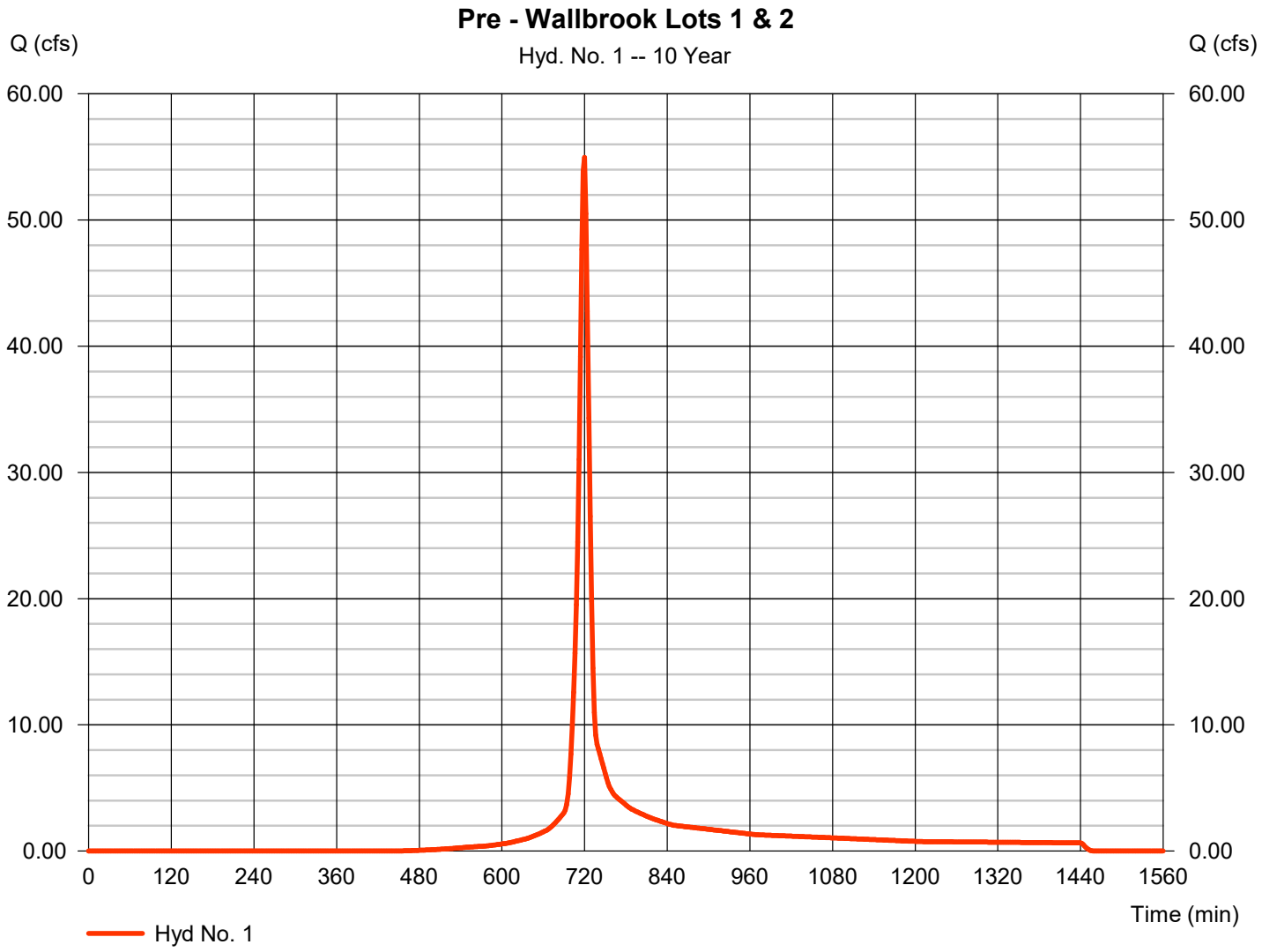
Hydrograph Report

Hyd. No. 1

Pre - Wallbrook Lots 1 & 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	54.97 cfs
Storm frequency	=	10 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	136,368 cuft
Drainage area	=	12.940 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.70 min
Total precip.	=	5.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(10.970 x 79) + (1.970 x 79)] / 12.940

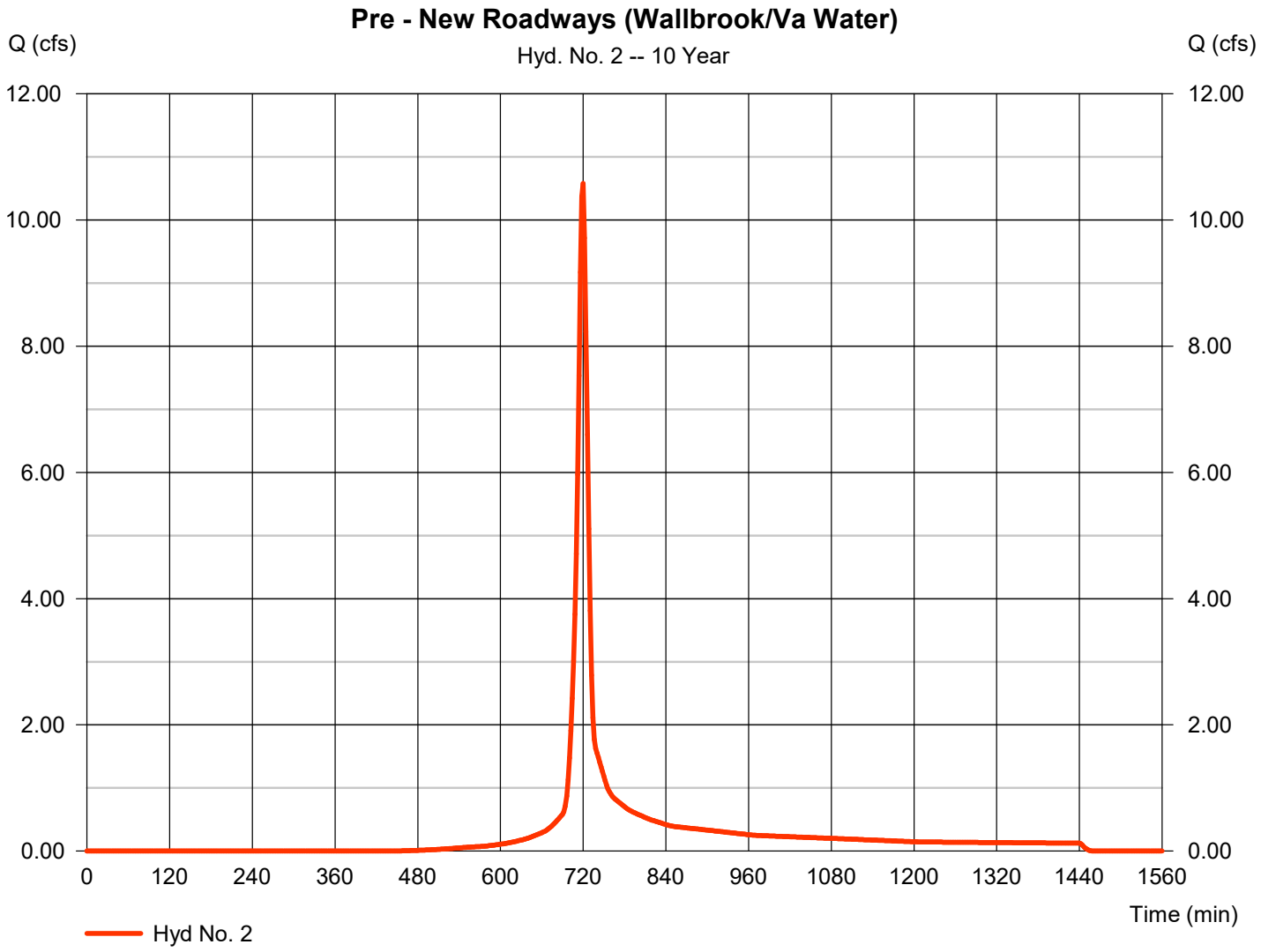


Hydrograph Report

Hyd. No. 2

Pre - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 10.58 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 26,241 cuft
Drainage area	= 2.490 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

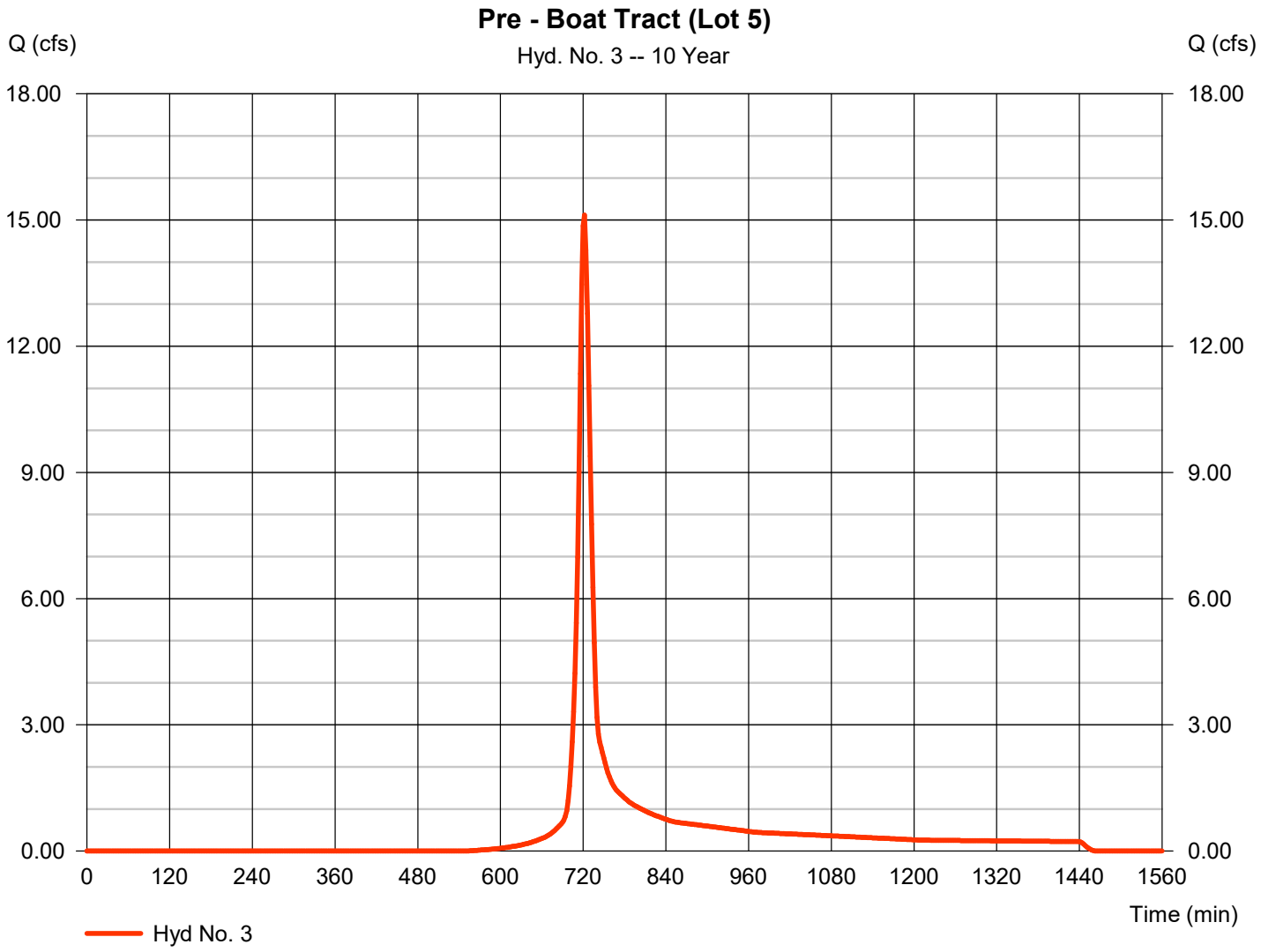


Hydrograph Report

Hyd. No. 3

Pre - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 15.12 cfs
Storm frequency	= 10 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 42,419 cuft
Drainage area	= 5.070 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

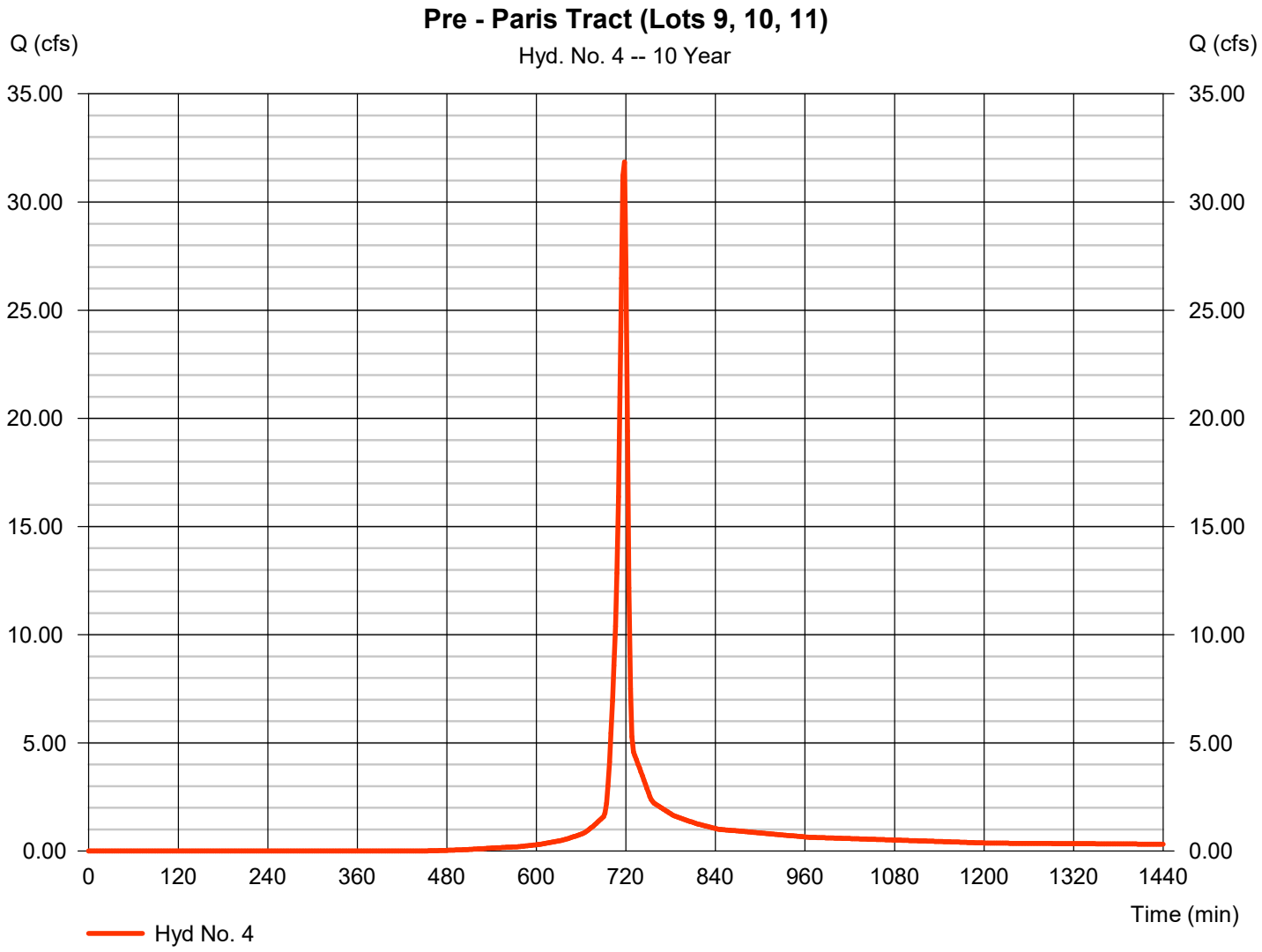


Hydrograph Report

Hyd. No. 4

Pre - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 31.85 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 66,961 cuft
Drainage area	= 7.060 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

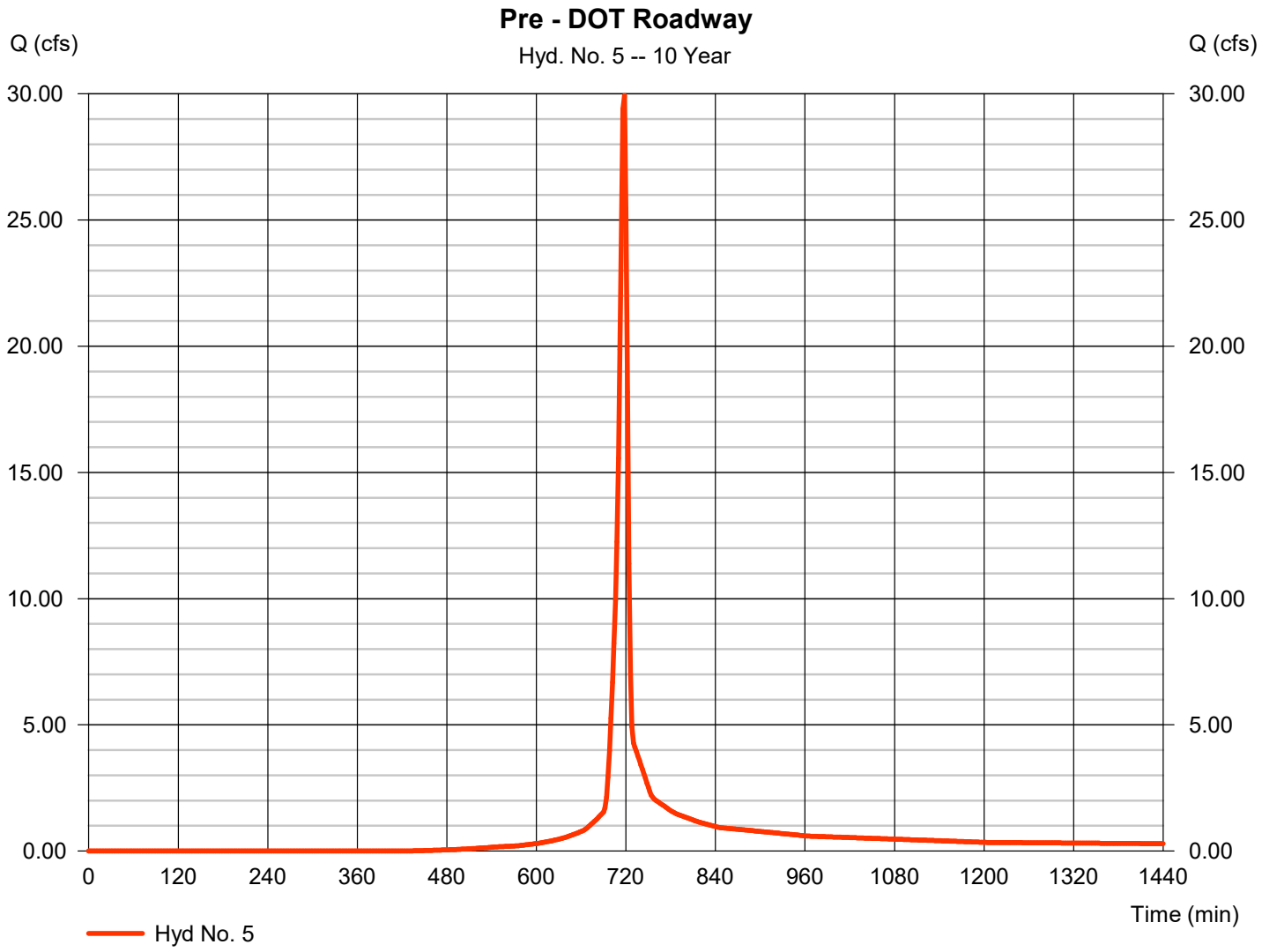


Hydrograph Report

Hyd. No. 5

Pre - DOT Roadway

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.93 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	63,164 cuft
Drainage area	=	6.450 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

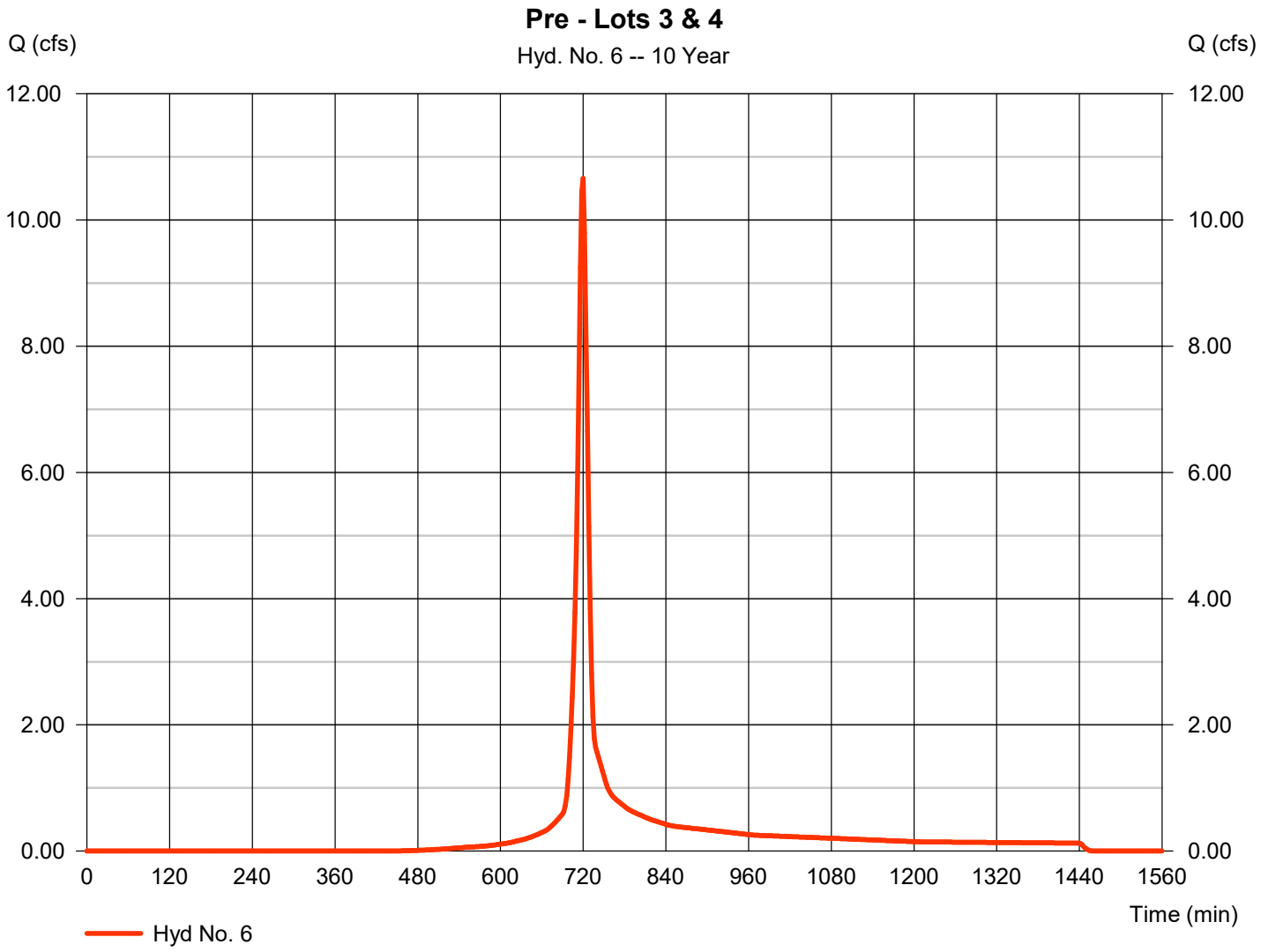


Hydrograph Report

Hyd. No. 6

Pre - Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 10.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 26,452 cuft
Drainage area	= 2.510 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

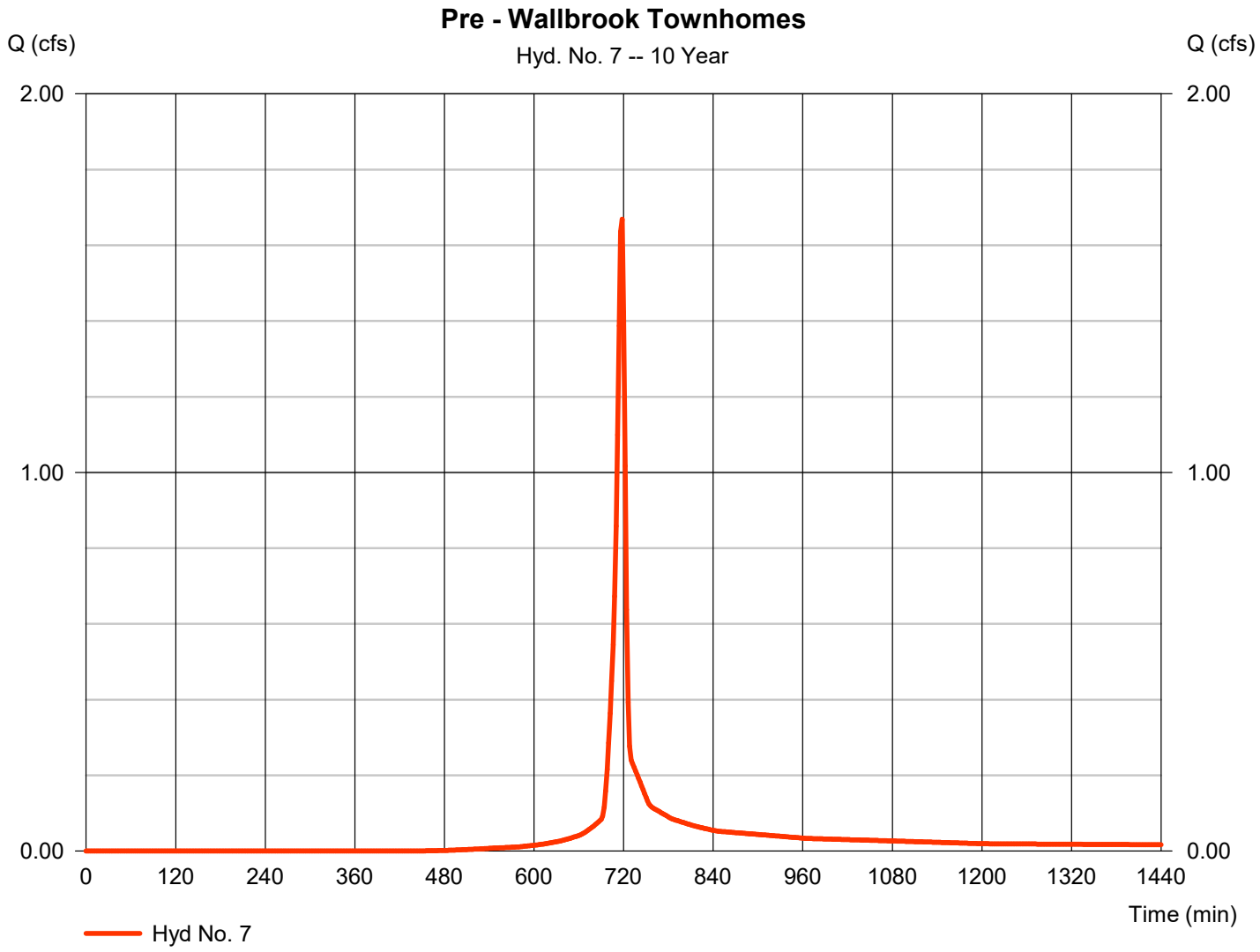


Hydrograph Report

Hyd. No. 7

Pre - Wallbrook Townhomes

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.669 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	3,509 cuft
Drainage area	=	0.370 ac	Curve number	=	79
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

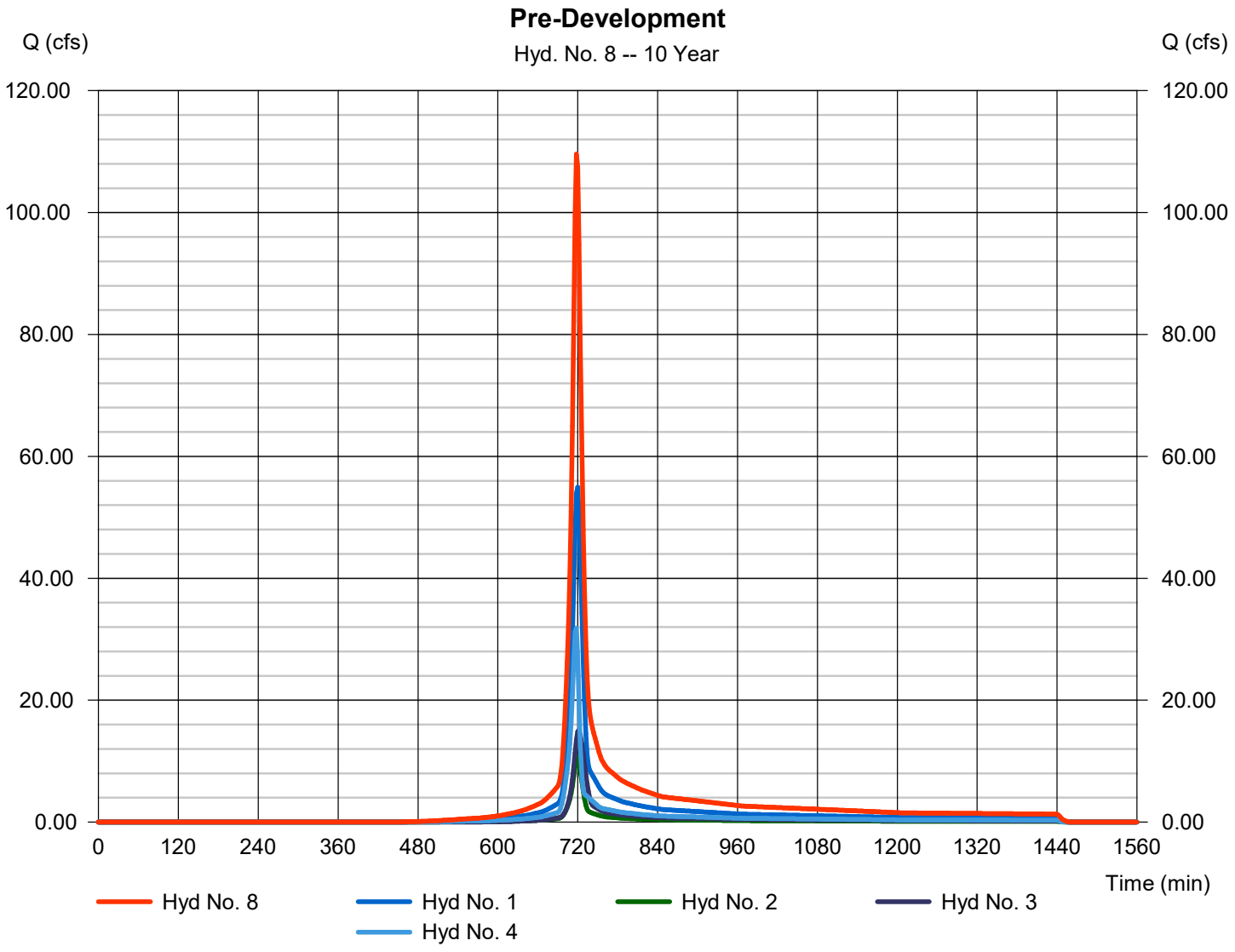


Hydrograph Report

Hyd. No. 8

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 109.58 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 271,989 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 27.560 ac

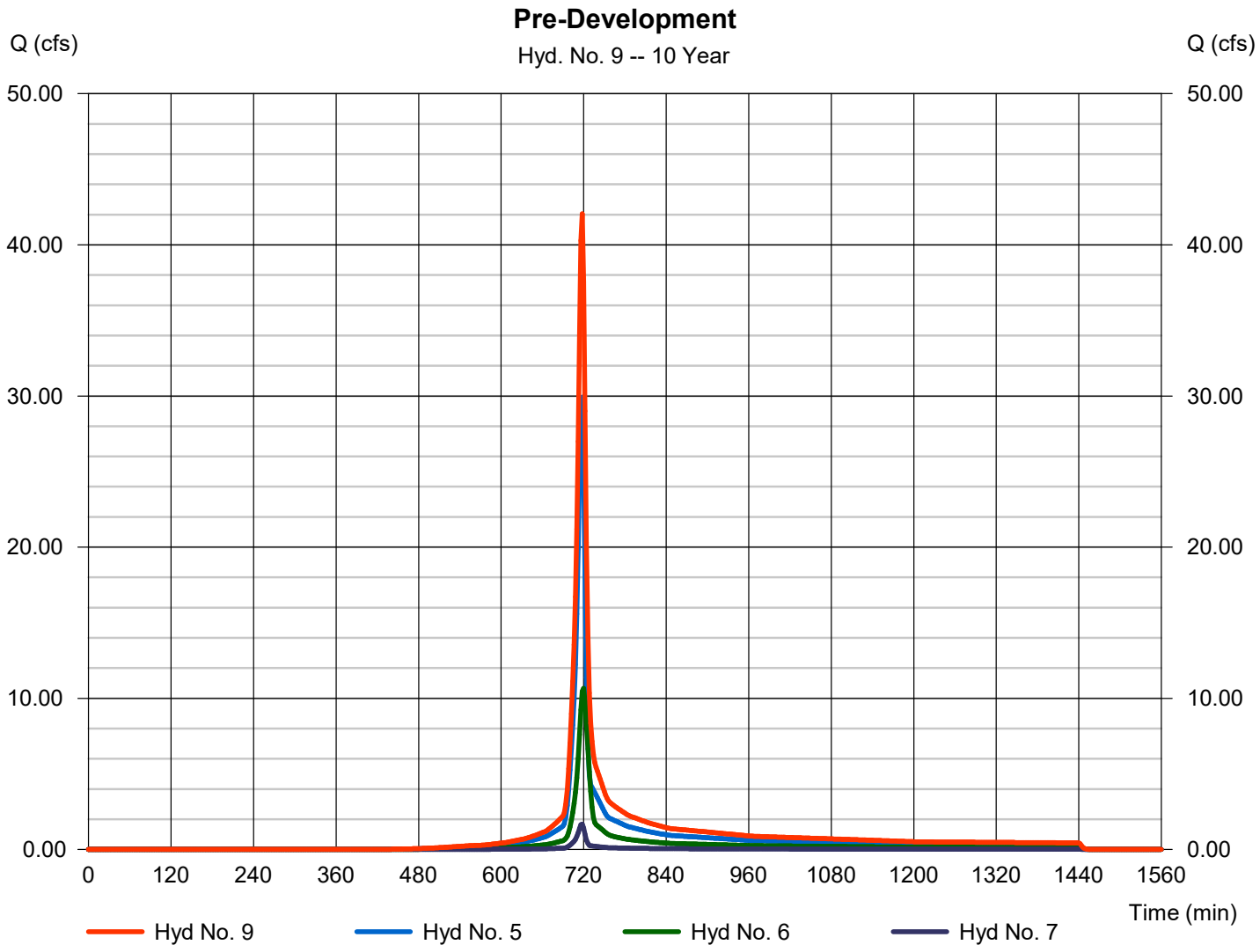


Hydrograph Report

Hyd. No. 9

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 42.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 93,125 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 9.330 ac

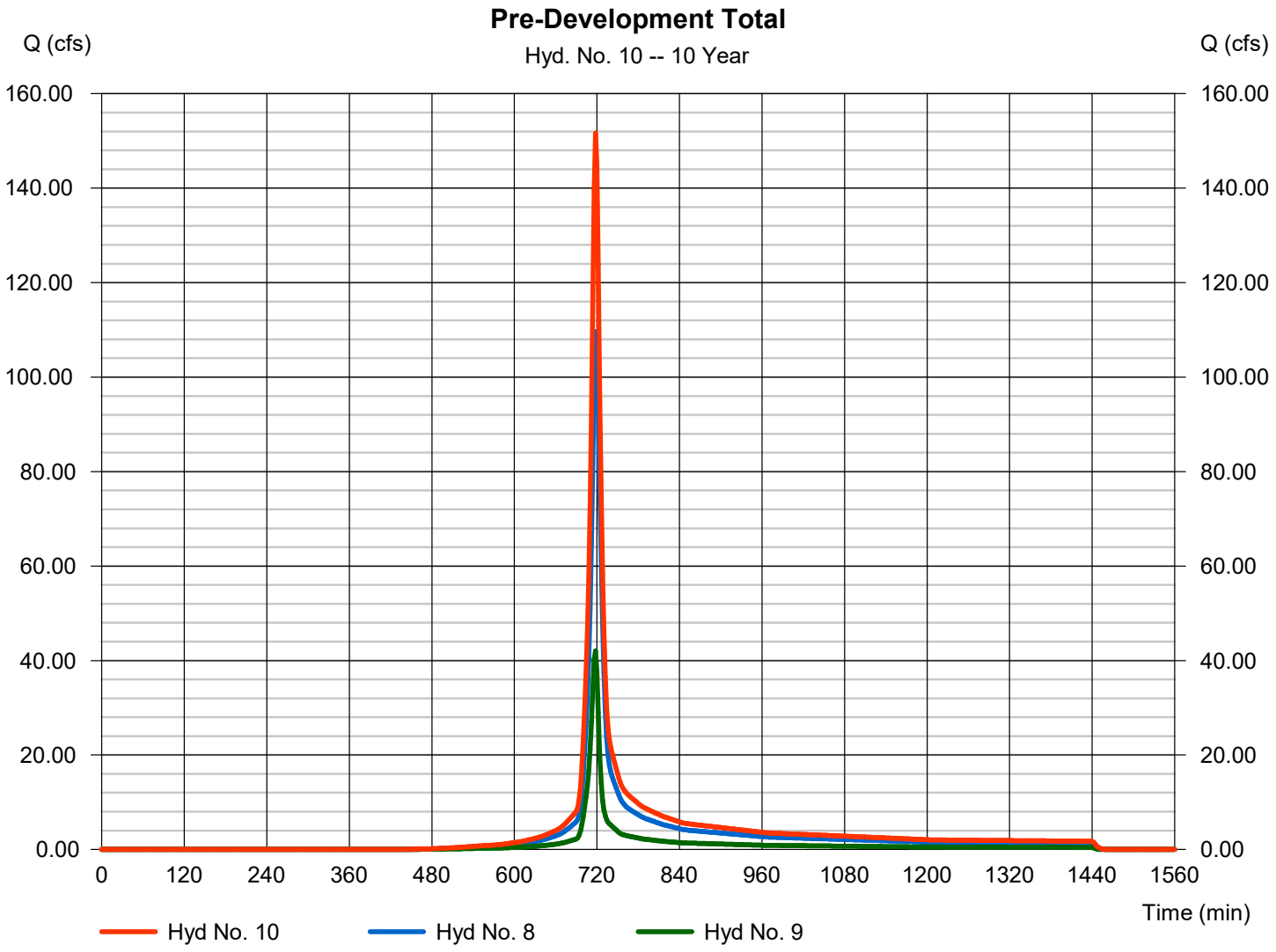


Hydrograph Report

Hyd. No. 10

Pre-Development Total

Hydrograph type	= Combine	Peak discharge	= 151.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 365,113 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	70.42	2	720	175,957	------	------	------	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	13.55	2	720	33,859	------	------	------	Pre - New Roadways (Wallbrook/Va
3	SCS Runoff	20.12	2	722	56,333	------	------	------	Pre - Boat Tract (Lot 5)
4	SCS Runoff	40.62	2	718	86,401	------	------	------	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	37.97	2	718	81,135	------	------	------	Pre - DOT Roadway
6	SCS Runoff	13.66	2	720	34,131	------	------	------	Pre - Lots 3 & 4
7	SCS Runoff	2.129	2	718	4,528	------	------	------	Pre - Wallbrook Townhomes
8	Combine	141.52	2	718	352,550	1, 2, 3, 4,	------	------	Pre-Development
9	Combine	53.56	2	718	119,794	5, 6, 7,	------	------	Pre-Development
10	Combine	195.08	2	718	472,344	8, 9	------	------	Pre-Development Total

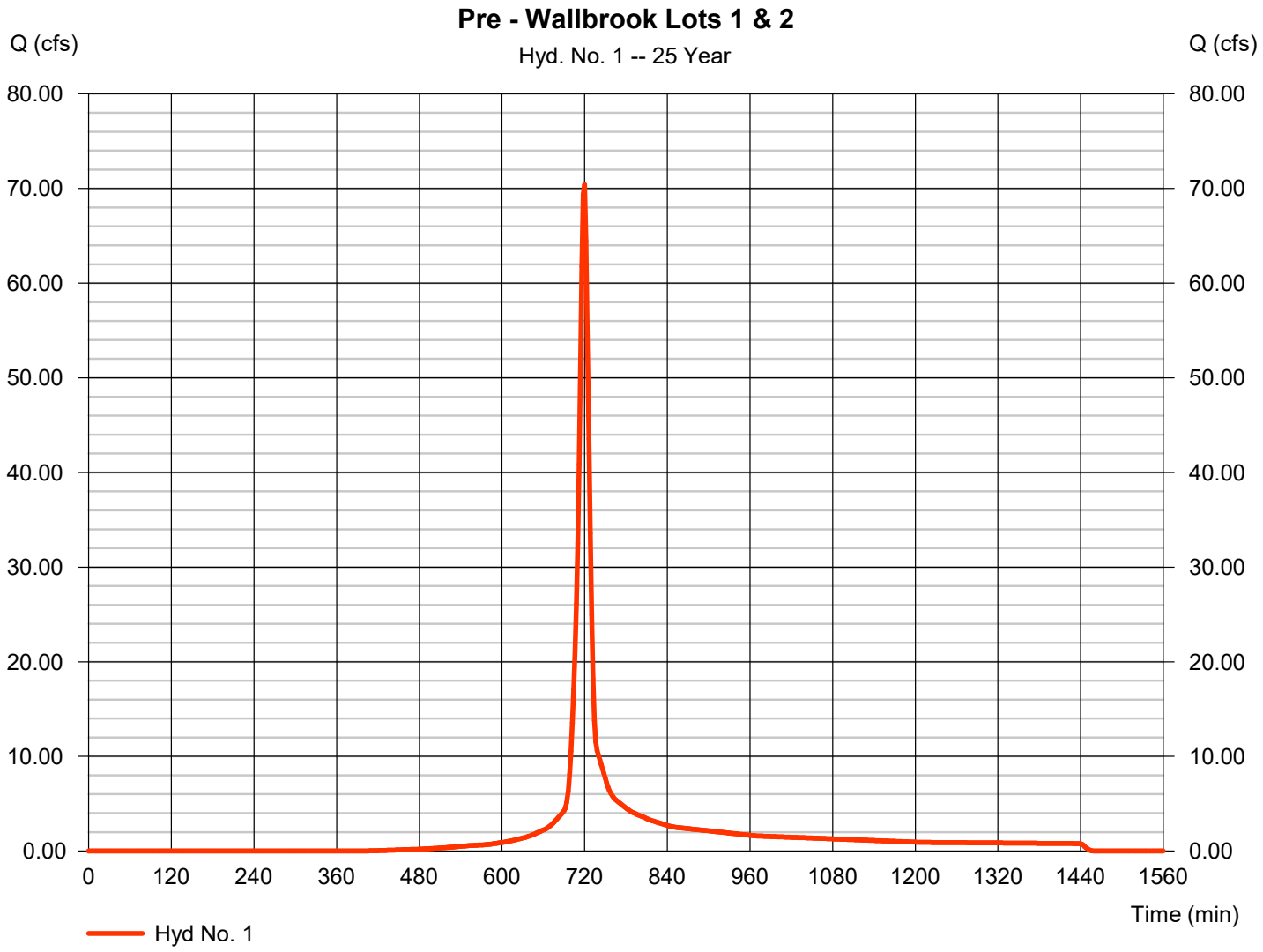
Hydrograph Report

Hyd. No. 1

Pre - Wallbrook Lots 1 & 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	70.42 cfs
Storm frequency	=	25 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	175,957 cuft
Drainage area	=	12.940 ac	Curve number	=	79*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	6.70 min
Total precip.	=	5.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(10.970 x 79) + (1.970 x 79)] / 12.940

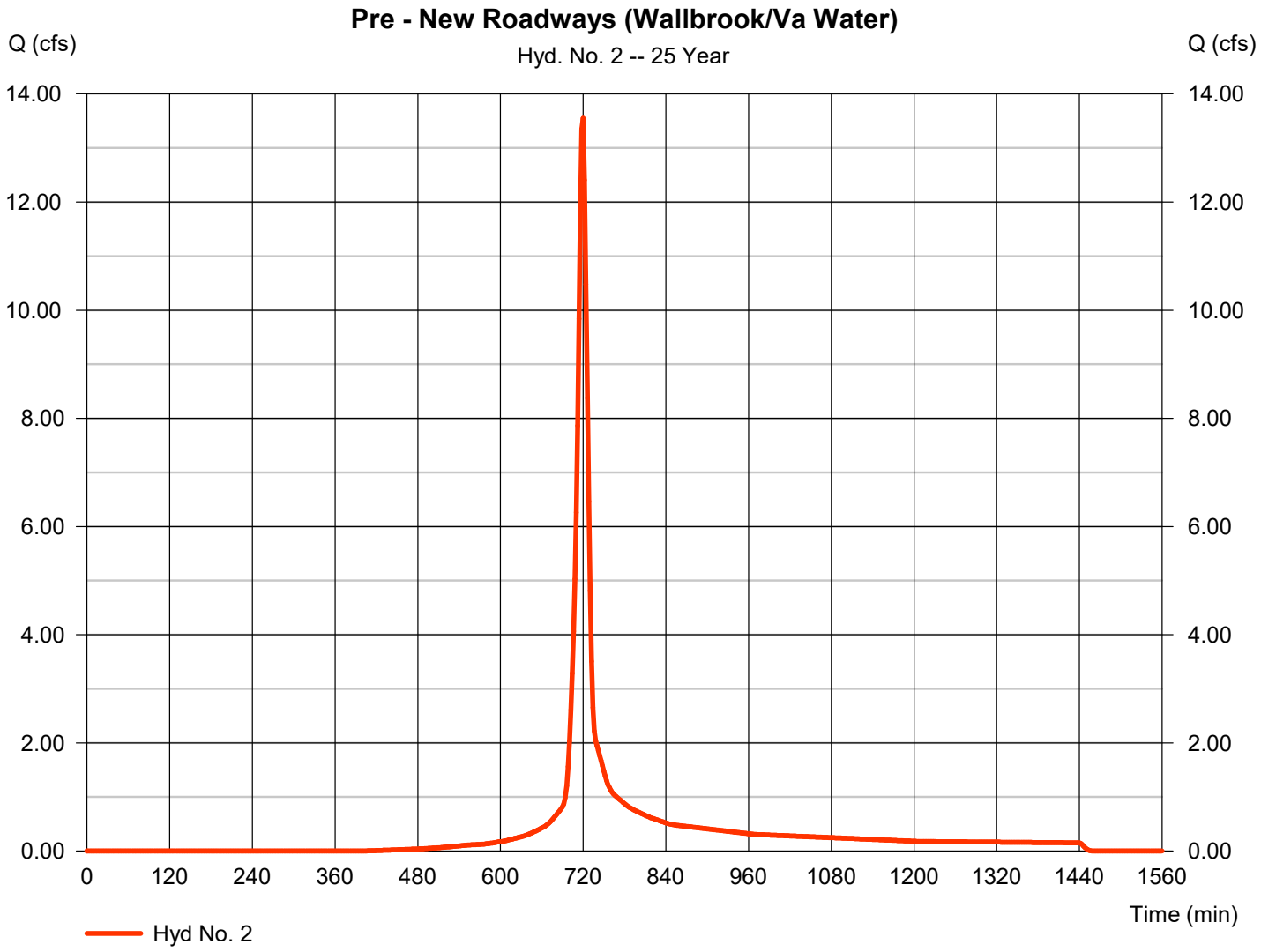


Hydrograph Report

Hyd. No. 2

Pre - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 13.55 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 33,859 cuft
Drainage area	= 2.490 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

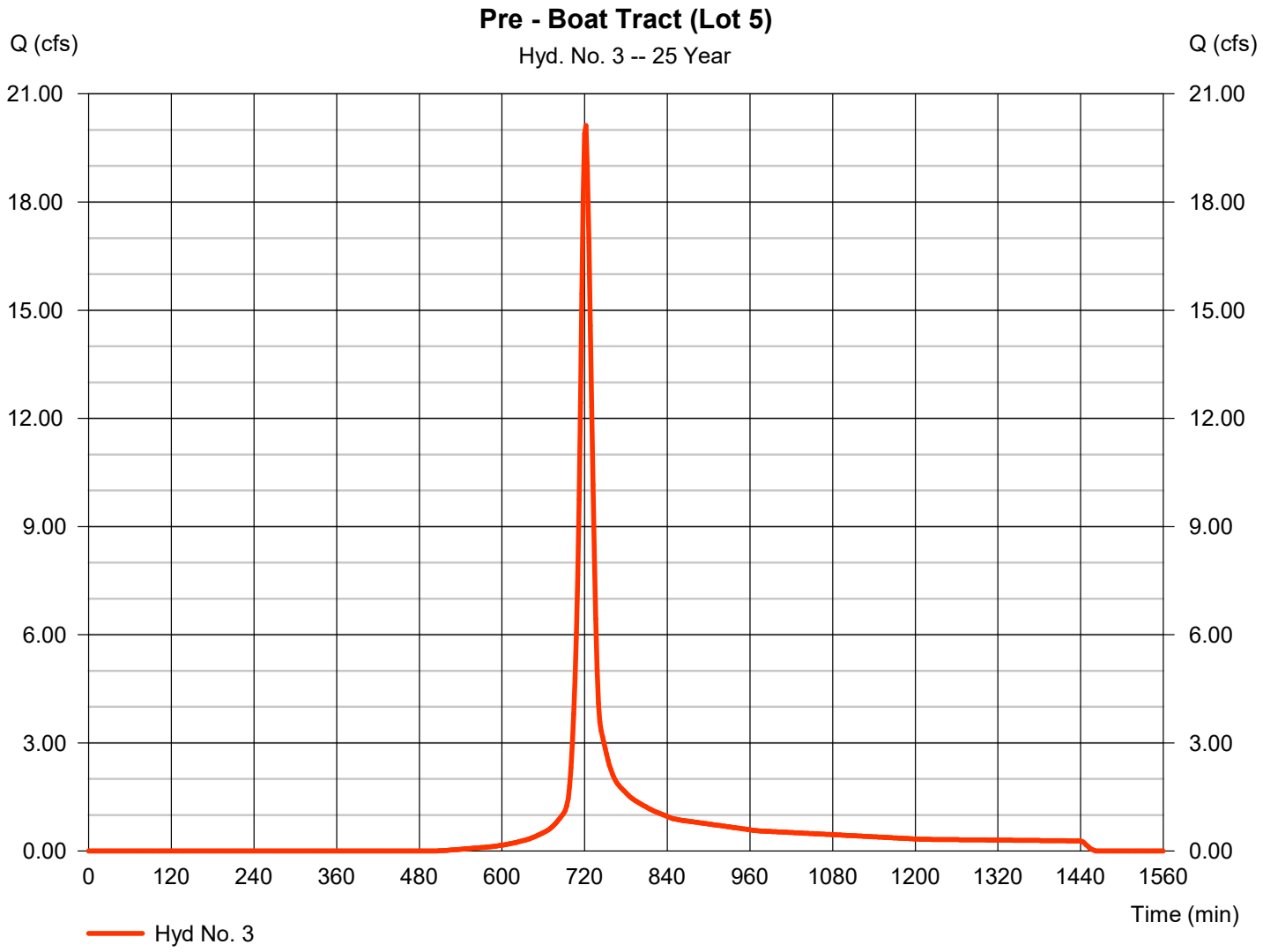


Hydrograph Report

Hyd. No. 3

Pre - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 20.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 56,333 cuft
Drainage area	= 5.070 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

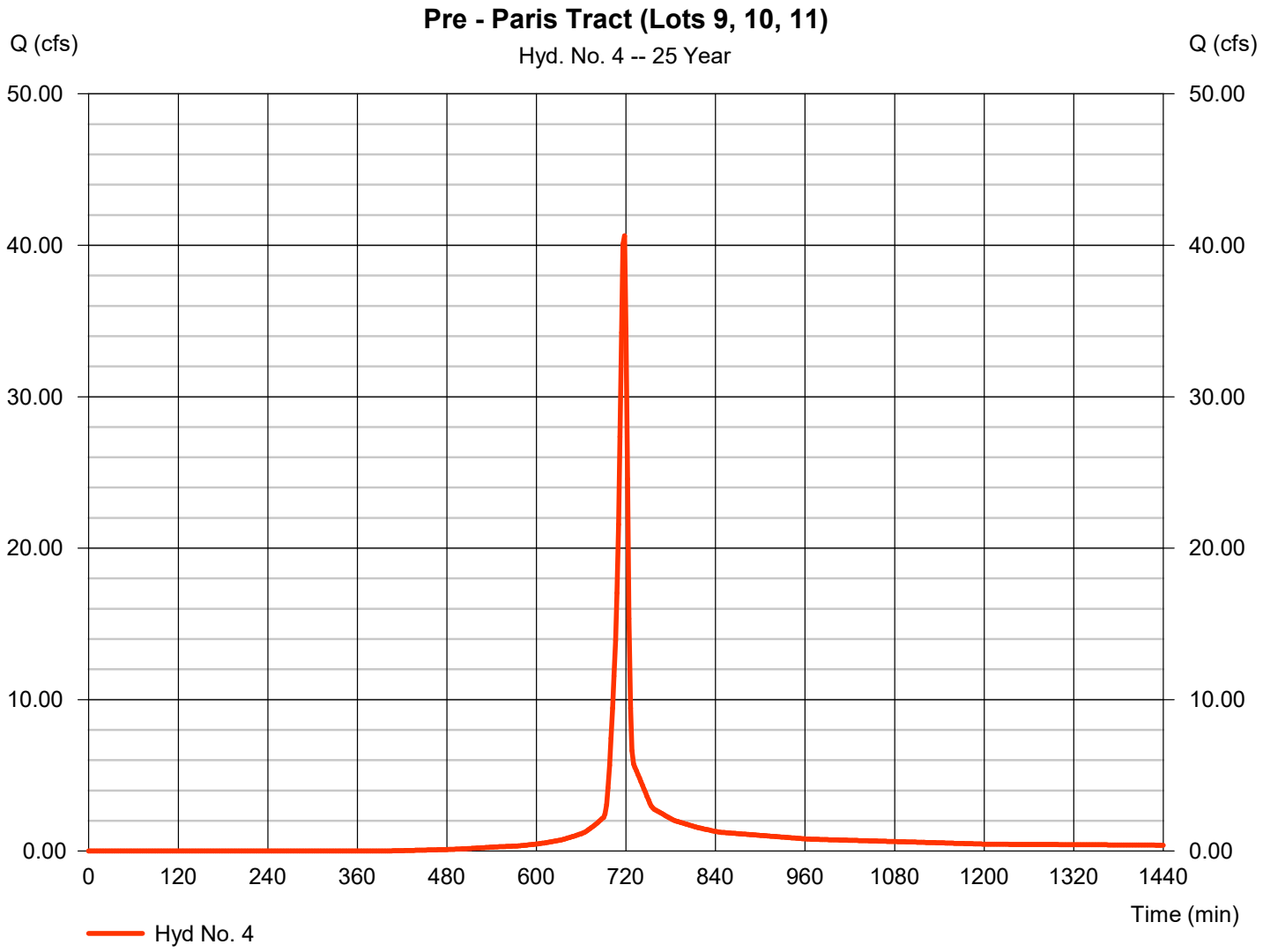


Hydrograph Report

Hyd. No. 4

Pre - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 40.62 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 86,401 cuft
Drainage area	= 7.060 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

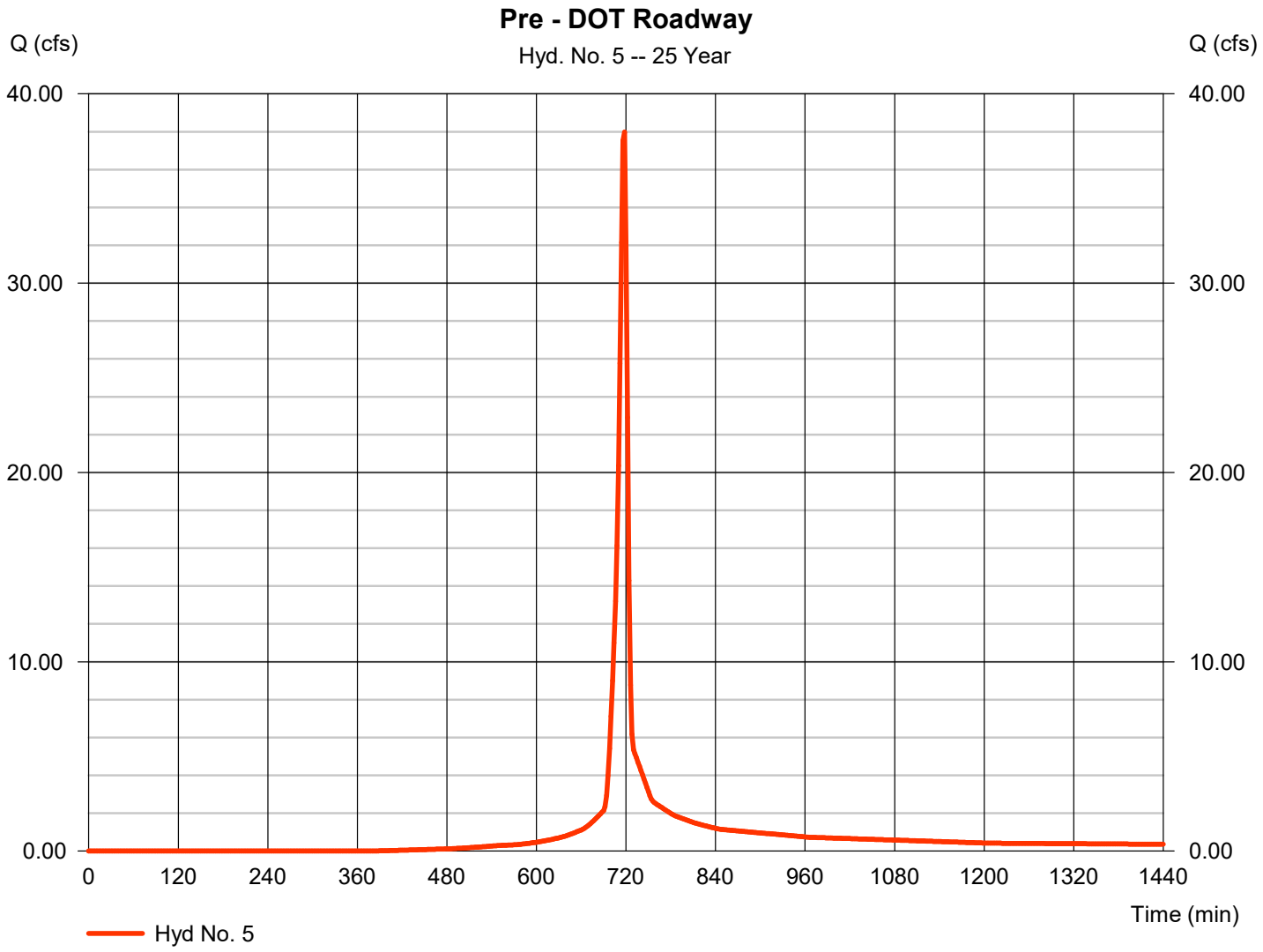


Hydrograph Report

Hyd. No. 5

Pre - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 37.97 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 81,135 cuft
Drainage area	= 6.450 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

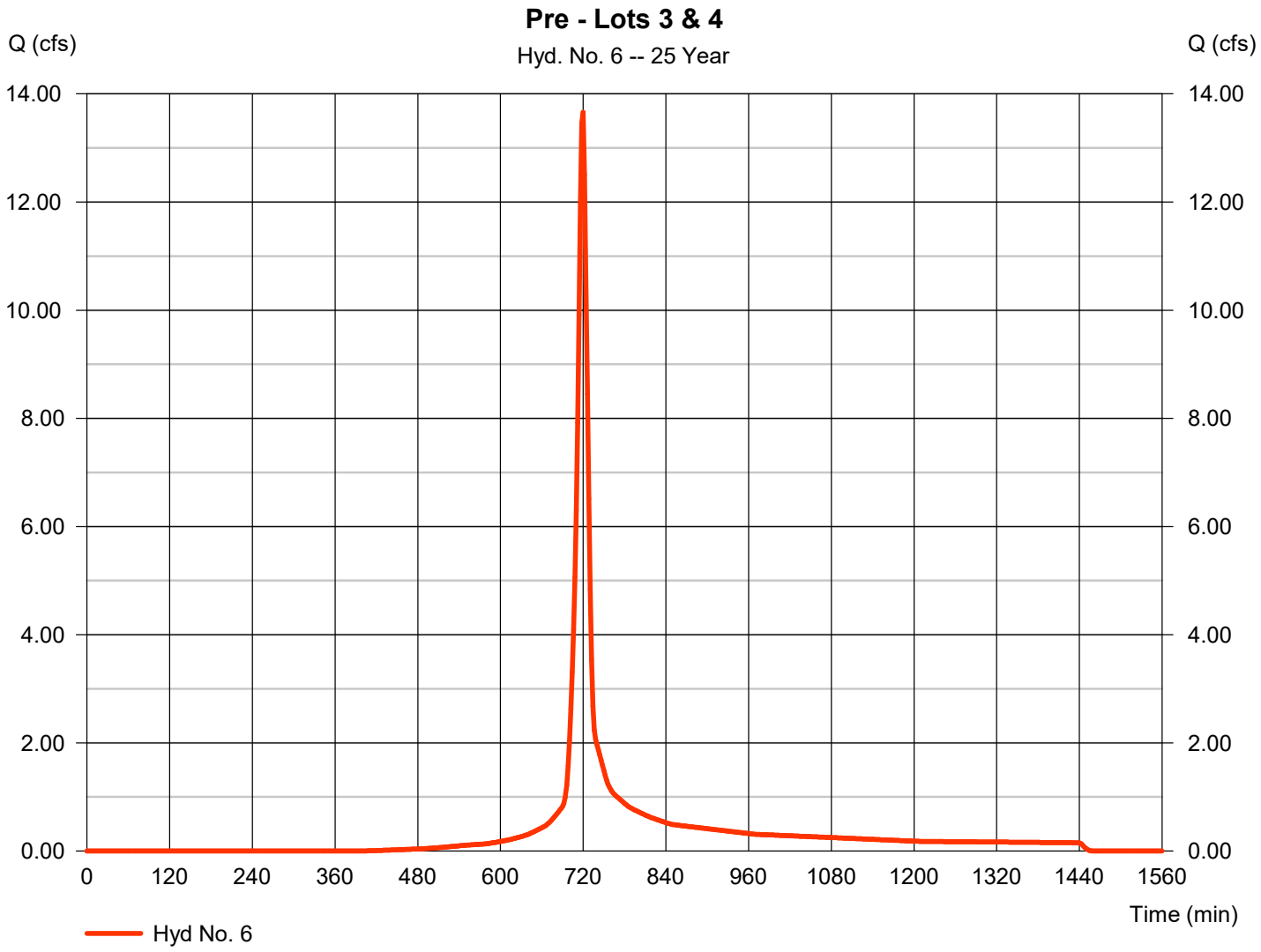


Hydrograph Report

Hyd. No. 6

Pre - Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 13.66 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 34,131 cuft
Drainage area	= 2.510 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

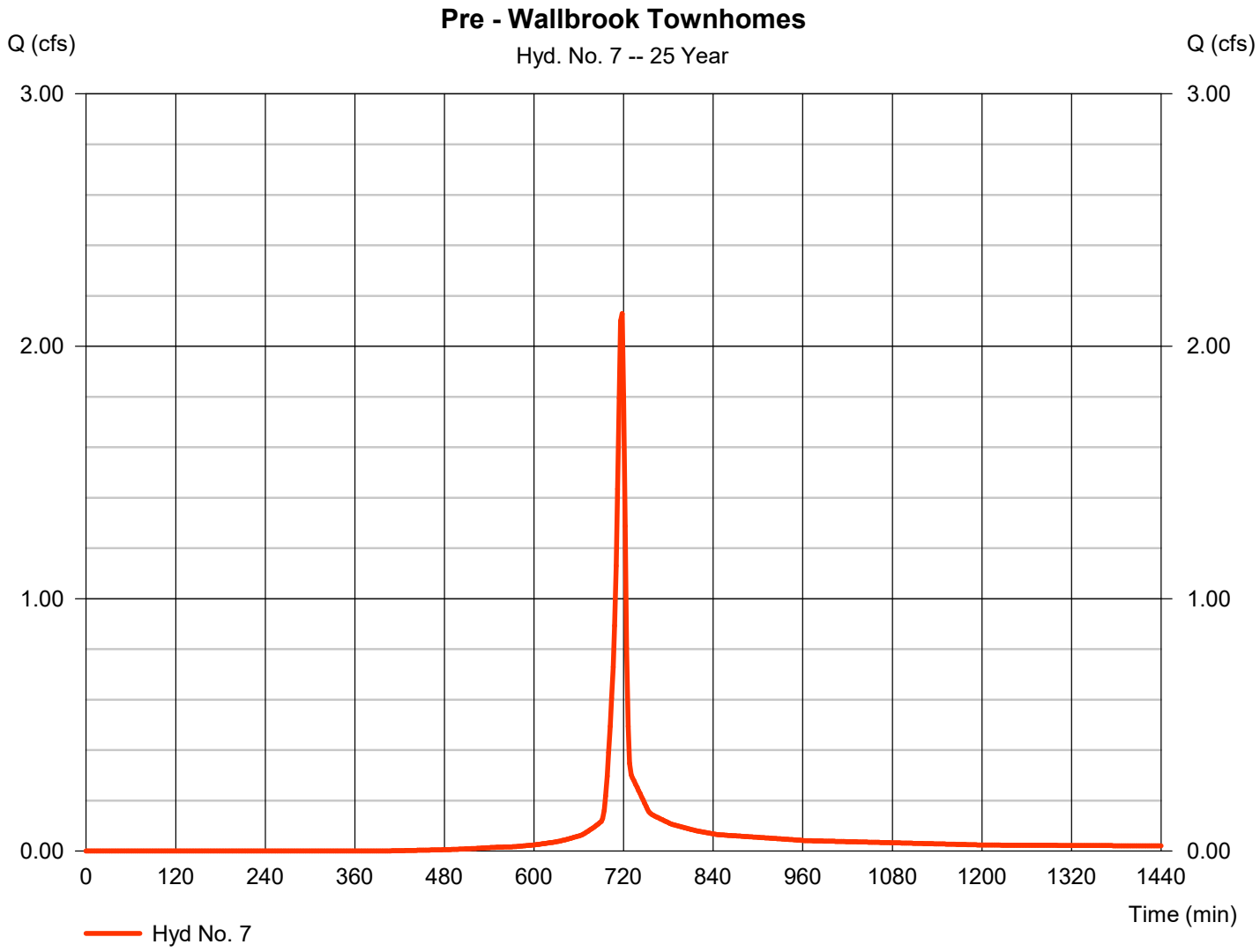


Hydrograph Report

Hyd. No. 7

Pre - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 2.129 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 4,528 cuft
Drainage area	= 0.370 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

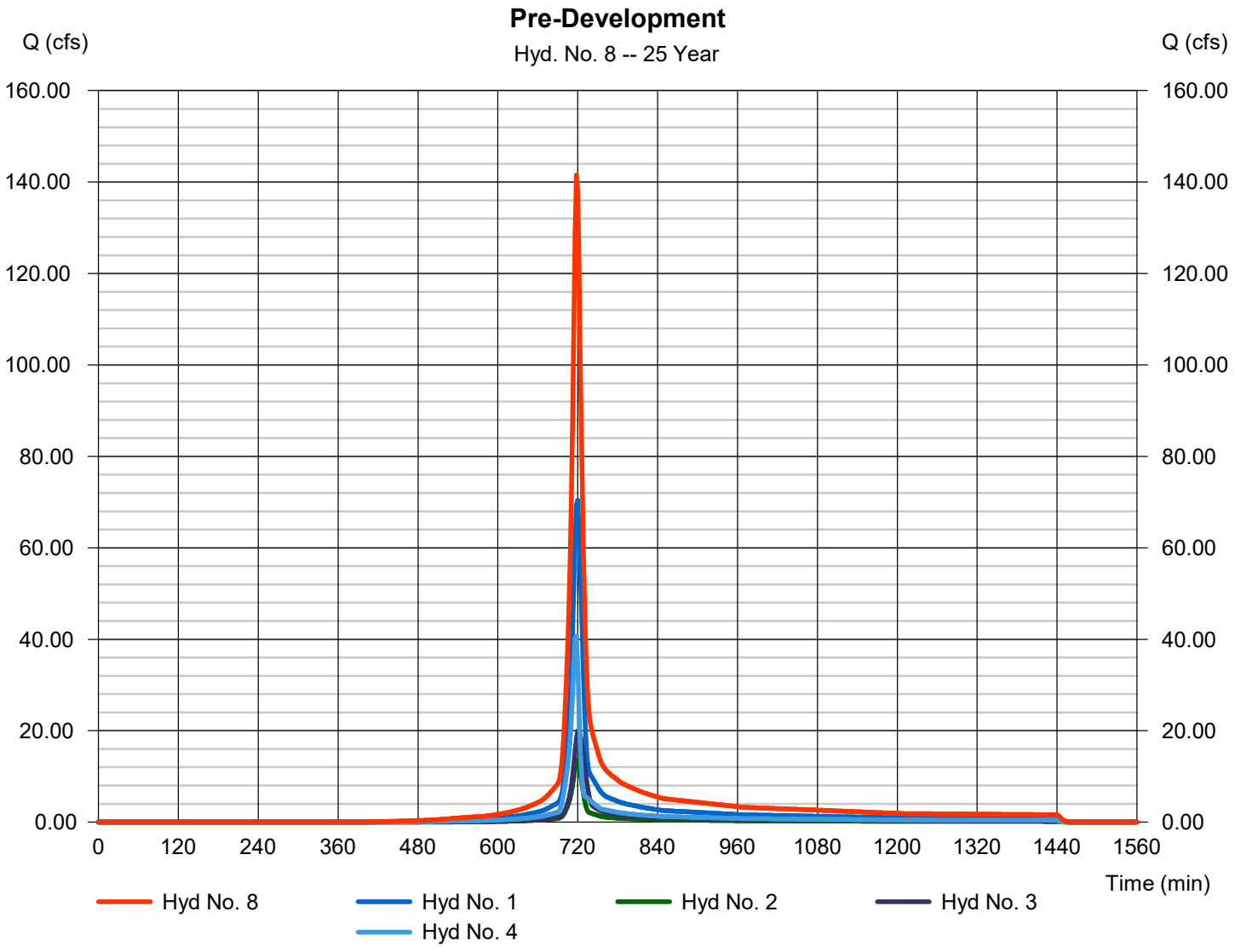


Hydrograph Report

Hyd. No. 8

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 141.52 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 352,550 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 27.560 ac

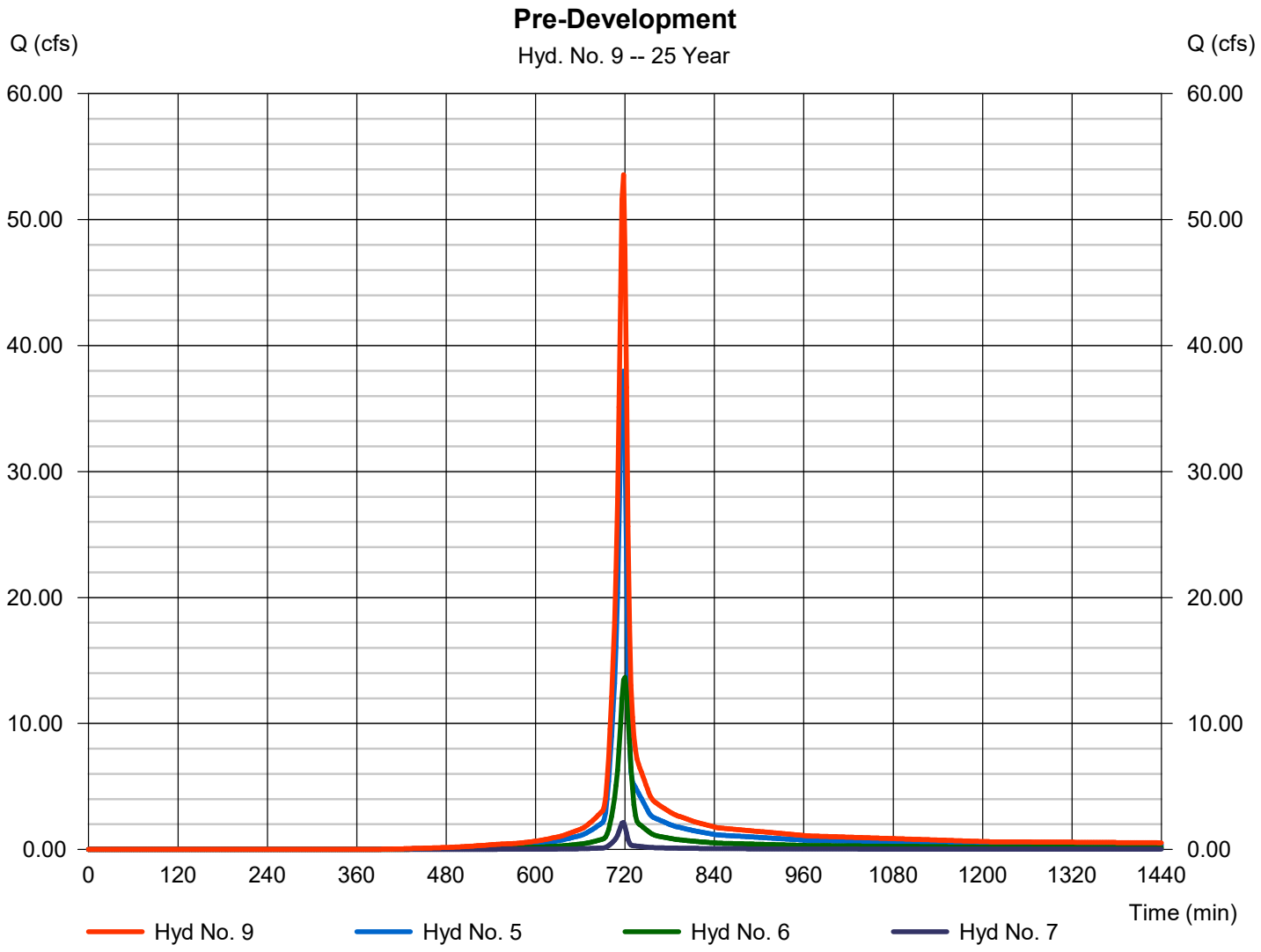


Hydrograph Report

Hyd. No. 9

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 53.56 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 119,794 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 9.330 ac

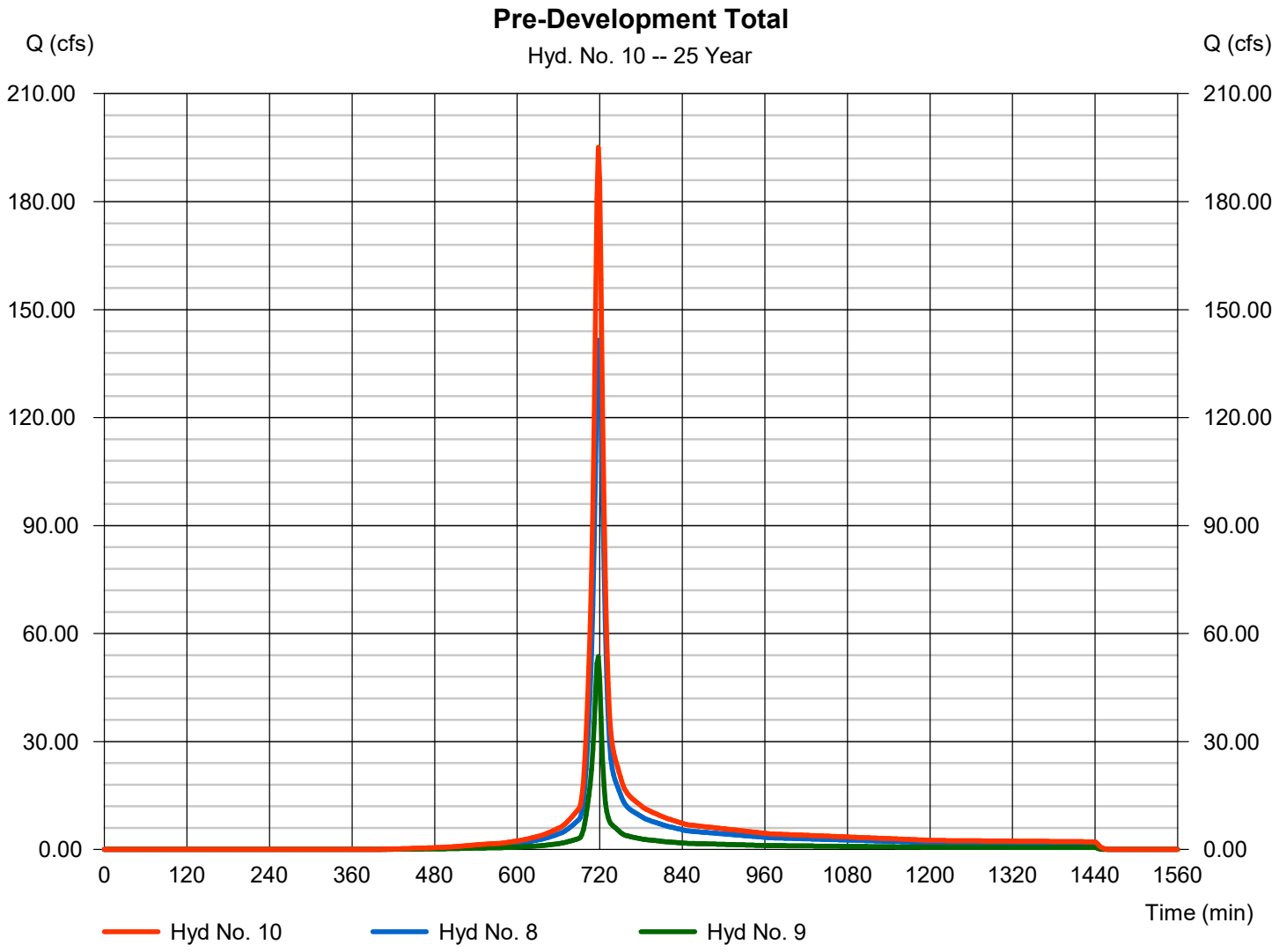


Hydrograph Report

Hyd. No. 10

Pre-Development Total

Hydrograph type	= Combine	Peak discharge	= 195.08 cfs
Storm frequency	= 25 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 472,344 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	95.65	2	720	242,079	------	------	------	Pre - Wallbrook Lots 1 & 2
2	SCS Runoff	18.40	2	720	46,583	------	------	------	Pre - New Roadways (Wallbrook/Va
3	SCS Runoff	28.49	2	722	80,028	------	------	------	Pre - Boat Tract (Lot 5)
4	SCS Runoff	54.91	2	718	118,870	------	------	------	Pre - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	51.04	2	718	111,066	------	------	------	Pre - DOT Roadway
6	SCS Runoff	18.55	2	720	46,957	------	------	------	Pre - Lots 3 & 4
7	SCS Runoff	2.878	2	718	6,230	------	------	------	Pre - Wallbrook Townhomes
8	Combine	193.95	2	718	487,560	1, 2, 3, 4,	------	------	Pre-Development
9	Combine	72.30	2	718	164,252	5, 6, 7,	------	------	Pre-Development
10	Combine	266.24	2	718	651,812	8, 9	------	------	Pre-Development Total

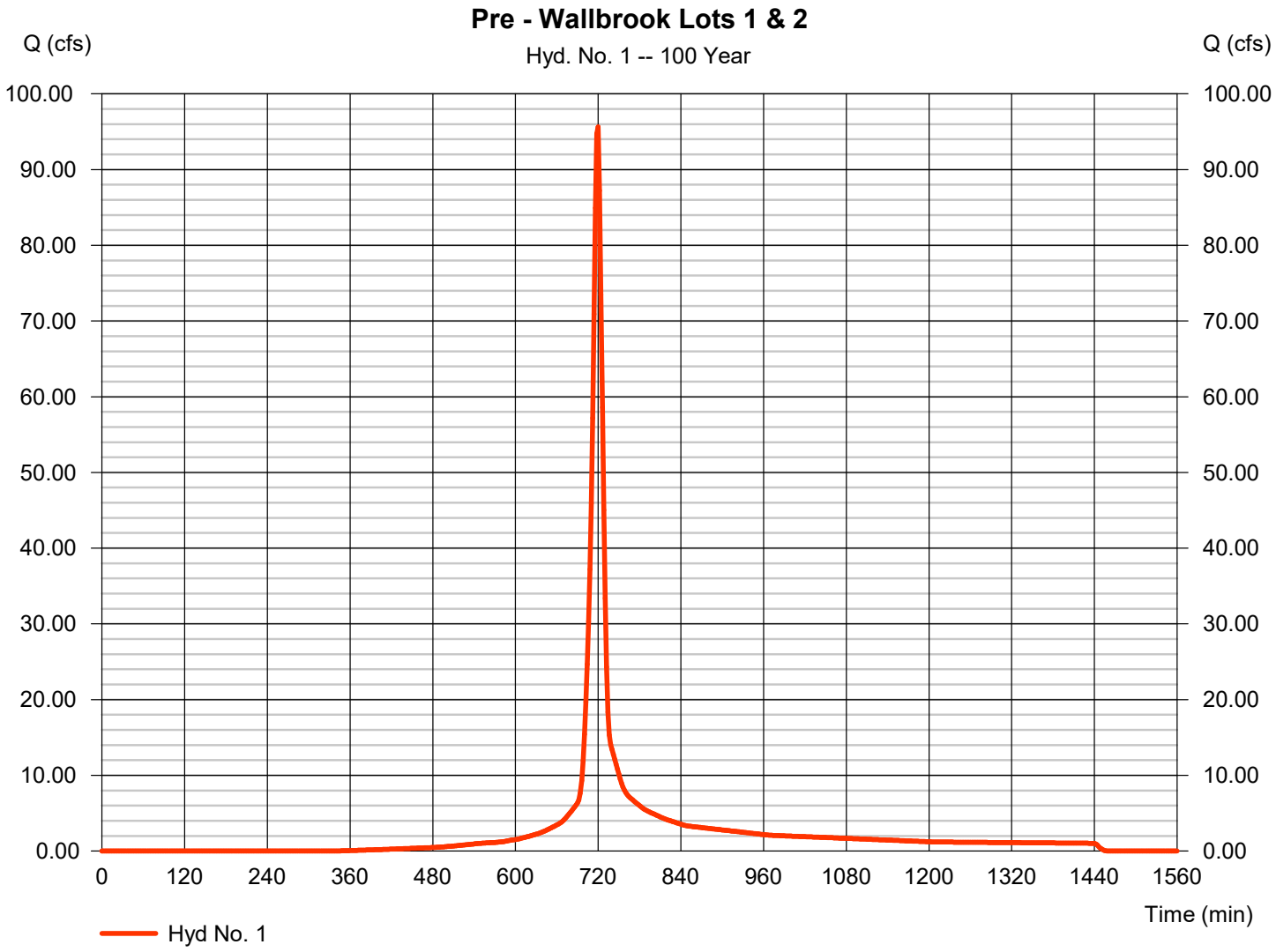
Hydrograph Report

Hyd. No. 1

Pre - Wallbrook Lots 1 & 2

Hydrograph type	= SCS Runoff	Peak discharge	= 95.65 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 242,079 cuft
Drainage area	= 12.940 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.70 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(10.970 x 79) + (1.970 x 79)] / 12.940

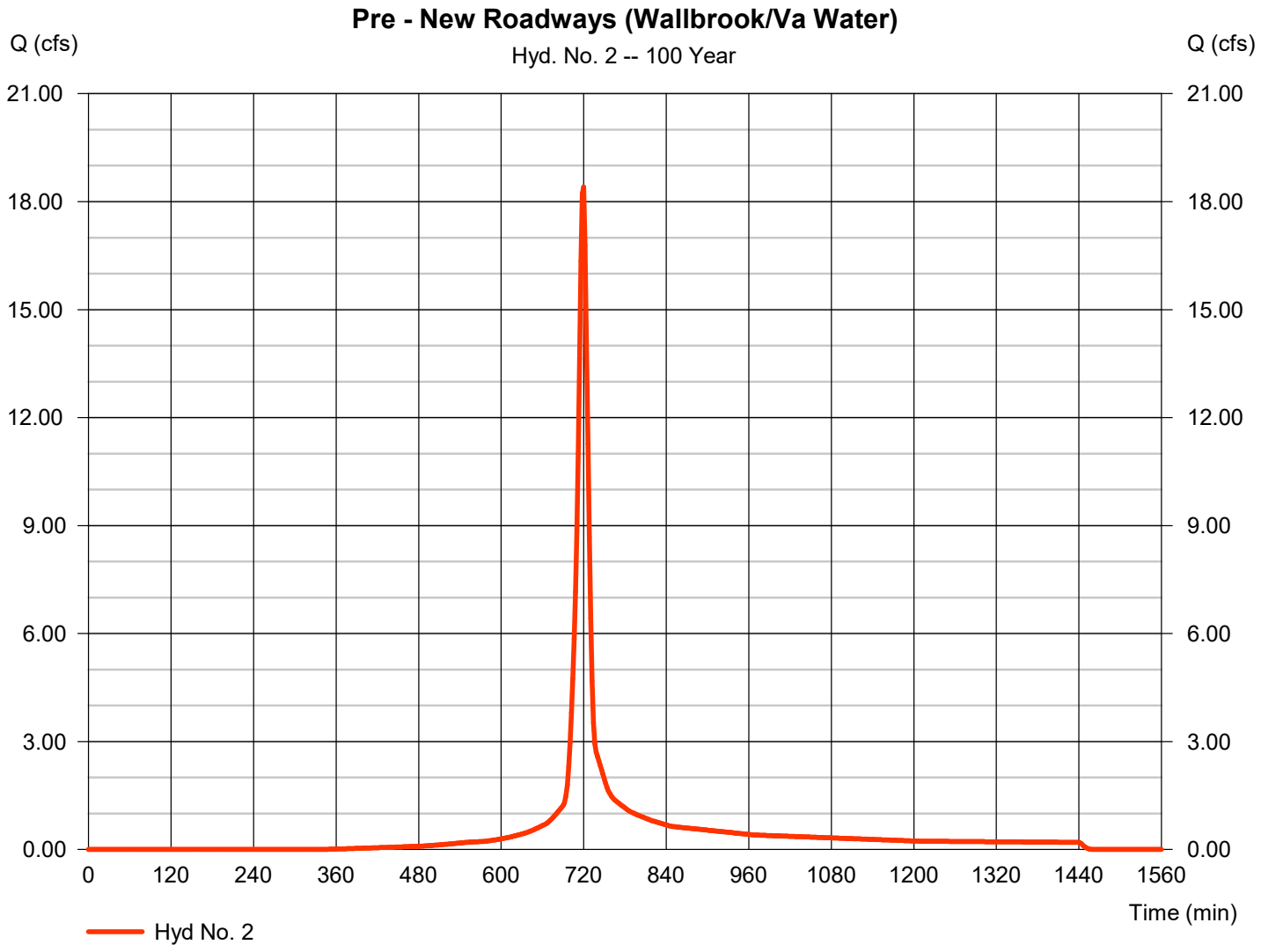


Hydrograph Report

Hyd. No. 2

Pre - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 18.40 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 46,583 cuft
Drainage area	= 2.490 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.40 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

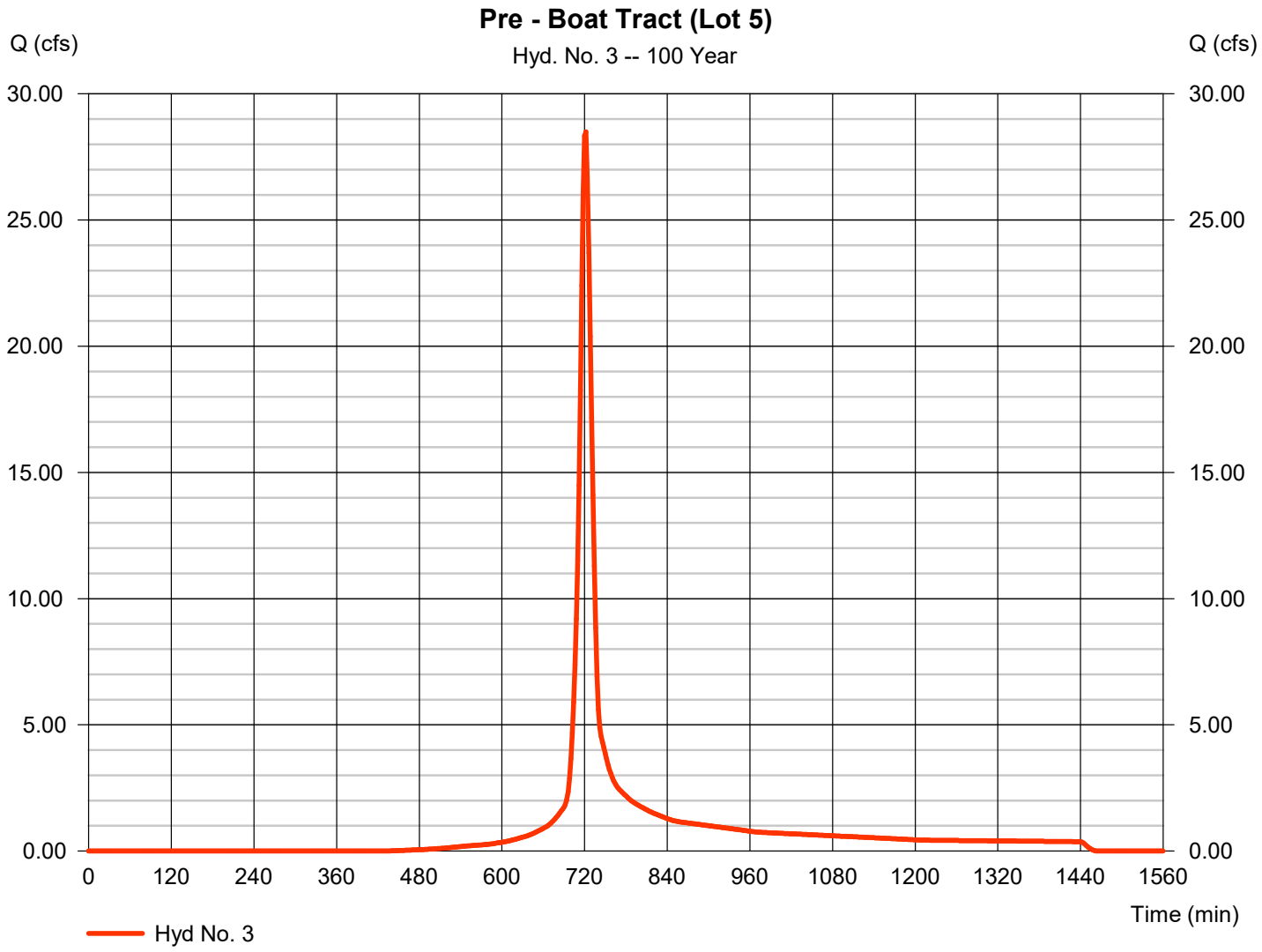


Hydrograph Report

Hyd. No. 3

Pre - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 28.49 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 80,028 cuft
Drainage area	= 5.070 ac	Curve number	= 73
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.50 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

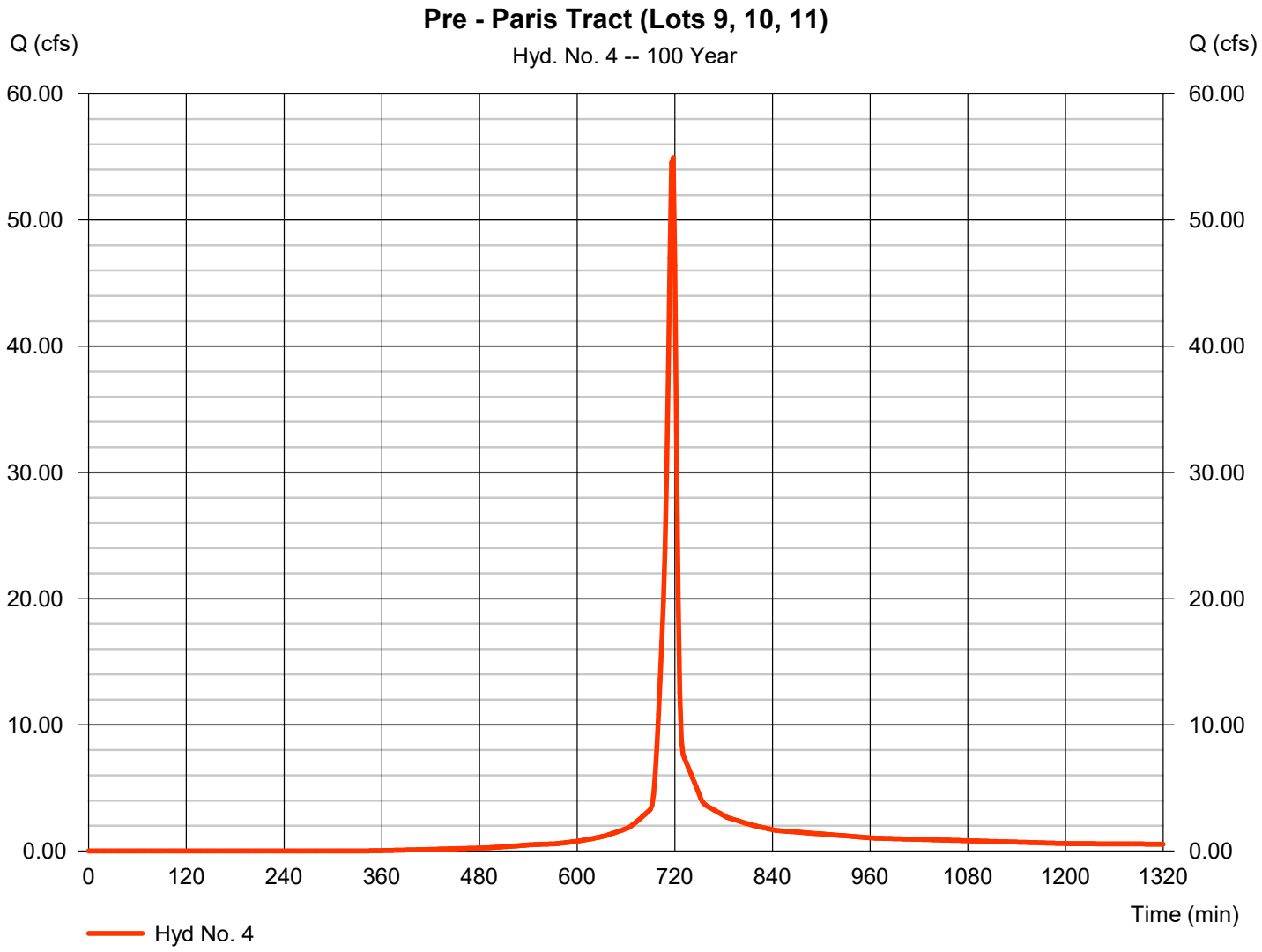


Hydrograph Report

Hyd. No. 4

Pre - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 54.91 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 118,870 cuft
Drainage area	= 7.060 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

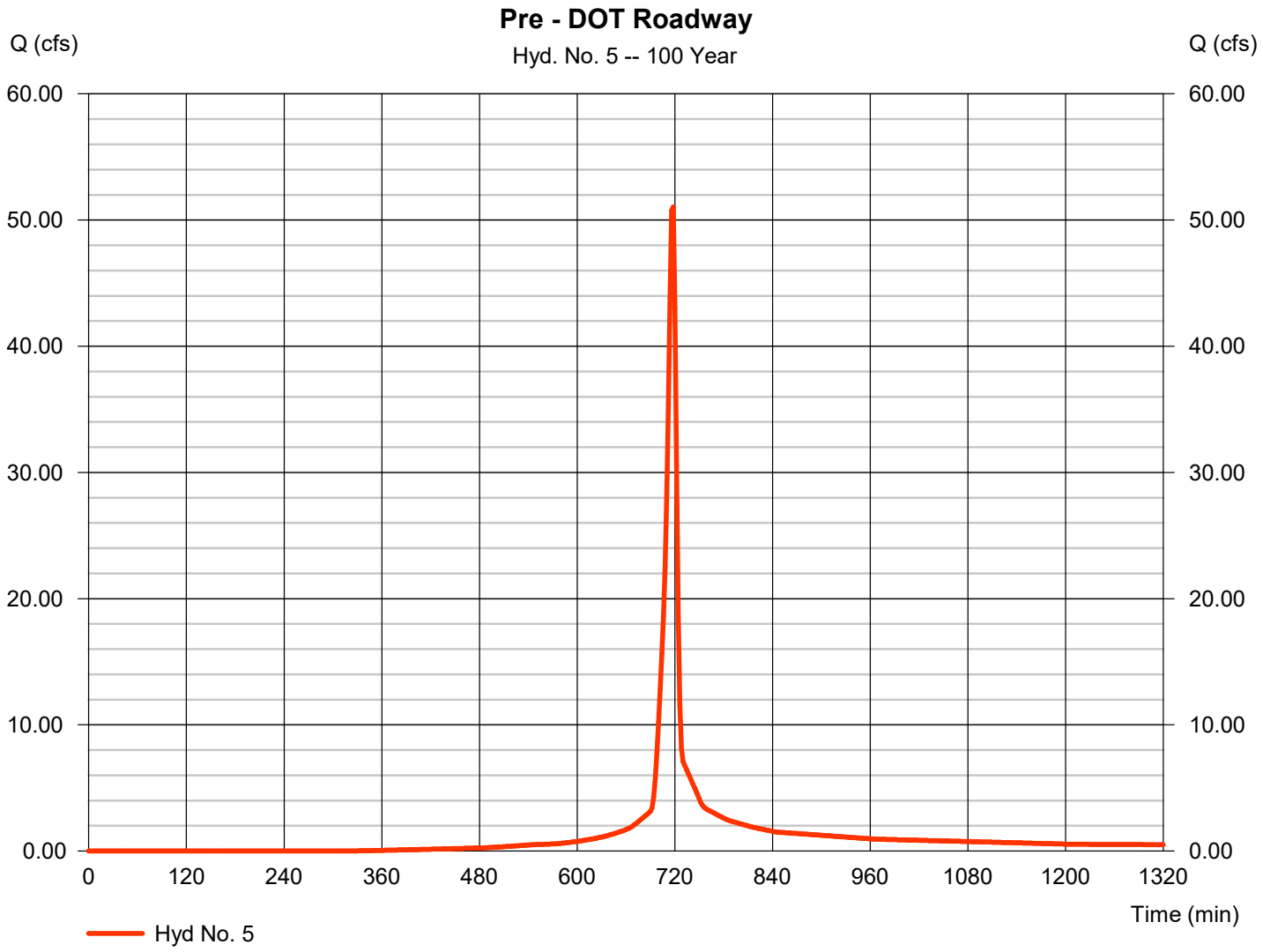


Hydrograph Report

Hyd. No. 5

Pre - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 51.04 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 111,066 cuft
Drainage area	= 6.450 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

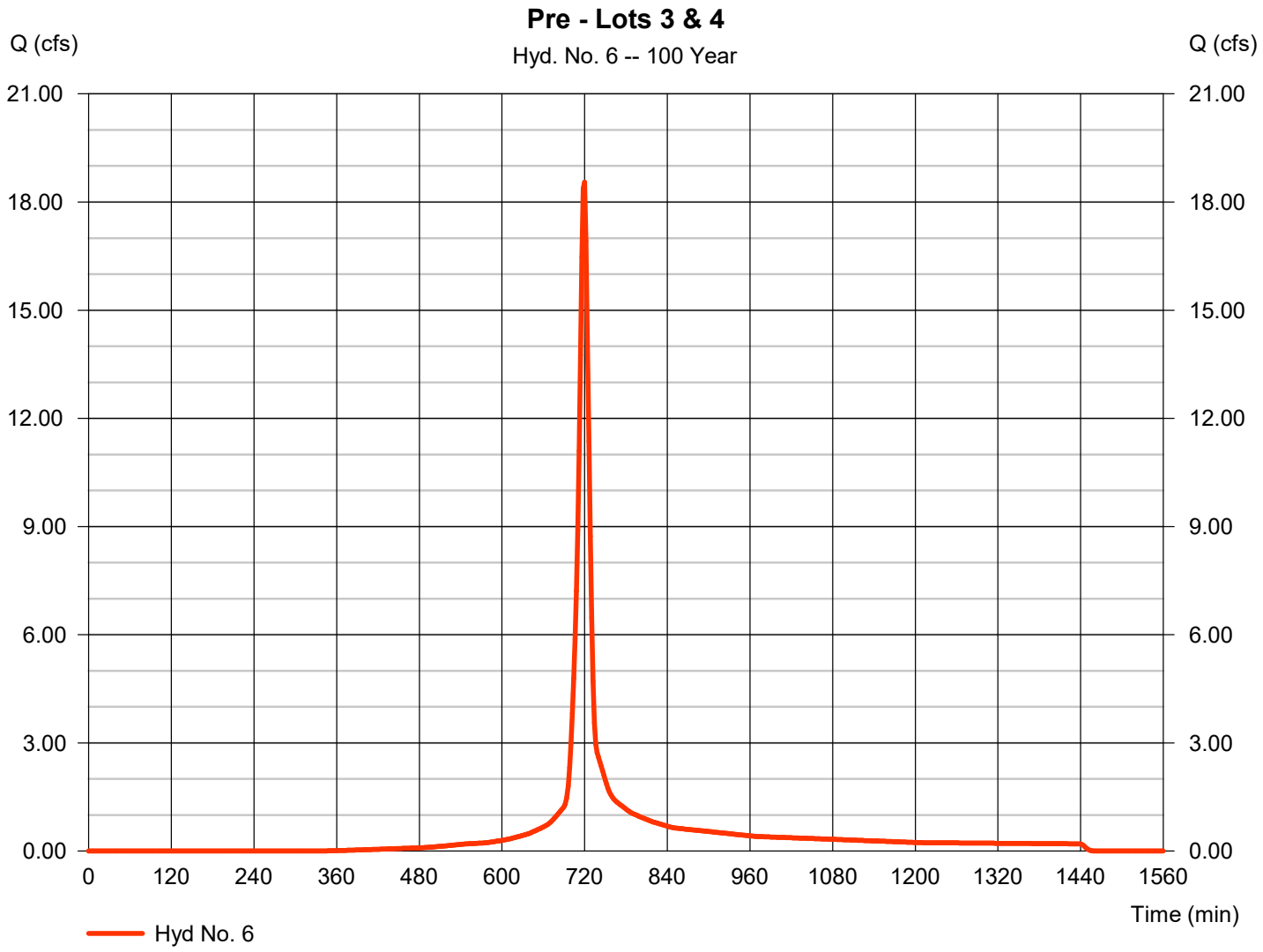


Hydrograph Report

Hyd. No. 6

Pre - Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 18.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 46,957 cuft
Drainage area	= 2.510 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

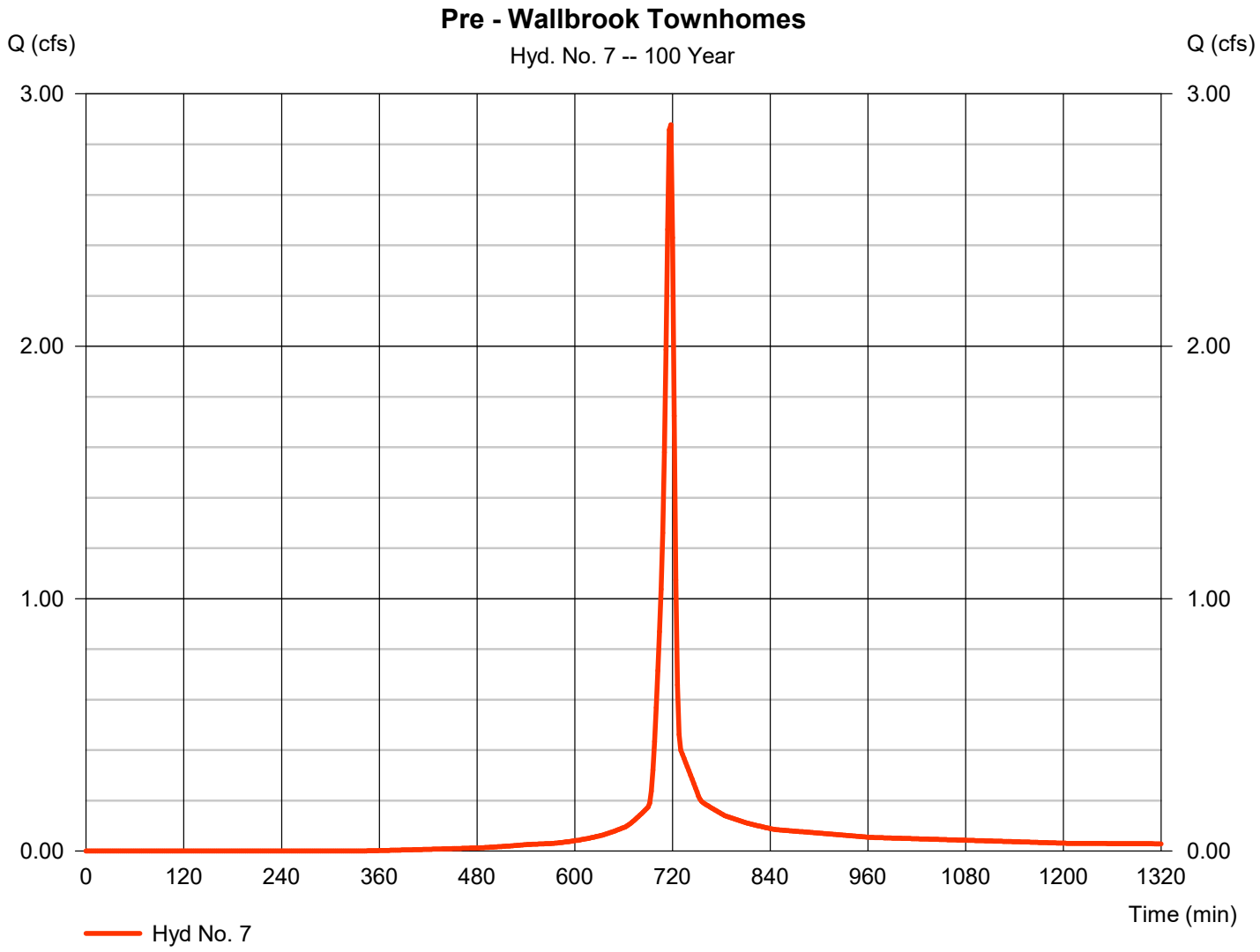


Hydrograph Report

Hyd. No. 7

Pre - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 2.878 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 6,230 cuft
Drainage area	= 0.370 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

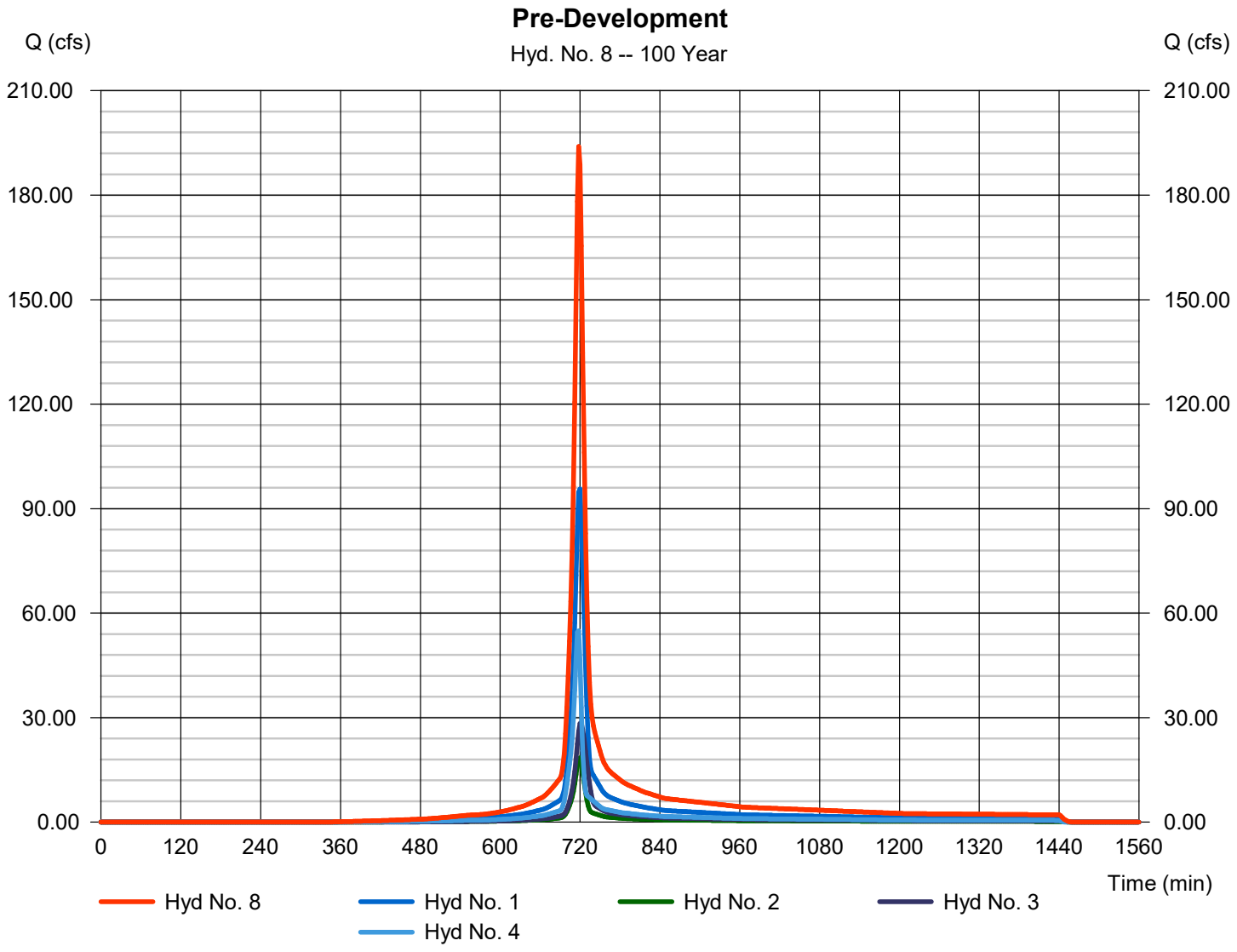


Hydrograph Report

Hyd. No. 8

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 193.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 487,560 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 27.560 ac

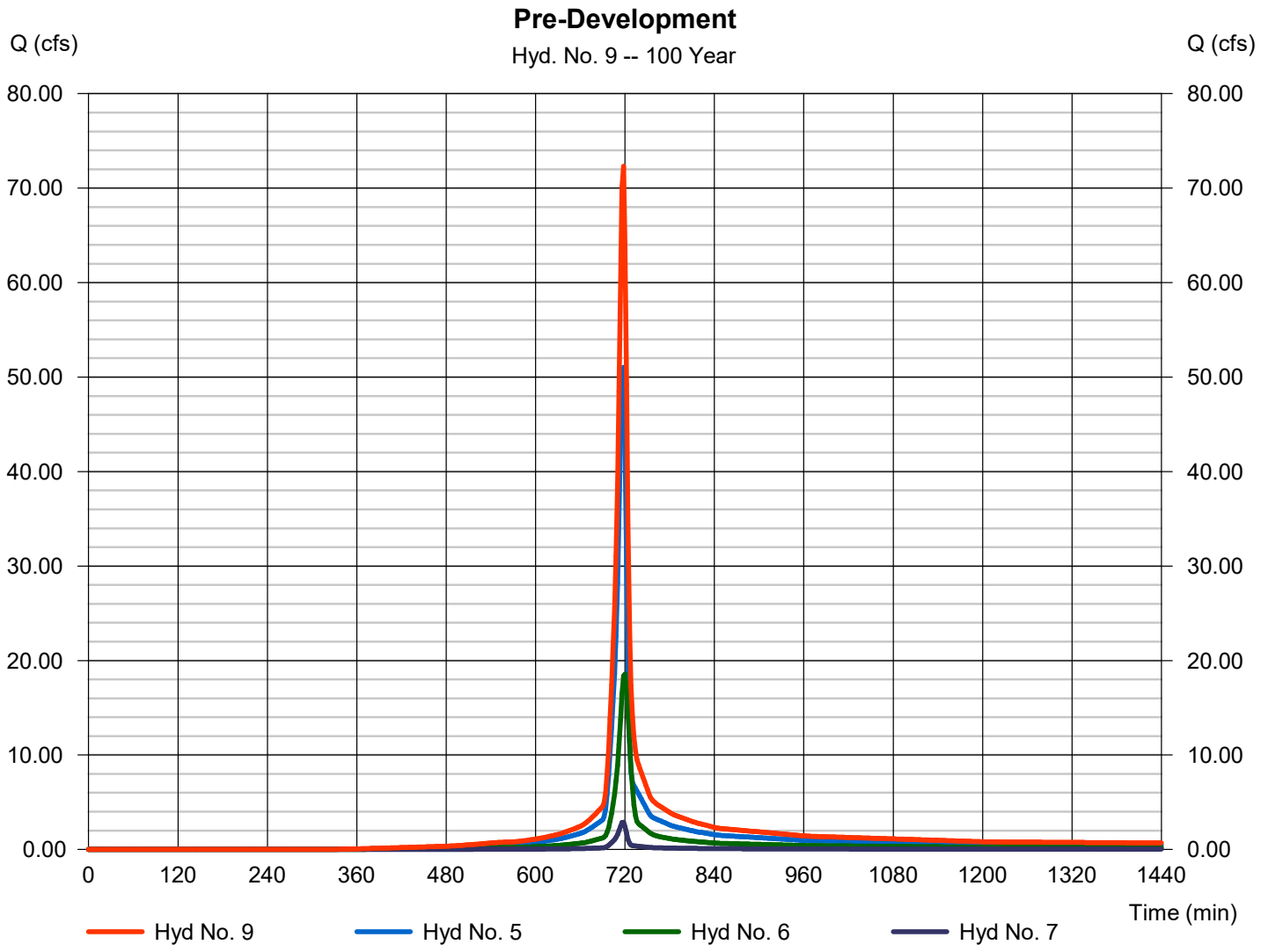


Hydrograph Report

Hyd. No. 9

Pre-Development

Hydrograph type	= Combine	Peak discharge	= 72.30 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 164,252 cuft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 9.330 ac

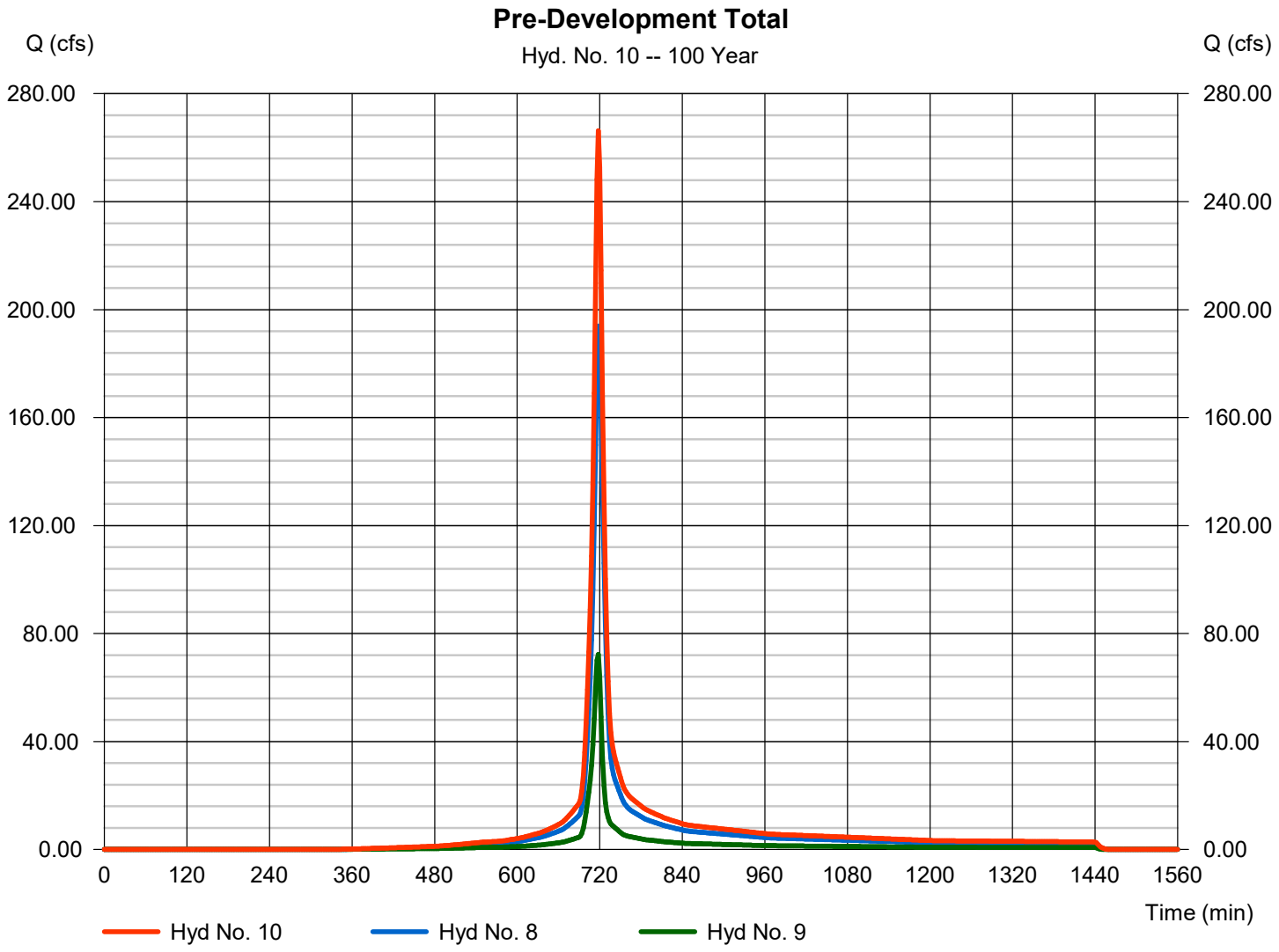


Hydrograph Report

Hyd. No. 10

Pre-Development Total

Hydrograph type	= Combine	Peak discharge	= 266.24 cfs
Storm frequency	= 100 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 651,812 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.000 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	62.1764	12.7000	0.8901	--------
2	71.2172	12.9000	0.8806	--------
3	0.0000	0.0000	0.0000	--------
5	68.4975	12.5000	0.8273	--------
10	73.1091	12.6000	0.8093	--------
25	2164.2561	37.3000	1.4976	--------
50	56.2148	10.1000	0.6951	--------
100	50.1117	8.9000	0.6500	--------

File name: Rolesville.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.82	3.86	3.23	2.79	2.46	2.20	1.99	1.82	1.68	1.56	1.46	1.37
2	5.61	4.52	3.80	3.28	2.90	2.60	2.36	2.16	2.00	1.86	1.74	1.63
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.42	5.21	4.42	3.85	3.42	3.08	2.81	2.59	2.40	2.24	2.10	1.98
10	7.18	5.86	4.99	4.36	3.88	3.51	3.21	2.96	2.75	2.57	2.42	2.28
25	7.94	6.72	5.78	5.04	4.45	3.96	3.56	3.22	2.93	2.68	2.47	2.28
50	8.52	6.98	5.98	5.27	4.74	4.32	3.98	3.70	3.46	3.26	3.08	2.93
100	9.06	7.42	6.37	5.63	5.07	4.64	4.29	4.00	3.75	3.54	3.36	3.20

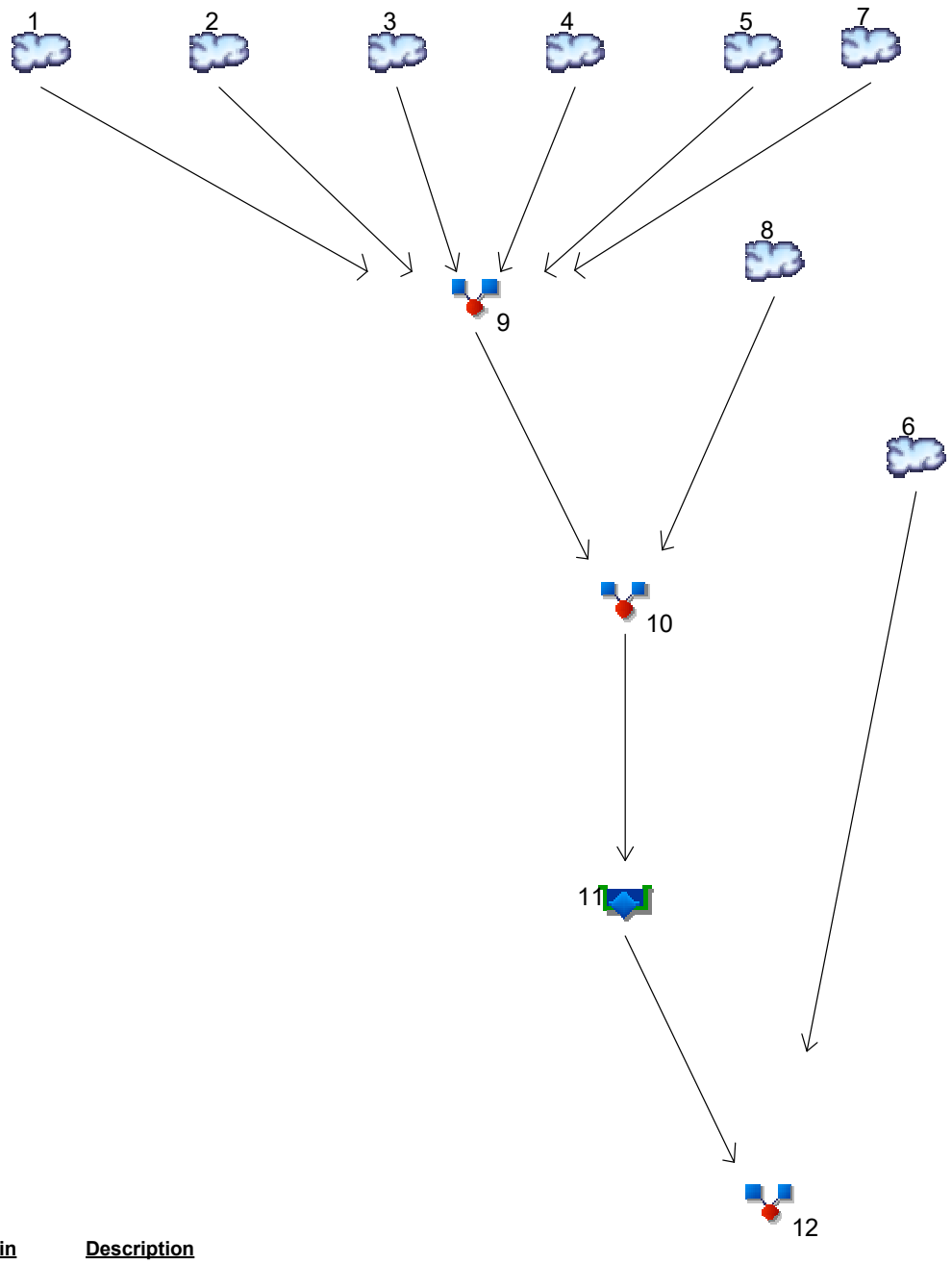
Tc = time in minutes. Values may exceed 60.

Precip. file name: D:\Ark Dropbox\03 - Support\Software\Hydraflow\Rolesville.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.86	3.45	0.00	4.32	5.01	5.94	6.69	7.44
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023



Legend

Hyd.	Origin	Description
1	SCS Runoff	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	Post - New Roadways (Wallbrook/Va Water)
3	SCS Runoff	Post - Boat Tract (Lot 5)
4	SCS Runoff	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	Post - DOT Roadway
6	SCS Runoff	Post - Direct Release
7	SCS Runoff	Post - Lots 3 & 4
8	SCS Runoff	Post - Wallbrook Townhomes
9	Combine	Post-Total
10	Combine	Post-Total with Townhomes
11	Reservoir	Post-Total Route
12	Combine	Post-Development Total

Project: Overall Post-Development.gpw	Thursday, 09 / 21 / 2023

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	------	38.84	47.87	-------	61.08	71.49	85.46	96.69	107.88	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	------	7.199	8.816	-------	11.18	13.05	15.56	17.58	19.59	Post - New Roadways (Wallbrook/Va
3	SCS Runoff	------	16.85	20.91	-------	26.86	31.54	37.82	42.86	47.88	Post - Boat Tract (Lot 5)
4	SCS Runoff	------	24.16	29.78	-------	37.99	44.47	53.16	60.14	67.11	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	------	21.44	26.61	-------	34.17	40.13	48.11	54.52	60.91	Post - DOT Roadway
6	SCS Runoff	------	4.859	6.446	-------	8.827	10.73	13.29	15.36	17.45	Post - Direct Release
7	SCS Runoff	------	8.589	10.59	-------	13.51	15.81	18.90	21.38	23.86	Post - Lots 3 & 4
8	SCS Runoff	------	1.230	1.526	-------	1.960	2.302	2.760	3.128	3.494	Post - Wallbrook Townhomes
9	Combine	1, 2, 3, 4, 5, 7, 8, 9	117.08	144.57	-------	184.80	216.49	259.01	293.16	327.23	Post-Total
10	Combine		118.31	146.10	-------	186.76	218.80	261.77	296.29	330.72	Post-Total with Townhomes
11	Reservoir	10	42.22	58.93	-------	72.73	80.89	89.79	95.91	101.43	Post-Total Route
12	Combine	6, 11	44.09	62.28	-------	77.50	86.96	97.45	104.79	111.72	Post-Development Total

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	38.84	2	716	88,597	------	------	------	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	7.199	2	716	16,704	------	------	------	Post - New Roadways (Wallbrook/Va
3	SCS Runoff	16.85	2	716	37,900	------	------	------	Post - Boat Tract (Lot 5)
4	SCS Runoff	24.16	2	716	55,109	------	------	------	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	21.44	2	716	48,216	------	------	------	Post - DOT Roadway
6	SCS Runoff	4.859	2	718	10,130	------	------	------	Post - Direct Release
7	SCS Runoff	8.589	2	716	19,593	------	------	------	Post - Lots 3 & 4
8	SCS Runoff	1.230	2	716	2,766	------	------	------	Post - Wallbrook Townhomes
9	Combine	117.08	2	716	266,119	1, 2, 3, 4, 5, 7,	------	------	Post-Total
10	Combine	118.31	2	716	268,885	8, 9	------	------	Post-Total with Townhomes
11	Reservoir	42.22	2	724	263,336	10	364.61	138,900	Post-Total Route
12	Combine	44.09	2	724	273,466	6, 11	------	------	Post-Development Total

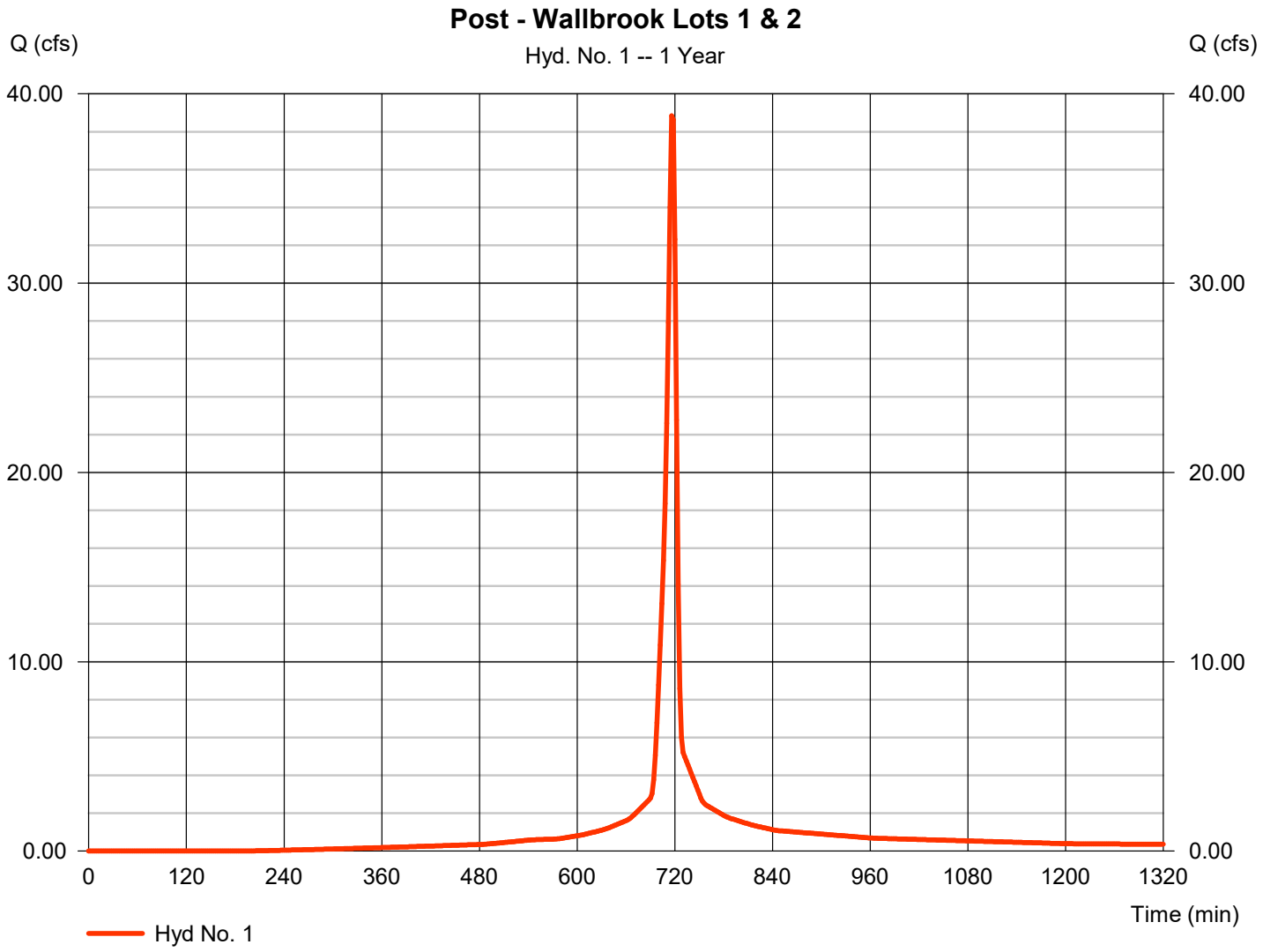
Hydrograph Report

Hyd. No. 1

Post - Wallbrook Lots 1 & 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.84 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	88,597 cuft
Drainage area	=	11.350 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.86 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.790 x 98) + (6.260 x 98) + (1.990 x 80) + (0.270 x 98) + (0.890 x 98) + (0.150 x 80)] / 11.350



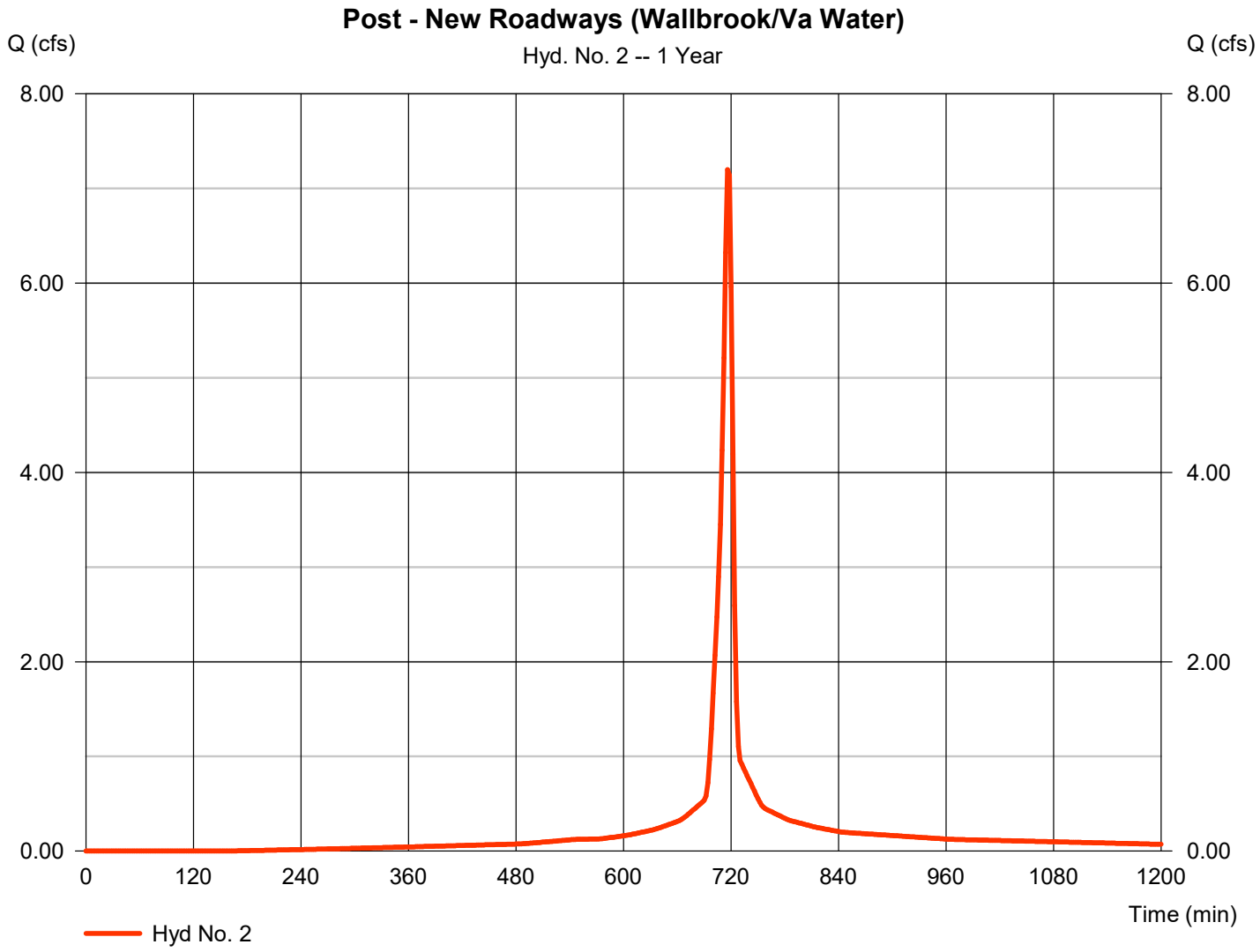
Hydrograph Report

Hyd. No. 2

Post - New Roadways (Wallbrook/Va Water)

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.199 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	16,704 cuft
Drainage area	=	2.050 ac	Curve number	=	96*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.86 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.820 x 98) + (0.230 x 80)] / 2.050



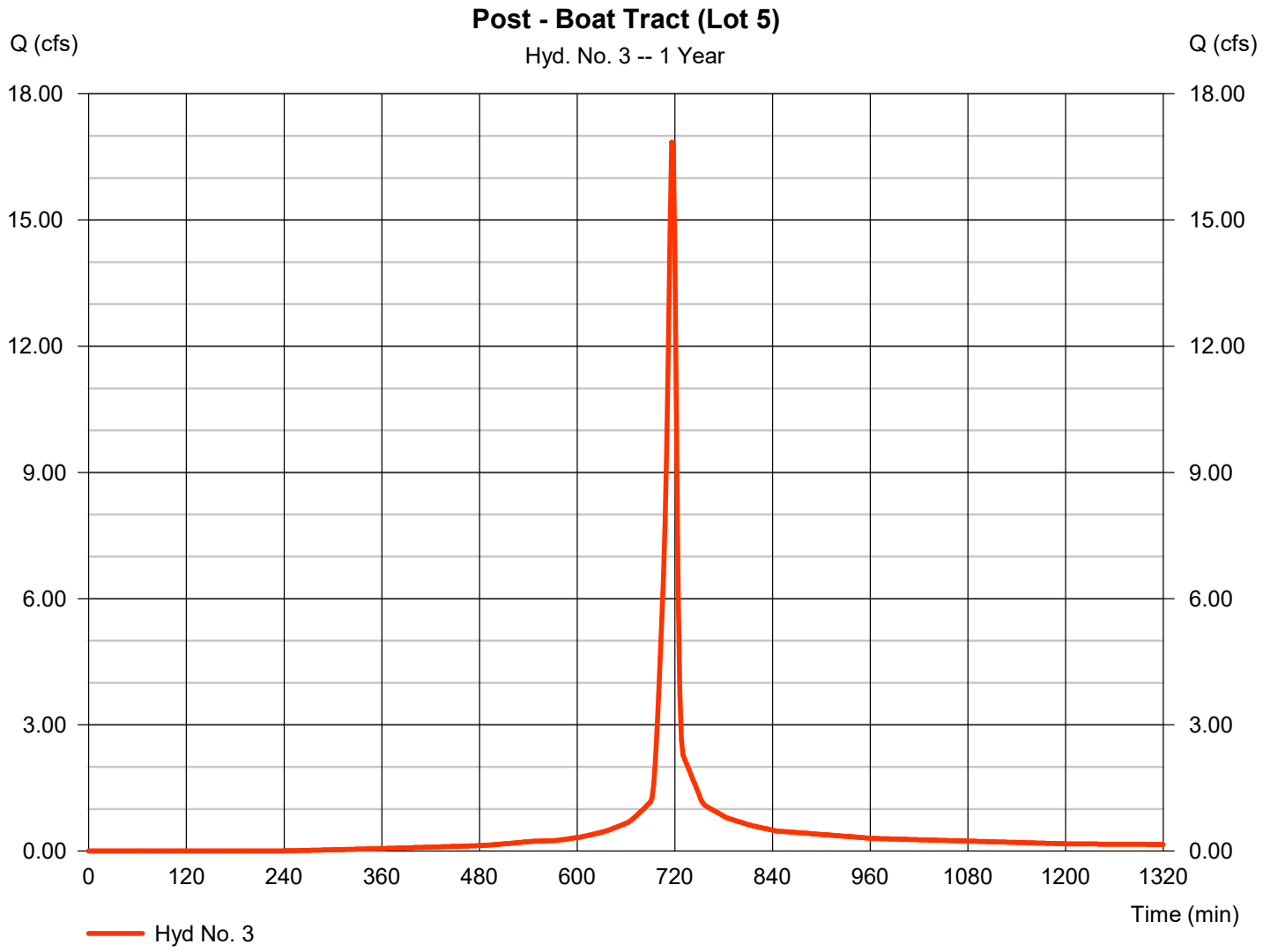
Hydrograph Report

Hyd. No. 3

Post - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 16.85 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 37,900 cuft
Drainage area	= 5.070 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.860 x 98) + (3.450 x 98) + (0.760 x 74)] / 5.070



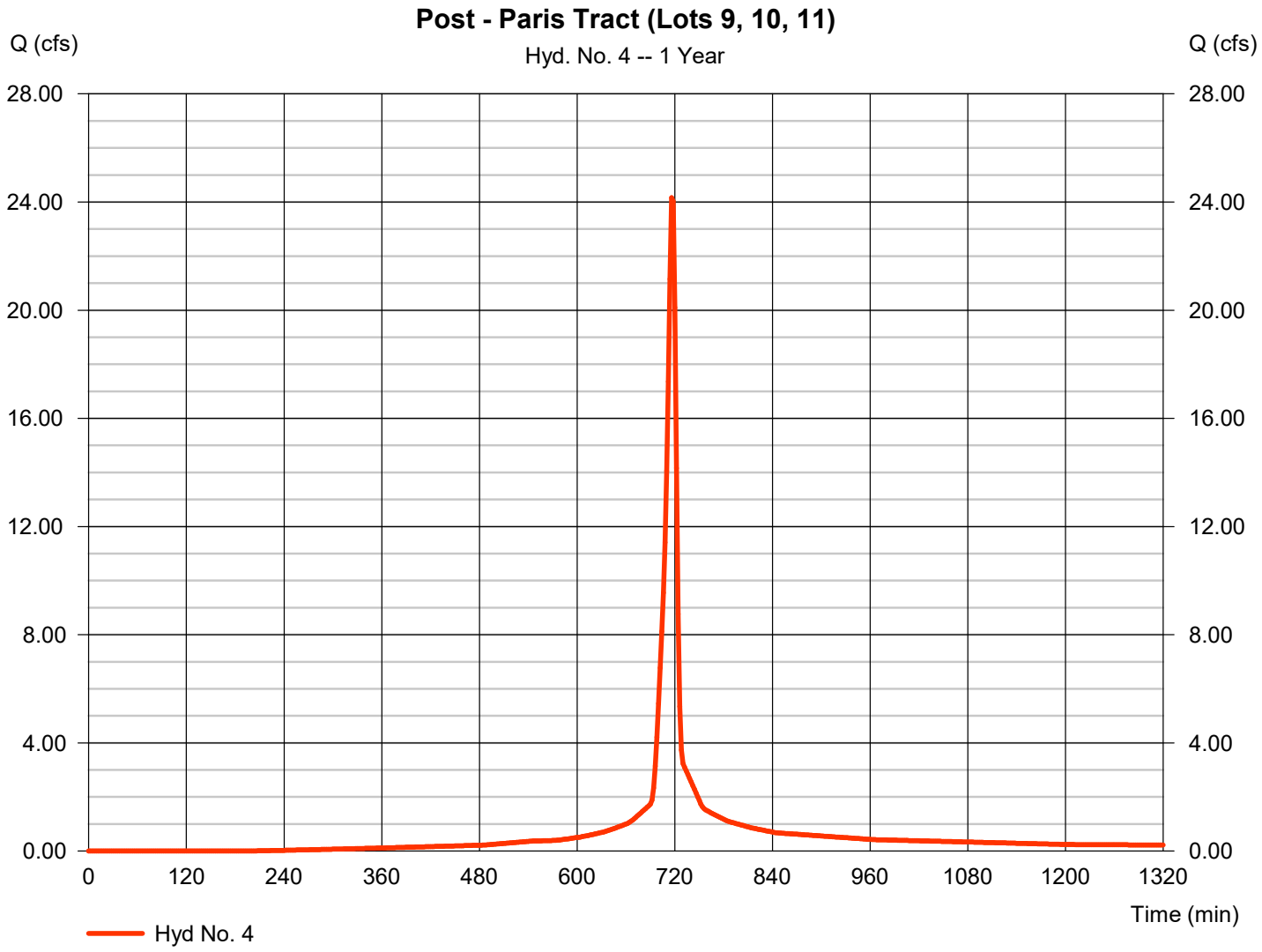
Hydrograph Report

Hyd. No. 4

Post - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 24.16 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 55,109 cuft
Drainage area	= 7.060 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.200 x 98) + (4.800 x 98) + (1.060 x 80)] / 7.060



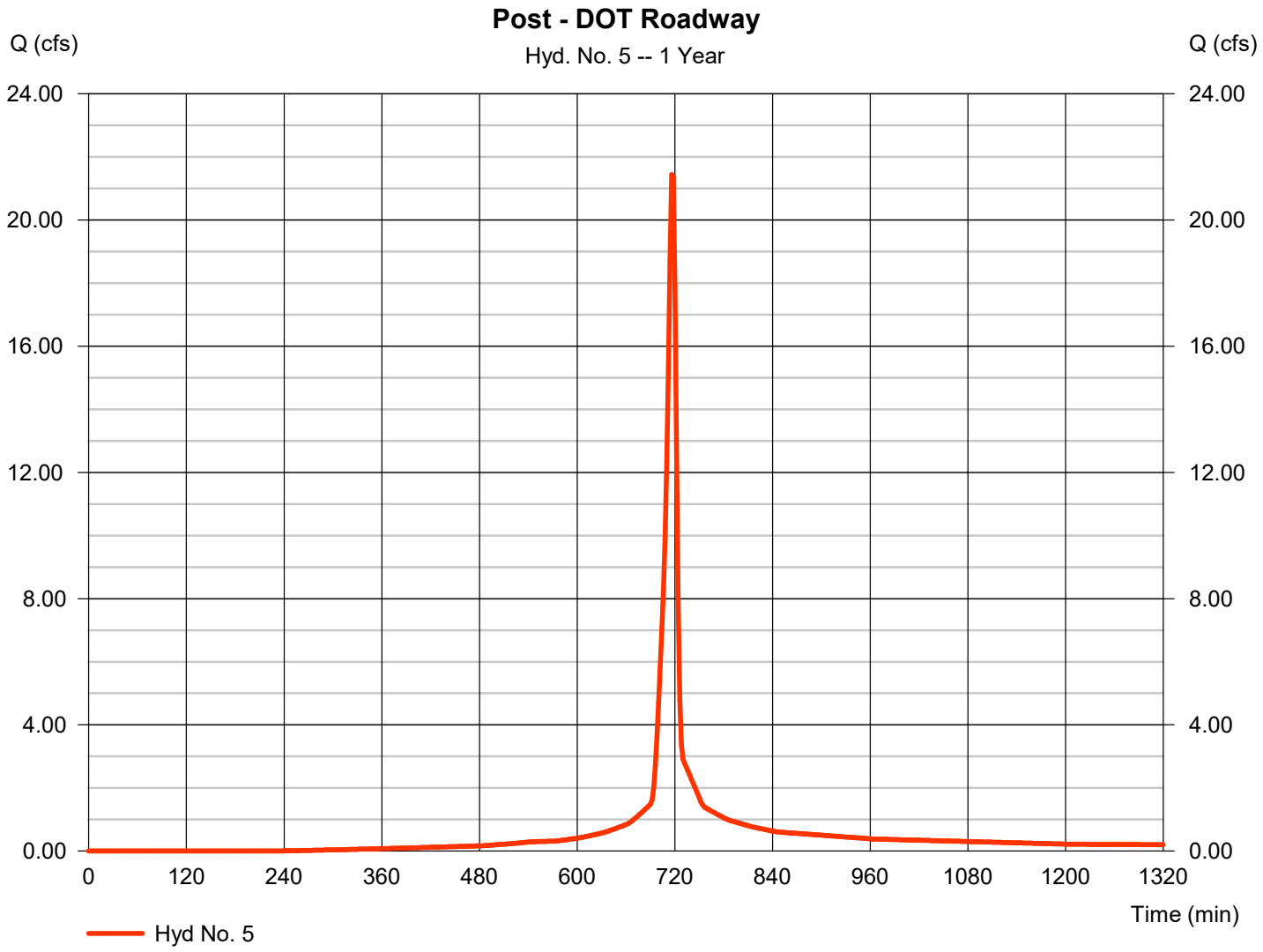
Hydrograph Report

Hyd. No. 5

Post - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 21.44 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 48,216 cuft
Drainage area	= 6.450 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(4.960 x 98) + (1.490 x 80)] / 6.450



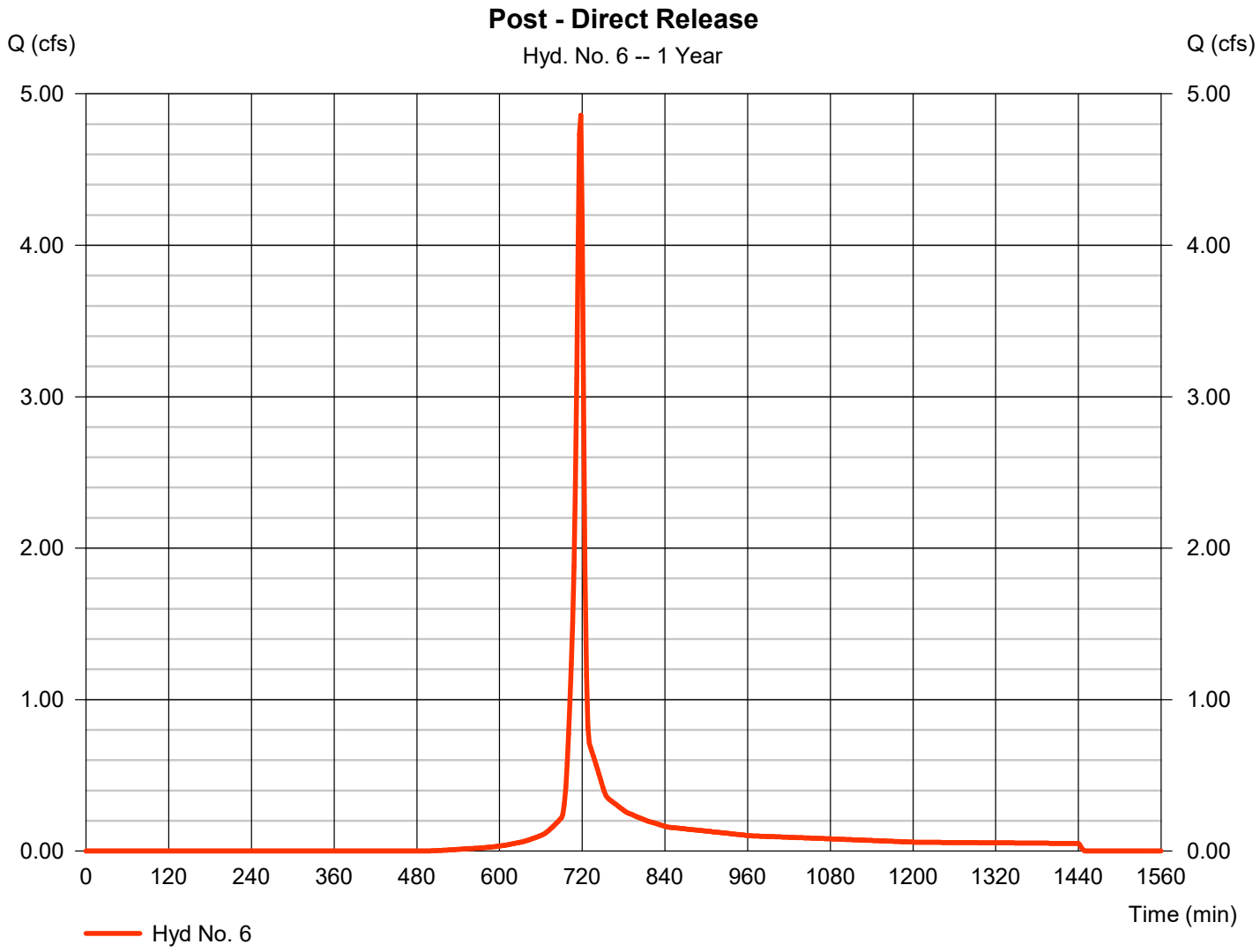
Hydrograph Report

Hyd. No. 6

Post - Direct Release

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.859 cfs
Storm frequency	=	1 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	10,130 cuft
Drainage area	=	2.040 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.86 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.480 x 80) + (0.560 x 98)] / 2.040



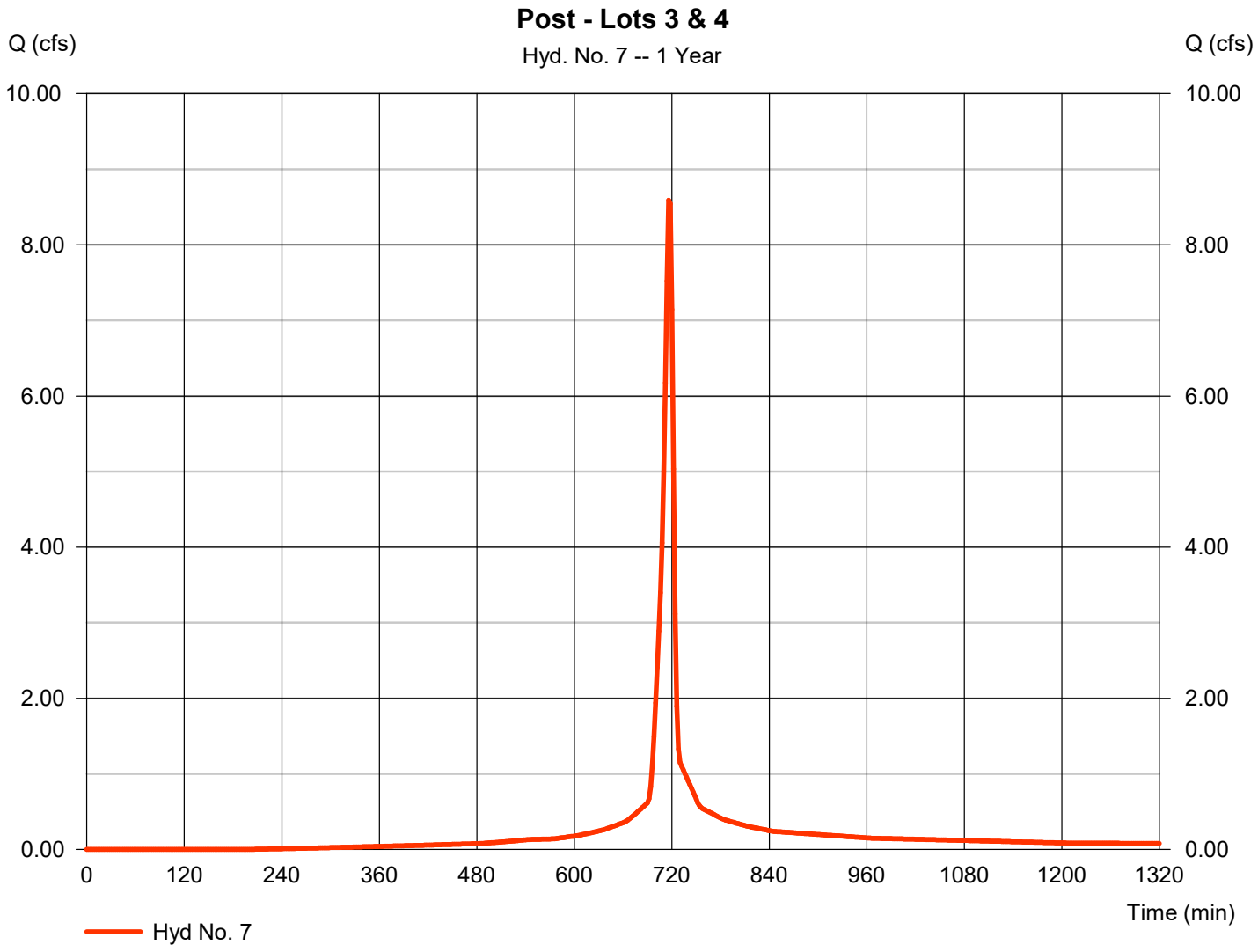
Hydrograph Report

Hyd. No. 7

Post - Lots 3 & 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.589 cfs
Storm frequency	=	1 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	19,593 cuft
Drainage area	=	2.510 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	2.86 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(0.320 x 98) + (1.810 x 98) + (0.380 x 80)] / 2.510



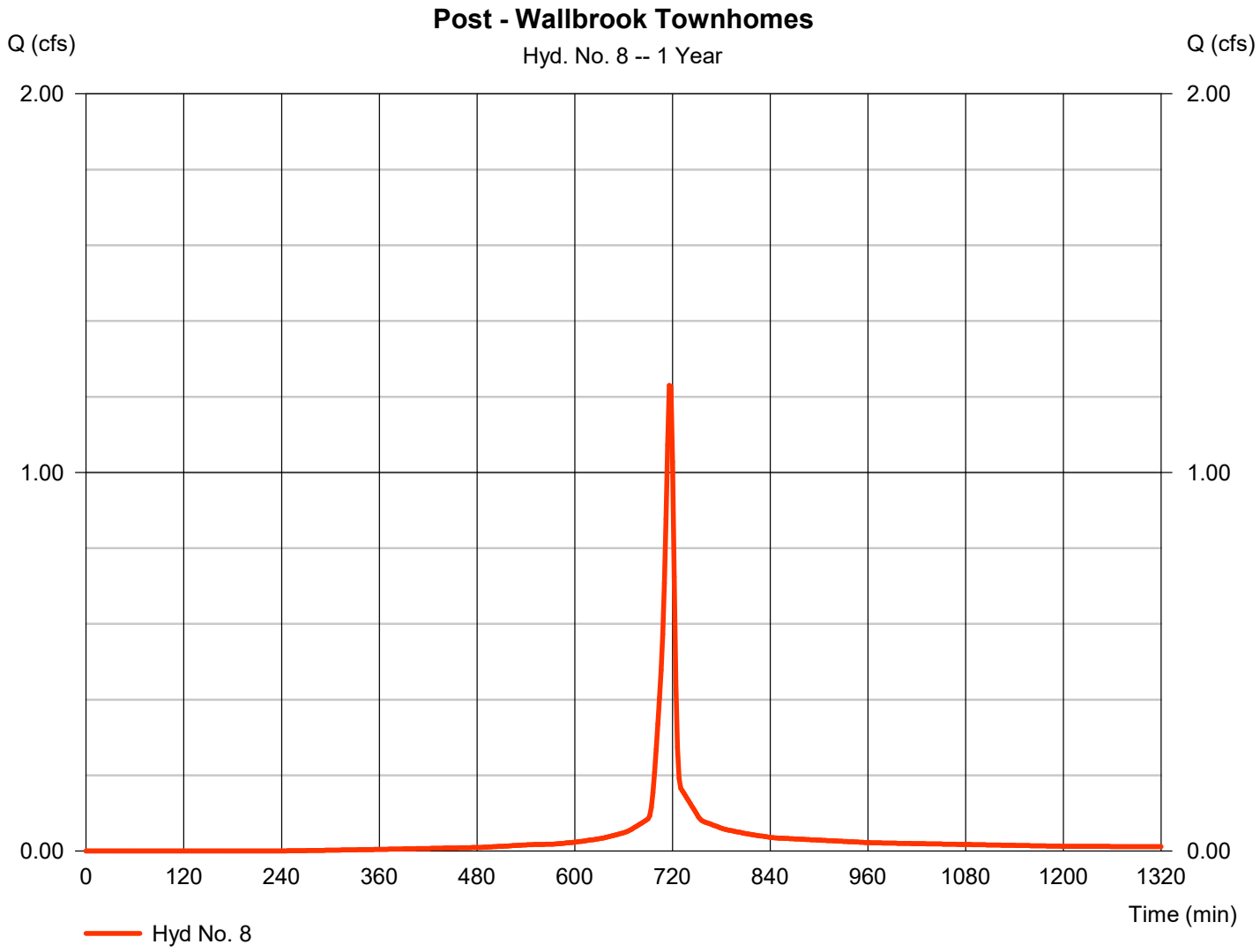
Hydrograph Report

Hyd. No. 8

Post - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 1.230 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 2,766 cuft
Drainage area	= 0.370 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.280 x 98) + (0.090 x 80)] / 0.370

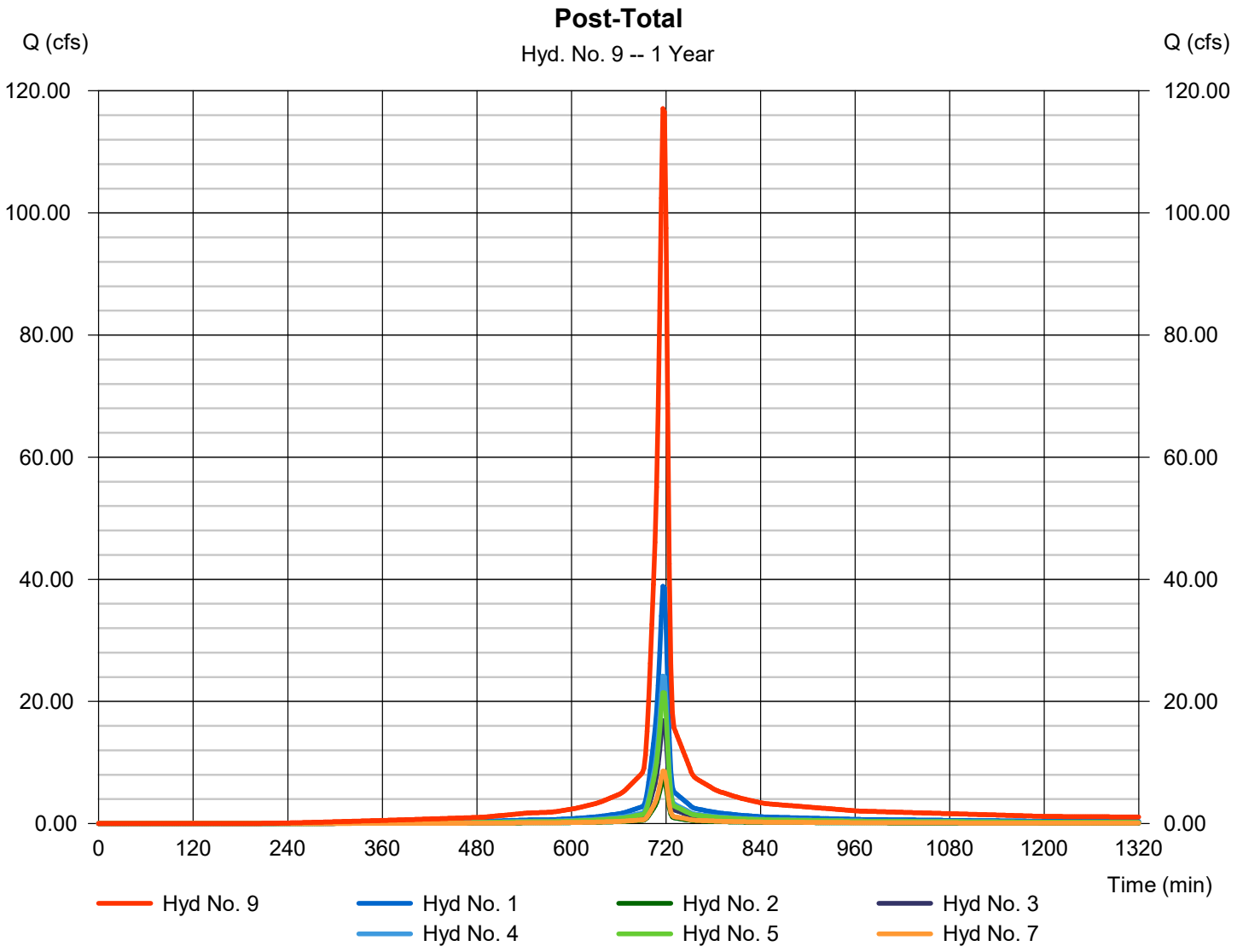


Hydrograph Report

Hyd. No. 9

Post-Total

Hydrograph type	= Combine	Peak discharge	= 117.08 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 266,119 cuft
Inflow hyds.	= 1, 2, 3, 4, 5, 7	Contrib. drain. area	= 34.490 ac

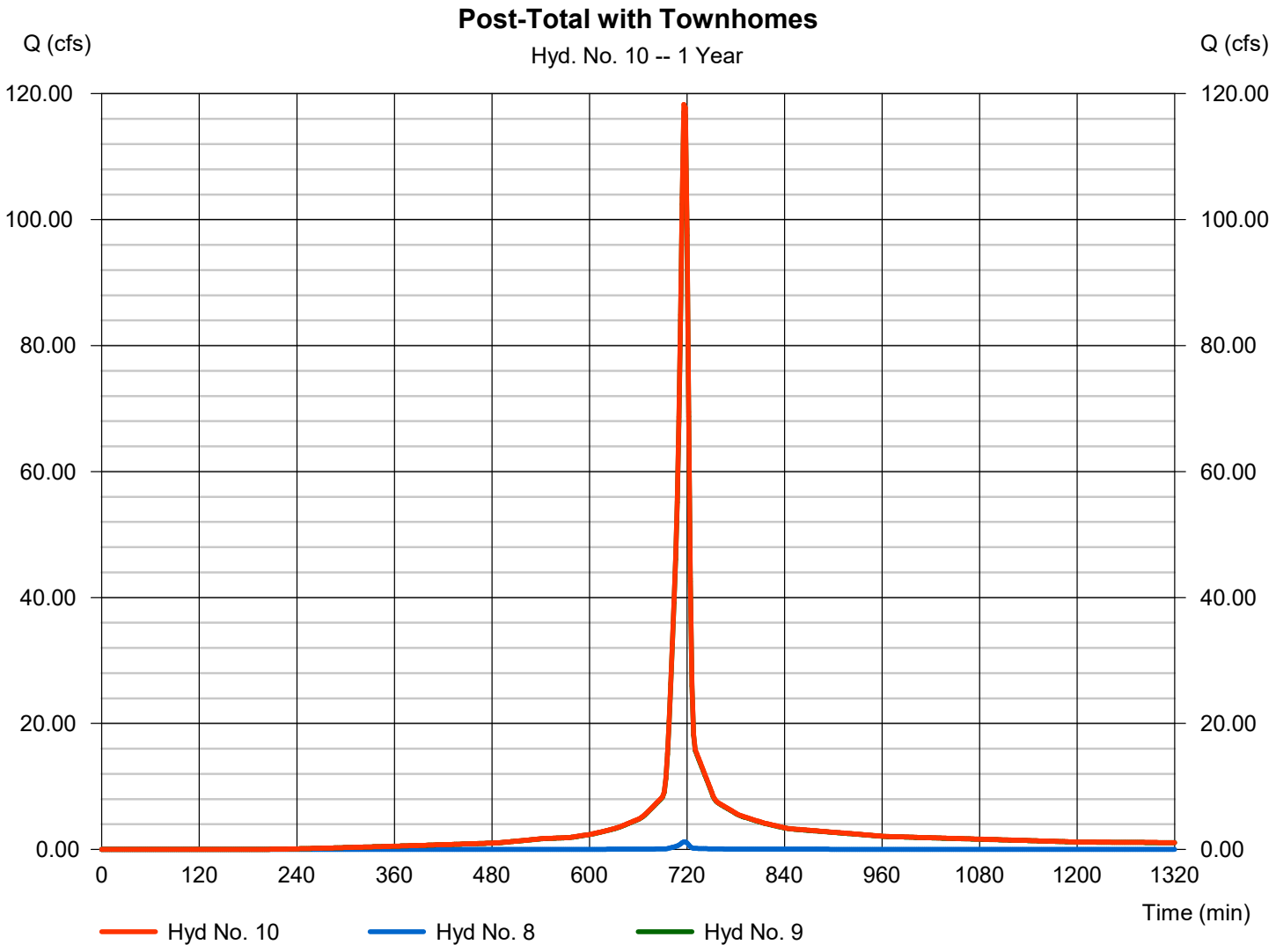


Hydrograph Report

Hyd. No. 10

Post-Total with Townhomes

Hydrograph type	= Combine	Peak discharge	= 118.31 cfs
Storm frequency	= 1 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 268,885 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.370 ac



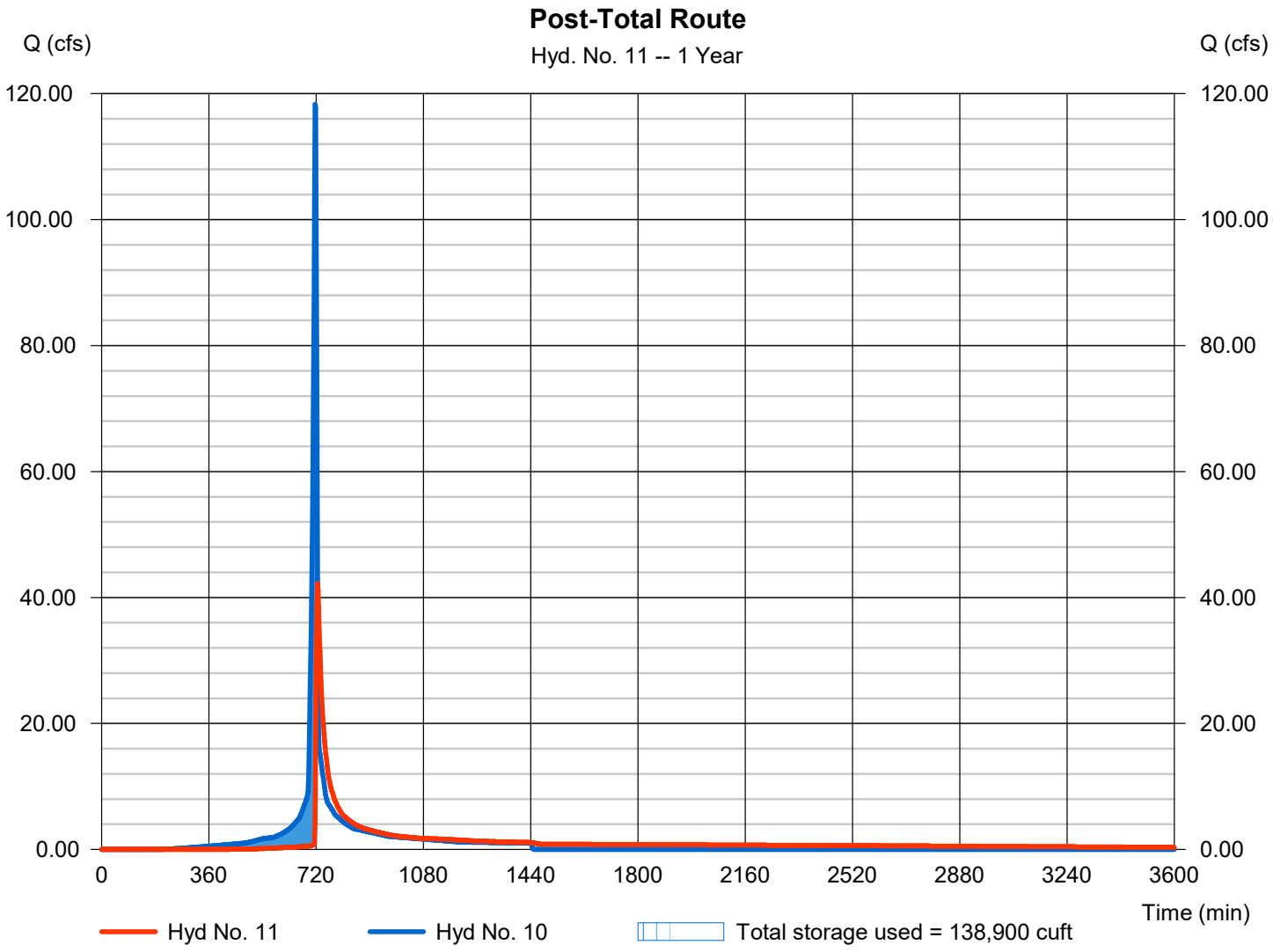
Hydrograph Report

Hyd. No. 11

Post-Total Route

Hydrograph type	= Reservoir	Peak discharge	= 42.22 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 263,336 cuft
Inflow hyd. No.	= 10 - Post-Total with Townhomes	Max. Elevation	= 364.61 ft
Reservoir name	= Wet Pond 1	Max. Storage	= 138,900 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Wet Pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 362.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	362.00	42,672	0	0
1.00	363.00	55,150	48,773	48,773
2.00	364.00	56,091	55,614	104,387
3.00	365.00	57,040	56,559	160,946
4.00	366.00	57,500	57,264	218,211
5.00	367.00	57,700	57,594	275,805
6.00	368.00	57,900	57,794	333,599
7.00	369.00	58,100	57,994	391,593

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	5.00	0.00	0.00
Span (in)	= 30.00	5.00	0.00	0.00
No. Barrels	= 2	1	0	0
Invert El. (ft)	= 362.00	362.00	0.00	0.00
Length (ft)	= 124.00	2.00	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	No	No

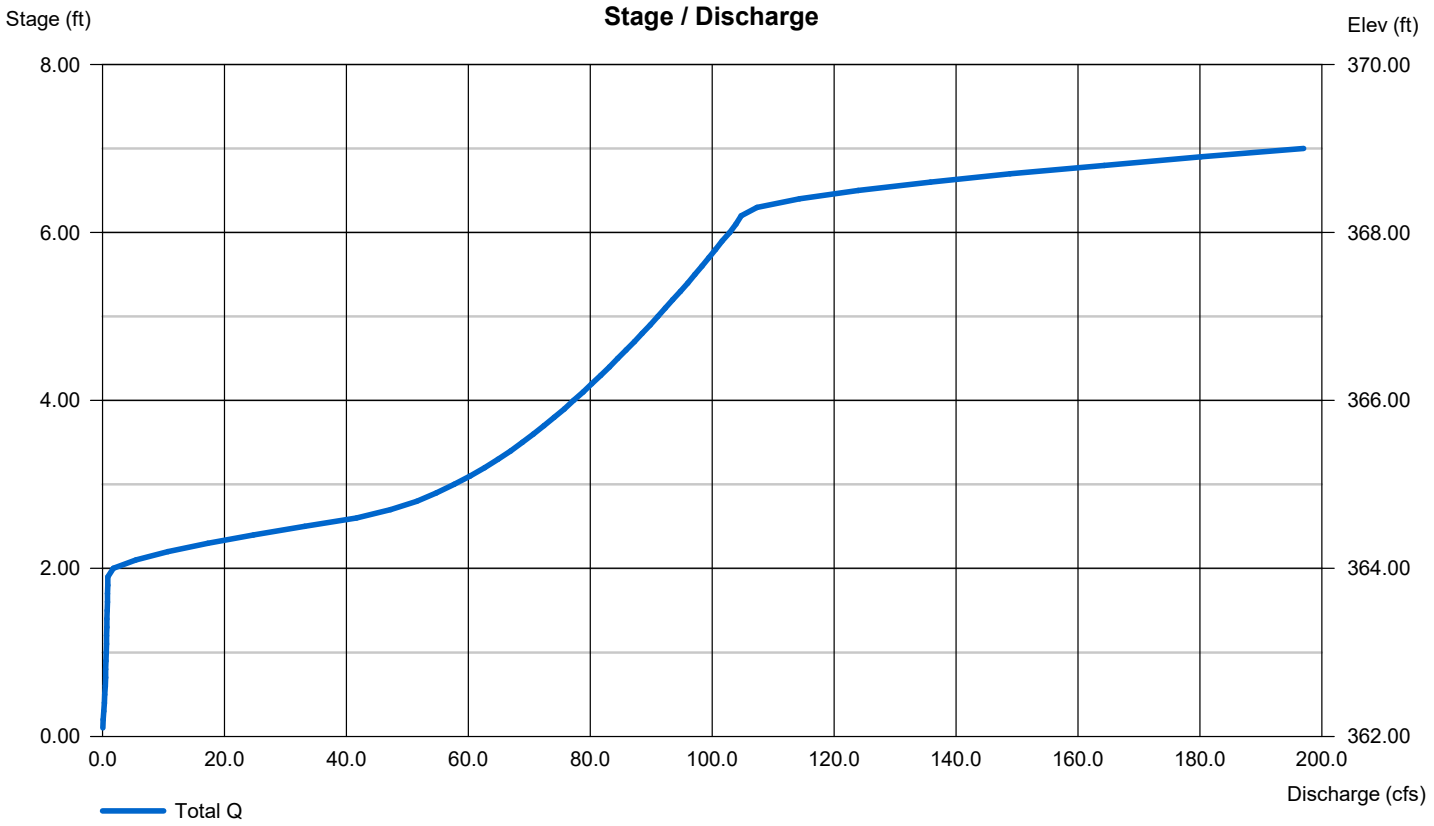
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 35.33	24.00	0.00	50.00
Crest El. (ft)	= 367.00	363.95	0.00	368.25
Weir Coeff.	= 3.33	3.33	3.33	2.60
Weir Type	= 1	Rect	---	Broad
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Contour)

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).

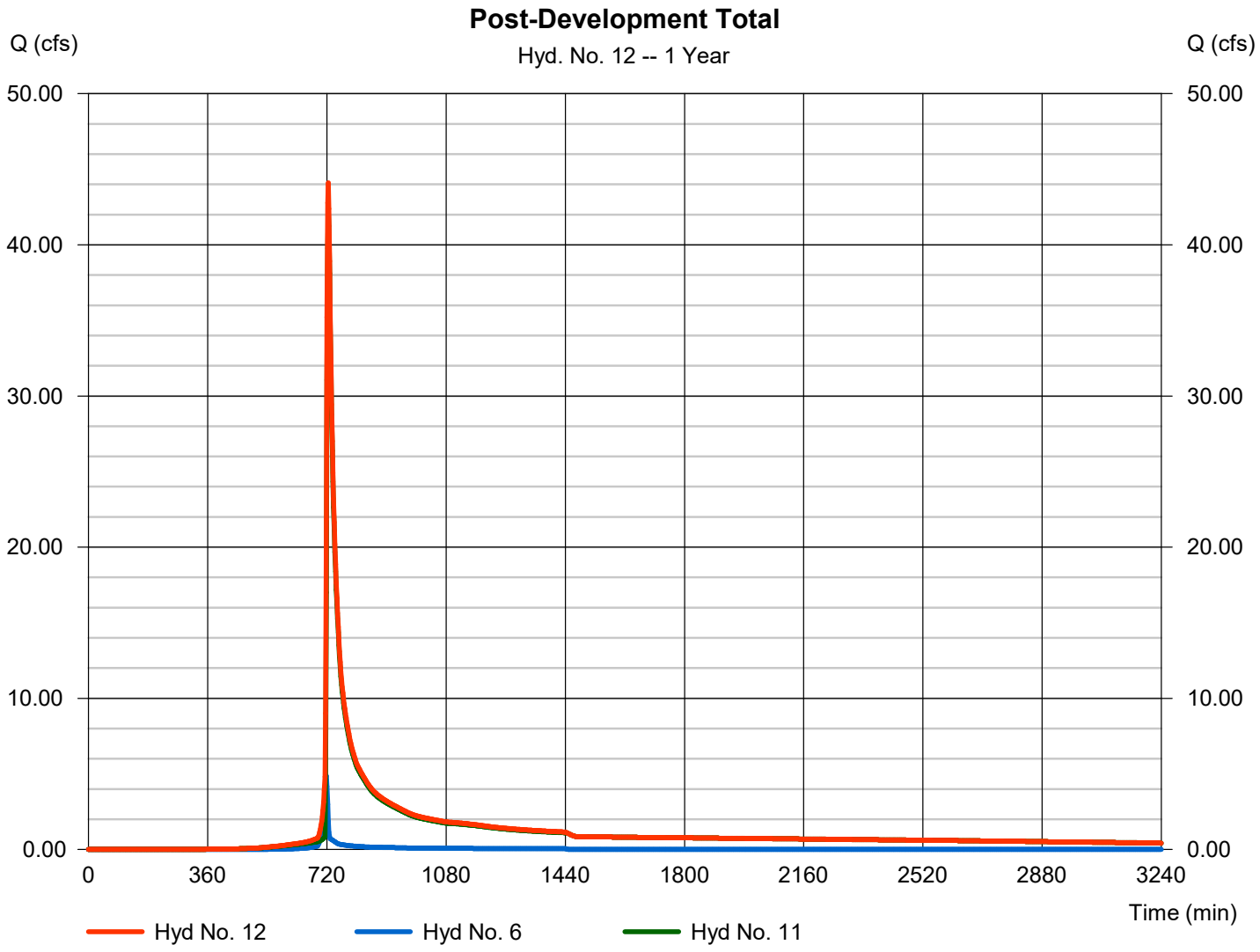


Hydrograph Report

Hyd. No. 12

Post-Development Total

Hydrograph type	= Combine	Peak discharge	= 44.09 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 273,466 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 2.040 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	47.87	2	716	110,704	------	------	------	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	8.816	2	716	20,728	------	------	------	Post - New Roadways (Wallbrook/Va
3	SCS Runoff	20.91	2	716	47,688	------	------	------	Post - Boat Tract (Lot 5)
4	SCS Runoff	29.78	2	716	68,861	------	------	------	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	26.61	2	716	60,668	------	------	------	Post - DOT Roadway
6	SCS Runoff	6.446	2	718	13,583	------	------	------	Post - Direct Release
7	SCS Runoff	10.59	2	716	24,482	------	------	------	Post - Lots 3 & 4
8	SCS Runoff	1.526	2	716	3,480	------	------	------	Post - Wallbrook Townhomes
9	Combine	144.57	2	716	333,130	1, 2, 3, 4, 5, 7, 8, 9	------	------	Post-Total
10	Combine	146.10	2	716	336,610		------	------	Post-Total with Townhomes
11	Reservoir	58.93	2	724	331,017	10	365.05	163,707	Post-Total Route
12	Combine	62.28	2	722	344,601	6, 11	------	------	Post-Development Total

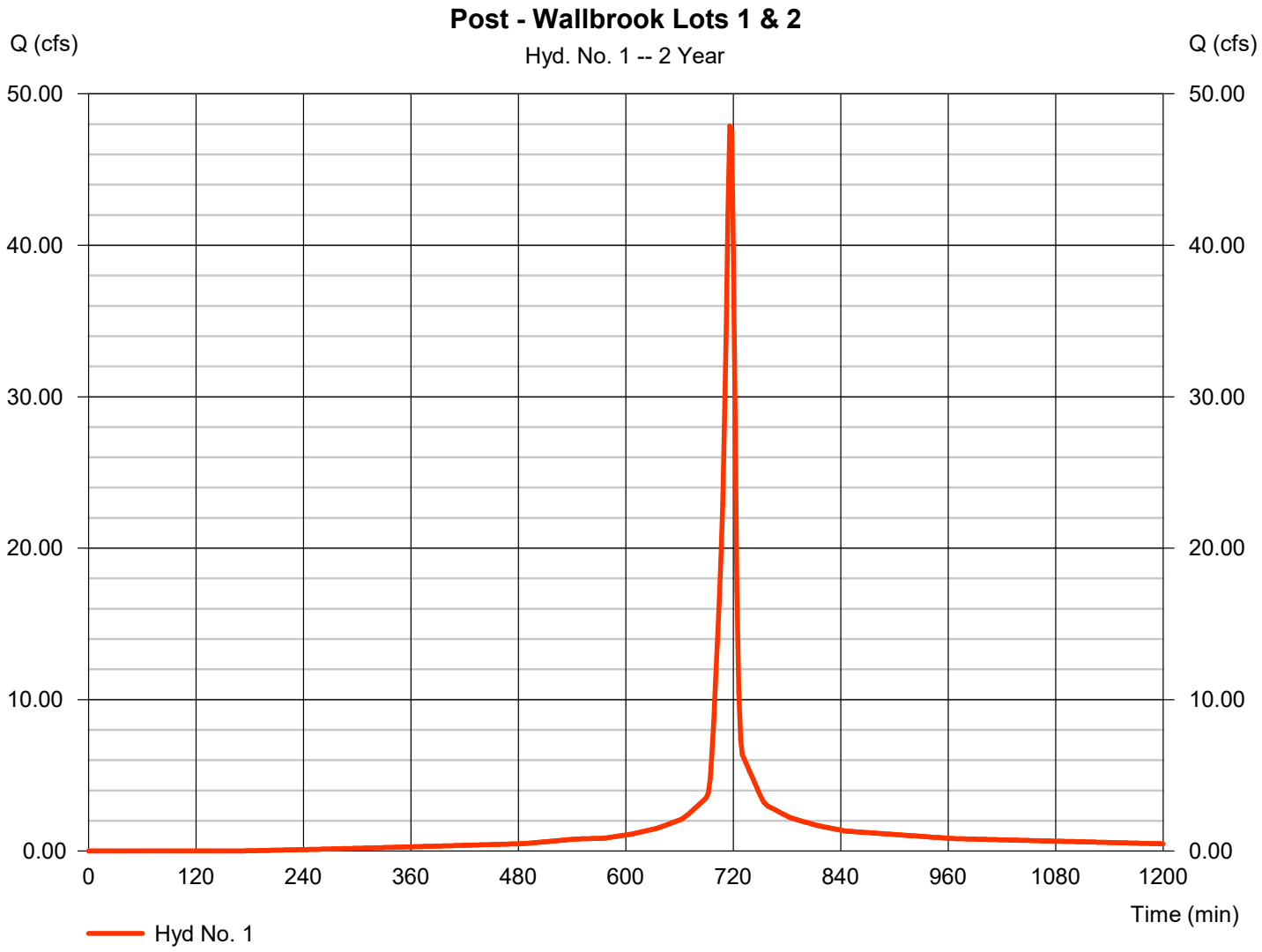
Hydrograph Report

Hyd. No. 1

Post - Wallbrook Lots 1 & 2

Hydrograph type	= SCS Runoff	Peak discharge	= 47.87 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 110,704 cuft
Drainage area	= 11.350 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.790 x 98) + (6.260 x 98) + (1.990 x 80) + (0.270 x 98) + (0.890 x 98) + (0.150 x 80)] / 11.350



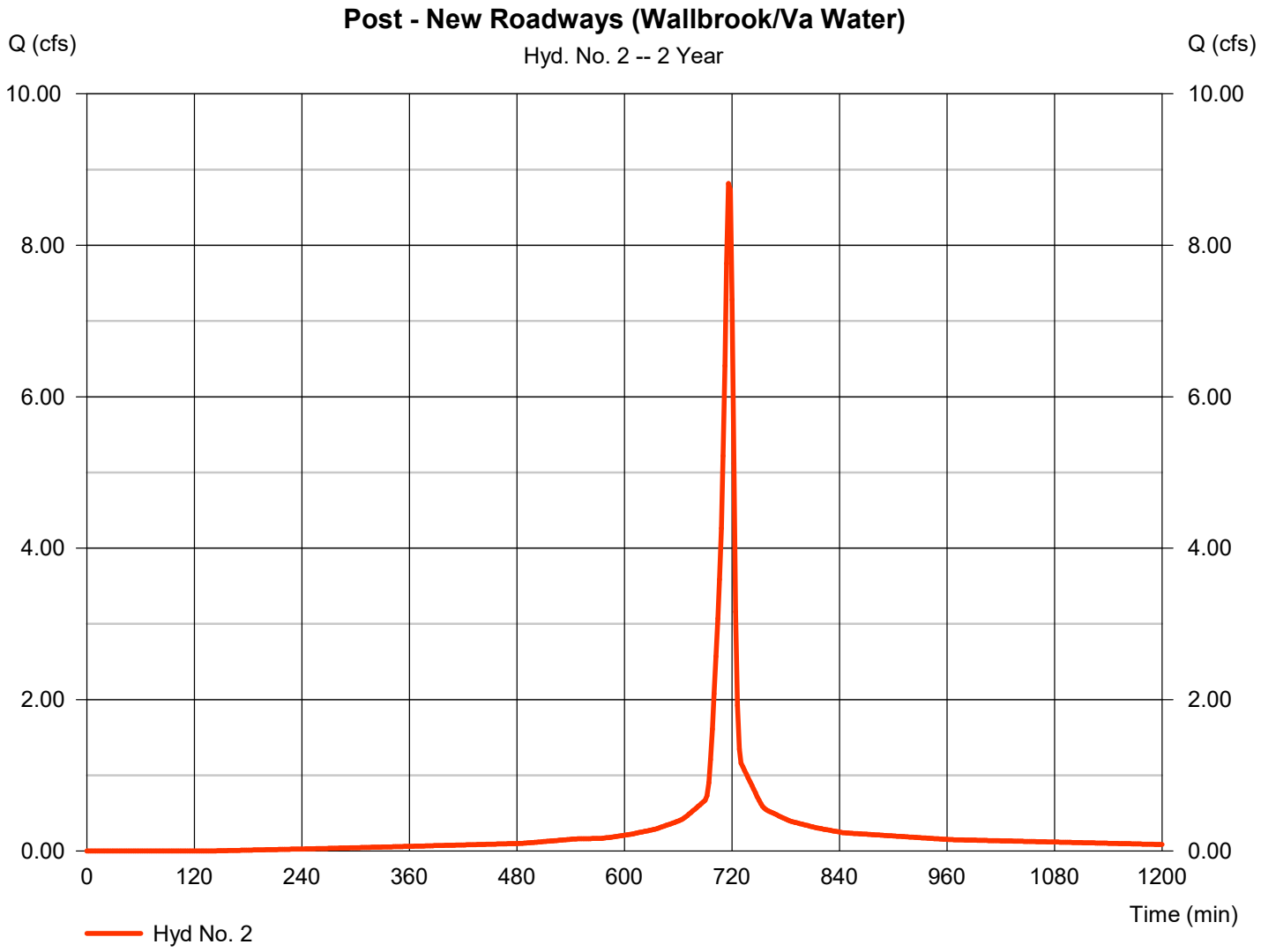
Hydrograph Report

Hyd. No. 2

Post - New Roadways (Wallbrook/Va Water)

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.816 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	20,728 cuft
Drainage area	=	2.050 ac	Curve number	=	96*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.820 x 98) + (0.230 x 80)] / 2.050



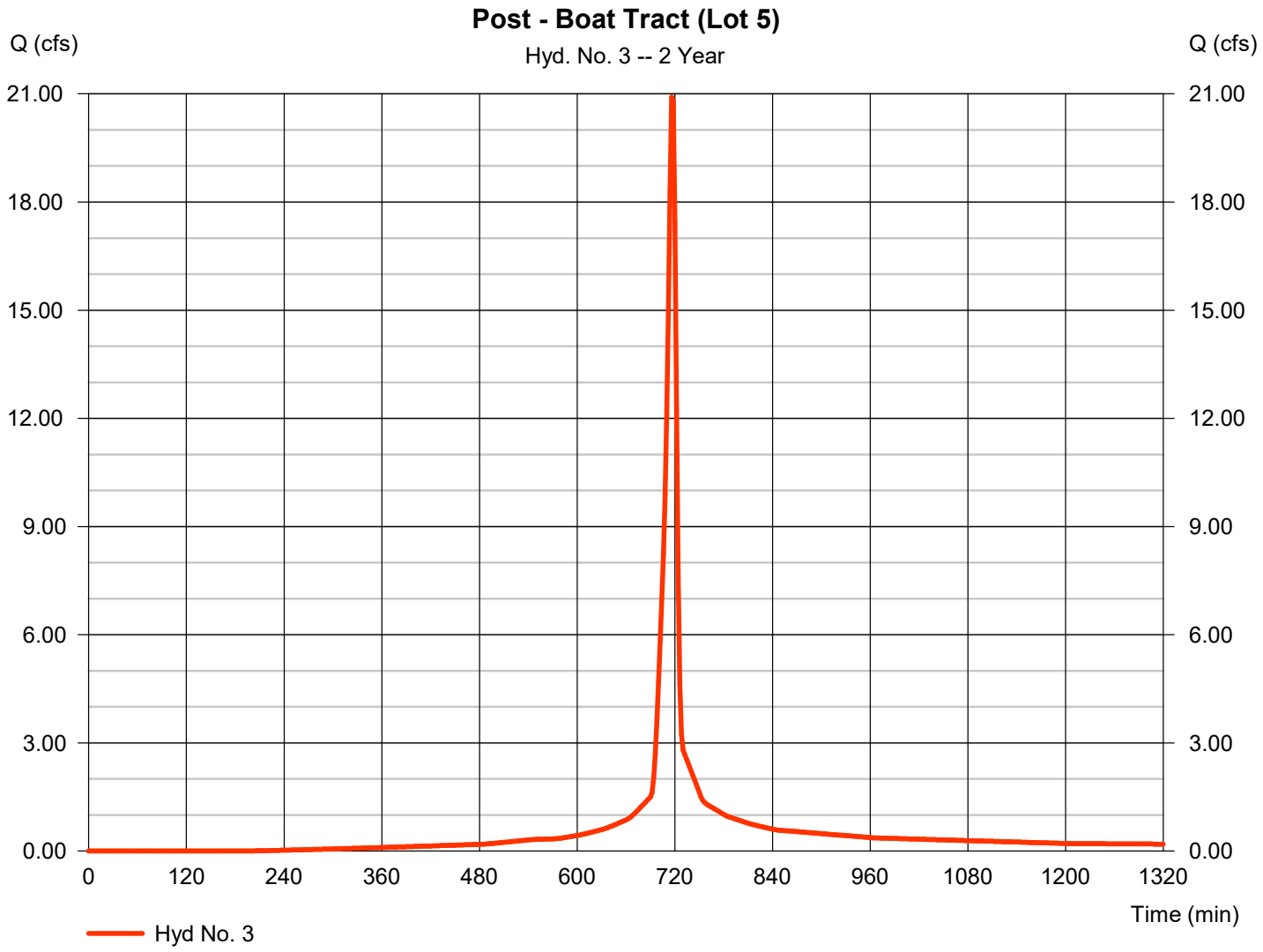
Hydrograph Report

Hyd. No. 3

Post - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 20.91 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 47,688 cuft
Drainage area	= 5.070 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.860 x 98) + (3.450 x 98) + (0.760 x 74)] / 5.070



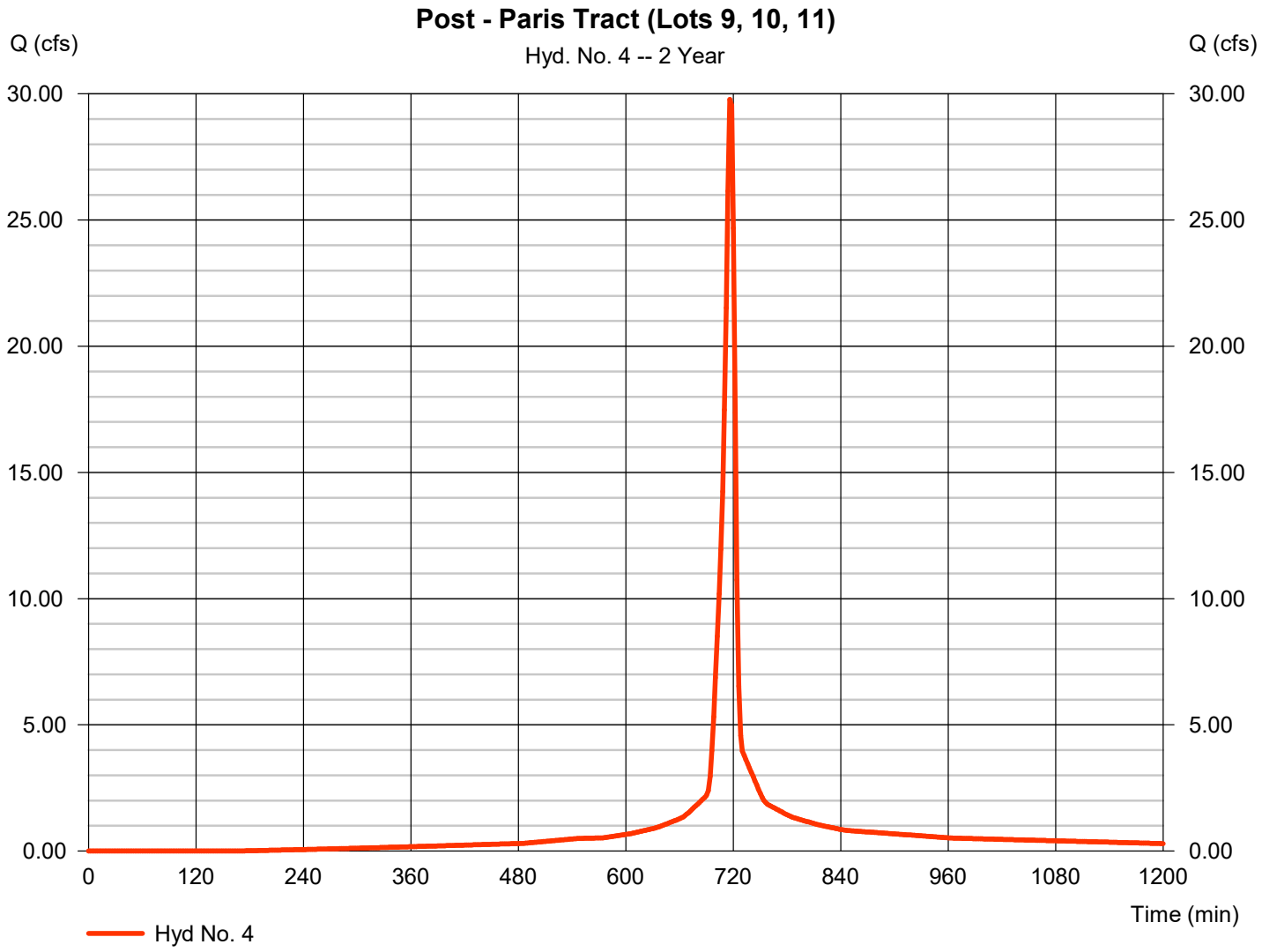
Hydrograph Report

Hyd. No. 4

Post - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 29.78 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 68,861 cuft
Drainage area	= 7.060 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.200 x 98) + (4.800 x 98) + (1.060 x 80)] / 7.060



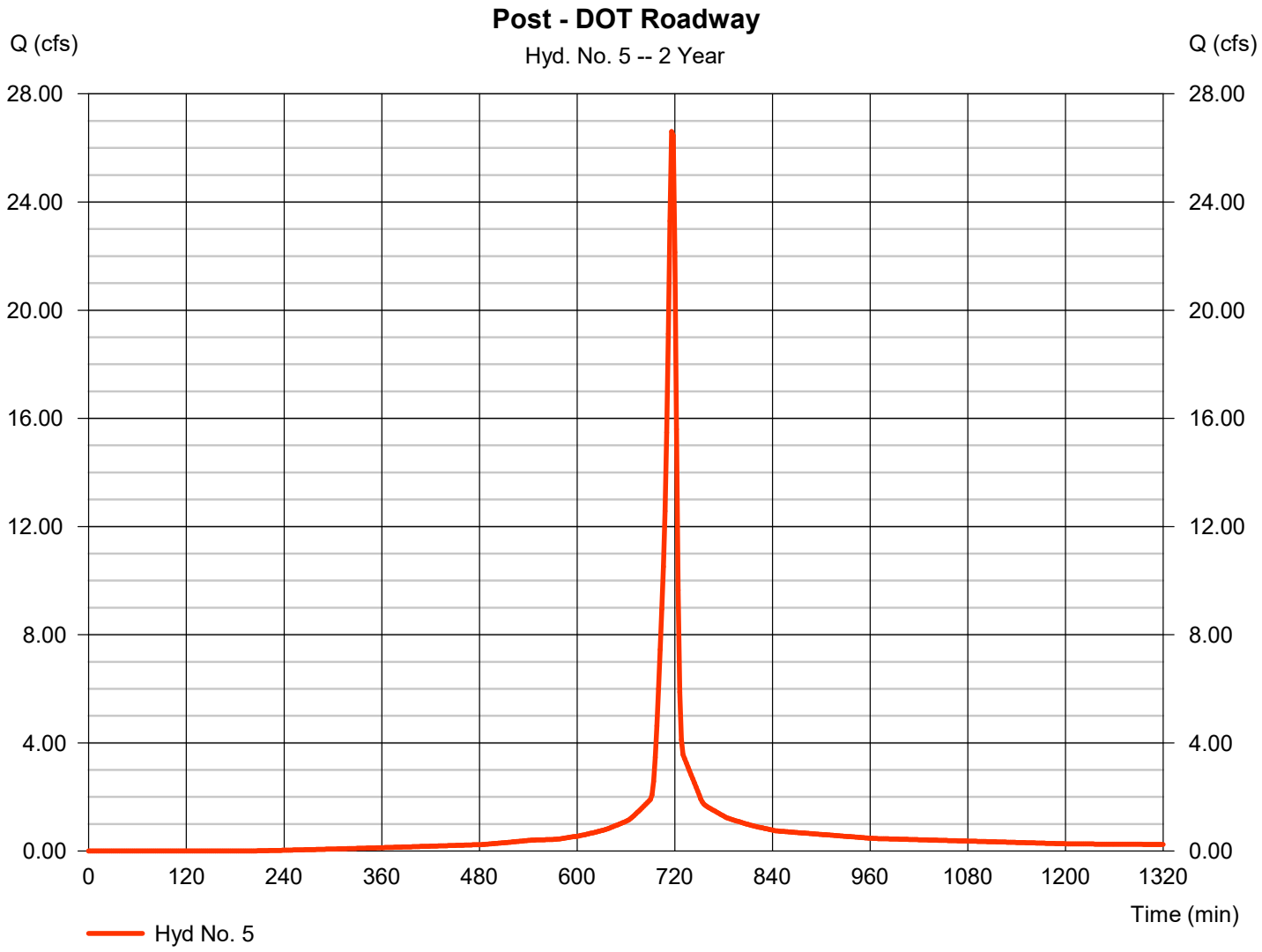
Hydrograph Report

Hyd. No. 5

Post - DOT Roadway

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.61 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	60,668 cuft
Drainage area	=	6.450 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(4.960 x 98) + (1.490 x 80)] / 6.450



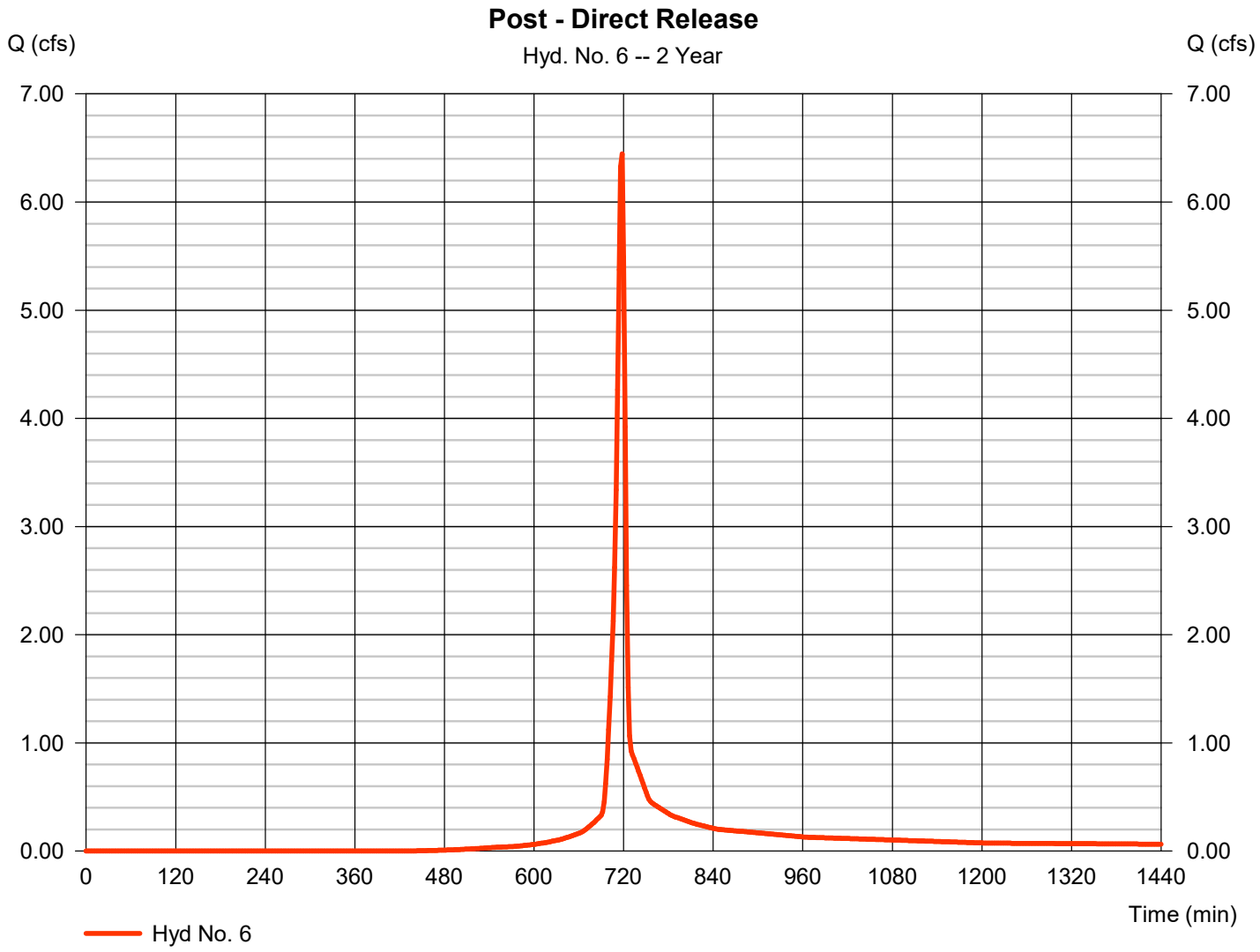
Hydrograph Report

Hyd. No. 6

Post - Direct Release

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.446 cfs
Storm frequency	=	2 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	13,583 cuft
Drainage area	=	2.040 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.480 x 80) + (0.560 x 98)] / 2.040



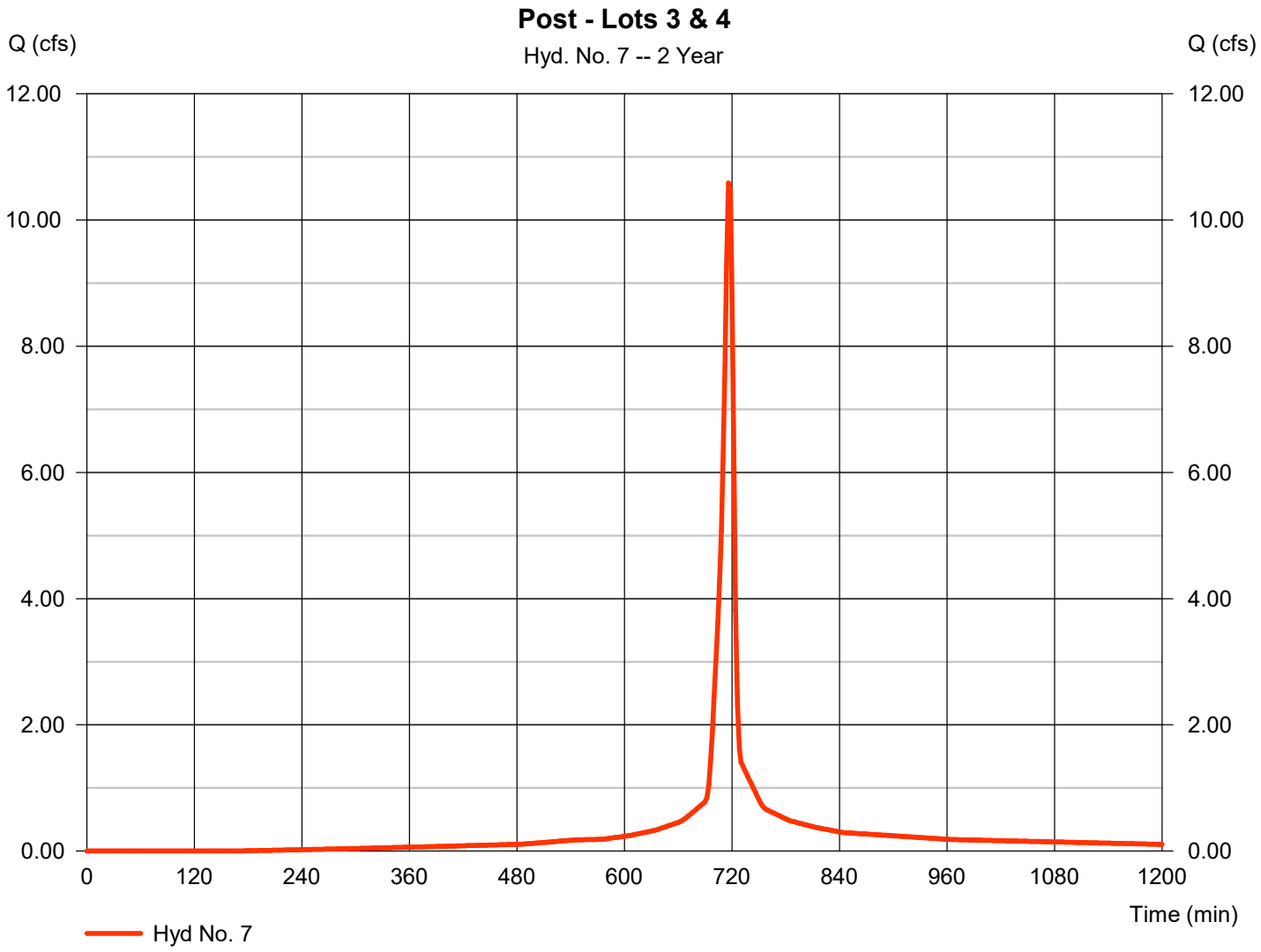
Hydrograph Report

Hyd. No. 7

Post - Lots 3 & 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.59 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	24,482 cuft
Drainage area	=	2.510 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.45 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(0.320 x 98) + (1.810 x 98) + (0.380 x 80)] / 2.510



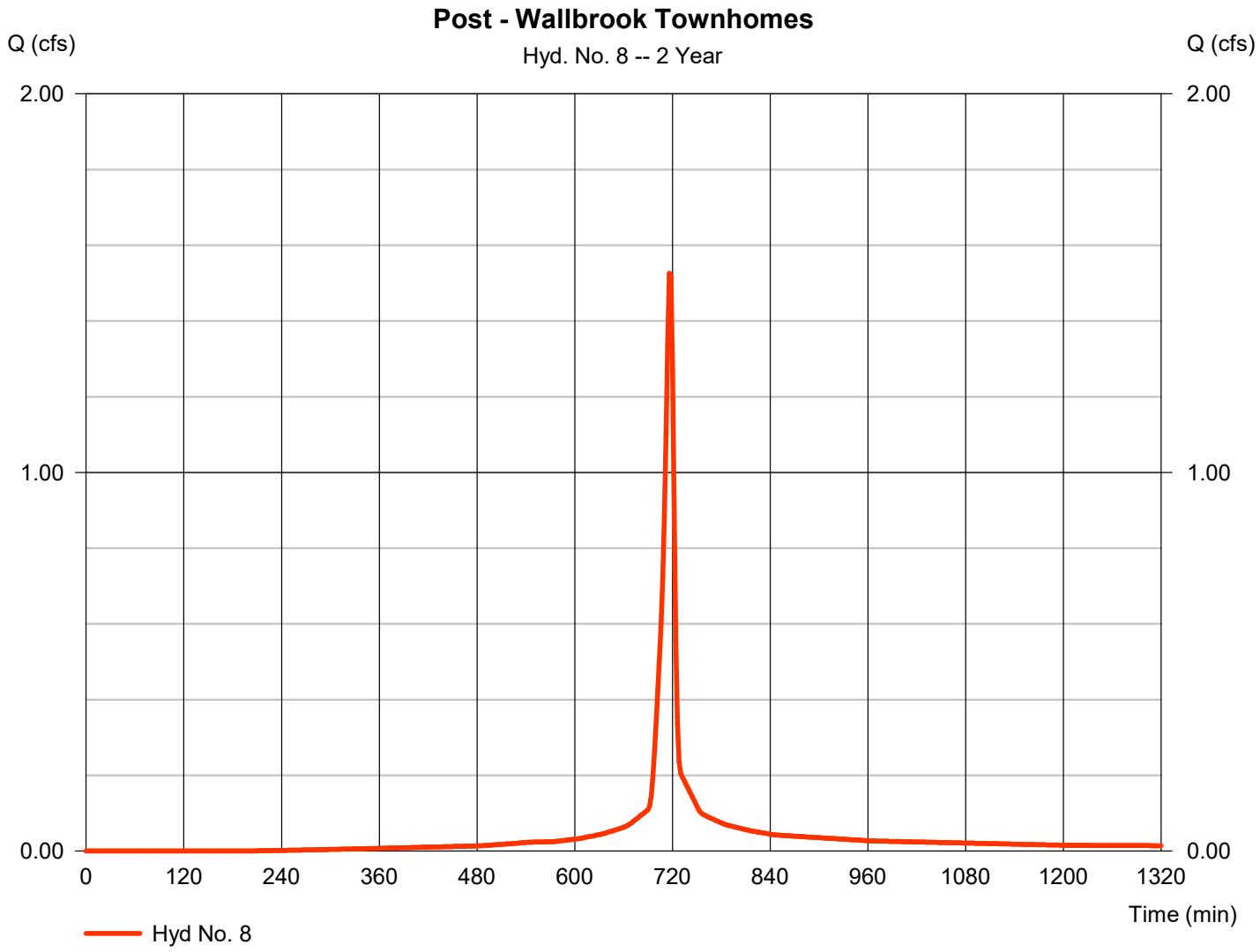
Hydrograph Report

Hyd. No. 8

Post - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 1.526 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 3,480 cuft
Drainage area	= 0.370 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.280 x 98) + (0.090 x 80)] / 0.370

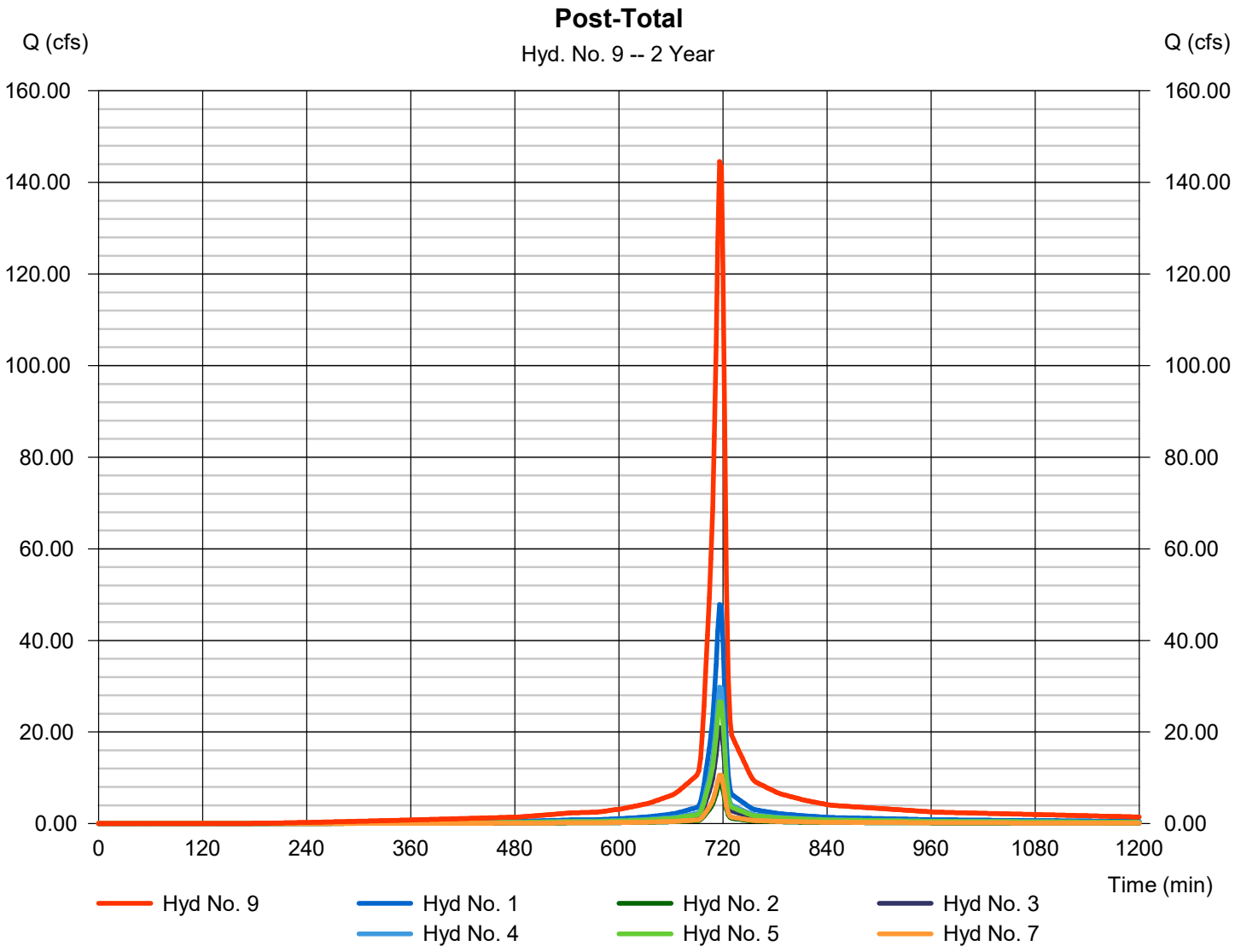


Hydrograph Report

Hyd. No. 9

Post-Total

Hydrograph type	=	Combine	Peak discharge	=	144.57 cfs
Storm frequency	=	2 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	333,130 cuft
Inflow hyds.	=	1, 2, 3, 4, 5, 7	Contrib. drain. area	=	34.490 ac

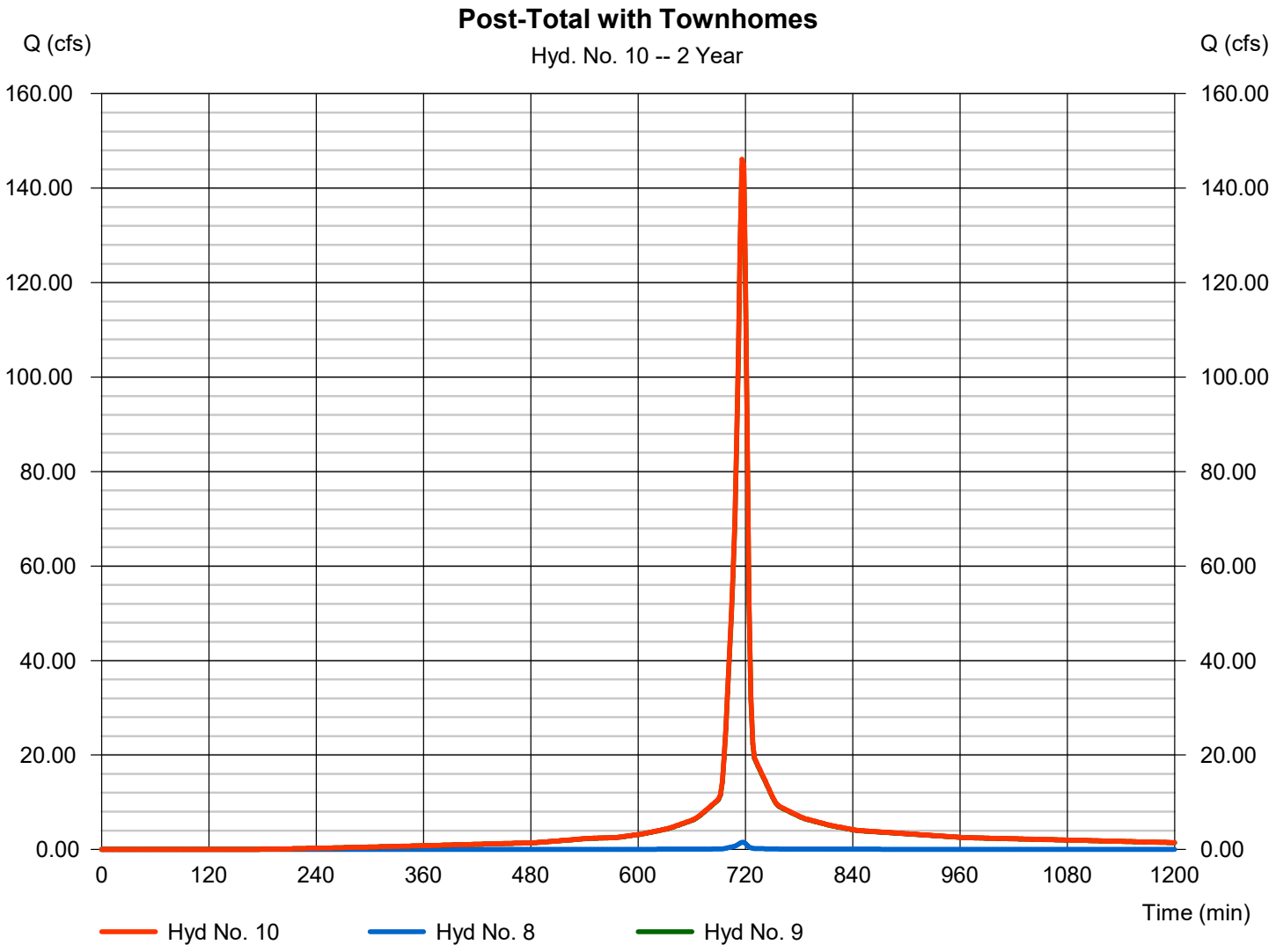


Hydrograph Report

Hyd. No. 10

Post-Total with Townhomes

Hydrograph type	= Combine	Peak discharge	= 146.10 cfs
Storm frequency	= 2 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 336,610 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.370 ac



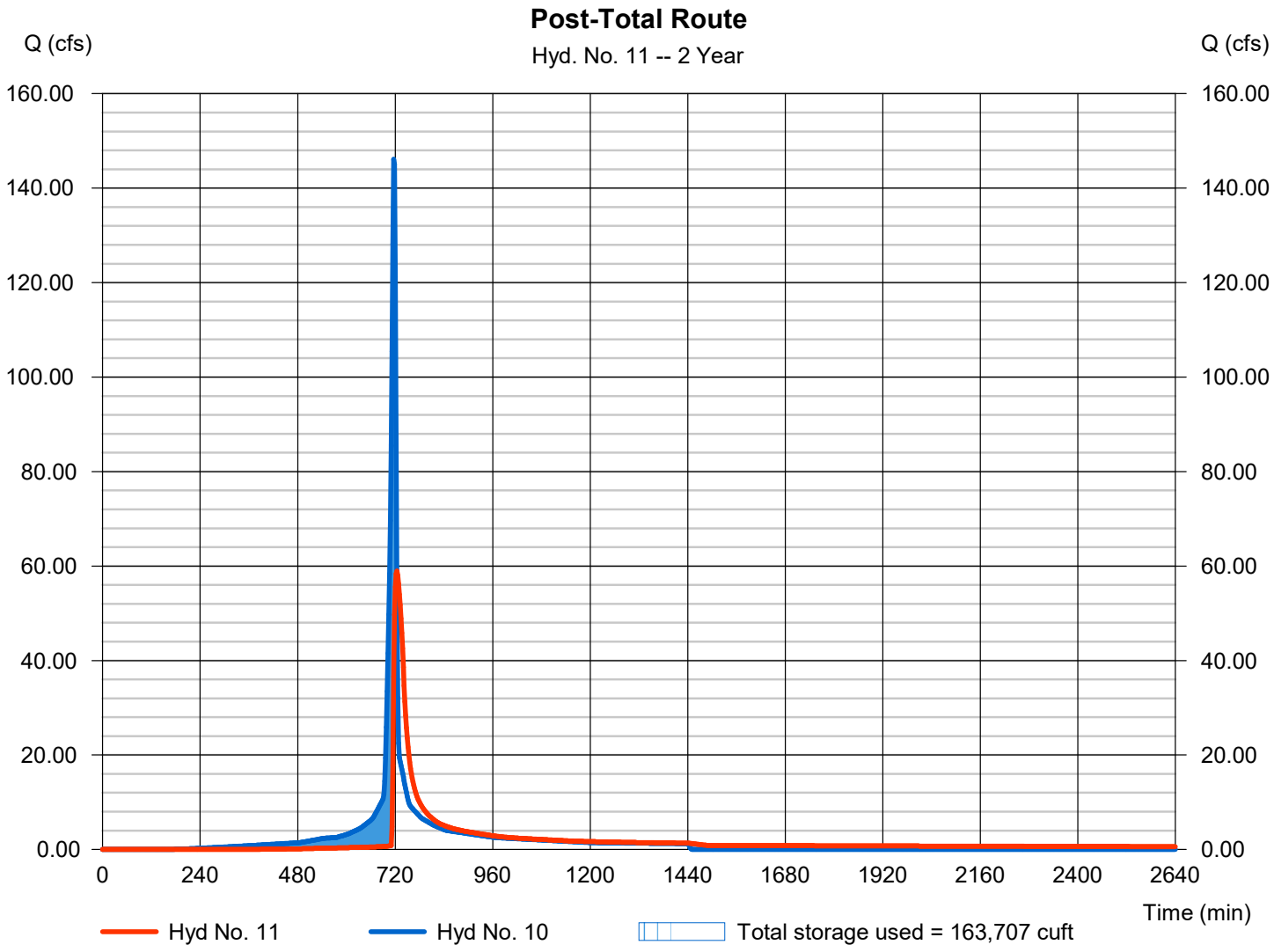
Hydrograph Report

Hyd. No. 11

Post-Total Route

Hydrograph type	= Reservoir	Peak discharge	= 58.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 331,017 cuft
Inflow hyd. No.	= 10 - Post-Total with Townhomes	Max. Elevation	= 365.05 ft
Reservoir name	= Wet Pond 1	Max. Storage	= 163,707 cuft

Storage Indication method used.

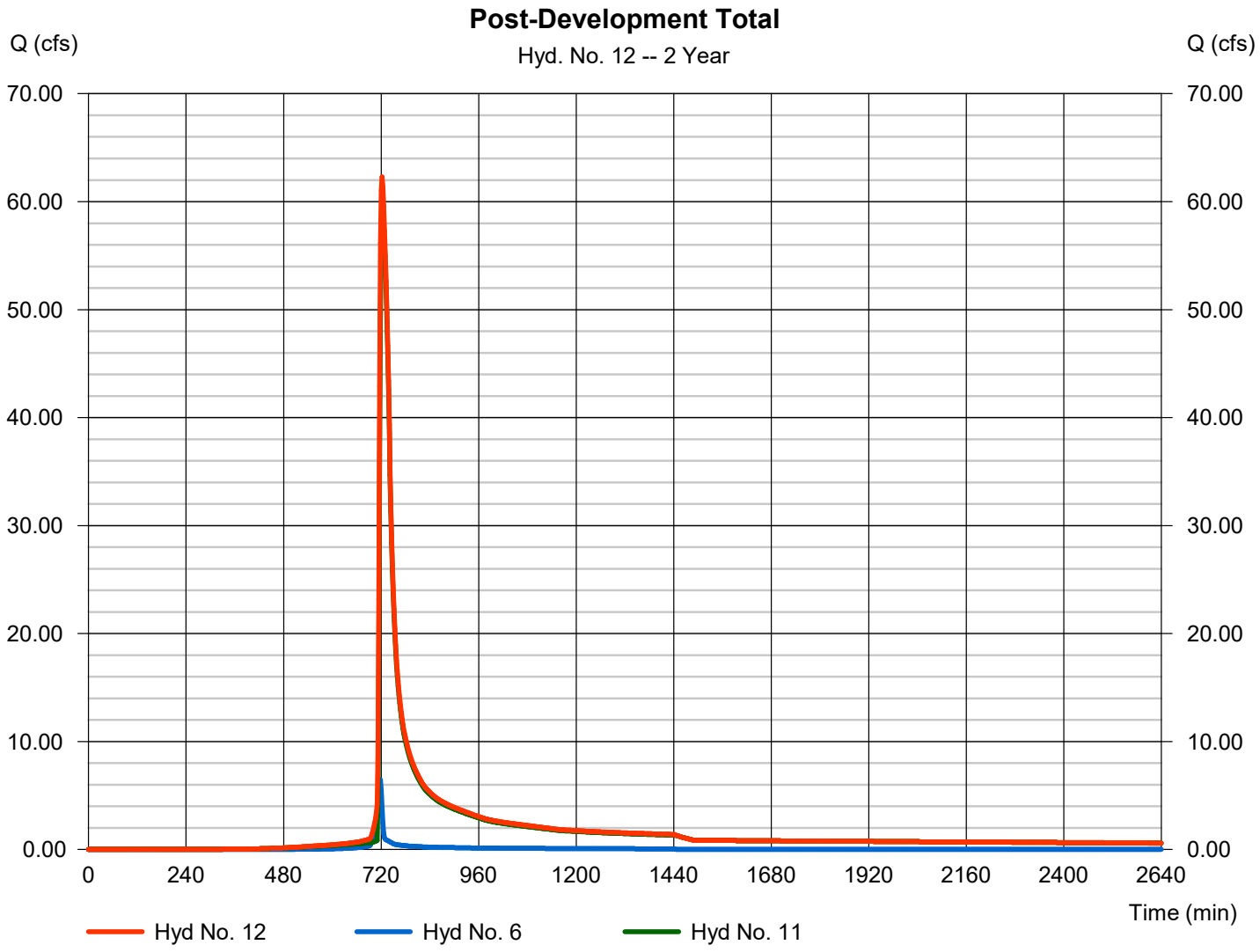


Hydrograph Report

Hyd. No. 12

Post-Development Total

Hydrograph type	= Combine	Peak discharge	= 62.28 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 2 min	Hyd. volume	= 344,601 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 2.040 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	71.49	2	716	169,675	------	------	------	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	13.05	2	716	31,428	------	------	------	Post - New Roadways (Wallbrook/Va
3	SCS Runoff	31.54	2	716	73,884	------	------	------	Post - Boat Tract (Lot 5)
4	SCS Runoff	44.47	2	716	105,542	------	------	------	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	40.13	2	716	93,994	------	------	------	Post - DOT Roadway
6	SCS Runoff	10.73	2	718	23,253	------	------	------	Post - Direct Release
7	SCS Runoff	15.81	2	716	37,523	------	------	------	Post - Lots 3 & 4
8	SCS Runoff	2.302	2	716	5,392	------	------	------	Post - Wallbrook Townhomes
9	Combine	216.49	2	716	512,045	1, 2, 3, 4, 5, 7,	------	------	Post-Total
10	Combine	218.80	2	716	517,438	8, 9	------	------	Post-Total with Townhomes
11	Reservoir	80.89	2	724	511,776	10	366.24	232,240	Post-Total Route
12	Combine	86.96	2	720	535,029	6, 11	------	------	Post-Development Total

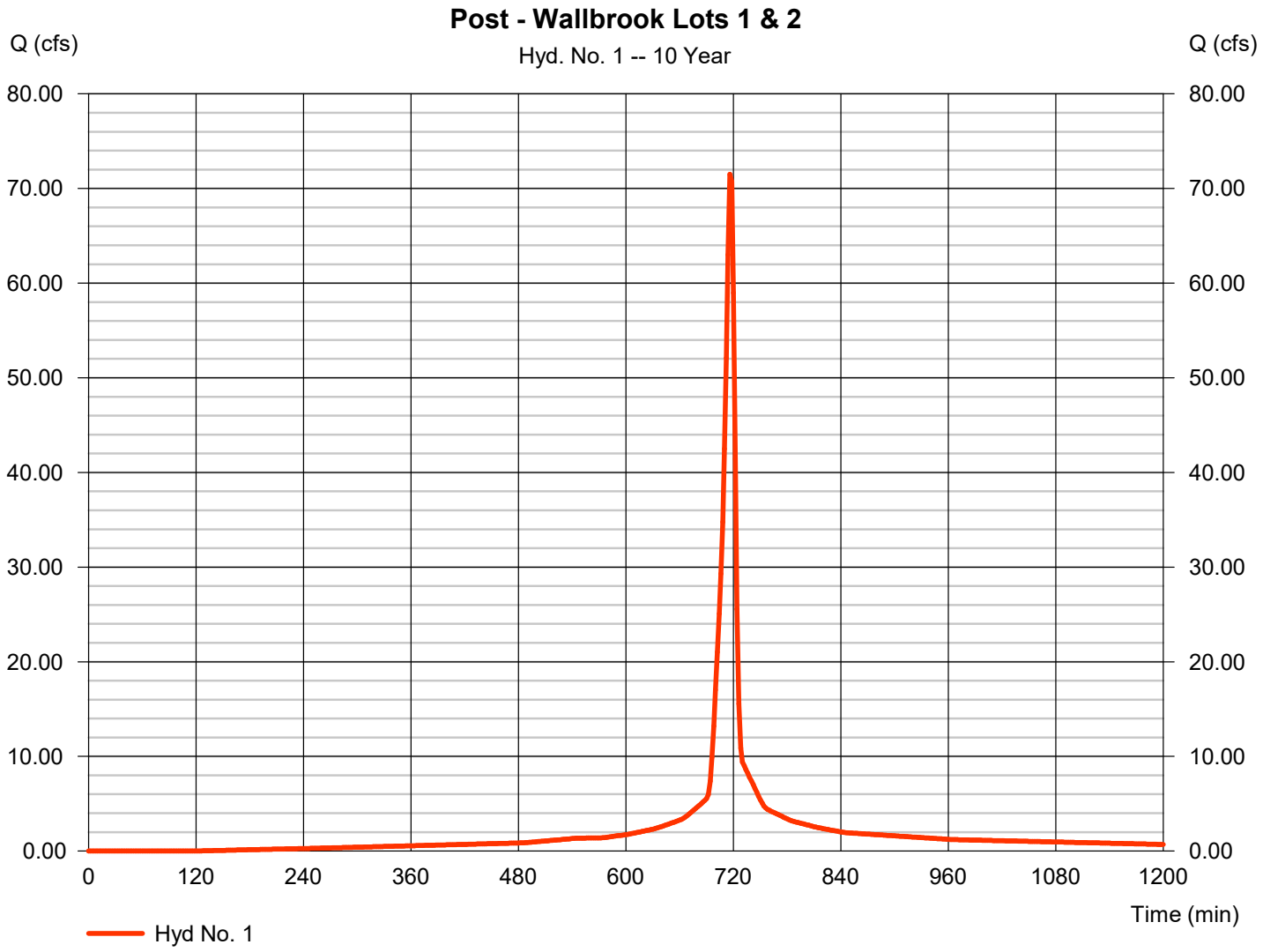
Hydrograph Report

Hyd. No. 1

Post - Wallbrook Lots 1 & 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	71.49 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	169,675 cuft
Drainage area	=	11.350 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.790 x 98) + (6.260 x 98) + (1.990 x 80) + (0.270 x 98) + (0.890 x 98) + (0.150 x 80)] / 11.350



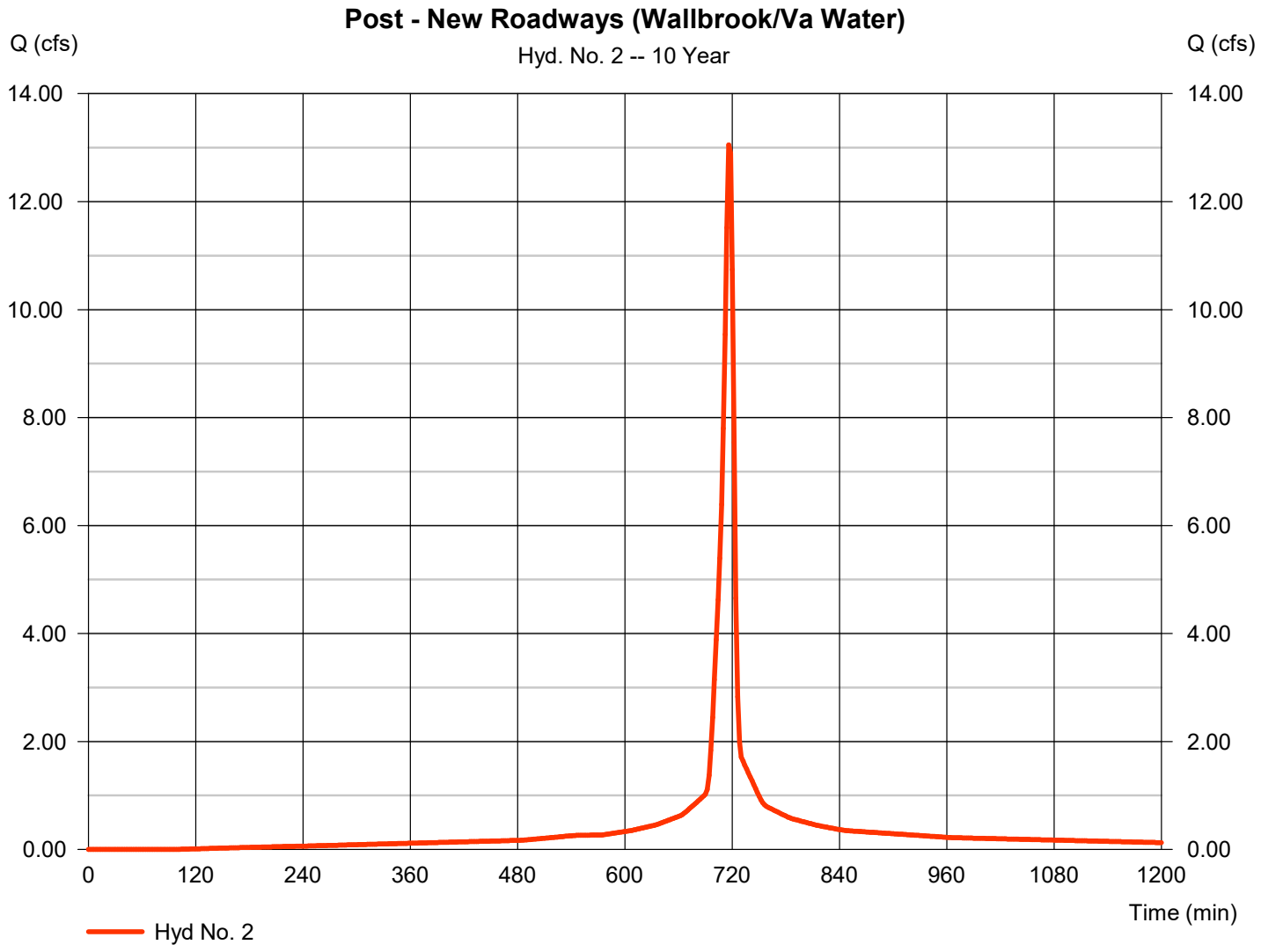
Hydrograph Report

Hyd. No. 2

Post - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 13.05 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 31,428 cuft
Drainage area	= 2.050 ac	Curve number	= 96*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.820 x 98) + (0.230 x 80)] / 2.050



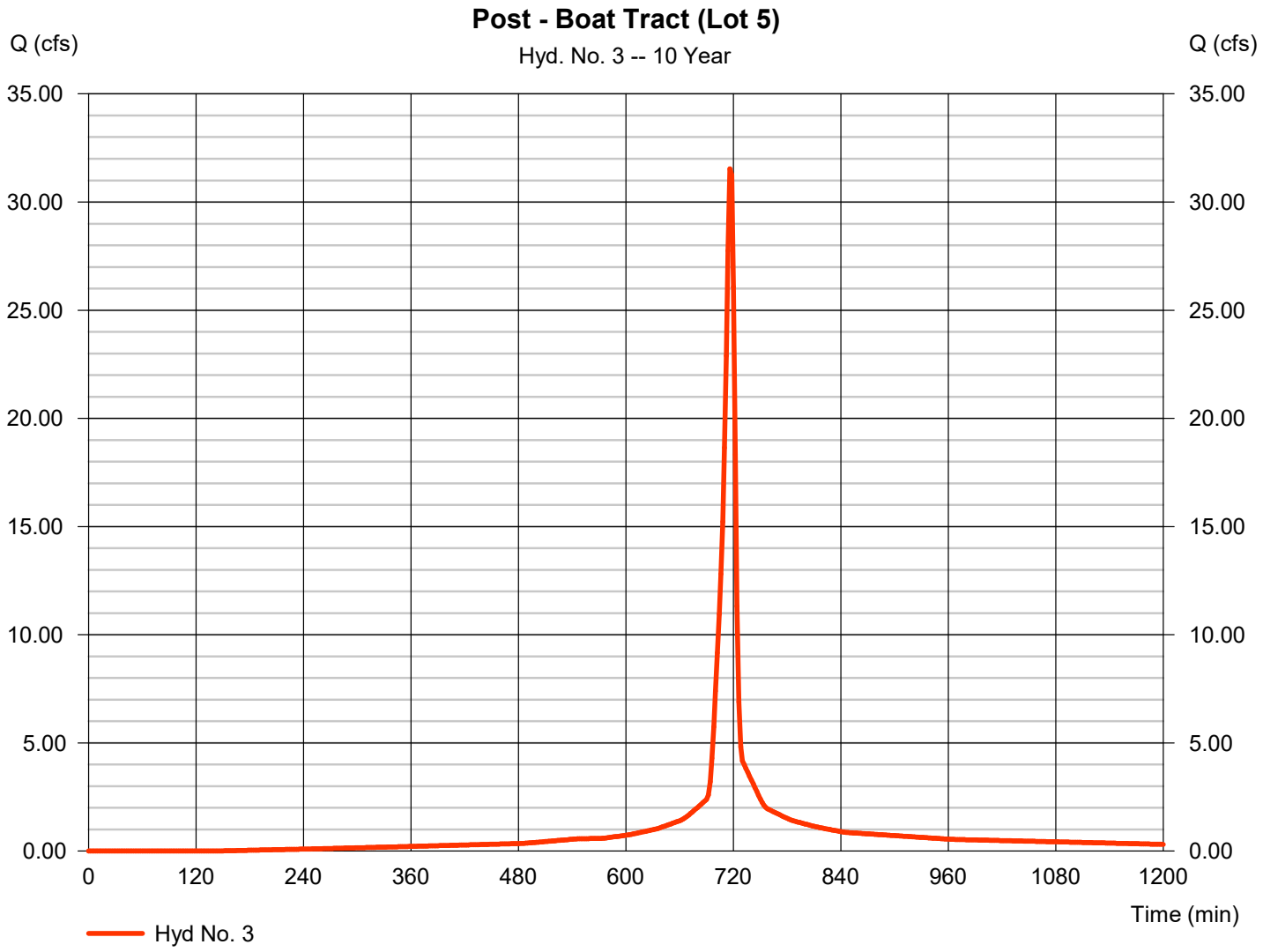
Hydrograph Report

Hyd. No. 3

Post - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 31.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 73,884 cuft
Drainage area	= 5.070 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.860 x 98) + (3.450 x 98) + (0.760 x 74)] / 5.070



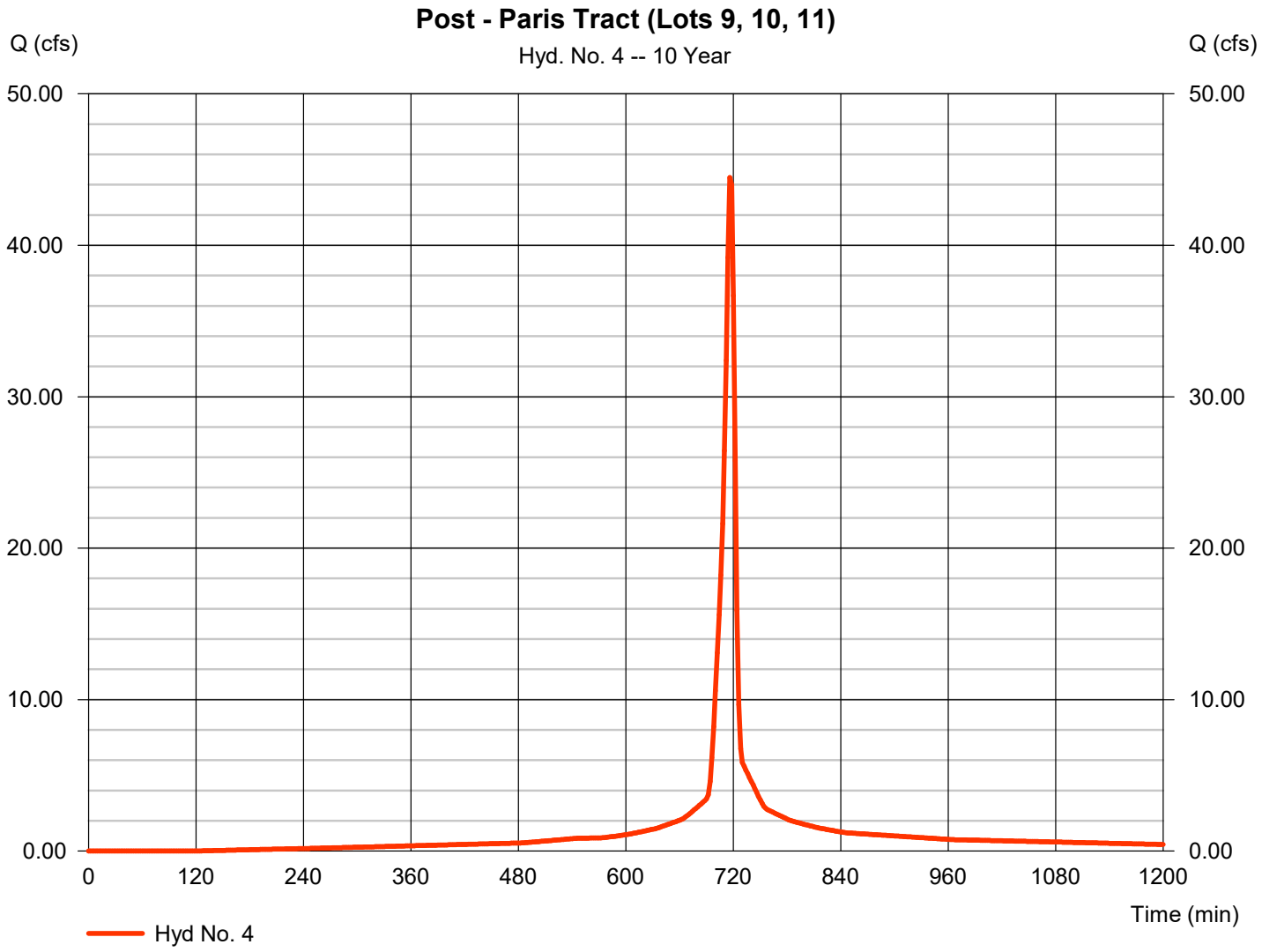
Hydrograph Report

Hyd. No. 4

Post - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 44.47 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 105,542 cuft
Drainage area	= 7.060 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.200 x 98) + (4.800 x 98) + (1.060 x 80)] / 7.060



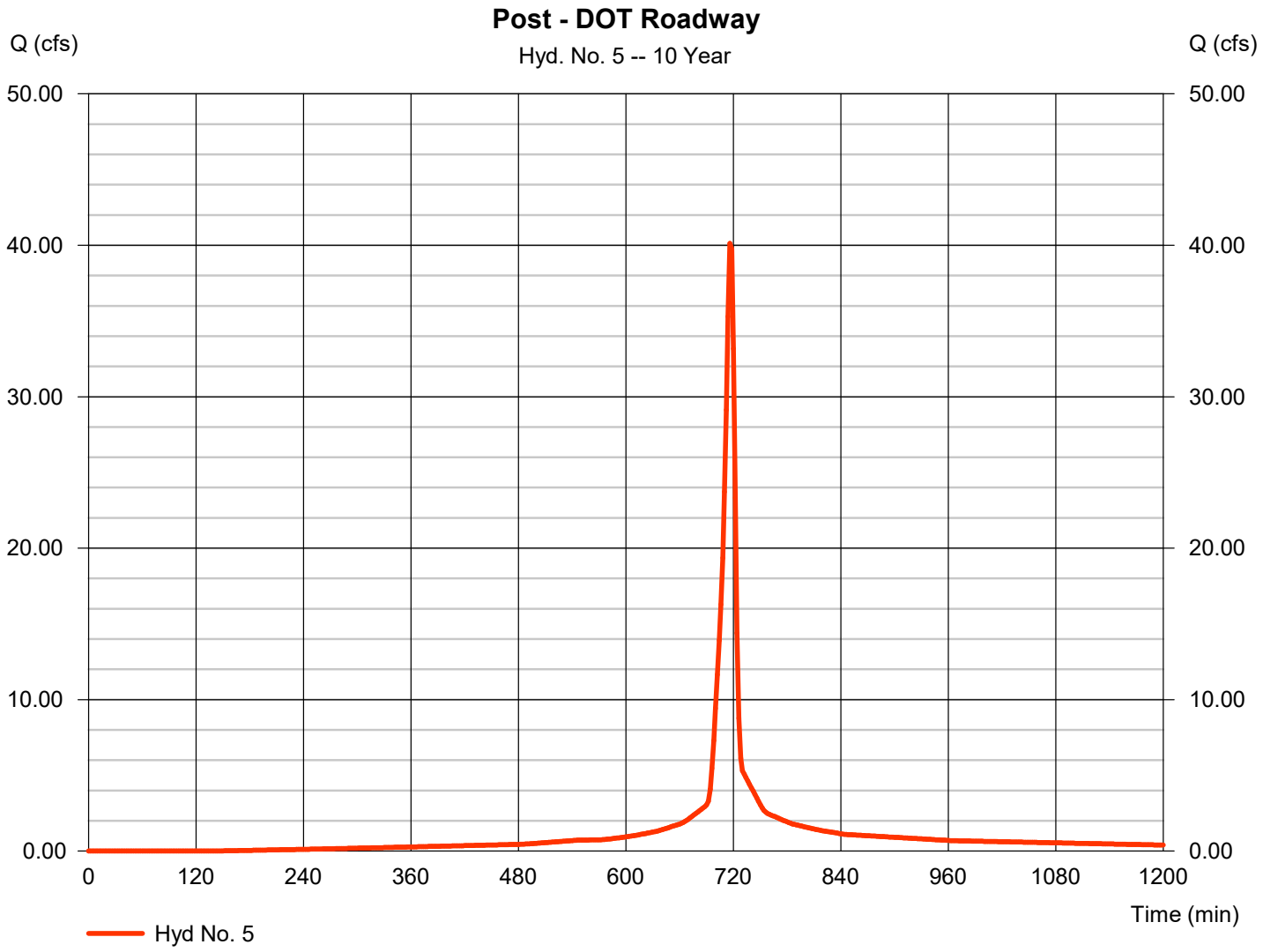
Hydrograph Report

Hyd. No. 5

Post - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 40.13 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 93,994 cuft
Drainage area	= 6.450 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(4.960 x 98) + (1.490 x 80)] / 6.450



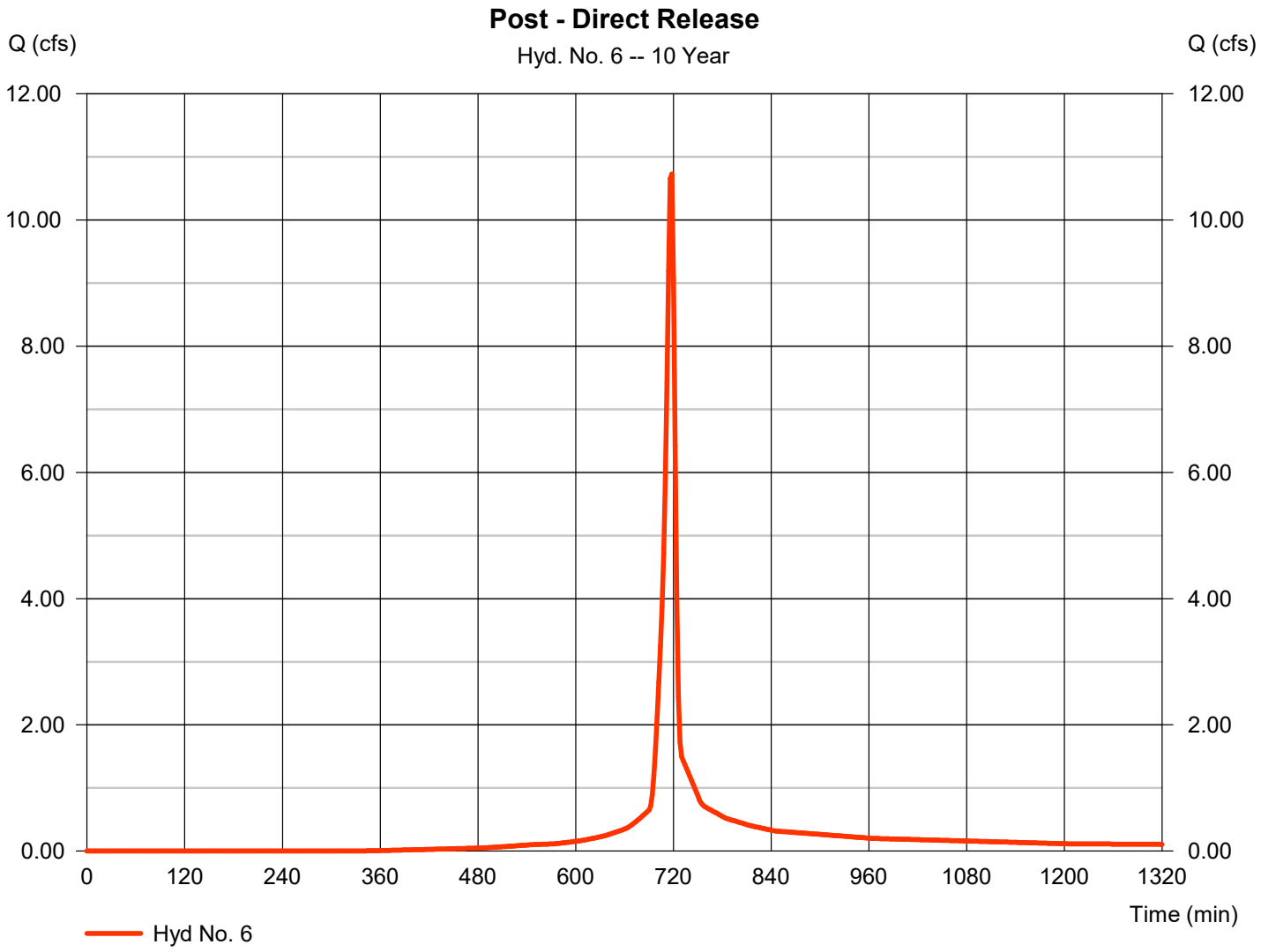
Hydrograph Report

Hyd. No. 6

Post - Direct Release

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.73 cfs
Storm frequency	=	10 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	23,253 cuft
Drainage area	=	2.040 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.480 x 80) + (0.560 x 98)] / 2.040



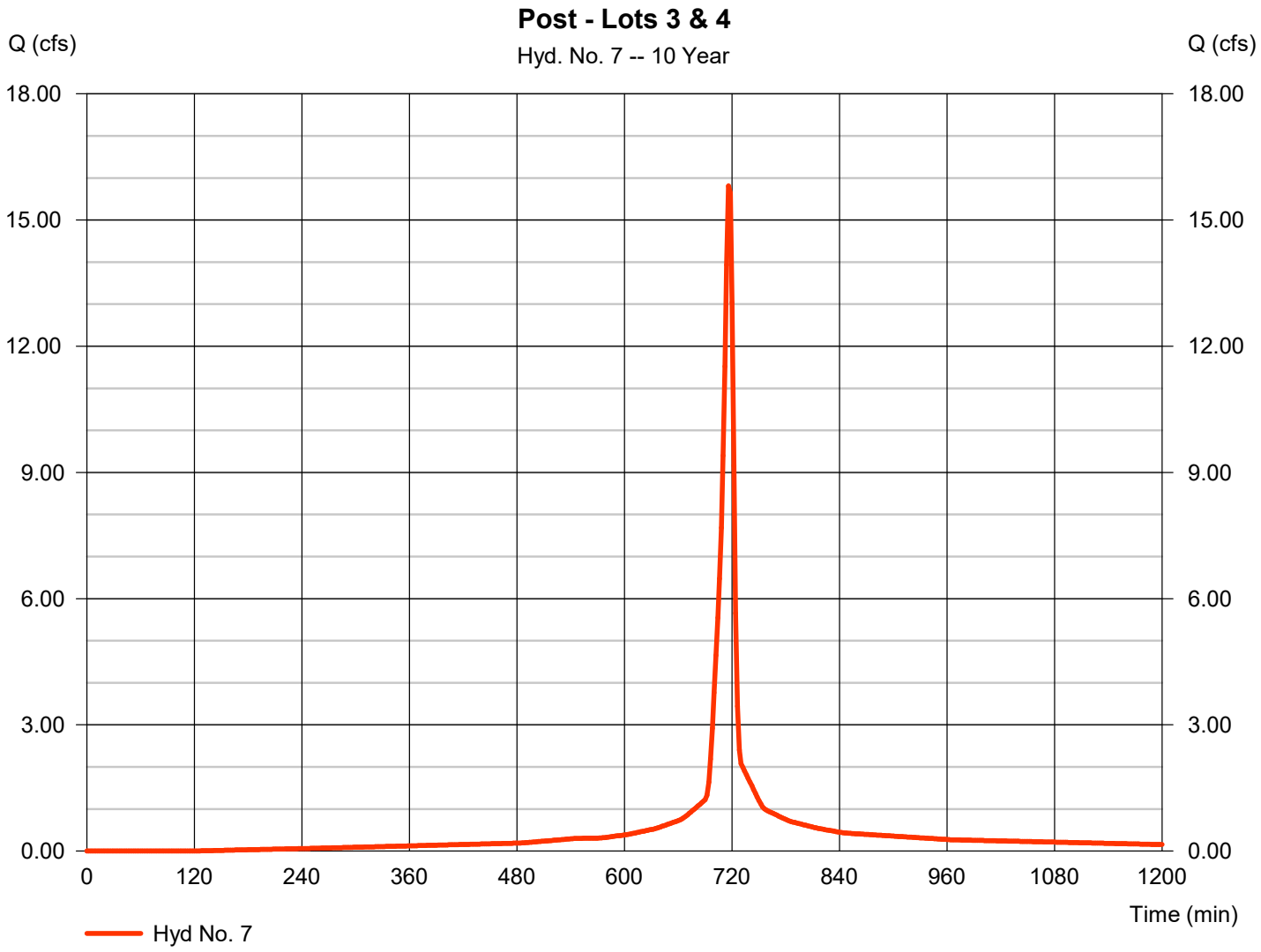
Hydrograph Report

Hyd. No. 7

Post - Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 15.81 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 37,523 cuft
Drainage area	= 2.510 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.320 x 98) + (1.810 x 98) + (0.380 x 80)] / 2.510



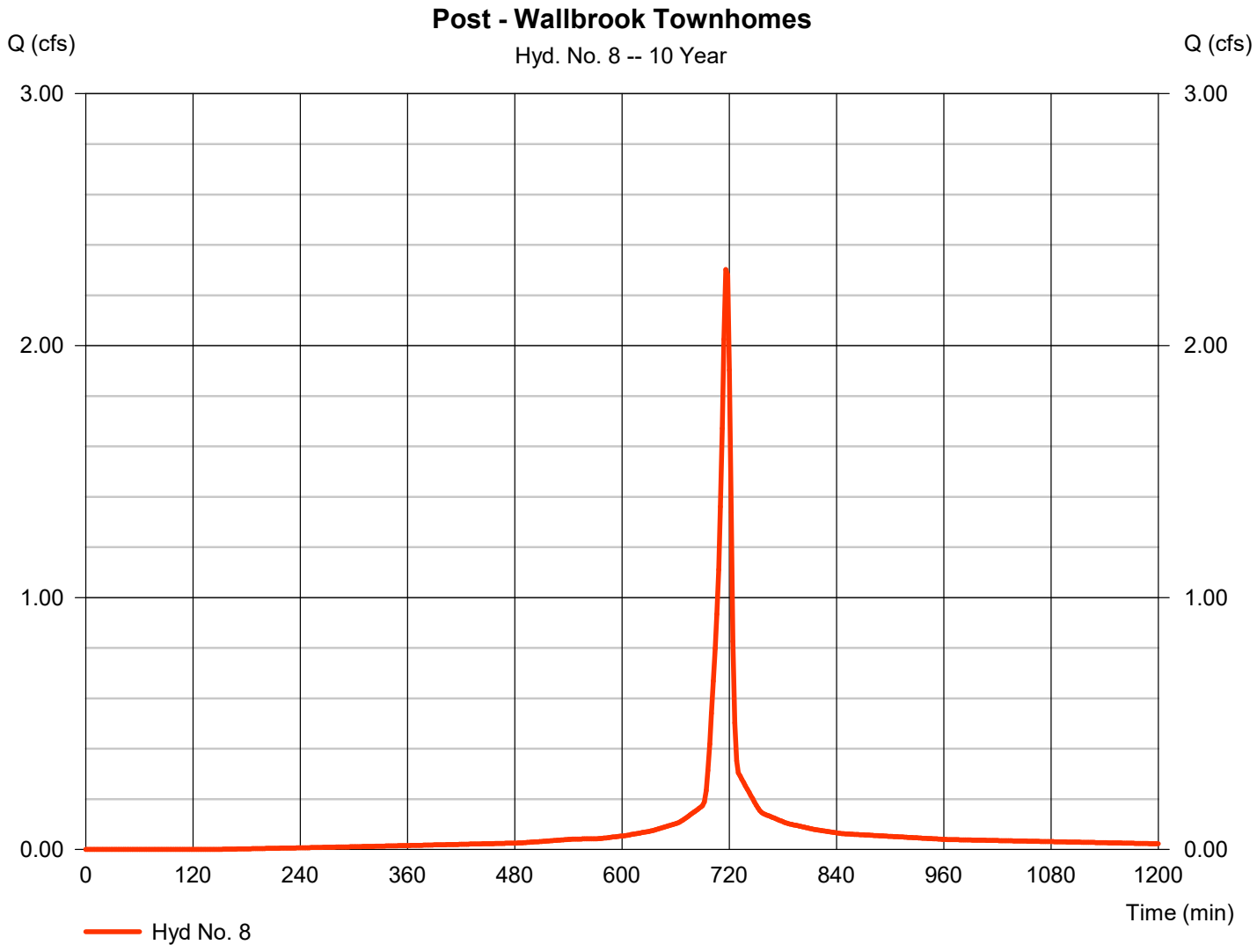
Hydrograph Report

Hyd. No. 8

Post - Wallbrook Townhomes

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.302 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	5,392 cuft
Drainage area	=	0.370 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.01 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(0.280 x 98) + (0.090 x 80)] / 0.370

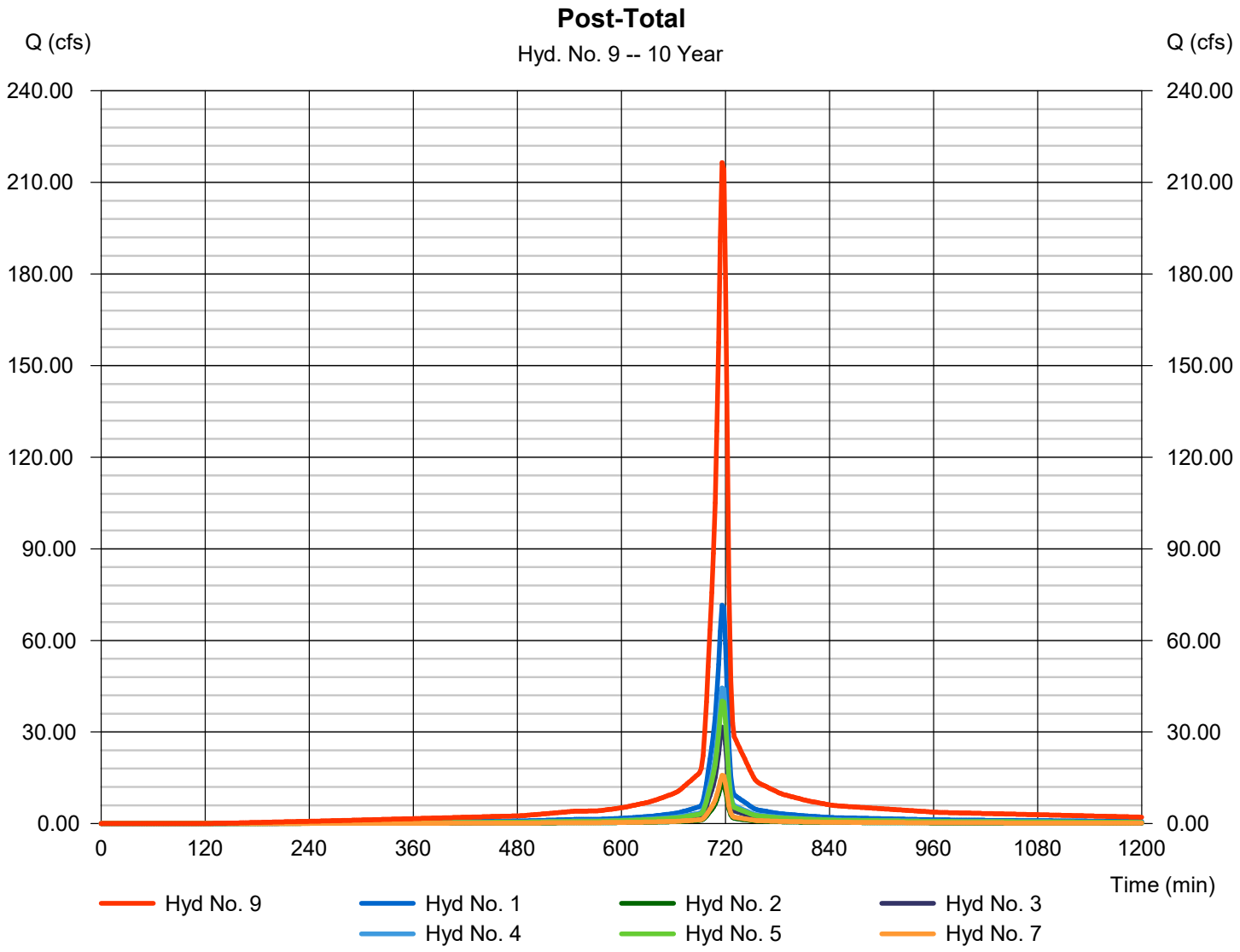


Hydrograph Report

Hyd. No. 9

Post-Total

Hydrograph type	=	Combine	Peak discharge	=	216.49 cfs
Storm frequency	=	10 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	512,045 cuft
Inflow hyds.	=	1, 2, 3, 4, 5, 7	Contrib. drain. area	=	34.490 ac

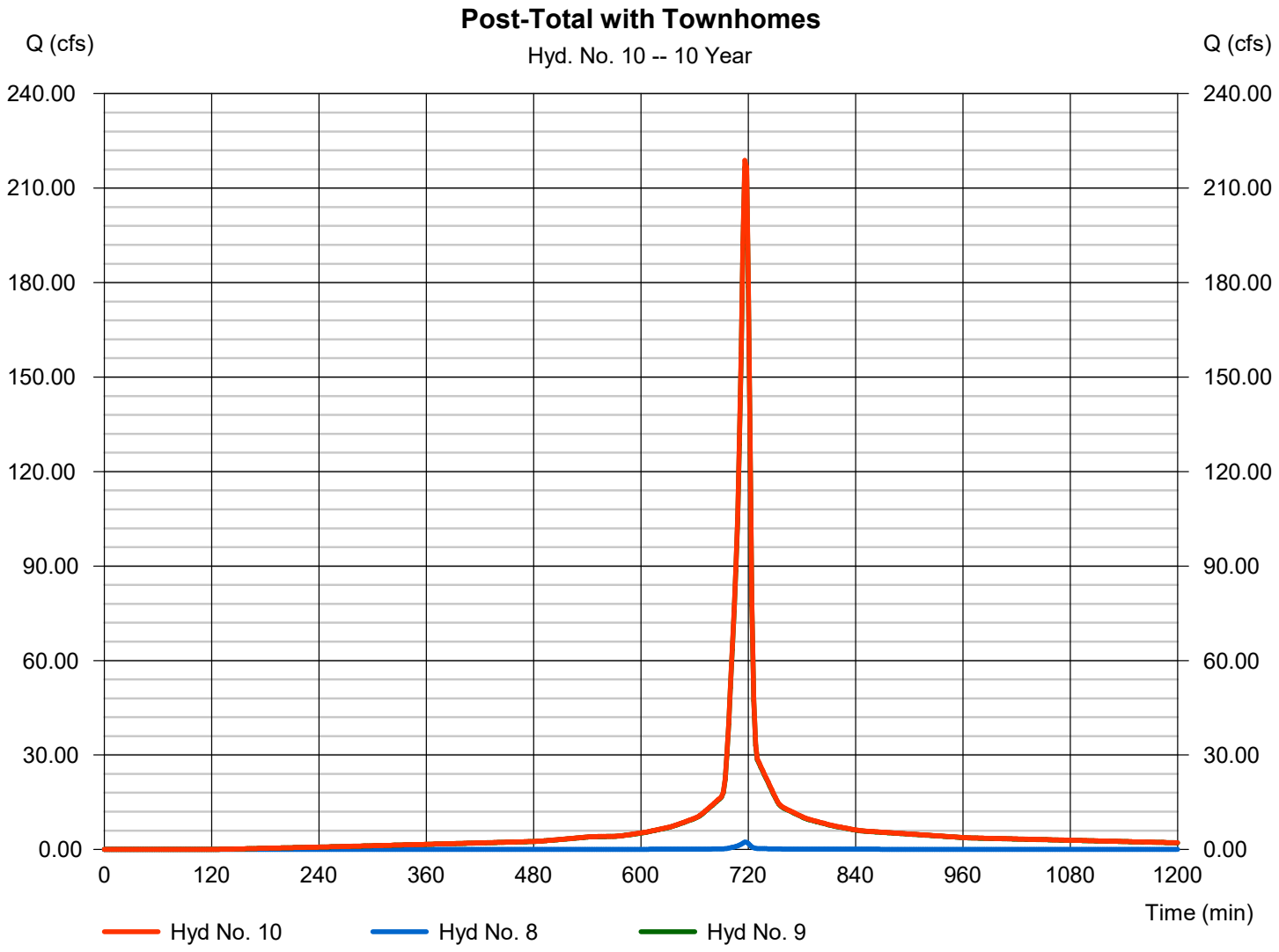


Hydrograph Report

Hyd. No. 10

Post-Total with Townhomes

Hydrograph type	= Combine	Peak discharge	= 218.80 cfs
Storm frequency	= 10 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 517,438 cuft
Inflow hyds.	= 8, 9	Contrib. drain. area	= 0.370 ac



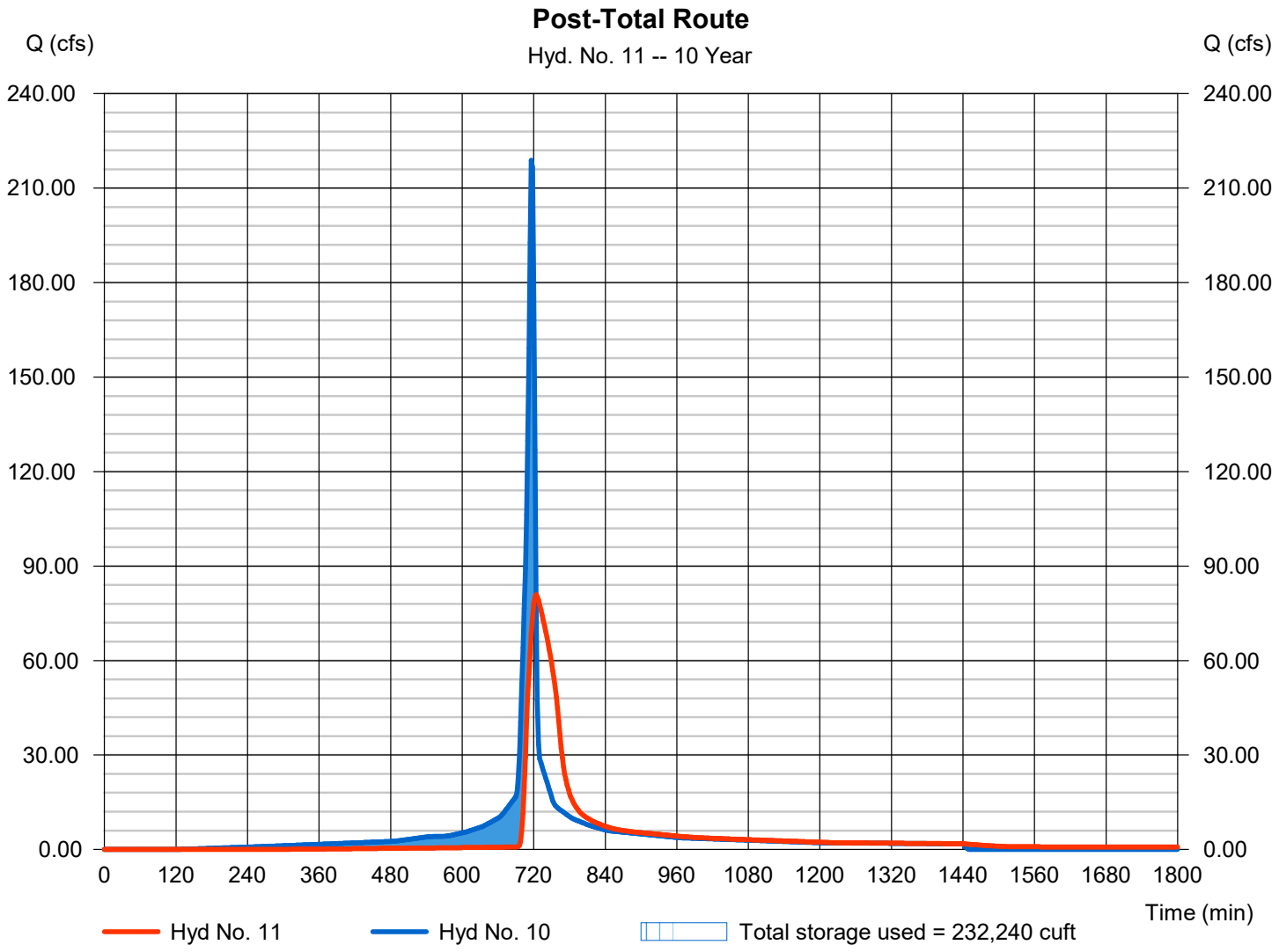
Hydrograph Report

Hyd. No. 11

Post-Total Route

Hydrograph type	= Reservoir	Peak discharge	= 80.89 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 511,776 cuft
Inflow hyd. No.	= 10 - Post-Total with Townhomes	Max. Elevation	= 366.24 ft
Reservoir name	= Wet Pond 1	Max. Storage	= 232,240 cuft

Storage Indication method used.

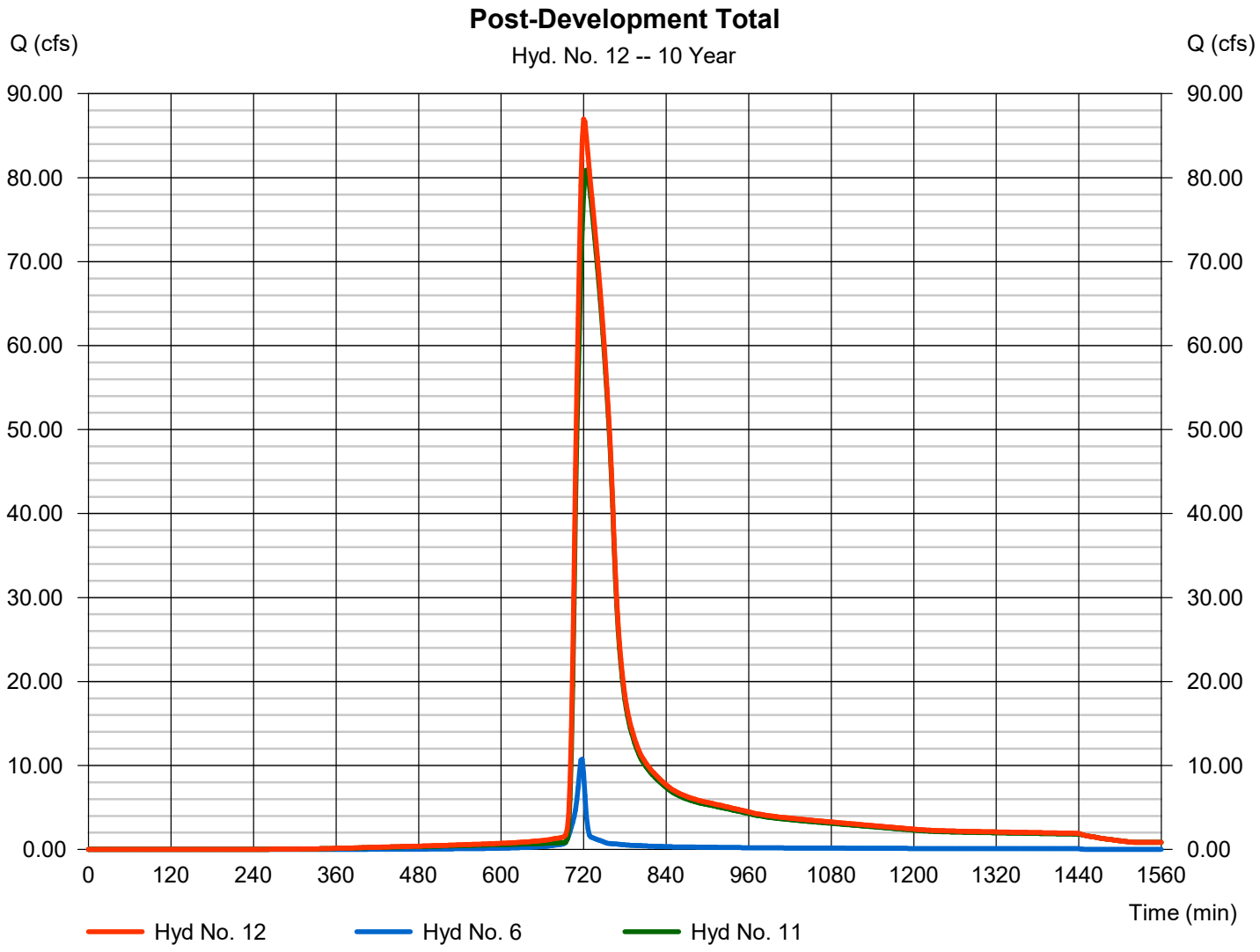


Hydrograph Report

Hyd. No. 12

Post-Development Total

Hydrograph type	= Combine	Peak discharge	= 86.96 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 535,029 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 2.040 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	85.46	2	716	205,014	------	------	------	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	15.56	2	716	37,829	------	------	------	Post - New Roadways (Wallbrook/Va
3	SCS Runoff	37.82	2	716	89,615	------	------	------	Post - Boat Tract (Lot 5)
4	SCS Runoff	53.16	2	716	127,524	------	------	------	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	48.11	2	716	114,007	------	------	------	Post - DOT Roadway
6	SCS Runoff	13.29	2	718	29,233	------	------	------	Post - Direct Release
7	SCS Runoff	18.90	2	716	45,338	------	------	------	Post - Lots 3 & 4
8	SCS Runoff	2.760	2	716	6,540	------	------	------	Post - Wallbrook Townhomes
9	Combine	259.01	2	716	619,328	1, 2, 3, 4, 5, 7,	------	------	Post-Total
10	Combine	261.77	2	716	625,868	8, 9	------	------	Post-Total with Townhomes
11	Reservoir	89.79	2	724	620,195	10	366.90	269,989	Post-Total Route
12	Combine	97.45	2	720	649,428	6, 11	------	------	Post-Development Total

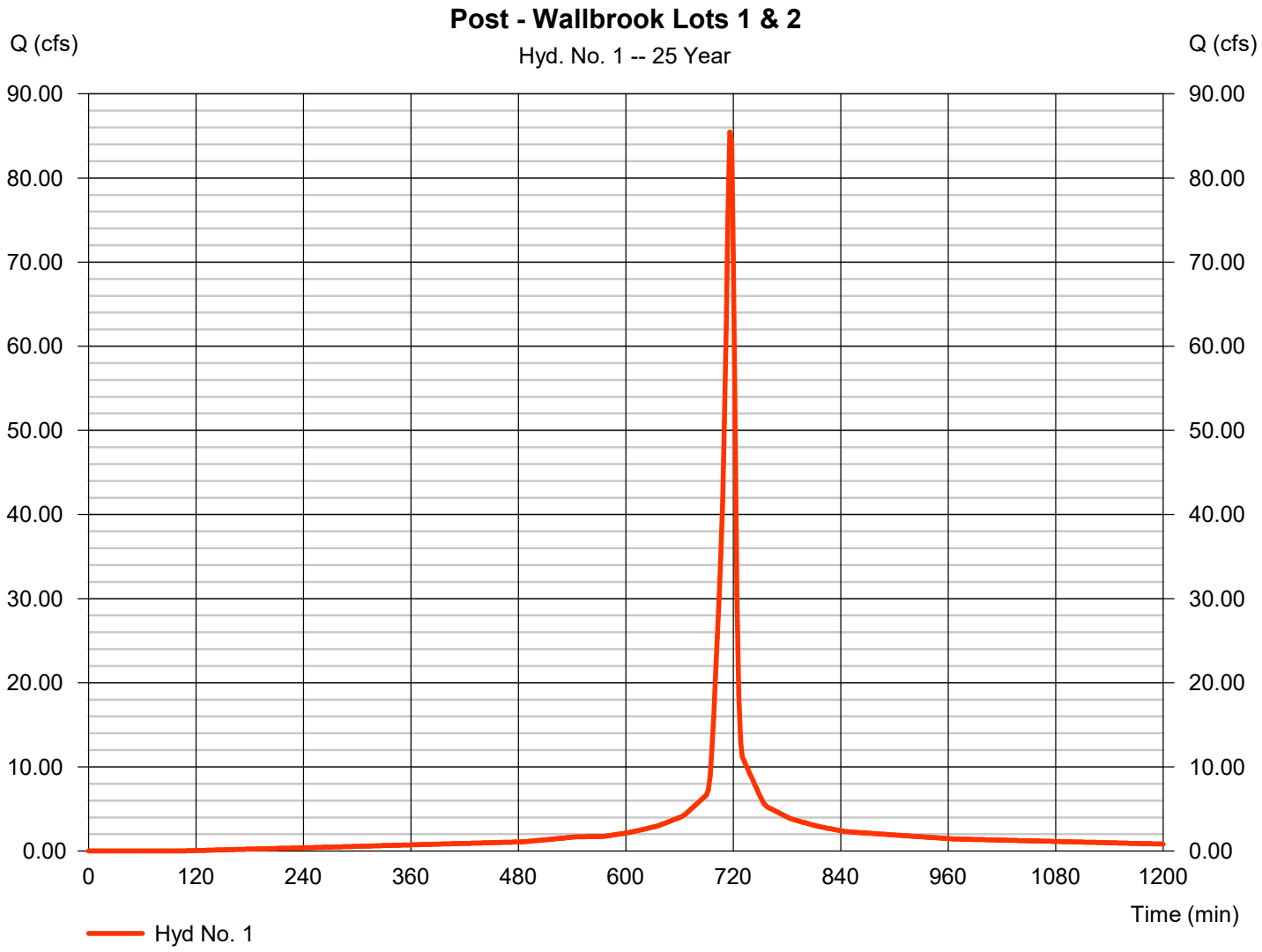
Hydrograph Report

Hyd. No. 1

Post - Wallbrook Lots 1 & 2

Hydrograph type	=	SCS Runoff	Peak discharge	=	85.46 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	205,014 cuft
Drainage area	=	11.350 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.790 x 98) + (6.260 x 98) + (1.990 x 80) + (0.270 x 98) + (0.890 x 98) + (0.150 x 80)] / 11.350



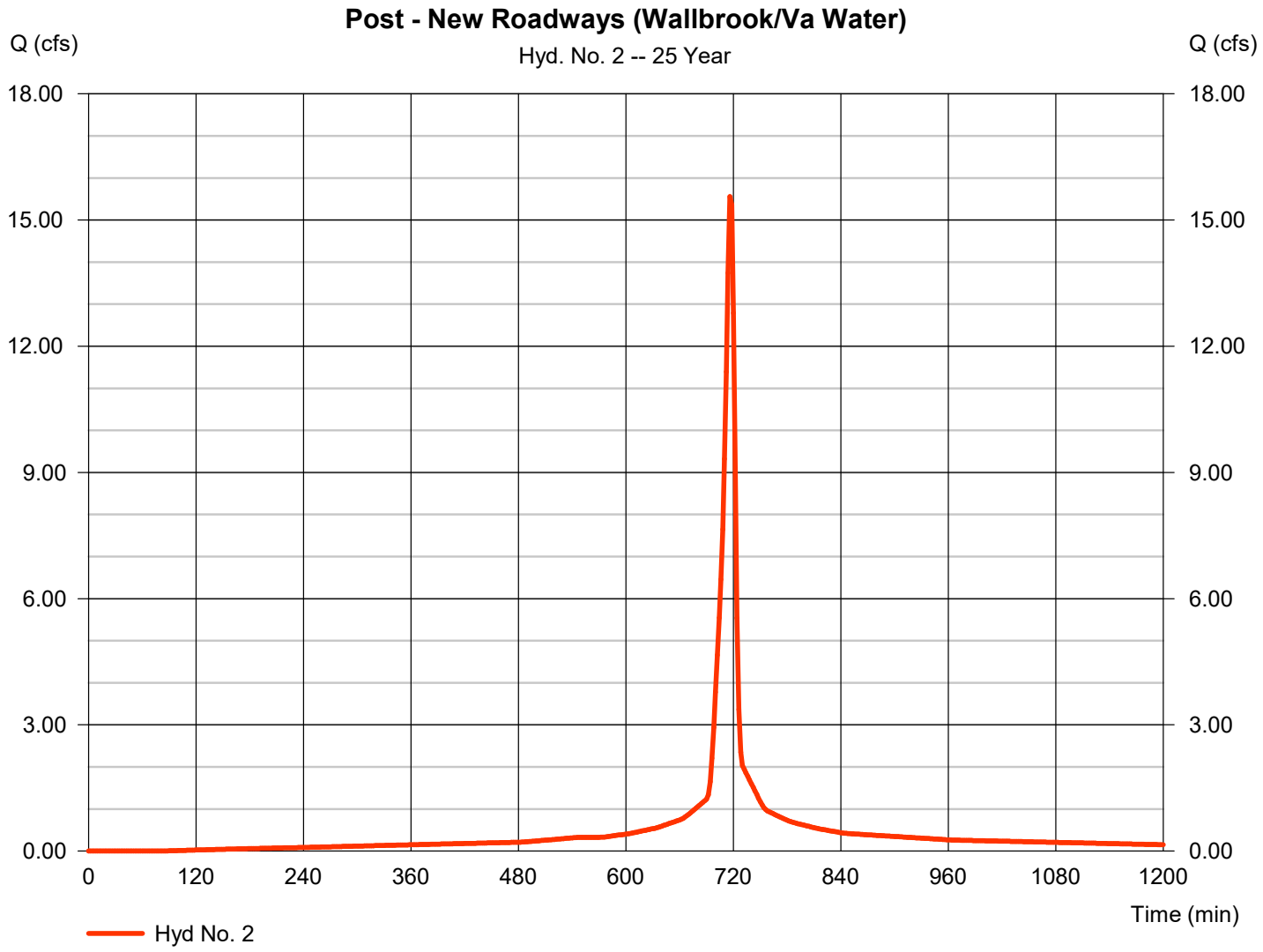
Hydrograph Report

Hyd. No. 2

Post - New Roadways (Wallbrook/Va Water)

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.56 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	37,829 cuft
Drainage area	=	2.050 ac	Curve number	=	96*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.820 x 98) + (0.230 x 80)] / 2.050



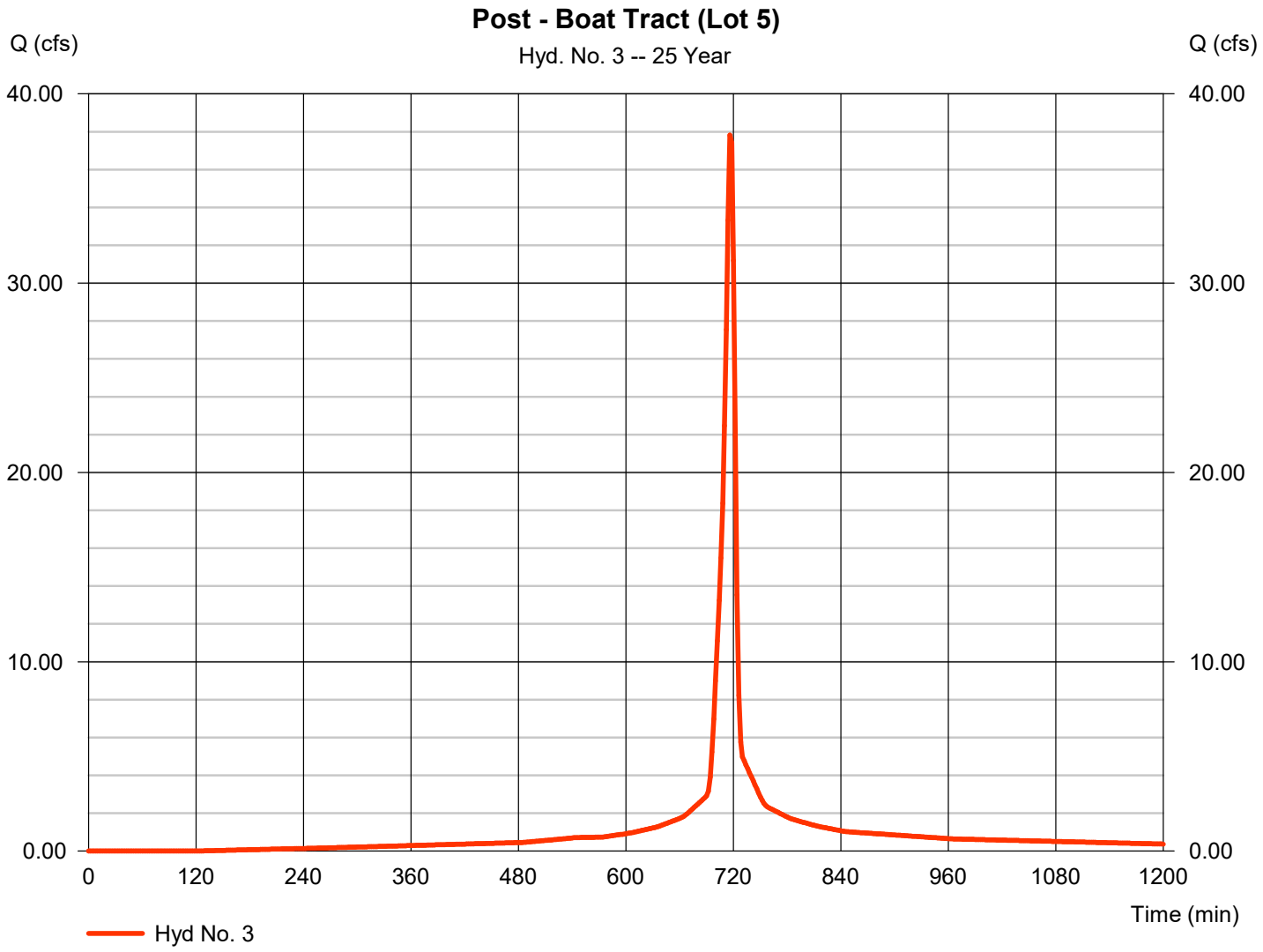
Hydrograph Report

Hyd. No. 3

Post - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 37.82 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 89,615 cuft
Drainage area	= 5.070 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.860 x 98) + (3.450 x 98) + (0.760 x 74)] / 5.070



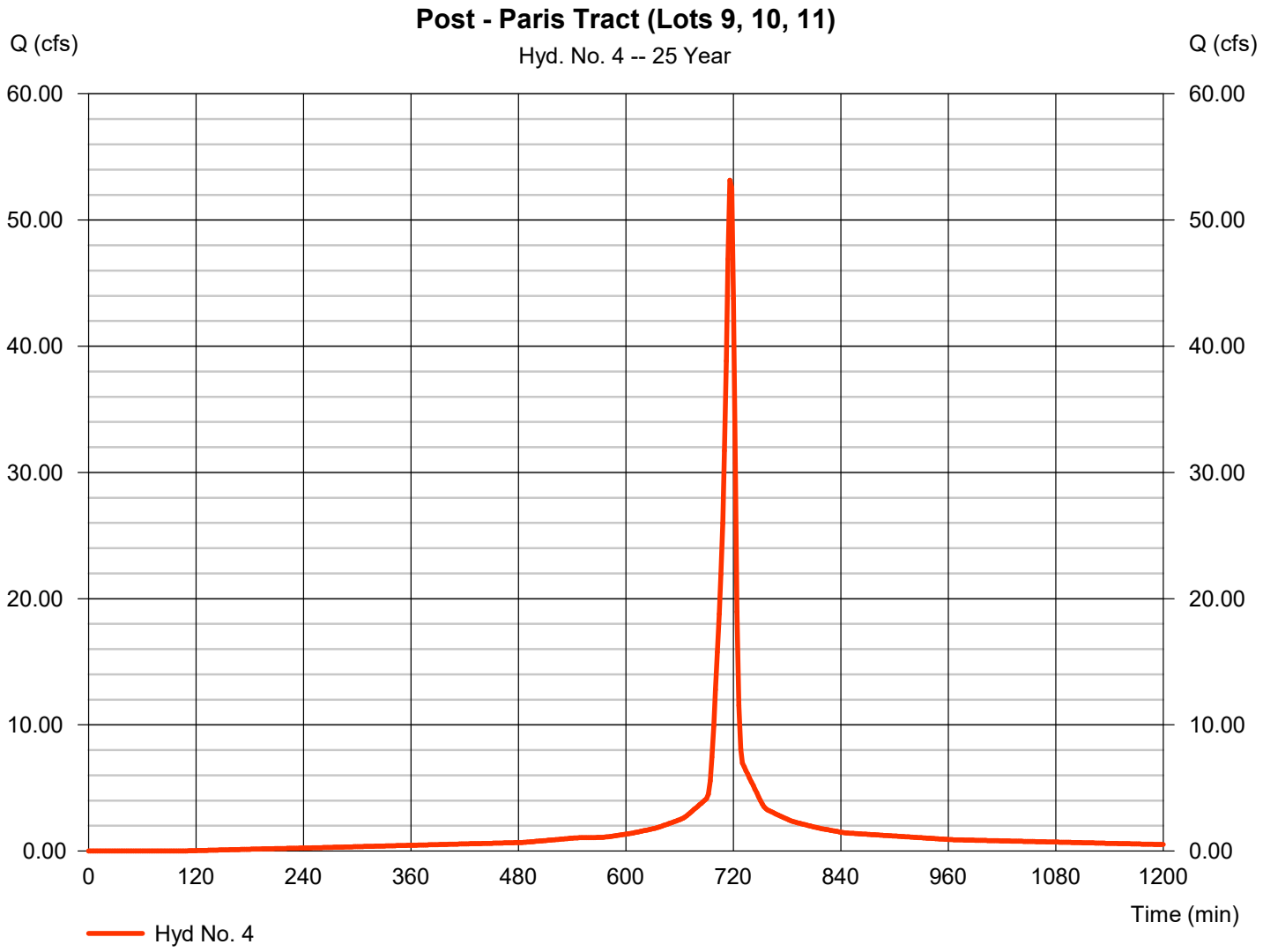
Hydrograph Report

Hyd. No. 4

Post - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 53.16 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 127,524 cuft
Drainage area	= 7.060 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.200 x 98) + (4.800 x 98) + (1.060 x 80)] / 7.060



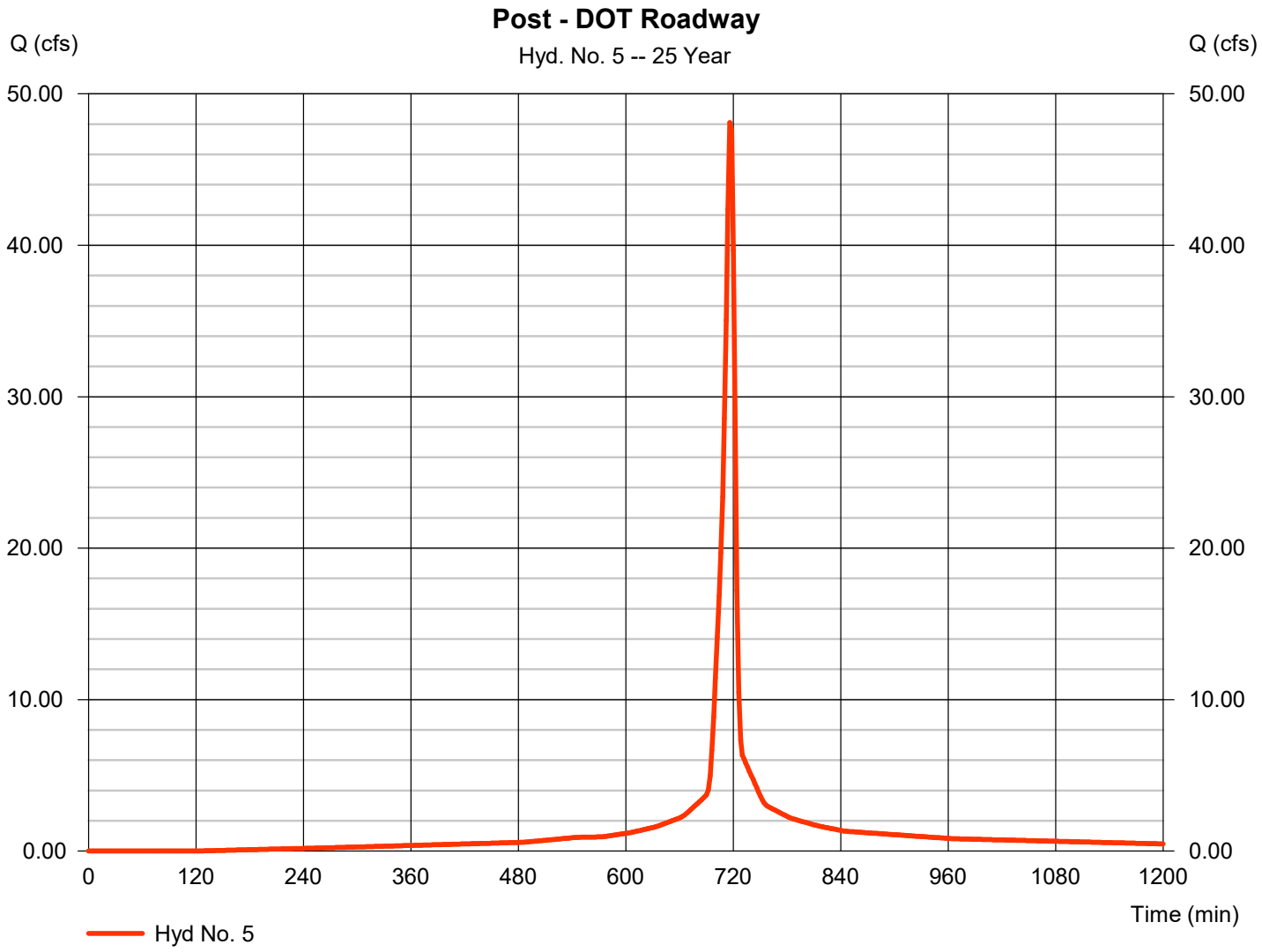
Hydrograph Report

Hyd. No. 5

Post - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 48.11 cfs
Storm frequency	= 25 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 114,007 cuft
Drainage area	= 6.450 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(4.960 x 98) + (1.490 x 80)] / 6.450



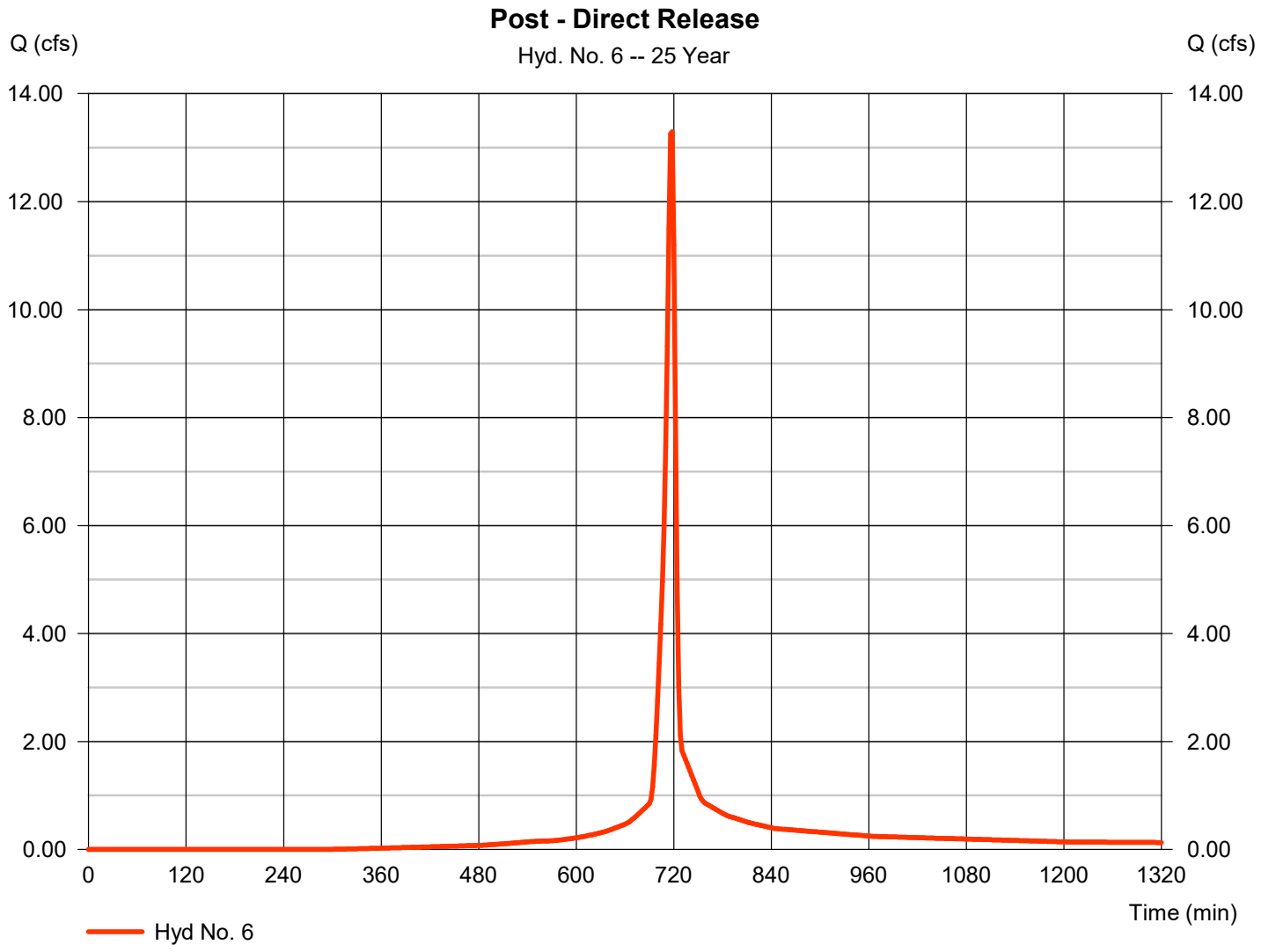
Hydrograph Report

Hyd. No. 6

Post - Direct Release

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.29 cfs
Storm frequency	=	25 yrs	Time to peak	=	718 min
Time interval	=	2 min	Hyd. volume	=	29,233 cuft
Drainage area	=	2.040 ac	Curve number	=	85*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(1.480 x 80) + (0.560 x 98)] / 2.040



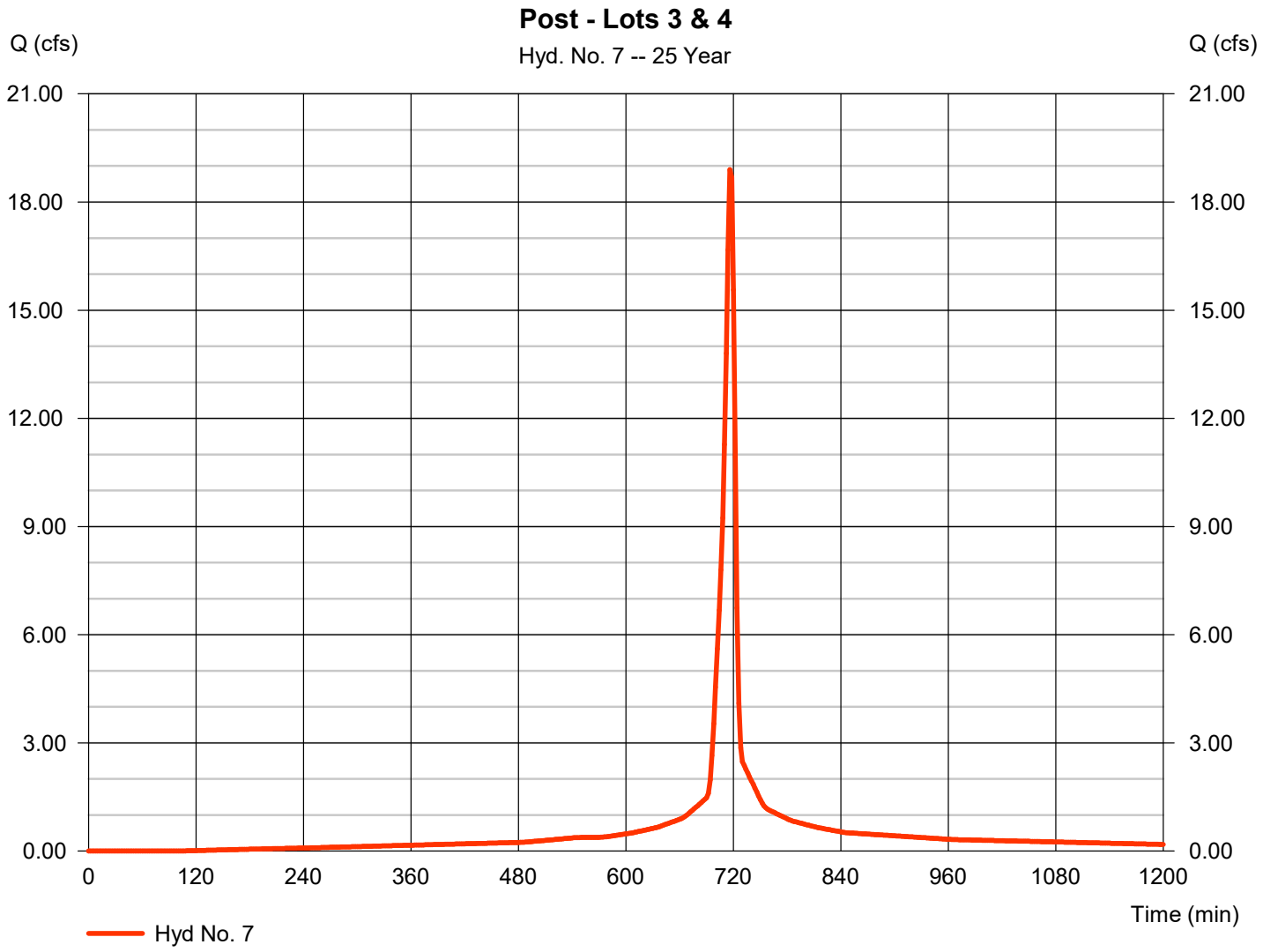
Hydrograph Report

Hyd. No. 7

Post - Lots 3 & 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.90 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	45,338 cuft
Drainage area	=	2.510 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(0.320 x 98) + (1.810 x 98) + (0.380 x 80)] / 2.510



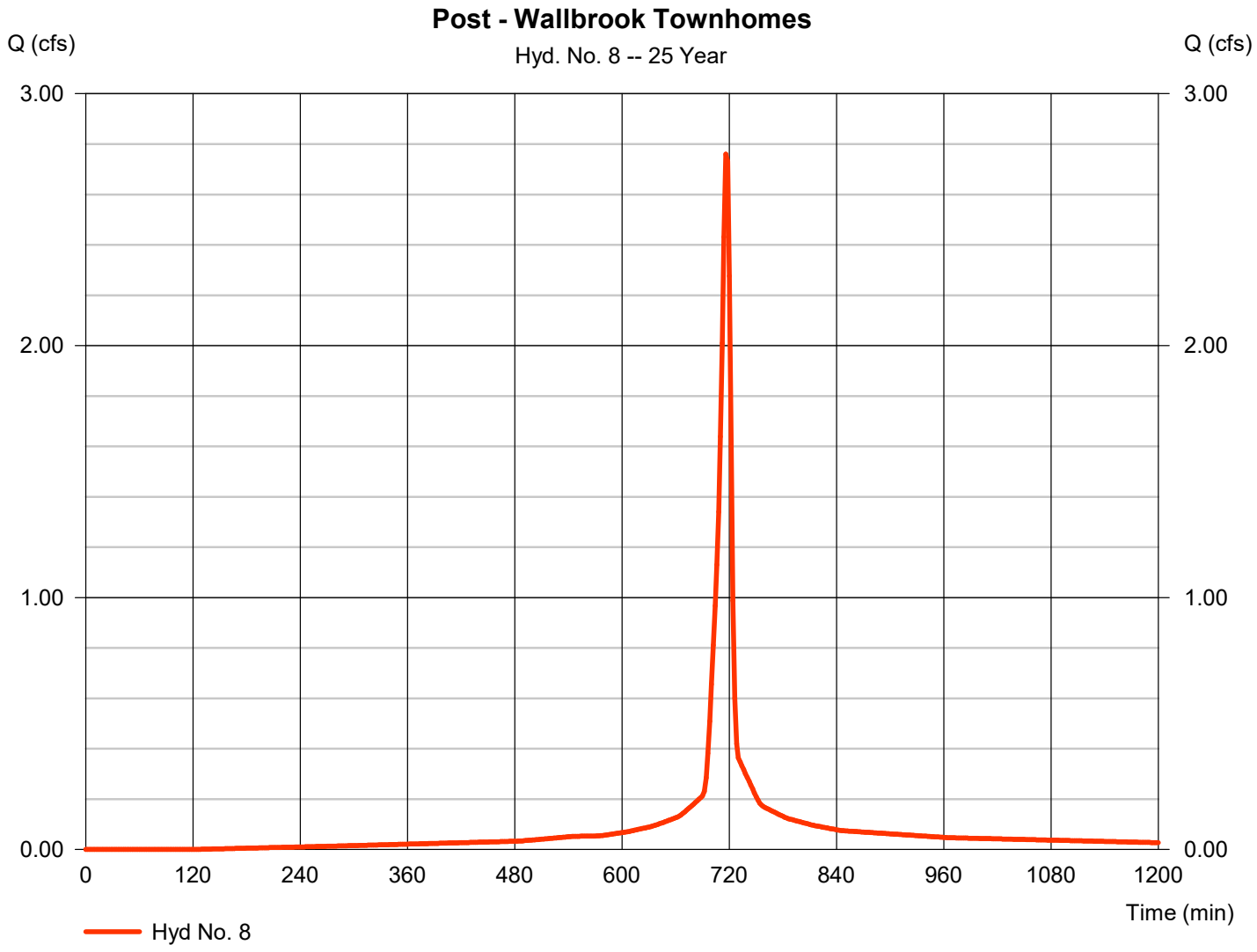
Hydrograph Report

Hyd. No. 8

Post - Wallbrook Townhomes

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.760 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	6,540 cuft
Drainage area	=	0.370 ac	Curve number	=	94*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.94 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(0.280 x 98) + (0.090 x 80)] / 0.370

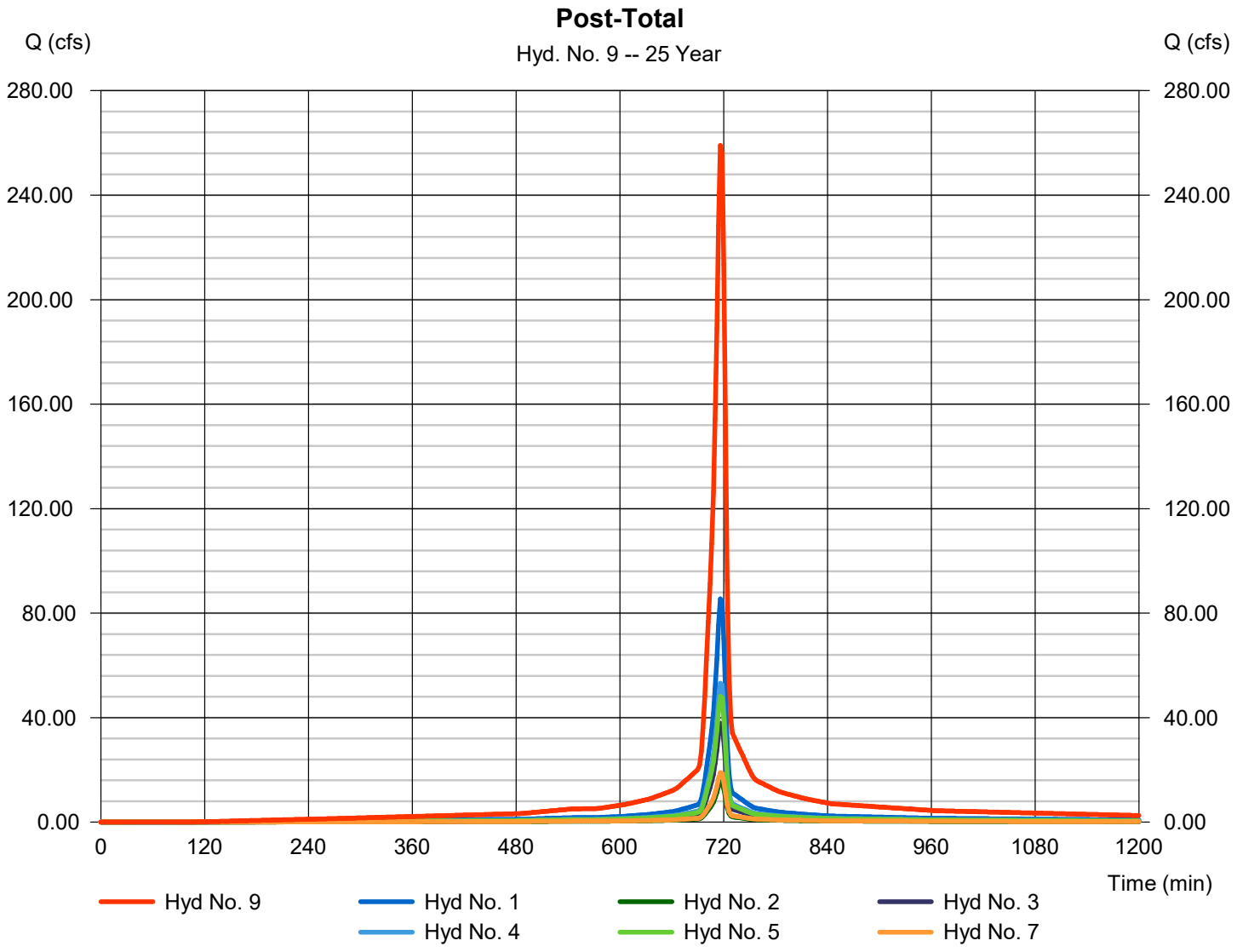


Hydrograph Report

Hyd. No. 9

Post-Total

Hydrograph type	=	Combine	Peak discharge	=	259.01 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	619,328 cuft
Inflow hyds.	=	1, 2, 3, 4, 5, 7	Contrib. drain. area	=	34.490 ac

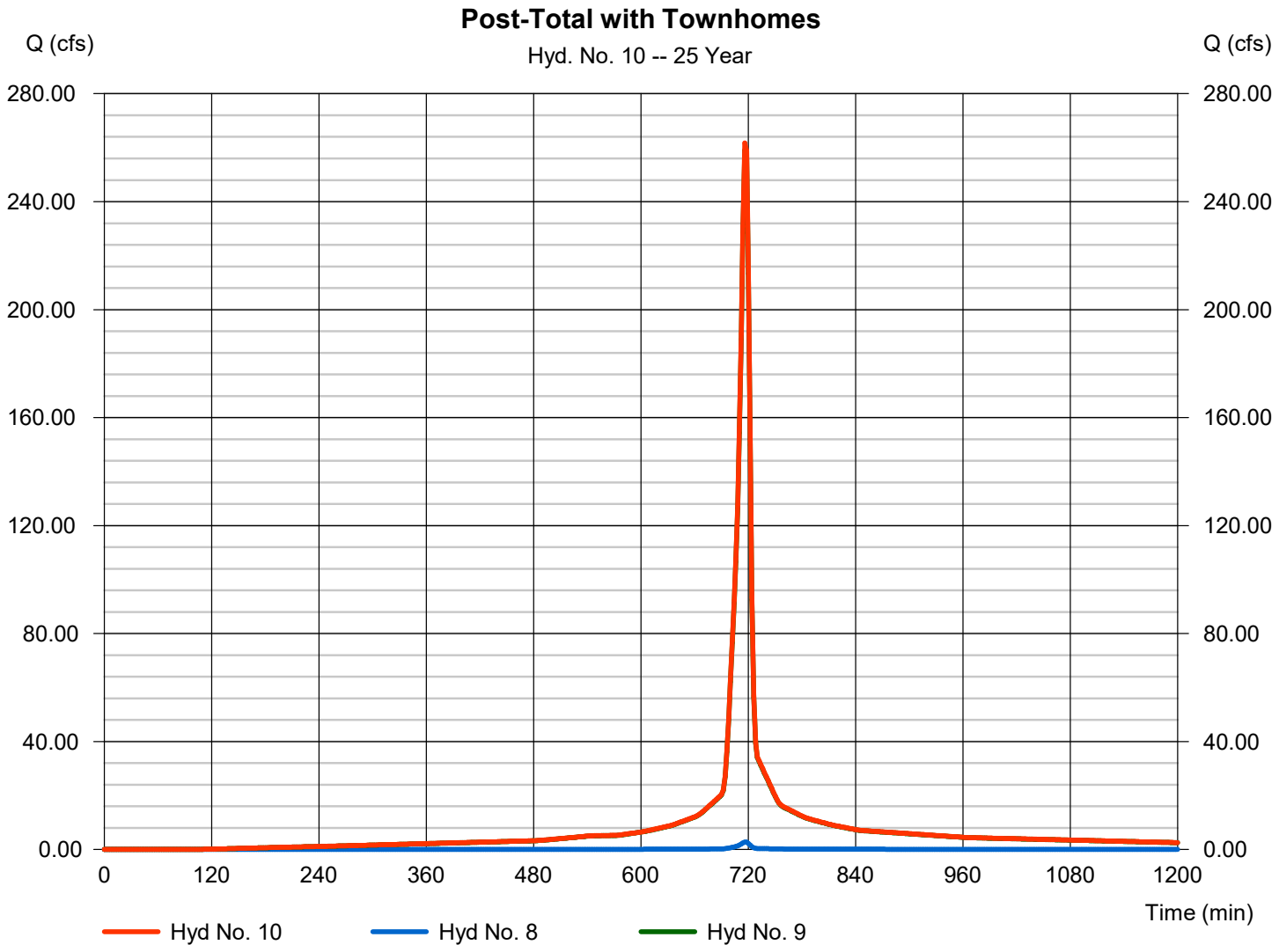


Hydrograph Report

Hyd. No. 10

Post-Total with Townhomes

Hydrograph type	=	Combine	Peak discharge	=	261.77 cfs
Storm frequency	=	25 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	625,868 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	0.370 ac



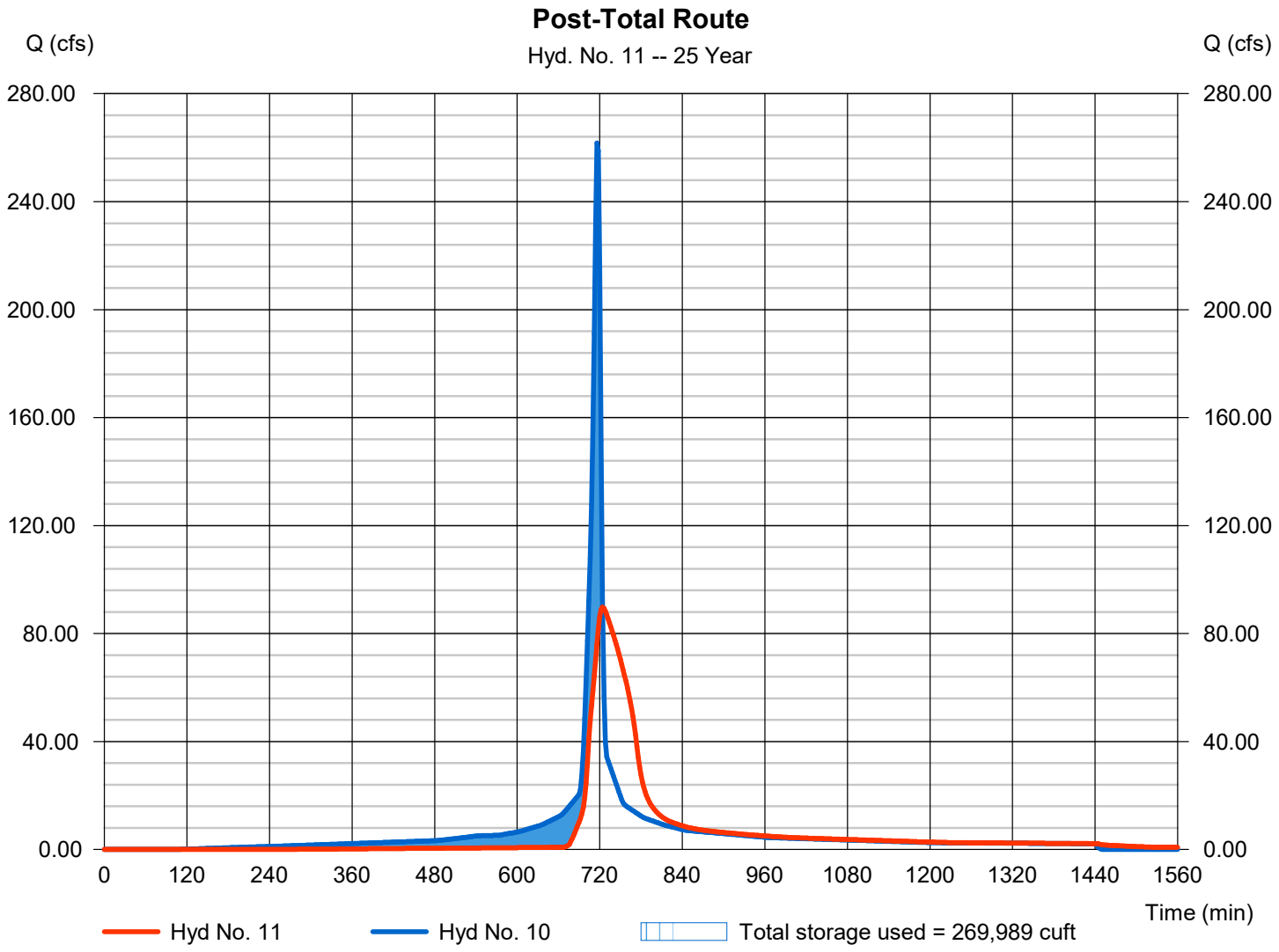
Hydrograph Report

Hyd. No. 11

Post-Total Route

Hydrograph type	= Reservoir	Peak discharge	= 89.79 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 620,195 cuft
Inflow hyd. No.	= 10 - Post-Total with Townhomes	Max. Elevation	= 366.90 ft
Reservoir name	= Wet Pond 1	Max. Storage	= 269,989 cuft

Storage Indication method used.

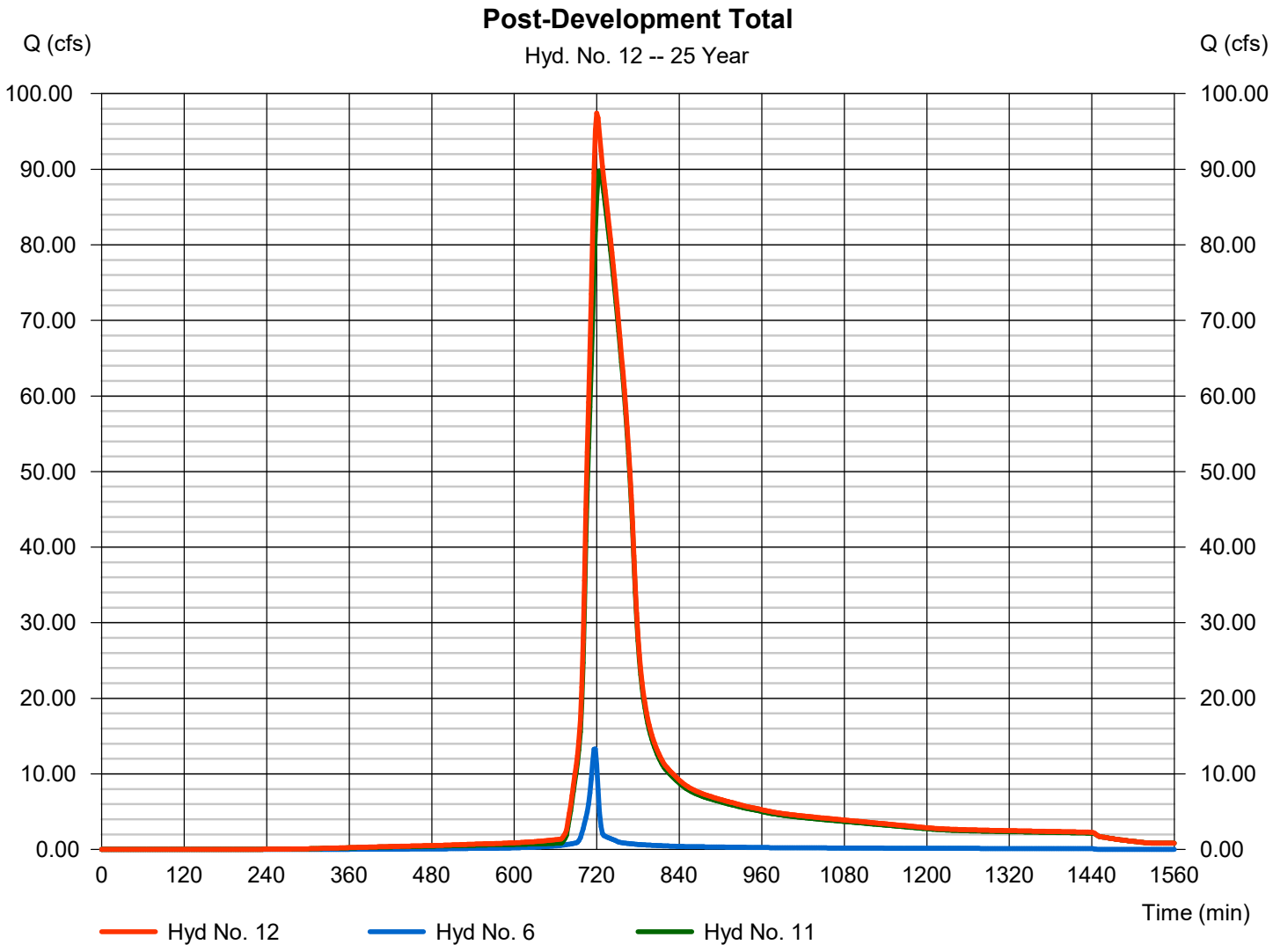


Hydrograph Report

Hyd. No. 12

Post-Development Total

Hydrograph type	= Combine	Peak discharge	= 97.45 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 649,428 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 2.040 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	107.88	2	716	262,155	------	------	------	Post - Wallbrook Lots 1 & 2
2	SCS Runoff	19.59	2	716	48,171	------	------	------	Post - New Roadways (Wallbrook/Va
3	SCS Runoff	47.88	2	716	115,078	------	------	------	Post - Boat Tract (Lot 5)
4	SCS Runoff	67.11	2	716	163,067	------	------	------	Post - Paris Tract (Lots 9, 10, 11)
5	SCS Runoff	60.91	2	716	146,401	------	------	------	Post - DOT Roadway
6	SCS Runoff	17.45	2	716	39,067	------	------	------	Post - Direct Release
7	SCS Runoff	23.86	2	716	57,974	------	------	------	Post - Lots 3 & 4
8	SCS Runoff	3.494	2	716	8,398	------	------	------	Post - Wallbrook Townhomes
9	Combine	327.23	2	716	792,846	1, 2, 3, 4, 5, 7, 8, 9	------	------	Post-Total
10	Combine	330.72	2	716	801,244		------	------	Post-Total with Townhomes
11	Reservoir	101.43	2	724	795,559	10	367.88	326,744	Post-Total Route
12	Combine	111.72	2	720	834,626	6, 11	------	------	Post-Development Total

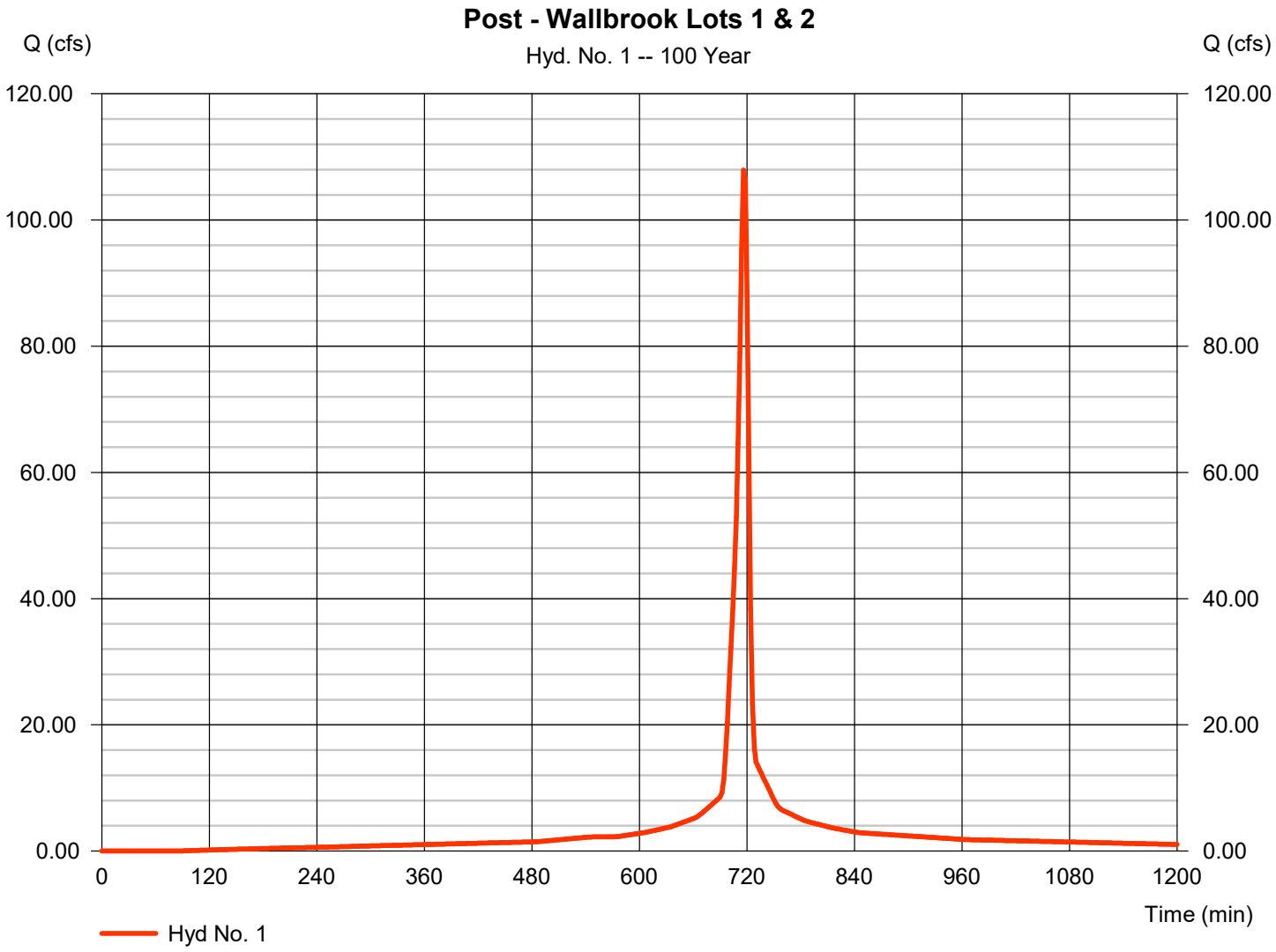
Hydrograph Report

Hyd. No. 1

Post - Wallbrook Lots 1 & 2

Hydrograph type	= SCS Runoff	Peak discharge	= 107.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 262,155 cuft
Drainage area	= 11.350 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.790 x 98) + (6.260 x 98) + (1.990 x 80) + (0.270 x 98) + (0.890 x 98) + (0.150 x 80)] / 11.350



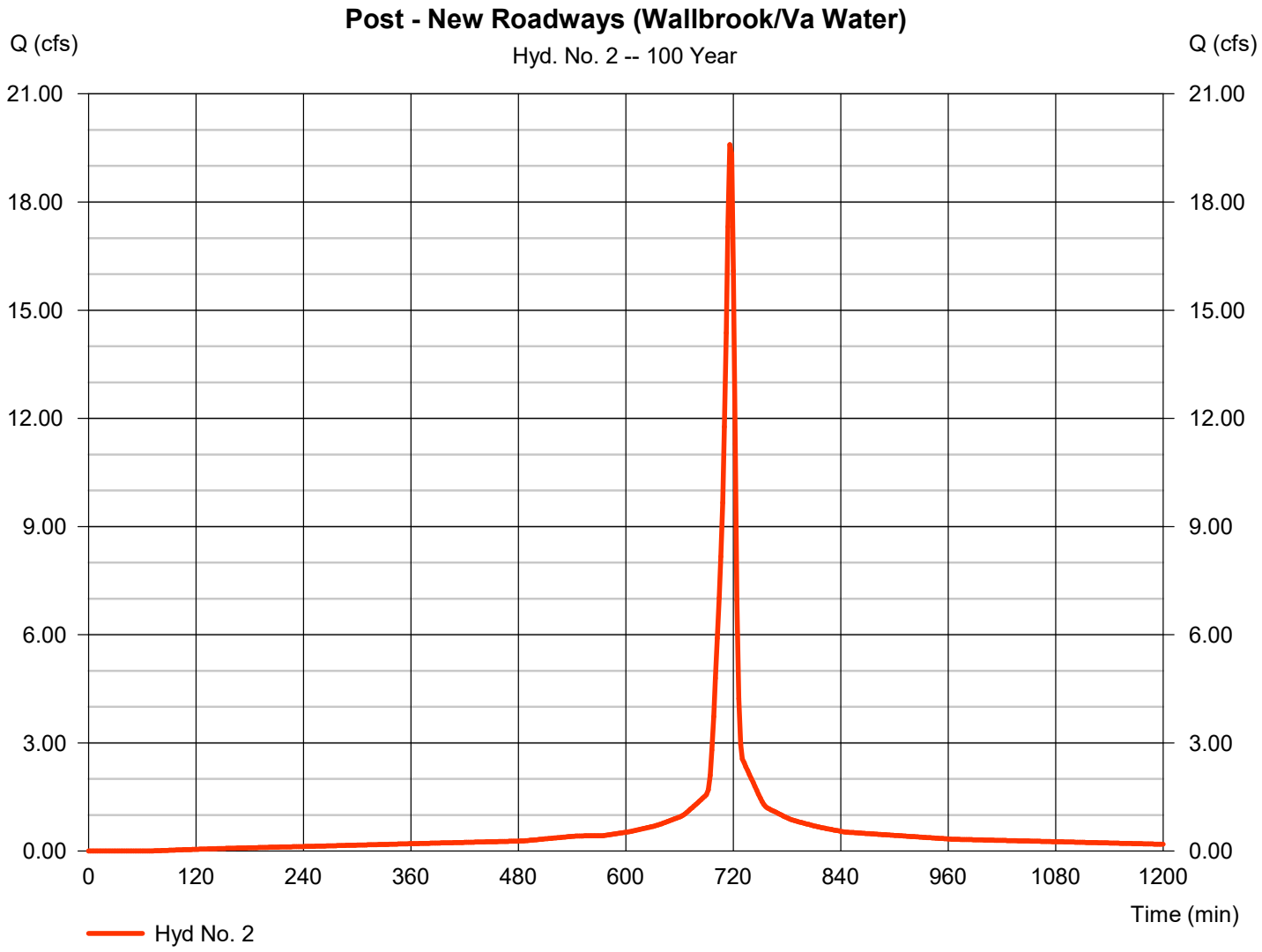
Hydrograph Report

Hyd. No. 2

Post - New Roadways (Wallbrook/Va Water)

Hydrograph type	= SCS Runoff	Peak discharge	= 19.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 48,171 cuft
Drainage area	= 2.050 ac	Curve number	= 96*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.820 x 98) + (0.230 x 80)] / 2.050



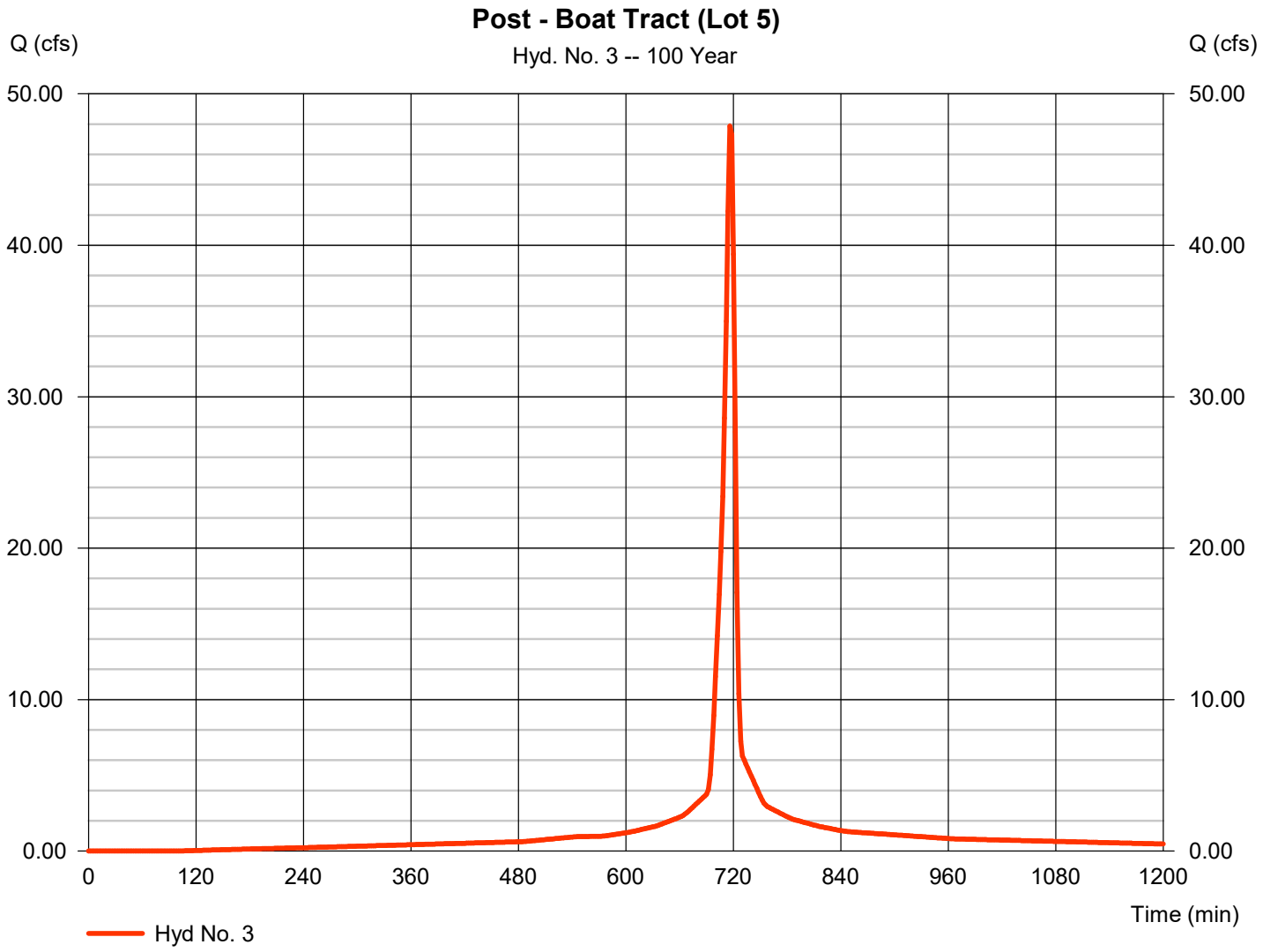
Hydrograph Report

Hyd. No. 3

Post - Boat Tract (Lot 5)

Hydrograph type	= SCS Runoff	Peak discharge	= 47.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 115,078 cuft
Drainage area	= 5.070 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.860 x 98) + (3.450 x 98) + (0.760 x 74)] / 5.070



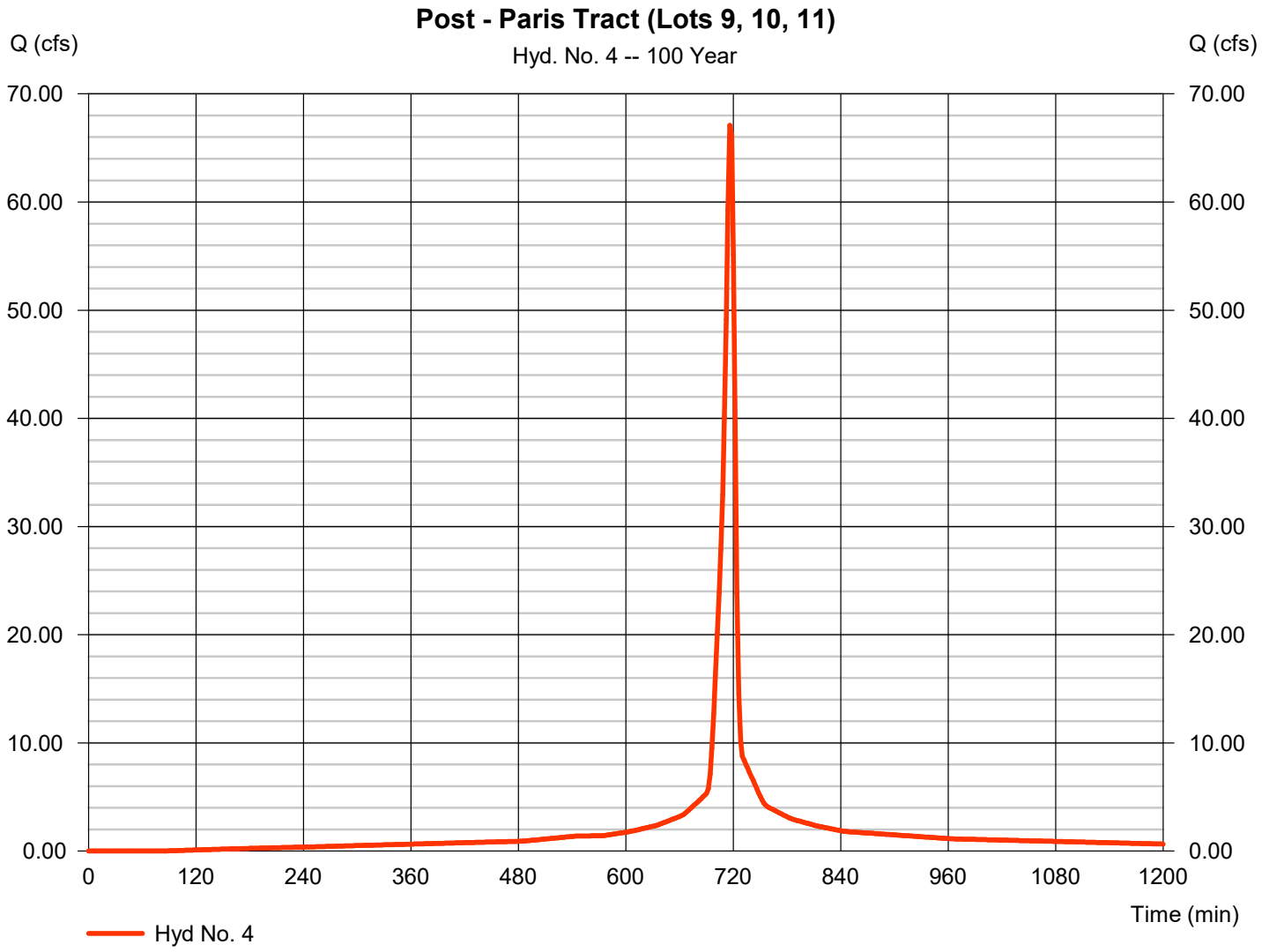
Hydrograph Report

Hyd. No. 4

Post - Paris Tract (Lots 9, 10, 11)

Hydrograph type	= SCS Runoff	Peak discharge	= 67.11 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 163,067 cuft
Drainage area	= 7.060 ac	Curve number	= 95*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.200 x 98) + (4.800 x 98) + (1.060 x 80)] / 7.060



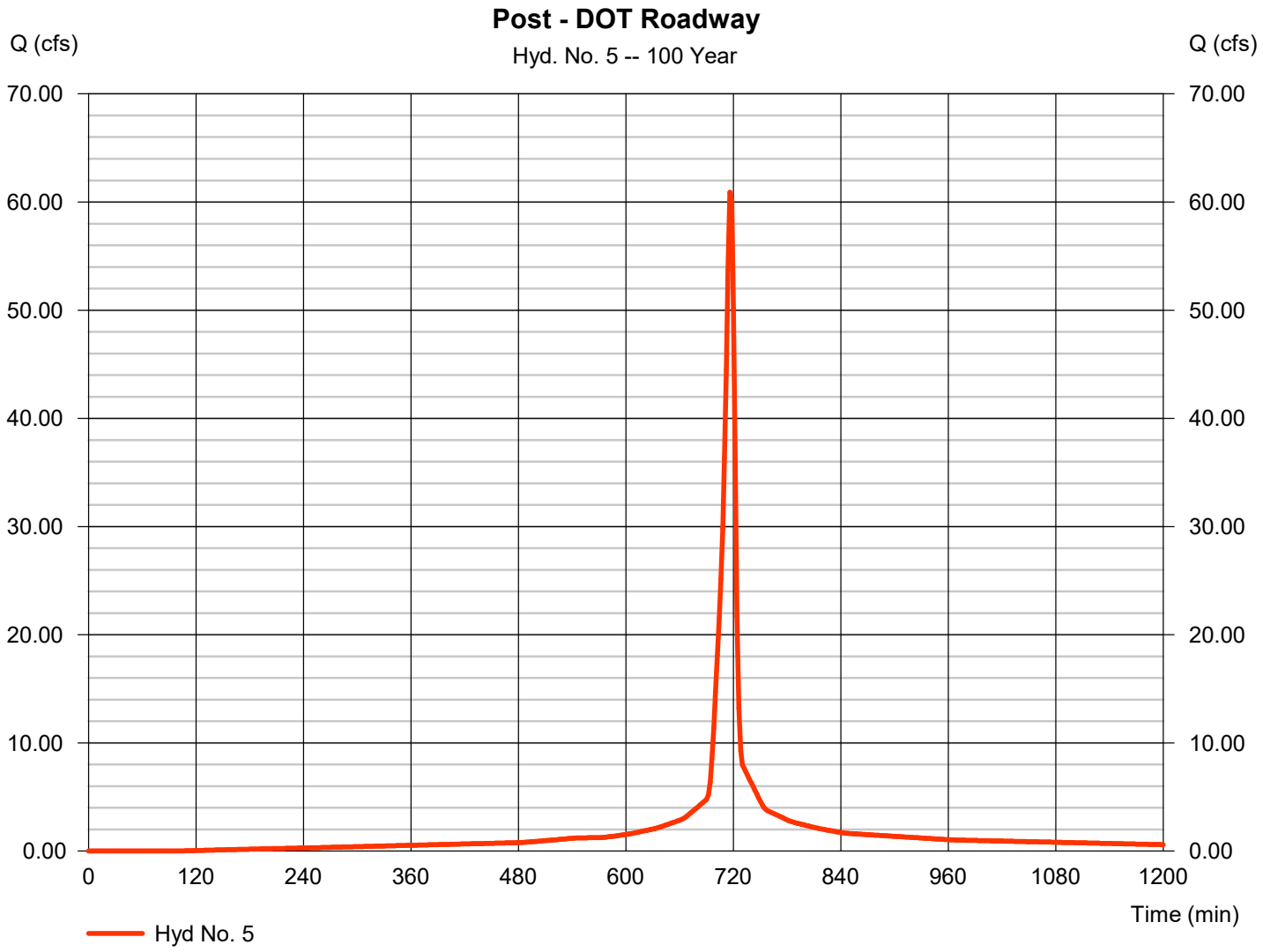
Hydrograph Report

Hyd. No. 5

Post - DOT Roadway

Hydrograph type	= SCS Runoff	Peak discharge	= 60.91 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 146,401 cuft
Drainage area	= 6.450 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(4.960 x 98) + (1.490 x 80)] / 6.450



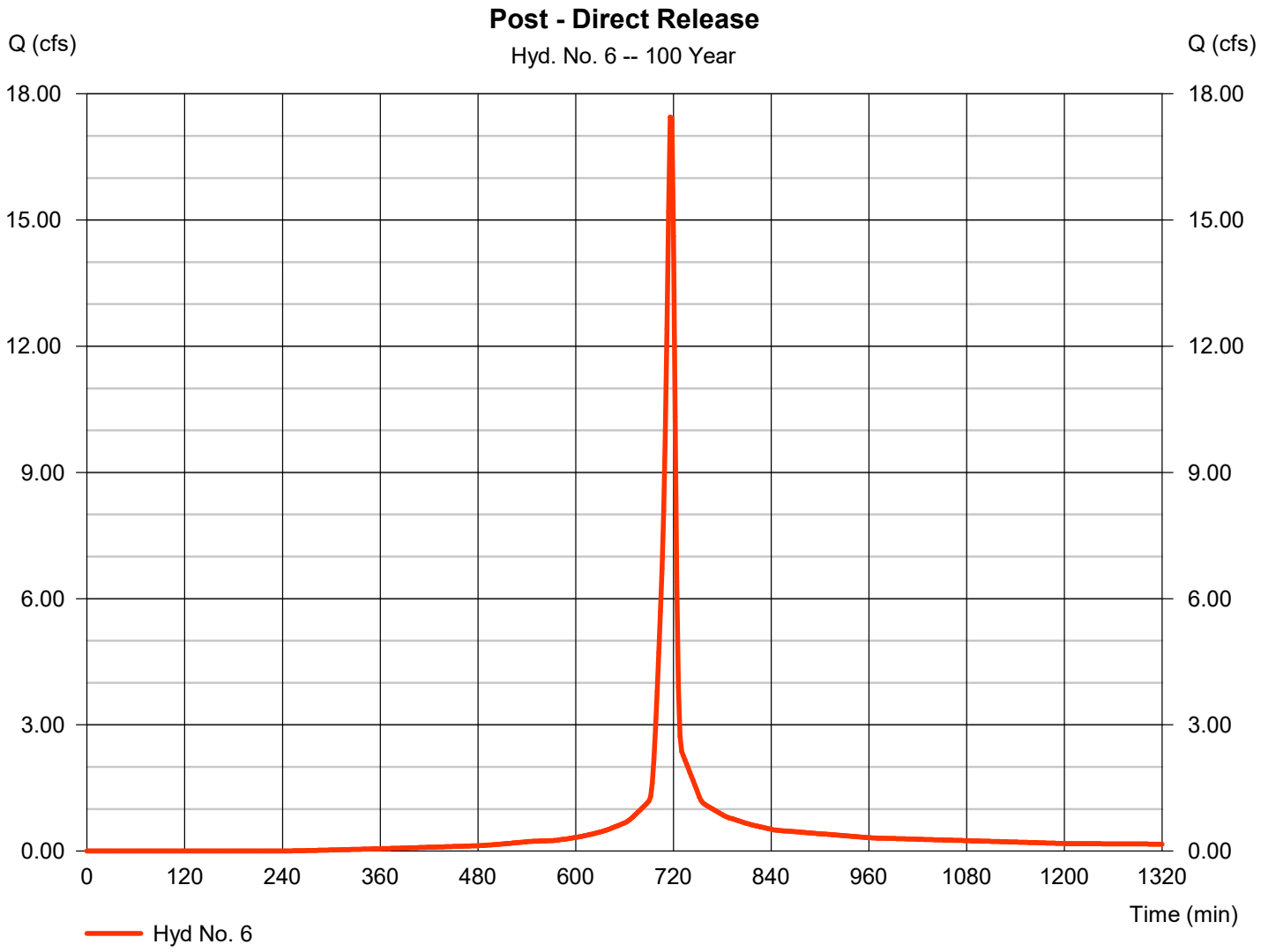
Hydrograph Report

Hyd. No. 6

Post - Direct Release

Hydrograph type	= SCS Runoff	Peak discharge	= 17.45 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 39,067 cuft
Drainage area	= 2.040 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(1.480 x 80) + (0.560 x 98)] / 2.040



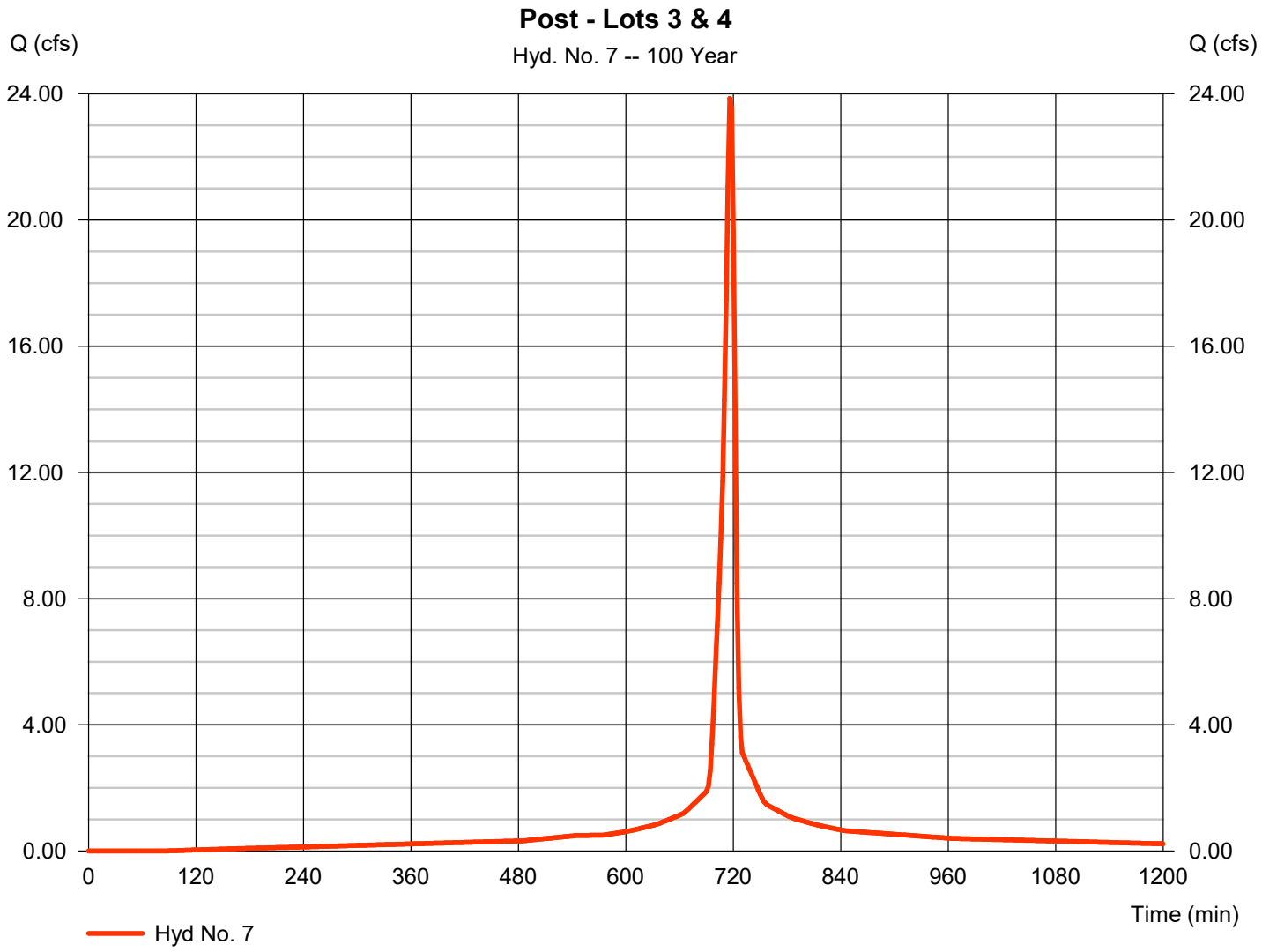
Hydrograph Report

Hyd. No. 7

Post - Lots 3 & 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	23.86 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	57,974 cuft
Drainage area	=	2.510 ac	Curve number	=	95*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.44 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400

* Composite (Area/CN) = [(0.320 x 98) + (1.810 x 98) + (0.380 x 80)] / 2.510



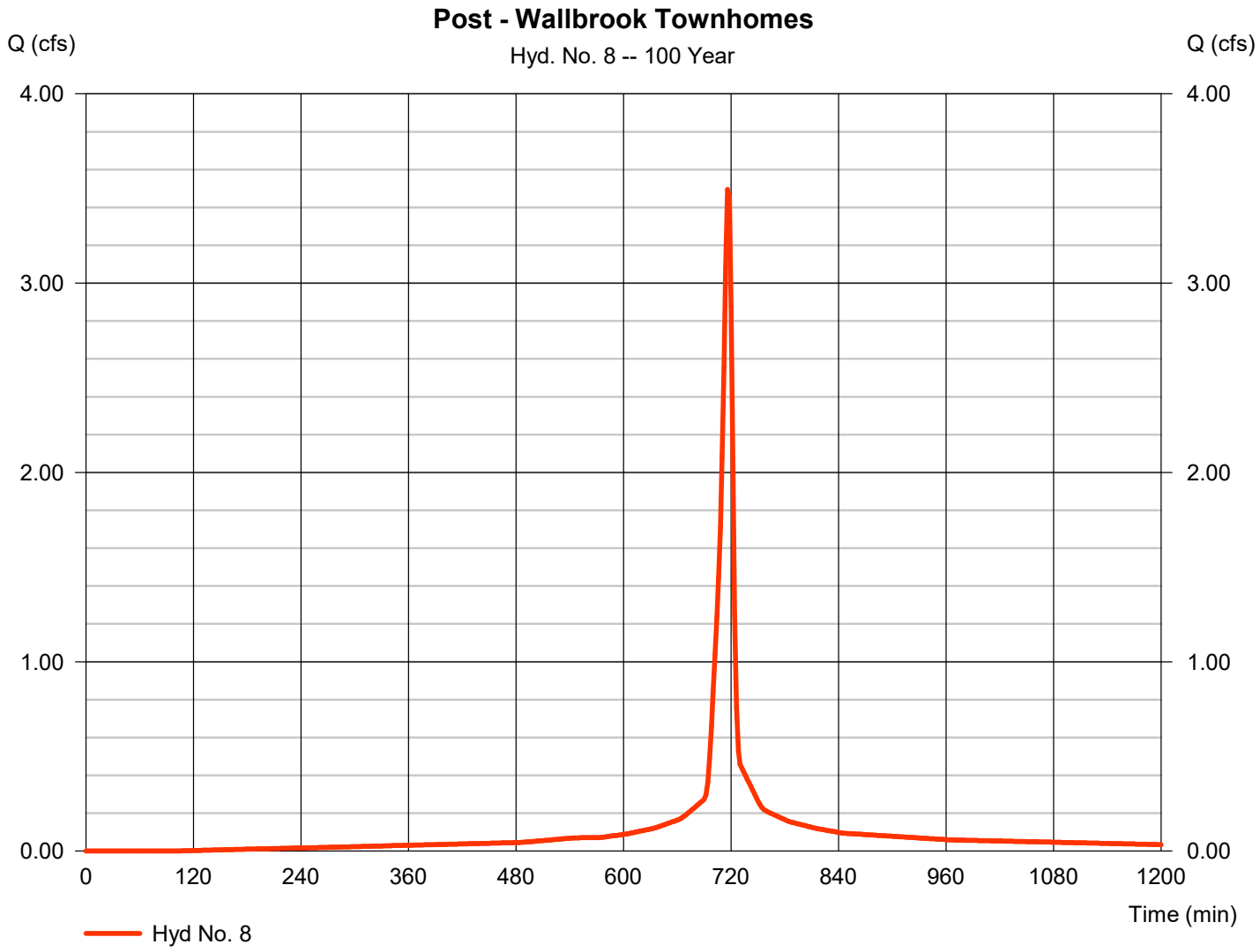
Hydrograph Report

Hyd. No. 8

Post - Wallbrook Townhomes

Hydrograph type	= SCS Runoff	Peak discharge	= 3.494 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 8,398 cuft
Drainage area	= 0.370 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

* Composite (Area/CN) = [(0.280 x 98) + (0.090 x 80)] / 0.370

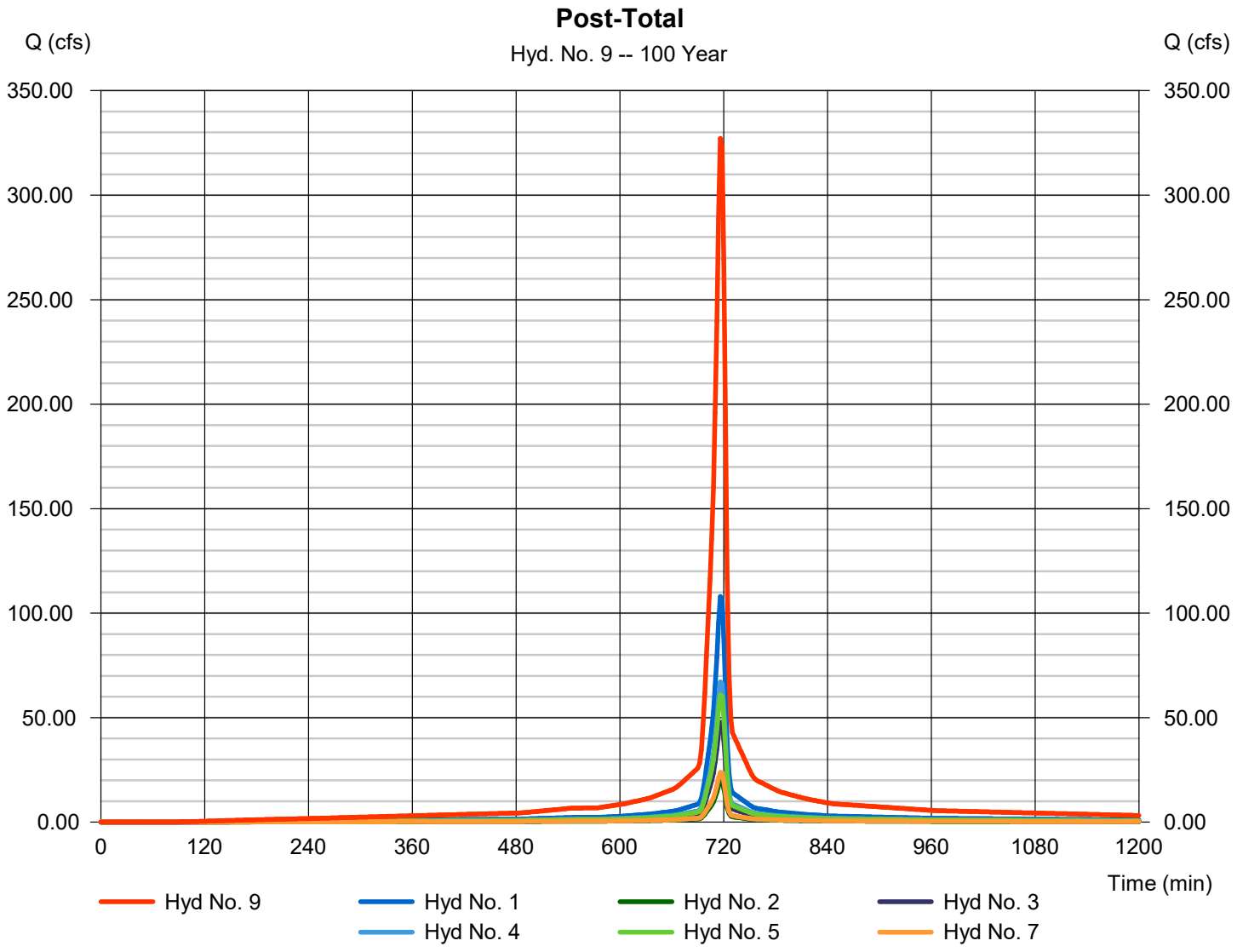


Hydrograph Report

Hyd. No. 9

Post-Total

Hydrograph type	= Combine	Peak discharge	= 327.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 716 min
Time interval	= 2 min	Hyd. volume	= 792,846 cuft
Inflow hyds.	= 1, 2, 3, 4, 5, 7	Contrib. drain. area	= 34.490 ac

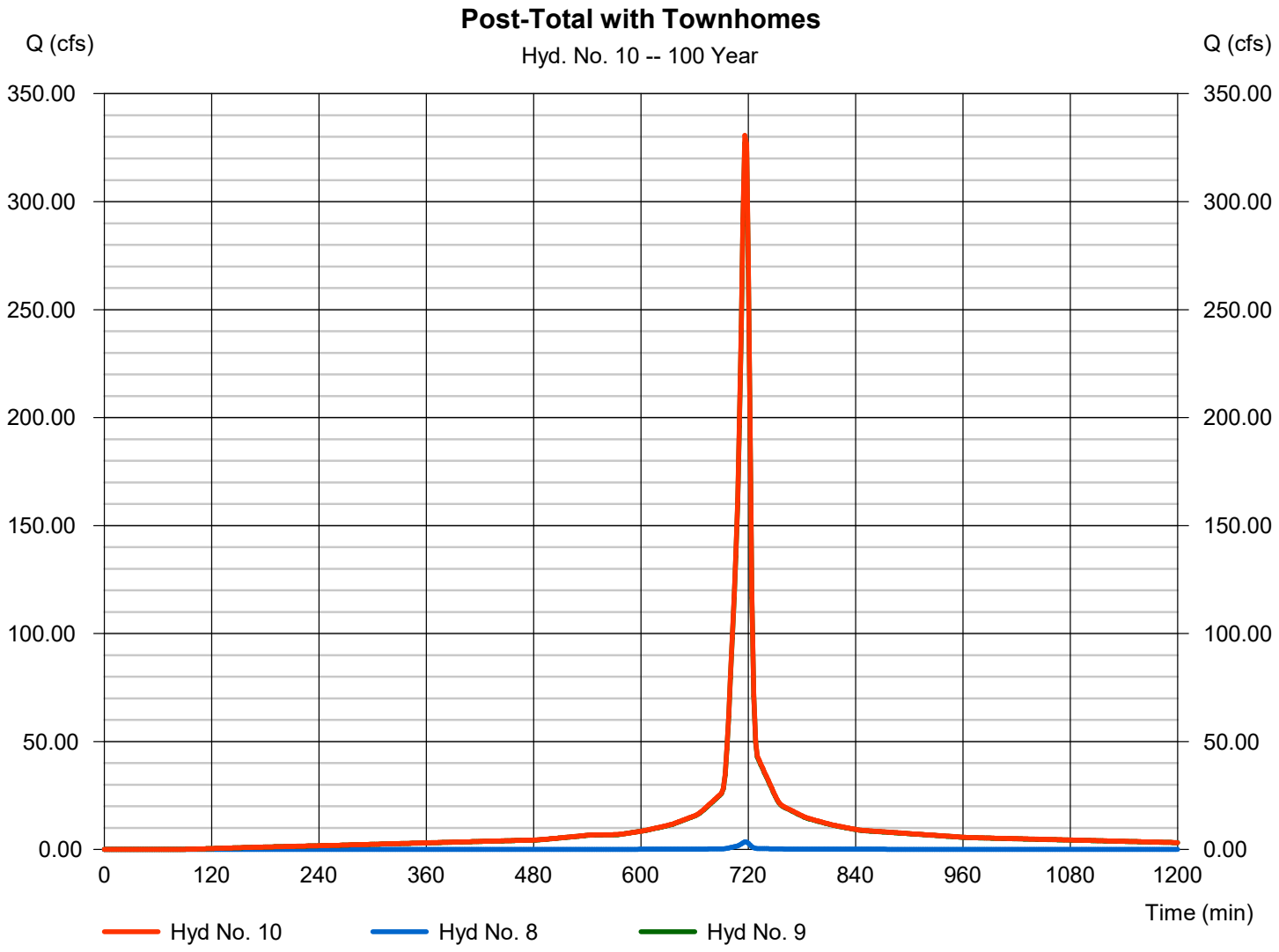


Hydrograph Report

Hyd. No. 10

Post-Total with Townhomes

Hydrograph type	=	Combine	Peak discharge	=	330.72 cfs
Storm frequency	=	100 yrs	Time to peak	=	716 min
Time interval	=	2 min	Hyd. volume	=	801,244 cuft
Inflow hyds.	=	8, 9	Contrib. drain. area	=	0.370 ac



Hydrograph Report

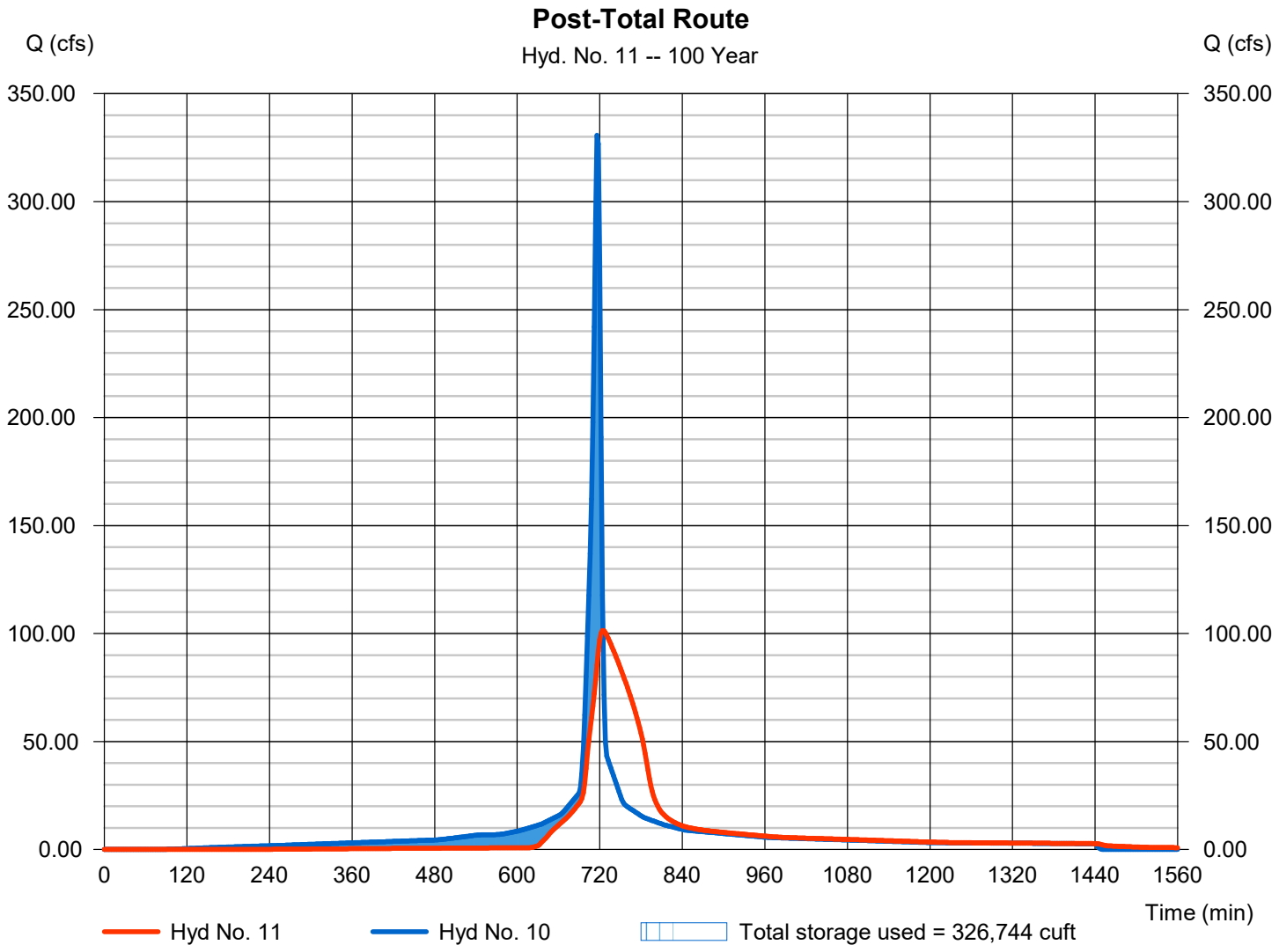
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Thursday, 09 / 21 / 2023

Hyd. No. 11

Post-Total Route

Hydrograph type	= Reservoir	Peak discharge	= 101.43 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 795,559 cuft
Inflow hyd. No.	= 10 - Post-Total with Townhomes	Max. Elevation	= 367.88 ft
Reservoir name	= Wet Pond 1	Max. Storage	= 326,744 cuft

Storage Indication method used.

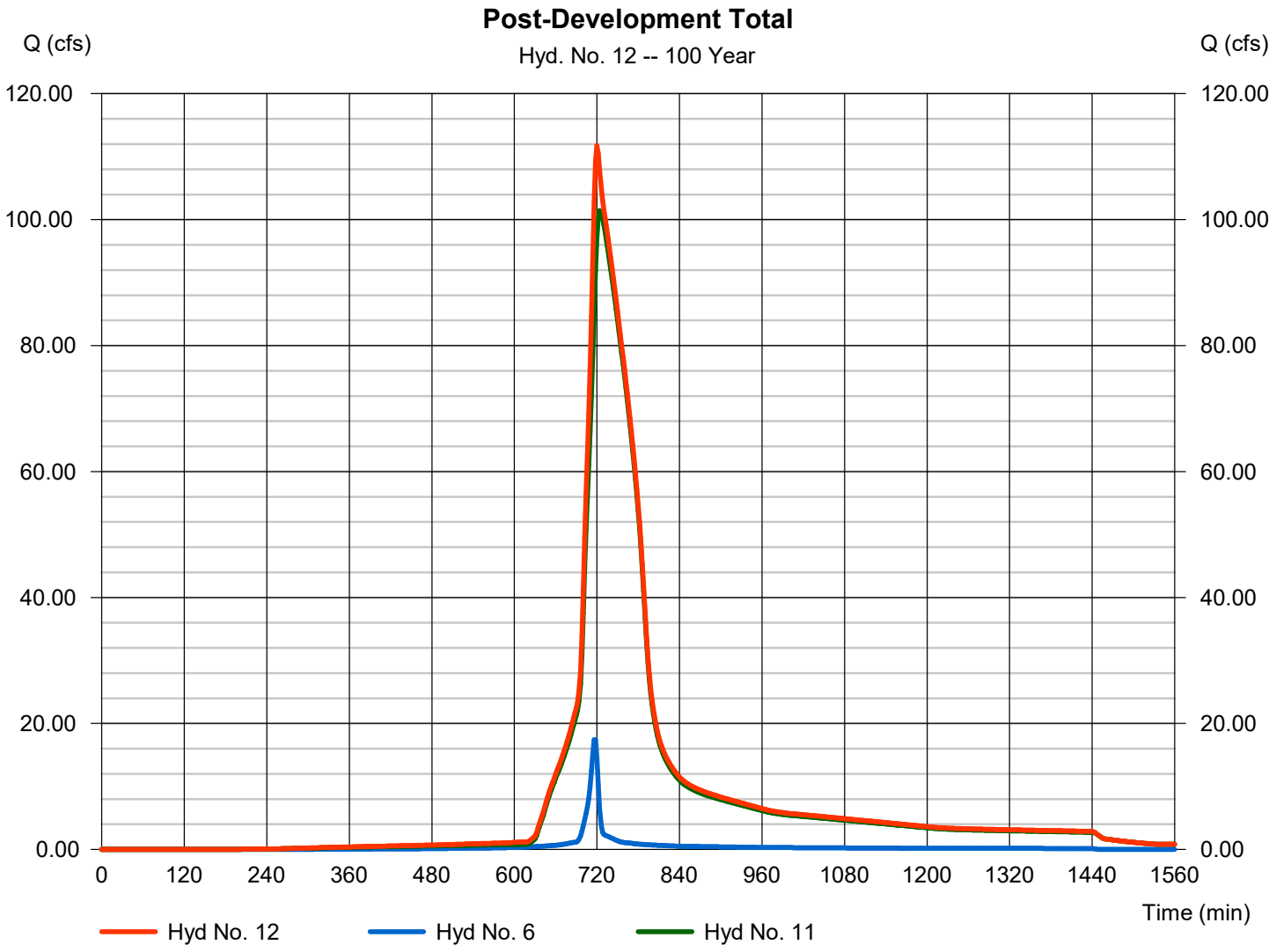


Hydrograph Report

Hyd. No. 12

Post-Development Total

Hydrograph type	= Combine	Peak discharge	= 111.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 834,626 cuft
Inflow hyds.	= 6, 11	Contrib. drain. area	= 2.040 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	62.1764	12.7000	0.8901	--------
2	71.2172	12.9000	0.8806	--------
3	0.0000	0.0000	0.0000	--------
5	68.4975	12.5000	0.8273	--------
10	73.1091	12.6000	0.8093	--------
25	2164.2561	37.3000	1.4976	--------
50	56.2148	10.1000	0.6951	--------
100	50.1117	8.9000	0.6500	--------

File name: Rolesville.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.82	3.86	3.23	2.79	2.46	2.20	1.99	1.82	1.68	1.56	1.46	1.37
2	5.61	4.52	3.80	3.28	2.90	2.60	2.36	2.16	2.00	1.86	1.74	1.63
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.42	5.21	4.42	3.85	3.42	3.08	2.81	2.59	2.40	2.24	2.10	1.98
10	7.18	5.86	4.99	4.36	3.88	3.51	3.21	2.96	2.75	2.57	2.42	2.28
25	7.94	6.72	5.78	5.04	4.45	3.96	3.56	3.22	2.93	2.68	2.47	2.28
50	8.52	6.98	5.98	5.27	4.74	4.32	3.98	3.70	3.46	3.26	3.08	2.93
100	9.06	7.42	6.37	5.63	5.07	4.64	4.29	4.00	3.75	3.54	3.36	3.20

Tc = time in minutes. Values may exceed 60.

Precip. file name: D:\Ark Dropbox\03 - Support\Software\Hydraflow\Rolesville.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.86	3.45	0.00	4.32	5.01	5.94	6.69	7.44
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre-Dev Lots 3 & 4
2	SCS Runoff	Post-Dev Lots 3 & 4

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	------	5.679	8.235	-------	12.27	15.60	20.21	23.99	27.79	Pre-Dev Lots 3 & 4
2	SCS Runoff	------	4.051	5.675	-------	8.188	10.24	13.05	15.33	17.62	Post-Dev Lots 3 & 4

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

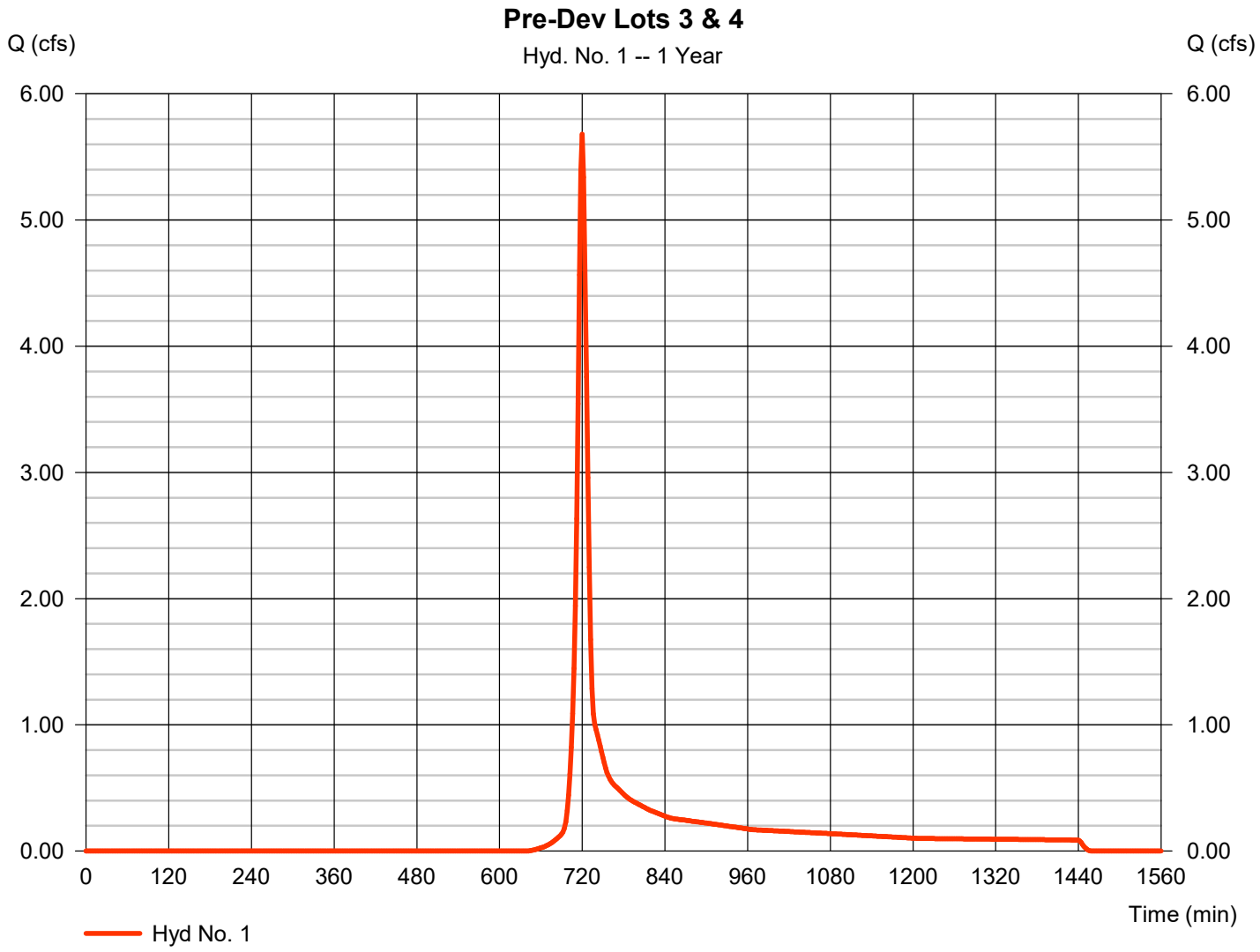
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.679	2	720	14,299	------	------	------	Pre-Dev Lots 3 & 4
2	SCS Runoff	4.051	2	720	10,056	------	------	------	Post-Dev Lots 3 & 4

Hydrograph Report

Hyd. No. 1

Pre-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 5.679 cfs
Storm frequency	= 1 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,299 cuft
Drainage area	= 3.910 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 2.86 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

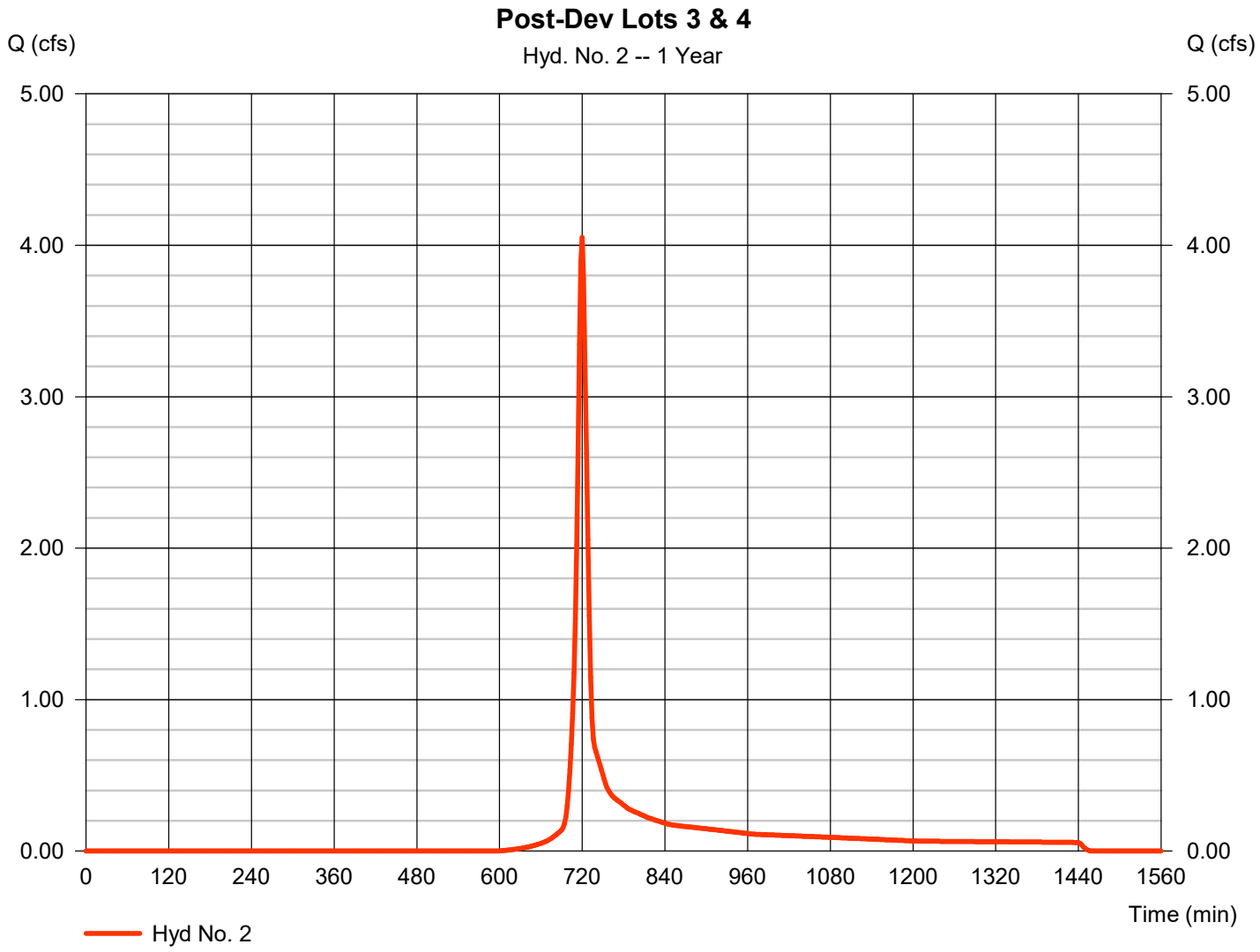


Hydrograph Report

Hyd. No. 2

Post-Dev Lots 3 & 4

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.051 cfs
Storm frequency	=	1 yrs	Time to peak	=	720 min
Time interval	=	2 min	Hyd. volume	=	10,056 cuft
Drainage area	=	2.340 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	7.30 min
Total precip.	=	2.86 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	400



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

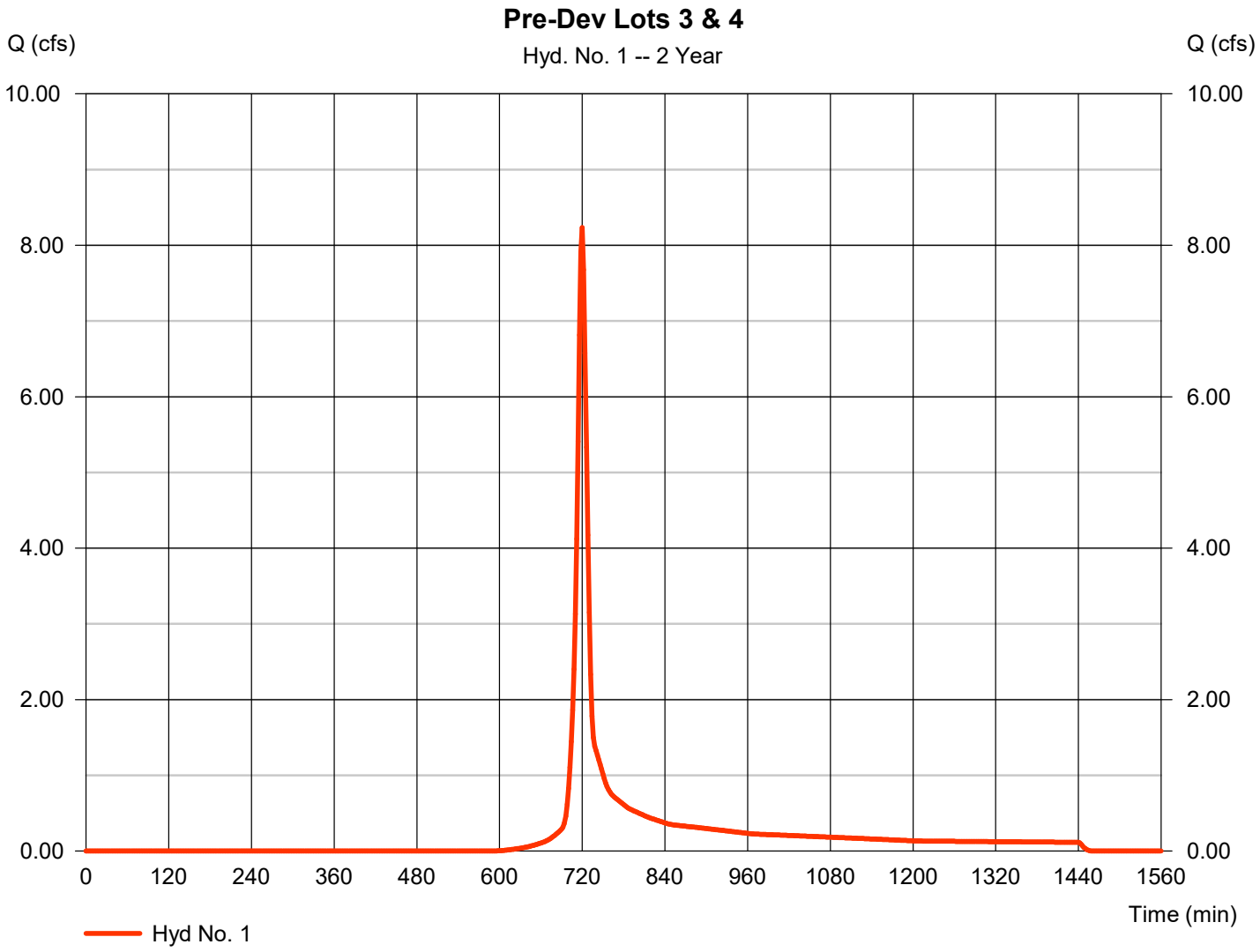
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	8.235	2	720	20,432	------	------	------	Pre-Dev Lots 3 & 4
2	SCS Runoff	5.675	2	720	14,012	------	------	------	Post-Dev Lots 3 & 4

Hydrograph Report

Hyd. No. 1

Pre-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 8.235 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 20,432 cuft
Drainage area	= 3.910 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

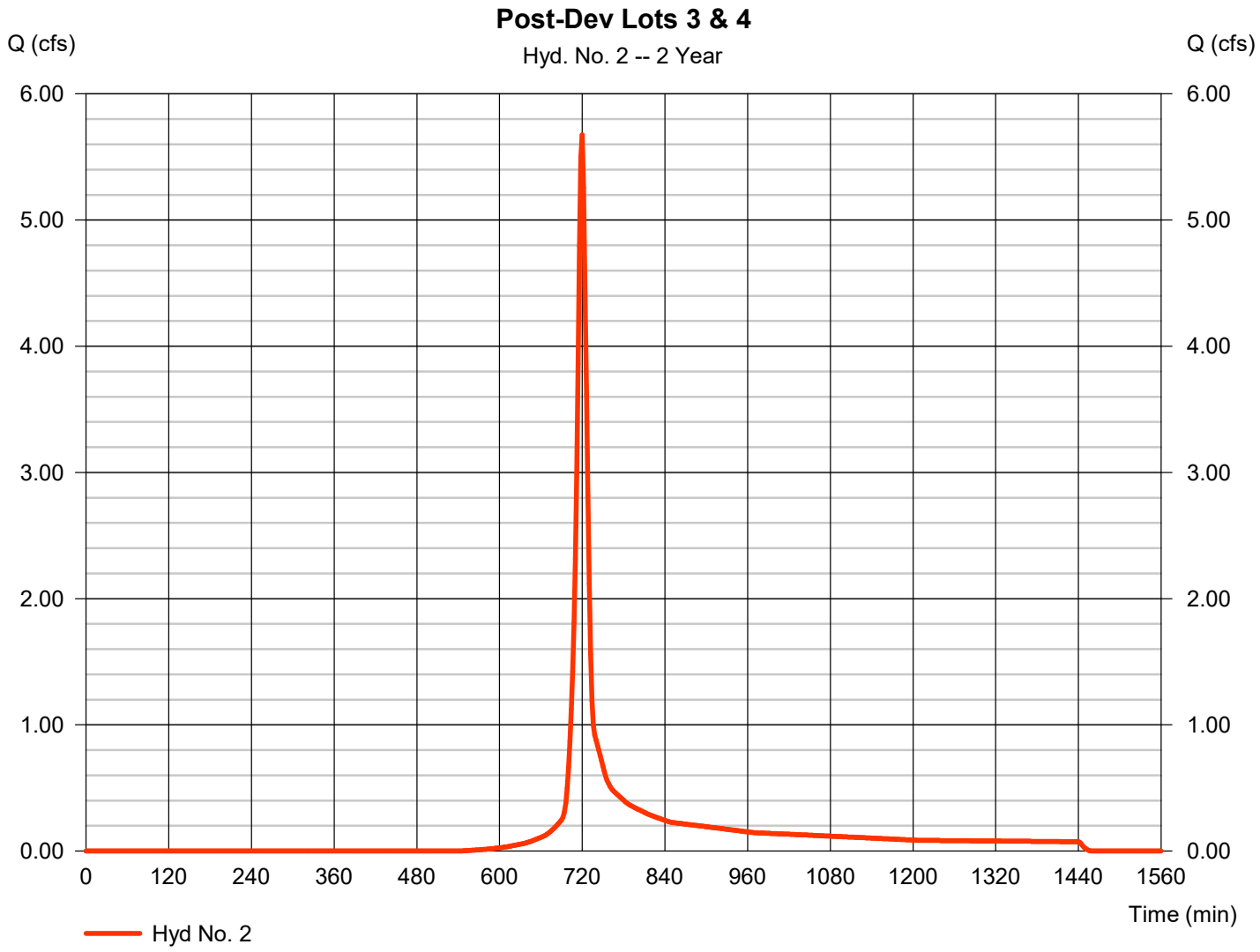


Hydrograph Report

Hyd. No. 2

Post-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 5.675 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 14,012 cuft
Drainage area	= 2.340 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 3.45 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

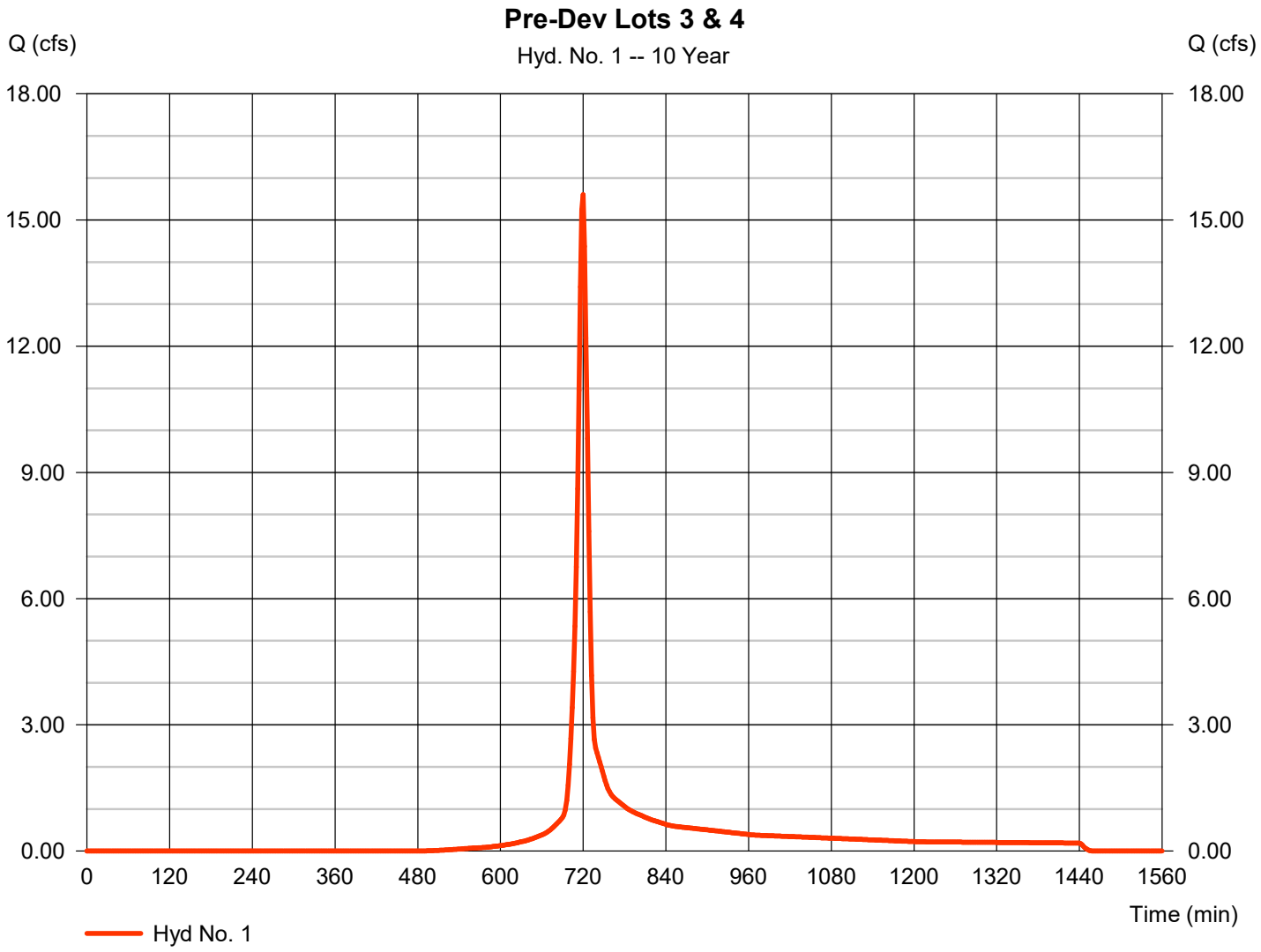
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	15.60	2	720	38,582	------	------	------	Pre-Dev Lots 3 & 4
2	SCS Runoff	10.24	2	720	25,461	------	------	------	Post-Dev Lots 3 & 4

Hydrograph Report

Hyd. No. 1

Pre-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 15.60 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 38,582 cuft
Drainage area	= 3.910 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

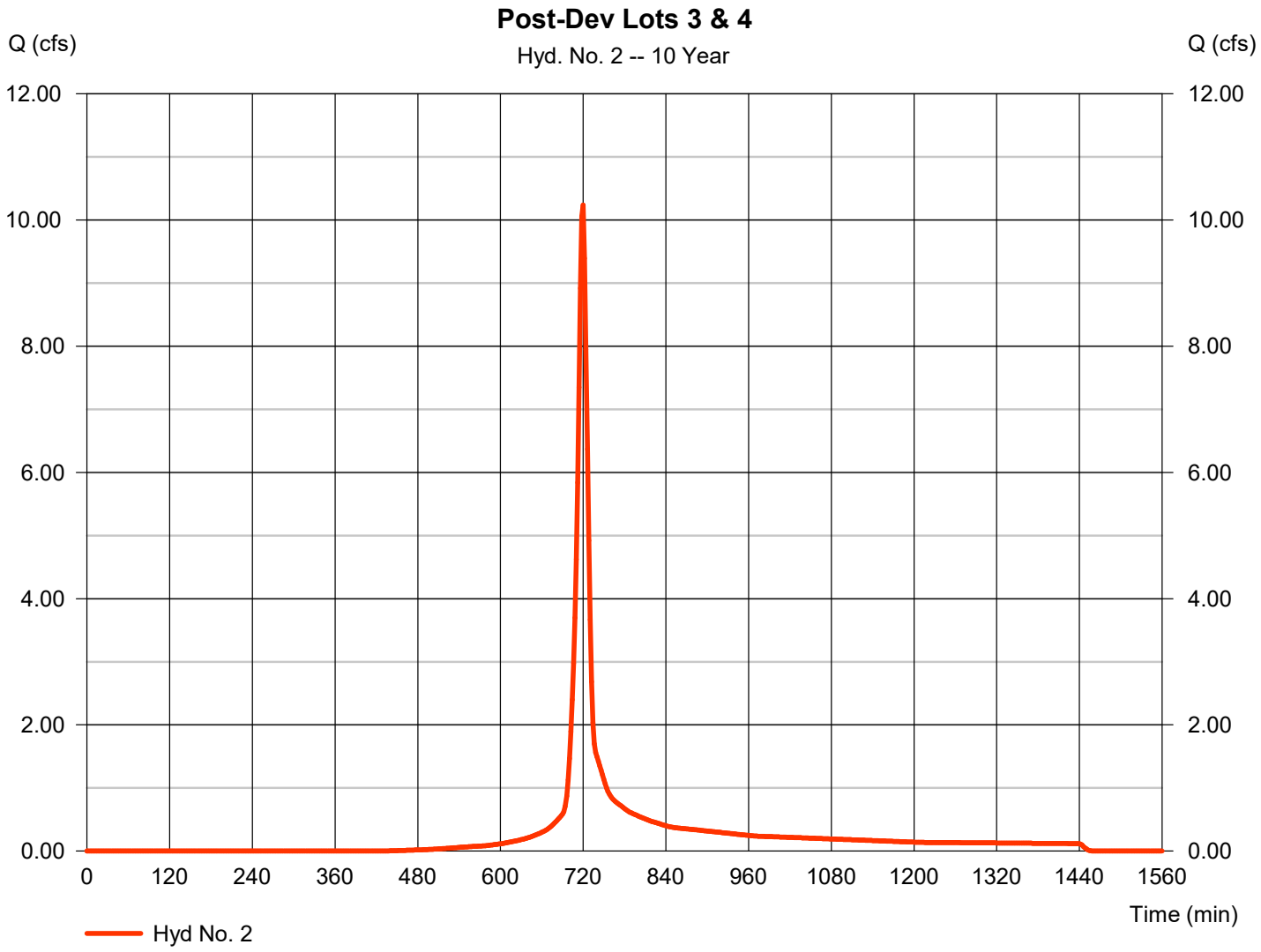


Hydrograph Report

Hyd. No. 2

Post-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 10.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 25,461 cuft
Drainage area	= 2.340 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 5.01 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

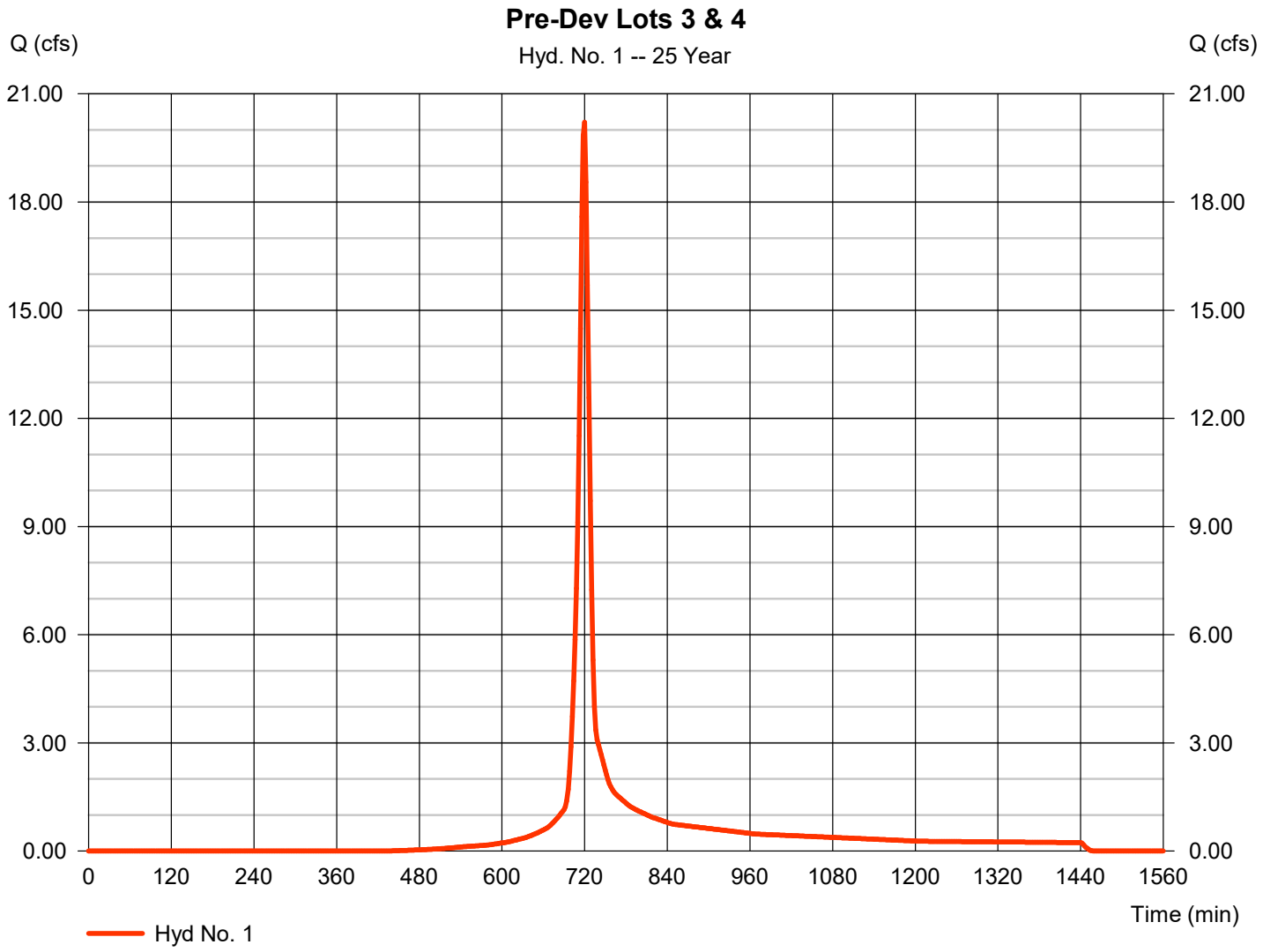
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	20.21	2	720	50,244	------	------	------	Pre-Dev Lots 3 & 4
2	SCS Runoff	13.05	2	720	32,706	------	------	------	Post-Dev Lots 3 & 4

Hydrograph Report

Hyd. No. 1

Pre-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 20.21 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 50,244 cuft
Drainage area	= 3.910 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

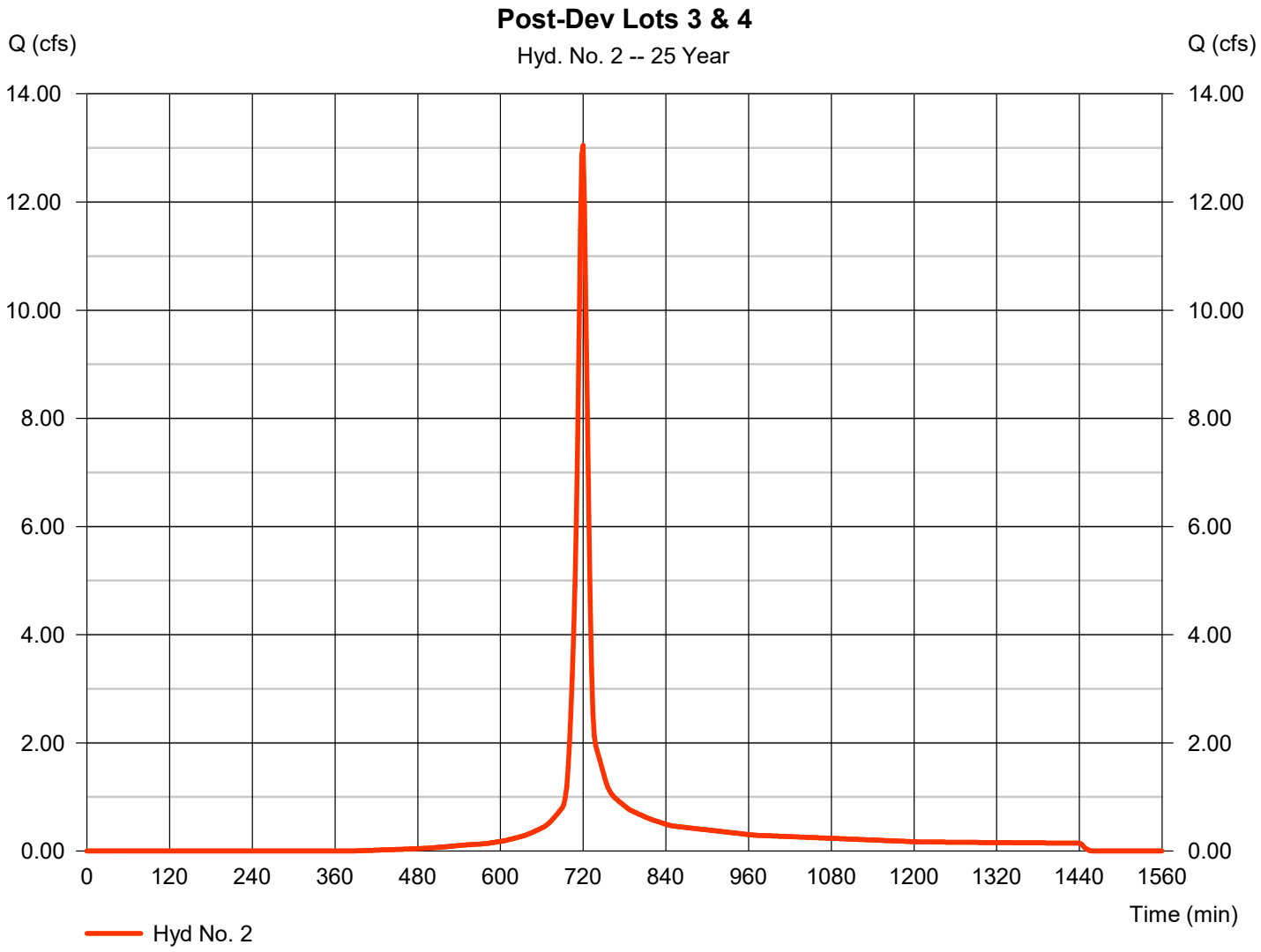


Hydrograph Report

Hyd. No. 2

Post-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 13.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 32,706 cuft
Drainage area	= 2.340 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 5.94 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023

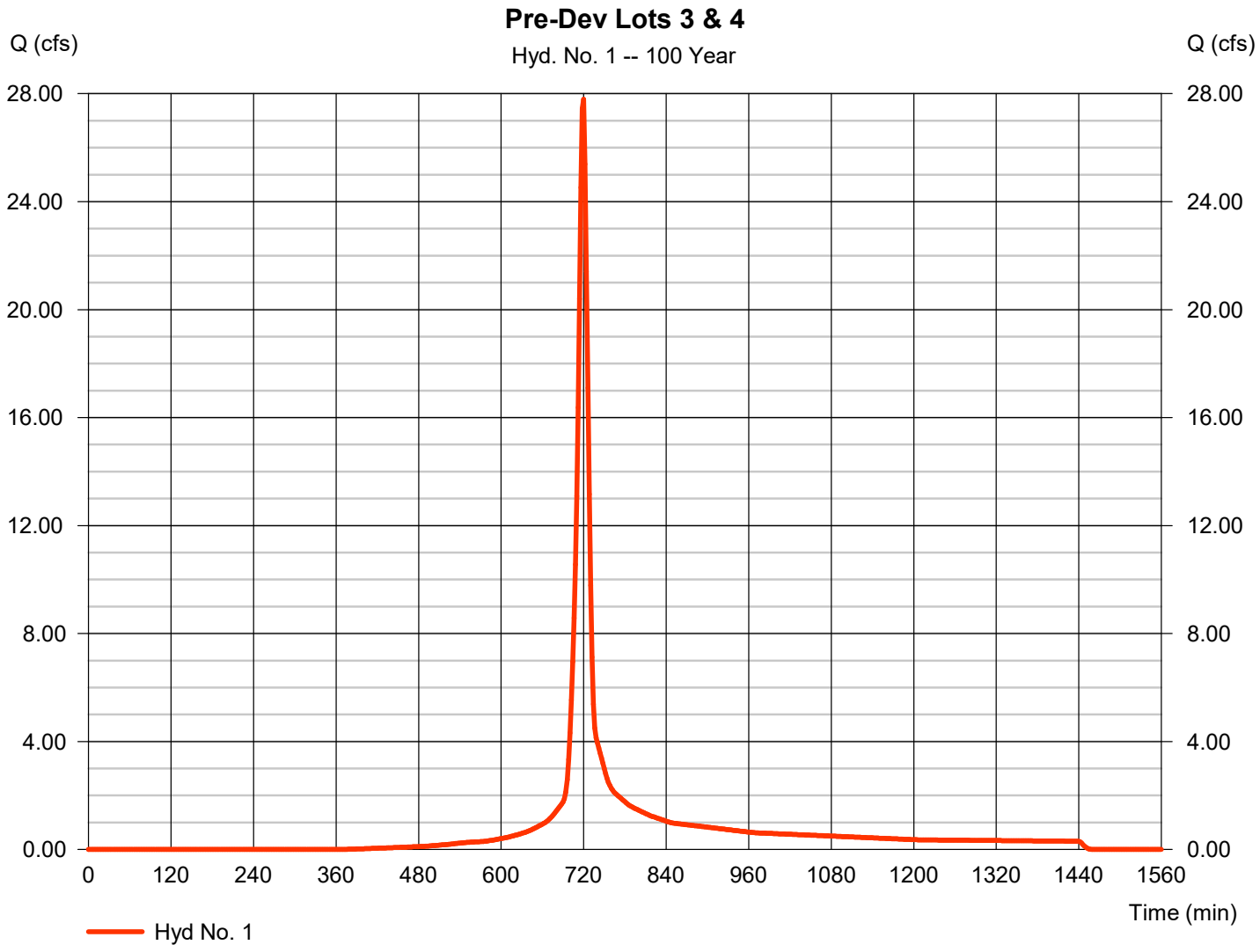
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	27.79	2	720	69,842	------	------	------	Pre-Dev Lots 3 & 4
2	SCS Runoff	17.62	2	720	44,771	------	------	------	Post-Dev Lots 3 & 4

Hydrograph Report

Hyd. No. 1

Pre-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 27.79 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 69,842 cuft
Drainage area	= 3.910 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.50 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400

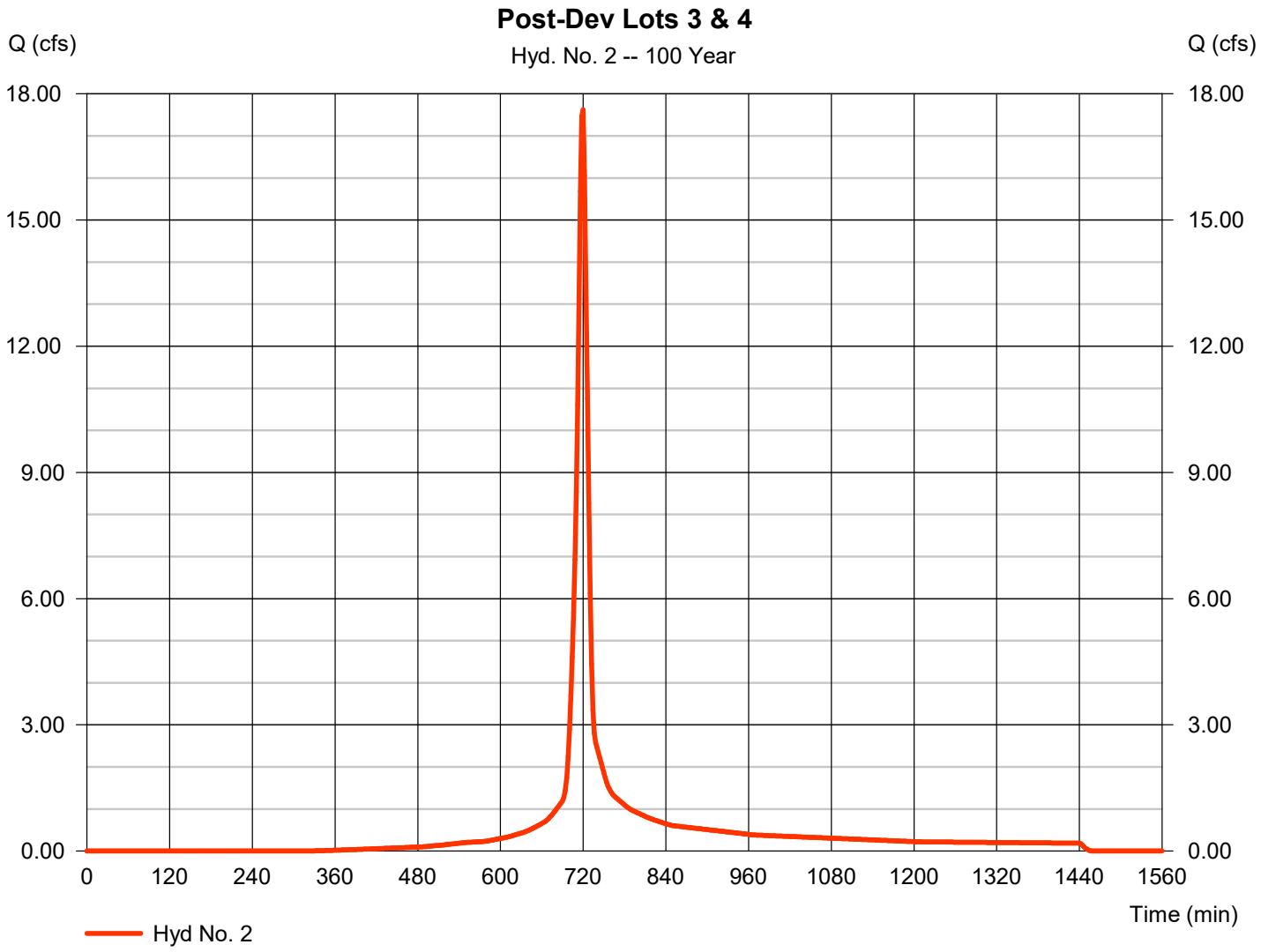


Hydrograph Report

Hyd. No. 2

Post-Dev Lots 3 & 4

Hydrograph type	= SCS Runoff	Peak discharge	= 17.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 2 min	Hyd. volume	= 44,771 cuft
Drainage area	= 2.340 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 7.30 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 400



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	62.1764	12.7000	0.8901	--------
2	71.2172	12.9000	0.8806	--------
3	0.0000	0.0000	0.0000	--------
5	68.4975	12.5000	0.8273	--------
10	73.1091	12.6000	0.8093	--------
25	2164.2561	37.3000	1.4976	--------
50	56.2148	10.1000	0.6951	--------
100	50.1117	8.9000	0.6500	--------

File name: Rolesville.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.82	3.86	3.23	2.79	2.46	2.20	1.99	1.82	1.68	1.56	1.46	1.37
2	5.61	4.52	3.80	3.28	2.90	2.60	2.36	2.16	2.00	1.86	1.74	1.63
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.42	5.21	4.42	3.85	3.42	3.08	2.81	2.59	2.40	2.24	2.10	1.98
10	7.18	5.86	4.99	4.36	3.88	3.51	3.21	2.96	2.75	2.57	2.42	2.28
25	7.94	6.72	5.78	5.04	4.45	3.96	3.56	3.22	2.93	2.68	2.47	2.28
50	8.52	6.98	5.98	5.27	4.74	4.32	3.98	3.70	3.46	3.26	3.08	2.93
100	9.06	7.42	6.37	5.63	5.07	4.64	4.29	4.00	3.75	3.54	3.36	3.20

Tc = time in minutes. Values may exceed 60.

Precip. file name: D:\Ark Dropbox\03 - Support\Software\Hydraflow\Rolesville.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.86	3.45	0.00	4.32	5.01	5.94	6.69	7.44
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

WALLBROOK

ROLESVILLE, WAKE COUNTY, NORTH CAROLINA

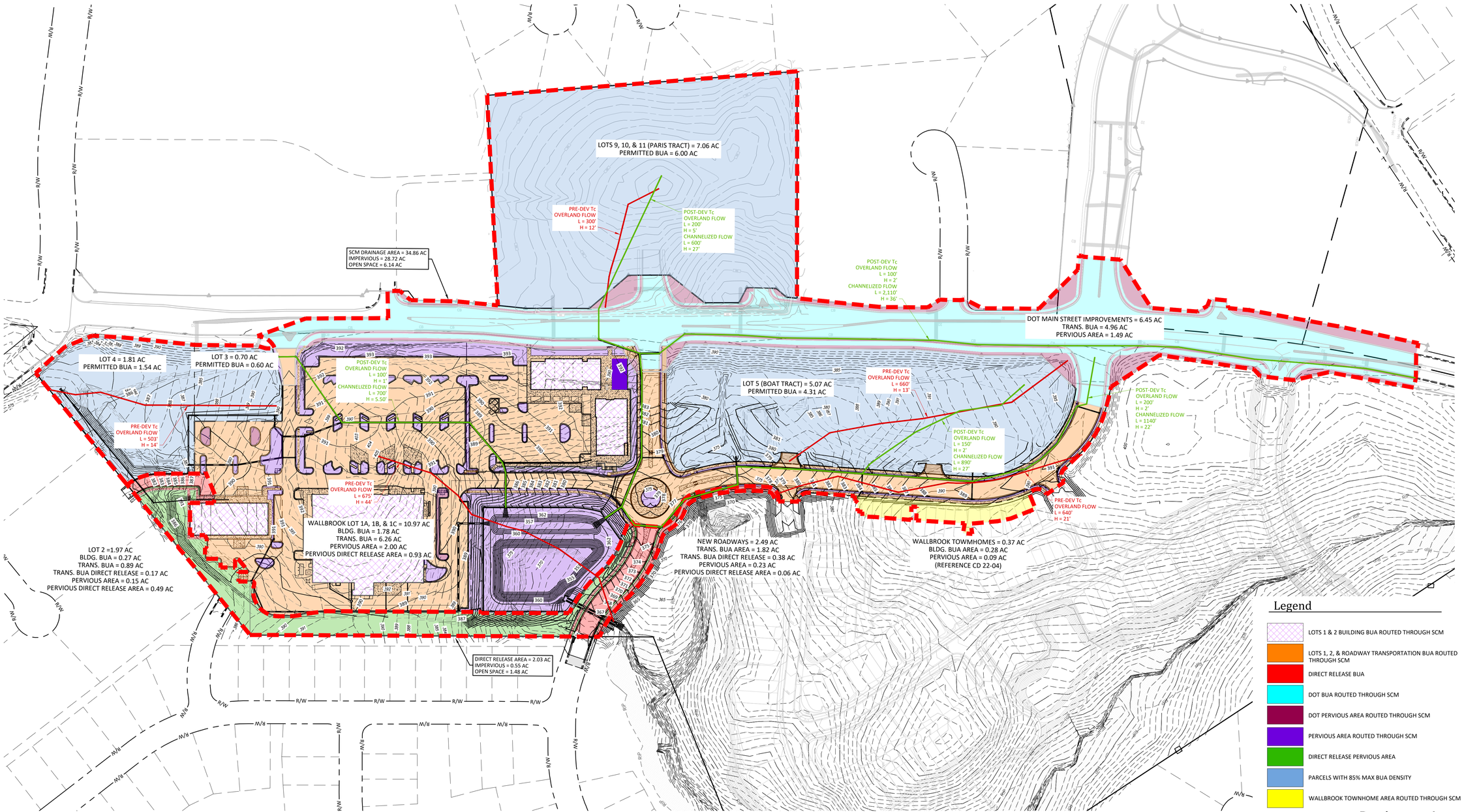
STORMWATER MANAGEMENT PLAN

DRAWING NO. D-1219

MAPS



Project Mgr.: BCF	Project No.: 21089	NC License: P-1199 ARK CONSULTING GROUP, PLLC Engineers & Planners 2755-B Charles Blvd. | Greenville, NC 27858	SITE LOCATION PLAN **WALLBROOK** **EROSION CONTROL PLAN** **TOWN OF ROLESVILLE, WAKE COUNTY, NC**	EXHIBIT A-1
Drawn By: KLG	Scale: AS SHOWN			
Checked By: TGN	Date: 03/24/2022			



September 25, 2023

Drainage Area Map

2755-B Charles Blvd.
Greenville, NC 27858
(252) 558-0888
www.arkconsultinggroup.com

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ARK CONSULTING GROUP, PLLC
ENGINEERS & PLANNERS

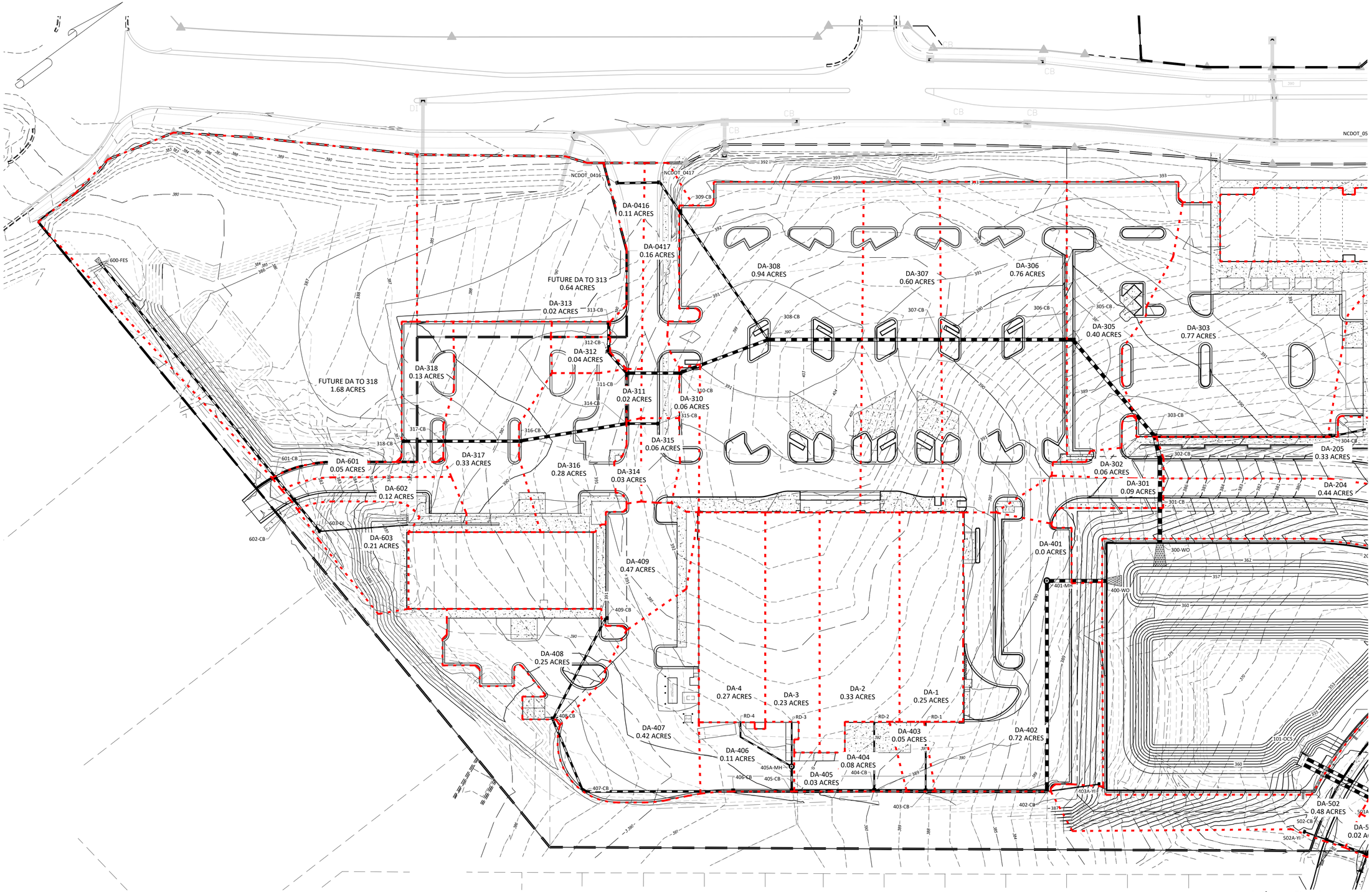
100' 0 50' 100'
SCALE 1 inch = 100 ft

Wallbrook

US 401 / S. Main Street & Virginia Water Drive | Rolesville, NC

CROSLAND SOUTHEAST

D:\ARK DROPBOX\01 - PROJECTS\ACTIVE\CROSLAND SE\2089 - WALLBROOK SHOP CTR\0 - DWG\05 - FINAL_XREF\DA_MAP.DWG, DA Map (1), Tim Nilong, Tue, Sep 26, 2023 @ 3:47 PM



September 25, 2023

Inlets Drainage Area Map

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40' 0 20' 40'
SCALE 1 inch = 40 ft

D:\ARK DROPBOX\01 – PROJECTS\ACTIVE\[CROSLAND SE]\2089 – WALLBROOK SHOP CTR\0 – DWG\03 – FINAL_XREF\DA_MAP.DWG, DA Map (2), Tim Nitong, Tue, Sep 26, 2023 @ 3:41 PM

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CROSLAND SOUTHEAST

DA-203
0.02 ACRES
DA-206
0.16 ACRES
DA-202
0.26 ACRES
DA-304
0.50 ACRES
DA-205
0.33 ACRES
DA-204
0.44 ACRES
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DA-218
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DA-220
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0.11 ACRES
DA-501A
0.19 ACRES
DA-502
0.48 ACRES
DA-501
0.02 ACRES

September 25, 2023

Inlets Drainage Area Map

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40' 0 20' 40'
SCALE 1 inch = 40 ft

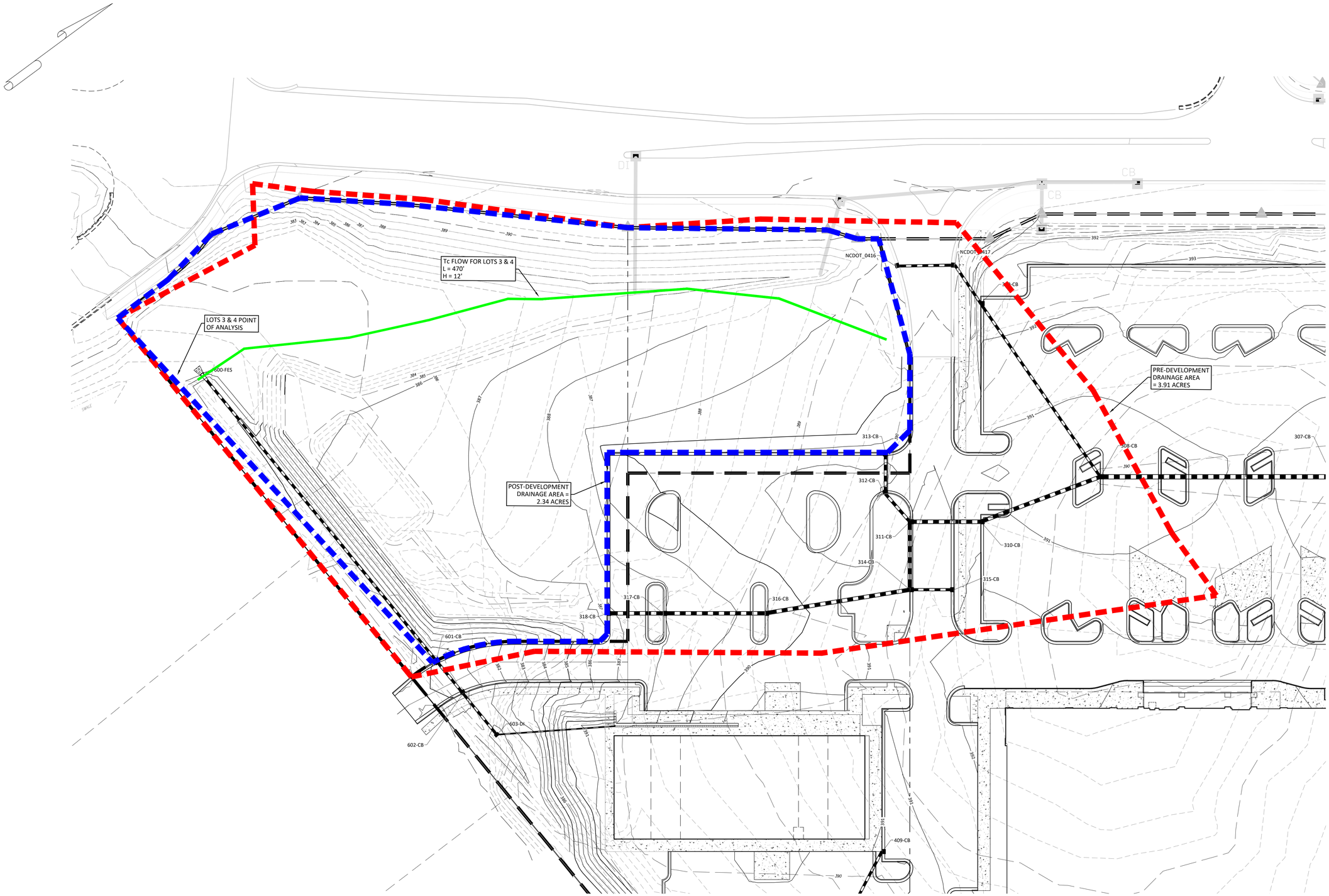
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CROSLAND SOUTHEAST

D:\ARK DROPBOX\05 – PROJECTS\ACTIVE\CROSLAND SE\21089 – WALLBROOK SHOP CTR\0 – DWG\05 – FINAL_XREF\DA_MAP.DWG, DA Map (3), Tim Nilong, Tue, Sep 26, 2023 @ 3:41 PM

PNC Bank Rolesville Stormwater Report to Wake County.pdf · Page 258



September 25, 2023

Drainage Area Map - Lots 3 & 4

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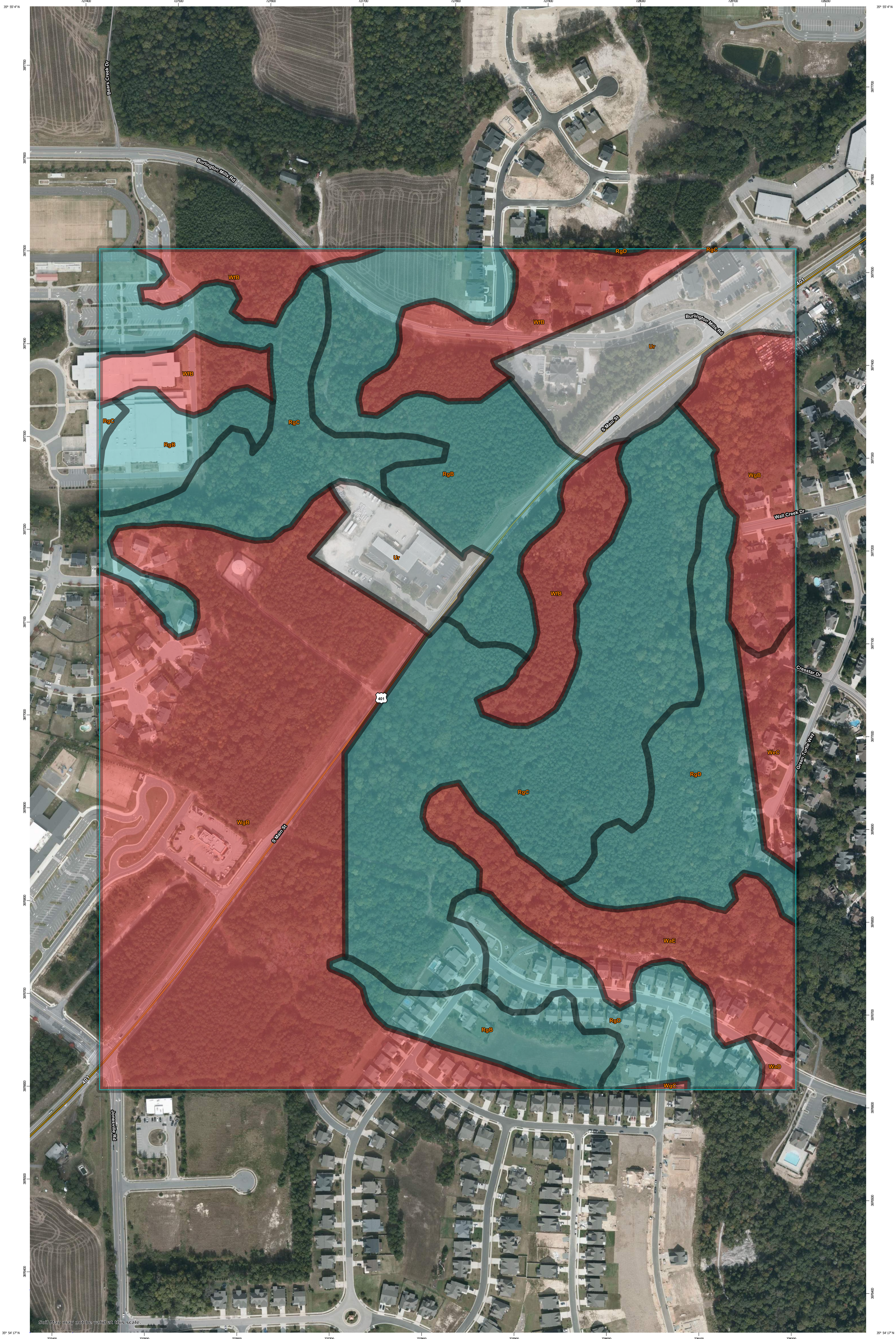
30' 0 15' 30'
SCALE 1 inch = 30 ft

Wallbrook

US 401 / S. Main Street & Virginia Water Drive | Rolesville, NC

CROSLAND SOUTHEAST

D:\ARK DROPBOX\01 - PROJECTS\ACTIVE\CROSLAND SE\2089 - WALLBROOK SHOP CTR\D - DWG\03 - FINAL_XREF\DA_MAP.DWG, DA Map (4), Tim Nitong, Tue, Sep 26, 2023 @ 3:41 PM



Map Scale: 1:1,810 if printed on D portrait (22" x 34") sheet.

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Wake County, North Carolina
Survey Area Data: Version 18, Sep 16, 2019

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

Date(s) aerial images were photographed: Oct 11, 2019—Oct 19, 2019

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

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
RgB	Rawlings-Rion complex, 2 to 6 percent slopes	C	21.8	12.9%
RgC	Rawlings-Rion complex, 6 to 10 percent slopes	C	38.3	22.7%
RgD	Rawlings-Rion complex, 10 to 15 percent slopes	C	16.7	9.9%
Ur	Urban land		12.7	7.5%
WaD	Wake-Rolesville complex, 10 to 15 percent slopes, very rocky	D	0.5	0.3%
WaE	Wake-Rolesville complex, 15 to 25 percent slopes, very rocky	D	9.3	5.5%
WeC	Wedowee sandy loam, 6 to 10 percent slopes	D	2.8	1.7%
WfB	Wedowee-Saw complex, 2 to 6 percent slopes	D	16.1	9.5%
WgB	Wedowee-Urban land complex, 2 to 6 percent slopes	D	50.6	30.0%
WgC	Wedowee-Urban land complex, 6 to 15 percent slopes	D	0.1	0.1%
Totals for Area of Interest			**168.9**	**100.0%**

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Description

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

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

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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WAKE COUNTY, NORTH CAROLINA — SHEET NUMBER 22
22
N
(Joins sheet 15)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 31)
Scale 1:15840
1 Mile
5,000 Feet
Walkers Crossroads
Rolesville
Rolesville Church

July 31, 2026

Town of Rolesville
Department of Planning
502 Southtown Circle
Rolesville, NC 27571

RE: PNC Bank – 800 South Main Street, Rolesville, NC 27517
Woolpert Project No. 10020503.29
City Project No. SDP-26-0003

In reference to the above-mentioned project, we have received your review comments and have worked to address the concerns. The following are your comments for ease of reference followed by our response in italics.

I. Plan Review Comments

C000 – COVER SHEET

Can you please add "Site Development Plan" above PNC Bank. "Issued for Permit Review" does not really mesh with this plan set bc this is NOT a "Permit" per se. We reserve the term "Permit" for Building Permits and other "permits" like Signs, and not land development (Nor Subdivision).
Information revised.

1. Add I am not seeing a new review submitted to Energov for this review. Please reach out to me at Austin.bain@raleighnc.gov so we can get this squared away.
We have coordinated with Austin and confirmed SWF-175396-2026, SEC-175450-2026, and PU-032343-2026.

2. Add Energov to the coversheet for cross reference.
Information provided.

3. Check to see if this needs updated to reflect either/both property descriptions / property lines created in BM2026/pg1244.
Property lines and information updated.

4. REvise the Legal description to: LO9B WALLBROOK PARIS TR SUB BM2026 -01244 - this was just recorded (by the master developer) on 7/13/26.
Information included.

5. Because this is a corner lot - can you add references for "FRONT" and "CORNER" - either Virginia Water or S. Main as those are the 2 street frontages and one of them is "Front" and the other would be the "corner". Do this by adding " - Virginia Water" at the end of the reference.
Information included.

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C201 – SITE PLAN

1. REVISE this reference per BM2026/pg1244-46 - you need to vet everything in relation to this plat because you submitted this SDP before the lot was created, which was a risk taken and now this plan set needs QC'd.
   Property lines and information updated.

2. ** Address has been updated. No fire service issues with initial site plan.
   Noted.

3. add the Bm/Pg reference for Virginia Water Drive
   Information added.

4. REvise this relative to BM2026/pg1244-46
   Property lines and information updated.

5. 30' Electric.....easement? IF so, reference it as an Easement and include the Bk/pg or BM/pg reference.
   Information added.

6. this is technically a "Street Buffer" per LDO 6.2.2.2, which differentiates from Perimeter buffers (which align on the private property sides of a lot). Yes, they are all "landscape" as the intent is for landscaping to be placed within the buffer spaces...please revise to "Street Buffer"
   Information updated.

7. BM2026/pg1244-46 does not show a 30' electric easement - contact ARK Engineering or JMT surveyors who created that plat and ask.
   Refer to Existing Easement Item 1 on BM2026/pg1244-46.

8. S Main Street was not dedicated in 2023....please double check this reference. The Wallbrook developers TMK did donate significant ROW on the Publix side for the widening of the road, but I'm not sure if that was via a particular Final Plat or via a Deed; recollection is that it happened well prior to the development of Wallbrook because the LAPP project was formulated in advance of Wallbrook's land plans.
   This has been confirmed by our surveyor who provided the note.

C301 – GRADING AND DRAINAGE PLAN

1. Please submit a stormwater report including the HGLs and drainage calcs for the pipes, as well as any riprap calculations and drainage areas.
   Please see submitted Stormwater Memo from our Wake County submission.

C302 – EROSION CONTROL PLAN

1. Please list the Max Permitted first, and then the proposed. Please add the SF'age to the % so that both figures can be compared and clearly observed and understood. TY.
   Table revised.

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C401 – UTILITY PLAN

1. Revise reference to match BM2026/Pg1244 which calls it a Cross Access Easement (not a Private Street - there are differences between those 2 things). TY.
   References revised/Private Street callout removed.

E100 – Electrical Site Plan

1. General note: Provide pole and light fixture details for wall and parking lot lighting.
   Pole and exterior building lighting cutsheets have been provided separately.

2. General Comment: Confirm that the proposed site lighting will not conflict with proposed landscaping.
   Confirmed. Current landscaping and pole lighting shall not interfere with one another.

A201 – Building Elevations

1. Provide pole height and light fixture details for wall and parking lot lighting in conformance with LDO, Section 6.6
   Cutsheets and details provided. Confirmed conformance with LDO section 6.6 per fixture types, details, and photometrics.

Sincerely,
Todd Ford, PE
Discipline Leader, Buildings
D: 513.527.2525
Todd.ford@woolpert.com

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