SUPPLEMENTAL DRAINAGE REPORT

FOR

STONEBRIDGE COMMERCIAL
WICHITA, KANSAS

SEPTEMBER 2008

Supplemental Drainage Report for Stonebridge Commercial Addition
Wichita, Sedgwick County, Kansas

Post-Project Conditions

Runoff Characteristics

Post-project runoff will flow into a detention pond, then to the south and exit the site into a drainage reserve. This drainage reserve will flow south into the lakes in Fox Ridge Addition and into Cadillac Lake. The drainage and utility plan shows the proposed pond layout, Appendix A. The runoff and detention was modeled in Hydraflow Hydrographs 2007, Appendix B. The December 2006 drainage report for this addition required 10.0 acre-feet of storage for the 100-year design storm. In order to provide ten-percent more storage volume than is required to maintain the pre-project peak-runoff, the outlet structure has been modified. The pond will have a normal pool of 1350.0, a 100-year water surface elevation of 1353.3, and provide 11.0 acre-feet of storage. The pond outlet structure will be a weir with 2.5' wide opening at 1350.0.

Table 1. Stonebridge Commercial Runoff.

Description	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Pre-Project Total Flow to the South	18.1	30.9	44.3	98.9
Post-Project Total Flow to the South	12.2	18.9	27.7	43.9

Runoff offsite to the south is reduced for the 2, 5, 10, and 100-yr design storms, from pre-project to post-project conditions.

Storm water sewer (SWS) lines are proposed to convey storm water from the commercial lots to the three detention ponds. A preliminary layout of the SWS is shown on the Drainage and Utility Plan, Appendix A. HydroFlow Storm Sewers 2008 was used to size the proposed system for the 5-year design storm. The storm sewer calculations are in Appendix C.

Summary

Stonebridge Commercial Addition is located on the southeast corner of the intersection of 37th Street North and Maize Road. The property is approximately 36 acres and will develop for commercial use. Runoff from the site currently sheet flows across the property to the south into the Fox Ridge lakes. A drainage reserve will be constructed through the adjacent property to the south and into a Fox Ridge lake. A weir was designed to control runoff from the site. Runoff offsite to the south is reduced for the 2, 5, 10, and 100-year design storms, from pre-project to post-project conditions. The site will provide 10-percent more storage volume than needed to maintain pre-project flow-rates.

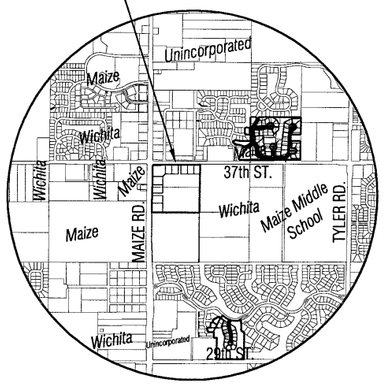
Appendix A

Drainage and Utility Plan

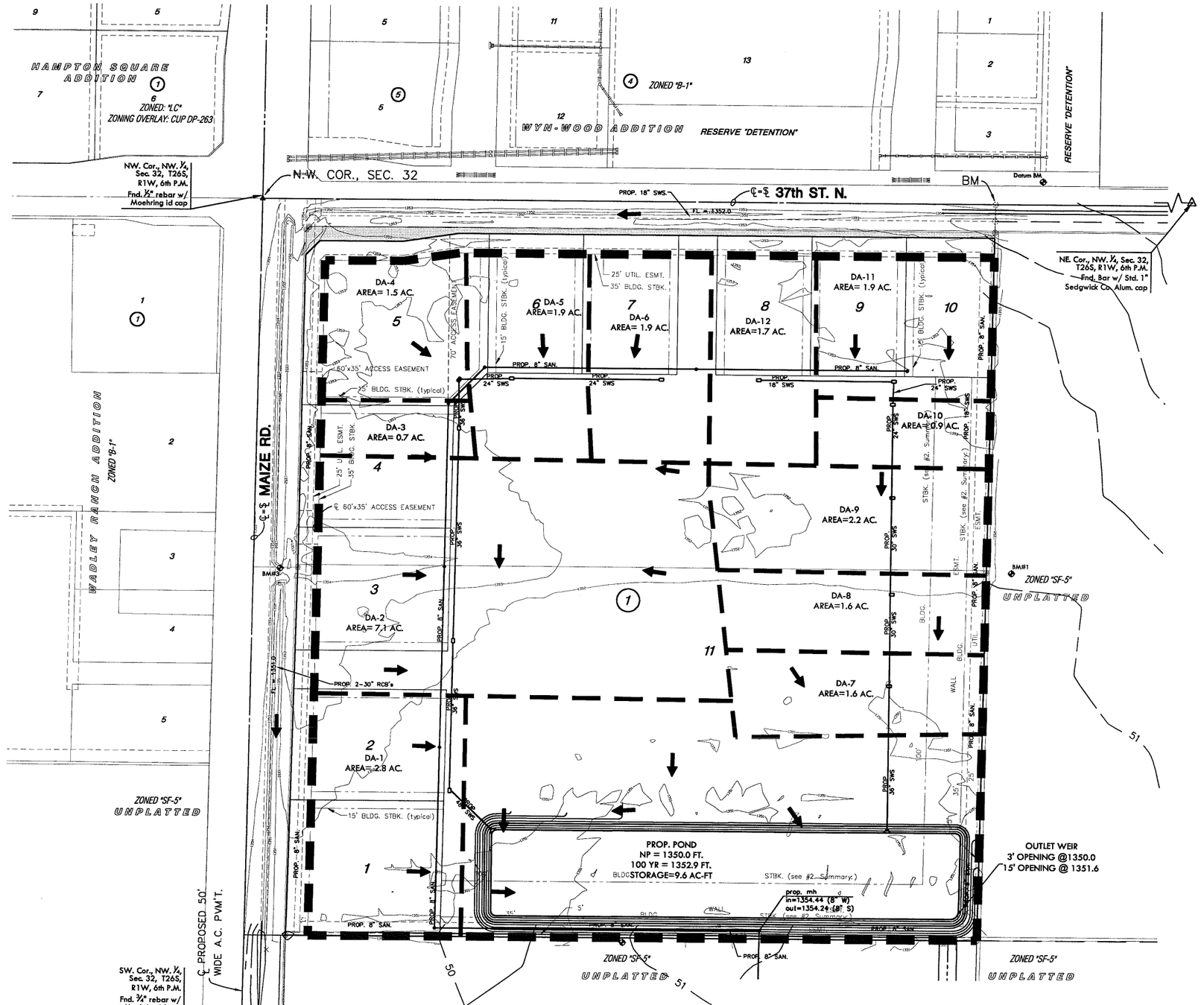
NOTES

1. GEOGRAPHY: Located in the Northwest portion of the City of Wichita in an area currently transitioning from agricultural uses into urban residential, institutional and commercial uses with access to K-96 via Maize Rd. and or Ridge Rd. The surrounding land uses include urban residential to the Northwest and South, rural residential to the West, and agriculture production to the immediate South and East, and institutional uses East of the agriculture production.
2. LOT TOTAL - 11 Commercial parcels
3. ANNEXATION: Lies within the City of Wichita and adjoins the City of Maize to the North and West.
4. EXISTING USE: Agricultural
5. ZONING: Existing / proposed - "LC" w/ CUP DP 295 overlay THIS PLAT SHALL CONFORM TO THE RECITALS OF CUP DP 295.
6. PLAT AREA: Gross - 36.3 Ac.
   Net - 35.93 Ac.
7. SURVEY DATE: January, 2006 (by MKEC)
8. PUBLIC UTILITIES: Shall be extended to site. Municipal sanitary sewer shall be served from the East. Municipal water shall be served from existing mains to the North and West.
9. LEGAL DESCRIPTION: See hereon
10. ACCESS CONTROLS: Shall align with developments to the West and North and also conform to access management policies as shown hereon..
11. PROPOSED COMMERCIAL: According to CUP DP 295 the total number of buildings is limited to 16 with the following minimum building setbacks:
    Arterial Street setback = 35'
    Interior side setback = 15'
    Interior side setback = 35' **
    Exterior boundary setback = 100' **
    ** (if building has a gross floor area greater than 100,000 s.f.)
12. RESERVES: All reserves are platted for irrigation, landscaping, monuments, drainage, and utilities in designated areas. Reserve "C" is also platted for a private swimming pool, pool house, and parking.
13. FLOOD: According to FEMA FIRM Community Unit Panel 200321 0125A, Effective Date June 3rd, 1986; this property lies within flood zone "C", *"areas of minimal flooding."*
14. DRAINAGE: A drainage report shall accompany this plat. The property lies within a branch of the Sand Creek drainage basin, which drains to the Little Arkansas River located in Sedgwick County and generally draining from northeast to southwest.

PLAT LOCATION



VICINITY MAP



LEGEND

- CIN - CONIFEROUS TREE & DIAMETER
- DIN - DECIDUOUS TREE & DIAMETER
- SN - SIGN
- PP - POWER POLE AND GUY ANCHOR
- ELEC BOX - ELECTRIC BOX
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- SECTION CORNER
- BM - BENCHMARK
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- GAS PIPELINE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD ELECTRIC
- FIBER OPTIC CABLE !
- DRAINAGE BOUNDARY
- A - DRAINAGE BOUNDARY LABEL
- FLOW ARROW

NORTH

MINIMUM PAD ELEVATIONS *LOWEST OPENINGS*		
LOTS *(inclusive)*	BLOCK	ELEVATION *NGVD*
1 - 2	1	1355.5
3 - 11	1	1355.5

LEGAL DESCRIPTION

The North ½, NW. ¼, NW. ¼, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West and North.
TOGETHER WITH,
The South ½, NW. ¼, NW. ¼, Section 32, Township 26 South, Range 1 West, Sedgwick County Kansas, EXCEPT, road right-of-way on the West.

BENCH MARKS

Datum BM. Top of "T" post 35' ± N. of the N. line of NW.¼, Sec. 32, T26S, R1W and 1384' ± E. of NW. corner of said NW.¼.
Elev. = 1353.54 (NGVD 29)
166.14 (City Datum)

BM#1 Top of "T" post 660' ± S. of the N. line of NW ¼, Sec. 32, T26S, R1W and 1325' ± E. of W. line of said NW.¼.
Elev.= 1351.69(NGVD 29)
164.29 (City Datum)

BM#2 Top of "T" post 675' ± E. of the W. line of NW.¼, Sec. 32, T26S, R1W and 1320' ± S. of the N. line of said NW. ¼.
Elev.=1351.79 (NGVD 29)
164.39 (City Datum)

BM#3 Square cut on N. end of on top of RCP 50' ± E. of the W. line of NW.¼, Sec. 32, T26S, R1W and 660' ± S. of the N. line of said NW. ¼.
Elev.=1353.59 (NGVD 29)
166.19 (City Datum)

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

STONEBRIDGE COMMERCIAL

STONEBRIDGE COMMERCIAL ADDITION
WICHITA, KANSAS

DRAINAGE AND UTILITY PLAN

DATE: SEPTEMBER 2008
REVISED
DESIGN BY: KLA
DRAWN BY: CMJ
CHECKED BY: GJA
SHEET NUMBER: 1

J:\Civil\05440\dwg\Dring\SEPT 08\05440DUP.dwg

Appendix B

Hydraflow Hydrographs

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	9.764	6	744	1.325	------	------	------	SB PreA
2	SCS Runoff	7.498	6	738	0.906	------	------	------	SB Pre B
3	SCS Runoff	7.761	6	750	1.226	------	------	------	SB Pre C
4	Combine	24.11	6	744	3.457	1, 2, 3	------	------	SB Pre-Proj South
5	SCS Runoff	40.11	6	720	2.926	------	------	------	SB Post A
6	SCS Runoff	25.93	6	720	1.892	------	------	------	SB Post B
7	SCS Runoff	36.18	6	720	2.640	------	------	------	SB Post C
8	Combine	102.22	6	720	7.458	5, 6, 7	------	------	SB Post Project A,B,C
9	Reservoir	14.08	6	750	7.457	8	1351.26	4.08	Stonebridge Pond

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	16.57	6	744	2.173	------	------	------	SB PreA
2	SCS Runoff	12.70	6	738	1.486	------	------	------	SB Pre B
3	SCS Runoff	13.22	6	750	2.011	------	------	------	SB Pre C
4	Combine	40.99	6	744	5.670	1, 2, 3	------	------	SB Pre-Proj South
5	SCS Runoff	54.17	6	720	4.016	------	------	------	SB Post A
6	SCS Runoff	35.03	6	720	2.596	------	------	------	SB Post B
7	SCS Runoff	48.87	6	720	3.623	------	------	------	SB Post C
8	Combine	138.07	6	720	10.235	5, 6, 7	------	------	SB Post Project A,B,C
9	Reservoir	22.58	6	744	10.234	8	1351.68	5.49	Stonebridge Pond

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	21.32	6	744	2.772	------	------	------	SB PreA
2	SCS Runoff	16.34	6	738	1.896	------	------	------	SB Pre B
3	SCS Runoff	17.05	6	750	2.565	------	------	------	SB Pre C
4	Combine	52.80	6	744	7.233	1, 2, 3	------	------	SB Pre-Proj South
5	SCS Runoff	63.30	6	720	4.733	------	------	------	SB Post A
6	SCS Runoff	40.93	6	720	3.060	------	------	------	SB Post B
7	SCS Runoff	57.12	6	720	4.270	------	------	------	SB Post C
8	Combine	161.35	6	720	12.063	5, 6, 7	------	------	SB Post Project A,B,C
9	Reservoir	35.58	6	738	11.096	8	1351.97	6.46	Stonebridge Pond

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.25

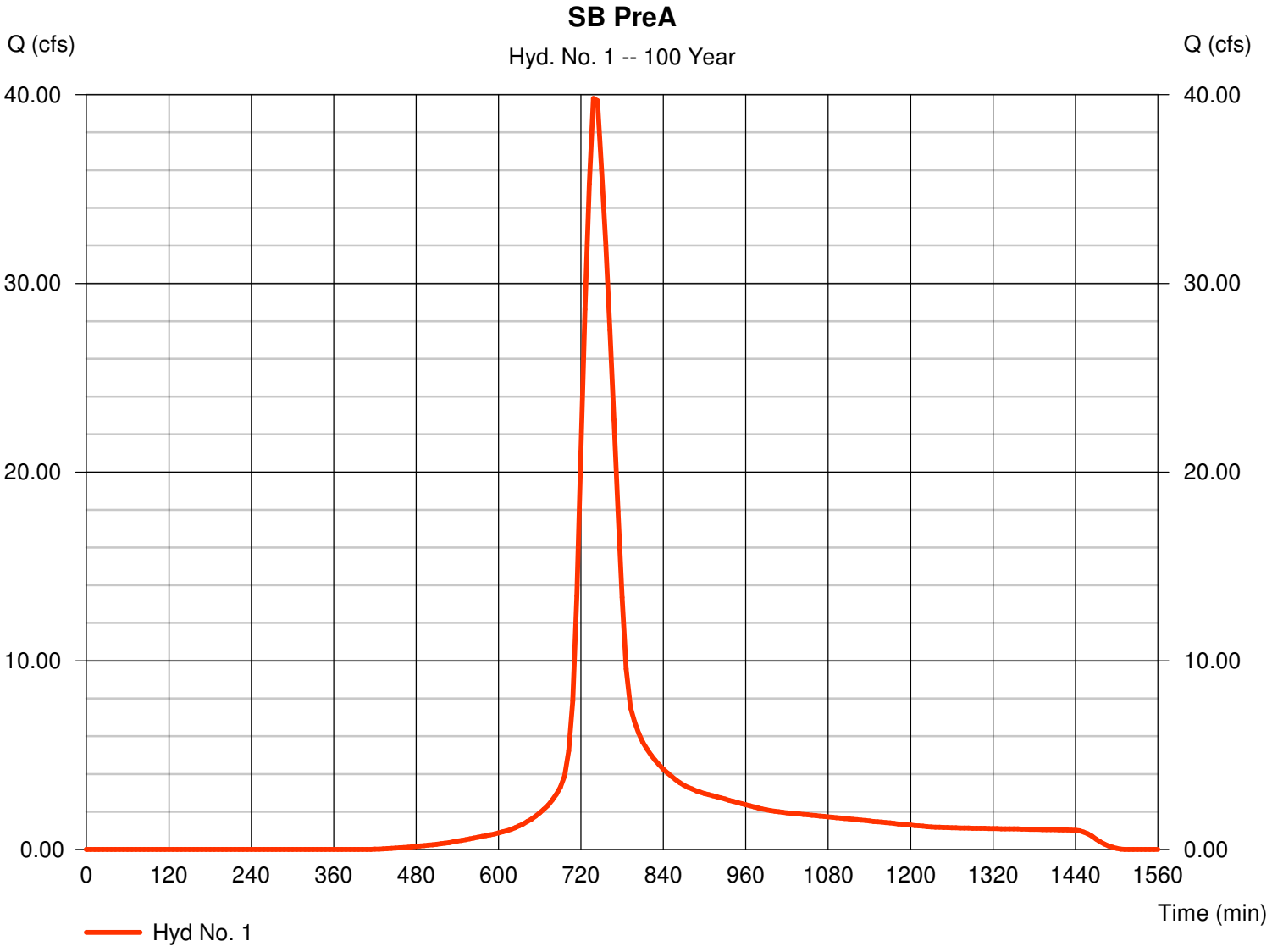
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	39.80	6	738	5.130	------	------	------	SB PreA
2	SCS Runoff	30.39	6	732	3.508	------	------	------	SB Pre B
3	SCS Runoff	31.83	6	750	4.747	------	------	------	SB Pre C
4	Combine	98.85	6	738	13.386	1, 2, 3	------	------	SB Pre-Proj South
5	SCS Runoff	96.28	6	720	7.360	------	------	------	SB Post A
6	SCS Runoff	62.25	6	720	4.759	------	------	------	SB Post B
7	SCS Runoff	86.87	6	720	6.640	------	------	------	SB Post C
8	Combine	245.39	6	720	18.759	5, 6, 7	------	------	SB Post Project A,B,C
9	Reservoir	98.75	6	738	14.528	8	1352.90	9.60	Stonebridge Pond

Hydrograph Report

Hyd. No. 1

SB PreA

Hydrograph type	=	SCS Runoff	Peak discharge	=	39.80 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	6 min	Hyd. volume	=	5.130 acft
Drainage area	=	13.300 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	44.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

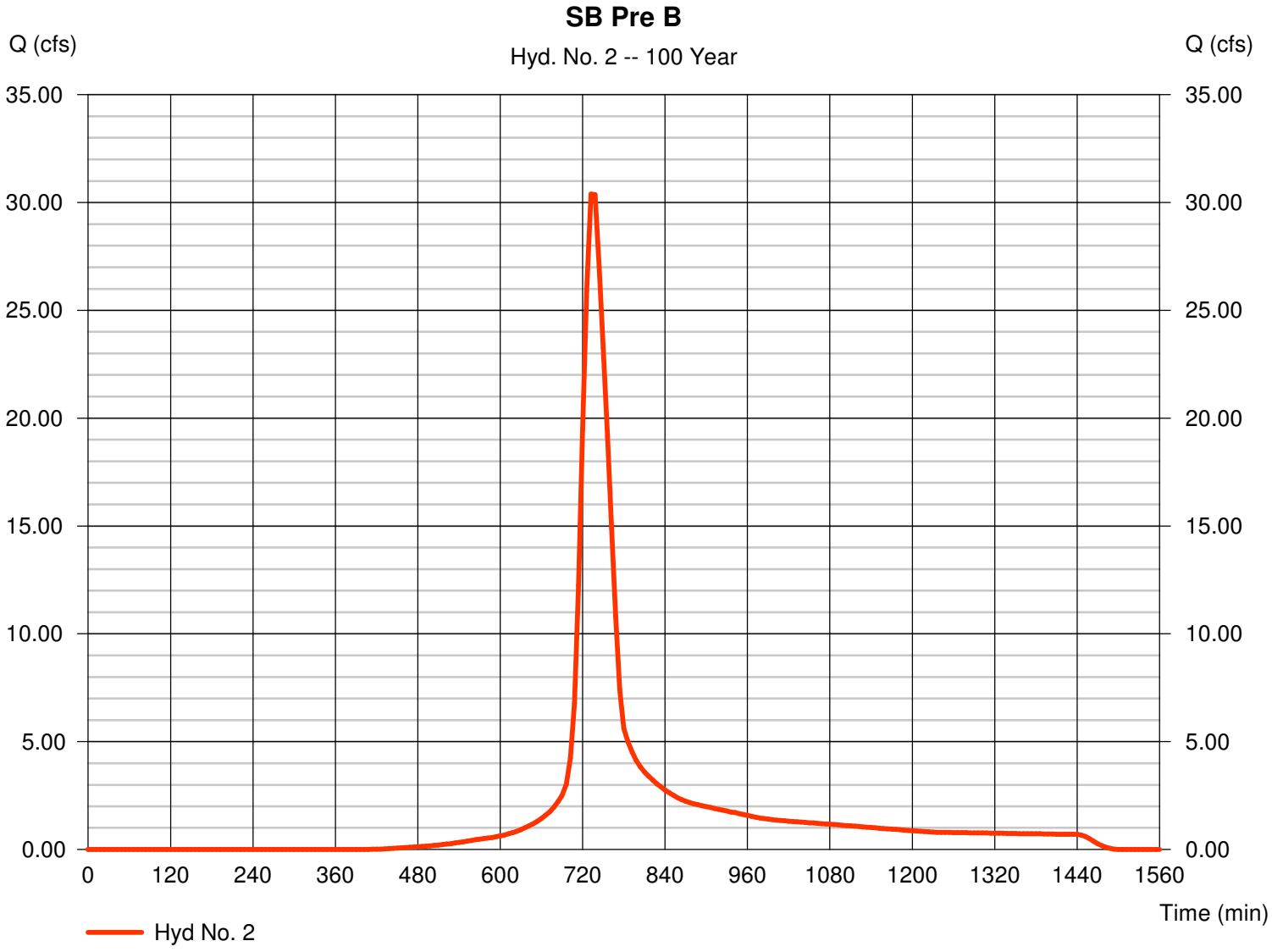


Hydrograph Report

Hyd. No. 2

SB Pre B

Hydrograph type	=	SCS Runoff	Peak discharge	=	30.39 cfs
Storm frequency	=	100 yrs	Time to peak	=	732 min
Time interval	=	6 min	Hyd. volume	=	3.508 acft
Drainage area	=	8.600 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	30.90 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

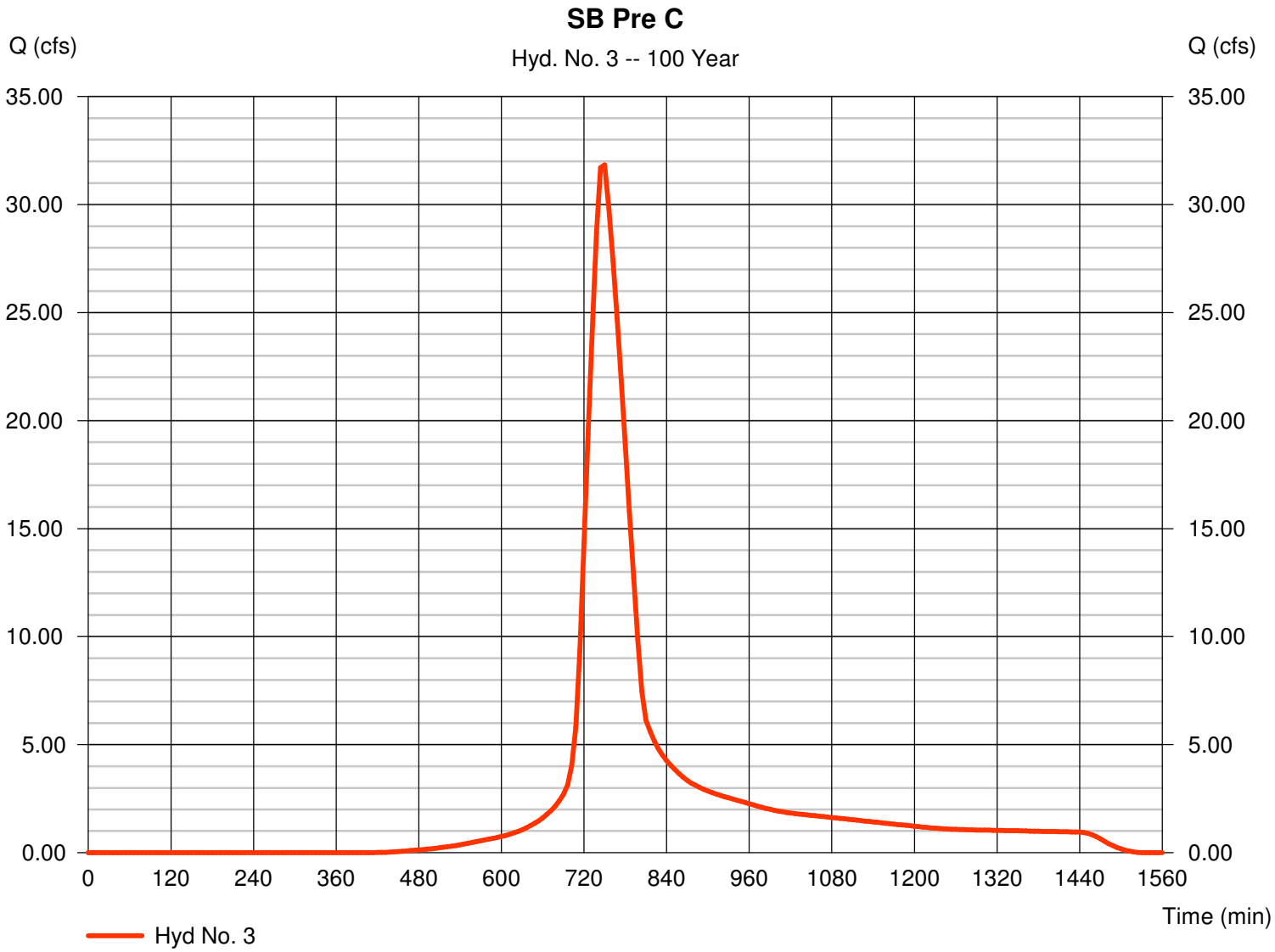


Hydrograph Report

Hyd. No. 3

SB Pre C

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.83 cfs
Storm frequency	=	100 yrs	Time to peak	=	750 min
Time interval	=	6 min	Hyd. volume	=	4.747 acft
Drainage area	=	12.000 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	59.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

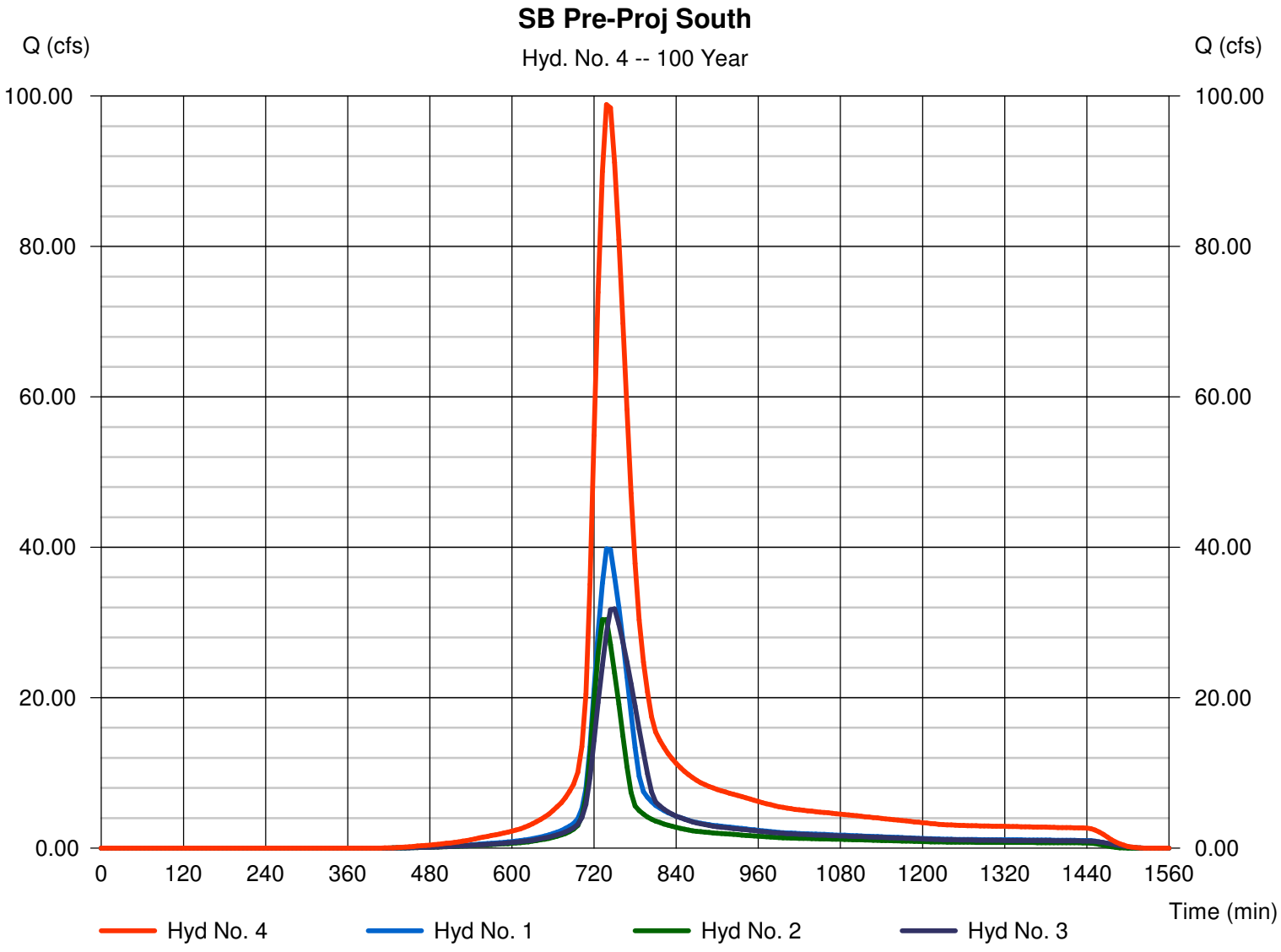


Hydrograph Report

Hyd. No. 4

SB Pre-Proj South

Hydrograph type	= Combine	Peak discharge	= 98.85 cfs
Storm frequency	= 100 yrs	Time to peak	= 738 min
Time interval	= 6 min	Hyd. volume	= 13.386 acft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 33.900 ac

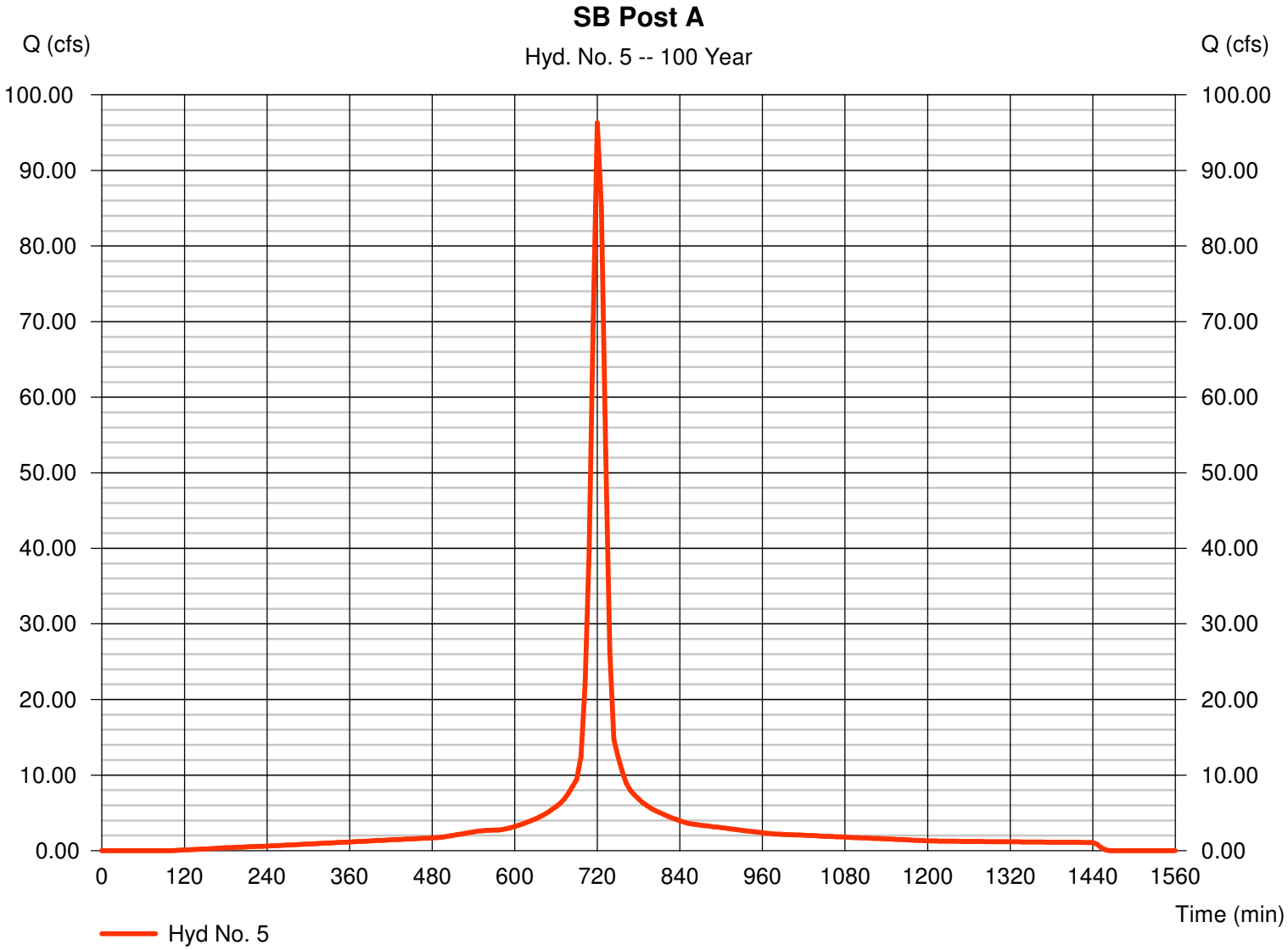


Hydrograph Report

Hyd. No. 5

SB Post A

Hydrograph type	=	SCS Runoff	Peak discharge	=	96.28 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	6 min	Hyd. volume	=	7.360 acft
Drainage area	=	13.300 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

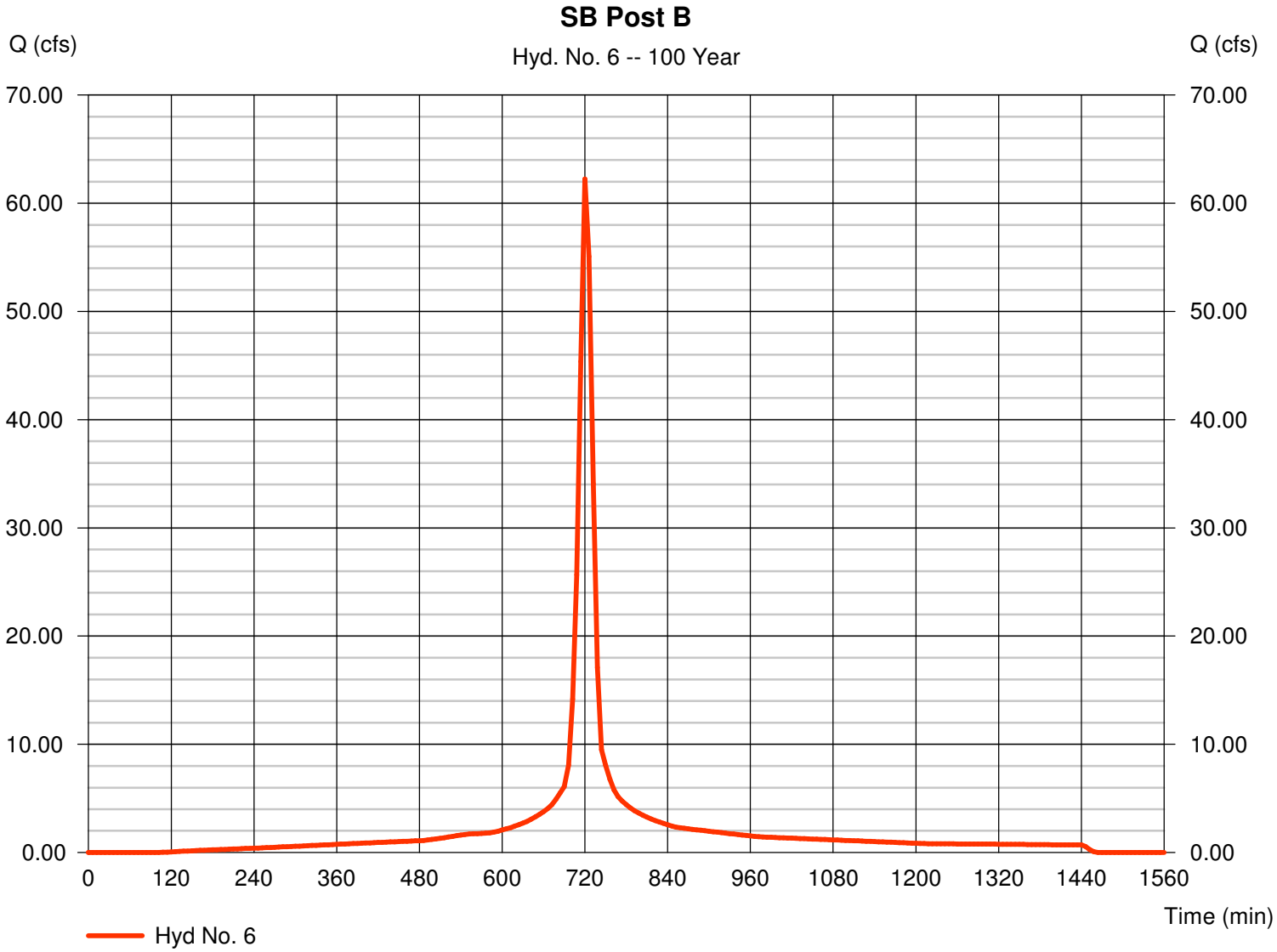


Hydrograph Report

Hyd. No. 6

SB Post B

Hydrograph type	=	SCS Runoff	Peak discharge	=	62.25 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	6 min	Hyd. volume	=	4.759 acft
Drainage area	=	8.600 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

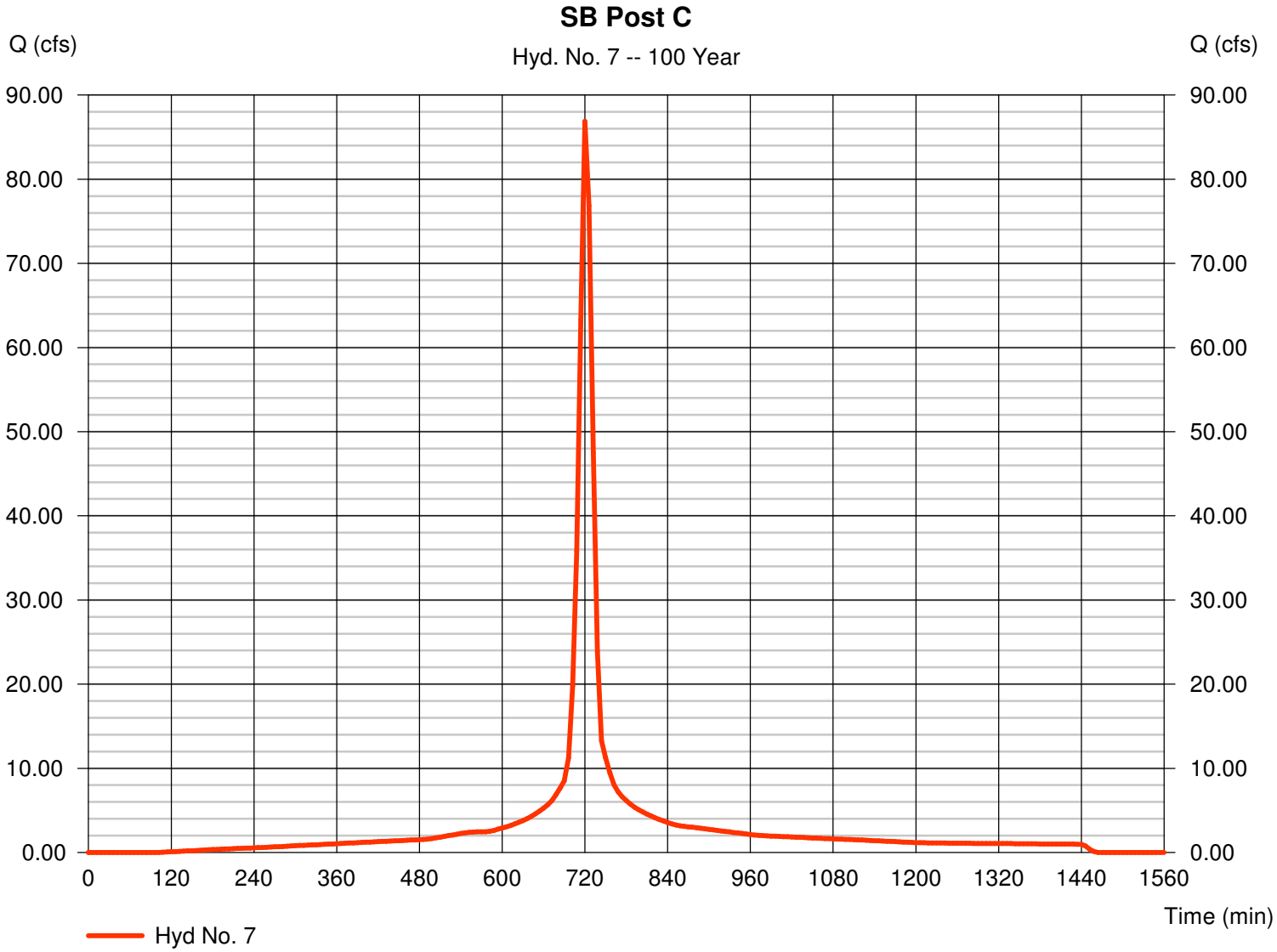


Hydrograph Report

Hyd. No. 7

SB Post C

Hydrograph type	=	SCS Runoff	Peak discharge	=	86.87 cfs
Storm frequency	=	100 yrs	Time to peak	=	720 min
Time interval	=	6 min	Hyd. volume	=	6.640 acft
Drainage area	=	12.000 ac	Curve number	=	94
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	16.20 min
Total precip.	=	7.80 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

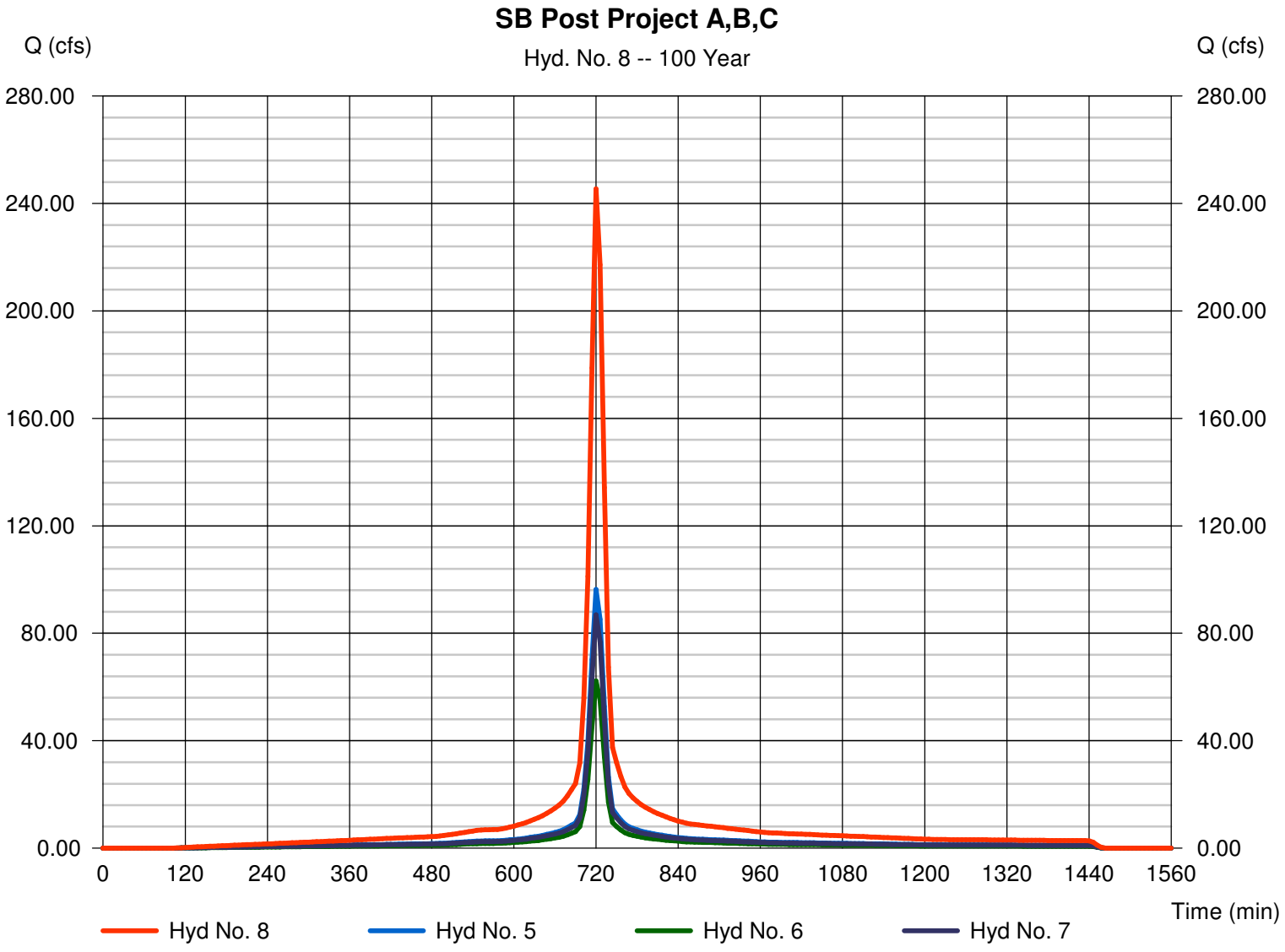


Hydrograph Report

Hyd. No. 8

SB Post Project A,B,C

Hydrograph type	= Combine	Peak discharge	= 245.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 6 min	Hyd. volume	= 18.759 acft
Inflow hyds.	= 5, 6, 7	Contrib. drain. area	= 33.900 ac



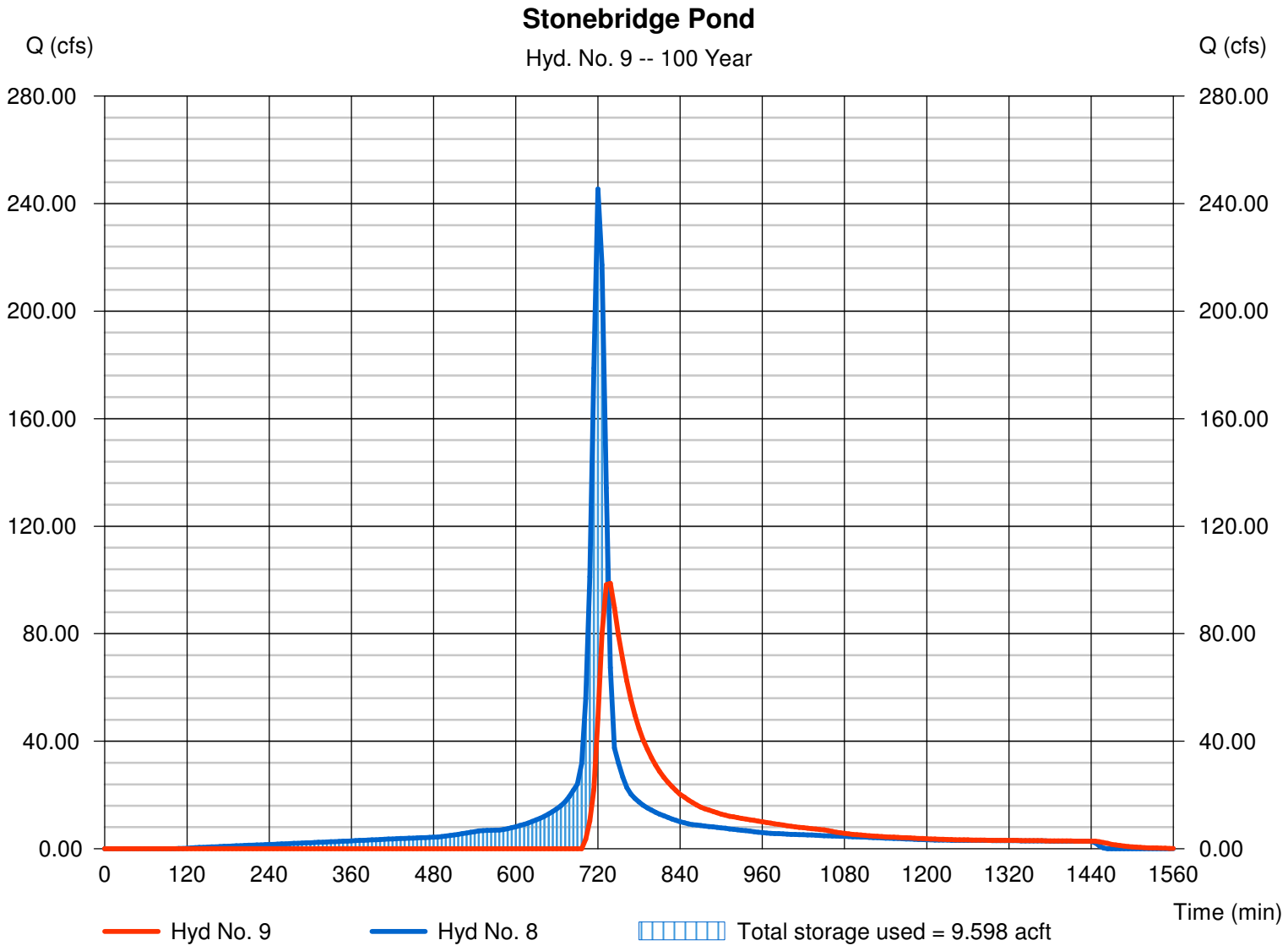
Hydrograph Report

Hyd. No. 9

Stonebridge Pond

Hydrograph type	=	Reservoir	Peak discharge	=	98.75 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	6 min	Hyd. volume	=	14.528 acft
Inflow hyd. No.	=	8 - SB Post Project A,B,C	Max. Elevation	=	1352.90 ft
Reservoir name	=	SB Pond - with tail water	Max. Storage	=	9.598 acft

Storage Indication method used.



Pond No. 11 - SB Pond - with tail water

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1350.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1350.00	137,509	0.000	0.000
1.00	1351.00	143,388	3.224	3.224
2.00	1352.00	149,322	3.359	6.583
3.00	1353.00	155,314	3.496	10.079

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	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	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	12.00	0.00	0.00
Crest El. (ft)	= 1350.00	1351.60	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 1351.30

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

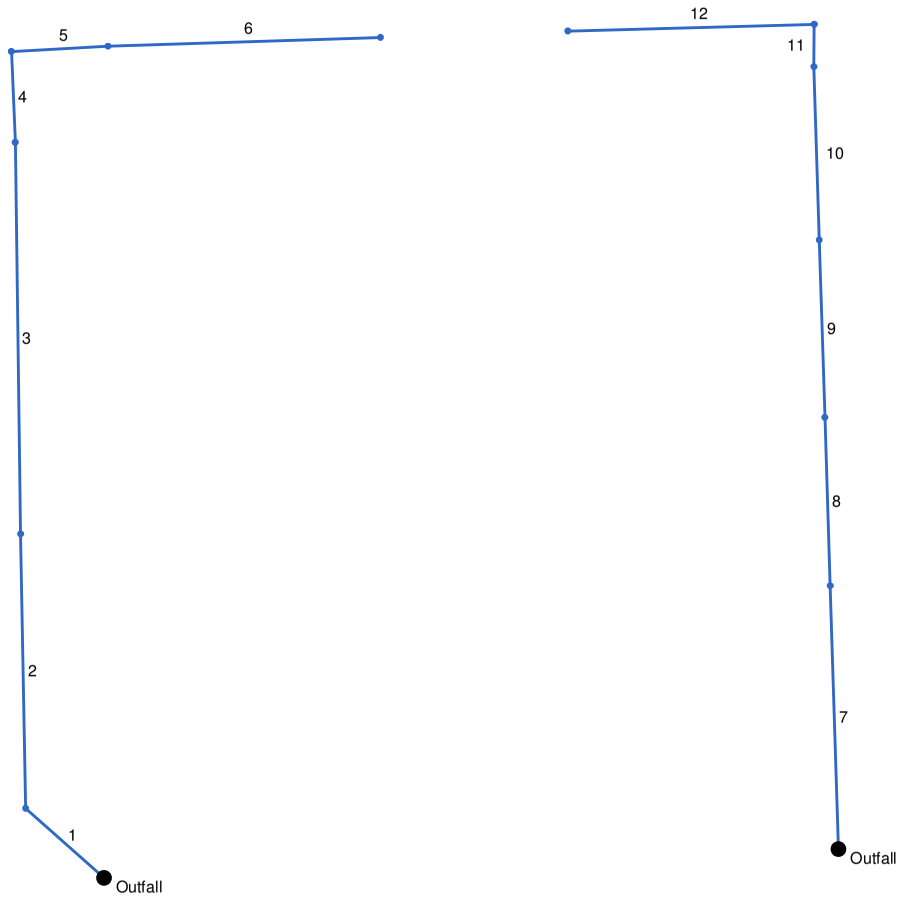
Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	1350.00	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.10	0.322	1350.10	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.20	0.645	1350.20	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.30	0.967	1350.30	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.40	1.289	1350.40	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.50	1.612	1350.50	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.60	1.934	1350.60	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.70	2.257	1350.70	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.80	2.579	1350.80	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.90	2.901	1350.90	---	---	---	---	0.00	0.00	---	---	---	---	0.000
1.00	3.224	1351.00	---	---	---	---	0.00	0.00	---	---	---	---	0.000
1.10	3.560	1351.10	---	---	---	---	0.00	0.00	---	---	---	---	0.000
1.20	3.896	1351.20	---	---	---	---	0.00	0.00	---	---	---	---	0.000
1.30	4.231	1351.30	---	---	---	---	0.00	0.00	---	---	---	---	0.000
1.40	4.567	1351.40	---	---	---	---	6.95 s	0.00	---	---	---	---	6.954
1.50	4.903	1351.50	---	---	---	---	9.74 s	0.00	---	---	---	---	9.744
1.60	5.239	1351.60	---	---	---	---	12.17 s	0.00	---	---	---	---	12.17
1.70	5.575	1351.70	---	---	---	---	14.47 s	1.26	---	---	---	---	15.73
1.80	5.911	1351.80	---	---	---	---	16.73 s	3.58	---	---	---	---	20.30
1.90	6.247	1351.90	---	---	---	---	18.97 s	6.57	---	---	---	---	25.54
2.00	6.583	1352.00	---	---	---	---	21.23 s	10.11	---	---	---	---	31.34
2.10	6.933	1352.10	---	---	---	---	23.51 s	14.13	---	---	---	---	37.64
2.20	7.282	1352.20	---	---	---	---	25.82 s	18.57	---	---	---	---	44.39
2.30	7.632	1352.30	---	---	---	---	28.16 s	23.41	---	---	---	---	51.57
2.40	7.981	1352.40	---	---	---	---	30.54 s	28.60	---	---	---	---	59.13
2.50	8.331	1352.50	---	---	---	---	32.95 s	34.12	---	---	---	---	67.07
2.60	8.681	1352.60	---	---	---	---	35.41 s	39.96	---	---	---	---	75.37
2.70	9.030	1352.70	---	---	---	---	37.90 s	46.10	---	---	---	---	84.00
2.80	9.380	1352.80	---	---	---	---	40.43 s	52.53	---	---	---	---	92.97
2.90	9.730	1352.90	---	---	---	---	43.00 s	59.23	---	---	---	---	102.24
3.00	10.079	1353.00	---	---	---	---	45.61 s	66.20	---	---	---	---	111.81

Appendix C

Hydraflow Storm Sewer Calculations

Hydraflow Storm Sewers Plan



Project File: Stonebridge Pipe Sizing 9-08.stm	Number of lines: 12	Date: 09-10-2008

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)	Inlet/ Rim El (ft)	
1	End	101.85	-138.43	Grate	0.00	2.80	0.84	15.0	1345.50	0.40	1345.91	48	Cir	0.013	1.16	1354.00	
2	1	267.18	47.36	Grate	0.00	7.10	0.84	15.0	1346.50	0.40	1347.57	36	Cir	0.013	0.50	1354.00	
3	2	380.77	0.28	Grate	0.00	0.70	0.84	15.0	1346.60	0.40	1348.12	36	Cir	0.013	0.50	1354.00	
4	3	88.52	-1.69	Grate	0.00	1.50	0.84	15.0	1347.70	0.40	1348.05	36	Cir	0.013	1.50	1354.20	
5	4	94.40	89.27	Grate	0.00	1.90	0.84	15.0	1348.70	0.40	1349.08	24	Cir	0.013	0.50	1354.30	
6	5	265.40	1.37	Grate	0.00	1.90	0.84	15.0	1348.70	0.40	1349.76	24	Cir	0.013	1.00	1354.50	
7	End	256.32	-91.83	Grate	0.00	1.60	0.84	15.0	1345.50	0.40	1346.53	36	Cir	0.013	0.50	1354.00	
8	7	163.87	0.05	Grate	0.00	1.60	0.84	15.0	1346.60	0.40	1347.26	30	Cir	0.013	0.50	1354.00	
9	8	172.73	-0.03	Grate	0.00	2.20	0.84	15.0	1346.90	0.40	1347.59	30	Cir	0.013	0.50	1354.00	
10	9	168.72	0.00	Grate	0.00	0.90	0.84	15.0	1347.70	0.40	1348.38	24	Cir	0.013	0.50	1354.20	
11	10	41.09	2.17	Grate	0.00	0.90	0.84	15.0	1348.50	0.39	1348.66	24	Cir	0.013	1.50	1354.30	
12	11	239.75	-91.92	Grate	0.00	1.70	0.84	15.0	1348.80	0.40	1349.76	18	Cir	0.013	1.00	1354.50	

Project File: Stonebridge Pipe Sizing 9-08.stm | Number of lines: 12 | Date: 09-10-2008

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		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	101.85	2.80	15.90	0.84	2.35	13.36	15.0	21.1	3.9	51.95	91.14	4.13	48	0.40	1345.50	1345.91	1350.00	1350.13	1350.00	1354.00	
2	1	267.18	7.10	13.10	0.84	5.96	11.00	15.0	19.6	4.0	44.34	42.21	6.27	36	0.40	1346.50	1347.57	1350.44	1351.62	1354.00	1354.00	
3	2	380.77	0.70	6.00	0.84	0.59	5.04	15.0	17.5	4.2	21.42	42.14	3.03	36	0.40	1346.60	1348.12	1352.40	1352.79	1354.00	1354.00	
4	3	88.52	1.50	5.30	0.84	1.26	4.45	15.0	17.0	4.3	19.17	41.94	2.71	36	0.40	1347.70	1348.05	1352.89	1352.96	1354.00	1354.20	
5	4	94.40	1.90	3.80	0.84	1.60	3.19	15.0	16.5	4.4	13.94	14.35	4.44	24	0.40	1348.70	1349.08	1353.13	1353.49	1354.20	1354.30	
6	5	265.40	1.90	1.90	0.84	1.60	1.60	15.0	15.0	4.5	7.26	14.29	2.31	24	0.40	1348.70	1349.76	1353.87	1354.14	1354.30	1354.50	
7	End	256.32	1.60	8.90	0.84	1.34	7.48	15.0	19.4	4.1	30.30	42.28	4.29	36	0.40	1345.50	1346.53	1350.00	1350.53	1350.00	1354.00	
8	7	163.87	1.60	7.30	0.84	1.34	6.13	15.0	18.5	4.1	25.42	26.03	5.18	30	0.40	1346.60	1347.26	1350.67	1351.30	1354.00	1354.00	
9	8	172.73	2.20	5.70	0.84	1.85	4.79	15.0	17.5	4.2	20.34	25.92	4.14	30	0.40	1346.90	1347.59	1351.66	1352.09	1354.00	1354.00	
10	9	168.72	0.90	3.50	0.84	0.76	2.94	15.0	16.6	4.4	12.81	14.36	4.08	24	0.40	1347.70	1348.38	1352.23	1352.77	1354.00	1354.20	
11	10	41.09	0.90	2.60	0.84	0.76	2.18	15.0	16.3	4.4	9.57	14.11	3.05	24	0.39	1348.50	1348.66	1353.01	1353.09	1354.20	1354.30	
12	11	239.75	1.70	1.70	0.84	1.43	1.43	15.0	15.0	4.5	6.50	6.64	3.68	18	0.40	1348.80	1349.76	1353.30	1354.22	1354.30	1354.50	

Project File: Stonebridge Pipe Sizing 9-08.stm

Number of lines: 12

Run Date: 09-10-2008

NOTES: Intensity = 52.62 / (Inlet time + 11.20) ^ 0.75; Return period = 5 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		51.95	48	Cir	101.85	1345.50	1345.91	0.403	1350.00*	1350.13*	0.31	1350.44	End	Grate
2		44.34	36	Cir	267.18	1346.50	1347.57	0.400	1350.44*	1351.62*	0.31	1351.93	1	Grate
3		21.42	36	Cir	380.77	1346.60	1348.12	0.399	1352.40*	1352.79*	0.07	1352.86	2	Grate
4		19.17	36	Cir	88.52	1347.70	1348.05	0.396	1352.89*	1352.96*	0.17	1353.13	3	Grate
5		13.94	24	Cir	94.40	1348.70	1349.08	0.403	1353.13*	1353.49*	0.15	1353.65	4	Grate
6		7.26	24	Cir	265.40	1348.70	1349.76	0.399	1353.87*	1354.14*	0.08	1354.23	5	Grate
7		30.30	36	Cir	256.32	1345.50	1346.53	0.402	1350.00*	1350.53*	0.14	1350.67	End	Grate
8		25.42	30	Cir	163.87	1346.60	1347.26	0.403	1350.67*	1351.30*	0.21	1351.51	7	Grate
9		20.34	30	Cir	172.73	1346.90	1347.59	0.399	1351.66*	1352.09*	0.13	1352.22	8	Grate
10		12.81	24	Cir	168.72	1347.70	1348.38	0.403	1352.23*	1352.77*	0.13	1352.90	9	Grate
11		9.57	24	Cir	41.09	1348.50	1348.66	0.389	1353.01*	1353.09*	0.22	1353.30	10	Grate
12		6.50	18	Cir	239.75	1348.80	1349.76	0.400	1353.30*	1354.22*	0.21	1354.43	11	Grate

Project File: Stonebridge Pipe Sizing 9-08.stm | Number of lines: 12 | Run Date: 09-10-2008

NOTES: Return period = 5 Yrs. ; *Surcharged (HGL above crown).