Drainage Design Report

for

JMH Behavioral Psychology Building

Franklin, Indiana

Prepared for:
Johnson Memorial Health
1125 W. Jefferson Street
Franklin, Indiana 46131

April 12, 2023

Certified By:

[Engineer's Name]
INDIANA PE 10504920



9339 Priority Way West Drive, Suite 100 Indianapolis, Indiana 46240 Telephone 317 844 6777 Facsimile 317 706 6451
www.cripe.biz
PIC: 13.0388-10900

DRAINAGE DESIGN REPORT FOR

JMH Behavioral Psychology Building
Franklin, Indiana

TABLE OF CONTENTS

1.0 Introduction 2
1.1 Project Description 2
1.2 Scope of Report 2
2.0 Hydrologic Method 2
2.1 Rainfall Distribution 2
2.2 Software 3
3.0 Water Quality Analysis 3
4.0 Conclusions 4

APPENDICES

Appendix A – Storm Sewer Basins Exhibit and Calculations
- Storm Sewer Basins Exhibit
- Hydraflow Storm Sewer Analysis
- Storm Inlet Flow Rates
- Discharge vs Depth on Grate Nomograph
- Drainage Overflow Exhibit

Appendix B – Water Quality Basins Exhibit and Calculations
- Water Quality Basins Exhibit
- HydroCAD Analysis
- Hydraflow Storm Sewer Analysis 10yr Flow
- Table A-1: Cascade Separator Treatment Flow Rata, and Standard Dimensions
- CS-4 Cascade Separator Standard Detail
- CS-5 Cascade Separator Standard Detail

Appendix C – Post Developed Watershed Exhibit and Calculations
- Post Developed Watershed Exhibit
- Pondpack Analysis

Appendix D – Approved Master Plan Improvements prepared by EMH&T
- Johnson Memorial Hospital Master Plan Improvements dated July 10, 2001

1.0 Introduction

Behavioral Psychology Building is a project located at 1125 W. Jefferson Street, Building 1161 in Franklin, Indiana. The stormwater management system for this project is addressed in this report using the parameters set by the approved Master Plan for the campus prepared by EMH&T.

1.1 Project Description

Johnson Memorial Hospital has a need to construct a Behavioral Psychology Building on their campus. The new building, parking area, and sidewalks is located at 1125 W. Jefferson Street, Building 1161, Franklin, Indiana, 46131.

1.2 Scope of Report

This report summarizes the design of the storm water management system for the proposed development. Since the site is located within the Johnson Memorial Hospital Campus, it is bound by the requirements of the approved Master Plan Improvements by EMH&T. This report provides documentation showing compliance with the master plan design report. Refer to Appendix D for the Masterplan Report.

2.0 Hydrologic Method

The Methods used to generate and determine the peak runoffs from the watersheds are the SCS unit hydrograph method, which is used in sizing the detention pond, and the Rational Method, which is used for sizing the storm sewer pipes.

Factors involved in using the SCS method are the curve number (CN), the time of concentration (TC), and the area (A) of the watershed. The curve number is determined based on the type of soil and land use. The time of concentration is determined from the surface conditions and slope of terrain. The watershed area is based on the topographic survey of the site. In the case of calculating the allowable release rates for the site, the watershed areas were determined using the Banning Engineering Master Plan Exhibit in Appendix D.

Factors involved in using the rational method are the storm sewer basin area (A), the runoff coefficient (c), and the rainfall intensity (i) for 10-year and 100-year storms. The IDF table from the Stormwater Technical Standards Manual Johnson County, Indiana is used to find the values of the rainfall intensity.

2.1 Rainfall Distribution

The overall site runoff and storm sewer drainage network was designed using Intensity-Duration Frequency curves and the Rational Method.

2.2 Software

After all data and rainfall information have been estimated, PondPack v8i, a hydraulic modeling program, is used to determine the peak flows and volumes using the SCS Unit Hydrograph Method. PondPack generates an individual hydrograph for each basin. The hydrographs are then added to generate runoff flows for ponds or to specific points of interest.

HydroCAD, a hydraulic modeling program, is used to determine the peak flows and volumes using the SCS Unit Hydrograph Method. HydroCAD generates an individual hydrograph for each watershed. The hydrographs are then added to generate runoff flows for specific points of interest

Hydraflow Storm Sewers Extension for AutoCAD Civil 3D, v10 is used to size all storm pipes for the 10-year and 100-year storm event peak flows. Hydraflow utilizes a graphical pipe network containing pipe data, inlet characteristics, watershed areas, and rainfall information. The calculations are based on the rational method. Factors involved include runoff coefficient (C), time of concentration (Tc) and the watershed area (A). See Appendix A for Storm Sewer Basins Exhibit and Calculations.

3.0 Water Quality Analysis

The City of Franklin and Johnson County are subject to the requirements of a stormwater discharge control permit that has been issued by the Indiana Department of Environmental Management (IDEM) under the National Pollutant Discharge Elimination System (NPDES).

The pollutants of concern that are to be addressed in stormwater runoff from newly developing and redeveloping areas include total suspended solids (TSS) and floatables.

The proposed water quality treatment method is the use of structural BMPs. The BMP structures are Contech Cascade Separator™, models CS-5 and CS-4. Refer to Appendix B for treatment flow calculations for the BMP unit and the Water Quality Basins Exhibit.

Per the manufacturer the Contech Cascade Separator can be subjected to traffic loading H-20. Since it is placed in a lawn area, it will be impacted by little to no traffic loading.

Table 3.1 Summary of Water Quality Flow Calcs (cfs)

WQ Unit	**STR 702 CS-5**	**STR 713 CS-4**
Calculated WQ Flow Rate	0.87	0.48
Max WQ Treatment Flow Rate	2.31	1.48

A separate BMP Manual for the operation and maintenance of the systems has been prepared and is provided under a separate cover.

4.0 Conclusions

The addition of the proposed development in Basin S1 is in compliance with the Approved Master Plan for the Campus. Refer to Appendix C for Post Developed Watershed Exhibit and Calculations. Refer to Appendix D for the Master Plan Report.

Table 4.1 Summary of Release Rates and Elevations of the S1 Watershed

Storm Event	Post-Developed Release Rate (cfs)	Post-Developed Water Surface Elevations	Master Plan Release Rate (cfs)	Master Plan Water Surface Elevations
2-Year	61.52	734.58	56	734.2
10 Year	92.12	735.70	97	735.5
100 Year	122.04	737.58	165	737.5

Appendix A

Storm Sewer Basins Exhibit and Calculations

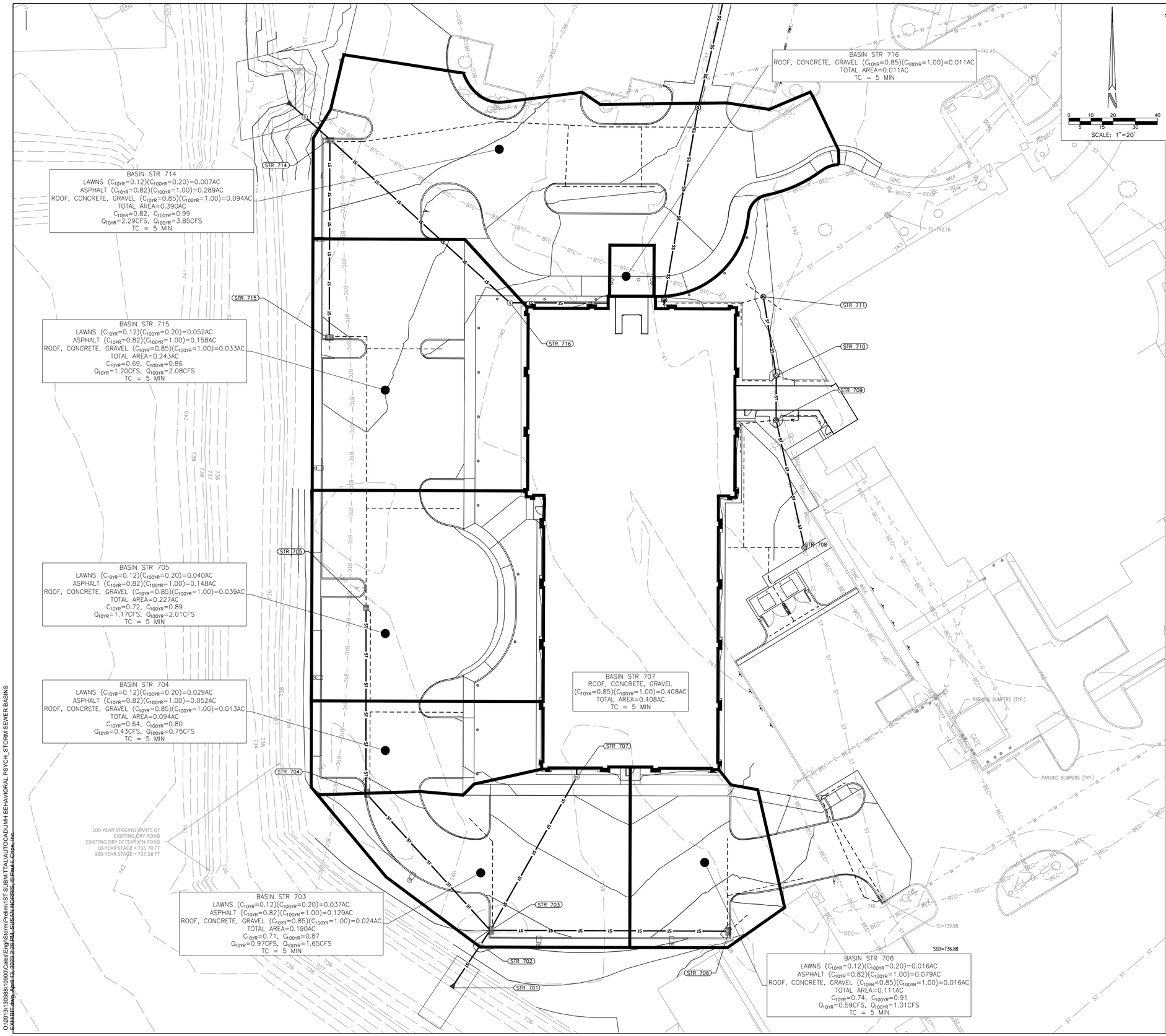


EXHIBIT LEGEND

BASIN LIMITS

INLET FLOW RATE
Q=CA
10 YEAR, 5 MIN i=7.16 in/hr
100 YEAR, 5 MIN i=9.97 in/hr

REVISION NUMBER	REVISION DATE	REVISION DESCRIPTION
REVISION SCHEDULE		

CONSULTANTS

9339 PRIORITY WAY WEST DRIVE
SUITE 100
INDIANAPOLIS, INDIANA 46240
Phone (317) 844-6777
E-Mail cripe@cripe.biz

ARCHITECTURE + INTERIORS
CIVIL ENGINEERING
SURVEY + 3D LASER SCANNING
TRANSPORTATION PLANNING
DEVELOPMENT PLANNING
REAL ESTATE SERVICES

Cripe
Solutions by Design Since 1937

STORM SEWER BASINS EXHIBIT

JOHNSON MEMORIAL HEALTH

BEHAVIORAL PSYCHOLOGY BUILDING

1125 W. JEFFERSON STREET, BUILDING 1161, FRANKLIN, INDIANA 46131

CERTIFIED BY:

CHRISTOPHER M. WISEMAN
REGISTERED
PE 10504920
STATE OF
INDIANA
PROFESSIONAL ENGINEER

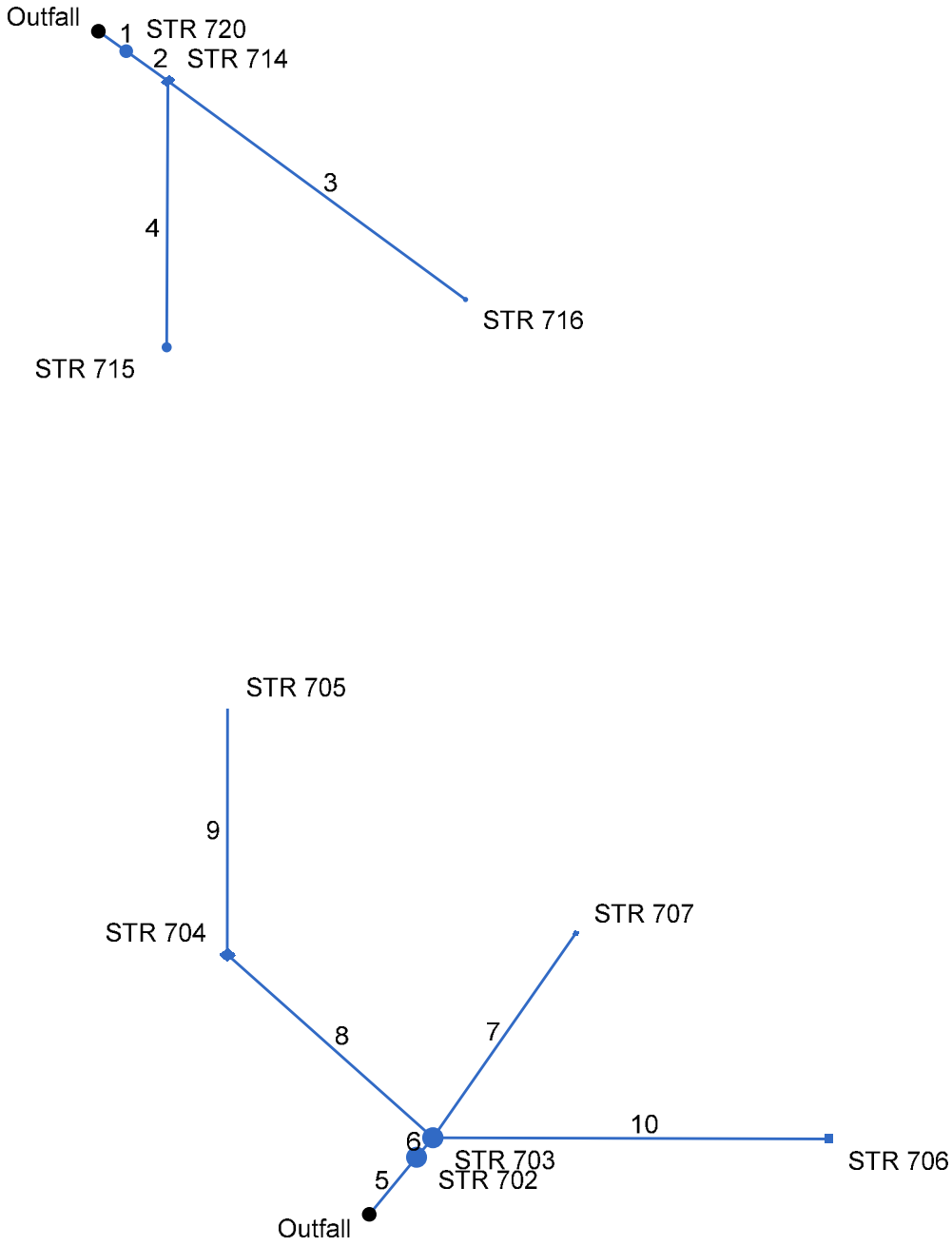
Drawn By:	S. SHAW
Checked By:	S. NORRIS, EI
Quality Assurance:	C. WISEMAN, PE
Scale:	Scale: 1" = 20'
Sheet	STM-1
Date	03-30-2023
Project Number	0130388.10900

© Paul I. Cripe, Inc.

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

O:\2013\13038810900\Calcs\Engr\Storm\Prelim\1ST SUBMITTAL\AUTOCAD\MH BEHAVIORAL PSYCH_STORM SEWER BASINS EXHIBIT dwg, April 13, 2023 2:28 PM, SUSAN.NORRIS, © Paul I. Cripe, Inc.

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



Project File: 130388-10900_Storm 10YR.stm	Number of lines: 10	Date: 3/29/2023

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	713-712	2.61	15	Cir	10.139	734.94	734.99	0.493	735.59	735.64	0.04	735.68	End	Manhole
2	714-713	2.62	15	Cir	15.143	734.99	735.07	0.528	735.68	735.72	n/a	735.72 j	1	Curb-Horiz
3	716	0.06	6	Cir	109.802	736.07	740.25	3.807	736.15	740.37	n/a	740.37	2	Manhole
4	715-714	1.15	12	Cir	90.000	735.32	735.77	0.500	735.79	736.24	0.15	736.40	2	Curb-Horiz
5	702-701	4.84	18	Cir	23.214	733.60	733.85	1.077	734.30	734.70	0.05	734.70	End	Manhole
6	703-702	4.86	18	Cir	7.953	733.85	733.99	1.761	734.70	734.84	0.51	734.84	5	Curb-Horiz
7	707-703	2.49	12	Cir	79.501	735.90	737.48	1.987	736.38	738.16	n/a	738.16	6	Manhole
8	704-703	1.46	12	Cir	83.532	734.49	736.30	2.167	734.85	736.81	n/a	736.81	6	Curb-Horiz
9	705-704	1.15	12	Cir	83.687	736.40	737.25	1.016	736.81	737.70	n/a	737.70	8	DropGrate
10	706-703	0.57	12	Cir	108.000	734.49	735.08	0.546	734.84	735.39	n/a	735.39 j	6	Curb-Horiz

Project File: 130388-10900_Storm 10YR.stm | Number of lines: 10 | Run Date: 3/29/2023

NOTES: Return period = 10 Yrs. ; j - Line contains hyd. jump.

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	10.139	0.00	0.64	0.00	0.00	0.49	5.0	11.0	5.4	2.61	4.91	4.05	15	0.49	734.94	734.99	735.59	735.64	736.82	737.65	713-712
2	1	15.143	0.39	0.64	0.81	0.32	0.49	5.0	10.9	5.4	2.62	5.09	3.93	15	0.53	734.99	735.07	735.68	735.72	737.65	737.27	714-713
3	2	109.802	0.01	0.01	0.85	0.01	0.01	5.0	5.0	7.2	0.06	1.19	2.42	6	3.81	736.07	740.25	736.15	740.37	737.27	741.72	716
4	2	90.000	0.24	0.24	0.67	0.16	0.16	5.0	5.0	7.2	1.15	2.52	3.13	12	0.50	735.32	735.77	735.79	736.24	737.27	737.87	715-714
5	End	23.214	0.00	1.03	0.00	0.00	0.77	5.0	7.5	6.3	4.84	10.90	5.35	18	1.08	733.60	733.85	734.30	734.70	735.39	741.00	702-701
6	5	7.953	0.19	1.03	0.69	0.13	0.77	5.0	7.5	6.3	4.86	13.93	4.73	18	1.76	733.85	733.99	734.70	734.84	741.00	739.50	703-702
7	6	79.501	0.41	0.41	0.85	0.35	0.35	5.0	5.0	7.2	2.49	5.44	5.59	12	1.99	735.90	737.48	736.38	738.16	739.50	742.80	707-703
8	6	83.532	0.09	0.32	0.61	0.05	0.22	5.0	6.0	6.8	1.46	5.24	4.67	12	2.17	734.49	736.30	734.85	736.81	739.50	740.88	704-703
9	8	83.687	0.23	0.23	0.70	0.16	0.16	5.0	5.0	7.2	1.15	3.59	3.56	12	1.02	736.40	737.25	736.81	737.70	740.88	741.00	705-704
10	6	108.000	0.11	0.11	0.72	0.08	0.08	5.0	5.0	7.2	0.57	2.63	2.52	12	0.55	734.49	735.08	734.84	735.39	739.50	738.83	706-703

Project File: 130388-10900_Storm 10YR.stm | Number of lines: 10 | Run Date: 3/29/2023

NOTES:Intensity = 57.33 / (Inlet time + 8.80) ^ 0.79; Return period =Yrs. 10 ; c = cir e = ellip b = box

FL-DOT Report

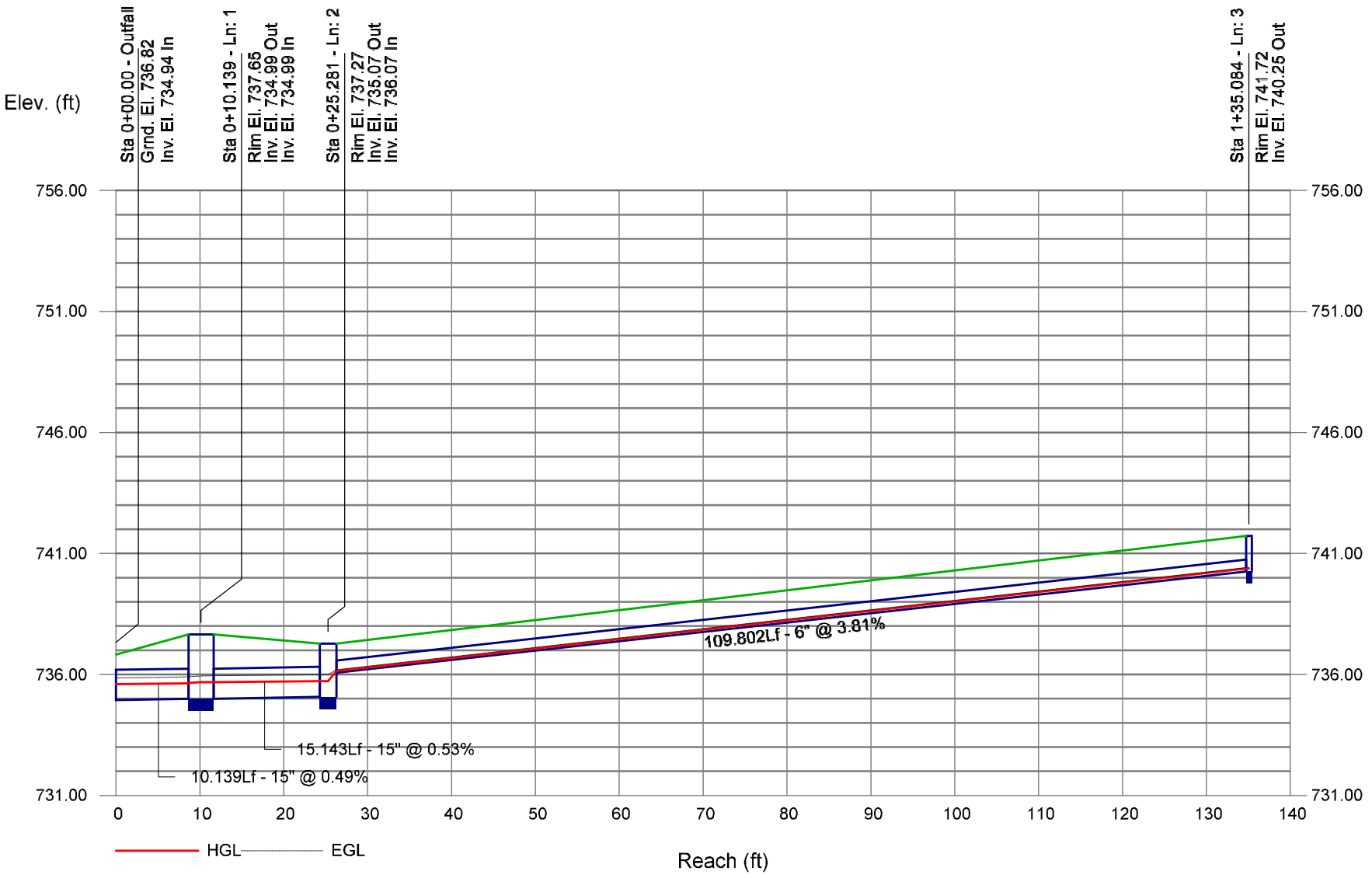
Line No	To Line	Type of struc	n - Value	Len	Drainage Area			Time of conc	Time of Flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	ADD		Date: 3/29/2023
					C1 = 0.12 C2 = 0.82 C3 = 0.85							Total Flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 10 yrs
														Elev of Invert							Proj: 130388-10900_Storm
					Increment (ac)	Sub-Total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	MH	0.012	10.139	0.00	0.06	0.01	11.00	0.06	5.37	0.49	0.00	737.65	735.64	735.59	0.05	15	0.51	4.05	2.61	713-712
					0.00	0.45	0.37					2.61		736.24	736.19		15	0.49	4.00	4.91	
					0.00	0.14	0.12							734.99	734.94	0.05	Cir				
2	1	Curb	0.012	15.143	0.01	0.06	0.01	10.91	0.09	5.39	0.49	0.00	737.27	735.72	735.68	0.04	15	0.26	3.93	2.62	714-713
					0.29	0.45	0.37					2.62		736.32	736.24		15	0.53	4.14	5.09	
					0.09	0.14	0.12							735.07	734.99	0.08	Cir				
3	2	MH	0.012	109.802	0.00	0.00	0.00	5.00	5.91	7.15	0.01	0.00	741.72	740.37	736.15	4.22	6	3.85	2.42	0.06	716
					0.00	0.00	0.00					0.06		740.75	736.57		6	3.81	6.04	1.19	
					0.01	0.01	0.01							740.25	736.07	4.18	Cir				
4	2	Curb	0.013	90.000	0.05	0.05	0.01	5.00	1.02	7.15	0.16	0.00	737.87	736.24	735.79	0.45	12	0.50	3.13	1.15	715-714
					0.16	0.16	0.13					1.15		736.77	736.32		12	0.50	3.21	2.52	
					0.03	0.03	0.03							735.77	735.32	0.45	Cir				
5	End	MH	0.013	23.214	0.00	0.12	0.01	7.54	0.13	6.25	0.77	0.00	741.00	734.70	734.30	0.39	18	1.70	5.35	4.84	702-701
					0.00	0.41	0.33					4.84		735.35	735.10		18	1.08	6.17	10.90	
					0.00	0.50	0.43							733.85	733.60	0.25	Cir				
6	5	Curb	0.013	7.953	0.04	0.12	0.01	7.50	0.04	6.27	0.77	0.00	739.50	734.84	734.70	0.14	18	1.77	4.73	4.86	703-702
					0.13	0.41	0.33					4.86		735.49	735.35		18	1.76	7.88	13.93	
					0.02	0.50	0.43							733.99	733.85	0.14	Cir				
7	6	MH	0.012	79.501	0.00	0.00	0.00	5.00	0.42	7.15	0.35	0.00	742.80	738.16	736.38	1.78	12	2.24	5.59	2.49	707-703
					0.00	0.00	0.00					2.49		738.48	736.90		12	1.99	6.92	5.44	
					0.41	0.41	0.35							737.48	735.90	1.58	Cir				
8	6	Curb	0.013	83.532	0.03	0.07	0.01	5.95	0.73	6.78	0.22	0.00	740.88	736.81	734.85	1.96	12	2.35	4.67	1.46	704-703
					0.05	0.20	0.16					1.46		737.30	735.49		12	2.17	6.67	5.24	
					0.01	0.05	0.04							736.30	734.49	1.81	Cir				
9	8	DrGrt	0.013	83.687	0.04	0.04	0.00	5.00	0.95	7.15	0.16	0.00	741.00	737.70	736.81	0.89	12	1.06	3.56	1.15	705-704
					0.15	0.15	0.12					1.15		738.25	737.40		12	1.02	4.57	3.59	
					0.04	0.04	0.03							737.25	736.40	0.85	Cir				
10	6	Curb	0.013	108.000	0.02	0.02	0.00	5.00	2.50	7.15	0.08	0.00	738.83	735.39	734.84	0.56	12	0.51	2.52	0.57	706-703
					0.08	0.08	0.06					0.57		736.08	735.49		12	0.55	3.35	2.63	
					0.02	0.02	0.01							735.08	734.49	0.59	Cir				

NOTES: Intensity = 57.33 / (Inlet time + 8.80) ^ 0.79 (in/hr) ; Time of flow in section is based on full flow.

Project File: 130388-10900_Storm 10YR.stm

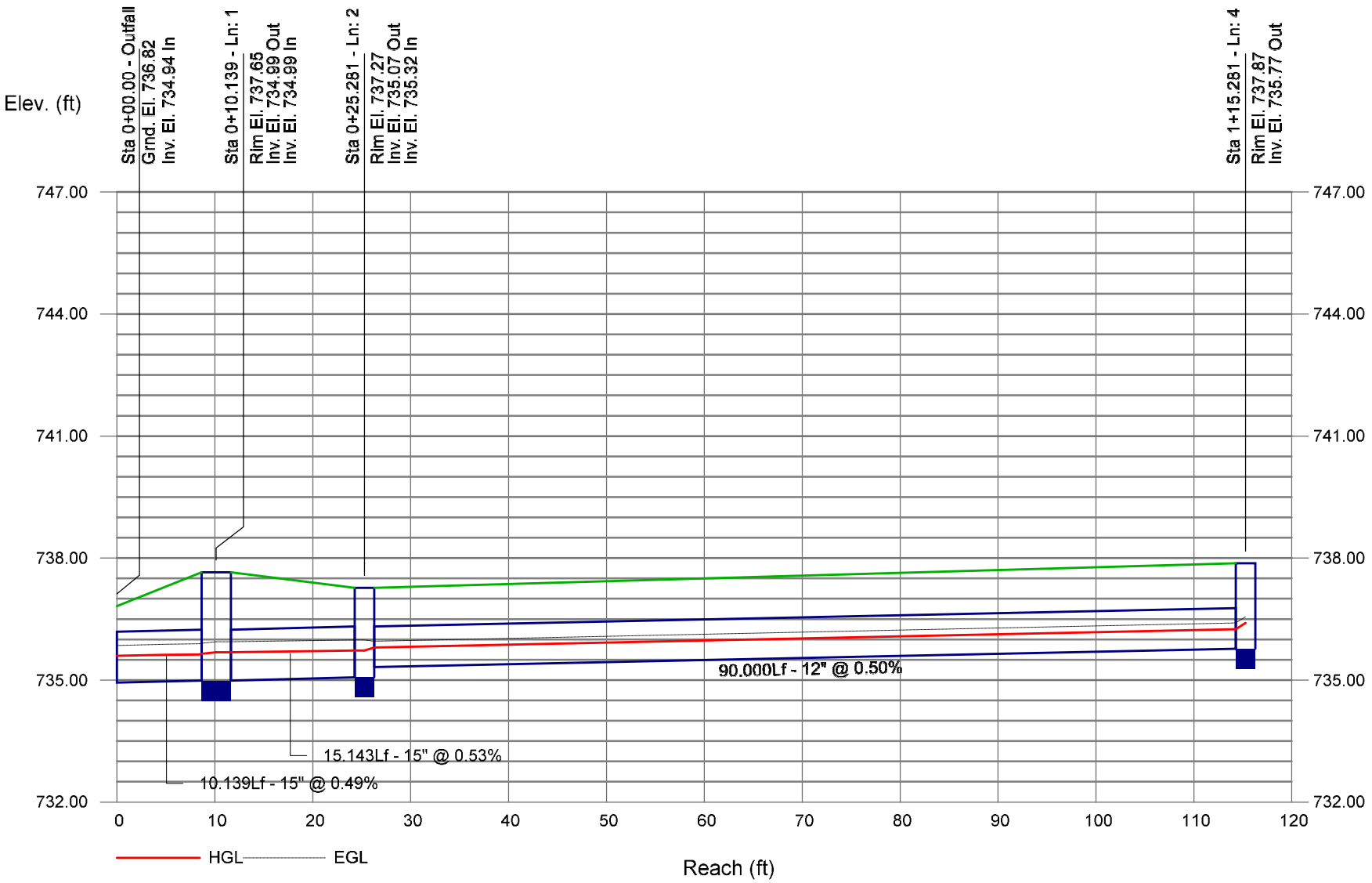
Storm Sewer Profile

Proj. file: 130388-10900_Storm 10YR.stm



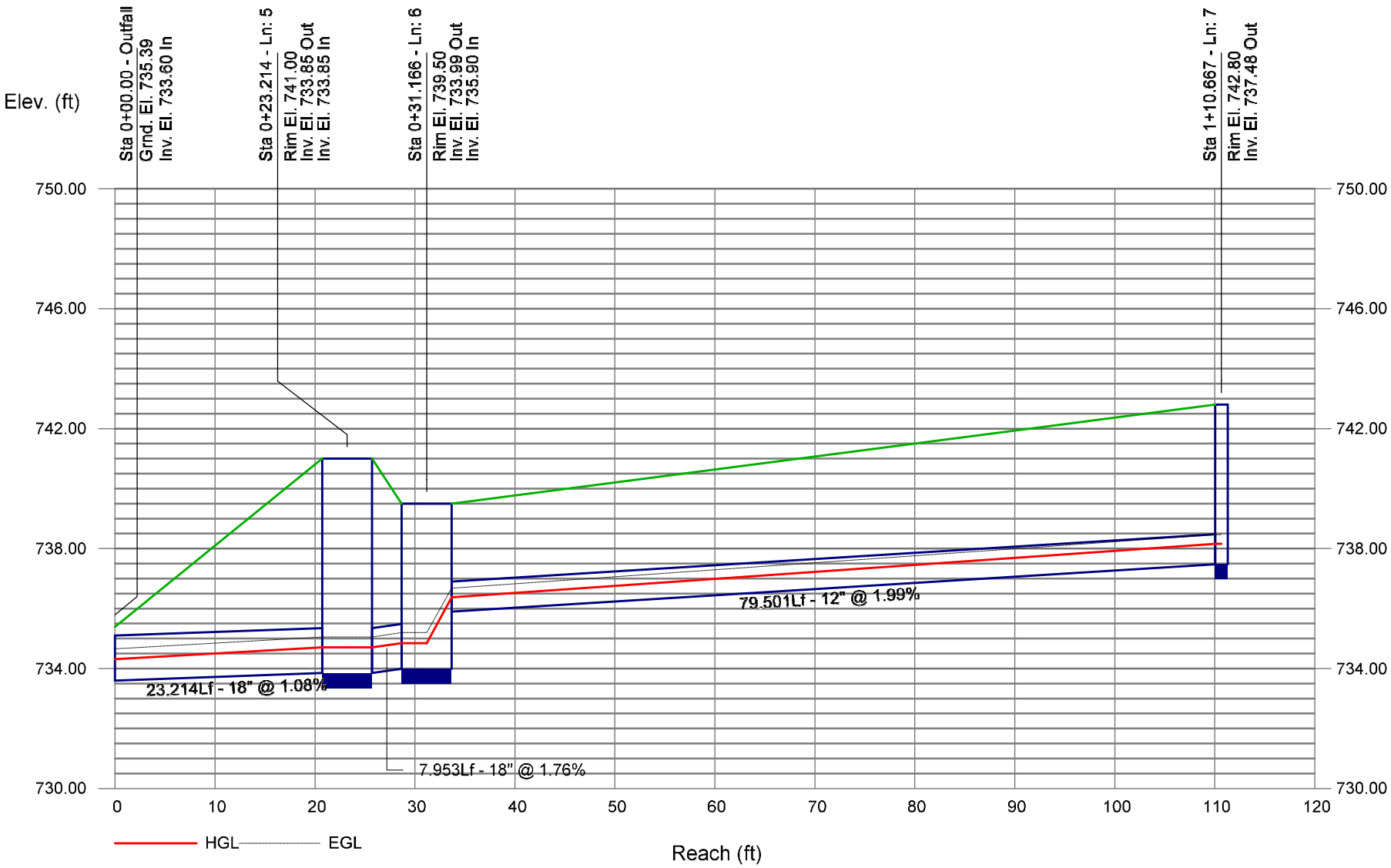
Storm Sewer Profile

Proj. file: 130388-10900_Storm 10YR.stm



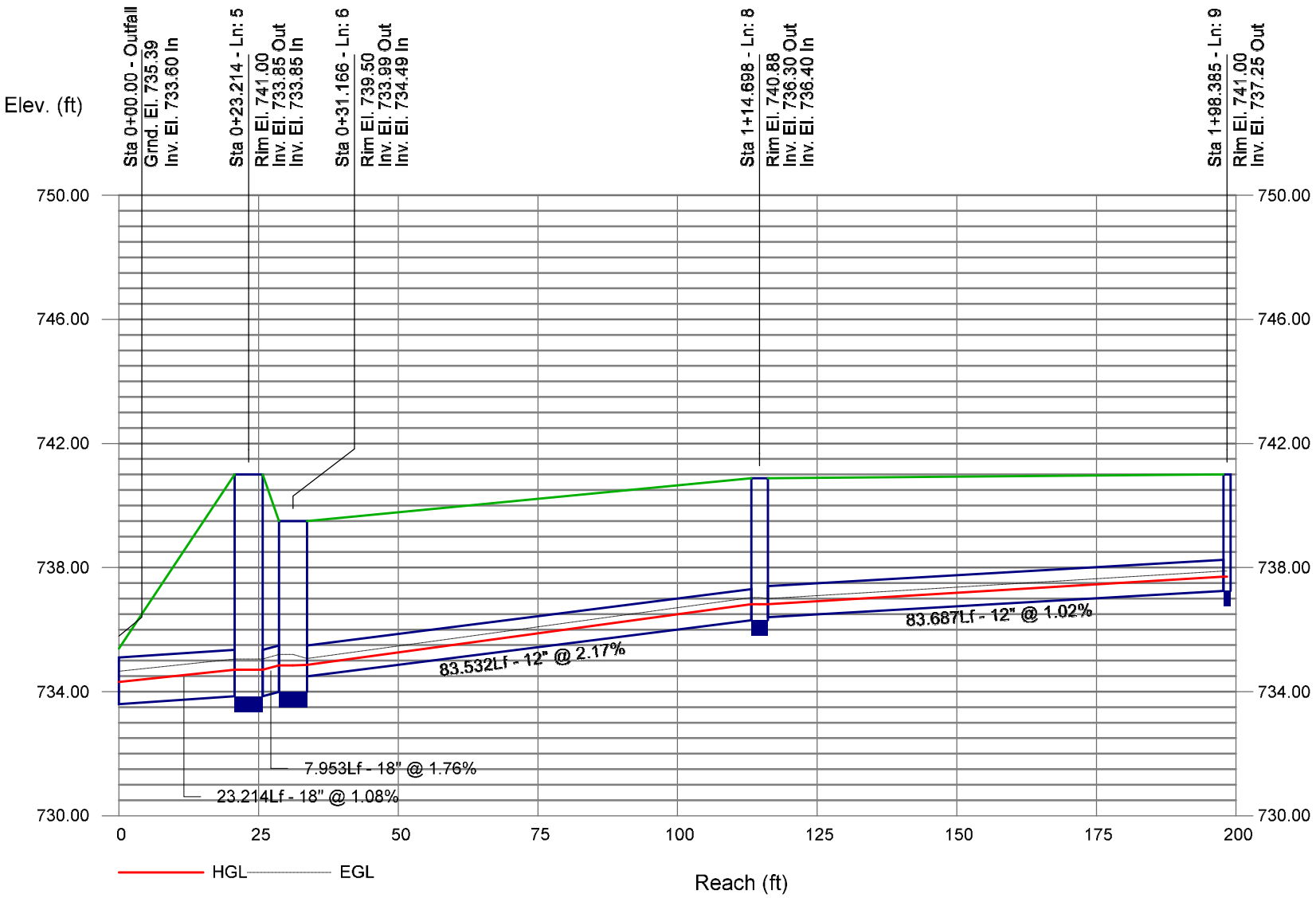
Storm Sewer Profile

Proj. file: 130388-10900_Storm 10YR.stm



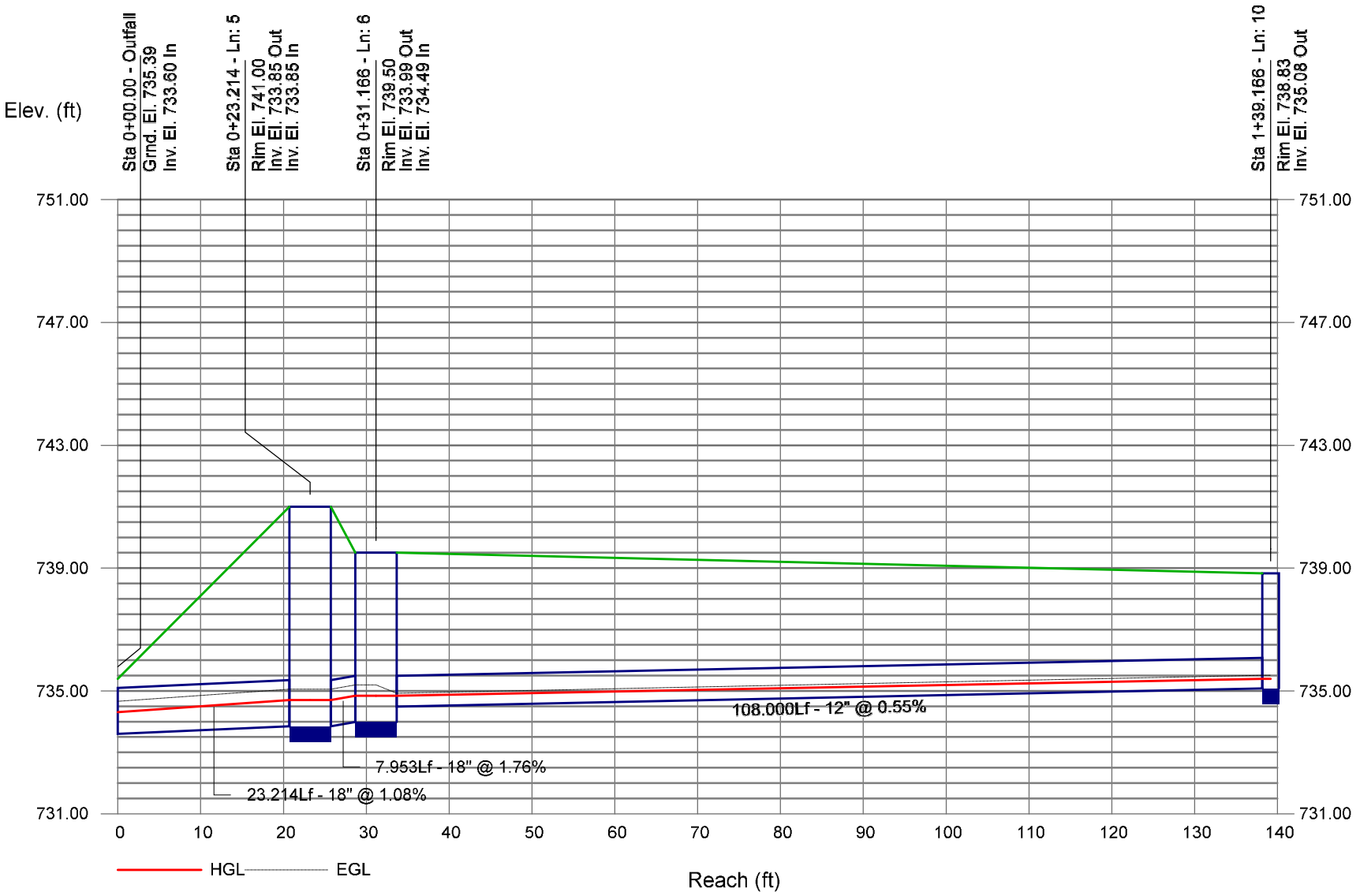
Storm Sewer Profile

Proj. file: 130388-10900_Storm 10YR.stm



Storm Sewer Profile

Proj. file: 130388-10900_Storm 10YR.stm



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	713-712	4.88	15	Cir	10.139	734.94	734.99	0.493	735.96	736.01	0.05	736.06	End	Manhole
2	714-713	4.89	15	Cir	15.143	734.99	735.07	0.528	736.06	736.12	0.37	736.48	1	Curb-Horiz
3	716	0.10	6	Cir	109.802	736.07	740.25	3.807	736.48	740.41	n/a	740.41 j	2	Manhole
4	715-714	1.98	12	Cir	90.000	735.32	735.77	0.500	736.48	736.74	0.10	736.84	2	Curb-Horiz
5	702-701	8.51	18	Cir	23.214	733.60	733.85	1.077	734.60	734.98	n/a	734.98	End	Manhole
6	703-702	8.52	18	Cir	7.953	733.85	733.99	1.761	734.98	735.12	0.81	735.12	5	Curb-Horiz
7	707-703	4.08	12	Cir	79.501	735.90	737.48	1.987	736.55	738.33	0.51	738.33	6	Manhole
8	704-703	2.55	12	Cir	83.532	734.49	736.30	2.167	735.12	736.98	0.33	736.98	6	Curb-Horiz
9	705-704	1.97	12	Cir	83.687	736.40	737.25	1.016	736.98	737.85	0.25	737.85	8	DropGrate
10	706-703	0.96	12	Cir	108.000	734.49	735.08	0.546	735.12	735.49	n/a	735.49 j	6	Curb-Horiz

Project File: 130388-10900_Storm 100YR.stm | Number of lines: 10 | Run Date: 3/29/2023

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

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	10.139	0.00	0.64	0.00	0.00	0.60	5.0	8.7	8.2	4.88	4.91	4.56	15	0.49	734.94	734.99	735.96	736.01	736.82	737.65	713-712
2	1	15.143	0.39	0.64	0.99	0.39	0.60	5.0	8.6	8.2	4.89	5.09	4.43	15	0.53	734.99	735.07	736.06	736.12	737.65	737.27	714-713
3	2	109.802	0.01	0.01	1.00	0.01	0.01	5.0	5.0	10.0	0.10	1.19	1.24	6	3.81	736.07	740.25	736.48	740.41	737.27	741.72	716
4	2	90.000	0.24	0.24	0.83	0.20	0.20	5.0	5.0	10.0	1.98	2.52	2.54	12	0.50	735.32	735.77	736.48	736.74	737.27	737.87	715-714
5	End	23.214	0.00	1.03	0.00	0.00	0.93	5.0	6.5	9.1	8.51	10.90	6.39	18	1.08	733.60	733.85	734.60	734.98	735.39	741.00	702-701
6	5	7.953	0.19	1.03	0.84	0.16	0.93	5.0	6.5	9.1	8.52	13.93	5.97	18	1.76	733.85	733.99	734.98	735.12	741.00	739.50	703-702
7	6	79.501	0.41	0.41	1.00	0.41	0.41	5.0	5.0	10.0	4.08	5.44	6.66	12	1.99	735.90	737.48	736.55	738.33	739.50	742.80	707-703
8	6	83.532	0.09	0.32	0.75	0.07	0.27	5.0	5.6	9.6	2.55	5.24	4.68	12	2.17	734.49	736.30	735.12	736.98	739.50	740.88	704-703
9	8	83.687	0.23	0.23	0.86	0.20	0.20	5.0	5.0	10.0	1.97	3.59	4.08	12	1.02	736.40	737.25	736.98	737.85	740.88	741.00	705-704
10	6	108.000	0.11	0.11	0.88	0.10	0.10	5.0	5.0	10.0	0.96	2.63	2.51	12	0.55	734.49	735.08	735.12	735.49	739.50	738.83	706-703

Project File: 130388-10900_Storm 100YR.stm

Number of lines: 10

Run Date: 3/29/2023

NOTES:Intensity = 47.72 / (Inlet time + 5.70) ^ 0.66; Return period =Yrs. 100 ; c = cir e = ellip b = box

FL-DOT Report

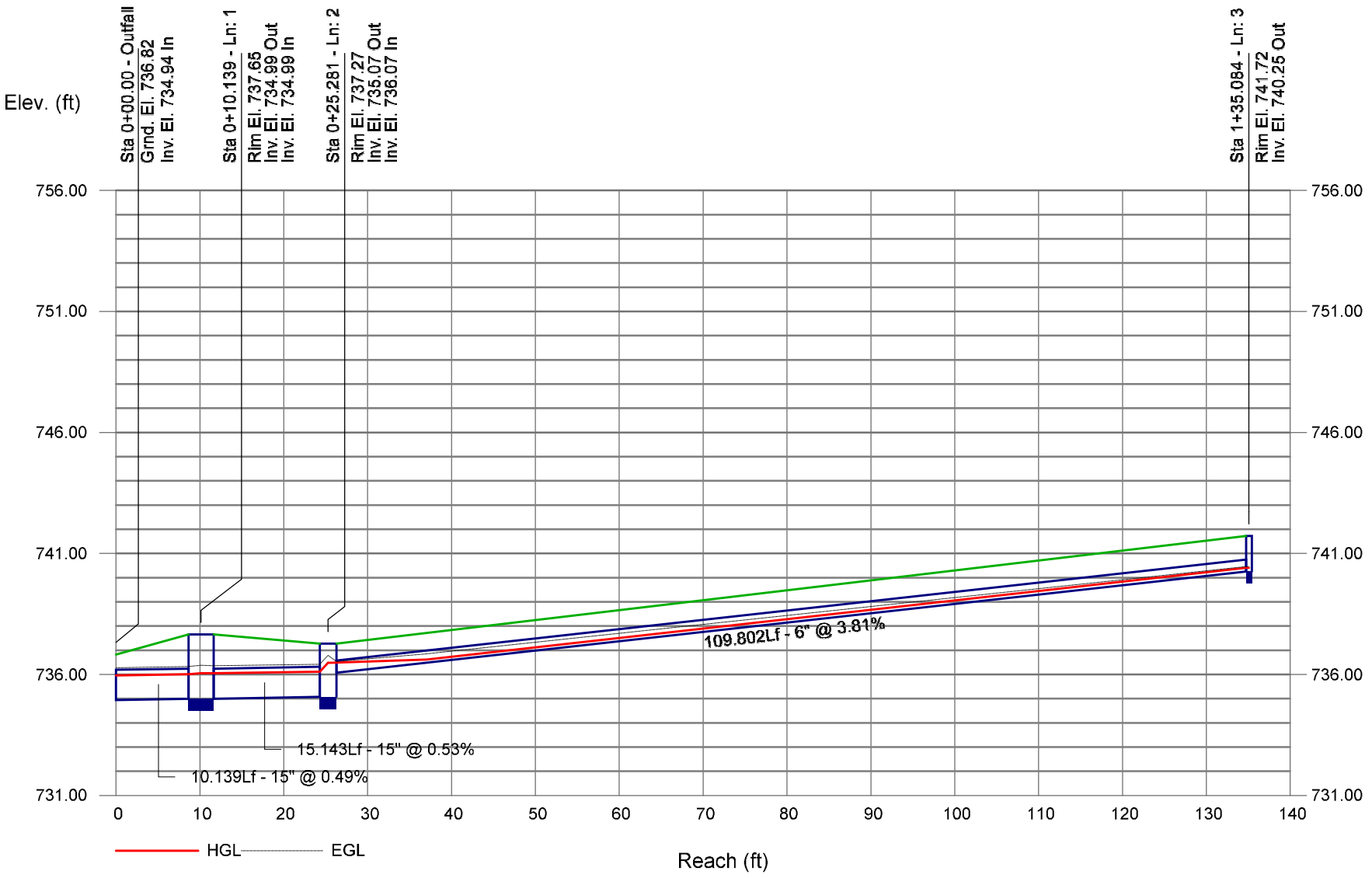
Line No	To Line	Type of struc	n - Value	Len	Drainage Area			Time of conc	Time of Flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	ADD		Date: 3/29/2023
					C1 = 0.2 C2 = 1 C3 = 1							Total Flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 100 yrs
														Elev of Invert							Proj: 130388-10900_Storm
					Increment (ac)	Sub-Total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	MH	0.012	10.139	0.00	0.06	0.01	8.66	0.04	8.20	0.60	0.00	737.65	736.01	735.96	0.05	15	0.48	4.56	4.88	713-712
					0.00	0.45	0.45					4.88		736.24	736.19		15	0.49	4.00	4.91	
					0.00	0.14	0.14							734.99	734.94	0.05	Cir				
2	1	Curb	0.012	15.143	0.01	0.06	0.01	8.61	0.05	8.22	0.60	0.00	737.27	736.12	736.06	0.06	15	0.40	4.43	4.89	714-713
					0.29	0.45	0.45					4.89		736.32	736.24		15	0.53	4.14	5.09	
					0.09	0.14	0.14							735.07	734.99	0.08	Cir				
3	2	MH	0.012	109.802	0.00	0.00	0.00	5.00	3.61	9.96	0.01	0.00	741.72	740.41	736.48	3.92	6	3.57	1.24	0.10	716
					0.00	0.00	0.00					0.10		740.75	736.57		6	3.81	6.04	1.19	
					0.01	0.01	0.01							740.25	736.07	4.18	Cir				
4	2	Curb	0.013	90.000	0.05	0.05	0.01	5.00	0.59	9.96	0.20	0.00	737.87	736.74	736.48	0.26	12	0.29	2.54	1.98	715-714
					0.16	0.16	0.16					1.98		736.77	736.32		12	0.50	3.21	2.52	
					0.03	0.03	0.03							735.77	735.32	0.45	Cir				
5	End	MH	0.013	23.214	0.00	0.12	0.02	6.49	0.08	9.13	0.93	0.00	741.00	734.98	734.60	0.38	18	1.64	6.39	8.51	702-701
					0.00	0.41	0.41					8.51		735.35	735.10		18	1.08	6.17	10.90	
					0.00	0.50	0.50							733.85	733.60	0.25	Cir				
6	5	Curb	0.013	7.953	0.04	0.12	0.02	6.47	0.03	9.15	0.93	0.00	739.50	735.12	734.98	0.14	18	1.77	5.97	8.52	703-702
					0.13	0.41	0.41					8.52		735.49	735.35		18	1.76	7.88	13.93	
					0.02	0.50	0.50							733.99	733.85	0.14	Cir				
7	6	MH	0.012	79.501	0.00	0.00	0.00	5.00	0.25	9.96	0.41	0.00	742.80	738.33	736.55	1.79	12	2.25	6.66	4.08	707-703
					0.00	0.00	0.00					4.08		738.48	736.90		12	1.99	6.92	5.44	
					0.41	0.41	0.41							737.48	735.90	1.58	Cir				
8	6	Curb	0.013	83.532	0.03	0.07	0.01	5.56	0.43	9.63	0.27	0.00	740.88	736.98	735.12	1.86	12	2.23	4.68	2.55	704-703
					0.05	0.20	0.20					2.55		737.30	735.49		12	2.17	6.67	5.24	
					0.01	0.05	0.05							736.30	734.49	1.81	Cir				
9	8	DrGrt	0.013	83.687	0.04	0.04	0.01	5.00	0.56	9.96	0.20	0.00	741.00	737.85	736.98	0.86	12	1.03	4.08	1.97	705-704
					0.15	0.15	0.15					1.97		738.25	737.40		12	1.02	4.57	3.59	
					0.04	0.04	0.04							737.25	736.40	0.85	Cir				
10	6	Curb	0.013	108.000	0.02	0.02	0.00	5.00	1.47	9.96	0.10	0.00	738.83	735.49	735.12	0.37	12	0.34	2.51	0.96	706-703
					0.08	0.08	0.08					0.96		736.08	735.49		12	0.55	3.35	2.63	
					0.02	0.02	0.02							735.08	734.49	0.59	Cir				

NOTES: Intensity = 47.72 / (Inlet time + 5.70) ^ 0.66 (in/hr) ; Time of flow in section is based on full flow.

Project File: 130388-10900_Storm 100YR.stm

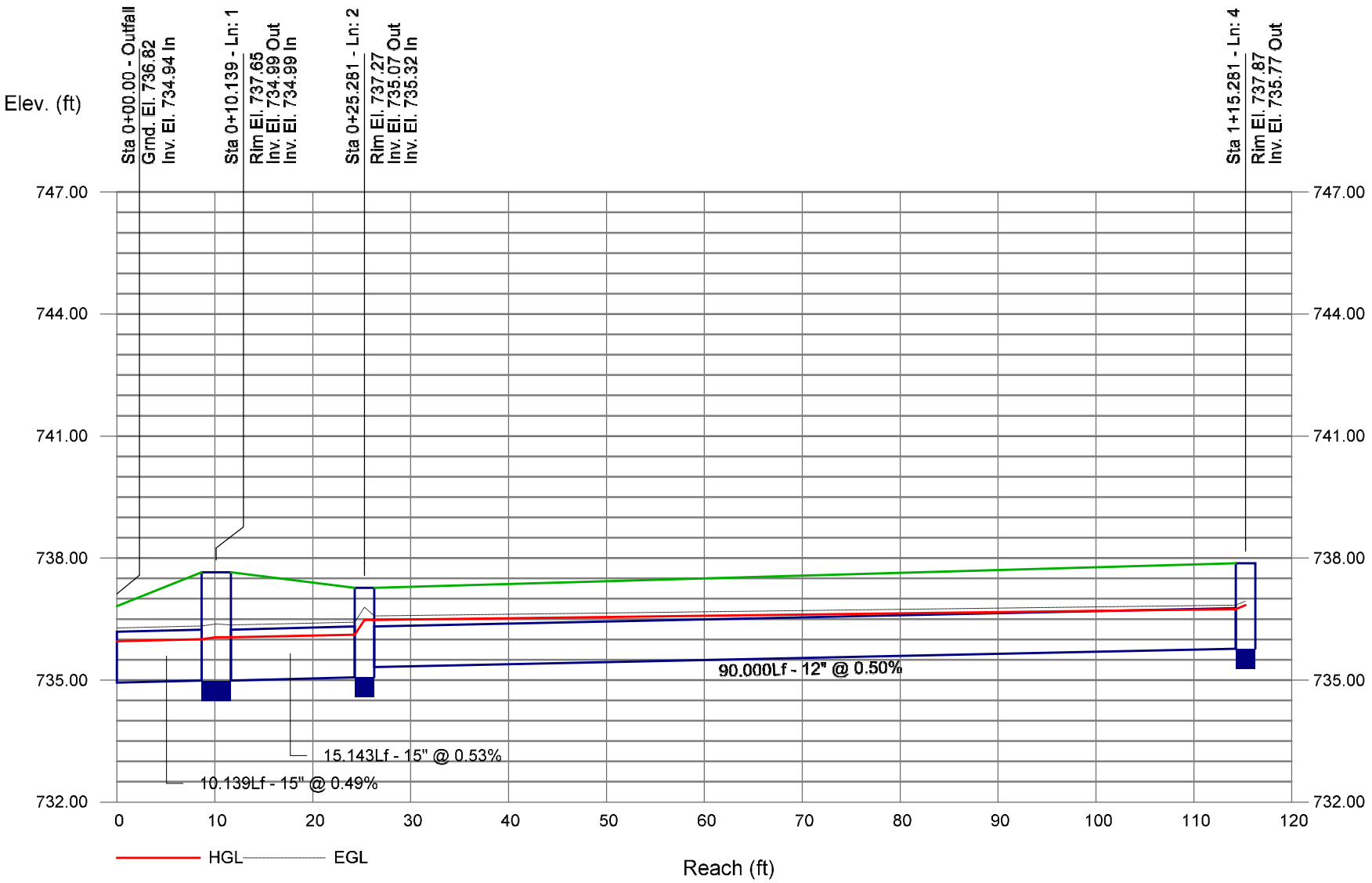
Storm Sewer Profile

Proj. file: 130388-10900_Storm 100YR.stm



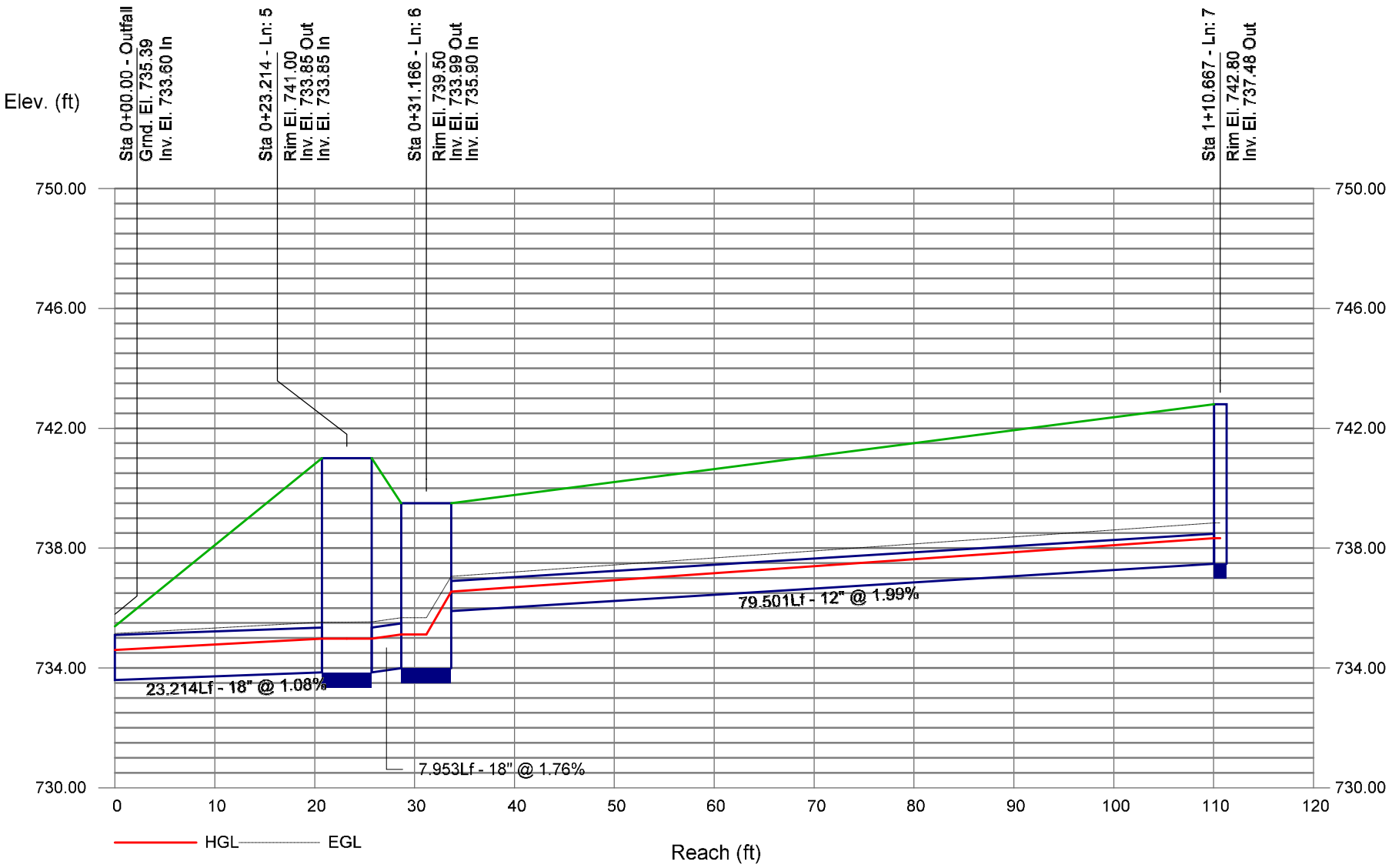
Storm Sewer Profile

Proj. file: 130388-10900_Storm 100YR.stm



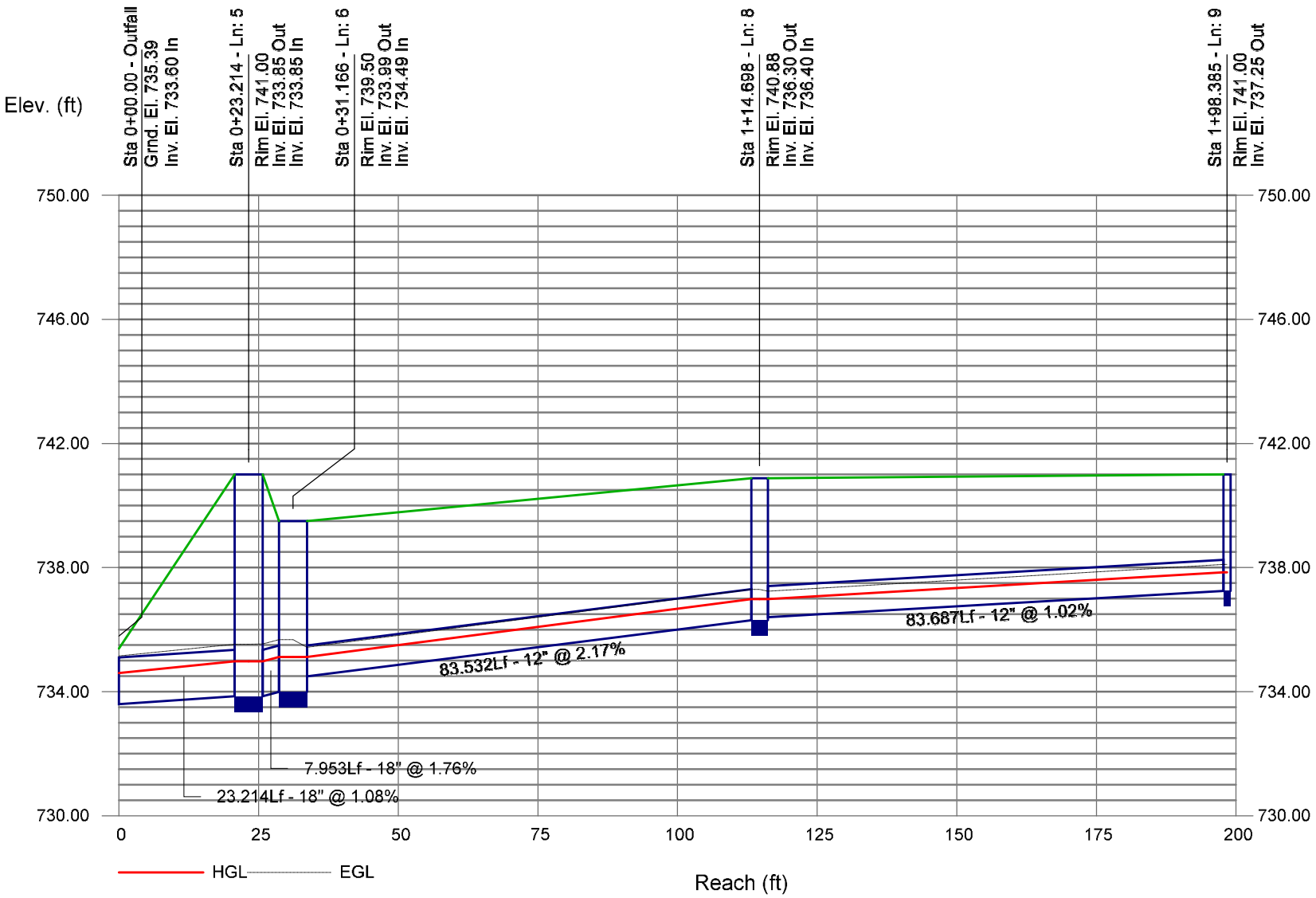
Storm Sewer Profile

Proj. file: 130388-10900_Storm 100YR.stm



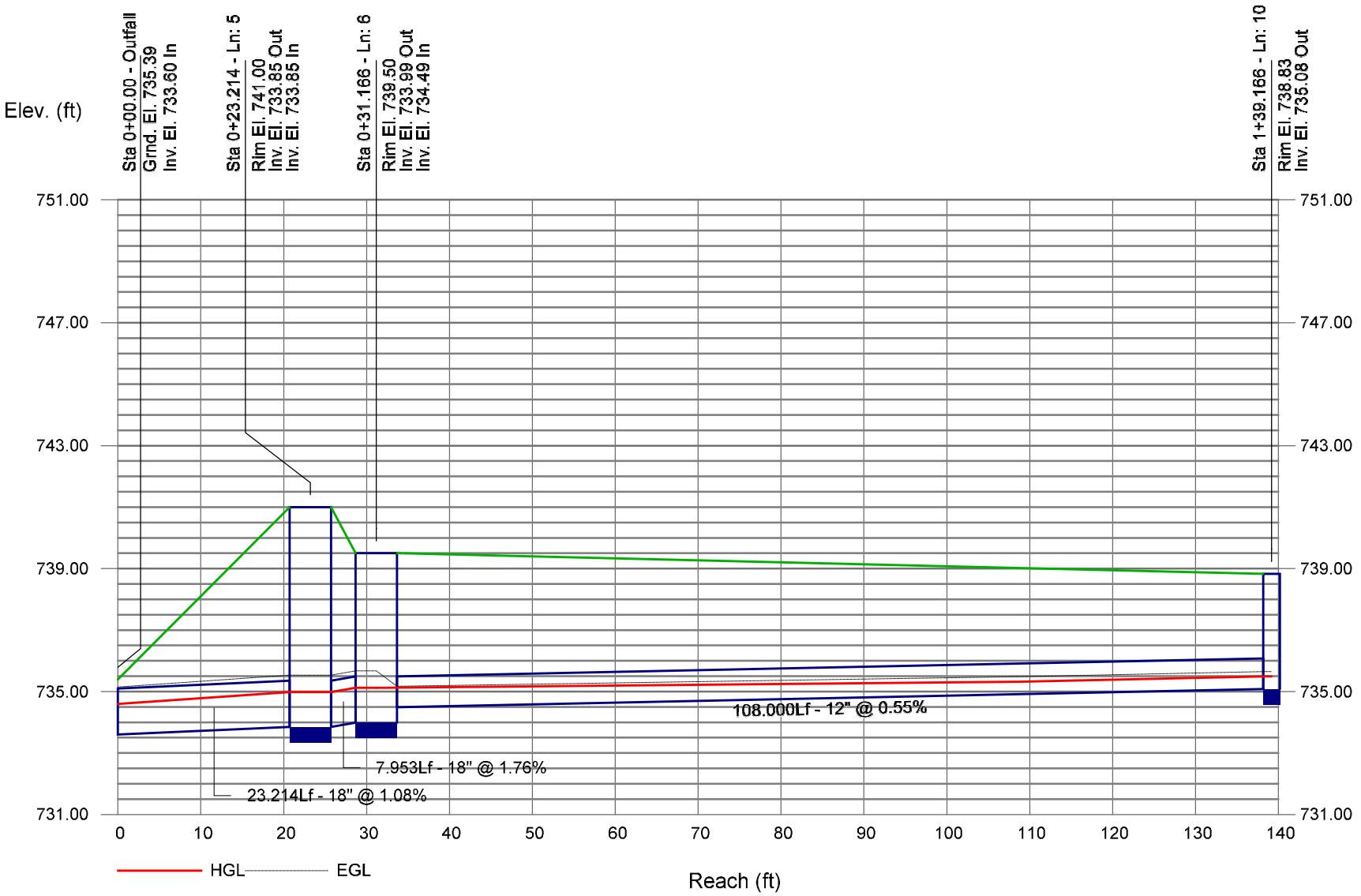
Storm Sewer Profile

Proj. file: 130388-10900_Storm 100YR.stm



Storm Sewer Profile

Proj. file: 130388-10900_Storm 100YR.stm



STORM INLET FLOW RATES

Project Name: JMH Behavioral Psychology Building
Project Number: 130388-10900

Performed by: Susan Norris, EI
Date: 4/12/2023
Checked By: Chris Wiseman, PE

Frequency (yr)	10	100
Time of Concentration (min.)	5	5
Intensity (in/hr)	7.16	9.97

Q=CiA

Structrue #	Area (Ac.)	Weighted C (10 YR)	Weighted C (100 YR)	10yr Flow Rate (cfs)	100yr Flow Rate (cfs)
STR 703	0.190	0.71	0.87	0.97	1.65
STR 704	0.094	0.64	0.8	0.43	0.75
STR 705	0.227	0.72	0.89	1.17	2.01
STR 706	0.111	0.74	0.91	0.59	1.01
STR 714	0.390	0.82	0.99	2.29	3.85
STR 715	0.243	0.69	0.86	1.20	2.08

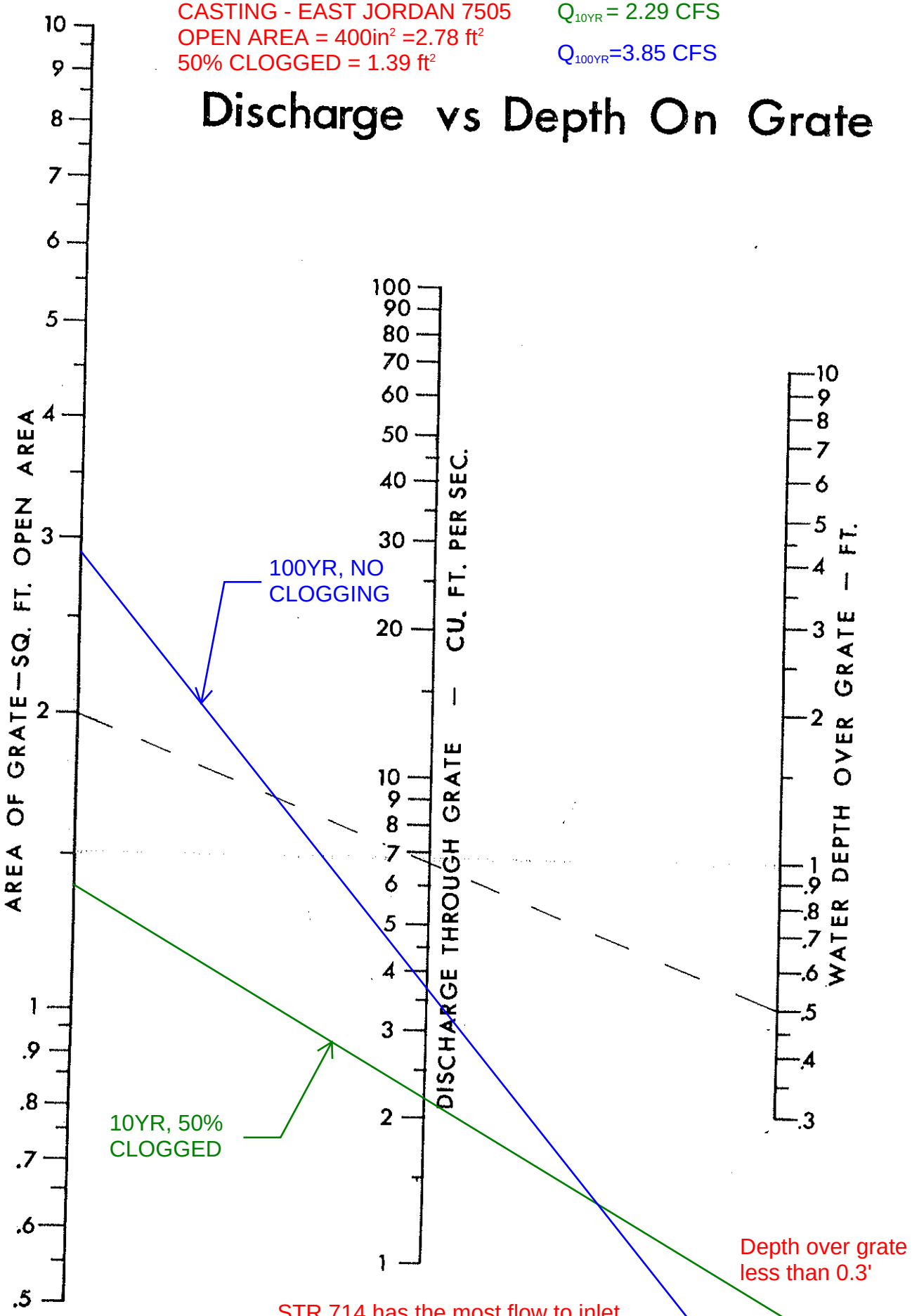
STR 714

CASTING - EAST JORDAN 7505
OPEN AREA = 400in^2 =2.78 ft^2
50% CLOGGED = 1.39 ft^2

Q_{10YR} = 2.29 CFS

Q_{100YR}=3.85 CFS

Discharge vs Depth On Grate



Depth over grate less than 0.3'

STR 714 has the most flow to inlet, therefor all inlets stage less the 0.3'

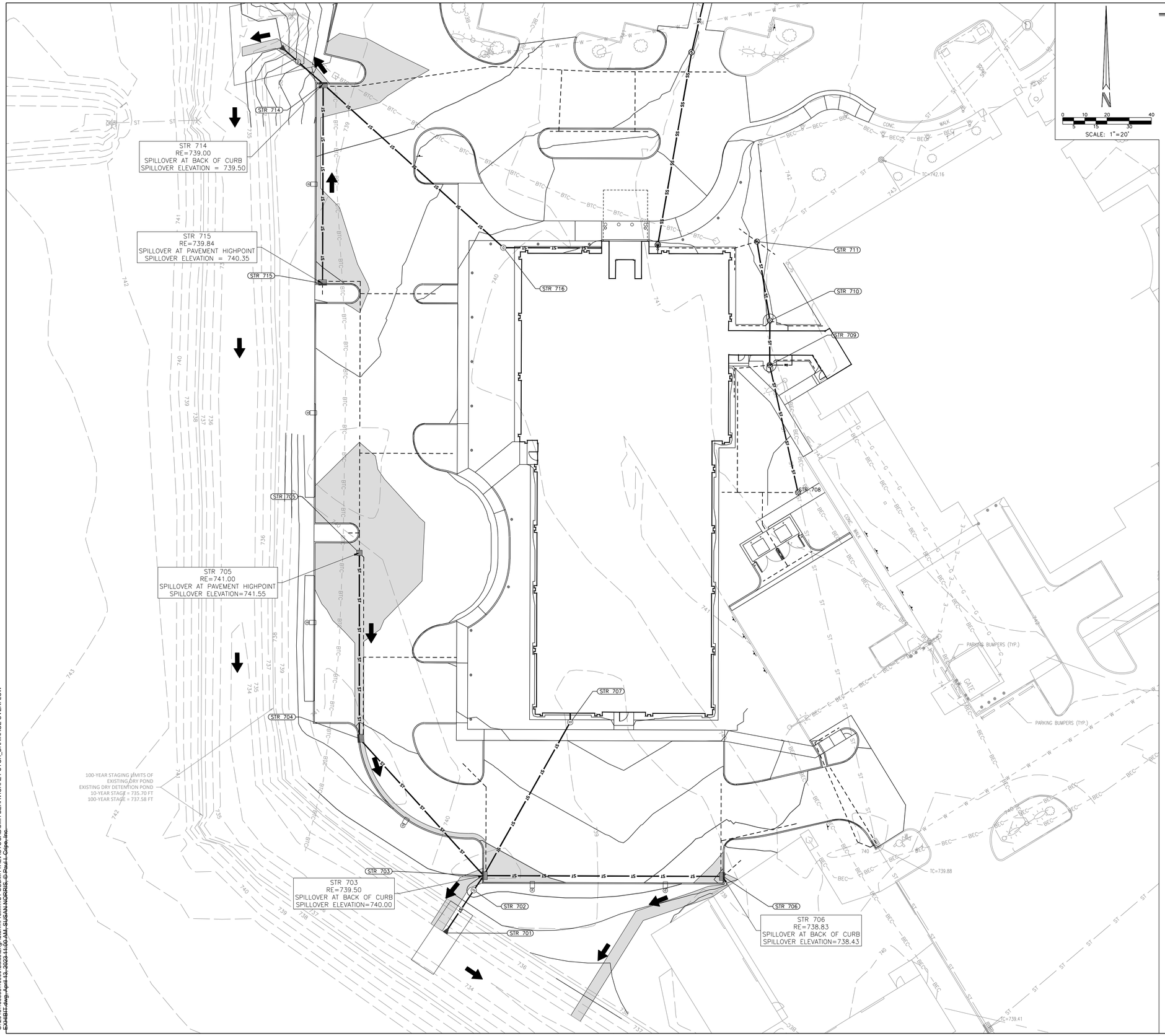


EXHIBIT LEGEND

FLOW ARROWS FOR REFERENCE ONLY

DRAINAGE OVERFLOW ROUTE

O:\2013\130388\10900\Calcs\Engr\Storm\Pselim\1ST SUBMITTAL\AUTOCAD\JNH BEHAVIORAL PSYCH_DRAINAGE OVERFLOW EXHIBIT.dwg, April 13, 2023 11:00 AM, SUSAN NORRIS, © Paul I. Cripe, Inc.

REVISION SCHEDULE

REVISION NUMBER	REVISION DATE	REVISION DESCRIPTION

CONSULTANTS

9339 PRIORITY WAY WEST DRIVE
SUITE 100
INDIANAPOLIS, INDIANA 46240
Phone (317) 844-6777
E-Mail cripe@cripe.biz

ARCHITECTURE + INTERIORS
CIVIL ENGINEERING
SURVEY + 3D LASER SCANNING
TRANSPORTATION PLANNING
DEVELOPMENT PLANNING
REAL ESTATE SERVICES

Cripe®
Solutions by Design Since 1937

DRAINAGE OVERFLOW EXHIBIT
JOHNSON MEMORIAL HEALTH
BEHAVIORAL PSYCHOLOGY BUILDING
1125 W. JEFFERSON STREET, BUILDING 1161, FRANKLIN, INDIANA 46131

CERTIFIED BY:

CHRISTOPHER M. WISEMAN
REGISTERED
PE 10504920
STATE OF
INDIANA
PROFESSIONAL ENGINEER

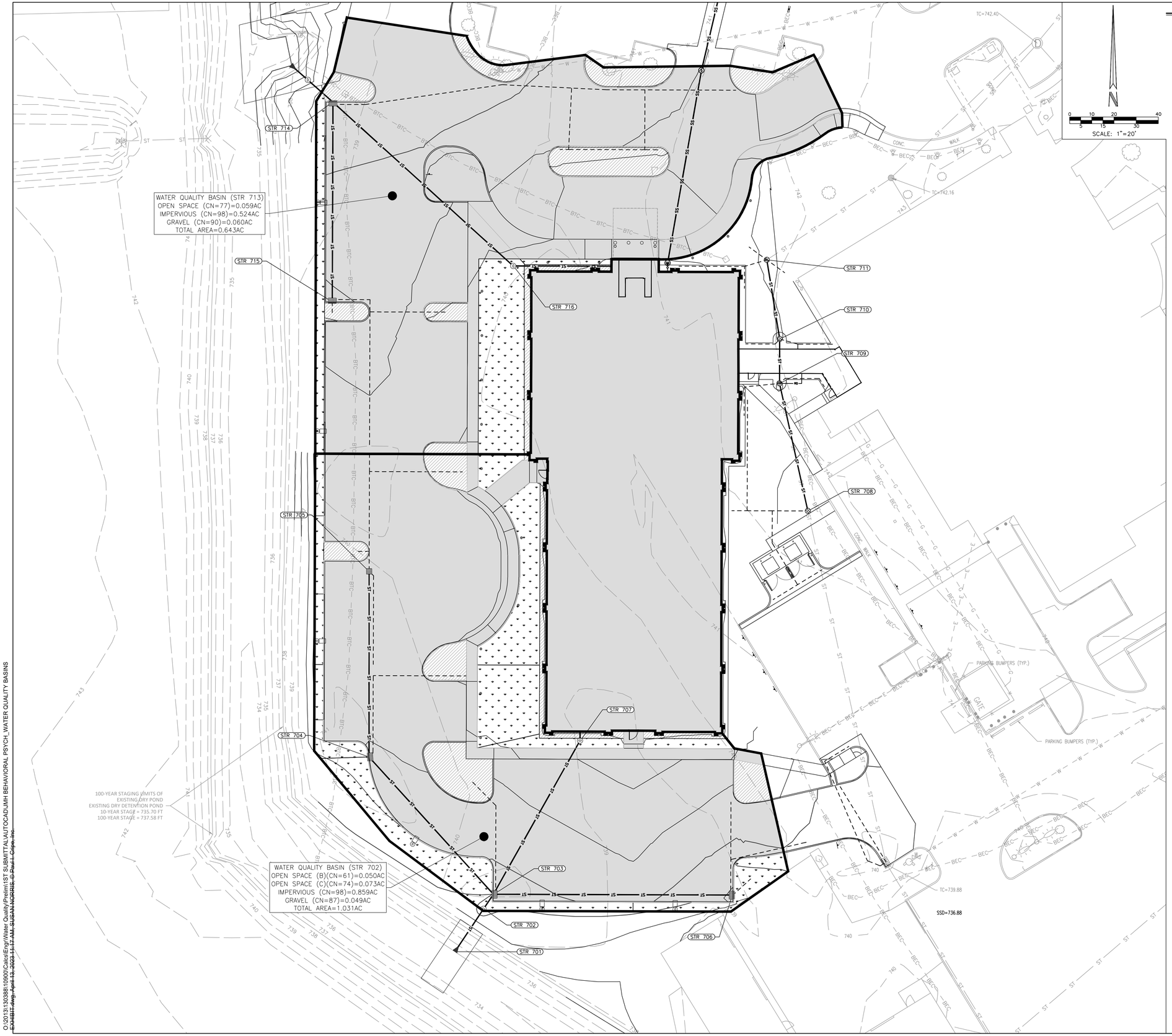
Drawn By:	S. SHAW
Checked By:	S. NORRIS, EI
Quality Assurance:	C. WISEMAN, PE
Scale:	Scale: 1"= 20'
Sheet	FL-1
Date	03-30-2023
Project Number	0130388.10900

© Paul I. Cripe, Inc.

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

Appendix B

Water Quality Basins Exhibit and Calculations



O:\2013\130388\10900\Calcs\Engr\Water Quality\Prelim\1ST SUBMITTAL\AUTOCAD\JMH BEHAVIORAL PSYCH_WATER QUALITY BASINS EXHIBIT.dwg, April 13, 2023 11:17 AM, SUSAN NORRIS, © Paul I. Cripe, Inc.

REVISION SCHEDULE		
REVISION NUMBER	REVISION DATE	REVISION DESCRIPTION

CONSULTANTS

9339 PRIORITY WAY WEST DRIVE
SUITE 100
INDIANAPOLIS, INDIANA 46240
Phone (317) 844-6777
E-Mail cripe@cripe.biz

ARCHITECTURE + INTERIORS
CIVIL ENGINEERING
SURVEY + 3D LASER SCANNING
TRANSPORTATION PLANNING
DEVELOPMENT PLANNING
REAL ESTATE SERVICES

Cripe®
Solutions by Design Since 1937

WATER QUALITY BASINS EXHIBIT

JOHNSON MEMORIAL HEALTH

BEHAVIORAL PSYCHOLOGY BUILDING

1125 W. JEFFERSON STREET, BUILDING 1161, FRANKLIN, INDIANA 46131

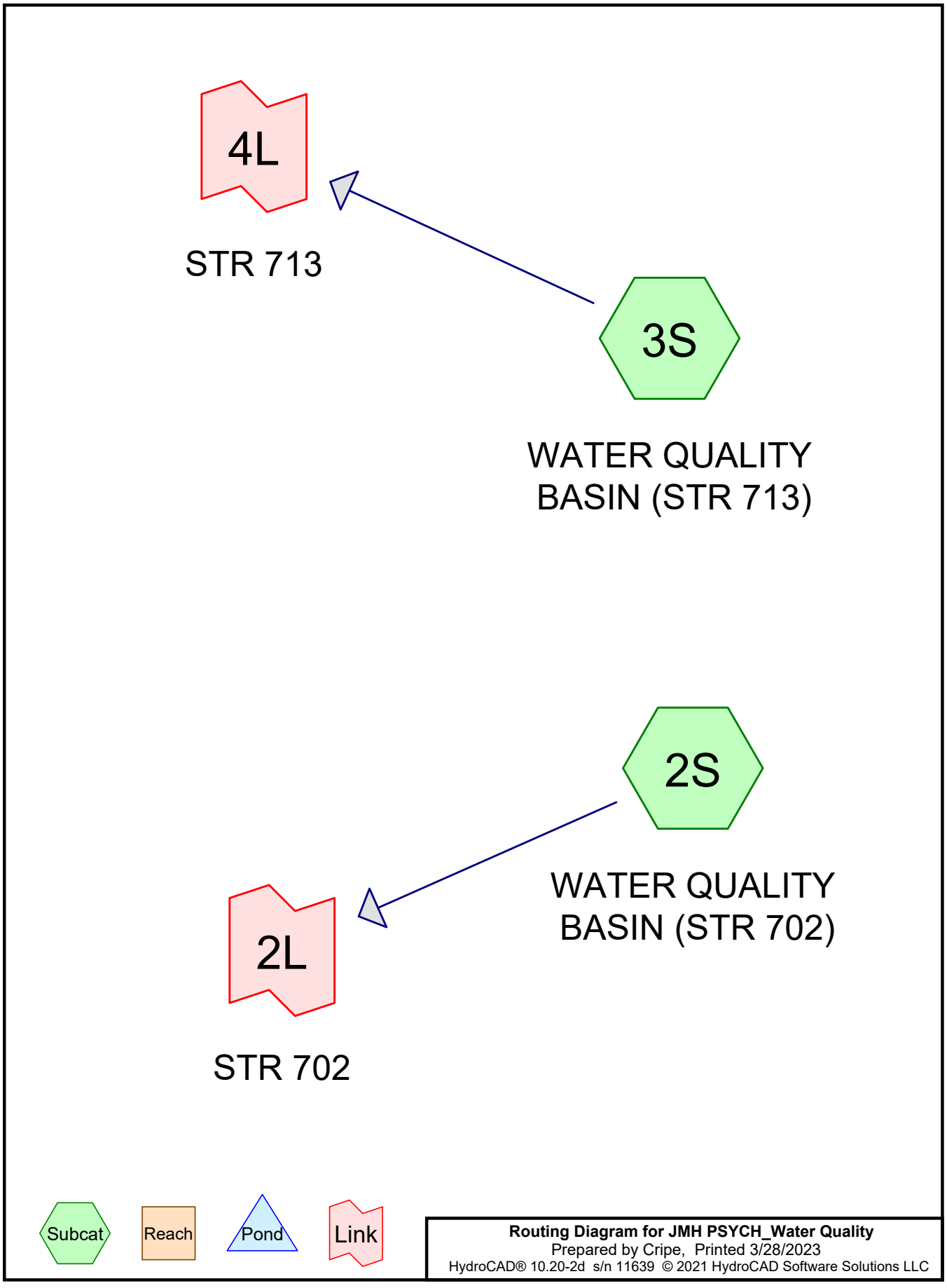
CERTIFIED BY:

CHRISTOPHER M. WISEMAN
REGISTERED
PE 10504920
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Drawn By:	S. SHAW
Checked By:	S. NORRIS, EI
Quality Assurance:	C. WISEMAN, PE
Scale:	Scale: 1" = 20'
Sheet	WQ-1
Date	03-30-2023
Project Number	0130388.10900

© Paul I. Cripe, Inc.

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



Routing Diagram for JMH PSYCH_Water Quality
Prepared by Cripe, Printed 3/28/2023
HydroCAD® 10.20-2d s/n 11639 © 2021 HydroCAD Software Solutions LLC

Summary for Subcatchment 2S: WATER QUALITY BASIN (STR 702)

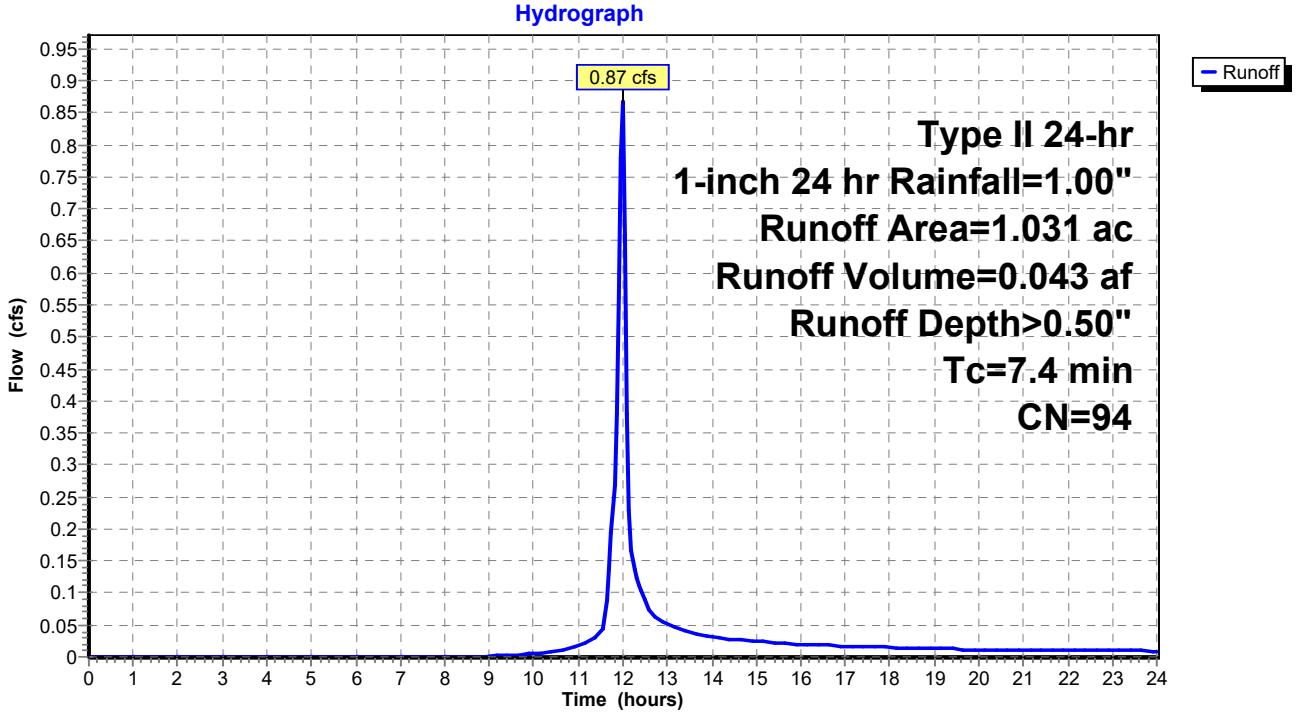
Runoff = 0.87 cfs @ 11.99 hrs, Volume= 0.043 af, Depth> 0.50"
Routed to Link 2L : STR 702

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-inch 24 hr Rainfall=1.00"

Area (ac)	CN	Description
0.050	61	>75% Grass cover, Good, HSG B
0.073	74	>75% Grass cover, Good, HSG C
0.859	98	Paved parking, HSG C
0.025	85	Gravel roads, HSG B
0.024	89	Gravel roads, HSG C
1.031	94	Weighted Average
0.172		16.68% Pervious Area
0.859		83.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4					**Direct Entry, Direct Entry**

Subcatchment 2S: WATER QUALITY BASIN (STR 702)



Summary for Subcatchment 3S: WATER QUALITY BASIN (STR 713)

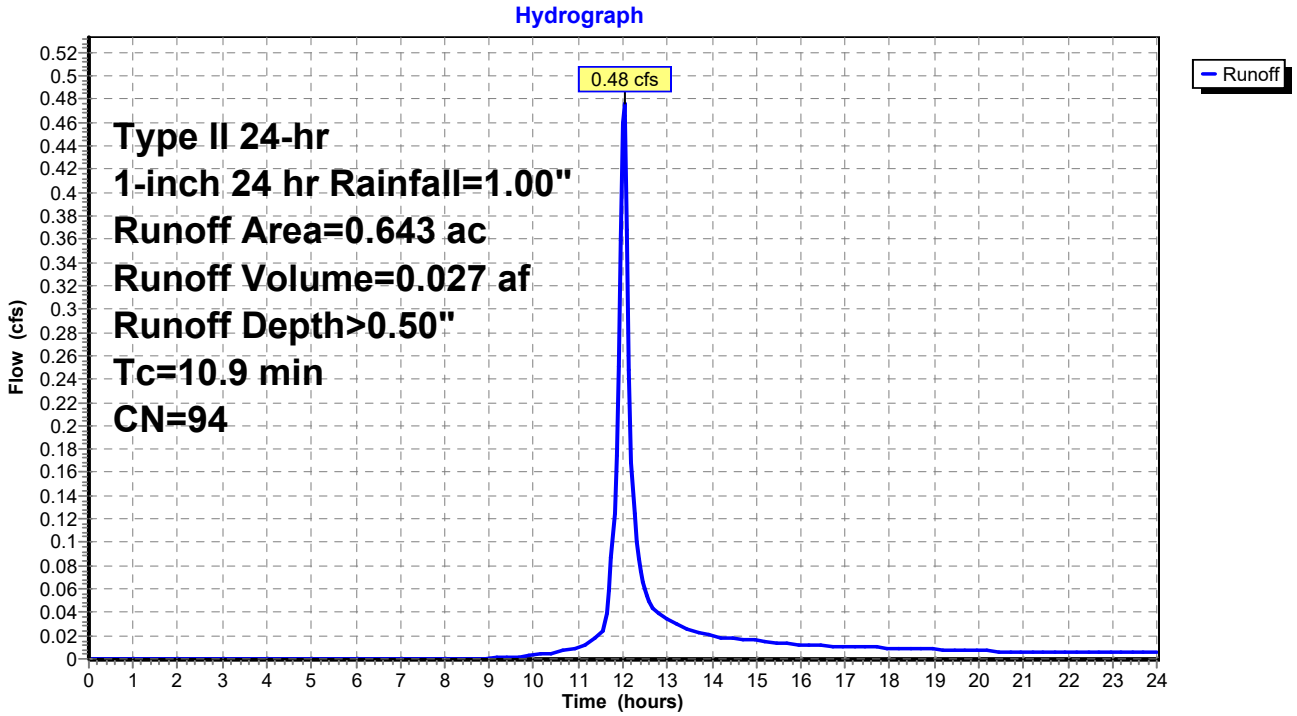
Runoff = 0.48 cfs @ 12.03 hrs, Volume= 0.027 af, Depth> 0.50"
Routed to Link 4L : STR 713

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-inch 24 hr Rainfall=1.00"

Area (ac)	CN	Description
0.024	61	>75% Grass cover, Good, HSG B
0.035	74	>75% Grass cover, Good, HSG C
0.524	98	Paved parking, HSG C
0.030	85	Gravel roads, HSG B
0.030	89	Gravel roads, HSG C
0.643	94	Weighted Average
0.119		18.51% Pervious Area
0.524		81.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9					**Direct Entry, DIRECT**

Subcatchment 3S: WATER QUALITY BASIN (STR 713)

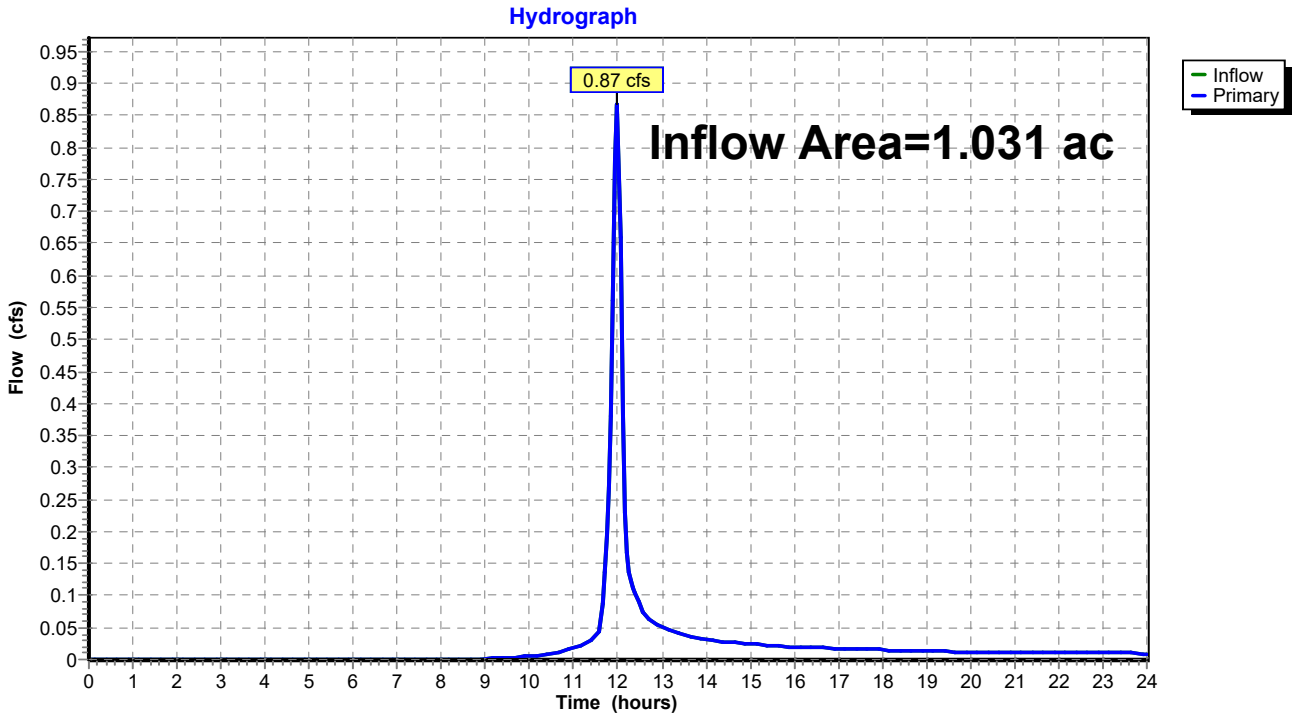


Summary for Link 2L: STR 702

Inflow Area = 1.031 ac, 83.32% Impervious, Inflow Depth > 0.50" for 1-inch 24 hr event
Inflow = 0.87 cfs @ 11.99 hrs, Volume= 0.043 af
Primary = 0.87 cfs @ 11.99 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: STR 702

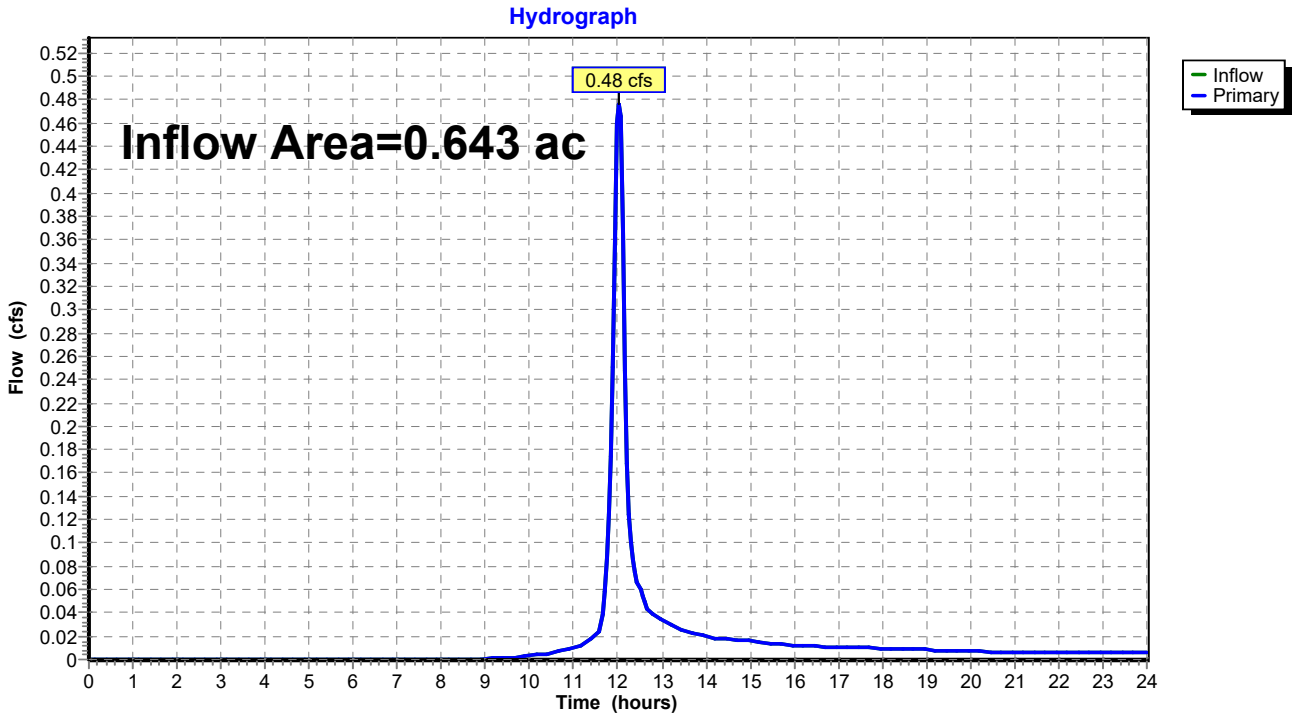


Summary for Link 4L: STR 713

Inflow Area = 0.643 ac, 81.49% Impervious, Inflow Depth > 0.50" for 1-inch 24 hr event
Inflow = 0.48 cfs @ 12.03 hrs, Volume= 0.027 af
Primary = 0.48 cfs @ 12.03 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 4L: STR 713



Events for Subcatchment 2S: WATER QUALITY BASIN (STR 702)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-inch 24 hr	**1.00**	**0.87**	**0.043**	**0.50**

Events for Subcatchment 3S: WATER QUALITY BASIN (STR 713)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-inch 24 hr	**1.00**	**0.48**	**0.027**	**0.50**

Events for Link 2L: STR 702

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1-inch 24 hr	**0.87**	**0.87**	**0.00**

Events for Link 4L: STR 713

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
1-inch 24 hr	**0.48**	**0.48**	**0.00**

JMH PSYCH_Water Quality
Prepared by Cripe
HydroCAD® 10.20-2d s/n 11639 © 2021 HydroCAD Software Solutions LLC

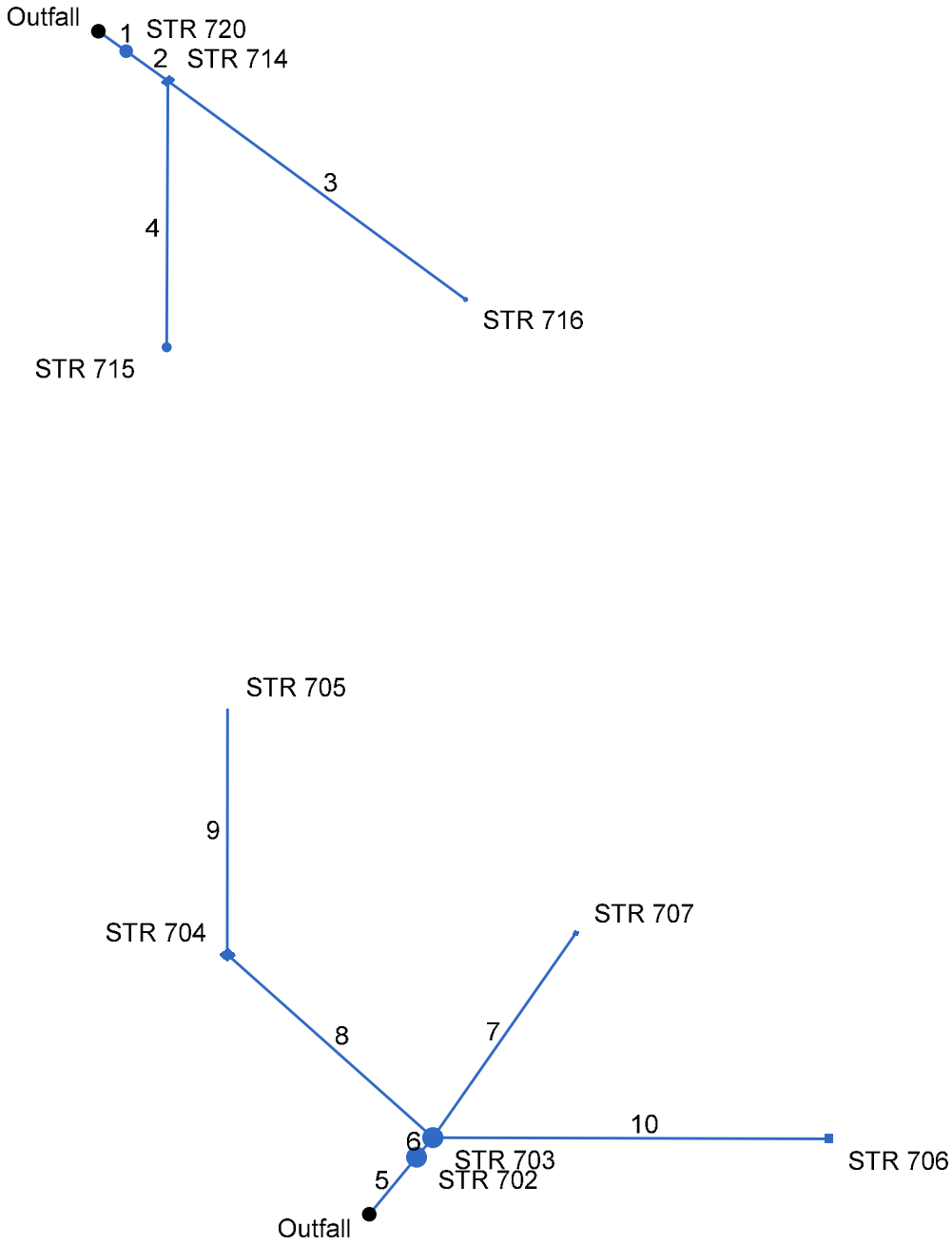
TABLE OF CONTENTS

Project Reports
1 Routing Diagram

1-inch 24 hr Event
2 Subcat 2S: WATER QUALITY BASIN (STR 702)
3 Subcat 3S: WATER QUALITY BASIN (STR 713)
4 Link 2L: STR 702
5 Link 4L: STR 713

Multi-Event Tables
6 Subcat 2S: WATER QUALITY BASIN (STR 702)
7 Subcat 3S: WATER QUALITY BASIN (STR 713)
8 Link 2L: STR 702
9 Link 4L: STR 713

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



Project File: 130388-10900_Storm 10YR.stm	Number of lines: 10	Date: 3/29/2023

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	10.139	0.00	0.64	0.00	0.00	0.49	5.0	11.0	5.4	2.61	4.91	4.05	15	0.49	734.94	734.99	735.59	735.64	736.82	737.65	713-712
2	1	15.143	0.39	0.64	0.81	0.32	0.49	5.0	10.9	5.4	2.62	5.09	3.93	15	0.53	734.99	735.07	735.68	735.72	737.65	737.27	714-713
3	2	109.802	0.01	0.01	0.85	0.01	0.01	5.0	5.0	7.2	0.06	1.19	2.42	6	3.81	736.07	740.25	736.15	740.37	737.27	741.72	716
4	2	90.000	0.24	0.24	0.67	0.16	0.16	5.0	5.0	7.2	1.15	2.52	3.13	12	0.50	735.32	735.77	735.79	736.24	737.27	737.87	715-714
5	End	23.214	0.00	1.03	0.00	0.00	0.77	5.0	7.5	6.3	4.84	10.90	5.35	18	1.08	733.60	733.85	734.30	734.70	735.39	741.00	702-701
6	5	7.953	0.19	1.03	0.69	0.13	0.77	5.0	7.5	6.3	4.86	13.93	4.73	18	1.76	733.85	733.99	734.70	734.84	741.00	739.50	703-702
7	6	79.501	0.41	0.41	0.85	0.35	0.35	5.0	5.0	7.2	2.49	5.44	5.59	12	1.99	735.90	737.48	736.38	738.16	739.50	742.80	707-703
8	6	83.532	0.09	0.32	0.61	0.05	0.22	5.0	6.0	6.8	1.46	5.24	4.67	12	2.17	734.49	736.30	734.85	736.81	739.50	740.88	704-703
9	8	83.687	0.23	0.23	0.70	0.16	0.16	5.0	5.0	7.2	1.15	3.59	3.56	12	1.02	736.40	737.25	736.81	737.70	740.88	741.00	705-704
10	6	108.000	0.11	0.11	0.72	0.08	0.08	5.0	5.0	7.2	0.57	2.63	2.52	12	0.55	734.49	735.08	734.84	735.39	739.50	738.83	706-703

Project File: 130388-10900_Storm 10YR.stm

Number of lines: 10

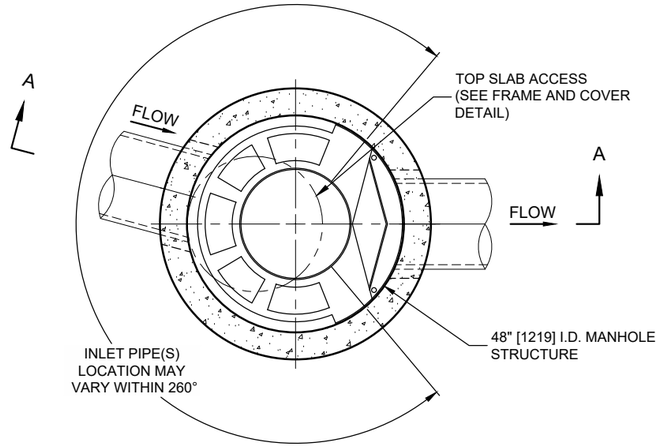
Run Date: 3/29/2023

NOTES:Intensity = 57.33 / (Inlet time + 8.80) ^ 0.79; Return period =Yrs. 10 ; c = cir e = ellip b = box

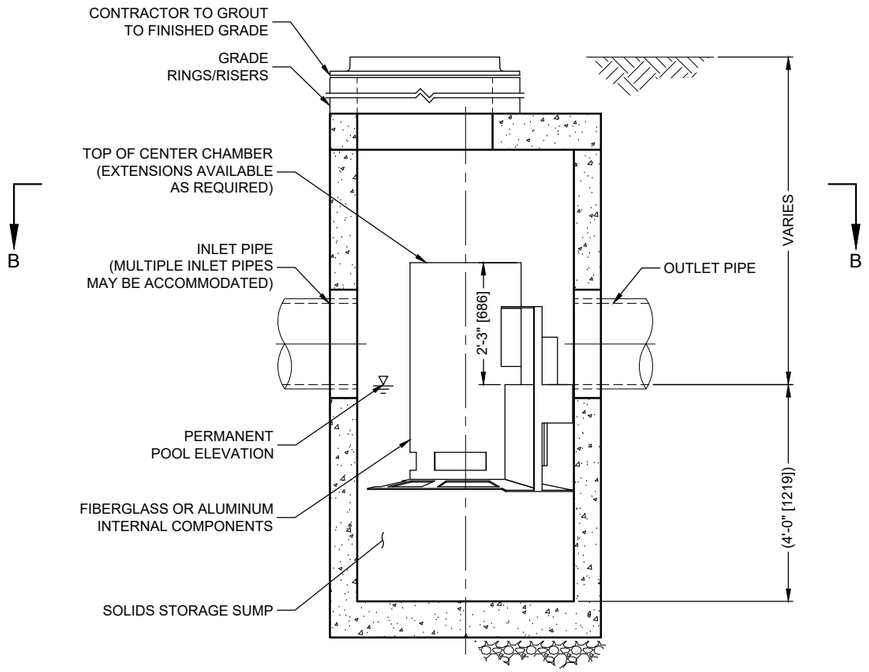
Table A-1: Cascade Separator Treatment Flow Rata, and Standard Dimensions

Model Number	Manhole Diameter (ft)	Annualized Maximum Treatment Flow Rate (cfs)	Hydraulic Loading Rate[1] (gpm/ft^2)	100% Maximum Sediment Storage Depth (in)	100% Maximum Sediment Storage Volume (ft^3)
CS-3	3	0.84	52.99	18	10.6
CS-4	4	1.48	52.99	18	18.8
CS-5	5	2.31	52.99	18	29.5
CS-6	6	3.33	52.99	18	42.4
CS-8	8	5.93	52.99	18	75.4
CS-10	10	9.27	52.99	18	117.8
CS-12	12	13.35	52.99	18	169.6
Model Number	**Effective Treatment Area (ft^2)**	**Effective Treatment Depth[2] (in)**	**Chamber Depth[3] (in)**	**Aspect Ratio[4]**	**Maximum Pipe Diameter (in)**
CS-3	7.1	27	36	0.75	18
CS-4	12.6	39	48	0.81	24
CS-5	19.6	45	54	0.75	30
CS-6	28.3	51	60	0.71	42
CS-8	50.3	66	75	0.69	48
CS-10	78.5	83	92	0.69	60
CS-12	113.1	99	108	0.69	72

[1] Hydraulic loading rate is defined as the ratio of treatment flow rate to effective treatment area
[2] Effective treatment depth is defined as depth from effluent invert to 50% maximum sediment storage depth
[3] Chamber depth is defined as depth from effluent invert to sump floor
[4] Aspect ratio is defined as the ratio of effective treatment depth to manhole diameter. All models are geometrically proportional to the tested CS-4 within the allowable ±15% tolerance (0.69 -0.93)



PLAN VIEW B-B
NOT TO SCALE



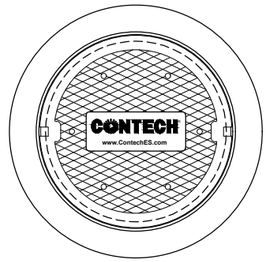
ELEVATION A-A
NOT TO SCALE

CASCADE separator™

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-4 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (cfs [L/s])	
PEAK FLOW RATE (cfs [L/s])	
RETURN PERIOD OF PEAK FLOW (yrs)	
RIM ELEVATION	

PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:

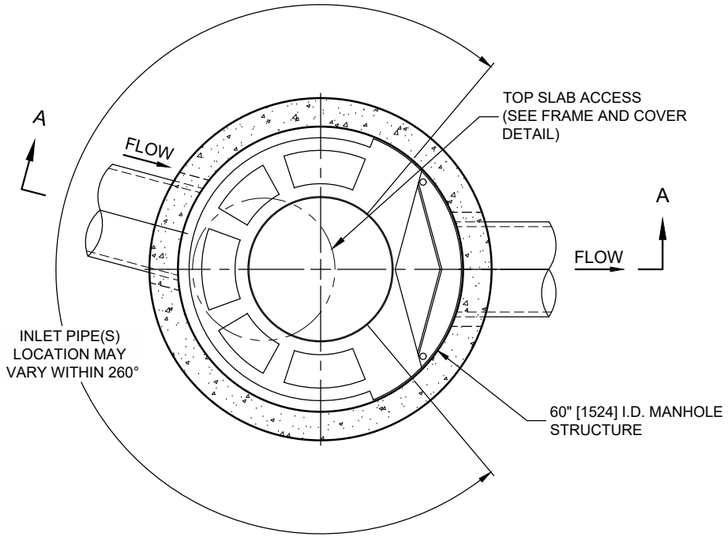
GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

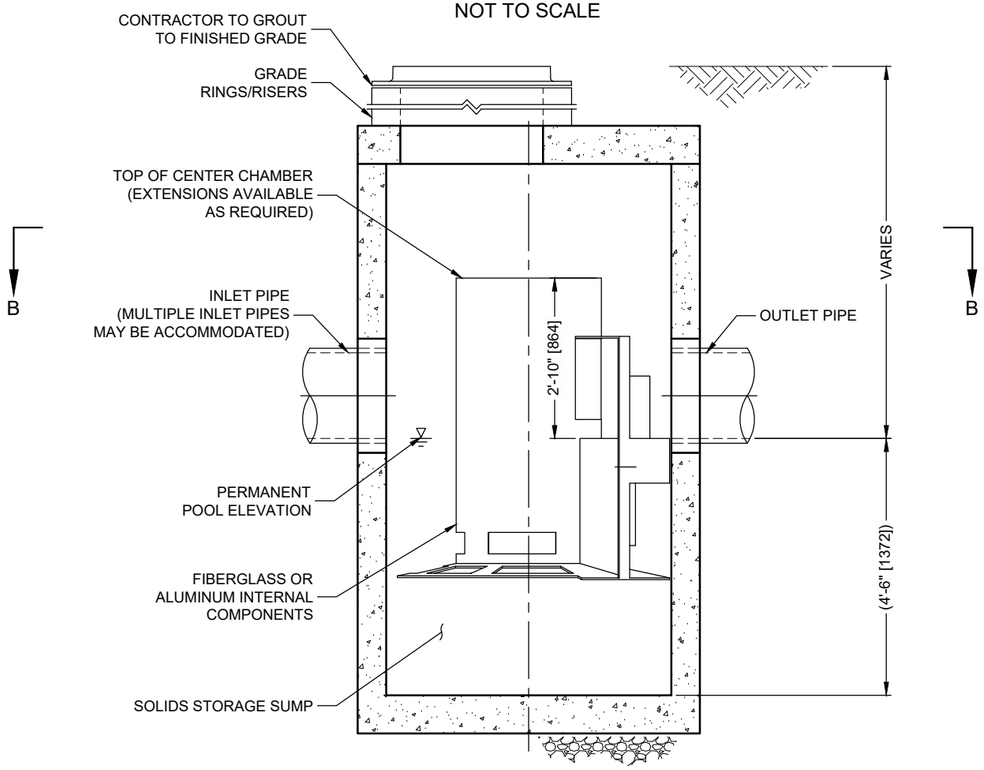
CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CS-4
CASCADE SEPARATOR
STANDARD DETAIL

\\AD.CONTECH-CPI.COM\ROOT\COMMON\CAD\TREATMENT\21 CASCADE\40 STANDARD DRAWINGS\DWG\CS-4-DTL.DWG
6/11/2020 1:50 PM



PLAN VIEW B-B
NOT TO SCALE



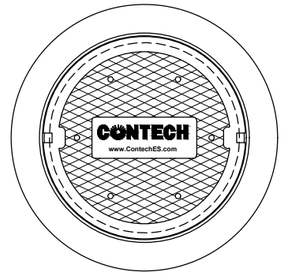
ELEVATION A-A
NOT TO SCALE

CASCADE separator™

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-5 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (cfs [L/s])	
PEAK FLOW RATE (cfs [L/s])	
RETURN PERIOD OF PEAK FLOW (yrs)	
RIM ELEVATION	

PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CS-5
CASCADE SEPARATOR
STANDARD DETAIL

\\AD.CONTECH-CPI.COM\ROOT\COMMON\CAD\TREATMENT\21 CASCADE\40 STANDARD DRAWINGS\DWG\CS-5-DTL.DWG
6/11/2020 1:49 PM

Appendix C

Post Developed Watershed Exhibit and Calculations

O3 WATERSHED
(CAMELOT)
TOTAL AREA = 60.00 ACRES
CN = 77
TC = 62.10 MIN.

O2 WATERSHED
(NURSING HOME)
TOTAL AREA = 5.60 ACRES
CN = 94
TC = 40.30 MIN.

NOTE: THE INFORMATION FOR WATERSHED O1, O2, O3 AND O7 ARE PER ORIGINAL MASTER PLAN BY EMH&T

LEGEND

S1 WATERSHED LIMITS

S1 WATERSHED PERVIOUS AREAS

O1 WATERSHED
(C.B. MIDDLE SCHOOL)
TOTAL AREA = 0.50 ACRES
CN = 74
TC = 39.20 MIN.

100-STAGE LIMITS OF EXISTING DRY POND

S1 WATERSHED
(PROJECT SITE)
TOTAL AREA = 35.441 ACRES
IMPERVIOUS 15.669 ACRES (CN = 98)

PERVIOUS:
TOTAL AREA = 19.772 ACRES
SOIL GROUP C AREA (80%) = 15.818 ACRES (CN = 74)
SOIL GROUP B AREA (20%) = 3.954 ACRES (CN = 61)

TC = 8 MIN.

EXISTING S1 DRY DETENTION POND
10-YEAR STAGE = 736.01 FT
100-YEAR STAGE = 737.84 FT

100-STAGE LIMITS OF EXISTING DRY POND

EAST WATERSHED
THIS AREA DOES DRAIN TO
THE EXISTING S1 DRY DETENTION POND

FFE = 739.73

FFE = 739.73

O7 WATERSHED
(RESIDENTIAL SOUTH)
TOTAL AREA = 6.00 ACRES
CN = 80
TC = 49.9 MIN.

0 40 80 160
20 60 120
SCALE: 1"=80'

REVISION SCHEDULE

REVISION NUMBER	REVISION DATE	REVISION DESCRIPTION

CONSULTANTS

9339 PRIORITY WAY WEST DRIVE
SUITE 100
INDIANAPOLIS, INDIANA 46240
Phone (317) 844-6777
E-Mail cripe@cripe.biz

ARCHITECTURE + INTERIORS
CIVIL ENGINEERING
SURVEY + 3D LASER SCANNING
CONSTRUCTION MANAGEMENT
EQUIPMENT PLANNING
REAL ESTATE SERVICES

Cripe®
Solutions by Design Since 1937

POST DEVELOPED WATERSHED EXHIBIT

JOHNSON MEMORIAL HEALTH

BEHAVIORAL PSYCHOLOGY BUILDING

1125 W. JEFFERSON STREET, BUILDING 1161, FRANKLIN, INDIANA 46131

CERTIFIED BY:

CHRISTOPHER M. WISEMAN
REGISTERED
PE 10504920
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Drawn By: S. SHAW
Checked By: S. NORRIS, EI
Quality Assurance: C. WISEMAN, PE
Scale: Scale: 1" = 80'
Sheet: POST
Date: 03-30-2023
Project Number: 0130388.10900

© Paul I. Cripe, Inc.

Indiana811 Know what's below. Call before you dig.

O:\2013\130388\10900\Calcs\Engr\Detention\Prelim\1ST SUBMITTAL\MH BEHAVIORAL PSYCH_POST DEV WATERSHED EXHIBIT .dwg, April 13, 2023 10:18 AM, SUSAN NORRIS, © Paul I. Cripe, Inc.

Scenario: Post-Development 2 YEAR

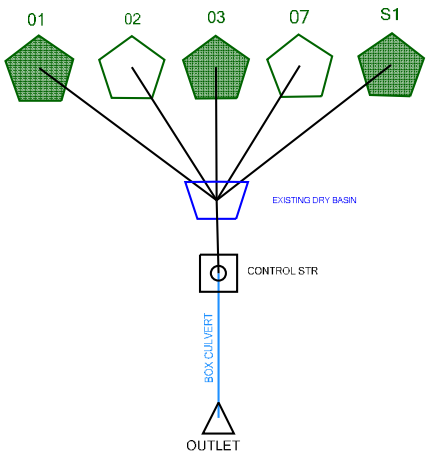


Table of Contents

	Master Network Summary	1
Johnson County SCS Type II		
	Time-Depth Curve, 10 years (Post-Development 10 YEAR)	3
	Time-Depth Curve, 100 years (Post-Development 100 YEAR)	5
	Time-Depth Curve, 2 years (Post-Development 2 YEAR)	7
01		
	Runoff CN-Area, 2 years (Post-Development 2 YEAR)	9
02		
	Runoff CN-Area, 2 years (Post-Development 2 YEAR)	10
03		
	Runoff CN-Area, 2 years (Post-Development 2 YEAR)	11
07		
	Runoff CN-Area, 2 years (Post-Development 2 YEAR)	12
S1		
	Runoff CN-Area, 2 years (Post-Development 2 YEAR)	13
01		
	Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR)	14
	Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR)	16
	Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR)	18
	Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR)	20
	Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR)	22
	Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR)	24
02		
	Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR)	26
	Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR)	28
	Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR)	31
	Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR)	33
	Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR)	36
	Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR)	38
03		
	Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR)	41
	Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR)	43

Table of Contents

	Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR)	45
	Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR)	47
	Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR)	49
	Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR)	51
07		
	Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR)	53
	Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR)	55
	Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR)	57
	Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR)	59
	Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR)	61
	Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR)	63
S1		
	Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR)	65
	Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR)	67
	Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR)	69
	Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR)	71
	Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR)	73
	Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR)	75
EXISTING DRY BASIN (OUT)		
	Time vs. Elevation, 2 years (Post-Development 2 YEAR)	78
	Time vs. Elevation, 10 years (Post-Development 10 YEAR)	81
	Time vs. Elevation, 100 years (Post-Development 100 YEAR)	84
EXISTING DRY BASIN		
	Time vs. Volume, 2 years (Post-Development 2 YEAR)	87
	Time vs. Volume, 10 years (Post-Development 10 YEAR)	90
	Time vs. Volume, 100 years (Post-Development 100 YEAR)	93
EXISTING DRY BASIN	Elevation-Area Volume Curve, 2 years (Post-Development 2 YEAR)	96
Dry Basin Out		
	Outlet Input Data, 2 years (Post-Development 2 YEAR)	97
	Composite Rating Curve, 2 years (Post-Development 2 YEAR)	102

Post-Developed Watershed Calculations

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
01	Post-Development 2 YEAR	2	0.037	738.000	0.29
01	Post-Development 10 YEAR	10	0.075	738.000	0.63
01	Post-Development 100 YEAR	100	0.128	738.000	1.10
02	Post-Development 2 YEAR	2	1.089	735.000	9.01
02	Post-Development 10 YEAR	10	1.677	735.000	13.62
02	Post-Development 100 YEAR	100	2.409	735.000	19.24
03	Post-Development 2 YEAR	2	5.259	753.000	31.19
03	Post-Development 10 YEAR	10	10.087	753.000	62.57
03	Post-Development 100 YEAR	100	16.722	753.000	104.93
07	Post-Development 2 YEAR	2	0.617	744.000	4.36
07	Post-Development 10 YEAR	10	1.133	744.000	8.22
07	Post-Development 100 YEAR	100	1.826	744.000	13.30
S1	Post-Development 2 YEAR	2	4.265	717.000	72.96
S1	Post-Development 10 YEAR	10	7.515	717.000	128.90
S1	Post-Development 100 YEAR	100	11.793	717.000	200.15

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
OUTLET	Post-Development 2 YEAR	2	10.781	726.000	61.52
OUTLET	Post-Development 10 YEAR	10	19.975	753.000	92.12
OUTLET	Post-Development 100 YEAR	100	32.332	765.000	122.04

Pond Summary

Post-Developed Watershed Calculations

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
EXISTING DRY BASIN (IN)	Post-Development 2 YEAR	2	11.267	720.000	86.96	(N/A)	(N/A)
EXISTING DRY BASIN (OUT)	Post-Development 2 YEAR	2	10.781	726.000	61.52	734.58	1.317
EXISTING DRY BASIN (IN)	Post-Development 10 YEAR	10	20.487	720.000	156.02	(N/A)	(N/A)
EXISTING DRY BASIN (OUT)	Post-Development 10 YEAR	10	19.975	753.000	92.12	735.70	2.573
EXISTING DRY BASIN (IN)	Post-Development 100 YEAR	100	32.878	717.000	245.69	(N/A)	(N/A)
EXISTING DRY BASIN (OUT)	Post-Development 100 YEAR	100	32.332	765.000	122.04	737.58	5.863

Post-Developed Watershed Calculations

Subsection: Time-Depth Curve
Label: Johnson County SCS Type II
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time-Depth Curve: 10 YR	
Label	10 YR
Start Time	0.000 min
Increment	6.000 min
End Time	1,440.000 min
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.000 min
Time on left represents time for first value in each row.

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
30.000	0.0	0.0	0.0	0.0	0.0
60.000	0.0	0.0	0.1	0.1	0.1
90.000	0.1	0.1	0.1	0.1	0.1
120.000	0.1	0.1	0.1	0.1	0.1
150.000	0.1	0.1	0.1	0.1	0.1
180.000	0.1	0.2	0.2	0.2	0.2
210.000	0.2	0.2	0.2	0.2	0.2
240.000	0.2	0.2	0.2	0.2	0.2
270.000	0.2	0.2	0.3	0.3	0.3
300.000	0.3	0.3	0.3	0.3	0.3
330.000	0.3	0.3	0.3	0.3	0.3
360.000	0.3	0.4	0.4	0.4	0.4
390.000	0.4	0.4	0.4	0.4	0.4
420.000	0.4	0.4	0.4	0.5	0.5
450.000	0.5	0.5	0.5	0.5	0.5
480.000	0.5	0.5	0.5	0.5	0.6
510.000	0.6	0.6	0.6	0.6	0.6
540.000	0.6	0.6	0.7	0.7	0.7
570.000	0.7	0.7	0.7	0.7	0.8
600.000	0.8	0.8	0.8	0.8	0.9
630.000	0.9	0.9	0.9	1.0	1.0
660.000	1.0	1.0	1.1	1.1	1.2
690.000	1.2	1.3	1.5	1.9	2.4
720.000	2.9	2.9	3.0	3.1	3.1
750.000	3.2	3.2	3.2	3.3	3.3
780.000	3.3	3.3	3.4	3.4	3.4
810.000	3.4	3.5	3.5	3.5	3.5
840.000	3.5	3.5	3.6	3.6	3.6
870.000	3.6	3.6	3.6	3.6	3.7
900.000	3.7	3.7	3.7	3.7	3.7
930.000	3.7	3.7	3.8	3.8	3.8
960.000	3.8	3.8	3.8	3.8	3.8
990.000	3.8	3.8	3.9	3.9	3.9

Post-Developed Watershed Calculations

Subsection: Time-Depth Curve
Label: Johnson County SCS Type II
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.000 min
Time on left represents time for first value in each row.

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,020.000	3.9	3.9	3.9	3.9	3.9
1,050.000	3.9	3.9	3.9	3.9	4.0
1,080.000	4.0	4.0	4.0	4.0	4.0
1,110.000	4.0	4.0	4.0	4.0	4.0
1,140.000	4.0	4.0	4.0	4.1	4.1
1,170.000	4.1	4.1	4.1	4.1	4.1
1,200.000	4.1	4.1	4.1	4.1	4.1
1,230.000	4.1	4.1	4.1	4.1	4.1
1,260.000	4.1	4.2	4.2	4.2	4.2
1,290.000	4.2	4.2	4.2	4.2	4.2
1,320.000	4.2	4.2	4.2	4.2	4.2
1,350.000	4.2	4.2	4.2	4.2	4.2
1,380.000	4.3	4.3	4.3	4.3	4.3
1,410.000	4.3	4.3	4.3	4.3	4.3
1,440.000	4.3	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time-Depth Curve
Label: Johnson County SCS Type II
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time-Depth Curve: 100 YR	
Label	100 YR
Start Time	0.000 min
Increment	6.000 min
End Time	1,440.000 min
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.000 min
Time on left represents time for first value in each row.

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
30.000	0.0	0.0	0.0	0.0	0.1
60.000	0.1	0.1	0.1	0.1	0.1
90.000	0.1	0.1	0.1	0.1	0.1
120.000	0.1	0.1	0.1	0.2	0.2
150.000	0.2	0.2	0.2	0.2	0.2
180.000	0.2	0.2	0.2	0.2	0.2
210.000	0.2	0.3	0.3	0.3	0.3
240.000	0.3	0.3	0.3	0.3	0.3
270.000	0.3	0.3	0.3	0.4	0.4
300.000	0.4	0.4	0.4	0.4	0.4
330.000	0.4	0.4	0.4	0.5	0.5
360.000	0.5	0.5	0.5	0.5	0.5
390.000	0.5	0.5	0.5	0.6	0.6
420.000	0.6	0.6	0.6	0.6	0.6
450.000	0.6	0.7	0.7	0.7	0.7
480.000	0.7	0.7	0.7	0.7	0.8
510.000	0.8	0.8	0.8	0.8	0.8
540.000	0.9	0.9	0.9	0.9	0.9
570.000	1.0	1.0	1.0	1.0	1.0
600.000	1.1	1.1	1.1	1.1	1.2
630.000	1.2	1.2	1.3	1.3	1.3
660.000	1.4	1.4	1.5	1.5	1.6
690.000	1.7	1.8	2.1	2.5	3.4
720.000	3.9	4.0	4.1	4.2	4.3
750.000	4.3	4.4	4.4	4.5	4.5
780.000	4.6	4.6	4.6	4.7	4.7
810.000	4.7	4.7	4.8	4.8	4.8
840.000	4.8	4.9	4.9	4.9	4.9
870.000	4.9	5.0	5.0	5.0	5.0
900.000	5.0	5.1	5.1	5.1	5.1
930.000	5.1	5.1	5.1	5.2	5.2
960.000	5.2	5.2	5.2	5.2	5.2
990.000	5.3	5.3	5.3	5.3	5.3

Post-Developed Watershed Calculations

Subsection: Time-Depth Curve
Label: Johnson County SCS Type II
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.000 min
Time on left represents time for first value in each row.

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,020.000	5.3	5.3	5.3	5.4	5.4
1,050.000	5.4	5.4	5.4	5.4	5.4
1,080.000	5.4	5.4	5.5	5.5	5.5
1,110.000	5.5	5.5	5.5	5.5	5.5
1,140.000	5.5	5.5	5.6	5.6	5.6
1,170.000	5.6	5.6	5.6	5.6	5.6
1,200.000	5.6	5.6	5.6	5.6	5.6
1,230.000	5.7	5.7	5.7	5.7	5.7
1,260.000	5.7	5.7	5.7	5.7	5.7
1,290.000	5.7	5.7	5.7	5.8	5.8
1,320.000	5.8	5.8	5.8	5.8	5.8
1,350.000	5.8	5.8	5.8	5.8	5.8
1,380.000	5.8	5.8	5.8	5.9	5.9
1,410.000	5.9	5.9	5.9	5.9	5.9
1,440.000	5.9	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time-Depth Curve
Label: Johnson County SCS Type II
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time-Depth Curve: 2 YR	
Label	2 YR
Start Time	0.000 min
Increment	6.000 min
End Time	1,440.000 min
Return Event	2 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.000 min
Time on left represents time for first value in each row.

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
30.000	0.0	0.0	0.0	0.0	0.0
60.000	0.0	0.0	0.0	0.0	0.0
90.000	0.0	0.1	0.1	0.1	0.1
120.000	0.1	0.1	0.1	0.1	0.1
150.000	0.1	0.1	0.1	0.1	0.1
180.000	0.1	0.1	0.1	0.1	0.1
210.000	0.1	0.1	0.1	0.1	0.1
240.000	0.1	0.1	0.2	0.2	0.2
270.000	0.2	0.2	0.2	0.2	0.2
300.000	0.2	0.2	0.2	0.2	0.2
330.000	0.2	0.2	0.2	0.2	0.2
360.000	0.2	0.2	0.3	0.3	0.3
390.000	0.3	0.3	0.3	0.3	0.3
420.000	0.3	0.3	0.3	0.3	0.3
450.000	0.3	0.3	0.3	0.3	0.4
480.000	0.4	0.4	0.4	0.4	0.4
510.000	0.4	0.4	0.4	0.4	0.4
540.000	0.4	0.5	0.5	0.5	0.5
570.000	0.5	0.5	0.5	0.5	0.5
600.000	0.5	0.6	0.6	0.6	0.6
630.000	0.6	0.6	0.6	0.7	0.7
660.000	0.7	0.7	0.8	0.8	0.8
690.000	0.8	0.9	1.1	1.3	1.7
720.000	2.0	2.0	2.1	2.1	2.2
750.000	2.2	2.2	2.3	2.3	2.3
780.000	2.3	2.3	2.4	2.4	2.4
810.000	2.4	2.4	2.4	2.4	2.4
840.000	2.5	2.5	2.5	2.5	2.5
870.000	2.5	2.5	2.5	2.5	2.6
900.000	2.6	2.6	2.6	2.6	2.6
930.000	2.6	2.6	2.6	2.6	2.6
960.000	2.6	2.6	2.7	2.7	2.7
990.000	2.7	2.7	2.7	2.7	2.7

Post-Developed Watershed Calculations

Subsection: Time-Depth Curve
Label: Johnson County SCS Type II
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.000 min
Time on left represents time for first value in each row.

Time (min)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
1,020.000	2.7	2.7	2.7	2.7	2.7
1,050.000	2.7	2.7	2.7	2.8	2.8
1,080.000	2.8	2.8	2.8	2.8	2.8
1,110.000	2.8	2.8	2.8	2.8	2.8
1,140.000	2.8	2.8	2.8	2.8	2.8
1,170.000	2.8	2.8	2.8	2.8	2.9
1,200.000	2.9	2.9	2.9	2.9	2.9
1,230.000	2.9	2.9	2.9	2.9	2.9
1,260.000	2.9	2.9	2.9	2.9	2.9
1,290.000	2.9	2.9	2.9	2.9	2.9
1,320.000	2.9	2.9	2.9	2.9	2.9
1,350.000	2.9	3.0	3.0	3.0	3.0
1,380.000	3.0	3.0	3.0	3.0	3.0
1,410.000	3.0	3.0	3.0	3.0	3.0
1,440.000	3.0	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Runoff CN-Area
Label: 01
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.500	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.500	(N/A)	(N/A)	74.000

Post-Developed Watershed Calculations

Subsection: Runoff CN-Area
Label: 02
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Urban Districts - Commercial & Business - Soil C	94.000	4.480	0.0	0.0	94.000
Urban Districts - Commercial & Business - Soil B	92.000	1.120	0.0	0.0	92.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	5.600	(N/A)	(N/A)	93.600

Post-Developed Watershed Calculations

Subsection: Runoff CN-Area
Label: 03
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Residential Districts - 1/3 acre - Soil C	81.000	36.000	0.0	0.0	81.000
Residential Districts - 1/3 acre - Soil B	72.000	24.000	0.0	0.0	72.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	60.000	(N/A)	(N/A)	77.400

Post-Developed Watershed Calculations

Subsection: Runoff CN-Area
Label: 07
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Residential Districts - 1/3 acre - Soil C	81.000	5.400	0.0	0.0	81.000
Residential Districts - 1/3 acre - Soil B	72.000	0.600	0.0	0.0	72.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	6.000	(N/A)	(N/A)	80.100

Post-Developed Watershed Calculations

Subsection: Runoff CN-Area
Label: S1
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	15.818	0.0	0.0	74.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	3.954	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil C	98.000	15.669	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	35.441	(N/A)	(N/A)	83.160

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 01
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	39.200 min
Area (User Defined)	0.500 acres

Computational Time Increment	5.227 min
Time to Peak (Computed)	736.960 min
Flow (Peak, Computed)	0.29 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	738.000 min
Flow (Peak Interpolated Output)	0.29 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.500 acres
Maximum Retention (Pervious)	3.5 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.9 in
Runoff Volume (Pervious)	0.038 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.037 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	39.200 min
Computational Time Increment	5.227 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 01
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	0.87 ft³/s
Unit peak time, Tp	26.133 min
Unit receding limb, Tr	104.533 min
Total unit time, Tb	130.667 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 01 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	39.200 min
Area (User Defined)	0.500 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
681.000	0.00	0.00	0.00	0.00	0.00
696.000	0.00	0.01	0.01	0.01	0.02
711.000	0.04	0.06	0.08	0.12	0.16
726.000	0.20	0.24	0.27	0.28	0.29
741.000	0.29	0.28	0.26	0.24	0.22
756.000	0.20	0.18	0.16	0.15	0.14
771.000	0.12	0.11	0.11	0.10	0.09
786.000	0.08	0.08	0.07	0.07	0.07
801.000	0.06	0.06	0.06	0.06	0.05
816.000	0.05	0.05	0.05	0.05	0.05
831.000	0.04	0.04	0.04	0.04	0.04
846.000	0.04	0.04	0.04	0.04	0.04
861.000	0.03	0.03	0.03	0.03	0.03
876.000	0.03	0.03	0.03	0.03	0.03
891.000	0.03	0.03	0.03	0.03	0.03
906.000	0.03	0.03	0.03	0.03	0.03
921.000	0.03	0.03	0.03	0.03	0.03
936.000	0.03	0.03	0.02	0.02	0.02
951.000	0.02	0.02	0.02	0.02	0.02
966.000	0.02	0.02	0.02	0.02	0.02
981.000	0.02	0.02	0.02	0.02	0.02
996.000	0.02	0.02	0.02	0.02	0.02
1,011.000	0.02	0.02	0.02	0.02	0.02
1,026.000	0.02	0.02	0.02	0.02	0.02
1,041.000	0.02	0.02	0.02	0.02	0.02
1,056.000	0.02	0.02	0.02	0.02	0.02
1,071.000	0.02	0.02	0.02	0.02	0.02
1,086.000	0.02	0.02	0.02	0.02	0.02
1,101.000	0.02	0.02	0.02	0.02	0.02
1,116.000	0.02	0.02	0.02	0.02	0.02
1,131.000	0.02	0.02	0.02	0.02	0.02
1,146.000	0.02	0.02	0.01	0.01	0.01
1,161.000	0.01	0.01	0.01	0.01	0.01

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 01 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,176.000	0.01	0.01	0.01	0.01	0.01
1,191.000	0.01	0.01	0.01	0.01	0.01
1,206.000	0.01	0.01	0.01	0.01	0.01
1,221.000	0.01	0.01	0.01	0.01	0.01
1,236.000	0.01	0.01	0.01	0.01	0.01
1,251.000	0.01	0.01	0.01	0.01	0.01
1,266.000	0.01	0.01	0.01	0.01	0.01
1,281.000	0.01	0.01	0.01	0.01	0.01
1,296.000	0.01	0.01	0.01	0.01	0.01
1,311.000	0.01	0.01	0.01	0.01	0.01
1,326.000	0.01	0.01	0.01	0.01	0.01
1,341.000	0.01	0.01	0.01	0.01	0.01
1,356.000	0.01	0.01	0.01	0.01	0.01
1,371.000	0.01	0.01	0.01	0.01	0.01
1,386.000	0.01	0.01	0.01	0.01	0.01
1,401.000	0.01	0.01	0.01	0.01	0.01
1,416.000	0.01	0.01	0.01	0.01	0.01
1,431.000	0.01	0.01	0.01	0.01	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 01
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	39.200 min
Area (User Defined)	0.500 acres

Computational Time Increment	5.227 min
Time to Peak (Computed)	736.960 min
Flow (Peak, Computed)	0.64 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	738.000 min
Flow (Peak Interpolated Output)	0.63 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.500 acres
Maximum Retention (Pervious)	3.5 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.8 in
Runoff Volume (Pervious)	0.076 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.075 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	39.200 min
Computational Time Increment	5.227 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 01
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	0.87 ft³/s
Unit peak time, Tp	26.133 min
Unit receding limb, Tr	104.533 min
Total unit time, Tb	130.667 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 01 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	39.200 min
Area (User Defined)	0.500 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
606.000	0.00	0.00	0.00	0.00	0.00
621.000	0.00	0.00	0.00	0.00	0.00
636.000	0.01	0.01	0.01	0.01	0.01
651.000	0.01	0.01	0.01	0.01	0.01
666.000	0.01	0.01	0.02	0.02	0.02
681.000	0.02	0.02	0.03	0.03	0.03
696.000	0.03	0.04	0.05	0.06	0.09
711.000	0.12	0.17	0.23	0.30	0.39
726.000	0.47	0.54	0.60	0.62	0.63
741.000	0.62	0.59	0.55	0.50	0.45
756.000	0.40	0.36	0.32	0.29	0.27
771.000	0.24	0.22	0.20	0.19	0.17
786.000	0.16	0.15	0.14	0.13	0.13
801.000	0.12	0.11	0.11	0.10	0.10
816.000	0.10	0.09	0.09	0.09	0.08
831.000	0.08	0.08	0.07	0.07	0.07
846.000	0.07	0.07	0.07	0.06	0.06
861.000	0.06	0.06	0.06	0.06	0.06
876.000	0.06	0.06	0.05	0.05	0.05
891.000	0.05	0.05	0.05	0.05	0.05
906.000	0.05	0.05	0.05	0.05	0.05
921.000	0.05	0.05	0.05	0.05	0.05
936.000	0.05	0.04	0.04	0.04	0.04
951.000	0.04	0.04	0.04	0.04	0.04
966.000	0.04	0.04	0.04	0.04	0.04
981.000	0.04	0.04	0.04	0.04	0.04
996.000	0.04	0.04	0.04	0.04	0.03
1,011.000	0.03	0.03	0.03	0.03	0.03
1,026.000	0.03	0.03	0.03	0.03	0.03
1,041.000	0.03	0.03	0.03	0.03	0.03
1,056.000	0.03	0.03	0.03	0.03	0.03
1,071.000	0.03	0.03	0.03	0.03	0.03
1,086.000	0.03	0.03	0.03	0.03	0.03

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 01 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,101.000	0.03	0.03	0.03	0.03	0.03
1,116.000	0.03	0.03	0.03	0.03	0.03
1,131.000	0.03	0.03	0.03	0.03	0.03
1,146.000	0.03	0.03	0.03	0.03	0.03
1,161.000	0.03	0.03	0.02	0.02	0.02
1,176.000	0.02	0.02	0.02	0.02	0.02
1,191.000	0.02	0.02	0.02	0.02	0.02
1,206.000	0.02	0.02	0.02	0.02	0.02
1,221.000	0.02	0.02	0.02	0.02	0.02
1,236.000	0.02	0.02	0.02	0.02	0.02
1,251.000	0.02	0.02	0.02	0.02	0.02
1,266.000	0.02	0.02	0.02	0.02	0.02
1,281.000	0.02	0.02	0.02	0.02	0.02
1,296.000	0.02	0.02	0.02	0.02	0.02
1,311.000	0.02	0.02	0.02	0.02	0.02
1,326.000	0.02	0.02	0.02	0.02	0.02
1,341.000	0.02	0.02	0.02	0.02	0.02
1,356.000	0.02	0.02	0.02	0.02	0.02
1,371.000	0.02	0.02	0.02	0.02	0.02
1,386.000	0.02	0.02	0.02	0.02	0.02
1,401.000	0.02	0.02	0.02	0.02	0.02
1,416.000	0.02	0.02	0.02	0.02	0.02
1,431.000	0.02	0.02	0.02	0.02	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 01
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	39.200 min
Area (User Defined)	0.500 acres

Computational Time Increment	5.227 min
Time to Peak (Computed)	736.960 min
Flow (Peak, Computed)	1.11 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	738.000 min
Flow (Peak Interpolated Output)	1.10 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.500 acres
Maximum Retention (Pervious)	3.5 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	0.129 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.128 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	39.200 min
Computational Time Increment	5.227 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 01
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	0.87 ft³/s
Unit peak time, Tp	26.133 min
Unit receding limb, Tr	104.533 min
Total unit time, Tb	130.667 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 01 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	39.200 min
Area (User Defined)	0.500 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
513.000	0.00	0.00	0.00	0.00	0.00
528.000	0.00	0.00	0.00	0.00	0.00
543.000	0.00	0.00	0.00	0.01	0.01
558.000	0.01	0.01	0.01	0.01	0.01
573.000	0.01	0.01	0.01	0.01	0.01
588.000	0.01	0.01	0.01	0.01	0.01
603.000	0.01	0.01	0.02	0.02	0.02
618.000	0.02	0.02	0.02	0.02	0.02
633.000	0.02	0.02	0.03	0.03	0.03
648.000	0.03	0.03	0.03	0.04	0.04
663.000	0.04	0.04	0.04	0.05	0.05
678.000	0.05	0.06	0.06	0.07	0.07
693.000	0.08	0.09	0.10	0.12	0.14
708.000	0.19	0.24	0.34	0.44	0.57
723.000	0.71	0.85	0.96	1.06	1.09
738.000	1.10	1.06	1.01	0.93	0.85
753.000	0.76	0.68	0.61	0.54	0.49
768.000	0.44	0.40	0.36	0.33	0.31
783.000	0.28	0.26	0.24	0.23	0.21
798.000	0.20	0.19	0.18	0.17	0.16
813.000	0.16	0.15	0.15	0.14	0.14
828.000	0.13	0.13	0.12	0.12	0.11
843.000	0.11	0.11	0.11	0.10	0.10
858.000	0.10	0.10	0.09	0.09	0.09
873.000	0.09	0.09	0.09	0.09	0.08
888.000	0.08	0.08	0.08	0.08	0.08
903.000	0.08	0.08	0.08	0.08	0.08
918.000	0.07	0.07	0.07	0.07	0.07
933.000	0.07	0.07	0.07	0.07	0.07
948.000	0.07	0.07	0.07	0.06	0.06
963.000	0.06	0.06	0.06	0.06	0.06
978.000	0.06	0.06	0.06	0.06	0.06
993.000	0.06	0.06	0.06	0.05	0.05

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 01 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,008.000	0.05	0.05	0.05	0.05	0.05
1,023.000	0.05	0.05	0.05	0.05	0.05
1,038.000	0.05	0.05	0.05	0.05	0.05
1,053.000	0.05	0.05	0.05	0.05	0.05
1,068.000	0.05	0.05	0.05	0.05	0.05
1,083.000	0.05	0.05	0.05	0.05	0.05
1,098.000	0.05	0.04	0.04	0.04	0.04
1,113.000	0.04	0.04	0.04	0.04	0.04
1,128.000	0.04	0.04	0.04	0.04	0.04
1,143.000	0.04	0.04	0.04	0.04	0.04
1,158.000	0.04	0.04	0.04	0.04	0.04
1,173.000	0.04	0.04	0.04	0.04	0.04
1,188.000	0.04	0.04	0.04	0.04	0.04
1,203.000	0.03	0.03	0.03	0.03	0.03
1,218.000	0.03	0.03	0.03	0.03	0.03
1,233.000	0.03	0.03	0.03	0.03	0.03
1,248.000	0.03	0.03	0.03	0.03	0.03
1,263.000	0.03	0.03	0.03	0.03	0.03
1,278.000	0.03	0.03	0.03	0.03	0.03
1,293.000	0.03	0.03	0.03	0.03	0.03
1,308.000	0.03	0.03	0.03	0.03	0.03
1,323.000	0.03	0.03	0.03	0.03	0.03
1,338.000	0.03	0.03	0.03	0.03	0.03
1,353.000	0.03	0.03	0.03	0.03	0.03
1,368.000	0.03	0.03	0.03	0.03	0.03
1,383.000	0.03	0.03	0.03	0.03	0.03
1,398.000	0.03	0.03	0.03	0.03	0.03
1,413.000	0.03	0.03	0.03	0.03	0.03
1,428.000	0.03	0.03	0.03	0.03	0.03

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 02
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	40.300 min
Area (User Defined)	5.600 acres

Computational Time Increment	5.373 min
Time to Peak (Computed)	736.147 min
Flow (Peak, Computed)	9.11 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	735.000 min
Flow (Peak Interpolated Output)	9.01 ft³/s

Drainage Area	
SCS CN (Composite)	94.000
Area (User Defined)	5.600 acres
Maximum Retention (Pervious)	0.6 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.4 in
Runoff Volume (Pervious)	1.097 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.089 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	40.300 min
Computational Time Increment	5.373 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 02
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	9.45 ft³/s
Unit peak time, Tp	26.867 min
Unit receding limb, Tr	107.467 min
Total unit time, Tb	134.333 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 02 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	40.300 min
Area (User Defined)	5.600 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
237.000	0.00	0.00	0.00	0.00	0.00
252.000	0.00	0.01	0.01	0.01	0.01
267.000	0.01	0.01	0.01	0.01	0.02
282.000	0.02	0.02	0.02	0.02	0.02
297.000	0.03	0.03	0.03	0.03	0.03
312.000	0.03	0.04	0.04	0.04	0.04
327.000	0.04	0.04	0.05	0.05	0.05
342.000	0.05	0.05	0.06	0.06	0.06
357.000	0.06	0.06	0.07	0.07	0.07
372.000	0.07	0.07	0.08	0.08	0.08
387.000	0.08	0.08	0.09	0.09	0.09
402.000	0.09	0.09	0.10	0.10	0.10
417.000	0.10	0.10	0.11	0.11	0.11
432.000	0.11	0.11	0.12	0.12	0.12
447.000	0.12	0.13	0.13	0.13	0.13
462.000	0.13	0.14	0.14	0.14	0.14
477.000	0.15	0.15	0.15	0.15	0.16
492.000	0.16	0.16	0.16	0.17	0.17
507.000	0.17	0.18	0.18	0.19	0.19
522.000	0.20	0.20	0.21	0.21	0.22
537.000	0.22	0.23	0.24	0.24	0.25
552.000	0.25	0.26	0.27	0.27	0.28
567.000	0.28	0.29	0.29	0.29	0.30
582.000	0.30	0.31	0.31	0.32	0.32
597.000	0.33	0.33	0.34	0.35	0.36
612.000	0.37	0.38	0.39	0.40	0.41
627.000	0.42	0.43	0.45	0.46	0.48
642.000	0.49	0.51	0.53	0.55	0.57
657.000	0.59	0.61	0.63	0.66	0.68
672.000	0.71	0.74	0.77	0.81	0.85
687.000	0.89	0.95	1.01	1.10	1.21
702.000	1.41	1.67	2.05	2.60	3.27
717.000	4.19	5.17	6.26	7.30	8.14

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 02 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
732.000	8.74	9.01	8.95	8.69	8.16
747.000	7.57	6.84	6.13	5.45	4.83
762.000	4.31	3.87	3.47	3.15	2.84
777.000	2.59	2.36	2.16	1.99	1.84
792.000	1.71	1.59	1.50	1.41	1.33
807.000	1.26	1.20	1.14	1.09	1.05
822.000	1.00	0.97	0.93	0.90	0.87
837.000	0.84	0.81	0.78	0.76	0.74
852.000	0.72	0.70	0.69	0.67	0.66
867.000	0.64	0.63	0.62	0.61	0.60
882.000	0.59	0.59	0.58	0.57	0.56
897.000	0.56	0.55	0.54	0.54	0.53
912.000	0.53	0.52	0.51	0.51	0.50
927.000	0.50	0.49	0.48	0.48	0.47
942.000	0.47	0.46	0.46	0.45	0.44
957.000	0.44	0.43	0.43	0.42	0.42
972.000	0.41	0.41	0.40	0.40	0.39
987.000	0.39	0.38	0.38	0.38	0.37
1,002.000	0.37	0.37	0.37	0.36	0.36
1,017.000	0.36	0.36	0.35	0.35	0.35
1,032.000	0.35	0.35	0.34	0.34	0.34
1,047.000	0.34	0.34	0.33	0.33	0.33
1,062.000	0.33	0.32	0.32	0.32	0.32
1,077.000	0.32	0.31	0.31	0.31	0.31
1,092.000	0.31	0.30	0.30	0.30	0.30
1,107.000	0.30	0.29	0.29	0.29	0.29
1,122.000	0.29	0.28	0.28	0.28	0.28
1,137.000	0.28	0.27	0.27	0.27	0.27
1,152.000	0.27	0.26	0.26	0.26	0.26
1,167.000	0.26	0.25	0.25	0.25	0.25
1,182.000	0.25	0.24	0.24	0.24	0.24
1,197.000	0.24	0.23	0.23	0.23	0.23
1,212.000	0.23	0.22	0.22	0.22	0.22
1,227.000	0.22	0.22	0.22	0.21	0.21
1,242.000	0.21	0.21	0.21	0.21	0.21
1,257.000	0.21	0.21	0.21	0.21	0.21
1,272.000	0.21	0.21	0.21	0.21	0.21
1,287.000	0.21	0.20	0.20	0.20	0.20
1,302.000	0.20	0.20	0.20	0.20	0.20
1,317.000	0.20	0.20	0.20	0.20	0.20
1,332.000	0.20	0.20	0.20	0.20	0.20
1,347.000	0.20	0.20	0.20	0.20	0.20

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 02 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,362.000	0.19	0.19	0.19	0.19	0.19
1,377.000	0.19	0.19	0.19	0.19	0.19
1,392.000	0.19	0.19	0.19	0.19	0.19
1,407.000	0.19	0.19	0.19	0.19	0.19
1,422.000	0.19	0.19	0.19	0.19	0.19
1,437.000	0.18	0.18	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 02
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	40.300 min
Area (User Defined)	5.600 acres

Computational Time Increment	5.373 min
Time to Peak (Computed)	736.147 min
Flow (Peak, Computed)	13.77 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	735.000 min
Flow (Peak Interpolated Output)	13.62 ft³/s

Drainage Area	
SCS CN (Composite)	94.000
Area (User Defined)	5.600 acres
Maximum Retention (Pervious)	0.6 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.6 in
Runoff Volume (Pervious)	1.689 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.677 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	40.300 min
Computational Time Increment	5.373 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 02
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	9.45 ft³/s
Unit peak time, Tp	26.867 min
Unit receding limb, Tr	107.467 min
Total unit time, Tb	134.333 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 02 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	40.300 min
Area (User Defined)	5.600 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
174.000	0.00	0.00	0.00	0.00	0.00
189.000	0.01	0.01	0.01	0.01	0.01
204.000	0.01	0.02	0.02	0.02	0.02
219.000	0.03	0.03	0.03	0.03	0.04
234.000	0.04	0.04	0.04	0.05	0.05
249.000	0.05	0.05	0.06	0.06	0.06
264.000	0.06	0.07	0.07	0.07	0.07
279.000	0.08	0.08	0.08	0.09	0.09
294.000	0.09	0.09	0.10	0.10	0.10
309.000	0.11	0.11	0.11	0.12	0.12
324.000	0.12	0.12	0.13	0.13	0.13
339.000	0.14	0.14	0.14	0.15	0.15
354.000	0.15	0.16	0.16	0.16	0.17
369.000	0.17	0.17	0.17	0.18	0.18
384.000	0.18	0.19	0.19	0.19	0.20
399.000	0.20	0.20	0.21	0.21	0.21
414.000	0.22	0.22	0.22	0.23	0.23
429.000	0.23	0.24	0.24	0.24	0.25
444.000	0.25	0.25	0.26	0.26	0.26
459.000	0.27	0.27	0.27	0.28	0.28
474.000	0.28	0.29	0.29	0.29	0.30
489.000	0.30	0.31	0.31	0.31	0.32
504.000	0.33	0.33	0.34	0.34	0.35
519.000	0.36	0.37	0.38	0.39	0.39
534.000	0.40	0.41	0.42	0.43	0.44
549.000	0.45	0.46	0.47	0.48	0.49
564.000	0.50	0.51	0.51	0.52	0.52
579.000	0.53	0.54	0.54	0.55	0.56
594.000	0.56	0.57	0.58	0.60	0.61
609.000	0.62	0.64	0.65	0.67	0.68
624.000	0.70	0.72	0.74	0.76	0.79
639.000	0.81	0.84	0.86	0.89	0.92
654.000	0.95	0.98	1.02	1.05	1.09

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 02 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
669.000	1.13	1.17	1.22	1.27	1.33
684.000	1.39	1.46	1.54	1.63	1.78
699.000	1.95	2.25	2.65	3.24	4.08
714.000	5.11	6.49	7.96	9.59	11.14
729.000	12.37	13.25	13.62	13.51	13.09
744.000	12.27	11.37	10.26	9.18	8.15
759.000	7.23	6.44	5.77	5.17	4.69
774.000	4.22	3.85	3.50	3.21	2.95
789.000	2.73	2.53	2.36	2.21	2.08
804.000	1.96	1.86	1.77	1.68	1.61
819.000	1.54	1.48	1.42	1.37	1.32
834.000	1.27	1.23	1.19	1.15	1.11
849.000	1.08	1.05	1.03	1.01	0.98
864.000	0.96	0.94	0.93	0.91	0.90
879.000	0.88	0.87	0.86	0.85	0.84
894.000	0.83	0.82	0.81	0.80	0.79
909.000	0.78	0.77	0.76	0.75	0.74
924.000	0.73	0.73	0.72	0.71	0.70
939.000	0.69	0.68	0.68	0.67	0.66
954.000	0.65	0.64	0.63	0.63	0.62
969.000	0.61	0.60	0.59	0.59	0.58
984.000	0.57	0.57	0.56	0.56	0.55
999.000	0.55	0.54	0.54	0.53	0.53
1,014.000	0.53	0.52	0.52	0.52	0.51
1,029.000	0.51	0.51	0.50	0.50	0.50
1,044.000	0.50	0.49	0.49	0.49	0.48
1,059.000	0.48	0.48	0.47	0.47	0.47
1,074.000	0.47	0.46	0.46	0.46	0.45
1,089.000	0.45	0.45	0.44	0.44	0.44
1,104.000	0.44	0.43	0.43	0.43	0.42
1,119.000	0.42	0.42	0.42	0.41	0.41
1,134.000	0.41	0.40	0.40	0.40	0.39
1,149.000	0.39	0.39	0.39	0.38	0.38
1,164.000	0.38	0.37	0.37	0.37	0.36
1,179.000	0.36	0.36	0.36	0.35	0.35
1,194.000	0.35	0.34	0.34	0.34	0.34
1,209.000	0.33	0.33	0.33	0.32	0.32
1,224.000	0.32	0.32	0.32	0.31	0.31
1,239.000	0.31	0.31	0.31	0.31	0.31
1,254.000	0.31	0.31	0.31	0.30	0.30
1,269.000	0.30	0.30	0.30	0.30	0.30
1,284.000	0.30	0.30	0.30	0.30	0.30

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 02 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,299.000	0.30	0.30	0.30	0.29	0.29
1,314.000	0.29	0.29	0.29	0.29	0.29
1,329.000	0.29	0.29	0.29	0.29	0.29
1,344.000	0.29	0.29	0.29	0.29	0.29
1,359.000	0.28	0.28	0.28	0.28	0.28
1,374.000	0.28	0.28	0.28	0.28	0.28
1,389.000	0.28	0.28	0.28	0.28	0.28
1,404.000	0.28	0.28	0.27	0.27	0.27
1,419.000	0.27	0.27	0.27	0.27	0.27
1,434.000	0.27	0.27	0.27	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 02
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	40.300 min
Area (User Defined)	5.600 acres

Computational Time Increment	5.373 min
Time to Peak (Computed)	736.147 min
Flow (Peak, Computed)	19.43 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	735.000 min
Flow (Peak Interpolated Output)	19.24 ft³/s

Drainage Area	
SCS CN (Composite)	94.000
Area (User Defined)	5.600 acres
Maximum Retention (Pervious)	0.6 in
Maximum Retention (Pervious, 20 percent)	0.1 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.2 in
Runoff Volume (Pervious)	2.426 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2.409 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	40.300 min
Computational Time Increment	5.373 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 02
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	9.45 ft³/s
Unit peak time, Tp	26.867 min
Unit receding limb, Tr	107.467 min
Total unit time, Tb	134.333 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 02 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	40.300 min
Area (User Defined)	5.600 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
132.000	0.00	0.00	0.00	0.00	0.01
147.000	0.01	0.01	0.01	0.02	0.02
162.000	0.02	0.03	0.03	0.03	0.04
177.000	0.04	0.04	0.05	0.05	0.06
192.000	0.06	0.06	0.07	0.07	0.08
207.000	0.08	0.08	0.09	0.09	0.10
222.000	0.10	0.10	0.11	0.11	0.12
237.000	0.12	0.12	0.13	0.13	0.14
252.000	0.14	0.14	0.15	0.15	0.16
267.000	0.16	0.16	0.17	0.17	0.18
282.000	0.18	0.18	0.19	0.19	0.20
297.000	0.20	0.21	0.21	0.22	0.22
312.000	0.22	0.23	0.23	0.24	0.24
327.000	0.25	0.25	0.26	0.26	0.26
342.000	0.27	0.27	0.28	0.28	0.29
357.000	0.29	0.30	0.30	0.31	0.31
372.000	0.32	0.32	0.32	0.33	0.33
387.000	0.34	0.34	0.35	0.35	0.36
402.000	0.36	0.37	0.37	0.38	0.38
417.000	0.39	0.39	0.39	0.40	0.40
432.000	0.41	0.41	0.42	0.42	0.43
447.000	0.43	0.44	0.44	0.45	0.45
462.000	0.46	0.46	0.46	0.47	0.47
477.000	0.48	0.48	0.49	0.49	0.50
492.000	0.50	0.51	0.52	0.52	0.53
507.000	0.54	0.55	0.56	0.57	0.58
522.000	0.59	0.61	0.62	0.63	0.65
537.000	0.66	0.67	0.69	0.70	0.72
552.000	0.73	0.75	0.76	0.77	0.78
567.000	0.79	0.80	0.81	0.82	0.83
582.000	0.83	0.84	0.85	0.86	0.87
597.000	0.89	0.90	0.92	0.93	0.95
612.000	0.97	1.00	1.02	1.05	1.07

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 02 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
627.000	1.10	1.13	1.16	1.19	1.23
642.000	1.26	1.30	1.34	1.38	1.43
657.000	1.47	1.52	1.57	1.63	1.69
672.000	1.75	1.81	1.89	1.97	2.06
687.000	2.16	2.27	2.40	2.61	2.86
702.000	3.29	3.86	4.69	5.89	7.34
717.000	9.29	11.37	13.65	15.82	17.53
732.000	18.74	19.24	19.05	18.44	17.27
747.000	15.99	14.43	12.89	11.44	10.14
762.000	9.02	8.09	7.25	6.56	5.91
777.000	5.38	4.89	4.48	4.12	3.80
792.000	3.53	3.29	3.08	2.89	2.73
807.000	2.59	2.46	2.34	2.23	2.14
822.000	2.05	1.98	1.90	1.83	1.77
837.000	1.70	1.65	1.59	1.55	1.50
852.000	1.46	1.43	1.40	1.36	1.34
867.000	1.31	1.28	1.26	1.24	1.22
882.000	1.21	1.19	1.17	1.16	1.14
897.000	1.13	1.12	1.10	1.09	1.08
912.000	1.07	1.05	1.04	1.03	1.02
927.000	1.01	0.99	0.98	0.97	0.96
942.000	0.95	0.94	0.93	0.91	0.90
957.000	0.89	0.88	0.87	0.86	0.85
972.000	0.83	0.82	0.81	0.80	0.79
987.000	0.79	0.78	0.77	0.76	0.76
1,002.000	0.75	0.75	0.74	0.74	0.73
1,017.000	0.73	0.72	0.72	0.71	0.71
1,032.000	0.70	0.70	0.69	0.69	0.69
1,047.000	0.68	0.68	0.67	0.67	0.67
1,062.000	0.66	0.66	0.65	0.65	0.64
1,077.000	0.64	0.64	0.63	0.63	0.62
1,092.000	0.62	0.62	0.61	0.61	0.60
1,107.000	0.60	0.60	0.59	0.59	0.58
1,122.000	0.58	0.57	0.57	0.57	0.56
1,137.000	0.56	0.55	0.55	0.55	0.54
1,152.000	0.54	0.53	0.53	0.53	0.52
1,167.000	0.52	0.51	0.51	0.51	0.50
1,182.000	0.50	0.49	0.49	0.48	0.48
1,197.000	0.48	0.47	0.47	0.46	0.46
1,212.000	0.46	0.45	0.45	0.45	0.44
1,227.000	0.44	0.44	0.44	0.43	0.43
1,242.000	0.43	0.43	0.43	0.43	0.42

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 02 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,257.000	0.42	0.42	0.42	0.42	0.42
1,272.000	0.42	0.42	0.42	0.42	0.41
1,287.000	0.41	0.41	0.41	0.41	0.41
1,302.000	0.41	0.41	0.41	0.41	0.41
1,317.000	0.41	0.40	0.40	0.40	0.40
1,332.000	0.40	0.40	0.40	0.40	0.40
1,347.000	0.40	0.40	0.40	0.39	0.39
1,362.000	0.39	0.39	0.39	0.39	0.39
1,377.000	0.39	0.39	0.39	0.39	0.39
1,392.000	0.38	0.38	0.38	0.38	0.38
1,407.000	0.38	0.38	0.38	0.38	0.38
1,422.000	0.38	0.38	0.37	0.37	0.37
1,437.000	0.37	0.37	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 03
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	62.100 min
Area (User Defined)	60.000 acres

Computational Time Increment	8.280 min
Time to Peak (Computed)	753.480 min
Flow (Peak, Computed)	31.28 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	753.000 min
Flow (Peak Interpolated Output)	31.19 ft³/s

Drainage Area	
SCS CN (Composite)	77.000
Area (User Defined)	60.000 acres
Maximum Retention (Pervious)	3.0 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.1 in
Runoff Volume (Pervious)	5.355 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5.259 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	62.100 min
Computational Time Increment	8.280 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 03
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	65.68 ft³/s
Unit peak time, Tp	41.400 min
Unit receding limb, Tr	165.600 min
Total unit time, Tb	207.000 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 03 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	62.100 min
Area (User Defined)	60.000 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
630.000	0.00	0.00	0.00	0.01	0.01
645.000	0.01	0.02	0.03	0.04	0.06
660.000	0.08	0.10	0.14	0.17	0.21
675.000	0.26	0.31	0.37	0.44	0.51
690.000	0.62	0.73	0.86	1.11	1.37
705.000	1.83	2.59	3.35	4.75	6.52
720.000	8.28	10.90	13.64	16.41	19.42
735.000	22.43	25.07	27.04	29.01	30.12
750.000	30.66	31.19	30.80	30.24	29.61
765.000	28.28	26.96	25.54	23.93	22.32
780.000	20.87	19.55	18.23	17.16	16.15
795.000	15.16	14.36	13.56	12.81	12.16
810.000	11.51	10.93	10.42	9.91	9.48
825.000	9.07	8.65	8.32	7.99	7.67
840.000	7.40	7.12	6.88	6.65	6.42
855.000	6.22	6.03	5.84	5.68	5.52
870.000	5.37	5.24	5.11	4.99	4.89
885.000	4.78	4.68	4.60	4.51	4.42
900.000	4.35	4.27	4.20	4.13	4.06
915.000	4.00	3.94	3.89	3.84	3.80
930.000	3.75	3.71	3.66	3.62	3.58
945.000	3.54	3.50	3.46	3.42	3.38
960.000	3.34	3.30	3.26	3.22	3.18
975.000	3.15	3.11	3.07	3.04	3.00
990.000	2.97	2.94	2.91	2.88	2.85
1,005.000	2.83	2.80	2.78	2.76	2.73
1,020.000	2.71	2.69	2.68	2.66	2.64
1,035.000	2.62	2.61	2.59	2.57	2.56
1,050.000	2.54	2.53	2.51	2.50	2.48
1,065.000	2.47	2.45	2.44	2.43	2.41
1,080.000	2.40	2.38	2.37	2.36	2.34
1,095.000	2.33	2.31	2.30	2.29	2.27
1,110.000	2.26	2.24	2.23	2.22	2.20

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 03 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,125.000	2.19	2.17	2.16	2.15	2.13
1,140.000	2.12	2.10	2.09	2.08	2.06
1,155.000	2.05	2.03	2.02	2.01	1.99
1,170.000	1.98	1.96	1.95	1.93	1.92
1,185.000	1.91	1.89	1.88	1.86	1.85
1,200.000	1.83	1.82	1.80	1.79	1.78
1,215.000	1.76	1.75	1.74	1.72	1.71
1,230.000	1.70	1.69	1.68	1.67	1.66
1,245.000	1.65	1.64	1.63	1.63	1.62
1,260.000	1.61	1.61	1.60	1.60	1.59
1,275.000	1.59	1.58	1.58	1.58	1.57
1,290.000	1.57	1.56	1.56	1.56	1.55
1,305.000	1.55	1.55	1.55	1.54	1.54
1,320.000	1.54	1.53	1.53	1.53	1.53
1,335.000	1.52	1.52	1.52	1.51	1.51
1,350.000	1.51	1.51	1.50	1.50	1.50
1,365.000	1.50	1.49	1.49	1.49	1.48
1,380.000	1.48	1.48	1.48	1.47	1.47
1,395.000	1.47	1.47	1.46	1.46	1.46
1,410.000	1.46	1.45	1.45	1.45	1.44
1,425.000	1.44	1.44	1.44	1.43	1.43
1,440.000	1.43	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 03
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	62.100 min
Area (User Defined)	60.000 acres

Computational Time Increment	8.280 min
Time to Peak (Computed)	753.480 min
Flow (Peak, Computed)	62.67 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	753.000 min
Flow (Peak Interpolated Output)	62.57 ft³/s

Drainage Area	
SCS CN (Composite)	77.000
Area (User Defined)	60.000 acres
Maximum Retention (Pervious)	3.0 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.0 in
Runoff Volume (Pervious)	10.247 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	10.087 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	62.100 min
Computational Time Increment	8.280 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 03
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	65.68 ft³/s
Unit peak time, Tp	41.400 min
Unit receding limb, Tr	165.600 min
Total unit time, Tb	207.000 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 03 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	62.100 min
Area (User Defined)	60.000 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
531.000	0.00	0.00	0.00	0.00	0.01
546.000	0.01	0.02	0.02	0.03	0.04
561.000	0.05	0.07	0.08	0.10	0.12
576.000	0.14	0.17	0.19	0.22	0.25
591.000	0.28	0.31	0.34	0.38	0.41
606.000	0.45	0.49	0.53	0.58	0.63
621.000	0.68	0.74	0.79	0.85	0.92
636.000	0.98	1.06	1.13	1.21	1.30
651.000	1.39	1.48	1.59	1.70	1.82
666.000	1.95	2.08	2.22	2.39	2.55
681.000	2.74	2.94	3.15	3.44	3.74
696.000	4.09	4.72	5.35	6.41	8.13
711.000	9.84	12.80	16.48	20.15	25.39
726.000	30.84	36.32	42.02	47.72	52.62
741.000	56.09	59.57	61.33	61.95	62.57
756.000	61.40	59.89	58.27	55.38	52.48
771.000	49.45	46.14	42.83	39.88	37.21
786.000	34.54	32.40	30.39	28.39	26.81
801.000	25.22	23.72	22.44	21.16	20.03
816.000	19.04	18.05	17.20	16.40	15.60
831.000	14.96	14.32	13.71	13.20	12.68
846.000	12.21	11.78	11.35	10.98	10.62
861.000	10.26	9.97	9.67	9.39	9.15
876.000	8.91	8.69	8.50	8.30	8.12
891.000	7.96	7.79	7.64	7.50	7.35
906.000	7.22	7.10	6.98	6.87	6.76
921.000	6.67	6.59	6.50	6.42	6.34
936.000	6.27	6.19	6.12	6.05	5.97
951.000	5.90	5.83	5.76	5.69	5.63
966.000	5.56	5.49	5.42	5.36	5.29
981.000	5.23	5.17	5.11	5.05	4.99
996.000	4.94	4.89	4.84	4.80	4.76
1,011.000	4.71	4.67	4.64	4.60	4.57

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 03 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,026.000	4.53	4.50	4.47	4.44	4.41
1,041.000	4.38	4.35	4.33	4.30	4.27
1,056.000	4.25	4.22	4.19	4.17	4.14
1,071.000	4.12	4.09	4.07	4.04	4.02
1,086.000	4.00	3.97	3.95	3.92	3.90
1,101.000	3.87	3.85	3.83	3.80	3.78
1,116.000	3.75	3.73	3.70	3.68	3.66
1,131.000	3.63	3.61	3.58	3.56	3.54
1,146.000	3.51	3.49	3.46	3.44	3.41
1,161.000	3.39	3.37	3.34	3.32	3.29
1,176.000	3.27	3.24	3.22	3.19	3.17
1,191.000	3.14	3.12	3.10	3.07	3.05
1,206.000	3.02	3.00	2.97	2.95	2.93
1,221.000	2.90	2.88	2.86	2.84	2.82
1,236.000	2.80	2.79	2.77	2.76	2.74
1,251.000	2.73	2.72	2.70	2.69	2.68
1,266.000	2.67	2.67	2.66	2.65	2.64
1,281.000	2.64	2.63	2.62	2.62	2.61
1,296.000	2.60	2.60	2.59	2.59	2.58
1,311.000	2.58	2.57	2.57	2.56	2.56
1,326.000	2.55	2.55	2.54	2.54	2.53
1,341.000	2.53	2.52	2.52	2.51	2.51
1,356.000	2.50	2.50	2.49	2.49	2.48
1,371.000	2.48	2.47	2.47	2.46	2.46
1,386.000	2.45	2.45	2.45	2.44	2.44
1,401.000	2.43	2.43	2.42	2.42	2.41
1,416.000	2.41	2.40	2.40	2.39	2.39
1,431.000	2.38	2.38	2.37	2.37	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 03
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	62.100 min
Area (User Defined)	60.000 acres

Computational Time Increment	8.280 min
Time to Peak (Computed)	753.480 min
Flow (Peak, Computed)	105.03 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	753.000 min
Flow (Peak Interpolated Output)	104.93 ft³/s

Drainage Area	
SCS CN (Composite)	77.000
Area (User Defined)	60.000 acres
Maximum Retention (Pervious)	3.0 in
Maximum Retention (Pervious, 20 percent)	0.6 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.4 in
Runoff Volume (Pervious)	16.960 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	16.722 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	62.100 min
Computational Time Increment	8.280 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 03
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	65.68 ft³/s
Unit peak time, Tp	41.400 min
Unit receding limb, Tr	165.600 min
Total unit time, Tb	207.000 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 03 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	62.100 min
Area (User Defined)	60.000 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
435.000	0.00	0.00	0.00	0.00	0.01
450.000	0.01	0.02	0.02	0.03	0.04
465.000	0.05	0.06	0.08	0.09	0.11
480.000	0.13	0.15	0.17	0.19	0.22
495.000	0.24	0.27	0.30	0.33	0.36
510.000	0.39	0.42	0.46	0.49	0.53
525.000	0.57	0.61	0.66	0.70	0.75
540.000	0.80	0.85	0.90	0.96	1.02
555.000	1.07	1.13	1.19	1.25	1.32
570.000	1.38	1.44	1.50	1.56	1.63
585.000	1.69	1.75	1.82	1.89	1.96
600.000	2.03	2.10	2.18	2.27	2.35
615.000	2.45	2.55	2.65	2.77	2.88
630.000	3.00	3.14	3.27	3.42	3.58
645.000	3.73	3.91	4.09	4.28	4.49
660.000	4.71	4.93	5.19	5.45	5.73
675.000	6.04	6.35	6.72	7.11	7.50
690.000	8.04	8.60	9.26	10.43	11.60
705.000	13.51	16.55	19.59	24.70	30.98
720.000	37.26	46.01	55.10	64.20	73.42
735.000	82.65	90.48	95.85	101.21	103.72
750.000	104.32	104.93	102.61	99.73	96.68
765.000	91.60	86.52	81.27	75.64	70.02
780.000	65.03	60.54	56.05	52.46	49.09
795.000	45.75	43.11	40.46	37.97	35.84
810.000	33.72	31.85	30.21	28.58	27.19
825.000	25.87	24.56	23.51	22.47	21.47
840.000	20.63	19.79	19.02	18.33	17.64
855.000	17.04	16.46	15.89	15.42	14.95
870.000	14.49	14.11	13.73	13.38	13.06
885.000	12.75	12.47	12.21	11.94	11.70
900.000	11.47	11.24	11.04	10.83	10.64
915.000	10.47	10.31	10.16	10.03	9.90

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 03 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
930.000	9.78	9.66	9.54	9.42	9.31
945.000	9.19	9.08	8.97	8.86	8.76
960.000	8.65	8.54	8.44	8.33	8.23
975.000	8.13	8.03	7.93	7.84	7.74
990.000	7.66	7.57	7.49	7.41	7.33
1,005.000	7.27	7.20	7.13	7.07	7.02
1,020.000	6.96	6.91	6.86	6.81	6.76
1,035.000	6.71	6.67	6.62	6.58	6.54
1,050.000	6.49	6.45	6.41	6.37	6.33
1,065.000	6.29	6.25	6.22	6.18	6.14
1,080.000	6.10	6.06	6.02	5.99	5.95
1,095.000	5.91	5.87	5.84	5.80	5.76
1,110.000	5.73	5.69	5.65	5.61	5.58
1,125.000	5.54	5.50	5.47	5.43	5.39
1,140.000	5.36	5.32	5.28	5.24	5.21
1,155.000	5.17	5.13	5.10	5.06	5.02
1,170.000	4.98	4.95	4.91	4.87	4.84
1,185.000	4.80	4.76	4.72	4.69	4.65
1,200.000	4.61	4.57	4.54	4.50	4.46
1,215.000	4.43	4.39	4.36	4.32	4.29
1,230.000	4.26	4.23	4.21	4.18	4.15
1,245.000	4.13	4.11	4.09	4.07	4.05
1,260.000	4.04	4.02	4.01	4.00	3.98
1,275.000	3.97	3.96	3.95	3.94	3.93
1,290.000	3.92	3.91	3.90	3.89	3.88
1,305.000	3.87	3.86	3.86	3.85	3.84
1,320.000	3.83	3.82	3.82	3.81	3.80
1,335.000	3.79	3.79	3.78	3.77	3.76
1,350.000	3.76	3.75	3.74	3.73	3.73
1,365.000	3.72	3.71	3.70	3.70	3.69
1,380.000	3.68	3.68	3.67	3.66	3.65
1,395.000	3.65	3.64	3.63	3.62	3.62
1,410.000	3.61	3.60	3.60	3.59	3.58
1,425.000	3.57	3.57	3.56	3.55	3.54
1,440.000	3.53	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 07
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	49.900 min
Area (User Defined)	6.000 acres

Computational Time Increment	6.653 min
Time to Peak (Computed)	745.173 min
Flow (Peak, Computed)	4.39 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	744.000 min
Flow (Peak Interpolated Output)	4.36 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	6.000 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	0.625 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.617 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	49.900 min
Computational Time Increment	6.653 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 07
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	8.17 ft³/s
Unit peak time, Tp	33.267 min
Unit receding limb, Tr	133.067 min
Total unit time, Tb	166.333 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 07 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	49.900 min
Area (User Defined)	6.000 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
594.000	0.00	0.00	0.00	0.00	0.00
609.000	0.00	0.01	0.01	0.01	0.01
624.000	0.01	0.02	0.02	0.02	0.03
639.000	0.03	0.04	0.04	0.05	0.05
654.000	0.06	0.06	0.07	0.08	0.08
669.000	0.09	0.10	0.11	0.12	0.13
684.000	0.15	0.16	0.18	0.20	0.23
699.000	0.26	0.33	0.39	0.54	0.69
714.000	0.96	1.27	1.65	2.11	2.57
729.000	3.05	3.53	3.84	4.16	4.28
744.000	4.36	4.33	4.21	4.06	3.82
759.000	3.58	3.30	3.02	2.78	2.55
774.000	2.35	2.17	2.00	1.86	1.73
789.000	1.61	1.50	1.41	1.32	1.24
804.000	1.17	1.11	1.05	1.00	0.96
819.000	0.91	0.87	0.84	0.81	0.77
834.000	0.75	0.72	0.70	0.67	0.65
849.000	0.63	0.61	0.60	0.58	0.57
864.000	0.55	0.54	0.52	0.51	0.50
879.000	0.49	0.48	0.47	0.47	0.46
894.000	0.45	0.45	0.44	0.44	0.43
909.000	0.43	0.42	0.42	0.41	0.41
924.000	0.40	0.40	0.40	0.39	0.39
939.000	0.38	0.38	0.37	0.37	0.37
954.000	0.36	0.36	0.35	0.35	0.34
969.000	0.34	0.34	0.33	0.33	0.32
984.000	0.32	0.32	0.31	0.31	0.31
999.000	0.30	0.30	0.30	0.30	0.30
1,014.000	0.29	0.29	0.29	0.29	0.29
1,029.000	0.28	0.28	0.28	0.28	0.28
1,044.000	0.28	0.27	0.27	0.27	0.27
1,059.000	0.27	0.27	0.26	0.26	0.26
1,074.000	0.26	0.26	0.26	0.26	0.25

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: 07 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,089.000	0.25	0.25	0.25	0.25	0.25
1,104.000	0.24	0.24	0.24	0.24	0.24
1,119.000	0.24	0.24	0.23	0.23	0.23
1,134.000	0.23	0.23	0.23	0.22	0.22
1,149.000	0.22	0.22	0.22	0.22	0.22
1,164.000	0.21	0.21	0.21	0.21	0.21
1,179.000	0.21	0.20	0.20	0.20	0.20
1,194.000	0.20	0.20	0.19	0.19	0.19
1,209.000	0.19	0.19	0.19	0.19	0.18
1,224.000	0.18	0.18	0.18	0.18	0.18
1,239.000	0.18	0.18	0.18	0.18	0.17
1,254.000	0.17	0.17	0.17	0.17	0.17
1,269.000	0.17	0.17	0.17	0.17	0.17
1,284.000	0.17	0.17	0.17	0.17	0.17
1,299.000	0.17	0.17	0.17	0.17	0.17
1,314.000	0.17	0.17	0.17	0.17	0.17
1,329.000	0.16	0.16	0.16	0.16	0.16
1,344.000	0.16	0.16	0.16	0.16	0.16
1,359.000	0.16	0.16	0.16	0.16	0.16
1,374.000	0.16	0.16	0.16	0.16	0.16
1,389.000	0.16	0.16	0.16	0.16	0.16
1,404.000	0.16	0.16	0.16	0.16	0.16
1,419.000	0.16	0.16	0.16	0.15	0.15
1,434.000	0.15	0.15	0.15	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 07
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	49.900 min
Area (User Defined)	6.000 acres

Computational Time Increment	6.653 min
Time to Peak (Computed)	745.173 min
Flow (Peak, Computed)	8.26 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	744.000 min
Flow (Peak Interpolated Output)	8.22 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	6.000 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.3 in
Runoff Volume (Pervious)	1.146 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.133 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	49.900 min
Computational Time Increment	6.653 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 07
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	8.17 ft³/s
Unit peak time, Tp	33.267 min
Unit receding limb, Tr	133.067 min
Total unit time, Tb	166.333 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 07 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	49.900 min
Area (User Defined)	6.000 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
489.000	0.00	0.00	0.00	0.00	0.00
504.000	0.00	0.01	0.01	0.01	0.01
519.000	0.01	0.01	0.02	0.02	0.02
534.000	0.02	0.03	0.03	0.03	0.04
549.000	0.04	0.04	0.05	0.05	0.06
564.000	0.06	0.06	0.07	0.07	0.08
579.000	0.08	0.08	0.09	0.09	0.10
594.000	0.10	0.11	0.11	0.12	0.12
609.000	0.13	0.13	0.14	0.15	0.16
624.000	0.16	0.17	0.18	0.19	0.20
639.000	0.21	0.22	0.23	0.25	0.26
654.000	0.27	0.29	0.31	0.32	0.34
669.000	0.36	0.38	0.40	0.43	0.46
684.000	0.49	0.52	0.56	0.60	0.67
699.000	0.74	0.88	1.01	1.32	1.64
714.000	2.15	2.76	3.48	4.33	5.18
729.000	6.05	6.90	7.43	7.97	8.13
744.000	8.22	8.10	7.85	7.51	7.04
759.000	6.56	6.02	5.49	5.04	4.59
774.000	4.22	3.88	3.57	3.31	3.05
789.000	2.84	2.63	2.47	2.30	2.17
804.000	2.03	1.92	1.82	1.72	1.64
819.000	1.56	1.49	1.43	1.37	1.31
834.000	1.27	1.22	1.18	1.14	1.10
849.000	1.07	1.03	1.00	0.97	0.95
864.000	0.92	0.90	0.87	0.85	0.83
879.000	0.82	0.80	0.79	0.78	0.77
894.000	0.75	0.74	0.74	0.73	0.72
909.000	0.71	0.70	0.69	0.68	0.68
924.000	0.67	0.66	0.65	0.65	0.64
939.000	0.63	0.62	0.62	0.61	0.60
954.000	0.60	0.59	0.58	0.57	0.57
969.000	0.56	0.55	0.55	0.54	0.53

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: 07 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
984.000	0.53	0.52	0.52	0.51	0.51
999.000	0.50	0.50	0.49	0.49	0.48
1,014.000	0.48	0.48	0.47	0.47	0.47
1,029.000	0.47	0.46	0.46	0.46	0.45
1,044.000	0.45	0.45	0.45	0.44	0.44
1,059.000	0.44	0.44	0.43	0.43	0.43
1,074.000	0.42	0.42	0.42	0.42	0.41
1,089.000	0.41	0.41	0.41	0.40	0.40
1,104.000	0.40	0.40	0.39	0.39	0.39
1,119.000	0.39	0.38	0.38	0.38	0.38
1,134.000	0.37	0.37	0.37	0.37	0.36
1,149.000	0.36	0.36	0.36	0.35	0.35
1,164.000	0.35	0.34	0.34	0.34	0.34
1,179.000	0.33	0.33	0.33	0.33	0.32
1,194.000	0.32	0.32	0.32	0.31	0.31
1,209.000	0.31	0.31	0.30	0.30	0.30
1,224.000	0.30	0.29	0.29	0.29	0.29
1,239.000	0.29	0.29	0.29	0.28	0.28
1,254.000	0.28	0.28	0.28	0.28	0.28
1,269.000	0.28	0.28	0.28	0.28	0.28
1,284.000	0.27	0.27	0.27	0.27	0.27
1,299.000	0.27	0.27	0.27	0.27	0.27
1,314.000	0.27	0.27	0.27	0.27	0.27
1,329.000	0.27	0.27	0.27	0.27	0.26
1,344.000	0.26	0.26	0.26	0.26	0.26
1,359.000	0.26	0.26	0.26	0.26	0.26
1,374.000	0.26	0.26	0.26	0.26	0.26
1,389.000	0.26	0.26	0.26	0.25	0.25
1,404.000	0.25	0.25	0.25	0.25	0.25
1,419.000	0.25	0.25	0.25	0.25	0.25
1,434.000	0.25	0.25	0.25	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 07
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	49.900 min
Area (User Defined)	6.000 acres

Computational Time Increment	6.653 min
Time to Peak (Computed)	745.173 min
Flow (Peak, Computed)	13.34 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	744.000 min
Flow (Peak Interpolated Output)	13.30 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	6.000 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	1.846 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.826 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	49.900 min
Computational Time Increment	6.653 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: 07
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	8.17 ft³/s
Unit peak time, Tp	33.267 min
Unit receding limb, Tr	133.067 min
Total unit time, Tb	166.333 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 07 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	49.900 min
Area (User Defined)	6.000 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
393.000	0.00	0.00	0.00	0.00	0.00
408.000	0.00	0.01	0.01	0.01	0.01
423.000	0.01	0.02	0.02	0.02	0.02
438.000	0.03	0.03	0.03	0.03	0.04
453.000	0.04	0.04	0.05	0.05	0.05
468.000	0.06	0.06	0.06	0.07	0.07
483.000	0.07	0.08	0.08	0.08	0.09
498.000	0.09	0.10	0.10	0.10	0.11
513.000	0.11	0.12	0.12	0.13	0.13
528.000	0.14	0.15	0.15	0.16	0.17
543.000	0.17	0.18	0.19	0.20	0.20
558.000	0.21	0.22	0.23	0.24	0.24
573.000	0.25	0.26	0.26	0.27	0.28
588.000	0.29	0.29	0.30	0.31	0.32
603.000	0.33	0.34	0.35	0.36	0.37
618.000	0.39	0.40	0.42	0.43	0.45
633.000	0.47	0.49	0.50	0.53	0.55
648.000	0.57	0.60	0.62	0.65	0.68
663.000	0.71	0.74	0.78	0.81	0.86
678.000	0.90	0.95	1.00	1.06	1.13
693.000	1.21	1.32	1.45	1.69	1.92
708.000	2.44	2.98	3.83	4.83	6.00
723.000	7.36	8.72	10.07	11.40	12.20
738.000	13.00	13.21	13.30	13.06	12.60
753.000	12.01	11.23	10.42	9.55	8.68
768.000	7.95	7.22	6.62	6.07	5.59
783.000	5.16	4.75	4.41	4.08	3.82
798.000	3.55	3.34	3.13	2.95	2.78
813.000	2.63	2.50	2.38	2.27	2.17
828.000	2.08	1.99	1.92	1.84	1.78
843.000	1.72	1.66	1.61	1.55	1.51
858.000	1.46	1.42	1.38	1.34	1.31
873.000	1.28	1.25	1.22	1.20	1.18

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: 07 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
888.000	1.16	1.14	1.13	1.11	1.10
903.000	1.08	1.07	1.06	1.04	1.03
918.000	1.02	1.01	1.00	0.99	0.97
933.000	0.96	0.95	0.94	0.93	0.92
948.000	0.91	0.90	0.89	0.87	0.86
963.000	0.85	0.84	0.83	0.82	0.81
978.000	0.80	0.79	0.78	0.77	0.77
993.000	0.76	0.75	0.74	0.74	0.73
1,008.000	0.72	0.72	0.71	0.71	0.70
1,023.000	0.70	0.69	0.69	0.68	0.68
1,038.000	0.68	0.67	0.67	0.66	0.66
1,053.000	0.66	0.65	0.65	0.64	0.64
1,068.000	0.64	0.63	0.63	0.62	0.62
1,083.000	0.62	0.61	0.61	0.61	0.60
1,098.000	0.60	0.59	0.59	0.59	0.58
1,113.000	0.58	0.57	0.57	0.57	0.56
1,128.000	0.56	0.56	0.55	0.55	0.54
1,143.000	0.54	0.54	0.53	0.53	0.52
1,158.000	0.52	0.52	0.51	0.51	0.50
1,173.000	0.50	0.50	0.49	0.49	0.49
1,188.000	0.48	0.48	0.47	0.47	0.47
1,203.000	0.46	0.46	0.45	0.45	0.45
1,218.000	0.44	0.44	0.44	0.43	0.43
1,233.000	0.43	0.43	0.42	0.42	0.42
1,248.000	0.42	0.42	0.41	0.41	0.41
1,263.000	0.41	0.41	0.41	0.41	0.41
1,278.000	0.41	0.40	0.40	0.40	0.40
1,293.000	0.40	0.40	0.40	0.40	0.40
1,308.000	0.40	0.40	0.40	0.39	0.39
1,323.000	0.39	0.39	0.39	0.39	0.39
1,338.000	0.39	0.39	0.39	0.39	0.39
1,353.000	0.39	0.38	0.38	0.38	0.38
1,368.000	0.38	0.38	0.38	0.38	0.38
1,383.000	0.38	0.38	0.38	0.38	0.37
1,398.000	0.37	0.37	0.37	0.37	0.37
1,413.000	0.37	0.37	0.37	0.37	0.37
1,428.000	0.37	0.37	0.37	0.36	0.36

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: S1
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	8.000 min
Area (User Defined)	35.441 acres

Computational Time Increment	1.067 min
Time to Peak (Computed)	717.867 min
Flow (Peak, Computed)	73.53 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	717.000 min
Flow (Peak Interpolated Output)	72.96 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	35.441 acres
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.4 in
Runoff Volume (Pervious)	4.272 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	4.265 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	8.000 min
Computational Time Increment	1.067 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: S1
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	301.17 ft³/s
Unit peak time, Tp	5.333 min
Unit receding limb, Tr	21.333 min
Total unit time, Tb	26.667 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: S1 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

Storm Event	2 YR
Return Event	2 years
Duration	1,440.000 min
Depth	3.0 in
Time of Concentration (Composite)	8.000 min
Area (User Defined)	35.441 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
522.000	0.00	0.00	0.01	0.03	0.04
537.000	0.05	0.07	0.08	0.10	0.12
552.000	0.13	0.15	0.16	0.18	0.19
567.000	0.21	0.22	0.24	0.25	0.27
582.000	0.29	0.32	0.34	0.36	0.39
597.000	0.42	0.45	0.48	0.51	0.54
612.000	0.58	0.62	0.66	0.71	0.75
627.000	0.80	0.85	0.90	0.96	1.02
642.000	1.10	1.17	1.25	1.34	1.43
657.000	1.52	1.61	1.72	1.86	2.00
672.000	2.19	2.38	2.60	2.82	3.06
687.000	3.30	3.57	4.42	6.39	9.35
702.000	14.24	20.24	28.83	40.96	60.48
717.000	72.96	71.74	61.69	39.61	23.97
732.000	17.20	14.06	12.27	11.14	10.13
747.000	9.32	8.45	7.75	7.12	6.69
762.000	6.39	6.18	5.96	5.78	5.58
777.000	5.39	5.19	5.02	4.85	4.72
792.000	4.60	4.49	4.38	4.29	4.17
807.000	4.07	3.96	3.87	3.77	3.68
822.000	3.60	3.53	3.45	3.37	3.29
837.000	3.22	3.14	3.07	3.01	2.97
852.000	2.93	2.90	2.88	2.85	2.82
867.000	2.80	2.77	2.75	2.72	2.69
882.000	2.67	2.64	2.61	2.59	2.56
897.000	2.54	2.51	2.48	2.45	2.43
912.000	2.40	2.37	2.35	2.32	2.29
927.000	2.26	2.24	2.21	2.18	2.15
942.000	2.13	2.10	2.07	2.04	2.02
957.000	1.99	1.96	1.93	1.91	1.90
972.000	1.88	1.87	1.86	1.86	1.84
987.000	1.83	1.83	1.82	1.81	1.80
1,002.000	1.79	1.78	1.77	1.76	1.75

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 2 years
Label: S1 Storm Event: 2 YR
Scenario: Post-Development 2 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,017.000	1.74	1.73	1.72	1.71	1.70
1,032.000	1.69	1.68	1.67	1.66	1.65
1,047.000	1.64	1.63	1.62	1.61	1.60
1,062.000	1.59	1.58	1.57	1.56	1.55
1,077.000	1.54	1.53	1.52	1.51	1.50
1,092.000	1.49	1.48	1.47	1.46	1.45
1,107.000	1.44	1.43	1.42	1.41	1.40
1,122.000	1.39	1.38	1.37	1.36	1.35
1,137.000	1.34	1.33	1.32	1.31	1.30
1,152.000	1.29	1.28	1.27	1.26	1.25
1,167.000	1.24	1.23	1.22	1.21	1.20
1,182.000	1.19	1.18	1.17	1.16	1.15
1,197.000	1.14	1.13	1.12	1.11	1.11
1,212.000	1.10	1.10	1.10	1.10	1.09
1,227.000	1.09	1.09	1.09	1.09	1.08
1,242.000	1.08	1.08	1.08	1.08	1.07
1,257.000	1.07	1.07	1.07	1.07	1.07
1,272.000	1.06	1.06	1.06	1.06	1.05
1,287.000	1.05	1.05	1.05	1.05	1.04
1,302.000	1.04	1.04	1.04	1.04	1.04
1,317.000	1.03	1.03	1.03	1.03	1.03
1,332.000	1.02	1.02	1.02	1.02	1.02
1,347.000	1.01	1.01	1.01	1.01	1.01
1,362.000	1.01	1.00	1.00	1.00	1.00
1,377.000	1.00	0.99	0.99	0.99	0.99
1,392.000	0.98	0.98	0.98	0.98	0.98
1,407.000	0.97	0.97	0.97	0.97	0.97
1,422.000	0.97	0.96	0.96	0.96	0.96
1,437.000	0.96	0.96	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: S1
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	8.000 min
Area (User Defined)	35.441 acres

Computational Time Increment	1.067 min
Time to Peak (Computed)	717.867 min
Flow (Peak, Computed)	129.07 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	717.000 min
Flow (Peak Interpolated Output)	128.90 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	35.441 acres
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.5 in
Runoff Volume (Pervious)	7.527 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	7.515 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	8.000 min
Computational Time Increment	1.067 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: S1
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	301.17 ft³/s
Unit peak time, Tp	5.333 min
Unit receding limb, Tr	21.333 min
Total unit time, Tb	26.667 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: S1 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

Storm Event	10 YR
Return Event	10 years
Duration	1,440.000 min
Depth	4.3 in
Time of Concentration (Composite)	8.000 min
Area (User Defined)	35.441 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
411.000	0.00	0.00	0.01	0.02	0.03
426.000	0.05	0.06	0.07	0.09	0.10
441.000	0.11	0.13	0.14	0.15	0.17
456.000	0.18	0.19	0.21	0.22	0.24
471.000	0.25	0.27	0.28	0.29	0.31
486.000	0.33	0.35	0.37	0.39	0.41
501.000	0.44	0.46	0.49	0.52	0.54
516.000	0.57	0.60	0.63	0.67	0.70
531.000	0.73	0.77	0.80	0.84	0.87
546.000	0.90	0.93	0.96	0.98	1.01
561.000	1.03	1.06	1.08	1.10	1.13
576.000	1.16	1.20	1.25	1.30	1.36
591.000	1.41	1.48	1.53	1.60	1.66
606.000	1.74	1.81	1.90	1.98	2.08
621.000	2.17	2.27	2.37	2.47	2.58
636.000	2.71	2.84	3.00	3.15	3.32
651.000	3.49	3.67	3.85	4.04	4.26
666.000	4.53	4.83	5.21	5.60	6.04
681.000	6.46	6.93	7.38	7.90	9.63
696.000	13.71	19.63	29.18	40.34	55.78
711.000	76.73	109.65	128.90	124.12	105.11
726.000	66.97	40.26	28.71	23.35	20.30
741.000	18.38	16.68	15.32	13.87	12.70
756.000	11.66	10.94	10.45	10.08	9.73
771.000	9.42	9.08	8.78	8.45	8.16
786.000	7.89	7.67	7.46	7.29	7.11
801.000	6.94	6.76	6.59	6.41	6.25
816.000	6.09	5.95	5.81	5.69	5.56
831.000	5.44	5.31	5.19	5.06	4.95
846.000	4.85	4.78	4.72	4.67	4.63
861.000	4.59	4.54	4.50	4.45	4.41
876.000	4.36	4.32	4.28	4.24	4.19
891.000	4.15	4.10	4.06	4.01	3.97

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: S1 Storm Event: 10 YR
Scenario: Post-Development 10 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
906.000	3.93	3.89	3.84	3.80	3.75
921.000	3.71	3.66	3.62	3.57	3.53
936.000	3.48	3.44	3.40	3.35	3.30
951.000	3.26	3.22	3.17	3.12	3.08
966.000	3.05	3.02	3.00	2.99	2.97
981.000	2.96	2.94	2.92	2.91	2.89
996.000	2.87	2.86	2.84	2.83	2.81
1,011.000	2.80	2.78	2.77	2.75	2.73
1,026.000	2.72	2.70	2.68	2.67	2.65
1,041.000	2.64	2.62	2.61	2.59	2.58
1,056.000	2.56	2.54	2.53	2.51	2.49
1,071.000	2.48	2.46	2.45	2.43	2.41
1,086.000	2.40	2.38	2.36	2.35	2.33
1,101.000	2.32	2.30	2.28	2.27	2.25
1,116.000	2.23	2.22	2.20	2.19	2.17
1,131.000	2.15	2.14	2.12	2.10	2.09
1,146.000	2.07	2.06	2.04	2.02	2.01
1,161.000	1.99	1.97	1.96	1.94	1.93
1,176.000	1.91	1.89	1.88	1.86	1.84
1,191.000	1.83	1.81	1.80	1.78	1.76
1,206.000	1.75	1.74	1.74	1.73	1.73
1,221.000	1.73	1.72	1.72	1.72	1.72
1,236.000	1.71	1.71	1.71	1.70	1.70
1,251.000	1.70	1.69	1.69	1.69	1.68
1,266.000	1.68	1.68	1.67	1.67	1.67
1,281.000	1.67	1.66	1.66	1.66	1.65
1,296.000	1.65	1.64	1.64	1.64	1.64
1,311.000	1.63	1.63	1.63	1.62	1.62
1,326.000	1.62	1.62	1.61	1.61	1.61
1,341.000	1.60	1.60	1.59	1.59	1.59
1,356.000	1.59	1.58	1.58	1.58	1.57
1,371.000	1.57	1.57	1.56	1.56	1.56
1,386.000	1.55	1.55	1.55	1.54	1.54
1,401.000	1.54	1.53	1.53	1.53	1.53
1,416.000	1.52	1.52	1.52	1.51	1.51
1,431.000	1.50	1.50	1.50	1.50	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: S1
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	8.000 min
Area (User Defined)	35.441 acres

Computational Time Increment	1.067 min
Time to Peak (Computed)	716.800 min
Flow (Peak, Computed)	200.27 ft³/s
Output Increment	3.000 min
Time to Flow (Peak Interpolated Output)	717.000 min
Flow (Peak Interpolated Output)	200.15 ft³/s

Drainage Area	
SCS CN (Composite)	83.000
Area (User Defined)	35.441 acres
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.0 in
Runoff Volume (Pervious)	11.810 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	11.793 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	8.000 min
Computational Time Increment	1.067 min
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph Summary
Label: S1
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit peak, qp	301.17 ft³/s
Unit peak time, Tp	5.333 min
Unit receding limb, Tr	21.333 min
Total unit time, Tb	26.667 min

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: S1 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

Storm Event	100 YR
Return Event	100 years
Duration	1,440.000 min
Depth	5.9 in
Time of Concentration (Composite)	8.000 min
Area (User Defined)	35.441 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
324.000	0.00	0.00	0.01	0.02	0.04
339.000	0.05	0.07	0.09	0.11	0.12
354.000	0.14	0.16	0.18	0.20	0.22
369.000	0.24	0.26	0.28	0.30	0.32
384.000	0.34	0.36	0.38	0.40	0.42
399.000	0.44	0.46	0.48	0.50	0.52
414.000	0.55	0.57	0.59	0.61	0.63
429.000	0.66	0.68	0.70	0.72	0.75
444.000	0.77	0.79	0.82	0.84	0.86
459.000	0.89	0.91	0.93	0.96	0.98
474.000	1.00	1.03	1.05	1.08	1.11
489.000	1.15	1.19	1.24	1.29	1.34
504.000	1.39	1.44	1.50	1.55	1.61
519.000	1.66	1.72	1.78	1.84	1.90
534.000	1.97	2.03	2.10	2.16	2.21
549.000	2.26	2.30	2.33	2.37	2.40
564.000	2.43	2.46	2.50	2.54	2.59
579.000	2.66	2.75	2.84	2.95	3.05
594.000	3.15	3.26	3.37	3.48	3.61
609.000	3.75	3.90	4.05	4.22	4.38
624.000	4.55	4.71	4.90	5.08	5.30
639.000	5.52	5.80	6.06	6.35	6.63
654.000	6.94	7.23	7.56	7.91	8.37
669.000	8.88	9.53	10.16	10.90	11.60
684.000	12.37	13.10	13.94	16.86	23.79
699.000	33.69	49.44	67.31	91.50	123.48
714.000	173.01	200.15	190.24	159.58	101.17
729.000	60.58	43.03	34.87	30.24	27.34
744.000	24.78	22.73	20.57	18.83	17.26
759.000	16.19	15.45	14.91	14.37	13.92
774.000	13.41	12.95	12.46	12.04	11.62
789.000	11.29	10.99	10.73	10.46	10.21
804.000	9.94	9.69	9.42	9.19	8.94

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: S1 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
819.000	8.74	8.53	8.35	8.16	7.98
834.000	7.78	7.61	7.41	7.25	7.11
849.000	7.00	6.91	6.84	6.77	6.71
864.000	6.64	6.58	6.52	6.46	6.38
879.000	6.32	6.26	6.20	6.12	6.06
894.000	6.00	5.94	5.86	5.80	5.74
909.000	5.68	5.60	5.54	5.48	5.42
924.000	5.34	5.28	5.21	5.15	5.08
939.000	5.01	4.95	4.89	4.81	4.75
954.000	4.69	4.63	4.55	4.49	4.44
969.000	4.41	4.37	4.35	4.32	4.30
984.000	4.28	4.25	4.23	4.21	4.18
999.000	4.16	4.14	4.12	4.09	4.07
1,014.000	4.04	4.02	4.00	3.97	3.95
1,029.000	3.93	3.90	3.88	3.86	3.84
1,044.000	3.81	3.79	3.76	3.74	3.71
1,059.000	3.69	3.67	3.65	3.62	3.60
1,074.000	3.57	3.55	3.53	3.50	3.48
1,089.000	3.46	3.43	3.41	3.39	3.36
1,104.000	3.34	3.31	3.29	3.27	3.24
1,119.000	3.22	3.20	3.17	3.15	3.12
1,134.000	3.10	3.08	3.05	3.03	3.00
1,149.000	2.98	2.96	2.93	2.91	2.89
1,164.000	2.86	2.84	2.81	2.79	2.76
1,179.000	2.74	2.72	2.70	2.67	2.64
1,194.000	2.62	2.60	2.57	2.55	2.54
1,209.000	2.53	2.51	2.51	2.51	2.50
1,224.000	2.49	2.49	2.49	2.48	2.48
1,239.000	2.47	2.47	2.46	2.46	2.45
1,254.000	2.45	2.45	2.44	2.43	2.43
1,269.000	2.43	2.42	2.41	2.41	2.41
1,284.000	2.40	2.40	2.39	2.39	2.38
1,299.000	2.38	2.38	2.37	2.36	2.36
1,314.000	2.36	2.35	2.35	2.34	2.34
1,329.000	2.33	2.33	2.32	2.32	2.32
1,344.000	2.31	2.30	2.30	2.30	2.29
1,359.000	2.28	2.28	2.28	2.27	2.26
1,374.000	2.26	2.26	2.25	2.25	2.24
1,389.000	2.24	2.23	2.23	2.23	2.22
1,404.000	2.21	2.21	2.21	2.20	2.19
1,419.000	2.19	2.19	2.18	2.18	2.17
1,434.000	2.17	2.17	2.17	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: S1 Storm Event: 100 YR
Scenario: Post-Development 100 YEAR

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	729.80	729.80	729.80	729.80	729.80
15.000	729.80	729.80	729.80	729.80	729.80
30.000	729.80	729.80	729.80	729.80	729.80
45.000	729.80	729.80	729.80	729.80	729.80
60.000	729.80	729.80	729.80	729.80	729.80
75.000	729.80	729.80	729.80	729.80	729.80
90.000	729.80	729.80	729.80	729.80	729.80
105.000	729.80	729.80	729.80	729.80	729.80
120.000	729.80	729.80	729.80	729.80	729.80
135.000	729.80	729.80	729.80	729.80	729.80
150.000	729.80	729.80	729.80	729.80	729.80
165.000	729.80	729.80	729.80	729.80	729.80
180.000	729.80	729.80	729.80	729.80	729.80
195.000	729.80	729.80	729.80	729.80	729.80
210.000	729.80	729.80	729.80	729.80	729.80
225.000	729.80	729.80	729.80	729.80	729.81
240.000	729.81	729.82	729.82	729.84	729.85
255.000	729.87	729.88	729.89	729.89	729.89
270.000	729.90	729.90	729.90	729.90	729.91
285.000	729.91	729.91	729.91	729.91	729.92
300.000	729.92	729.92	729.93	729.93	729.93
315.000	729.93	729.94	729.94	729.94	729.94
330.000	729.95	729.95	729.95	729.96	729.96
345.000	729.96	729.96	729.97	729.97	729.97
360.000	729.98	729.98	729.98	729.99	729.99
375.000	729.99	729.99	730.00	730.00	730.00
390.000	730.01	730.01	730.01	730.02	730.02
405.000	730.02	730.03	730.03	730.03	730.04
420.000	730.04	730.04	730.05	730.05	730.05
435.000	730.06	730.06	730.06	730.07	730.07
450.000	730.07	730.08	730.08	730.08	730.09
465.000	730.09	730.09	730.10	730.10	730.11
480.000	730.11	730.11	730.12	730.12	730.12
495.000	730.13	730.13	730.14	730.14	730.15
510.000	730.15	730.16	730.17	730.17	730.18
525.000	730.19	730.21	730.23	730.25	730.28
540.000	730.31	730.33	730.35	730.38	730.41
555.000	730.44	730.47	730.50	730.53	730.56
570.000	730.59	730.62	730.64	730.67	730.71
585.000	730.74	730.78	730.81	730.83	730.85

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
600.000	730.88	730.91	730.95	731.00	731.05
615.000	731.11	731.18	731.25	731.31	731.33
630.000	731.35	731.38	731.41	731.45	731.49
645.000	731.53	731.58	731.63	731.69	731.76
660.000	731.81	731.85	731.89	731.93	731.98
675.000	732.04	732.10	732.17	732.25	732.32
690.000	732.38	732.45	732.55	732.68	732.86
705.000	733.07	733.33	733.59	733.88	734.16
720.000	734.38	734.52	734.58	734.56	734.52
735.000	734.48	734.45	734.44	734.43	734.42
750.000	734.41	734.40	734.38	734.36	734.34
765.000	734.31	734.28	734.24	734.20	734.17
780.000	734.13	734.09	734.05	734.02	733.99
795.000	733.96	733.93	733.91	733.88	733.86
810.000	733.84	733.82	733.81	733.79	733.77
825.000	733.75	733.73	733.71	733.70	733.68
840.000	733.66	733.65	733.64	733.62	733.61
855.000	733.60	733.59	733.58	733.57	733.56
870.000	733.55	733.55	733.54	733.53	733.53
885.000	733.52	733.52	733.51	733.51	733.50
900.000	733.50	733.49	733.49	733.48	733.48
915.000	733.48	733.47	733.47	733.47	733.47
930.000	733.46	733.46	733.46	733.45	733.45
945.000	733.45	733.45	733.44	733.44	733.44
960.000	733.44	733.43	733.43	733.43	733.43
975.000	733.43	733.42	733.42	733.42	733.42
990.000	733.42	733.41	733.41	733.41	733.41
1,005.000	733.41	733.41	733.41	733.40	733.40
1,020.000	733.40	733.40	733.40	733.40	733.40
1,035.000	733.40	733.40	733.40	733.39	733.39
1,050.000	733.39	733.39	733.39	733.39	733.39
1,065.000	733.39	733.39	733.39	733.39	733.38
1,080.000	733.38	733.38	733.38	733.38	733.38
1,095.000	733.38	733.38	733.38	733.38	733.38
1,110.000	733.38	733.37	733.37	733.37	733.37
1,125.000	733.37	733.37	733.37	733.37	733.37
1,140.000	733.37	733.37	733.37	733.36	733.36
1,155.000	733.36	733.36	733.36	733.36	733.36
1,170.000	733.36	733.36	733.36	733.36	733.36
1,185.000	733.35	733.35	733.35	733.35	733.35
1,200.000	733.35	733.35	733.35	733.35	733.35

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,215.000	733.35	733.35	733.34	733.34	733.34
1,230.000	733.34	733.34	733.34	733.34	733.34
1,245.000	733.34	733.34	733.34	733.34	733.34
1,260.000	733.34	733.34	733.34	733.34	733.34
1,275.000	733.34	733.34	733.34	733.34	733.34
1,290.000	733.34	733.34	733.34	733.34	733.34
1,305.000	733.34	733.33	733.33	733.33	733.33
1,320.000	733.33	733.33	733.33	733.33	733.33
1,335.000	733.33	733.33	733.33	733.33	733.33
1,350.000	733.33	733.33	733.33	733.33	733.33
1,365.000	733.33	733.33	733.33	733.33	733.33
1,380.000	733.33	733.33	733.33	733.33	733.33
1,395.000	733.33	733.33	733.33	733.33	733.33
1,410.000	733.33	733.33	733.33	733.33	733.33
1,425.000	733.33	733.33	733.33	733.33	733.33
1,440.000	733.33	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	729.80	729.80	729.80	729.80	729.80
15.000	729.80	729.80	729.80	729.80	729.80
30.000	729.80	729.80	729.80	729.80	729.80
45.000	729.80	729.80	729.80	729.80	729.80
60.000	729.80	729.80	729.80	729.80	729.80
75.000	729.80	729.80	729.80	729.80	729.80
90.000	729.80	729.80	729.80	729.80	729.80
105.000	729.80	729.80	729.80	729.80	729.80
120.000	729.80	729.80	729.80	729.80	729.80
135.000	729.80	729.80	729.80	729.80	729.80
150.000	729.80	729.80	729.80	729.80	729.80
165.000	729.80	729.80	729.80	729.80	729.81
180.000	729.81	729.82	729.84	729.85	729.88
195.000	729.89	729.89	729.90	729.90	729.90
210.000	729.91	729.91	729.91	729.92	729.92
225.000	729.93	729.93	729.93	729.94	729.94
240.000	729.94	729.95	729.95	729.96	729.96
255.000	729.96	729.97	729.97	729.98	729.98
270.000	729.98	729.99	729.99	730.00	730.00
285.000	730.01	730.01	730.02	730.02	730.02
300.000	730.03	730.03	730.04	730.04	730.05
315.000	730.05	730.06	730.06	730.07	730.07
330.000	730.08	730.08	730.09	730.09	730.09
345.000	730.10	730.10	730.11	730.11	730.12
360.000	730.12	730.13	730.13	730.14	730.14
375.000	730.15	730.15	730.16	730.16	730.17
390.000	730.17	730.18	730.19	730.19	730.20
405.000	730.20	730.21	730.21	730.22	730.23
420.000	730.25	730.27	730.29	730.31	730.32
435.000	730.34	730.36	730.39	730.41	730.43
450.000	730.46	730.48	730.50	730.53	730.55
465.000	730.58	730.61	730.63	730.66	730.68
480.000	730.71	730.74	730.76	730.79	730.81
495.000	730.83	730.85	730.87	730.90	730.94
510.000	730.98	731.02	731.07	731.12	731.18
525.000	731.24	731.30	731.32	731.34	731.36
540.000	731.38	731.41	731.44	731.47	731.50
555.000	731.53	731.57	731.61	731.65	731.69
570.000	731.74	731.78	731.81	731.84	731.86
585.000	731.89	731.92	731.95	731.98	732.02

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
600.000	732.05	732.09	732.14	732.18	732.23
615.000	732.28	732.33	732.36	732.40	732.45
630.000	732.49	732.54	732.59	732.64	732.70
645.000	732.76	732.82	732.87	732.92	732.98
660.000	733.04	733.10	733.17	733.24	733.31
675.000	733.36	733.40	733.44	733.47	733.50
690.000	733.53	733.57	733.62	733.69	733.81
705.000	733.94	734.10	734.33	734.59	734.91
720.000	735.20	735.43	735.56	735.61	735.62
735.000	735.62	735.63	735.65	735.66	735.68
750.000	735.69	735.70	735.69	735.68	735.65
765.000	735.61	735.56	735.51	735.44	735.36
780.000	735.27	735.16	735.04	734.93	734.81
795.000	734.68	734.56	734.47	734.38	734.31
810.000	734.23	734.17	734.12	734.07	734.04
825.000	734.00	733.98	733.95	733.93	733.91
840.000	733.89	733.87	733.86	733.84	733.83
855.000	733.82	733.81	733.80	733.78	733.77
870.000	733.76	733.75	733.74	733.73	733.72
885.000	733.71	733.70	733.69	733.68	733.67
900.000	733.66	733.66	733.65	733.64	733.64
915.000	733.63	733.63	733.62	733.61	733.61
930.000	733.60	733.60	733.60	733.59	733.59
945.000	733.58	733.58	733.57	733.57	733.57
960.000	733.56	733.56	733.55	733.55	733.55
975.000	733.54	733.54	733.54	733.53	733.53
990.000	733.53	733.52	733.52	733.52	733.52
1,005.000	733.51	733.51	733.51	733.51	733.51
1,020.000	733.50	733.50	733.50	733.50	733.50
1,035.000	733.49	733.49	733.49	733.49	733.49
1,050.000	733.49	733.48	733.48	733.48	733.48
1,065.000	733.48	733.48	733.48	733.47	733.47
1,080.000	733.47	733.47	733.47	733.47	733.47
1,095.000	733.46	733.46	733.46	733.46	733.46
1,110.000	733.46	733.46	733.45	733.45	733.45
1,125.000	733.45	733.45	733.45	733.45	733.44
1,140.000	733.44	733.44	733.44	733.44	733.44
1,155.000	733.44	733.44	733.43	733.43	733.43
1,170.000	733.43	733.43	733.43	733.43	733.42
1,185.000	733.42	733.42	733.42	733.42	733.42
1,200.000	733.42	733.41	733.41	733.41	733.41

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,215.000	733.41	733.41	733.41	733.41	733.40
1,230.000	733.40	733.40	733.40	733.40	733.40
1,245.000	733.40	733.40	733.40	733.40	733.40
1,260.000	733.40	733.40	733.40	733.39	733.39
1,275.000	733.39	733.39	733.39	733.39	733.39
1,290.000	733.39	733.39	733.39	733.39	733.39
1,305.000	733.39	733.39	733.39	733.39	733.39
1,320.000	733.39	733.39	733.39	733.39	733.39
1,335.000	733.39	733.39	733.39	733.39	733.39
1,350.000	733.39	733.39	733.39	733.39	733.38
1,365.000	733.38	733.38	733.38	733.38	733.38
1,380.000	733.38	733.38	733.38	733.38	733.38
1,395.000	733.38	733.38	733.38	733.38	733.38
1,410.000	733.38	733.38	733.38	733.38	733.38
1,425.000	733.38	733.38	733.38	733.38	733.38
1,440.000	733.38	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	729.80	729.80	729.80	729.80	729.80
15.000	729.80	729.80	729.80	729.80	729.80
30.000	729.80	729.80	729.80	729.80	729.80
45.000	729.80	729.80	729.80	729.80	729.80
60.000	729.80	729.80	729.80	729.80	729.80
75.000	729.80	729.80	729.80	729.80	729.80
90.000	729.80	729.80	729.80	729.80	729.80
105.000	729.80	729.80	729.80	729.80	729.80
120.000	729.80	729.80	729.80	729.80	729.80
135.000	729.81	729.81	729.83	729.84	729.86
150.000	729.88	729.89	729.90	729.90	729.91
165.000	729.91	729.92	729.93	729.93	729.94
180.000	729.94	729.95	729.96	729.96	729.97
195.000	729.97	729.98	729.99	729.99	730.00
210.000	730.01	730.01	730.02	730.03	730.03
225.000	730.04	730.04	730.05	730.06	730.06
240.000	730.07	730.07	730.08	730.09	730.09
255.000	730.10	730.11	730.11	730.12	730.12
270.000	730.13	730.14	730.14	730.15	730.16
285.000	730.16	730.17	730.18	730.18	730.19
300.000	730.20	730.20	730.21	730.22	730.22
315.000	730.23	730.24	730.25	730.25	730.26
330.000	730.27	730.29	730.31	730.33	730.35
345.000	730.38	730.41	730.44	730.47	730.50
360.000	730.54	730.57	730.60	730.64	730.67
375.000	730.71	730.74	730.78	730.81	730.82
390.000	730.84	730.87	730.89	730.92	730.96
405.000	730.99	731.03	731.07	731.12	731.16
420.000	731.21	731.26	731.30	731.32	731.33
435.000	731.35	731.37	731.38	731.41	731.43
450.000	731.45	731.47	731.50	731.53	731.56
465.000	731.59	731.62	731.66	731.70	731.73
480.000	731.78	731.81	731.83	731.85	731.87
495.000	731.90	731.92	731.95	731.98	732.02
510.000	732.05	732.09	732.13	732.17	732.21
525.000	732.26	732.31	732.34	732.37	732.41
540.000	732.45	732.49	732.53	732.57	732.62
555.000	732.66	732.71	732.76	732.81	732.85
570.000	732.89	732.93	732.97	733.01	733.05
585.000	733.10	733.14	733.19	733.24	733.29

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
600.000	733.32	733.35	733.38	733.40	733.41
615.000	733.43	733.44	733.45	733.46	733.48
630.000	733.49	733.50	733.51	733.52	733.53
645.000	733.54	733.56	733.57	733.59	733.60
660.000	733.62	733.63	733.65	733.67	733.69
675.000	733.71	733.74	733.77	733.80	733.82
690.000	733.85	733.88	733.93	734.02	734.15
705.000	734.34	734.55	734.85	735.24	735.70
720.000	736.12	736.47	736.70	736.84	736.92
735.000	737.00	737.08	737.16	737.25	737.33
750.000	737.40	737.46	737.51	737.55	737.57
765.000	737.58	737.58	737.56	737.53	737.49
780.000	737.43	737.36	737.28	737.19	737.09
795.000	736.99	736.88	736.76	736.63	736.50
810.000	736.37	736.23	736.07	735.92	735.77
825.000	735.60	735.44	735.28	735.10	734.93
840.000	734.76	734.59	734.46	734.35	734.25
855.000	734.17	734.10	734.05	734.01	733.98
870.000	733.96	733.94	733.92	733.91	733.89
885.000	733.88	733.87	733.86	733.85	733.85
900.000	733.84	733.83	733.83	733.82	733.81
915.000	733.81	733.80	733.80	733.79	733.78
930.000	733.78	733.77	733.77	733.76	733.75
945.000	733.75	733.74	733.73	733.73	733.72
960.000	733.72	733.71	733.70	733.70	733.69
975.000	733.69	733.68	733.68	733.67	733.67
990.000	733.66	733.66	733.66	733.65	733.65
1,005.000	733.64	733.64	733.64	733.63	733.63
1,020.000	733.63	733.63	733.62	733.62	733.62
1,035.000	733.61	733.61	733.61	733.61	733.60
1,050.000	733.60	733.60	733.60	733.59	733.59
1,065.000	733.59	733.59	733.59	733.58	733.58
1,080.000	733.58	733.58	733.58	733.57	733.57
1,095.000	733.57	733.57	733.57	733.56	733.56
1,110.000	733.56	733.56	733.55	733.55	733.55
1,125.000	733.55	733.55	733.54	733.54	733.54
1,140.000	733.54	733.54	733.53	733.53	733.53
1,155.000	733.53	733.53	733.52	733.52	733.52
1,170.000	733.52	733.52	733.51	733.51	733.51
1,185.000	733.51	733.51	733.50	733.50	733.50
1,200.000	733.50	733.49	733.49	733.49	733.49

Post-Developed Watershed Calculations

Subsection: Time vs. Elevation
Label: EXISTING DRY BASIN (OUT)
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,215.000	733.49	733.49	733.48	733.48	733.48
1,230.000	733.48	733.48	733.48	733.48	733.47
1,245.000	733.47	733.47	733.47	733.47	733.47
1,260.000	733.47	733.47	733.47	733.47	733.46
1,275.000	733.46	733.46	733.46	733.46	733.46
1,290.000	733.46	733.46	733.46	733.46	733.46
1,305.000	733.46	733.46	733.46	733.46	733.46
1,320.000	733.46	733.46	733.46	733.45	733.45
1,335.000	733.45	733.45	733.45	733.45	733.45
1,350.000	733.45	733.45	733.45	733.45	733.45
1,365.000	733.45	733.45	733.45	733.45	733.45
1,380.000	733.45	733.45	733.45	733.45	733.45
1,395.000	733.45	733.45	733.45	733.44	733.44
1,410.000	733.44	733.44	733.44	733.44	733.44
1,425.000	733.44	733.44	733.44	733.44	733.44
1,440.000	733.44	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
15.000	0.000	0.000	0.000	0.000	0.000
30.000	0.000	0.000	0.000	0.000	0.000
45.000	0.000	0.000	0.000	0.000	0.000
60.000	0.000	0.000	0.000	0.000	0.000
75.000	0.000	0.000	0.000	0.000	0.000
90.000	0.000	0.000	0.000	0.000	0.000
105.000	0.000	0.000	0.000	0.000	0.000
120.000	0.000	0.000	0.000	0.000	0.000
135.000	0.000	0.000	0.000	0.000	0.000
150.000	0.000	0.000	0.000	0.000	0.000
165.000	0.000	0.000	0.000	0.000	0.000
180.000	0.000	0.000	0.000	0.000	0.000
195.000	0.000	0.000	0.000	0.000	0.000
210.000	0.000	0.000	0.000	0.000	0.000
225.000	0.000	0.000	0.000	0.000	0.000
240.000	0.000	0.000	0.000	0.000	0.000
255.000	0.000	0.000	0.000	0.000	0.000
270.000	0.000	0.000	0.000	0.000	0.000
285.000	0.000	0.000	0.000	0.000	0.000
300.000	0.000	0.000	0.000	0.000	0.000
315.000	0.000	0.000	0.000	0.000	0.000
330.000	0.000	0.000	0.000	0.000	0.000
345.000	0.000	0.000	0.000	0.000	0.000
360.000	0.000	0.000	0.000	0.000	0.000
375.000	0.000	0.000	0.000	0.000	0.000
390.000	0.000	0.000	0.000	0.000	0.000
405.000	0.000	0.000	0.000	0.000	0.000
420.000	0.000	0.000	0.000	0.000	0.000
435.000	0.000	0.000	0.000	0.000	0.000
450.000	0.000	0.000	0.000	0.000	0.000
465.000	0.001	0.001	0.001	0.001	0.001
480.000	0.001	0.001	0.001	0.001	0.001
495.000	0.001	0.001	0.001	0.001	0.001
510.000	0.001	0.001	0.001	0.001	0.001
525.000	0.001	0.001	0.001	0.001	0.001
540.000	0.001	0.001	0.001	0.002	0.002
555.000	0.002	0.002	0.002	0.002	0.002
570.000	0.003	0.003	0.003	0.003	0.003
585.000	0.004	0.004	0.004	0.004	0.005

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
600.000	0.005	0.005	0.006	0.006	0.007
615.000	0.008	0.009	0.011	0.013	0.014
630.000	0.015	0.017	0.018	0.020	0.022
645.000	0.025	0.029	0.034	0.039	0.046
660.000	0.052	0.057	0.062	0.069	0.076
675.000	0.085	0.097	0.110	0.125	0.141
690.000	0.155	0.172	0.197	0.237	0.294
705.000	0.371	0.487	0.618	0.791	0.979
720.000	1.151	1.267	1.317	1.302	1.265
735.000	1.233	1.211	1.198	1.189	1.183
750.000	1.176	1.166	1.153	1.137	1.119
765.000	1.098	1.072	1.043	1.013	0.984
780.000	0.956	0.929	0.904	0.880	0.859
795.000	0.839	0.821	0.805	0.790	0.777
810.000	0.765	0.753	0.743	0.732	0.720
825.000	0.708	0.697	0.686	0.676	0.667
840.000	0.658	0.650	0.642	0.635	0.628
855.000	0.622	0.616	0.611	0.606	0.601
870.000	0.597	0.593	0.590	0.586	0.583
885.000	0.580	0.577	0.574	0.572	0.569
900.000	0.567	0.565	0.563	0.561	0.559
915.000	0.557	0.556	0.554	0.552	0.551
930.000	0.549	0.548	0.547	0.545	0.544
945.000	0.543	0.542	0.540	0.539	0.538
960.000	0.537	0.536	0.534	0.533	0.532
975.000	0.531	0.530	0.529	0.528	0.527
990.000	0.527	0.526	0.525	0.524	0.524
1,005.000	0.523	0.522	0.521	0.521	0.520
1,020.000	0.520	0.519	0.519	0.518	0.517
1,035.000	0.517	0.517	0.516	0.516	0.515
1,050.000	0.515	0.514	0.514	0.513	0.513
1,065.000	0.513	0.512	0.512	0.511	0.511
1,080.000	0.510	0.510	0.510	0.509	0.509
1,095.000	0.508	0.508	0.508	0.507	0.507
1,110.000	0.506	0.506	0.506	0.505	0.505
1,125.000	0.504	0.504	0.504	0.503	0.503
1,140.000	0.502	0.502	0.502	0.501	0.501
1,155.000	0.500	0.500	0.500	0.499	0.499
1,170.000	0.498	0.498	0.498	0.497	0.497
1,185.000	0.496	0.496	0.496	0.495	0.495
1,200.000	0.494	0.494	0.494	0.493	0.493

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,215.000	0.493	0.492	0.492	0.492	0.491
1,230.000	0.491	0.491	0.491	0.490	0.490
1,245.000	0.490	0.490	0.489	0.489	0.489
1,260.000	0.489	0.489	0.489	0.488	0.488
1,275.000	0.488	0.488	0.488	0.488	0.488
1,290.000	0.488	0.488	0.487	0.487	0.487
1,305.000	0.487	0.487	0.487	0.487	0.487
1,320.000	0.487	0.487	0.487	0.487	0.486
1,335.000	0.486	0.486	0.486	0.486	0.486
1,350.000	0.486	0.486	0.486	0.486	0.486
1,365.000	0.486	0.486	0.485	0.485	0.485
1,380.000	0.485	0.485	0.485	0.485	0.485
1,395.000	0.485	0.485	0.485	0.485	0.485
1,410.000	0.484	0.484	0.484	0.484	0.484
1,425.000	0.484	0.484	0.484	0.484	0.484
1,440.000	0.484	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
15.000	0.000	0.000	0.000	0.000	0.000
30.000	0.000	0.000	0.000	0.000	0.000
45.000	0.000	0.000	0.000	0.000	0.000
60.000	0.000	0.000	0.000	0.000	0.000
75.000	0.000	0.000	0.000	0.000	0.000
90.000	0.000	0.000	0.000	0.000	0.000
105.000	0.000	0.000	0.000	0.000	0.000
120.000	0.000	0.000	0.000	0.000	0.000
135.000	0.000	0.000	0.000	0.000	0.000
150.000	0.000	0.000	0.000	0.000	0.000
165.000	0.000	0.000	0.000	0.000	0.000
180.000	0.000	0.000	0.000	0.000	0.000
195.000	0.000	0.000	0.000	0.000	0.000
210.000	0.000	0.000	0.000	0.000	0.000
225.000	0.000	0.000	0.000	0.000	0.000
240.000	0.000	0.000	0.000	0.000	0.000
255.000	0.000	0.000	0.000	0.000	0.000
270.000	0.000	0.000	0.000	0.000	0.000
285.000	0.000	0.000	0.000	0.000	0.000
300.000	0.000	0.000	0.000	0.000	0.000
315.000	0.000	0.000	0.000	0.000	0.000
330.000	0.000	0.000	0.000	0.001	0.001
345.000	0.001	0.001	0.001	0.001	0.001
360.000	0.001	0.001	0.001	0.001	0.001
375.000	0.001	0.001	0.001	0.001	0.001
390.000	0.001	0.001	0.001	0.001	0.001
405.000	0.001	0.001	0.001	0.001	0.001
420.000	0.001	0.001	0.001	0.001	0.001
435.000	0.001	0.001	0.002	0.002	0.002
450.000	0.002	0.002	0.002	0.002	0.002
465.000	0.003	0.003	0.003	0.003	0.003
480.000	0.003	0.004	0.004	0.004	0.004
495.000	0.004	0.005	0.005	0.005	0.006
510.000	0.006	0.006	0.007	0.008	0.009
525.000	0.011	0.013	0.014	0.015	0.016
540.000	0.017	0.018	0.020	0.021	0.023
555.000	0.026	0.028	0.031	0.035	0.039
570.000	0.043	0.049	0.052	0.055	0.058
585.000	0.062	0.066	0.071	0.076	0.082

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
600.000	0.088	0.095	0.103	0.112	0.122
615.000	0.133	0.142	0.151	0.160	0.171
630.000	0.182	0.195	0.209	0.225	0.242
645.000	0.262	0.280	0.297	0.316	0.337
660.000	0.360	0.385	0.413	0.445	0.474
675.000	0.497	0.518	0.537	0.554	0.570
690.000	0.586	0.604	0.631	0.674	0.744
705.000	0.824	0.940	1.107	1.329	1.635
720.000	1.951	2.222	2.390	2.453	2.466
735.000	2.472	2.486	2.505	2.529	2.552
750.000	2.568	2.573	2.567	2.545	2.510
765.000	2.461	2.397	2.321	2.235	2.138
780.000	2.028	1.903	1.778	1.655	1.537
795.000	1.411	1.307	1.223	1.153	1.095
810.000	1.036	0.988	0.950	0.919	0.892
825.000	0.870	0.851	0.834	0.820	0.806
840.000	0.795	0.784	0.774	0.765	0.757
855.000	0.750	0.743	0.737	0.729	0.721
870.000	0.714	0.707	0.701	0.694	0.688
885.000	0.683	0.677	0.672	0.667	0.663
900.000	0.659	0.655	0.651	0.647	0.643
915.000	0.640	0.637	0.633	0.630	0.628
930.000	0.625	0.622	0.620	0.617	0.615
945.000	0.613	0.610	0.608	0.606	0.604
960.000	0.601	0.599	0.597	0.595	0.593
975.000	0.591	0.590	0.588	0.586	0.585
990.000	0.583	0.582	0.580	0.579	0.577
1,005.000	0.576	0.575	0.574	0.573	0.572
1,020.000	0.571	0.570	0.569	0.568	0.567
1,035.000	0.566	0.565	0.564	0.563	0.562
1,050.000	0.562	0.561	0.560	0.559	0.558
1,065.000	0.558	0.557	0.556	0.556	0.555
1,080.000	0.554	0.553	0.553	0.552	0.551
1,095.000	0.551	0.550	0.549	0.548	0.548
1,110.000	0.547	0.546	0.546	0.545	0.544
1,125.000	0.544	0.543	0.542	0.541	0.541
1,140.000	0.540	0.539	0.539	0.538	0.537
1,155.000	0.537	0.536	0.535	0.535	0.534
1,170.000	0.533	0.532	0.532	0.531	0.530
1,185.000	0.530	0.529	0.528	0.528	0.527
1,200.000	0.526	0.526	0.525	0.524	0.524

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 10 YEAR

Return Event: 10 years
Storm Event: 10 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,215.000	0.523	0.522	0.522	0.521	0.521
1,230.000	0.520	0.520	0.519	0.519	0.519
1,245.000	0.518	0.518	0.518	0.517	0.517
1,260.000	0.517	0.516	0.516	0.516	0.516
1,275.000	0.515	0.515	0.515	0.515	0.515
1,290.000	0.515	0.514	0.514	0.514	0.514
1,305.000	0.514	0.514	0.513	0.513	0.513
1,320.000	0.513	0.513	0.513	0.513	0.512
1,335.000	0.512	0.512	0.512	0.512	0.512
1,350.000	0.512	0.511	0.511	0.511	0.511
1,365.000	0.511	0.511	0.511	0.511	0.510
1,380.000	0.510	0.510	0.510	0.510	0.510
1,395.000	0.510	0.509	0.509	0.509	0.509
1,410.000	0.509	0.509	0.509	0.509	0.508
1,425.000	0.508	0.508	0.508	0.508	0.508
1,440.000	0.508	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
15.000	0.000	0.000	0.000	0.000	0.000
30.000	0.000	0.000	0.000	0.000	0.000
45.000	0.000	0.000	0.000	0.000	0.000
60.000	0.000	0.000	0.000	0.000	0.000
75.000	0.000	0.000	0.000	0.000	0.000
90.000	0.000	0.000	0.000	0.000	0.000
105.000	0.000	0.000	0.000	0.000	0.000
120.000	0.000	0.000	0.000	0.000	0.000
135.000	0.000	0.000	0.000	0.000	0.000
150.000	0.000	0.000	0.000	0.000	0.000
165.000	0.000	0.000	0.000	0.000	0.000
180.000	0.000	0.000	0.000	0.000	0.000
195.000	0.000	0.000	0.000	0.000	0.000
210.000	0.000	0.000	0.000	0.000	0.000
225.000	0.000	0.000	0.000	0.000	0.000
240.000	0.000	0.000	0.000	0.000	0.001
255.000	0.001	0.001	0.001	0.001	0.001
270.000	0.001	0.001	0.001	0.001	0.001
285.000	0.001	0.001	0.001	0.001	0.001
300.000	0.001	0.001	0.001	0.001	0.001
315.000	0.001	0.001	0.001	0.001	0.001
330.000	0.001	0.001	0.001	0.001	0.001
345.000	0.001	0.002	0.002	0.002	0.002
360.000	0.002	0.003	0.003	0.003	0.003
375.000	0.003	0.004	0.004	0.004	0.004
390.000	0.005	0.005	0.005	0.005	0.006
405.000	0.006	0.007	0.007	0.008	0.009
420.000	0.010	0.012	0.013	0.014	0.014
435.000	0.015	0.016	0.017	0.018	0.019
450.000	0.020	0.022	0.023	0.025	0.027
465.000	0.030	0.033	0.036	0.039	0.043
480.000	0.048	0.052	0.054	0.057	0.060
495.000	0.063	0.067	0.072	0.076	0.082
510.000	0.088	0.094	0.101	0.109	0.118
525.000	0.128	0.138	0.145	0.153	0.162
540.000	0.171	0.181	0.192	0.204	0.217
555.000	0.231	0.245	0.261	0.277	0.289
570.000	0.303	0.317	0.332	0.348	0.365
585.000	0.383	0.403	0.423	0.446	0.466

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
600.000	0.482	0.495	0.507	0.516	0.524
615.000	0.532	0.538	0.545	0.551	0.556
630.000	0.562	0.568	0.573	0.579	0.586
645.000	0.592	0.599	0.607	0.614	0.623
660.000	0.631	0.640	0.650	0.661	0.674
675.000	0.687	0.703	0.719	0.738	0.752
690.000	0.768	0.787	0.820	0.878	0.973
705.000	1.115	1.299	1.580	2.000	2.574
720.000	3.189	3.742	4.147	4.388	4.542
735.000	4.687	4.842	5.007	5.177	5.339
750.000	5.481	5.607	5.711	5.789	5.840
765.000	5.863	5.856	5.819	5.753	5.660
780.000	5.543	5.405	5.248	5.065	4.872
795.000	4.671	4.466	4.253	4.023	3.797
810.000	3.576	3.348	3.114	2.891	2.676
825.000	2.449	2.240	2.044	1.839	1.656
840.000	1.490	1.333	1.215	1.125	1.049
855.000	0.985	0.938	0.903	0.876	0.856
870.000	0.839	0.825	0.814	0.805	0.796
885.000	0.789	0.783	0.777	0.772	0.767
900.000	0.763	0.758	0.754	0.751	0.747
915.000	0.744	0.740	0.737	0.733	0.729
930.000	0.725	0.721	0.718	0.714	0.710
945.000	0.706	0.703	0.699	0.695	0.692
960.000	0.688	0.685	0.681	0.678	0.675
975.000	0.672	0.669	0.666	0.663	0.661
990.000	0.658	0.656	0.654	0.651	0.649
1,005.000	0.647	0.645	0.643	0.641	0.640
1,020.000	0.638	0.636	0.635	0.633	0.632
1,035.000	0.630	0.629	0.627	0.626	0.625
1,050.000	0.623	0.622	0.621	0.620	0.618
1,065.000	0.617	0.616	0.615	0.614	0.612
1,080.000	0.611	0.610	0.609	0.608	0.607
1,095.000	0.606	0.604	0.603	0.602	0.601
1,110.000	0.600	0.599	0.598	0.597	0.596
1,125.000	0.594	0.593	0.592	0.591	0.590
1,140.000	0.589	0.588	0.587	0.586	0.585
1,155.000	0.584	0.582	0.581	0.580	0.579
1,170.000	0.578	0.577	0.576	0.575	0.574
1,185.000	0.573	0.572	0.571	0.569	0.568
1,200.000	0.567	0.566	0.565	0.564	0.563

Post-Developed Watershed Calculations

Subsection: Time vs. Volume
Label: EXISTING DRY BASIN
Scenario: Post-Development 100 YEAR

Return Event: 100 years
Storm Event: 100 YR

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,215.000	0.562	0.561	0.560	0.560	0.559
1,230.000	0.558	0.557	0.557	0.556	0.555
1,245.000	0.555	0.554	0.554	0.553	0.553
1,260.000	0.552	0.552	0.552	0.551	0.551
1,275.000	0.550	0.550	0.550	0.550	0.549
1,290.000	0.549	0.549	0.548	0.548	0.548
1,305.000	0.548	0.547	0.547	0.547	0.547
1,320.000	0.546	0.546	0.546	0.546	0.546
1,335.000	0.545	0.545	0.545	0.545	0.545
1,350.000	0.544	0.544	0.544	0.544	0.543
1,365.000	0.543	0.543	0.543	0.543	0.542
1,380.000	0.542	0.542	0.542	0.542	0.541
1,395.000	0.541	0.541	0.541	0.541	0.540
1,410.000	0.540	0.540	0.540	0.540	0.539
1,425.000	0.539	0.539	0.539	0.539	0.538
1,440.000	0.538	(N/A)	(N/A)	(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Elevation-Area Volume Curve
Label: EXISTING DRY BASIN
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Elevation (ft)	Planimeter (ft^2)	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
729.80	0.0	0.001	0.000	0.000	0.000
730.00	0.0	0.002	0.004	0.000	0.000
731.00	0.0	0.011	0.018	0.006	0.006
732.00	0.0	0.165	0.218	0.073	0.079
733.00	0.0	0.381	0.797	0.266	0.345
734.00	0.0	0.678	1.568	0.523	0.867
735.00	0.0	1.065	2.593	0.864	1.732
736.00	0.0	1.487	3.810	1.270	3.002
737.00	0.0	1.904	5.073	1.691	4.693
738.00	0.0	2.267	6.249	2.083	6.776
739.00	0.0	3.006	7.883	2.628	9.404

Post-Developed Watershed Calculations

Subsection: Outlet Input Data
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Requested Pond Water Surface Elevations	
Minimum (Headwater)	729.80 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	739.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Inlet Box	PARALLEL ORIFICE	Forward	BOX CULVERT	733.25	739.00
Culvert-Circular	5 IN PVC	Forward	BOX CULVERT	729.88	739.00
Culvert-Box	BOX CULVERT	Forward	TW	728.47	739.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Post-Developed Watershed Calculations

Subsection: Outlet Input Data
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Structure ID: BOX CULVERT Structure Type: Culvert-Box	
Number of Barrels	1
Width	5.00 ft
Height	3.00 ft
Length	817.00 ft
Length (Computed Barrel)	817.00 ft
Slope (Computed)	0.003 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.005
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.141
T2 ratio (HW/D)	1.196
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	731.89 ft	T1 Flow	90.93 ft³/s
T2 Elevation	732.06 ft	T2 Flow	103.92 ft³/s

Post-Developed Watershed Calculations

Subsection: Outlet Input Data
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Structure ID: PARALLEL ORIFICE Structure Type: Inlet Box	
Number of Openings	1
Elevation	733.25 ft
Orifice Area	12.0 ft²
Orifice Coefficient	0.600
Weir Length	14.00 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Structure ID: 5 IN PVC Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	5.0 in
Length	2.00 ft
Length (Computed Barrel)	2.00 ft
Slope (Computed)	0.005 ft/ft

Outlet Control Data	
Manning's n	0.010
Ke	0.200
Kb	0.059
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	0.000
T2 ratio (HW/D)	1.195
Slope Correction Factor	-0.500

Post-Developed Watershed Calculations

Subsection: Outlet Input Data
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	729.88 ft	T1 Flow	0.31 ft³/s
T2 Elevation	730.38 ft	T2 Flow	0.35 ft³/s

Post-Developed Watershed Calculations

Subsection: Outlet Input Data
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Post-Developed Watershed Calculations

Subsection: Composite Rating Curve
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
729.80	0.00	(N/A)	0.00
729.88	0.00	(N/A)	0.00
730.30	0.27	(N/A)	0.00
730.80	0.61	(N/A)	0.00
731.30	0.82	(N/A)	0.00
731.80	0.98	(N/A)	0.00
732.30	1.12	(N/A)	0.00
732.80	1.24	(N/A)	0.00
733.25	1.35	(N/A)	0.00
733.30	1.83	(N/A)	0.00
733.80	18.59	(N/A)	0.00
734.30	46.78	(N/A)	0.00
734.80	73.57	(N/A)	0.00
735.30	84.44	(N/A)	0.00
735.80	94.08	(N/A)	0.00
736.30	102.75	(N/A)	0.00
736.80	110.79	(N/A)	0.00
737.30	118.28	(N/A)	0.00
737.80	124.92	(N/A)	0.00
738.30	131.43	(N/A)	0.00
738.80	137.64	(N/A)	0.00
739.00	140.05	(N/A)	0.00

Contributing Structures

(no Q: PARALLEL ORIFICE,5 IN PVC,BOX CULVERT)
(no Q: PARALLEL ORIFICE,5 IN PVC,BOX CULVERT)
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)

Post-Developed Watershed Calculations

Subsection: Composite Rating Curve
Label: Dry Basin Out
Scenario: Post-Development 2 YEAR

Return Event: 2 years
Storm Event: 2 YR

Composite Outflow Summary

Contributing Structures
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)
5 IN PVC,BOX CULVERT (no Q: PARALLEL ORIFICE)
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT
PARALLEL ORIFICE,5 IN PVC,BOX CULVERT

Post-Developed Watershed Calculations

Index

0

01 (Runoff CN-Area, 2 years (Post-Development 2 YEAR))...9

01 (Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR))...20, 21

01 (Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR))...24, 25

01 (Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR))...16, 17

01 (Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR))...18, 19

01 (Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR))...22, 23

01 (Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR))...14, 15

02 (Runoff CN-Area, 2 years (Post-Development 2 YEAR))...10

02 (Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR))...33, 34, 35

02 (Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR))...38, 39, 40

02 (Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR))...28, 29, 30

02 (Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR))...31, 32

02 (Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR))...36, 37

02 (Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR))...26, 27

03 (Runoff CN-Area, 2 years (Post-Development 2 YEAR))...11

03 (Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR))...47, 48

03 (Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR))...51, 52

03 (Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR))...43, 44

03 (Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR))...45, 46

03 (Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR))...49, 50

03 (Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR))...41, 42

07 (Runoff CN-Area, 2 years (Post-Development 2 YEAR))...12

07 (Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR))...59, 60

07 (Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR))...63, 64

07 (Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR))...55, 56

07 (Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR))...57, 58

07 (Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR))...61, 62

07 (Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR))...53, 54

D

Dry Basin Out (Composite Rating Curve, 2 years (Post-Development 2 YEAR))...102, 103
Dry Basin Out (Outlet Input Data, 2 years (Post-Development 2 YEAR))...97, 98, 99, 100, 101

E

EXISTING DRY BASIN (Elevation-Area Volume Curve, 2 years (Post-Development 2 YEAR))...96
EXISTING DRY BASIN (OUT) (Time vs. Elevation, 10 years (Post-Development 10 YEAR))...81, 82, 83
EXISTING DRY BASIN (OUT) (Time vs. Elevation, 100 years (Post-Development 100 YEAR))...84, 85, 86
EXISTING DRY BASIN (OUT) (Time vs. Elevation, 2 years (Post-Development 2 YEAR))...78, 79, 80
EXISTING DRY BASIN (Time vs. Volume, 10 years (Post-Development 10 YEAR))...90, 91, 92
EXISTING DRY BASIN (Time vs. Volume, 100 years (Post-Development 100 YEAR))...93, 94, 95
EXISTING DRY BASIN (Time vs. Volume, 2 years (Post-Development 2 YEAR))...87, 88, 89

J

Johnson County SCS Type II (Time-Depth Curve, 10 years (Post-Development 10 YEAR))...3, 4
Johnson County SCS Type II (Time-Depth Curve, 100 years (Post-Development 100 YEAR))...5, 6
Johnson County SCS Type II (Time-Depth Curve, 2 years (Post-Development 2 YEAR))...7, 8

M

Master Network Summary...1, 2

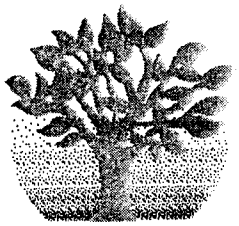
S

S1 (Runoff CN-Area, 2 years (Post-Development 2 YEAR))...13
S1 (Unit Hydrograph (Hydrograph Table), 10 years (Post-Development 10 YEAR))...71, 72
S1 (Unit Hydrograph (Hydrograph Table), 100 years (Post-Development 100 YEAR))...75, 76, 77
S1 (Unit Hydrograph (Hydrograph Table), 2 years (Post-Development 2 YEAR))...67, 68
S1 (Unit Hydrograph Summary, 10 years (Post-Development 10 YEAR))...69, 70
S1 (Unit Hydrograph Summary, 100 years (Post-Development 100 YEAR))...73, 74
S1 (Unit Hydrograph Summary, 2 years (Post-Development 2 YEAR))...65, 66

Appendix D

Approved Master Drainage Plan Exhibits And Calculations Prepared by EMH&T

DRAINAGE DESIGN REPORT



JOHNSON MEMORIAL Hospital

Master Drainage Plan

055118
14 JUNE 2001

BSA DESIGN

BSA DESIGN
9365 COUNSELORS ROW / SUITE 300
INDIANAPOLIS INDIANA 46240.1479

317.819.7878 PH
317.819.7288 FX

EAST JORDAN IRON WORKS, INC.

Young Memorial Hosp Master Plan – Proj

✓ S1 Post Dev Tc ? Used 5 Tc Calc Sheet
Used 8 in Design Calcs
– Why so small? – Bc Conservative
No Collection System

✓ Inflow into Detention? #5 used?

✓ Existing Qs for Downstream Analysis – Revised

✓ Culvert #1 – Q10 – OT. ? – Submerged, but not overtopping

Onsite
– ✓ Design Acceptable
– ✓ Pre Dev. Discharge Rates
– ✓ Meets Sub Ord Req for 2/10, 10/100 & Water Quality

✓ Offsite Design Acceptable
– ✓ ~~Box~~ Culvert, Storm Sewer, & Open Channel are designed to accept Flow from Project Site & Channel it to Young's Creek
Existing
– ✓ Culverts #1 & #2 do overtop during 100 yr storm event

✓ This design (onsite & offsite) is contingent upon the approval of adjoining project: Custer Baker Middle School - Commercial - Revised, Final August 21, ~~2001~~ Drainage Boards Meeting.

SUNFIELD, MICHIGAN
517-566-7211
FAX 517-566-7111

COLUMBUS, GROVE CITY, OHIO
614-871-2436
FAX 614-871-3773

GRAND RAPIDS, MICHIGAN
616-538-2040
FAX 616-538-4990

EAST JORDAN, MICHIGAN
800-231-3549
FAX 616-536-7058

DETROIT, OAK PARK, MICHIGAN
800-231-3549
FAX 313-546-4612

CLEVELAND, SOUTH EUCLID, OHIO
216-692-3001
FAX 216-692-3009

CHICAGO, MARKHAM, ILLINOIS
800-344-3549
FAX 708-333-9506

MID-ATLANTIC
WARRENTON, VIRGINIA
800-354-3549

EAST JORDAN IRON WORKS, INC.

JOHNSON MEMORIAL HOSP – PRELIMINARY DR 9081-01

EJIW SINCE 1883

- PRE DEV CN's - CALCULATIONS
- POST DEV SITE CN - CALCULATIONS
- $T_c^{PRE-DEV}$ - CALCULATIONS
- 1 1/4" VOLUME HYDRO.?
- POND ROUTING FOR 2, 10, 25, 50, 100, 1.25 ?

EMERG. ROUTE WITH OUTLETS PLUGGED

RICH KELLY - 7/6/2001

- WILL MAKE REVISIONS & RESUBMIT
- WILL TAB CRITICAL INFO

- BOX CULVERT SIZES 100YR.
- PIPE @ ROAD NEAR CREEK OVERTOPS HAS SHOWN HOW MUCH IN ONE OF DIAGRAMS

SUNFIELD, MICHIGAN
517-566-7211
FAX 517-566-7111

EAST JORDAN, MICHIGAN
800-231-3549
FAX 616-536-7058

CHICAGO, MARKHAM, ILLINOIS
800-344-3549
FAX 708-333-9506

COLUMBUS, GROVE CITY, OHIO
614-871-2436
FAX 614-871-3773

DETROIT, OAK PARK, MICHIGAN
800-231-3549
FAX 313-546-4612

MID-ATLANTIC
WARRENTON, VIRGINIA
800-354-3549

GRAND RAPIDS, MICHIGAN
616-538-2040
FAX 616-538-4990

CLEVELAND, SOUTH EUCLID, OHIO
216-692-3001
FAX 216-692-3009

JOHNSON COUNTY

Department of Planning and Zoning
86 West Court Street
Courthouse Annex
Franklin, Indiana 46131

Phone: (317) 736-3723
Fax: (317) 736-4722
Website: www.co.johnson.in.us

July 5, 2001

Johnson County Drainage Board
Johnson County Surveyor's Office
86 W. Court Street
Franklin, IN 46131

RE: Johnson Memorial Hospital Commercial - Preliminary
7/17/2001 Meeting

Dear Board Members:

I have reviewed the plans and drainage report for DR-9081-01, Johnson Memorial Hospital Commercial, and have the following comments:

1. The overall design appears to be acceptable, however, several critical computations made at the beginning of the design and used throughout may require revision. Revision of these computations will effect both pre-developed and post-developed discharge numbers and may require the revision of key elements of the design. The computations in question include:
   a. Pre-developed curve numbers for basins 03, 04, 06, 07, and S1.
   b. Post-developed curve number for basin S1.
   c. Time of concentration numbers used for the pre-developed and post-developed calculations.

Due to scheduling conflicts prior to the July 17, 2001 meeting, these issue have not been addressed and reviewed. I would recommend a continuance until the next meeting to allow the Petitioner and the Planning Engineer time to discuss Item #1.

Very truly yours,

Allen D. Kirk, P.E.
Planning Engineer

cc: Doug Lechner/ Johnson County Surveyor
Project File
Office File

RICH KELLEY
317-913-6930

BSA DESIGN

CHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES

TO Johnson County Department of Planning & Zonin
86 West Court Street
Courthouse Annex
Franklin, IN 46131

DATE 12 July 2001

ATTENTION Mr. Allen D. Kirk

PROJECT Johnson Memorial Hospital
Storm Drainage Renovations

COPIES	DOCUMENT NO.	DOCUMENT DATE	DESCRIPTION	ACTION CODE
1			Revised Master Drainage Plan	B

REMARKS

A. Action indicated on Item transmitted
B. For your information
C. For signature & return to this office
D. Furnish as submitted
E. Furnish as corrected - resubmittal required
F. Furnish as corrected - no resubmittal required
G. Revise and resubmit
H. For your approval

FROM Richard A. Berger/mjg

COPIES TO

PROJECT NO. 055118

TRANSMITTAL LETTER

9365 COUNSELORS ROW, SUITE 300
INDIANAPOLIS, IN / 46240-3809
.819.7878 PH / 317.819.7288 FAX
www.bsadesign.com

Reviewed w/ 6.18.01
Doug L —
Alan Kirk —
RAB/RPS/Rich Kelly.

DRAINAGE DESIGN REPORT

For

Johnson Memorial Hospital

Master Plan Improvements

S.R. 44 and Hospital Road
Johnson County, Indiana

Prepared
By:

and

EVANS, MECHWART, HAMBLETON & TILTON, INC.
CONSULTING ENGINEERS & SURVEYORS
6994 HILLSDALE COURT, INDIANAPOLIS, INDIANA 46250
317-913-6930
FAX 317-913-6928

June 14, 2001

Revised July 10, 2001

RICHARD J. KELLY REGISTERED No. PE19500055 STATE OF INDIANA PROFESSIONAL ENGINEER

Certified By:

Richard J. Kelly
Indiana Registration No. 9500055

TABLE OF CONTENTS

1. Purpose

2. Introduction

3. Existing Conditions

   A. Existing Drainage System
   B. Watershed and Sub-basins
   C. Existing Runoff Calculations
   D. Exhibits

4. Post-Developed Conditions

   A. Proposed Drainage System
   B. Watershed and Sub-basins
   C. Post-developed Runoff Calculations
   D. Staged Detention Provisions
   E. Water Quality Provisions
   F. Exhibits

5. Downstream Capacity Analysis

   A. Downstream Drainage System
   B. Watershed and Sub-basins
   C. Existing and Post-developed Runoff Calculations
   D. Table and Exhibits

6. Summary

7. Appendices

   Appendix A Calculations – Existing Conditions

   Appendix B Calculations – Proposed Conditions

   Appendix C Calculations – Downstream Capacity Analysis

   Appendix D Maps

   Appendix E Hydrology Reports for Custer Baker Middle School

   Appendix F Design Calculations and Plans for existing On-site Detention System

PURPOSE

The purpose of this report is to present the design of the proposed stormwater management system for the implementation of the master plan improvements for Johnson Memorial Hospital located at State Road 44 and Hospital Road in Johnson County, Indiana. The stormwater management system is designed to comply with the requirements of the Johnson County Subdivision Control Ordinance as related to the drainage requirements outlined under Section 6-102-5, Item C. This report presents the design parameters established to comply with the stormwater detention and water quality provisions of the ordinance. The stormwater management system design presented herein is limited in concept to the master conveyance systems and stormwater detention structures necessary to comply with the ordinance for complete implementation of the master plan including development of four buildings and a 1500+ parking field on a 26-acre (+/-) tract located adjacent to and west of the existing Johnson Memorial Hospital campus. The design of ancillary collection structures and collection systems for the proposed parking lots and buildings is beyond the scope of this report. The design of such improvements will be presented at the time of implementation of each phase of the master plan.

The design of the storm water management system presented herein accommodates complete implementation of the master plan. However, it is anticipated that implementation of the master plan will occur in phases with the development of several projects on an individual basis. Therefore, the design of the stormwater management system is predicated on the ability to implement the improvements in phases concurrent with implementation of the master plan. Although the phased development of the system is implicit in the design, the exact nature of the phased improvements is not presented herein to allow for flexibility of implementation of the master plan. It is anticipated that separate design concepts will be presented for review and approval at the time of implementation of each phase of the master plan.

INTRODUCTION

The existing campus of the Johnson Memorial Hospital is situated on a 30-acre tract bounded by State Road 44 to the north, Drake Road to the east and Hospital Road to the south. The master plan for the hospital includes development of additional medical and office facilities and associated parking fields on a 26-acre (+/-) tract located adjacent to and west of the existing campus. The development tract is bounded by Tracey Miles Road to the west. The 26-acre development tract is presently undeveloped with brush and grass vegetative cover. A wide, open-channel drainage way bisects the development tract and conveys runoff from on-site and off-site sources from the north end of the parcel (SR44) to the southern boundary (Hospital Road).

The proposed stormwater management system consists of a dry detention basin located along the southern boundary of the development tract along with conveyance systems to accommodate upstream off-site runoff as well as the downstream discharge of the proposed dry detention basin.

Hydrologic and hydraulic calculations are prepared in accordance with SCS TR-55 methodology. Hydrologic and storage calculations have been modeled using "PondPak" modeling software. Culvert and open channel hydraulics are performed utilizing "Flowmaster" and "Culvertmaster" software programs.

The design duration for all frequency storm events of interest is 24 hours based upon a SCS Type II rainfall distribution. Composite CN values for each watershed sub-basin have been calculated based upon land use, intensity of development and soil types. Time-of-Concentration calculations are performed utilizing the hydrologic modeling software based upon TR-55 methodology. Pipes and structures are sized to accommodate the peak flow rate for a 10-year storm event flowing under gravity conditions. Rainfall intensities for the 24-hour design storm events for Johnson County have been obtained from the Indiana Department of Natural Resources publication "Rainfall Frequency for Indiana". The 2-year, 10-year and 100-year 24-hour intensities are 3.00 inches, 4.30 inches and 5.90 inches respectively.

EXISTING CONDITIONS

A. Existing Drainage System

The 26-acre master plan development tract sheet drains to an open channel with wideoverbank areas extending from the intersection of SR 44 and Tracey Miles Road to Hospital Road and bisecting the site. Runoff is conveyed under Hospital Road to an open channel south of the Johnson County Juvenile Detention Center via an 18-inch diameter RCP storm sewer extending from north of Hospital Road approximately 500 feet southeasterly to the west side of the detention center. Per information obtained from the Johnson County Surveyor's Office, we understand that the existing on-site open channel serves to provide stormwater detention upstream of the 18-inch storm sewer. Design calculations and construction plans prepared by Franklin Engineering, circa 1991, indicate that the existing storage volume provided within the open channel and overbank areas is 12.0 acre-feet at a peak stage elevation of 740 feet NVGD. The minimal capacity of the 18-inch storm sewer will cause overtopping of Hospital Road under intense rainfall conditions. It is estimated that the existing on-site detention basin is capable of storing runoff from a 2-year event based upon its contributing on-site and off-site watershed areas. A copy of the calculations and plans prepared by Franklin Engineering is included in this report at Appendix F.

It is reasonable to assume that the existing 18-inch storm sewer south of Hospital Road is not sufficient to support the intensity of the proposed master plan improvements. Therefore, the design includes replacement of the existing sewer as outlined in Section 4 of this report.

B. Watershed and Sub-basins

A significant volume of off-site runoff contributes to the existing on-site open channel and downstream 18-inch storm sewer. The sub-basins are delineated on the watershed map included at the end of this section and are described as follows:

Off-Site West:

Basin O1-Culver Baker Middle School (presently under construction) has prepared a storm water management plan to direct the majority of its on-site runoff to an off-site detention pond. There remains approximately 0.5 acres of lawn area that is directed to the east to the project site via a 30-inch culvert under Tracey Miles Road. A copy of the narrative from the Preliminary Drainage Design Report for the school provided by TLF Engineering is included as Appendix E. Based upon the TLF report, off-site runoff contributions from the school have been neglected.

Basin O2 – Nursing Home contains approximately 5.0 acres that is collected via surface drainage along the roadside swales and is directed toward the project site and outlets at the same point as Basin O3-Camelot.

Off-Site North:

The off-site watersheds north of SR 44 or Jefferson Street contain two basins of interest.

Basin O3, known as Camelot (a residential community), encompasses approximately 60 acres collected via a storm sewer drainage network and its outlet is directed through the project site. This outlet consists of a 42" RCP and a 24" RCP and outlets on the south side of SR 44.

Basin O4-Residential NE is a commercial and residential watershed encompassing approximately 35-acres and is collected via a storm drainage network and surface drainage and is directed south to the existing Johnson Memorial Hospital site. This drainage is being collected and directed to the north side of Hospital Road and outlets beneath Hospital Road to a storm drainage network between the County Maintenance Facility and the Juvenile Detention Center to the open channel south of the Juvenile Detention Center that discharges into Young's Creek.

Off-Site East:

Basin O5 - J. Mem Hosp. is the existing Hospital site, part of the residential site east of the Hospital and part of the County Maintenance Facility south of Hospital Road. This total basin area is approximately 40-acres. This basin does not discharge to the project site, but it does discharge toward the drainage network between the County Maintenance Facility and the Juvenile Detention Center to the defined drainage way south of the Juvenile Detention Center that discharges into Young's Creek.

Off-Site South:

Basin O6 – Franklin Meadows includes part of the Franklin Meadows manufactured home park and part of the Juvenile Detention Center. This area is approximately 15-acres and is collected and directed to the defined drainage channel behind the Juvenile Detention Center beneath the asphalt drive to the firing range and kennel.

Basin O7-Residential South contains approximately 6-acres and includes part of the Franklin Meadows manufactured home park. This drainage is surface drainage that is directed to the existing detention channel on the project site.

Project Site:

Basin S1-Project Site contains approximately 32.5-acres and includes the existing POB #1. This basin is collected in the existing drainage detention channel north of Hospital Road. There is a small portion of the project site that is collected south of SR 44 at the same point as basins O2 and O3 at the most northerly end of the existing defined drainage way through the project site.

C. Existing Runoff Calculations

Peak runoff calculations have been performed for three points of interest as shown on Exhibits 3.1, 3.2 and 3.3 as P1, P2 and P3.

Point **P1** is the most northerly point of the existing drainage channel through the project site at the south side of SR 44. This point has an existing upstream watershed consisting of basins O2 and O3 for a total of 65.6 acres. This includes a small portion of the project site.

Point **P2** is the discharge point at the existing drainage detention channel south of the County Maintenance Facility. This point has an upstream watershed consisting of P1, and basins S1, 01 and 07 for a total of approximately 104.6 acres.

Point P3 is located at the downstream end of a culvert under a gravel drive that is south of the County Maintenance Facility. This point has an upstream watershed containing P1, P2, basins O4, O5 and O7 for a total of approximately 195 acres.

The existing peak flow rates associated with the 2, 10 and 100 year storm events at these three points are as follows:

Point	2 year event	10 year event	100 year event
P1	38 (cfs)	73 (cfs)	121 (cfs)
P2	53 (cfs)	107 (cfs)	181 (cfs)
P3	123 (cfs)	225 (cfs)	362 (cfs)

The peak runoff rates generated by the on-site development site under existing conditions for the 2, 10 and 100 year events are 11.2 cfs, 25.9 cfs and 47.2 cfs respectively.

D. Exhibits

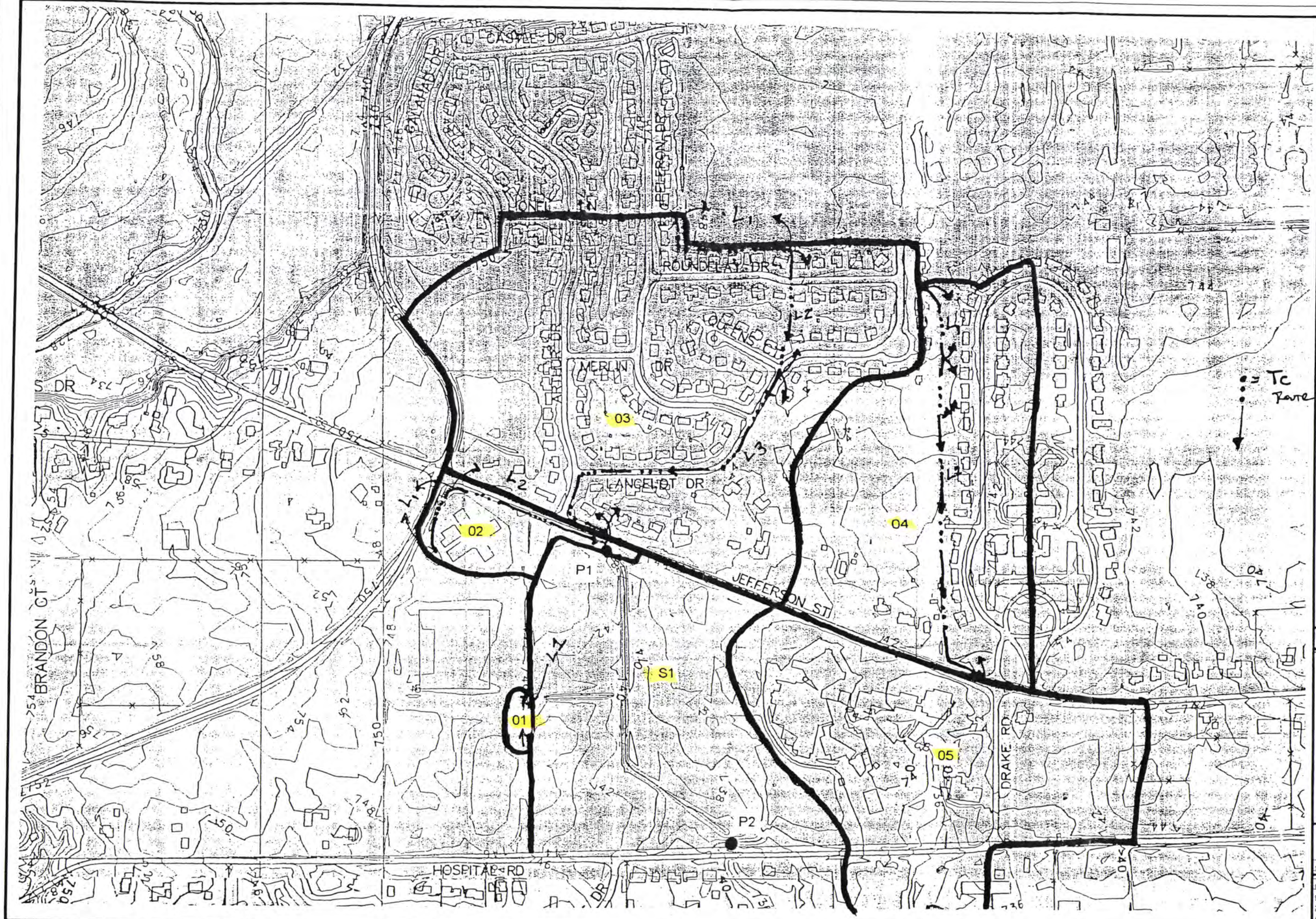
The following exhibits are included at the end of Section 3, Existing Conditions:

Table 3.1 Summary of Existing Sub-Basins
Exhibit 3.1 Watershed Delineation Map (1 of 2)
Exhibit 3.2 Watershed Delineation Map (2 of 2)
Exhibit 3.3 Watershed Contribution Map
Exhibit 3.4 Soils Map

Table 3.1

SUMMARY OF EXISTING SUB-BASINS

DESC.	BASIN	AREA	CONDITION	SOIL CLASS	SOIL TYPE	Cn	Weighted Cn	Tc (min.)
C.B. Middle School	01	0.5 ac.	Lawn (good)	CsB2	C	74	74	39.2
Nursing Home	02	5.6 ac.	Commercial	CrA (80%) BR (20%)	C B	94 92	91	40.3
Camelot	03	60.0 ac.	Residential (1/3 acre)	CrA (60%) BR (40%)	C B	81 72	77.4	62.1
Residential N.E.	04	35.0 ac.	Residential (1/3 acre)	CrA (70%) BR (30%)	C B	81 72	78.3	70.4
J. Mem. Hospital	05	40.0 ac.	Commercial	CrA (80%) BR (20%)	C B	94 92	92	64.2
Franklin Meadows	06	15.0 ac.	Residential (1/3 acre)	CrA (60%) BR (40%)	C B	81 72	77.4	56.8
Residential South	07	6.0 ac.	Residential (1/3 acre)	CrA (90%) MnB2 (10%)	C B	81 72	80.1	49.9
Project Site	S1	32.4 ac.	Pasture (fair)	CrA (80%) BR (20%)	C B	74 61	71.4	61.8



BSA DESIGN

ARCHITECTURE . ENGINEERING . INTERIOR DESIGN AND A COMPANION OF PROJECT MANAGEMENT SERVICES

BSA DESIGN
9245 Counselors Row / Suite 300
Indianapolis, Indiana 46240-1423
317.819.7878 ph 317.819.7288 fx www.bsadesign.com

EMH&T INC.
EVANS, MECHWART, HAMBLETON & TILTON, INC.
CONSULTING ENGINEERS & SURVEYORS
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION

Tc
WATERSHED DELINEATION
MAP (1 OF 2)

JOHNSON MEMORIAL Hospital

Year 2000 / 2001
Capital Improvement
Project

1" = 400'

SCALE CLIENT NO.

DATE 14 JUNE 2001 COMMISSION 055116

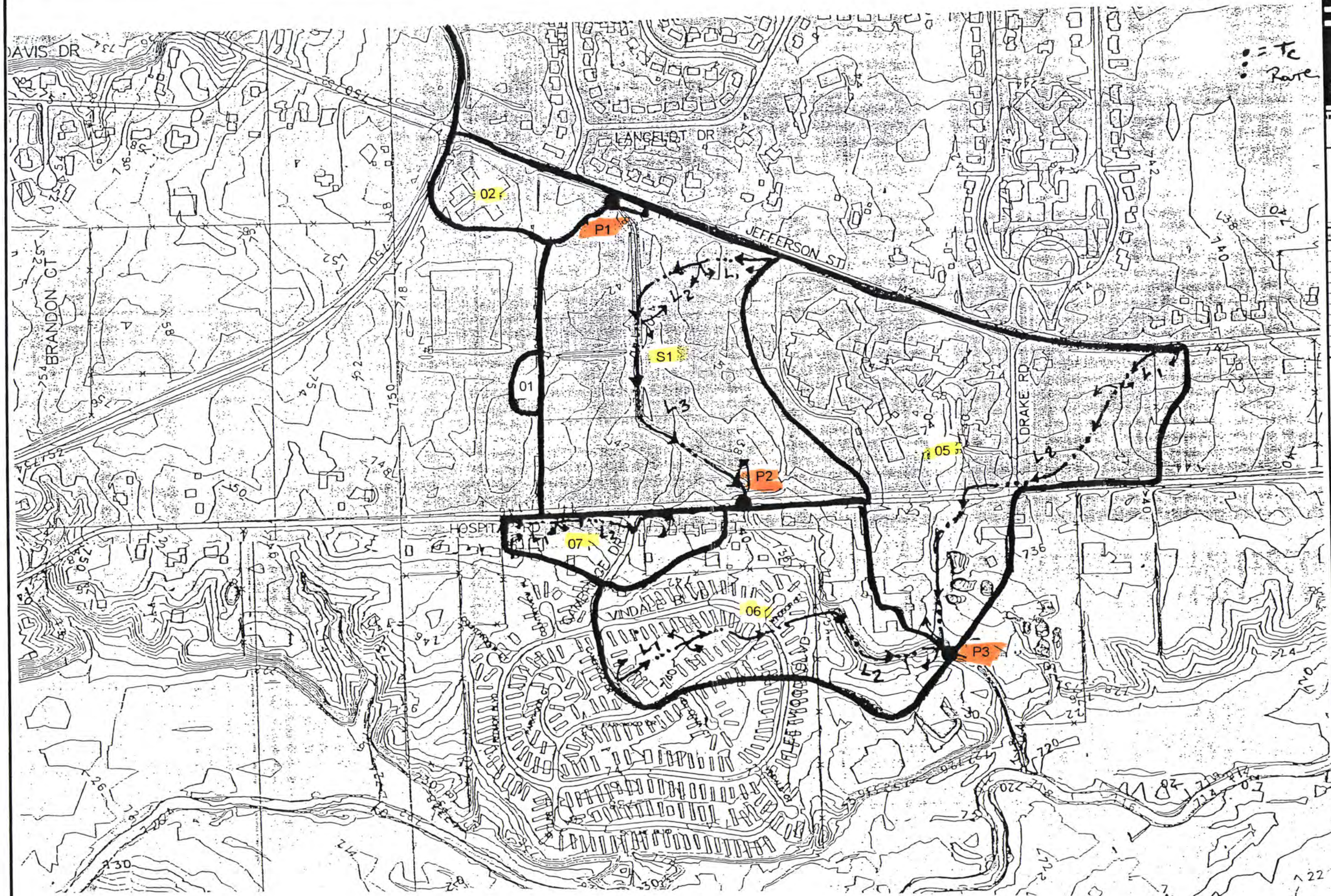
COORD.

DRAWN

APPROVED

FILE NAME

3.1



BSA DESIGN

ARCHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES

BSA DESIGN
9245 Counselors Row / Suite 300
Indianapolis, Indiana 46240-1479
317.819.7878 tel 317.819.7288 fx www.bsadesign.com

EMH&T
EVANS, MECHWART, HAMBLETON & TILTON, INC.
CONSULTING ENGINEERS & SURVEYORS
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION

Tc
WATERSHED DELINEATION
MAP (2 OF 2)

JOHNSON MEMORIAL Hosp

Year 2000 / 2001
Capital Improvement
Project

1" = 400'

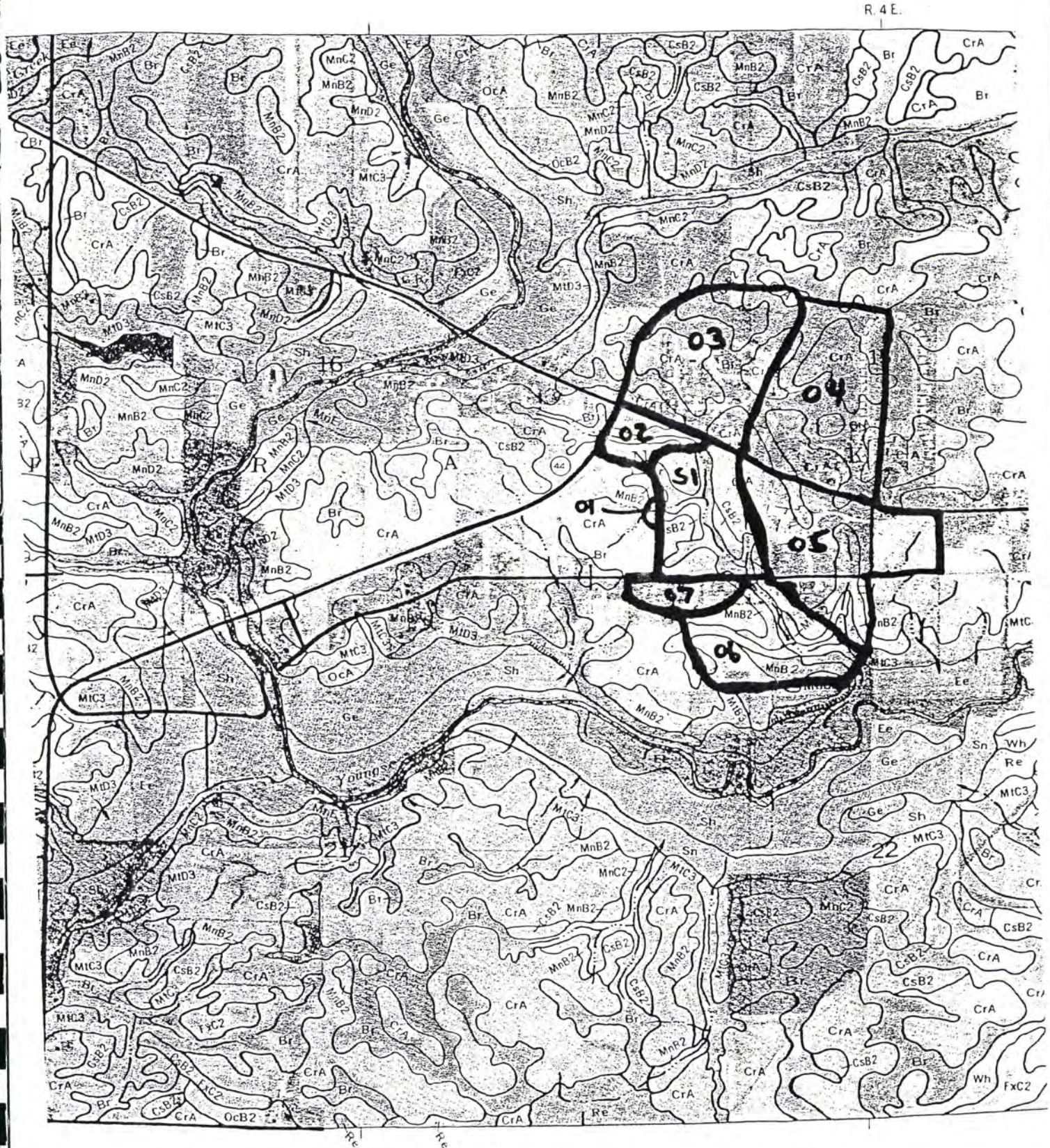
SCALE CLIENT NO.

DATE 14 JUNE 2001 COMMISSION 055116

DESIGNED
DRAWN
APPROVED

3.2

FILE NAME


R. 4 E.
03
04
02
01
05
07
06
Young
CrA
Br
MnB2
MnC2
MnD2
CsB2
MtC3
MtD3
Ge
Sh
Ee
Re
FxC2
OcA
OcB2

Type.... Tc Calcs
Name.... C.B. MIDDLE SCH BASIN 01

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	240.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.10 ft/sec

Segment #1 Time: 39.18 min

Total Tc: 39.18 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

Type.... Tc Calcs
Name.... NURSING HOME BASIN 02

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	100.00 ft
2yr, 24hr P	3.0000 in
Slope	.005000 ft/ft
Avg.Velocity	.06 ft/sec

Segment #1 Time: 25.66 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1000.00 ft
Slope	.005000 ft/ft
Unpaved	
Avg.Velocity	1.14 ft/sec

Segment #2 Time: 14.61 min

Total Tc: 40.27 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... CAMELOT BASIN 03

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	370.00 ft
Slope	.007000 ft/ft
Unpaved	
Avg.Velocity	1.35 ft/sec

Segment #2 Time: 4.57 min

Segment #3: Tc: Length & Vel.

Hydraulic Length	1600.00 ft
Avg.Velocity	2.50 ft/sec

Segment #3 Time: 10.67 min

Total Tc: 62.07 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

==== User Defined Length & Velocity ==========

Tc = (Lf / V) / (3600sec/hr)

Where: Tc = Time of concentration, hrs
Lf = Flow length, ft
V = Velocity, ft/sec

Type.... Tc Calcs
Name.... RESIDENTIAL NE BASIN 04

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	300.00	ft
2yr, 24hr P	3.0000	in
Slope	.007500	ft/ft
Avg.Velocity	.10	ft/sec

Segment #1 Time: 52.54 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1500.00	ft
Slope	.007500	ft/ft
Unpaved		
Avg.Velocity	1.40	ft/sec

Segment #2 Time: 17.89 min

Total Tc: 70.44 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... J.CO. MEM HOSP BASIN 05

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1680.00 ft
Slope	.010000 ft/ft
Unpaved	
Avg.Velocity	1.61 ft/sec

Segment #2 Time: 17.35 min

Total Tc: 64.19 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... FRANKLIN MEADOWS BASIN 06

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	300.00	ft
2yr, 24hr P	3.0000	in
Slope	.010000	ft/ft
Avg.Velocity	.11	ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1370.00	ft
Slope	.020000	ft/ft
Unpaved		
Avg.Velocity	2.28	ft/sec

Segment #2 Time: 10.01 min

Total Tc: 56.84 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... RESIDENTIAL SOUT BASIN 07

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	530.00 ft
Slope	.020000 ft/ft
Paved	
Avg.Velocity	2.87 ft/sec

Segment #2 Time: 3.07 min

Total Tc: 49.91 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2000
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.015000 ft/ft
Avg.Velocity	.15 ft/sec

Segment #1 Time: 34.42 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	350.00 ft
Slope	.010000 ft/ft
Unpaved	
Avg.Velocity	1.61 ft/sec

Segment #2 Time: 3.62 min

Segment #3: Tc: TR-55 Channel

Flow Area	84.0000 sq.ft
Wetted Perimeter	37.98 ft
Hydraulic Radius	2.21 ft
Slope	.011500 ft/ft
Mannings n	.3300
Hydraulic Length	1170.00 ft
Avg.Velocity	.82 ft/sec

Segment #3 Time: 23.72 min

Total Tc: 61.76 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

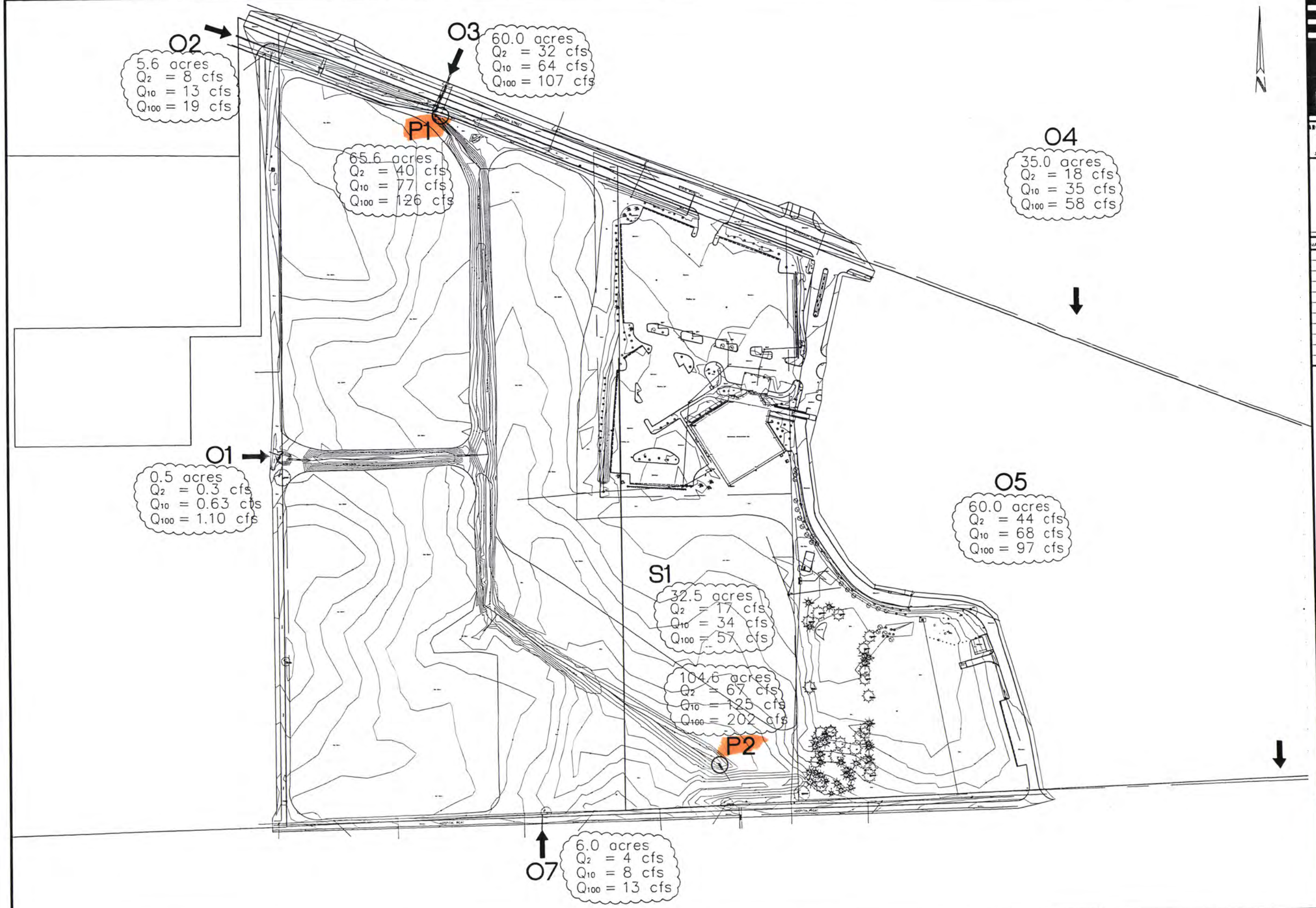
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

==== SCS Channel Flow ==

R = Aq / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

Tc = (Lf / V) / (3600sec/hr)

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft



BSA DESIGN

ARCHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES
BSA Design
9245 Counselors Row / Suite 300
Indianapolis, Indiana 46240-1479
317.819.7878 ph 317.819.7288 fx www.bsadesign.com

EMH&T Inc
Evans, Mechwart, Hambleton & Tilton, Inc
Consulting Engineers & Surveyors
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION

EXISTING CONDITIONS WATERSHED CONTRIBUTION

JOHNSON MEMORIAL Hospital

Year 2000 / 2001 Capital Improvement Project

SCALE CLIENT NO.

DATE 14 JUNE 2001 COMMISSION 055116

COORD.

DRAWN

APPROVED

FILE NAME

3.3

POST-DEVELOPED CONDITIONS

A. Proposed Design System

The master stormwater management system includes a large dry detention basin along the southern boundary of the development site with a multi-staged outlet control structure and large-diameter upstream storm sewer to convey on-site and off-site runoff to the detention basin. The invert elevation of the detention basin at the discharge end is 730.0 feet NVGD. The basin is designed with a minimum bank elevation of 739.0 feet and a peak stage elevation of 737.5 feet for a 100-year event. Total storage provided for a 100-year event is 10.6 acre-feet.

The outlet structure includes a 5-inch diameter low-flow orifice with a larger (3' x 4') parallel orifice located in the top of a 3' x 5' box culvert. The two orifices are designed to control discharge rates from the pond to allowable release rates per the Subdivision Control Ordinance. The low-flow orifice also serves to comply with the water quality storage requirements of the ordinance.

The design proposes to replace the existing 18-inch storm sewer south of Hospital Road with approximately 820 lineal feet of 3' x 5' reinforced concrete box culvert. The box culvert is designed to convey runoff from the entire range of storm events including a 100-year event. Thus, the potential for the overtopping of Hospital Road is reduced significantly from the existing condition. The increased capacity of the 3' x 5' box culvert is further substantiated by the fact that the downstream open channel south of the Juvenile Detention Center and County Correctional Facility has sufficient capacity to convey the peak flows from the entire range of events, including the 100-year event, to Young's Creek.

B. Watershed and Sub-basins

The contributing watershed to the proposed dry detention basin includes off-site sub-basins 01 (Custer Baker Middle School), 02 (Nursing Home), 03 (Camelot), 07 (Residential South) and S1 (Project Site in developed condition). The contribution from Custer Baker Middle School (Basin 01) is limited to 0.5 acres predicated on the revised design prepared by TLF Engineering which directs runoff from the school property to an off-site detention basin south of Hospital Road. The total contributing watershed for the proposed dry detention basin serving Johnson Memorial Hospital includes approximately 104.6 acres with 72.1 acres of off-site watershed area and 32.5 acres of on-site developed watershed west of the existing hospital campus. The characteristics of the sub-basins contributing to the open channel system downstream of Hospital Road remain unchanged in the post-developed analysis less the on-site 32.5-acre development site.

C. Post-Developed Runoff Calculations

Hydrographs associated with the post-developed project conditions have been developed for the detention basin watershed based upon development of the 32.5-acre on-site basin (S1) in accordance with the elements of the master plan. The CN value for the project site is increased to a value of 92 based upon the intensity of the proposed development. The peak inflow rates for the 2-year, 10-year and 100-year design events for the detention pond watershed are 110 cfs, 178 cfs and 263 cfs respectively.

D. Staged Detention Calculations

The proposed dry detention basin and outlet control structure are designed to comply with the staged detention requirements of the Subdivision Control Ordinance. Specifically, the storage capacity and outlet hydraulics of the system are designed to release the 100-year post-developed event at a peak rate equal to or less than the existing 10-year peak flow and release of the 10-year post-developed event at a peak rate equal to or less than existing 2-year peak flow.

The allowable release rates from the project site are calculated based upon a "pass-through" condition for the off-site contributing sub-basins. Thus, the allowable 100-year rate is determined by mathematically adding the existing 10-year peak runoff rate from the project site to the 100-year peak runoff rate of the off-site contributing watershed areas. A similar calculation is used to determine the 10-year allowable release rate as well. The following table summarizes the determination of allowable release rates and a comparison to the design release rates of the proposed detention basin:

Allowable Release Rates

Basin	Q2cfs	Q10cfs	Q100cfs
Pre-Dev Site	11.23 (Pre-2 yr.)	11.23 (Pre-2 yr.)	25.88 (Pre-10 yr.)
Off-Site	44.93 (2 yr.)	85.52 (10 yr.)	139.44 (100 yr.)
Totals	56.16	96.75	165

Pond Inflow and Outflow Rates

Basin	Q2cfs	Q10cfs	Q100cfs
Dry Basin In	110	178	263
Dry Basin Out	43	78	105
Allowable Release	56	97	165
% of Allowable	77%	80%	64%

E. Water Quality Provisions

The proposed stormwater management system is designed to comply with the water quality provisions of the Subdivision Control Ordinance via the introduction of a 5-inch diameter low-flow orifice structure incorporated in the design of the primary outlet structure. The 5-inch orifice provides sufficient restriction to detain 21% of the on-site and off-site volume of a 1-¼ inch

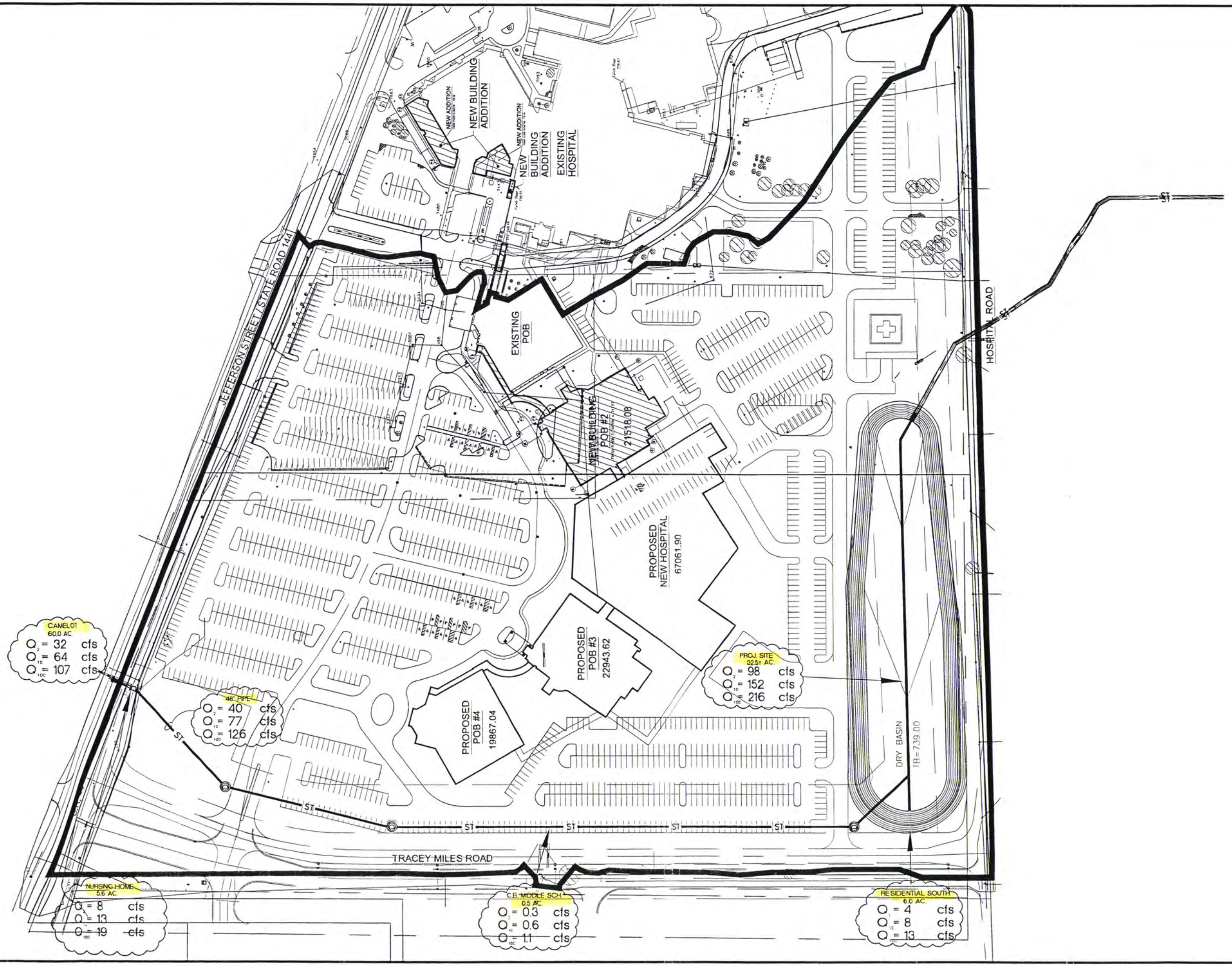
event for a period greater than 24 hours. The total volume of the 1-¼ inch event for the on-site watershed is 1.61 acre-feet and the volume detained beyond 24 hours is 0.55 acre-feet.

A 1 ¼ inch rainfall distribution was used to determine the water quality storage requirement since it's volume is greater than the volume of ½ inch of direct runoff over the on-site development tract. A summary of the comparison of the volume of ½ inch of direct runoff versus 1 ¼ inch rainfall event is included as Table 3.1 at the end of Section 3, Existing Conditions.

F. Exhibits

The following Exhibits are included at the end of Section 4, Post Development Conditions:

Exhibit 4.1 Post Developed Basins Map
Exhibit 4.2 Post Developed Detention
Exhibit 4.3 Outlet Structure
Exhibit 4.4 Off-site Outlet



BSA DESIGN

ARCHITECTURE, ENGINEERING, INTERIOR DESIGN AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES

BSA Design
9365 Counselors Row / Suite 300
Indianapolis, Indiana 46240-1479
317.819.7070 tel 317.819.7288 fx www.bsadesign.com

EMH&T, Inc.
Evans, Mechwart, Hambleton & Tilton, Inc.
Consulting Engineers & Surveyors
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION

MASTER DRAINAGE PLAN
POST-DEVELOPED BASINS MAP

JOHNSON MEMORIAL Hospital

Year 2000 / 2001 Capital Improvement Project

SCALE: CLIENT NO.:

DATE: 14 JUNE 2001 COMMISSION: 055116

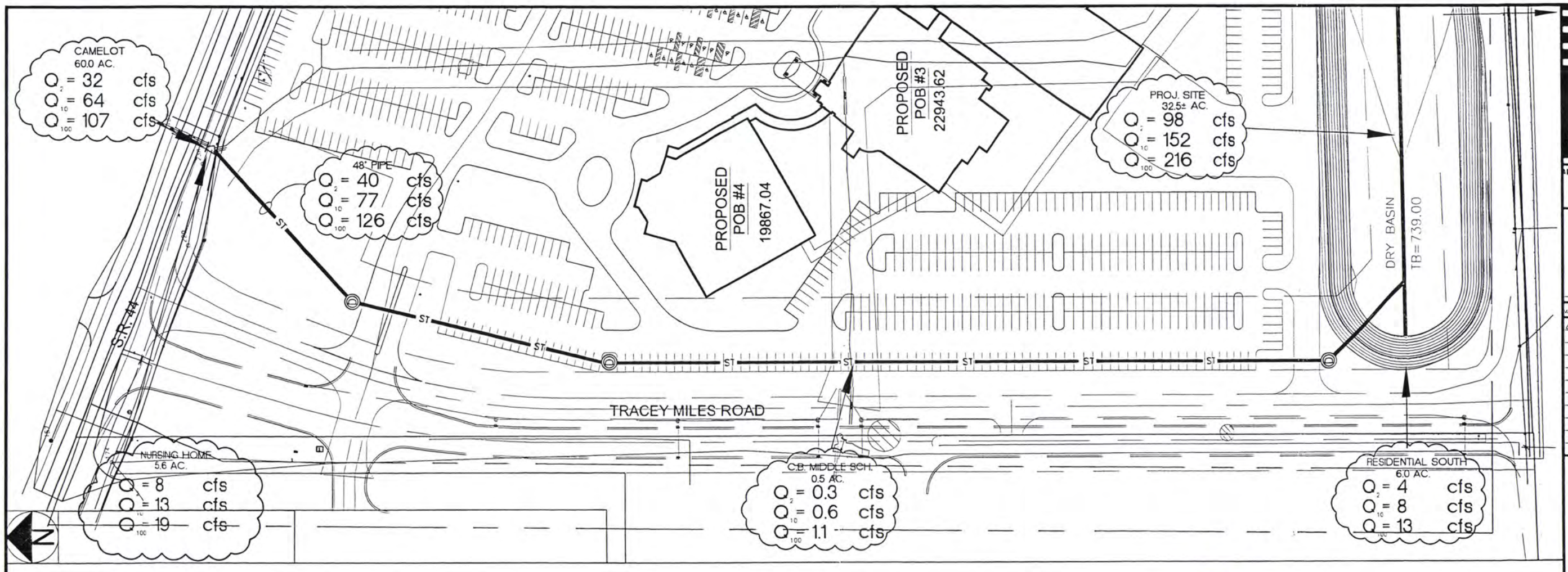
COORD.:

DRAWN:

APPROVED:

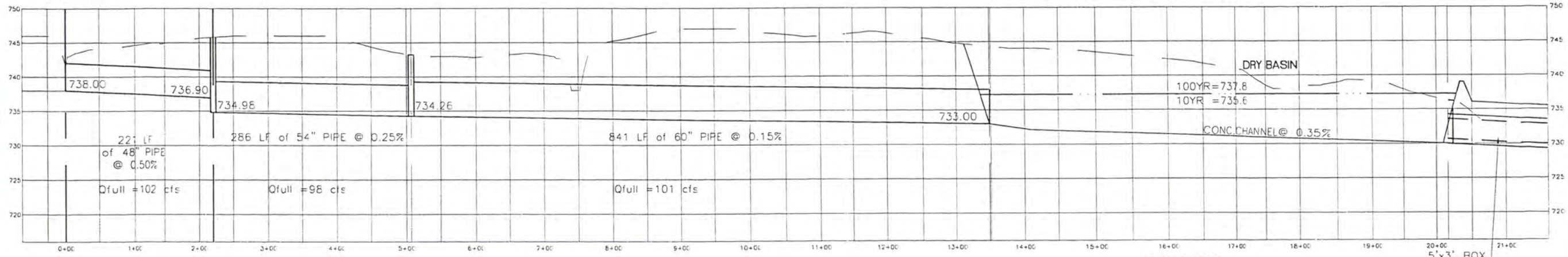
FILE NAME:

4.1



DRY BASIN

Q In cfs	Q Out cfs	Peak El.	Storage Vol. ac-ft
Q_2 = 110	Q_2 = 43	734.2	4.1
Q_{10} = 178	Q_{10} = 78	735.5	6.3
Q_{100} = 263	Q_{100} = 105	737.5	10.6



DRY BASIN

STAGE ft	AREA sf	VOLUME ac-ft
730	0	0
731	8467	.065
732	39561	.572
733	74217	1.858
734	78675	3.612
735	83094	5.469
736	87570	7.428
737	92114	9.490
738	96717	11.657
739	101390	13.931

BSA DESIGN
ARCHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES
BSA Design
9365 Counselors Row / Suite 300
Indianapolis, Indiana 46240-1479
317.815.7878 fx 317.815.7288 ph www.bsadesign.com

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Consulting Engineers & Surveyors
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION
△		

MASTER DRAINAGE PLAN
POST-DEVELOPED DETENTION

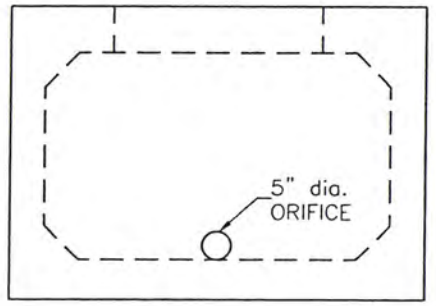
JOHNSON MEMORIAL Hospital

Year 2000 / 2001 Capital Improvement Project

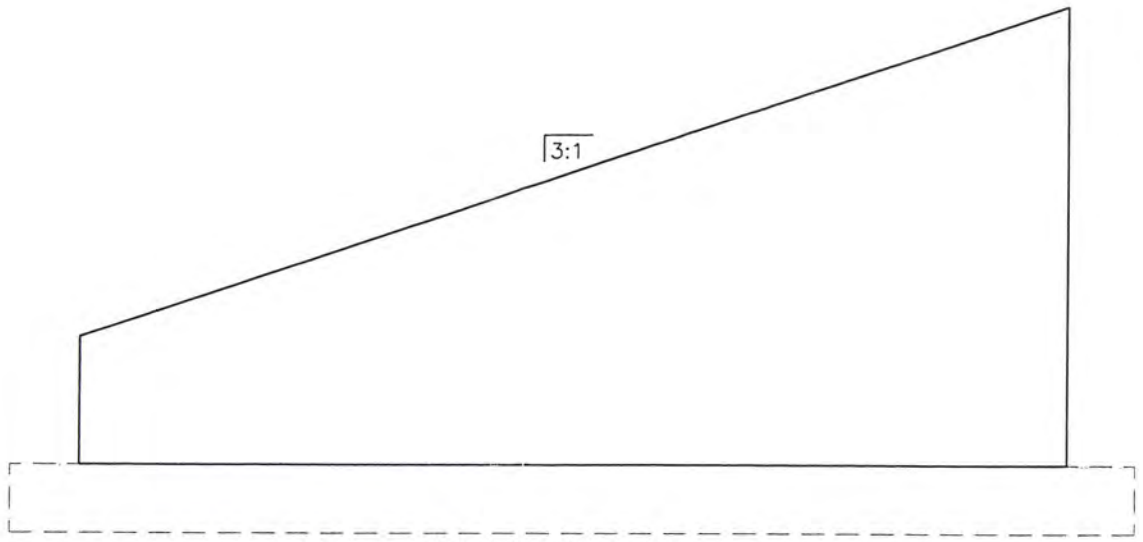
SCALE: N.T.S. CLIENT NO.

DATE 14 JUNE 2001 COMMISSION 055116
COORD
DRAWN
APPROVED
FILE NAME

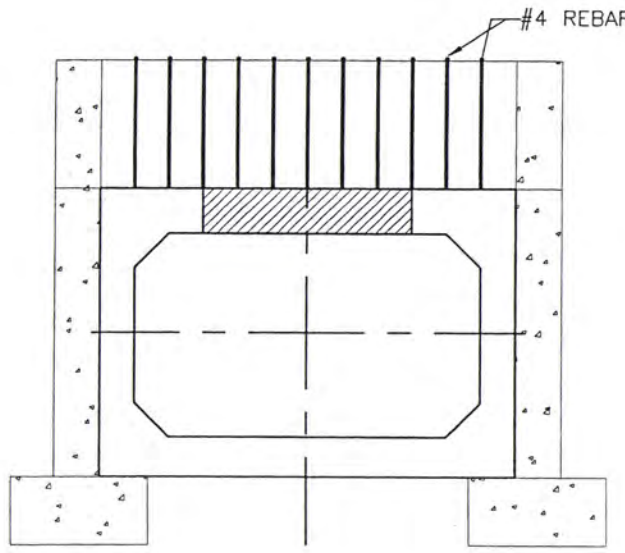
4.2



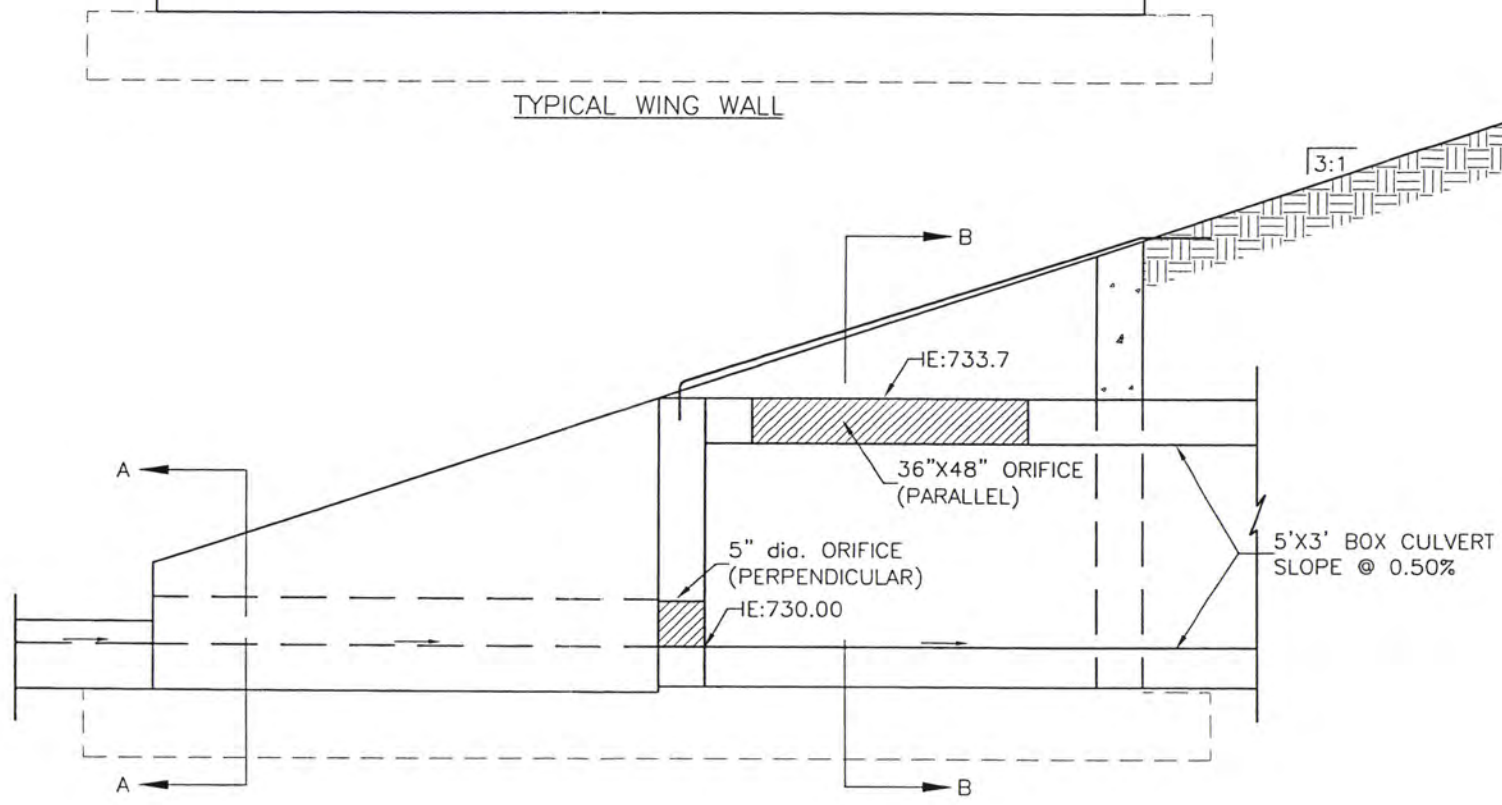
BOX END WALL

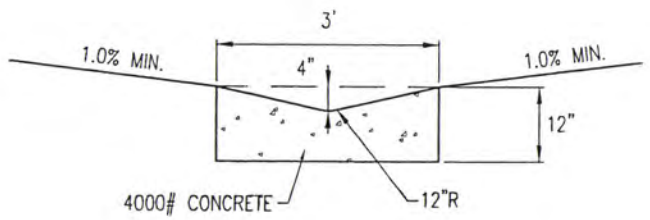


TYPICAL WING WALL

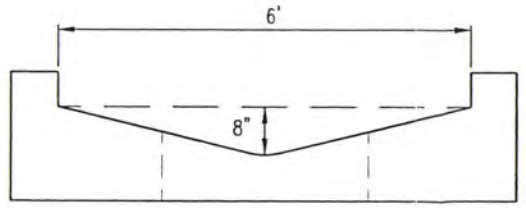


SECTION B–B





CONCRETE PAVED DITCH



SECTION A–A

BSA DESIGN
ARCHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES
BSA Design
9365 Counselors Row / Suite 300
Indianapolis Indiana 46240.1479
317.819.7878 ph 317.819.7288 fx www.bsadesign.com

EMH&T INC
Evans, Mechwart, Hambleton & Tilton, Inc.
Consulting Engineers & Surveyors
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION
△		

MASTER DRAINAGE PLAN
OUTLET STRUCTURE

JOHNSON MEMORIAL Hospital

Year 2000 / 2001 Capital Improvement Project

SCALE CLIENT NO.

DATE 14 JUNE 2001 COMMISSION 055116
COORD.
DRAWN
APPROVED
FILE NAME

4.3

Water Quality

Comparison of ½-inch Direct Runoff Versus 1 ¼-inch Rainfall for Project Site

½" over 32.5 ac. = 1.35 acre-feet.

1 ¼" 24 hour Type II Rainfall for 32.5 ac. Basin = 1.61 acre-feet.

Required 20% of 1.61 ac.-ft. (On-Site Only) = 0.32 ac.-ft. to be detained for more than 24 hours.

Actual: 0.55 ac-ft. (On-Site and Off-Site) detained for more than 24 hours.

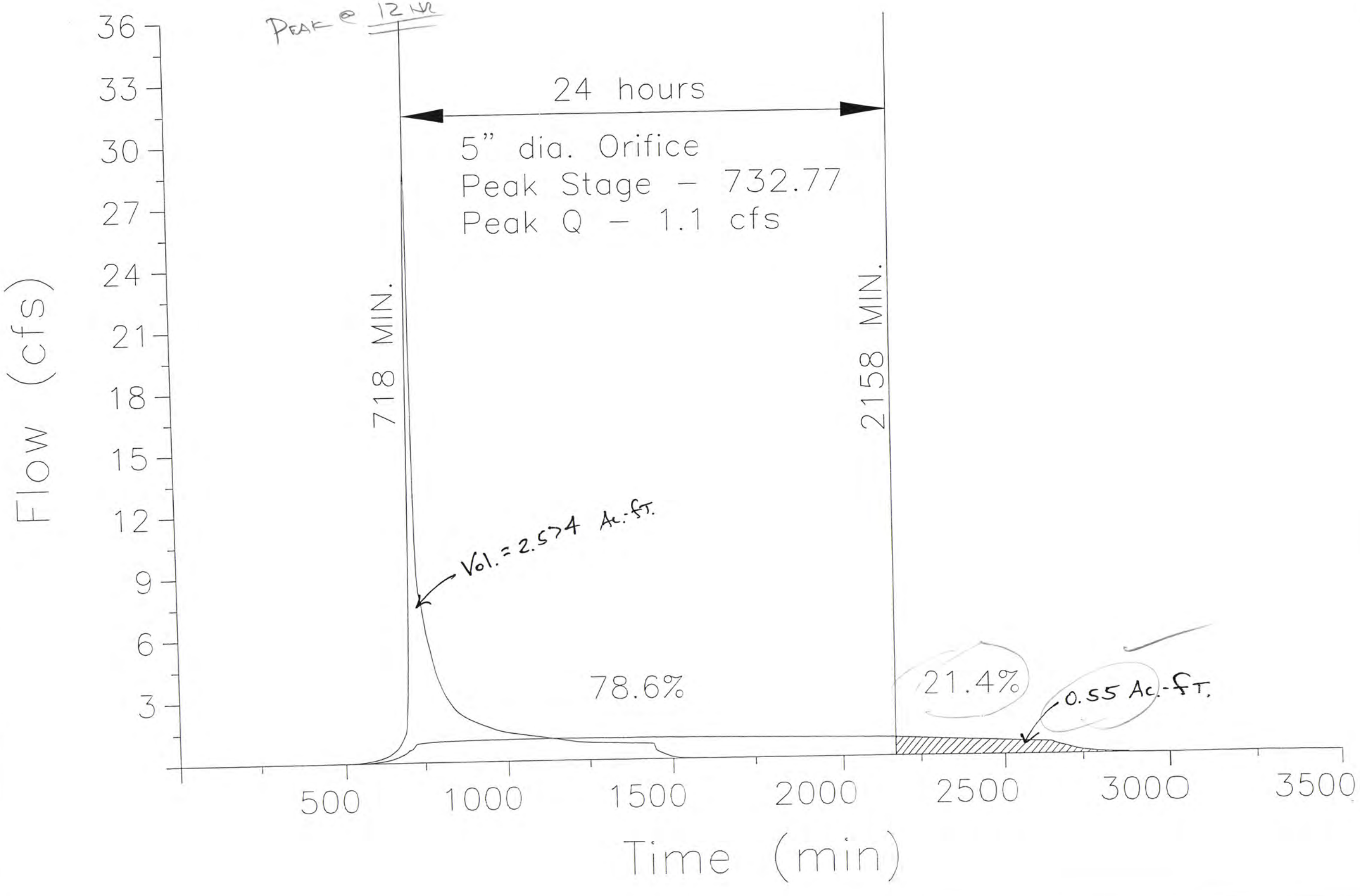
Total Volume On-site and Off-site = 2.57 ac.-ft.

0.55 ac-ft./2.57 = 21%

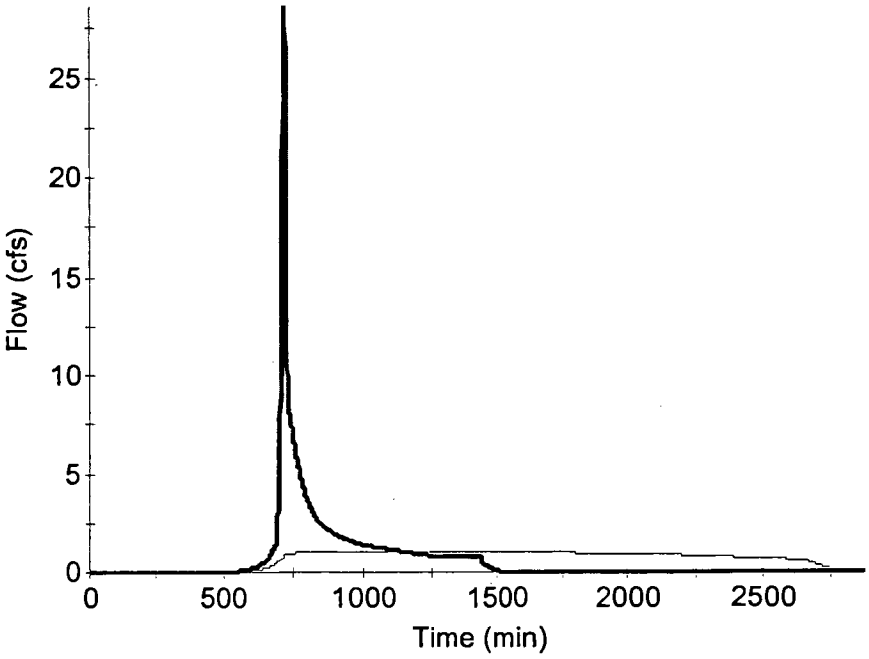
Hydrograph
1.25in STORM EVENT

POND2

Peak @ 12 hr



Hydrograph
POND2 OUT 1.25in



Currently Plotted Curves

———	POND2	IN 1.25in
———	POND2	OUT 1.25in

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JOHNSON.RNQ Type II

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
1.25in	1.2500	Synthetic Curve	SCSTYPES	TypeII 24hr

ICPM CALCULATION TOLERANCES

Target Convergence=	.000	cfs +/-
Max. Iterations =	35	loops
ICPM Time Step =	1.00	min
Output Time Step =	1.00	min
ICPM Ending Time =	2880.00	min

WATER QUALITY

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
C.B. MIDDLE SCH	AREA	1.25	.003		746.00	.01		
CAMELOT	AREA	1.25	.618		762.00	2.00		
FRANKLIN MEADOWS	AREA	1.25	.155		758.00	.53		
J. MEM HOSP	AREA	1.25	1.984		753.00	11.85		
NURSING HOME	AREA	1.25	.253		736.00	2.07		
*OUT FALL	T-E	1.25	5.116		753.00	14.41	725.00	
POND2	POND	1.25	2.574		718.00	28.68		
POND2	OUT POND	1.25	2.570		1060.00	1.05	732.77	1.557
PROJ SITE	AREA	1.25	1.612		718.00	27.71		

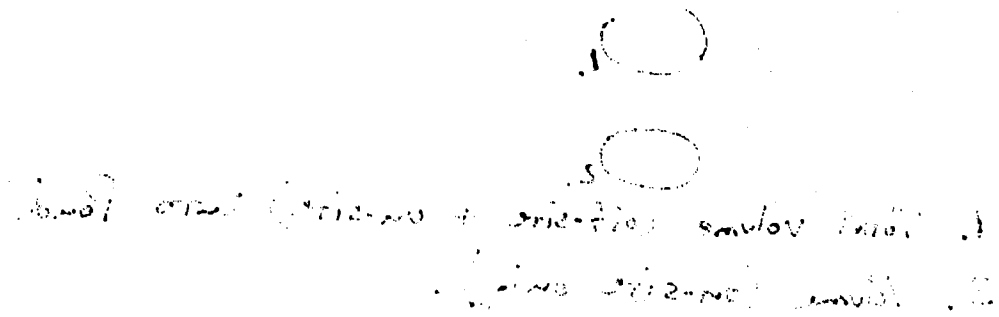
1. Total volume (off-site + on-site) into Pond
2. Volume (on-site only).

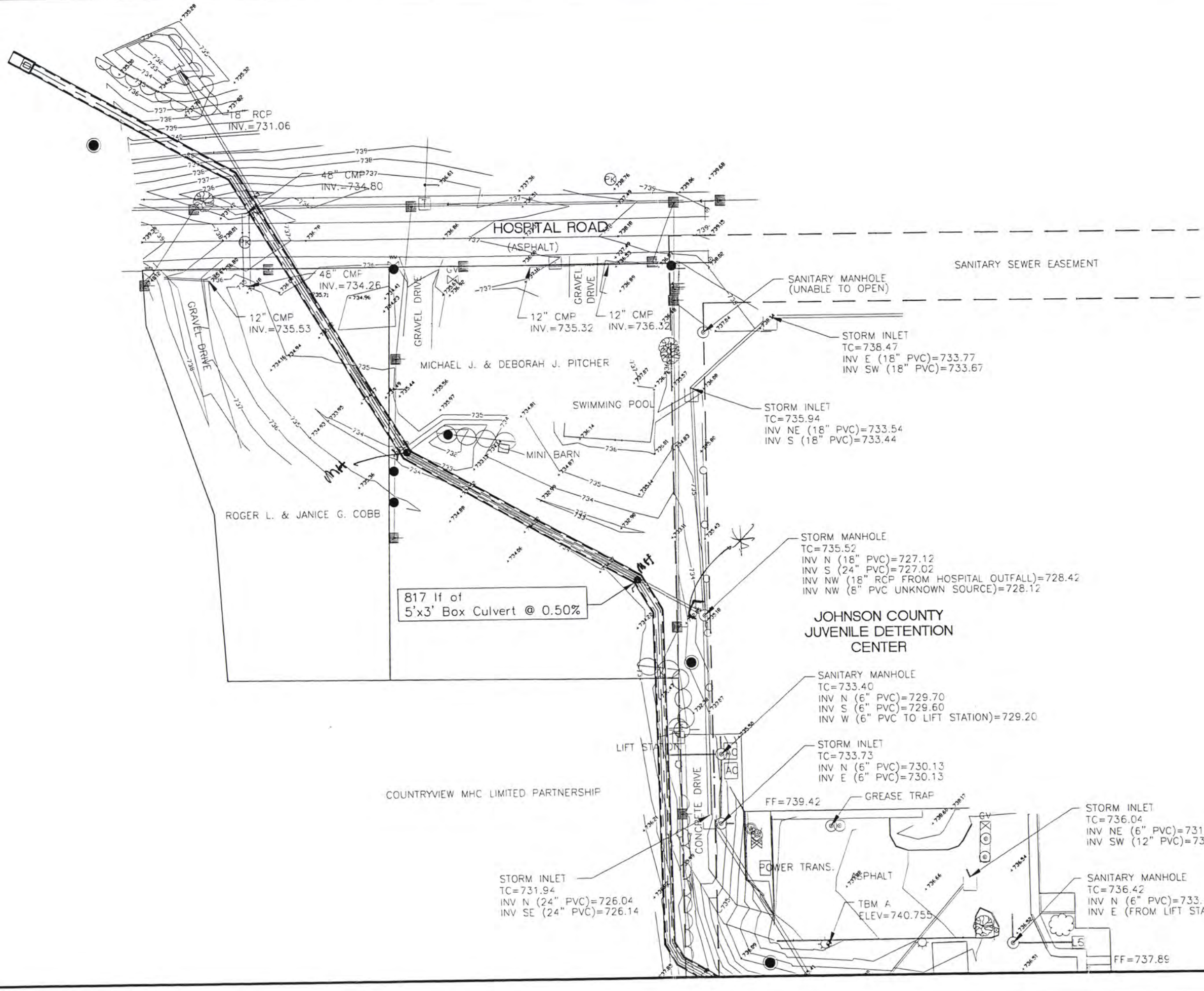
S/N: 321105F06A8A
PondPack Ver. 7.5 (765) Compute Time: 10:07:15 Date: 07/09/2001

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
RESIDENTIAL NE	AREA	1.25	.407		770.00	1.33		
RESIDENTIAL SOUT	AREA	1.25	.088		752.00	.41		





BSA DESIGN

ARCHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES

BSA Design
8365 Counselors Row / Suite 300
Indianapolis, Indiana 46240-1479
317.819.7878 ph 317.819.7288 fx www.bsadesign.com

EMHT, Inc.
Evans, Mechwart, Hambleton & Tilton, Inc.
Consulting Engineers & Surveyors
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION

MASTER DRAINAGE PLAN
OFF SITE OUTLET

JOHNSON MEMORIAL Hospital

Year 2000 / 2001 Capital Improvement Project

SCALE CLIENT NO.

DATE 14 JUNE 2001 COMMISSION 055116

COORD.

DRAWN

APPROVED

FILE NAME

4.4

DOWNSTREAM CAPACITY ANALYSIS

A. Downstream Drainage System

The proposed stormwater management system includes the construction of approximately 820 lineal feet of 3' x 5' box culvert to replace the existing 18-inch diameter storm sewer south of Hospital Road. The proposed box culvert will discharge to an open channel located west and south of the Juvenile Detention Center and Correctional Facility. From the outfall location, runoff is conveyed via open channel southeasterly approximately 1200 lineal feet to Young's Creek as shown on Exhibit 5.1 at the end of this section.

Per the Flood Insurance Study for Franklin, Indiana dated October 1, 1980, Young's Creek has an associated Base Flood Elevation of 727.5 feet NVGD at the confluence of the open channel and the creek. Since the confluence of the open channel with Young's Creek is approximately 6 miles downstream of the upper reach of Young's Creek, it is reasonable to assume that the peak stage of the creek will occur much later in time than the peak of the hydrograph for the open channel. Therefore, the tailwater imparted to the upstream system has been neglected in the capacity calculations of the open channel and culverts. The BFE for Young's Creek of 727.5 feet NVGD is also below the invert of the detention basin outlet structure (El. 730.0) and will therefore impart no effect on the stage/storage performance of the detention basin.

B. Watershed and Sub-basins

The watershed of the open channel from Hospital Road to Young's Creek consists of two primary sub-sheds. The first sub-shed introduces runoff at the outfall of the proposed box culvert and includes all of the sub-basins that contribute to the proposed detention basin as well as additional areas south of Hospital Road including the Juvenile Detention Center and the Correctional Facility. The area of the contributing watershed for the upper reach of the open channel is approximately 110 acres.

The contributing watershed is significantly increased immediately downstream of the 48-inch culvert (Culvert #1) that carries the channel under an asphalt drive east of the Correctional Facility. At this point, 54-inch and 18-inch storm sewers outlet on the north bank of the channel which conveys runoff from the north, including the existing Johnson Memorial Hospital Campus. The contributing watershed of the open channel is increased to approximately 200 acres at the downstream end of Culvert #2.

C. Existing and Post-Developed Runoff Calculations

The sewer and open channel system south of Hospital Road has been surveyed and analyzed to determine its ability to adequately convey the post-developed flows from the associated on-site and off-site contributing sub-basins. The hydraulic capacity of the open channels and culverts south of the Juvenile Detention Center and Correctional Facility have been calculated to determine the system's capacity relative to the various frequency rainfall events.

The capacity of the open channel upstream and downstream of Culvert #1 has been calculated with the computer input and output data included as Appendix C of this report. Per Table 5.1 included at the end of this section, the open channel sections both upstream and downstream of Culvert #1 are capable of conveying the peak flow from a 100-year event within the banks for both existing and post-developed conditions. Although the two 48-inch diameter culverts

(Culverts 1 and 2) are not sufficient to convey peak flows from a 10-year event via gravity flow for both existing and post-developed conditions, it must be noted that the proposed stormwater management system significantly reduces the peak flow rates at these structures for the range of storm frequencies studied. The 100-year peak flow at Culvert #1 is reduced from 233 cfs to 141 cfs from existing to post-developed conditions. Likewise, the 100-year peak flow at Culvert #2 is reduced from 387 cfs to 290 cfs due to the storage provided by the proposed dry detention basin.

D. Table and Exhibits

Table 5.1 follows and provides a summary of the channel and culvert capacities and demand flow rates. Exhibit 5.1 depicts the topographic information for the downstream system as well as the locations of the various cross-sections utilized for calculation of channel capacities.

TABLE 5.1

DITCH CAPACITIES

Section	NORTH OF KENNEL Q cfs	A-A Elev.	B-B Elev.	C-C Elev.	SOUTH OF JAIL Q cfs	D-D Elev.	E-E Elev.	F-F Elev.
Existing Conditions								
Q_2	138.0	723.98	725.50	725.14	78.00	726.47	727.65	727.59
Q_{10}	246.0	725.30	727.04	726.15	145.00	727.13	728.31	728.21
Q_{100}	387.0	726.60	728.64	727.11	233.00	727.67	729.06	728.81
Post-Developed								
Q_2	116.0	723.64	725.12	724.88	59.00	726.24	727.40	727.33
Q_{10}	201.0	724.80	726.45	725.77	102.00	726.75	727.92	727.83
Q_{100}	290.0	725.74	727.55	726.48	141.00	727.10	728.28	728.18
Bank Full	538.3	727.77			612.2	729.00		
	351.0		728.20		402.5		729.88	
	437.1			727.40	459.1			729.88

CULVERT CAPACITIES

	NORTH OF KENNEL Q cfs	CULVERT NO.2	SOUTH OF JAIL Q cfs	CULVERT NO.1
Existing Conditions				
Q_2	138.0	728.83	78.00	729.15
Q_{10}	246.0	O.T.	145.00	O.T.
Q_{100}	387.0	O.T.	233.00	O.T.
Post-Developed				
Q_2	116.0	726.87	59.00	728.14
Q_{10}	201.0	O.T.	102.00	731.17
Q_{100}	290.0	O.T.	141.00	O.T.
Culvert Full overtopping	58.8	724.00	56.8	728.03
	138.8	728.91	120.6	733.00

Drainage Summary

ON-SITE PRE-DEVELOPED CONDITIONS

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Pre-Dev Site	11.23	25.88	47.22

OFF-SITE CONDITIONS

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Camelot	32.10	63.81	106.46
Nursing Home	8.13	12.80	18.52
C.B. Middle Sch.	0.29	0.63	1.10
Residential South	4.41	8.28	13.36
Total OS	44.93	85.52	139.44

ALLOWABLE RELEASE RATES

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Pre-Dev Site	11.23 (Pre-2 yr)	11.23 (Pre-2 yr)	25.88 (Pre-10 yr)
Off-Site	44.93 (2 yr)	85.52 (10 yr)	139.44 (100 yr)
Totals	56.16	96.75	165.32

11.23 PRE 2 + 85.52 OFFSITE PRE 10 = 96.75 CFS > OK

POST 10 FROM POND = 78 CFS

25.88 PRE 10 + 139.44 OFFSITE PRE 100 = 165.32 CFS > OK

POST 100 FROM POND = 109 CFS

POST-DEVELOPED DRAINAGE ANALYSIS

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Post-Dev. Site	98	152	216
Dry Basin In	110	178	263
Dry Basin Out	43	78	105
Allowable Release	56	97	165
% of Allowable	77%	80%	64%

The proposed design is detaining offsite and on-site drainage and releasing it at a lower rate than allowed per drainage ordinance.

PIPE CAPACITIES

Pipe Size	Pre-Developed	Post-Developed	Full Capacity
48" @ 0.50%	Q_{10} = 87 cfs		102 cfs
54" @ 0.25%	Q_{10} = 87 cfs		98 cfs
60" @ 0.15%	Q_{10} = 88cfs		101 cfs

Down STream Analysis

SEE ATTACHED REVISIONS

TABLE 5.1

DITCH CAPACITIES

Section	NORTH OF KENNEL Q cfs	A-A Elev.	B-B Elev.	C-C Elev.	SOUTH OF JAIL Q cfs	D-D Elev.	E-E Elev.	F-F Elev.
Existing Conditions								
Q_2	138.0	723.98	725.50	725.14	78.00	726.47	727.65	727.59
Q_{10}	246.0	725.30	727.04	726.15	145.00	727.13	728.31	728.21
Q_{100}	387.0	726.60	728.64	727.11	233.00	727.67	729.06	728.81
Post-Developed								
Q_2	116.0	723.64	725.12	724.88	59.00	726.24	727.40	727.33
Q_{10}	201.0	724.80	726.45	725.77	102.00	726.75	727.92	727.83
Q_{100}	290.0	725.74	727.55	726.48	141.00	727.10	728.28	728.18
Bank Full	538.3	727.77			612.2	729.00		
	351.0		728.20		402.5		729.88	
	437.1			727.40	459.1			729.88

CULVERT CAPACITIES

	NORTH OF KENNEL Q cfs	CULVERT NO.2	SOUTH OF JAIL Q cfs	CULVERT NO.1
Existing Conditions				
Q_2	138.0	728.83	78.00	729.15
Q_{10}	246.0	O.T.	145.00	O.T.
Q_{100}	387.0	O.T.	233.00	O.T.
Post-Developed				
Q_2	116.0	726.87	59.00	728.14
Q_{10}	201.0	O.T.	102.00	731.17
Q_{100}	290.0	O.T.	141.00	O.T.
Culvert Full overtopping	58.8	724.00	56.8	728.03
	138.8	728.91	120.6	733.00

- SUBMERGED, BUT NOT O.T.

D. Staged Detention Calculations

The proposed dry detention basin and outlet control structure are designed to comply with the staged detention requirements of the Subdivision Control Ordinance. Specifically, the storage capacity and outlet hydraulics of the system are designed to release the 100-year post-developed event at a peak rate equal to or less than the existing 10-year peak flow and release of the 10-year post-developed event at a peak rate equal to or less than existing 2-year peak flow.

The allowable release rates from the project site are calculated based upon a "pass-through" condition for the off-site contributing sub-basins. Thus, the allowable 100-year rate is determined by mathematically adding the existing 10-year peak runoff rate from the project site to the 100-year peak runoff rate of the off-site contributing watershed areas. A similar calculation is used to determine the 10-year allowable release rate as well. The following table summarizes the determination of allowable release rates and a comparison to the design release rates of the proposed detention basin:

Allowable Release Rates

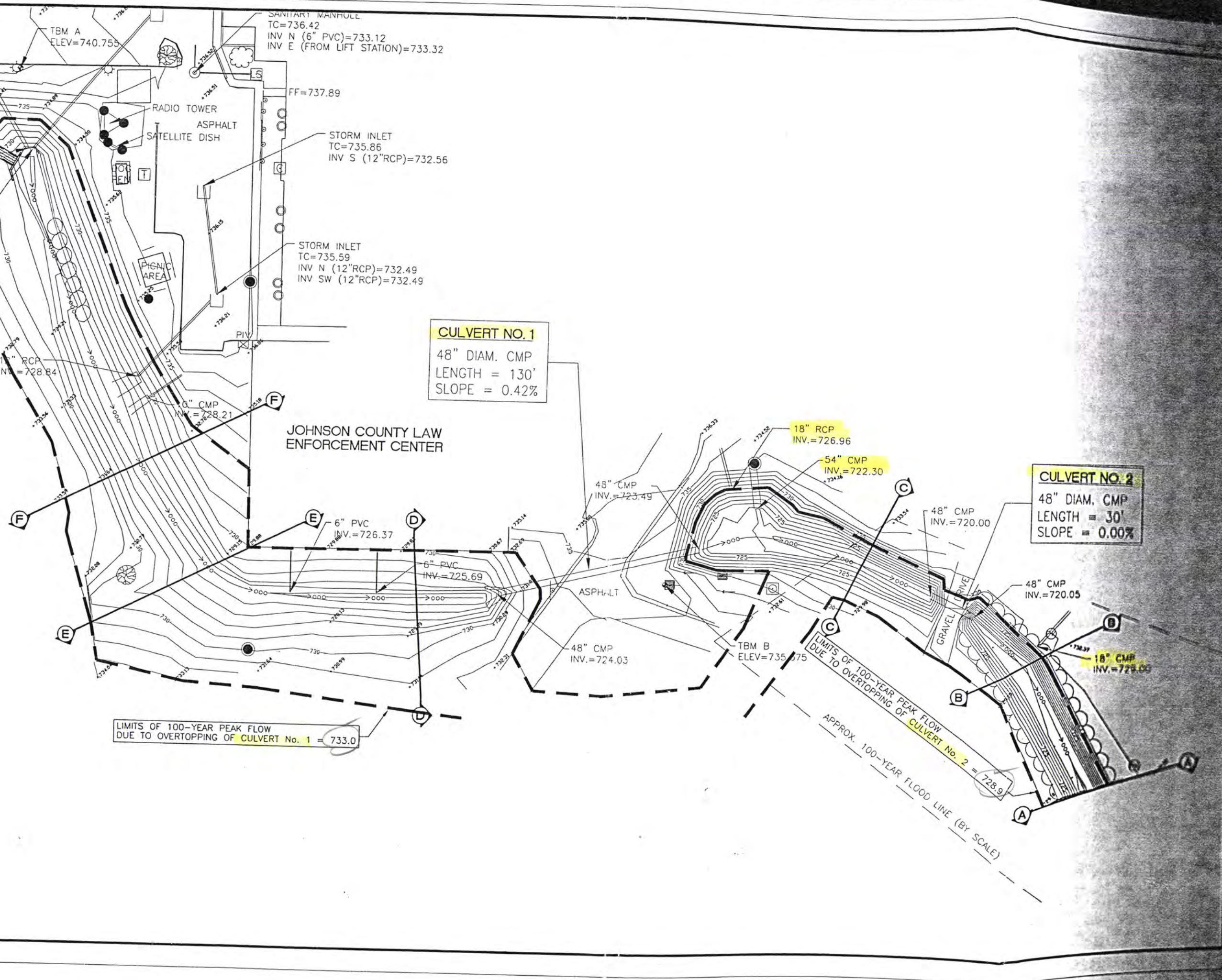
Basin	Q2cfs	Q10cfs	Q100cfs
Pre-Dev Site	11.23 (Pre-2 yr.)	11.23 (Pre-2 yr.)	25.88 (Pre-10 yr.)
Off-Site	44.93 (2 yr.)	85.52 (10 yr.)	139.44 (100 yr.)
Totals	56.16	96.75	165

Pond Inflow and Outflow Rates

Basin	Q2cfs	Q10cfs	Q100cfs
Dry Basin In	110	178	263
Dry Basin Out	43	78	105
Allowable Release	56	97	165
% of Allowable	77%	80%	64%

E. Water Quality Provisions

The proposed stormwater management system is designed to comply with the water quality provisions of the Subdivision Control Ordinance via the introduction of a 5-inch diameter low-flow orifice structure incorporated in the design of the primary outlet structure. The 5-inch orifice provides sufficient restriction to detain 21% of the on-site and off-site volume of a 1-¼ inch


TBM A
ELEV=740.755
SANITARY MANHOLE
TC=736.42
INV N (6" PVC)=733.12
INV E (FROM LIFT STATION)=733.32
FF=737.89
RADIO TOWER
ASPHALT
SATELLITE DISH
STORM INLET
TC=735.86
INV S (12"RCP)=732.56
STORM INLET
TC=735.59
INV N (12"RCP)=732.49
INV SW (12"RCP)=732.49
PICNIC AREA
PIV
CULVERT NO. 1
48" DIAM. CMP
LENGTH = 130'
SLOPE = 0.42%
JOHNSON COUNTY LAW
ENFORCEMENT CENTER
48" CMP
INV.=728.21
48" CMP
INV.=723.49
6" PVC
INV.=726.37
6" PVC
INV.=725.69
ASPHALT
48" CMP
INV.=724.03
TBM B
ELEV=735.075
18" RCP
INV.=726.96
54" CMP
INV.=722.30
48" CMP
INV.=720.00
CULVERT NO. 2
48" DIAM. CMP
LENGTH = 30'
SLOPE = 0.00%
48" CMP
INV.=720.05
18" CMP
INV.=729.09
GRAVEL DRIVE
LIMITS OF 100-YEAR PEAK FLOW
DUE TO OVERTOPPING OF CULVERT No. 1 = 733.0
LIMITS OF 100-YEAR PEAK FLOW
DUE TO OVERTOPPING OF CULVERT No. 2 = 728.9
APPROX. 100-YEAR FLOOD LINE (BY SCALE)
MASTER DRAINAGE PLAN
JOHNSON COUNTY
MEMORIAL
2008
Year 2008 / 2009
Capital Improvement
Project
5.1

DRY BASIN

Pond	Stage	Area (sf)	Area (ac)	Volume (ac-ft)
Outlet	730	0	0	0
	731	8467	0.194	0.065
	732	39561	0.908	0.572
	733	74217	1.70	1.858
	734	78675	1.81	3.612
	735	83094	1.908	5.469
	736	87570	2.01	7.428
	737	92114	2.11	9.490
	738	96717	2.22	11.657
Top Bank	739	101390	2.33	13.931

	Q_2 cfs	Q_2 Peak	Q_{10} cfs	Q_{10} Peak	Q_{100} cfs	Q_{100} Peak
Q In	110		178		263	
Q Out	43	734.2	78	735.5	105	737.5

OUTLET STRUCTURE

Outlet	Elevation	Size	Slope	Length
Orifice	730.00	5" dia.	Perpendicular	-
Orifice	733.7	36" x 48"	Parallel	-
Box Culvert	730.00	5'x 3'	0.50%	817 lf

C 25.9 Ac × 79 = 2046.1

B 6.5 Ac × 69 = 448.5

32.4 2494.6 = 77

51

C : 25.9 × 74 : 1916.6

B : 6.5 × 61 : 396.5

32.4 2313.1 = 71.4

---

53 C : 36 Ac × 81 = 2916

B : 24 Ac × 72 = 1728

60 4644 = 77.4

---

54 C : 24.5 Ac × 81 = 1984.5

B : 10.5 Ac × 72 = 756.0

35.0 2740.5 = 78.3

---

56 C : 9 Ac × 81 = 729

B : 6 Ac × 72 = 432

15 1161 = 77.4

---

57 C : 5.4 Ac × 81 = 437.4

B : 0.6 Ac × 72 = 43.2

6.0 480.6 = 80.1

RAINFALL INTENSITIES

2YR – 3.00 IN

10YR – 4.30 IN

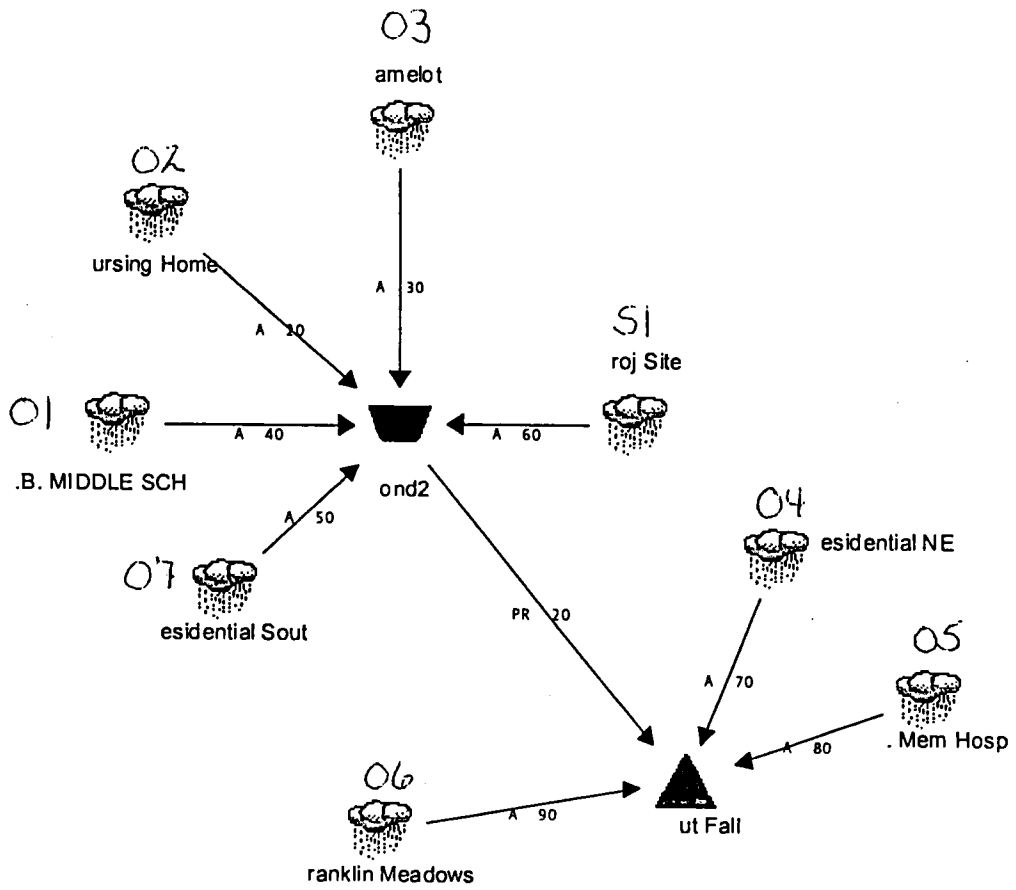
100YR – 5.90 IN

REVISED

Table 3.1

SUMMARY OF EXISTING SUB-BASINS

DESC.	BASIN	AREA	CONDITION	SOIL CLASS	SOIL TYPE	Cn	Weighted Cn	Tc (min.)
C.B. Middle School	01	0.5 ac.	Lawn (good)	CsB2	C	74	POST 74	POST 39.2
Nursing Home	02	5.6 ac.	Commercial	CrA (80%) BR (20%)	C B	94 92	91	40.3
Camelot	03	60.0 ac.	Residential (1/3 acre)	CrA (60%) BR (40%)	C B	81 72	77.4	62.1
Residential N.E.	04	35.0 ac.	Residential (1/3 acre)	CrA (70%) BR (30%)	C B	81 72	78.3	70.4
J. Mem. Hospital	05	40.0 ac.	Commercial	CrA (80%) BR (20%)	C B	94 92	92	64.2
Franklin Meadows	06	15.0 ac.	Residential (1/3 acre)	CrA (60%) BR (40%)	C B	81 72	77.4	56.8
Residential South	07	6.0 ac.	Residential (1/3 acre)	CrA (90%) MnB2 (10%)	C B	81 72	80.1	49.9
Project Site	S1	32.4 ac.	Pasture (fair)	CrA (80%) BR (20%)	C B	74 61	92 71.4	5? 61.8 POST


03
amelot
02
ursing Home
A 30
A 20
S1
roj Site
01
A 40
A 60
.B. MIDDLE SCH
ond2
A 50
04
esidential NE
07
esidential Sout
PR 20
05
A 70
. Mem Hosp
A 80
06
A 90
ut Fall
ranklin Meadows

EMH&T INC.
EVANS, MECHWART, HAMBLETON & TILTON, INC.
CONSULTING ENGINEERS & SURVEYORS

Facsimile Transmission

Date of transmission: **8-7-01**
Number of sheets including cover sheet: **10**

To:
Name: Allen Kirk, P.E.
Company: Johnson County Planning Dept.
Fax Number: 317-736-4722

From:
Name: Mr. Rich Kelly
Fax Number: 317-913-6928

Job: Johnson Memorial Hospital
Master Drainage Design

Fax Notes:

Allen:

Attached please find information to clarify our discussion last evening as follows:

1. The peak inflow rates into the detention basin are found on Page 1.02 at Appendix B. I've attached a copy for reference.

2. I've attached revised Table 5.1 "Downstream Analysis." It appears that we did not adjust the existing flow rates (2, 10, and 100-year) for the downstream culvert and channel analysis when we lowered the CN values for the various watersheds a couple of weeks ago. The existing peak flow rates for the two culverts are found on Page 1.02 of Appendix A. I've attached a copy for reference. The revisions to the CN values lowered slightly the existing flows at Culverts 1 and 2. However, the same conclusions can be drawn about Culverts 1 and 2 – both overtop for the 100-year event and operate under head for a 10-year event.

We trust that these responses address the questions we discussed yesterday. Please call if you need any additional information.

Rich Kelly, PE

cc: Rick Berger/BSA Design 819-7288

NOTE TO RECEIVING OPERATOR: IN THE EVENT TRANSMISSION IS NOT COMPLETE PLEASE CALL 317-913-6930.

\\INDSRV01\Ind\Project\20010616\docs\Kirk080701fax.doc

Type.... Master Network Summary
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

From Appendix B

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
J. MEM HOSP	AREA	2	7.204		753.00	43.46		
J. MEM HOSP	AREA	10	11.360		753.00	67.54		
J. MEM HOSP	AREA	100	16.571		753.00	96.96		
J. MEM HOSP	AREA	1.25	1.984		753.00	11.85		
NURSING HOME	AREA	2	.967		736.00	8.13		
NURSING HOME	AREA	10	1.542		736.00	12.80		
NURSING HOME	AREA	100	2.268		736.00	18.52		
NURSING HOME	AREA	1.25	.253		736.00	2.07		
*OUT FALL	T-E	2	23.918		753.00	111.30	725.00	
*OUT FALL	T-E	10	41.668		753.00	194.83	725.00	
*OUT FALL	T-E	100	65.004		753.00	282.65	725.00	
*OUT FALL	T-E	1.25	5.116		753.00	14.41	725.00	
POND2	POND	2	12.956		718.00	110.35		
POND2	POND	10	22.404		718.00	177.72		
POND2	POND	100	34.870		718.00	262.50		
POND2	POND	1.25	2.574		718.00	28.68		
POND2	OUT POND	2	12.002		764.00	43.31	734.24	4.052
POND2	OUT POND	10	21.428		765.00	77.88	735.45	6.346
POND2	OUT POND	100	33.876		773.00	104.62	737.51	10.597
POND2	OUT POND	1.25	2.570		1060.00	1.05	732.77	1.557
PROJ SITE	AREA	2	5.854		717.00	98.29		
PROJ SITE	AREA	10	9.231		717.00	151.56		
PROJ SITE	AREA	100	13.465		717.00	216.41		
PROJ SITE	AREA	1.25	1.612		718.00	27.71		
RESIDENTIAL NE	AREA	2	3.344		761.00	17.92		
RESIDENTIAL NE	AREA	10	6.279		760.00	34.88		
RESIDENTIAL NE	AREA	100	10.268		752.00	57.53		
RESIDENTIAL NE	AREA	1.25	.407		770.00	1.33		

Basin inflow rates

Basin outflow rates

S/N: 321105F06A8A
PondPack Ver. 7.5 (765)

EMH&T Inc.
Compute Time: 10:55:25 Date: 07/06/2001

Type.... Master Network Summary
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

From Appendix A

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
NURSING HOME	AREA	1.25	.253		736.00	2.07		
*OUT FALL	JCT	2	21.122		753.00	122.46		
*OUT FALL	JCT	10	37.818		751.00	225.22		
*OUT FALL	JCT	100	60.243		751.00	361.62		
*OUT FALL	JCT	1.25	3.630		753.00	17.31		
P1	JCT	2	6.436		746.00	37.81		
P1	JCT	10	11.947		745.00	73.21		
P1	JCT	100	19.425		745.00	120.70		
P1	JCT	1.25	.872		746.00	3.43		
P2	JCT	2	9.206		750.00	53.20		
P2	JCT	10	17.578		749.00	107.14		
P2	JCT	100	29.115		749.00	180.66		
P2	JCT	1.25	1.084		746.00	3.87		
P3	JCT	2	21.122		753.00	122.46		
P3	JCT	10	37.818		751.00	225.22		
P3	JCT	100	60.243		751.00	361.62		
P3	JCT	1.25	3.630		753.00	17.31		
PROJ SITE	AREA	2	2.104		757.00	11.23		
PROJ SITE	AREA	10	4.405		750.00	25.88		
PROJ SITE	AREA	100	7.710		750.00	47.22		
PROJ SITE	AREA	1.25	.122		810.00	.19		
RESIDENTIAL NE	AREA	2	3.344		761.00	17.92		
RESIDENTIAL NE	AREA	10	6.279		760.00	34.88		
RESIDENTIAL NE	AREA	100	10.268		752.00	57.53		
RESIDENTIAL NE	AREA	1.25	.407		770.00	1.33		
RESIDENTIAL SOUT	AREA	2	.628		745.00	4.41		
RESIDENTIAL SOUT	AREA	10	1.150		745.00	8.28		
RESIDENTIAL SOUT	AREA	100	1.851		745.00	13.36		

Existing Peak flows at Culvert No. 1 (Node P2)

Existing Peak flows at Culvert No. 2 (Node P3)

Culvert Calculator Report
48" Culvert No. 1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	733.00 ft	Headwater Depth/ Height	0.96
Computed Headwater Elevation	727.86 ft	Discharge	53.20 cfs
Inlet Control HW Elev	727.52 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	727.86 ft	Control Type	Outlet Control

Q_{25}

Grades			
Upstream Invert	724.03 ft	Downstream Invert	723.49 ft
Length	130.00 ft	Constructed Slope	0.004154 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	2.19 ft
Slope Type	Mild	Normal Depth	3.56 ft
Flow Regime	Subcritical	Critical Depth	2.19 ft
Velocity Downstream	7.56 ft/s	Critical Slope	0.013797 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	727.86 ft	Upstream Velocity Head	0.42 ft
Ke	0.90	Entrance Loss	0.38 ft

Inlet Control Properties			
Inlet Control HW Elev	727.52 ft	Flow Control	Unsubmerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05630	Equation Form	1
Y	0.54000		

Culvert Calculator Report
48" Culvert No. 1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	733.00 ft	Headwater Depth/ Height	1.91
Computed Headwater Elevation	731.65 ft	Discharge	107.10 cfs
Inlet Control HW Elev	730.20 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	731.65 ft	Control Type	Outlet Control

Q 10 year

Grades			
Upstream Invert	724.03 ft	Downstream Invert	723.49 ft
Length	130.00 ft	Constructed Slope	0.004154 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.13 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.13 ft
Velocity Downstream	10.15 ft/s	Critical Slope	0.020726 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	731.65 ft	Upstream Velocity Head	1.13 ft
Ke	0.90	Entrance Loss	1.02 ft

Inlet Control Properties			
Inlet Control HW Elev	730.20 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 6 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Calculator Report
48" Culvert No. 1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	739.00 ft	Headwater Depth/ Height	4.12
Computed Headwater Elevation	740.52 ft	Discharge	180.70 cfs
Inlet Control HW Elev	737.62 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	740.52 ft	Control Type	Outlet Control

Q100yr.

Grades			
Upstream Invert	724.03 ft	Downstream Invert	723.49 ft
Length	130.00 ft	Constructed Slope	0.004154 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.78 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.78 ft
Velocity Downstream	14.70 ft/s	Critical Slope	0.048646 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	740.52 ft	Upstream Velocity Head	3.21 ft
Ke	0.90	Entrance Loss	2.89 ft

Inlet Control Properties			
Inlet Control HW Elev	737.62 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Calculator Report
48" Culvert No. 2

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	728.91 ft	Headwater Depth/ Height	1.85
Computed Headwater Elevation	727.42 ft	Discharge	122.50 cfs
Inlet Control HW Elev	727.42 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	727.22 ft	Control Type	Inlet Control

Grades			
Upstream Invert	720.00 ft	Downstream Invert	720.00 ft
Length	29.42 ft	Constructed Slope	0.000034 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.33 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.33 ft
Velocity Downstream	10.96 ft/s	Critical Slope	0.024152 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	727.22 ft	Upstream Velocity Head	1.48 ft
Ke	0.90	Entrance Loss	1.33 ft

Inlet Control Properties			
Inlet Control HW Elev	727.42 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Calculator Report
48" Culvert No. 2

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	728.91 ft	Headwater Depth/ Height	4.98
Computed Headwater Elevation	739.92 ft	Discharge	225.20 cfs
Inlet Control HW Elev	739.92 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	735.91 ft	Control Type	Inlet Control

Grades			
Upstream Invert	720.00 ft	Downstream Invert	720.00 ft
Length	29.42 ft	Constructed Slope	0.000034 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.90 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.90 ft
Velocity Downstream	18.04 ft/s	Critical Slope	0.074395 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	735.91 ft	Upstream Velocity Head	4.99 ft
Ka	0.90	Entrance Loss	4.49 ft

Inlet Control Properties			
Inlet Control HW Elev	739.92 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Calculator Report
48" Culvert No. 2

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	728.91 ft	Headwater Depth/ Height	~~11.99~~
Computed Headwater Elevation	767.95 ft	Discharge	361.60 cfs
Inlet Control HW Elev	767.95 ft	Tailwater Elevation	~~0.00~~ ft
Outlet Control HW Elev	754.80 ft	Control Type	Inlet Control

Q100 yr.

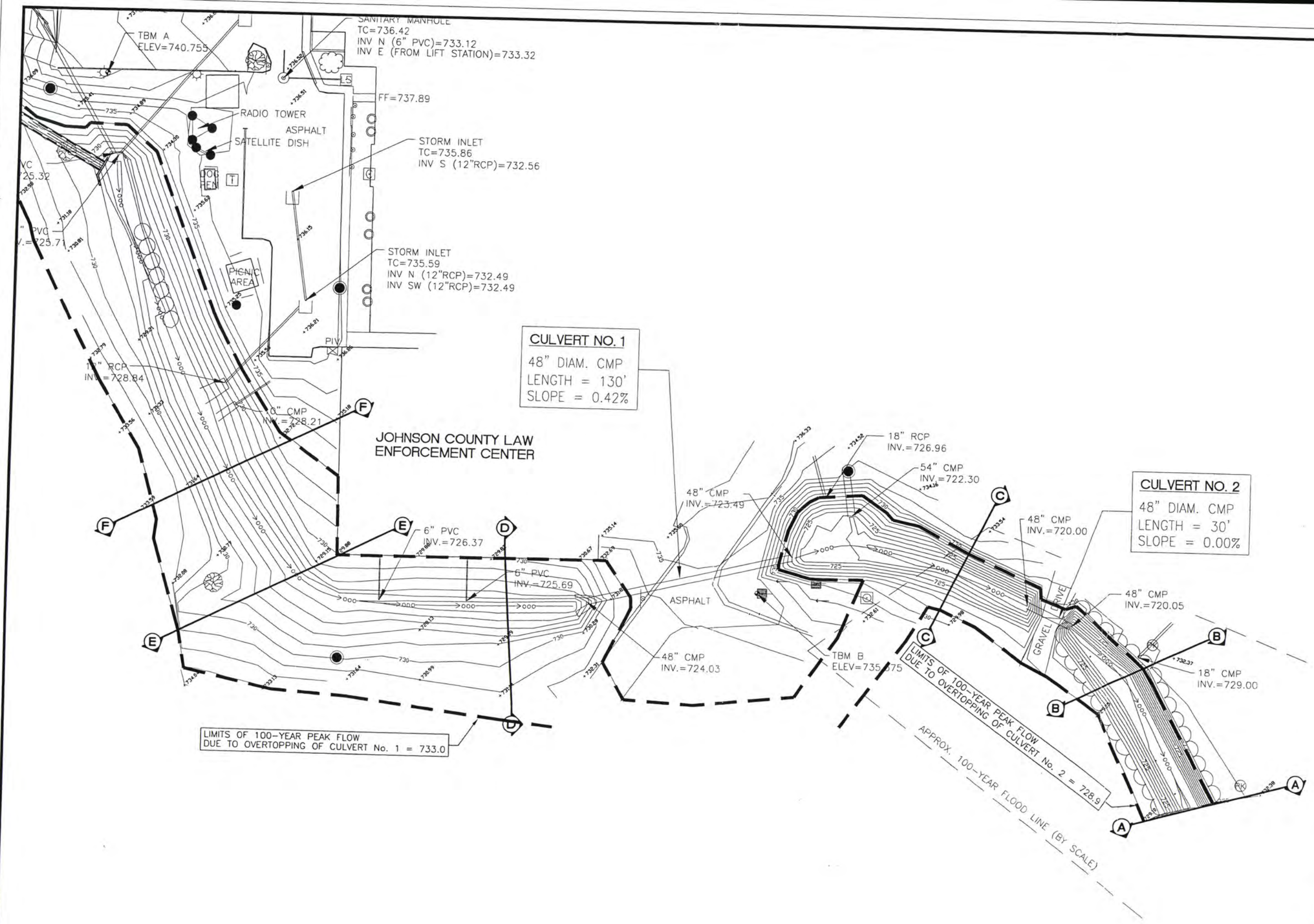
Grades			
Upstream Invert	720.00 ft	Downstream Invert	720.00 ft
Length	29.42 ft	Constructed Slope	0.000034 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.99 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.99 ft
Velocity Downstream	28.79 ft/s	Critical Slope	0.205138 ft/ft

Section			
Section Shape	Circular	Manninge Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	754.80 ft	Upstream Velocity Head	12.87 ft
Ke	0.90	Entrance Loss	11.58 ft

Inlet Control Properties			
Inlet Control HW Elev	767.95 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		



BSA DESIGN

ARCHITECTURE . ENGINEERING . INTERIOR DESIGN
AND A CONTINUUM OF PROJECT MANAGEMENT SERVICES

BSA Design
9365 Counselors Row / Suite 300
Indianapolis Indiana 46240.1479
317.819.7878 ph 317.819.7288 fx www.bsadesign.com

EMHT, Inc.
Evans, Mechwart, Hambleton & Tilton, Inc.
Consulting Engineers & Surveyors
Ph:317-913-6930
Fax:317-913-6928

MARK	DATE	DESCRIPTION

MASTER DRAINAGE PLAN
DOWN STREAM ANALYSIS

JOHNSON MEMORIAL Hosp

Year 2000 / 2001 Capital Improvement Project

SCALE
CLIENT NO.
DATE 14 JUNE 2001 COMMISSION 055116
COORD
DRAWN
APPROVED
FILE NAME

5.1

SUMMARY

The proposed stormwater management system designed to serve the master plan improvements for the Johnson Memorial Hospital complies with the requirements of the Subdivision Control Ordinance as related to staged detention requirements and water quality storage provisions. The peak discharge rates of the proposed dry detention basin range from 64% to 80% of the allowable release rates for the various design storm events. Water quality storage is controlled by a low-flow 5-inch diameter orifice incorporated in the outlet structure of the basin. The 100-peak stage of the basin is 737.5 feet NVGD with an associated storage volume of 10.6 acre-feet. The detention basin provides storage of both on-site and off-site runoff and significantly reduces the peak flow rates imparted to the downstream open channel extending from Hospital Road to Young's Creek. The design includes the construction of approximately 820 lineal feet of 3' x 5' reinforced concrete box culvert to convey the discharge from the detention basin to the open channel south of Hospital Road. The box culvert replaces an existing 18-inch diameter storm sewer and significantly reduces the likelihood of the overtopping of Hospital Road during intense storm events.

Drainage Summary

ON-SITE PRE-DEVELOPED CONDITIONS

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Pre-Dev Site	11.23	25.88	47.22

OFF-SITE CONDITIONS

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Camelot	32.10	63.81	106.46
Nursing Home	8.13	12.80	18.52
C.B. Middle Sch.	0.29	0.63	1.10
Residential South	4.41	8.28	13.36
Total OS	44.93	85.52	139.44

ALLOWABLE RELEASE RATES

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Pre-Dev Site	11.23 (Pre-2 yr)	11.23 (Pre-2 yr)	25.88 (Pre-10 yr)
Off-Site	44.93 (2 yr)	85.52 (10 yr)	139.44 (100 yr)
Totals	56.16	96.75	165.32

POST-DEVELOPED DRAINAGE ANALYSIS

BASIN	Q_2 cfs	Q_{10} cfs	Q_{100} cfs
Post-Dev. Site	98	152	216
Dry Basin In	110	178	263
Dry Basin Out	43	78	105
Allowable Release	56	97	165
% of Allowable	77%	80%	64%

The proposed design is detaining offsite and on-site drainage and releasing it at a lower rate than allowed per drainage ordinance.

PIPE CAPACITIES

Pipe Size	Pre-Developed	Post-Developed	Full Capacity
48" @ 0.50%	Q_{10} = 87 cfs		102 cfs
54" @ 0.25%	Q_{10} = 87 cfs		98 cfs
60" @ 0.15%	Q_{10} = 88cfs		101 cfs

DRY BASIN

Pond	Stage	Area (sf)	Area (ac)	Volume (ac-ft)
Outlet	730	0	0	0
	731	8467	0.194	0.065
	732	39561	0.908	0.572
	733	74217	1.70	1.858
	734	78675	1.81	3.612
	735	83094	1.908	5.469
	736	87570	2.01	7.428
	737	92114	2.11	9.490
	738	96717	2.22	11.657
Top Bank	739	101390	2.33	13.931

	Q_2 cfs	Q_2 Peak	Q_{10} cfs	Q_{10} Peak	Q_{100} cfs	Q_{100} Peak
Q In	110		178		263	
Q Out	43	734.2	78	735.5	105	737.5

OUTLET STRUCTURE

Outlet	Elevation	Size	Slope	Length
Orifice	730.00	5" dia.	Perpendicular	-
Orifice	733.7	36" x 48"	Parallel	-
Box Culvert	730.00	5'x 3'	0.50%	817 lf

Appendix A

Calculations – Existing Conditions

Job File: Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Rain Dir: C:\HAESTAD\PPKW\RAINFALL\

==========
JOB TITLE
==========

Existing Conditions
Johnson Memorial Hospital

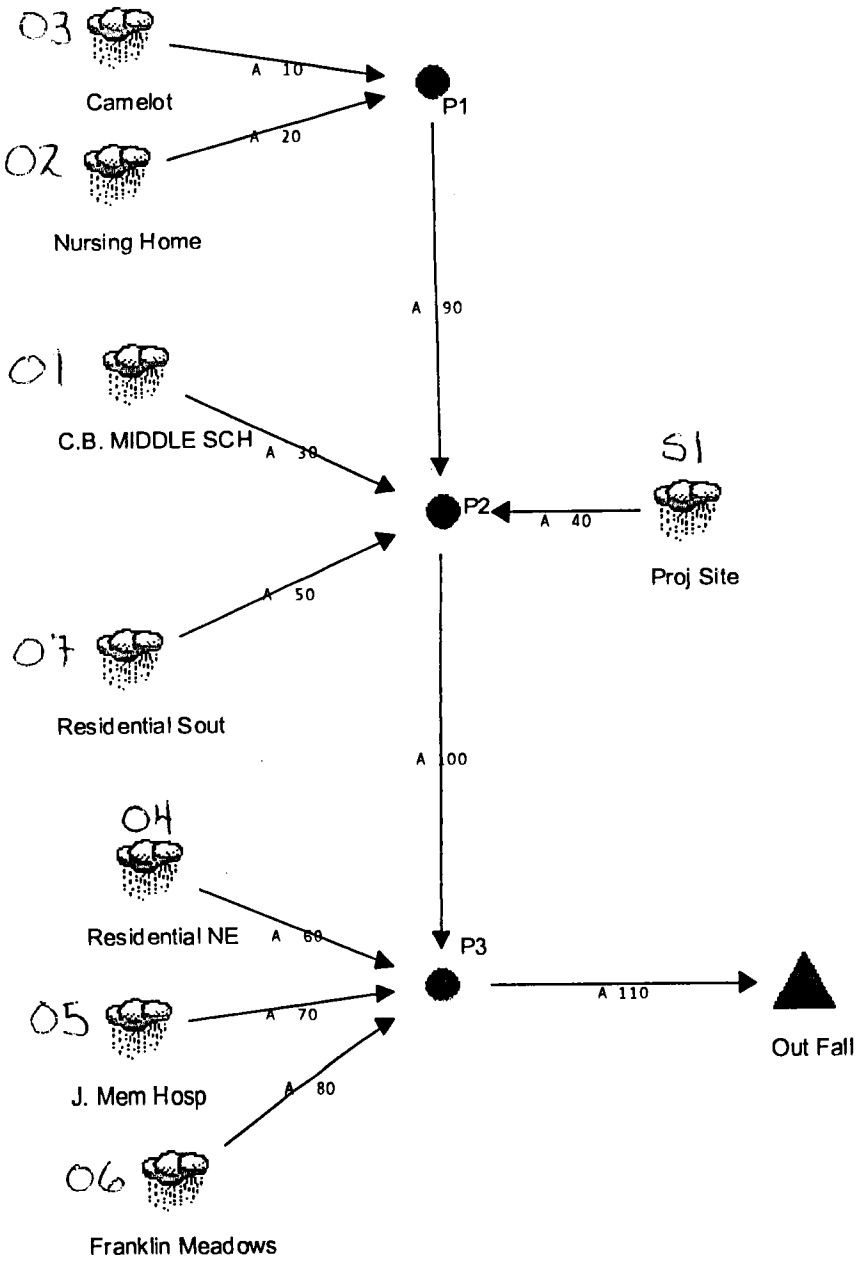

03
Camelot
A 10
P1
02
Nursing Home
A 20
A 90
01
C.B. MIDDLE SCH
A 30
S1
P2
A 40
Proj Site
A 50
07
Residential Sout
A 100
04
Residential NE
A 60
P3
05
J. Mem Hosp
A 70
A 110
Out Fall
A 80
06
Franklin Meadows

Table of Contents

********** MASTER SUMMARY **********

Watershed..... Master Network Summary 1.01

********** NETWORK SUMMARIES (DETAILED) **********

Watershed..... 2 yr
Executive Summary (Nodes) 2.01
Executive Summary (Links) 2.02

Watershed..... 10 yr
Executive Summary (Nodes) 2.04
Executive Summary (Links) 2.05

Watershed..... 1.25in
Executive Summary (Nodes) 2.07
Executive Summary (Links) 2.08
Network Calcs Sequence 2.10

Watershed..... 100 yr
Executive Summary (Nodes) 2.12
Executive Summary (Links) 2.13

********** DESIGN STORMS SUMMARY **********

Type II..... Design Storms 3.01

Type II..... 2 yr
Design Storms 3.02

********** RAINFALL DATA **********

TypeII 24hr.... 2 yr
Synthetic Curve 4.01

Table of Contents (continued)

Synthetic Cumulative Depth 4.03

TypeII 24hr.... 10 yr
Synthetic Curve 4.05
Synthetic Cumulative Depth 4.07

TypeII 24hr.... 1.25in
Synthetic Curve 4.09
Synthetic Cumulative Depth 4.11

TypeII 24hr.... 100 yr
Synthetic Curve 4.13
Synthetic Cumulative Depth 4.15

********** TC CALCULATIONS **********

C.B. MIDDLE SCH Tc Calcs 5.01

CAMELOT..... Tc Calcs 5.03

FRANKLIN MEADOWS Tc Calcs 5.05

J.CO. MEM HOSP.. Tc Calcs 5.07

NURSING HOME.... Tc Calcs 5.09

PROJ SITE..... Tc Calcs 5.11

RESIDENTIAL NE.. Tc Calcs 5.14

RESIDENTIAL SOUT Tc Calcs 5.16

********** RUNOFF HYDROGRAPHS **********

C.B. MIDDLE SCH 2 yr
SCS Unit Hyd. Summary 6.01

C.B. MIDDLE SCH 10 yr
SCS Unit Hyd. Summary 6.02

C.B. MIDDLE SCH 1.25in
SCS Unit Hyd. Summary 6.03

Table of Contents (continued)

C.B. MIDDLE SCH 100 yr
SCS Unit Hyd. Summary 6.04

CAMELOT..... 2 yr
SCS Unit Hyd. Summary 6.05

CAMELOT..... 10 yr
SCS Unit Hyd. Summary 6.06

CAMELOT..... 1.25in
SCS Unit Hyd. Summary 6.07

CAMELOT..... 100 yr
SCS Unit Hyd. Summary 6.08

FRANKLIN MEADOWS 2 yr
SCS Unit Hyd. Summary 6.09

FRANKLIN MEADOWS 10 yr
SCS Unit Hyd. Summary 6.10

FRANKLIN MEADOWS 1.25in
SCS Unit Hyd. Summary 6.11

FRANKLIN MEADOWS 100 yr
SCS Unit Hyd. Summary 6.12

J. MEM HOSP..... 2 yr
SCS Unit Hyd. Summary 6.13

J. MEM HOSP..... 10 yr
SCS Unit Hyd. Summary 6.14

J. MEM HOSP..... 1.25in
SCS Unit Hyd. Summary 6.15

J. MEM HOSP..... 100 yr
SCS Unit Hyd. Summary 6.16

NURSING HOME.... 2 yr
SCS Unit Hyd. Summary 6.17

NURSING HOME.... 10 yr
SCS Unit Hyd. Summary 6.18

NURSING HOME.... 1.25in
SCS Unit Hyd. Summary 6.19

Table of Contents (continued)

NURSING HOME.... 100 yr
SCS Unit Hyd. Summary 6.20

PROJ SITE..... 2 yr
SCS Unit Hyd. Summary 6.21

PROJ SITE..... 10 yr
SCS Unit Hyd. Summary 6.22

PROJ SITE..... 1.25in
SCS Unit Hyd. Summary 6.23

PROJ SITE..... 100 yr
SCS Unit Hyd. Summary 6.24

RESIDENTIAL NE.. 2 yr
SCS Unit Hyd. Summary 6.25

RESIDENTIAL NE.. 10 yr
SCS Unit Hyd. Summary 6.26

RESIDENTIAL NE.. 1.25in
SCS Unit Hyd. Summary 6.27

RESIDENTIAL NE.. 100 yr
SCS Unit Hyd. Summary 6.28

RESIDENTIAL SOUT 2 yr
SCS Unit Hyd. Summary 6.29

RESIDENTIAL SOUT 10 yr
SCS Unit Hyd. Summary 6.30

RESIDENTIAL SOUT 1.25in
SCS Unit Hyd. Summary 6.31

RESIDENTIAL SOUT 100 yr
SCS Unit Hyd. Summary 6.32

Type.... Master Network Summary
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JOHNSON.RNQ Type II

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
2 yr	3.0000	Synthetic Curve	SCSTYPES	TypeII 24hr
10 yr	4.3000	Synthetic Curve	SCSTYPES	TypeII 24hr
100 yr	5.9000	Synthetic Curve	SCSTYPES	TypeII 24hr
1.25in	1.2500	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
C.B. MIDDLE SCH	AREA	2	.038		736.00	.29		
C.B. MIDDLE SCH	AREA	10	.076		736.00	.63		
C.B. MIDDLE SCH	AREA	100	.129		736.00	1.10		
C.B. MIDDLE SCH	AREA	1.25	.003		746.00	.01		
CAMELOT	AREA	2	5.470		753.00	32.10		
CAMELOT	AREA	10	10.405		753.00	63.81		
CAMELOT	AREA	100	17.157		753.00	106.46		
CAMELOT	AREA	1.25	.618		762.00	2.00		
FRANKLIN MEADOWS	AREA	2	1.367		750.00	8.55		
FRANKLIN MEADOWS	AREA	10	2.601		750.00	16.96		
FRANKLIN MEADOWS	AREA	100	4.289		750.00	28.26		
FRANKLIN MEADOWS	AREA	1.25	.155		758.00	.53		
J. MEM HOSP	AREA	2	7.204		753.00	43.46		
J. MEM HOSP	AREA	10	11.360		753.00	67.54		
J. MEM HOSP	AREA	100	16.571		753.00	96.96		
J. MEM HOSP	AREA	1.25	1.984		753.00	11.85		
NURSING HOME	AREA	2	.967		736.00	8.13		
NURSING HOME	AREA	10	1.542		736.00	12.80		
NURSING HOME	AREA	100	2.268		736.00	18.52		

Type.... Master Network Summary
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft	
NURSING HOME	AREA	1.25	.253		736.00	2.07			
*OUT FALL	JCT	2	21.122		753.00	122.46			
*OUT FALL	JCT	10	37.818		751.00	225.22			
*OUT FALL	JCT	100	60.243		751.00	361.62			
*OUT FALL	JCT	1.25	3.630		753.00	17.31			
P1	JCT	2	6.436		746.00	37.81			
P1	JCT	10	11.947		745.00	73.21			
P1	JCT	100	19.425		745.00	120.70			
P1	JCT	1.25	.872		746.00	3.43			
P2	JCT	2	9.206		750.00	53.20			
P2	JCT	10	17.578		749.00	107.14	CULVERT #1		
P2	JCT	100	29.115		749.00	180.66			
P2	JCT	1.25	1.084		746.00	3.87			
P3	JCT	2	21.122		753.00	122.46			
P3	JCT	10	37.818		751.00	225.22	CULVERT #2		
P3	JCT	100	60.243		751.00	361.62			
P3	JCT	1.25	3.630		753.00	17.31			
PROJ SITE	AREA	2	2.104		757.00	11.23			
PROJ SITE	AREA	10	4.405		750.00	25.88			
PROJ SITE	AREA	100	7.710		750.00	47.22			
PROJ SITE	AREA	1.25	.122		810.00	.19			
RESIDENTIAL NE	AREA	2	3.344		761.00	17.92			
RESIDENTIAL NE	AREA	10	6.279		760.00	34.88			
RESIDENTIAL NE	AREA	100	10.268		752.00	57.53			
RESIDENTIAL NE	AREA	1.25	.407		770.00	1.33			
RESIDENTIAL SOUT	AREA	2	.628		745.00	4.41			
RESIDENTIAL SOUT	AREA	10	1.150		745.00	8.28			
RESIDENTIAL SOUT	AREA	100	1.851		745.00	13.36			

Type.... Master Network Summary
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
RESIDENTIAL SOUT AREA		1.25	.088		752.00	.41		

Type.... Executive Summary (Nodes)
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 2 yr

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.038		736.00	.29	
	CAMELOT	AREA	5.470		753.00	32.10	
	FRANKLIN MEADOWS	AREA	1.367		750.00	8.55	
	J. MEM HOSP	AREA	7.204		753.00	43.46	
	NURSING HOME	AREA	.967		736.00	8.13	
Outfall	OUT FALL	JCT	21.122		753.00	122.46	
	P1	JCT	6.436		746.00	37.81	
	P2	JCT	9.206		750.00	53.20	
	P3	JCT	21.122		753.00	122.46	
	PROJ SITE	AREA	2.104		757.00	11.23	
	RESIDENTIAL NE	AREA	3.344		761.00	17.92	
	RESIDENTIAL SOUT	AREA	.628		745.00	4.41	

Type.... Executive Summary (Links)
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 2 yr

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 10	ADD	UN	5.470		753.00	32.10	CAMELOT
		DL	5.470		753.00	32.10	
		DN	6.436		746.00	37.81	P1
A 20	ADD	UN	.967		736.00	8.13	NURSING HOME
		DL	.967		736.00	8.13	
		DN	6.436		746.00	37.81	P1
A 30	ADD	UN	.038		736.00	.29	C.B. MIDDLE SCH
		DL	.038		736.00	.29	
		DN	9.206		750.00	53.20	P2
A 40	ADD	UN	2.104		757.00	11.23	PROJ SITE
		DL	2.104		757.00	11.23	
		DN	9.206		750.00	53.20	P2
A 50	ADD	UN	.628		745.00	4.41	RESIDENTIAL SOUT
		DL	.628		745.00	4.41	
		DN	9.206		750.00	53.20	P2
A 60	ADD	UN	3.344		761.00	17.92	RESIDENTIAL NE
		DL	3.344		761.00	17.92	
		DN	21.122		753.00	122.46	P3
A 70	ADD	UN	7.204		753.00	43.46	J. MEM HOSP
		DL	7.204		753.00	43.46	
		DN	21.122		753.00	122.46	P3

Type.... Executive Summary (Links)
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 2 yr

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 80	ADD	UN	1.367		750.00	8.55	FRANKLIN MEADOWS
		DL	1.367		750.00	8.55	
		DN	21.122		753.00	122.46	P3
A 90	ADD	UN	6.436		746.00	37.81	P1
		DL	6.436		746.00	37.81	
		DN	9.206		750.00	53.20	P2
A 100	ADD	UN	9.206		750.00	53.20	P2
		DL	9.206		750.00	53.20	
		DN	21.122		753.00	122.46	P3
A 110	ADD	UN	21.122		753.00	122.46	P3
		DL	21.122		753.00	122.46	
		DN	21.122		753.00	122.46	OUT FALL

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.076		736.00	.63	
	CAMELOT	AREA	10.405		753.00	63.81	
	FRANKLIN MEADOWS	AREA	2.601		750.00	16.96	
	J. MEM HOSP	AREA	11.360		753.00	67.54	
	NURSING HOME	AREA	1.542		736.00	12.80	
Outfall	OUT FALL	JCT	37.818		751.00	225.22	
	P1	JCT	11.947		745.00	73.21	
	P2	JCT	17.578		749.00	107.14	
	P3	JCT	37.818		751.00	225.22	
	PROJ SITE	AREA	4.405		750.00	25.88	
	RESIDENTIAL NE	AREA	6.279		760.00	34.88	
	RESIDENTIAL SOUT	AREA	1.150		745.00	8.28	

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 10	ADD	UN	10.405		753.00	63.81	CAMELOT
		DL	10.405		753.00	63.81	
		DN	11.947		745.00	73.21	P1
A 20	ADD	UN	1.542		736.00	12.80	NURSING HOME
		DL	1.542		736.00	12.80	
		DN	11.947		745.00	73.21	P1
A 30	ADD	UN	.076		736.00	.63	C.B. MIDDLE SCH
		DL	.076		736.00	.63	
		DN	17.578		749.00	107.14	P2
A 40	ADD	UN	4.405		750.00	25.88	PROJ SITE
		DL	4.405		750.00	25.88	
		DN	17.578		749.00	107.14	P2
A 50	ADD	UN	1.150		745.00	8.28	RESIDENTIAL SOUT
		DL	1.150		745.00	8.28	
		DN	17.578		749.00	107.14	P2
A 60	ADD	UN	6.279		760.00	34.88	RESIDENTIAL NE
		DL	6.279		760.00	34.88	
		DN	37.818		751.00	225.22	P3
A 70	ADD	UN	11.360		753.00	67.54	J. MEM HOSP
		DL	11.360		753.00	67.54	
		DN	37.818		751.00	225.22	P3

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 80	ADD	UN	2.601		750.00	16.96	FRANKLIN MEADOWS
		DL	2.601		750.00	16.96	
		DN	37.818		751.00	225.22	P3
A 90	ADD	UN	11.947		745.00	73.21	P1
		DL	11.947		745.00	73.21	
		DN	17.578		749.00	107.14	P2
A 100	ADD	UN	17.578		749.00	107.14	P2
		DL	17.578		749.00	107.14	
		DN	37.818		751.00	225.22	P3
A 110	ADD	UN	37.818		751.00	225.22	P3
		DL	37.818		751.00	225.22	
		DN	37.818		751.00	225.22	OUT FALL

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.003		746.00	.01	
	CAMELOT	AREA	.618		762.00	2.00	
	FRANKLIN MEADOWS	AREA	.155		758.00	.53	
	J. MEM HOSP	AREA	1.984		753.00	11.85	
	NURSING HOME	AREA	.253		736.00	2.07	
Outfall	OUT FALL	JCT	3.630		753.00	17.31	
	P1	JCT	.872		746.00	3.43	
	P2	JCT	1.084		746.00	3.87	
	P3	JCT	3.630		753.00	17.31	
	PROJ SITE	AREA	.122		810.00	.19	
	RESIDENTIAL NE	AREA	.407		770.00	1.33	
	RESIDENTIAL SOUT	AREA	.088		752.00	.41	

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 10	ADD	UN	.618		762.00	2.00	CAMELOT
		DL	.618		762.00	2.00	
		DN	.872		746.00	3.43	P1
A 20	ADD	UN	.253		736.00	2.07	NURSING HOME
		DL	.253		736.00	2.07	
		DN	.872		746.00	3.43	P1
A 30	ADD	UN	.003		746.00	.01	C.B. MIDDLE SCH
		DL	.003		746.00	.01	
		DN	1.084		746.00	3.87	P2
A 40	ADD	UN	.122		810.00	.19	PROJ SITE
		DL	.122		810.00	.19	
		DN	1.084		746.00	3.87	P2
A 50	ADD	UN	.088		752.00	.41	RESIDENTIAL SOUT
		DL	.088		752.00	.41	
		DN	1.084		746.00	3.87	P2
A 60	ADD	UN	.407		770.00	1.33	RESIDENTIAL NE
		DL	.407		770.00	1.33	
		DN	3.630		753.00	17.31	P3
A 70	ADD	UN	1.984		753.00	11.85	J. MEM HOSP
		DL	1.984		753.00	11.85	
		DN	3.630		753.00	17.31	P3

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 80	ADD	UN	.155		758.00	.53	FRANKLIN MEADOWS
		DL	.155		758.00	.53	
		DN	3.630		753.00	17.31	P3
A 90	ADD	UN	.872		746.00	3.43	P1
		DL	.872		746.00	3.43	
		DN	1.084		746.00	3.87	P2
A 100	ADD	UN	1.084		746.00	3.87	P2
		DL	1.084		746.00	3.87	
		DN	3.630		753.00	17.31	P3
A 110	ADD	UN	3.630		753.00	17.31	P3
		DL	3.630		753.00	17.31	
		DN	3.630		753.00	17.31	OUT FALL

NETWORK RUNOFF NODE SEQUENCE

Runoff Data		Apply to Node		Receiving Link	
SCS UH	Camelot	Subarea	CAMELOT	Add Hyd	CAMELOT
SCS UH	Nursing Home	Subarea	NURSING HOME	Add Hyd	NURSING HOME
SCS UH	C.B. MIDDLE SCH	Subarea	C.B. MIDDLE SCH	Add Hyd	C.B. MIDDLE SCH
SCS UH	Proj Site	Subarea	PROJ SITE	Add Hyd	PROJ SITE
SCS UH	Residential Sout	Subarea	RESIDENTIAL SOUT	Add Hyd	RESIDENTIAL SOUT
SCS UH	Residential NE	Subarea	RESIDENTIAL NE	Add Hyd	RESIDENTIAL NE
SCS UH	J. Mem Hosp	Subarea	J. MEM HOSP	Add Hyd	J. MEM HOSP
SCS UH	Franklin Meadows	Subarea	FRANKLIN MEADOWS	Add Hyd	FRANKLIN MEADOWS

NETWORK ROUTING SEQUENCE

Link Operation	UPstream Node		DNstream Node	
Add Hyd A 10	Subarea	CAMELOT	Jct	P1
Add Hyd A 20	Subarea	NURSING HOME	Jct	P1
Add Hyd A 40	Subarea	PROJ SITE	Jct	P2
Add Hyd A 30	Subarea	C.B. MIDDLE SCH	Jct	P2
Add Hyd A 90	Jct	P1	Jct	P2
Add Hyd A 50	Subarea	RESIDENTIAL SOUT	Jct	P2
Add Hyd A 80	Subarea	FRANKLIN MEADOWS	Jct	P3
Add Hyd A 100	Jct	P2	Jct	P3
Add Hyd A 60	Subarea	RESIDENTIAL NE	Jct	P3
Add Hyd A 70	Subarea	J. MEM HOSP	Jct	P3
Add Hyd A 110	Jct	P3	Jct	OUT FALL

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.129		736.00	1.10	
	CAMELOT	AREA	17.157		753.00	106.46	
	FRANKLIN MEADOWS	AREA	4.289		750.00	28.26	
	J. MEM HOSP	AREA	16.571		753.00	96.96	
	NURSING HOME	AREA	2.268		736.00	18.52	
Outfall	OUT FALL	JCT	60.243		751.00	361.62	
	P1	JCT	19.425		745.00	120.70	
	P2	JCT	29.115		749.00	180.66	
	P3	JCT	60.243		751.00	361.62	
	PROJ SITE	AREA	7.710		750.00	47.22	
	RESIDENTIAL NE	AREA	10.268		752.00	57.53	
	RESIDENTIAL SOUT	AREA	1.851		745.00	13.36	

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 10	ADD	UN	17.157		753.00	106.46	CAMELOT
		DL	17.157		753.00	106.46	
		DN	19.425		745.00	120.70	P1
A 20	ADD	UN	2.268		736.00	18.52	NURSING HOME
		DL	2.268		736.00	18.52	
		DN	19.425		745.00	120.70	P1
A 30	ADD	UN	.129		736.00	1.10	C.B. MIDDLE SCH
		DL	.129		736.00	1.10	
		DN	29.115		749.00	180.66	P2
A 40	ADD	UN	7.710		750.00	47.22	PROJ SITE
		DL	7.710		750.00	47.22	
		DN	29.115		749.00	180.66	P2
A 50	ADD	UN	1.851		745.00	13.36	RESIDENTIAL SOUT
		DL	1.851		745.00	13.36	
		DN	29.115		749.00	180.66	P2
A 60	ADD	UN	10.268		752.00	57.53	RESIDENTIAL NE
		DL	10.268		752.00	57.53	
		DN	60.243		751.00	361.62	P3
A 70	ADD	UN	16.571		753.00	96.96	J. MEM HOSP
		DL	16.571		753.00	96.96	
		DN	60.243		751.00	361.62	P3

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 80	ADD	UN	4.289		750.00	28.26	FRANKLIN MEADOWS
		DL	4.289		750.00	28.26	
		DN	60.243		751.00	361.62	P3
A 90	ADD	UN	19.425		745.00	120.70	P1
		DL	19.425		745.00	120.70	
		DN	29.115		749.00	180.66	P2
A 100	ADD	UN	29.115		749.00	180.66	P2
		DL	29.115		749.00	180.66	
		DN	60.243		751.00	361.62	P3
A 110	ADD	UN	60.243		751.00	361.62	P3
		DL	60.243		751.00	361.62	
		DN	60.243		751.00	361.62	OUT FALL

File.... C:\HAESTAD\PPKW\RAINFALL\JOHNSON.RNQ
Title... Existing Conditions
Johnson Memorial Hospital

DESIGN STORMS SUMMARY

Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

DESIGN STORMS SUMMARY

Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Type.... Synthetic Curve
Name.... TypeII 24hr Tag: 2 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 2 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 2 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0030	.0061	.0092	.0122
30.00	.0154	.0185	.0218	.0250	.0282
60.00	.0315	.0348	.0382	.0416	.0449
90.00	.0484	.0518	.0554	.0589	.0624
120.00	.0660	.0696	.0733	.0770	.0806
150.00	.0844	.0881	.0920	.0958	.0996
180.00	.1035	.1074	.1114	.1154	.1193
210.00	.1234	.1274	.1316	.1357	.1398
240.00	.1440	.1482	.1525	.1569	.1613
270.00	.1658	.1703	.1749	.1795	.1842
300.00	.1890	.1938	.1987	.2037	.2087
330.00	.2138	.2189	.2241	.2293	.2346
360.00	.2400	.2454	.2509	.2565	.2621
390.00	.2678	.2735	.2793	.2851	.2910
420.00	.2970	.3030	.3091	.3153	.3215
450.00	.3278	.3341	.3405	.3469	.3534
480.00	.3600	.3668	.3738	.3812	.3888
510.00	.3968	.4050	.4136	.4224	.4316
540.00	.4410	.4506	.4602	.4698	.4794
570.00	.4890	.4988	.5092	.5200	.5312
600.00	.5430	.5554	.5684	.5822	.5968
630.00	.6120	.6282	.6456	.6642	.6840
660.00	.7050	.7280	.7540	.7828	.8144
690.00	.8490	.9205	1.0631	1.2924	1.7036
720.00	1.9890	2.0459	2.0959	2.1391	2.1755
750.00	2.2050	2.2303	2.2541	2.2763	2.2969
780.00	2.3160	2.3339	2.3509	2.3671	2.3825
810.00	2.3970	2.4108	2.4240	2.4366	2.4486
840.00	2.4600	2.4710	2.4818	2.4924	2.5027
870.00	2.5129	2.5228	2.5326	2.5421	2.5514
900.00	2.5605	2.5694	2.5781	2.5866	2.5948
930.00	2.6029	2.6107	2.6184	2.6258	2.6330
960.00	2.6400	2.6469	2.6537	2.6604	2.6670
990.00	2.6736	2.6801	2.6865	2.6928	2.6991
1020.00	2.7053	2.7114	2.7174	2.7234	2.7293
1050.00	2.7351	2.7408	2.7465	2.7521	2.7576
1080.00	2.7630	2.7684	2.7737	2.7789	2.7840
1110.00	2.7891	2.7941	2.7990	2.8038	2.8086
1140.00	2.8133	2.8179	2.8224	2.8269	2.8313
1170.00	2.8356	2.8398	2.8440	2.8481	2.8521
1200.00	2.8560	2.8599	2.8638	2.8676	2.8715
1230.00	2.8753	2.8791	2.8829	2.8867	2.8905
1260.00	2.8943	2.8980	2.9017	2.9054	2.9091
1290.00	2.9128	2.9165	2.9201	2.9238	2.9274
1320.00	2.9310	2.9346	2.9382	2.9417	2.9453
1350.00	2.9488	2.9523	2.9558	2.9593	2.9628

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 2 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 2 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	2.9663	2.9697	2.9731	2.9765	2.9799
1410.00	2.9833	2.9867	2.9900	2.9934	2.9967
1440.00	3.0000				

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 10 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 10 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0043	.0087	.0131	.0175
30.00	.0221	.0266	.0312	.0358	.0405
60.00	.0452	.0499	.0547	.0596	.0644
90.00	.0694	.0743	.0793	.0844	.0895
120.00	.0946	.0998	.1050	.1103	.1156
150.00	.1210	.1263	.1318	.1373	.1428
180.00	.1484	.1540	.1596	.1653	.1711
210.00	.1769	.1827	.1886	.1944	.2004
240.00	.2064	.2125	.2186	.2248	.2312
270.00	.2376	.2441	.2506	.2573	.2641
300.00	.2709	.2778	.2848	.2919	.2991
330.00	.3064	.3137	.3212	.3287	.3363
360.00	.3440	.3518	.3597	.3676	.3756
390.00	.3838	.3920	.4003	.4087	.4171
420.00	.4257	.4343	.4431	.4519	.4608
450.00	.4698	.4788	.4880	.4973	.5066
480.00	.5160	.5257	.5358	.5463	.5573
510.00	.5687	.5805	.5928	.6054	.6186
540.00	.6321	.6459	.6596	.6734	.6871
570.00	.7009	.7150	.7298	.7453	.7614
600.00	.7783	.7960	.8148	.8345	.8554
630.00	.8772	.9004	.9254	.9520	.9804
660.00	1.0105	1.0435	1.0807	1.1220	1.1674
690.00	1.2169	1.3194	1.5237	1.8524	2.4418
720.00	2.8509	2.9324	3.0042	3.0661	3.1182
750.00	3.1605	3.1968	3.2308	3.2627	3.2923
780.00	3.3196	3.3452	3.3697	3.3929	3.4149
810.00	3.4357	3.4555	3.4744	3.4925	3.5097
840.00	3.5260	3.5418	3.5572	3.5724	3.5872
870.00	3.6018	3.6160	3.6300	3.6436	3.6570
900.00	3.6701	3.6828	3.6952	3.7074	3.7192
930.00	3.7308	3.7420	3.7530	3.7636	3.7740
960.00	3.7840	3.7938	3.8036	3.8132	3.8227
990.00	3.8321	3.8414	3.8506	3.8597	3.8687
1020.00	3.8775	3.8863	3.8949	3.9035	3.9119
1050.00	3.9203	3.9285	3.9366	3.9446	3.9525
1080.00	3.9603	3.9680	3.9756	3.9830	3.9904
1110.00	3.9977	4.0048	4.0119	4.0188	4.0256
1140.00	4.0323	4.0389	4.0454	4.0518	4.0581
1170.00	4.0643	4.0704	4.0764	4.0822	4.0880
1200.00	4.0936	4.0992	4.1047	4.1103	4.1158
1230.00	4.1213	4.1268	4.1322	4.1376	4.1431
1260.00	4.1484	4.1538	4.1591	4.1645	4.1698
1290.00	4.1750	4.1803	4.1855	4.1907	4.1959
1320.00	4.2011	4.2063	4.2114	4.2165	4.2216
1350.00	4.2266	4.2317	4.2367	4.2417	4.2467

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	4.2516	4.2566	4.2615	4.2664	4.2712
1410.00	4.2761	4.2809	4.2857	4.2905	4.2953
1440.00	4.3000				

Type.... Synthetic Curve
Name.... TypeII 24hr Tag: 1.25in
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

Type.... Synthetic Curve
Name.... TypeII 24hr Tag: 1.25in
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 1.25in
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 1.25in
Event: 1.25 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0013	.0025	.0038	.0051
30.00	.0064	.0077	.0091	.0104	.0118
60.00	.0131	.0145	.0159	.0173	.0187
90.00	.0202	.0216	.0231	.0245	.0260
120.00	.0275	.0290	.0305	.0321	.0336
150.00	.0352	.0367	.0383	.0399	.0415
180.00	.0431	.0448	.0464	.0481	.0497
210.00	.0514	.0531	.0548	.0565	.0583
240.00	.0600	.0618	.0636	.0654	.0672
270.00	.0691	.0710	.0729	.0748	.0768
300.00	.0788	.0808	.0828	.0849	.0870
330.00	.0891	.0912	.0934	.0956	.0978
360.00	.1000	.1023	.1046	.1069	.1092
390.00	.1116	.1140	.1164	.1188	.1213
420.00	.1238	.1263	.1288	.1314	.1340
450.00	.1366	.1392	.1419	.1446	.1473
480.00	.1500	.1528	.1558	.1588	.1620
510.00	.1653	.1688	.1723	.1760	.1798
540.00	.1838	.1878	.1918	.1958	.1998
570.00	.2038	.2079	.2122	.2167	.2214
600.00	.2263	.2314	.2369	.2426	.2487
630.00	.2550	.2618	.2690	.2768	.2850
660.00	.2938	.3034	.3142	.3262	.3394
690.00	.3538	.3836	.4430	.5385	.7098
720.00	.8288	.8525	.8733	.8913	.9065
750.00	.9188	.9293	.9392	.9485	.9571
780.00	.9650	.9725	.9796	.9863	.9927
810.00	.9988	1.0045	1.0100	1.0153	1.0203
840.00	1.0250	1.0296	1.0341	1.0385	1.0428
870.00	1.0470	1.0512	1.0552	1.0592	1.0631
900.00	1.0669	1.0706	1.0742	1.0777	1.0812
930.00	1.0845	1.0878	1.0910	1.0941	1.0971
960.00	1.1000	1.1029	1.1057	1.1085	1.1113
990.00	1.1140	1.1167	1.1194	1.1220	1.1246
1020.00	1.1272	1.1297	1.1323	1.1347	1.1372
1050.00	1.1396	1.1420	1.1444	1.1467	1.1490
1080.00	1.1513	1.1535	1.1557	1.1579	1.1600
1110.00	1.1621	1.1642	1.1662	1.1683	1.1702
1140.00	1.1722	1.1741	1.1760	1.1779	1.1797
1170.00	1.1815	1.1833	1.1850	1.1867	1.1884
1200.00	1.1900	1.1916	1.1932	1.1949	1.1965
1230.00	1.1981	1.1996	1.2012	1.2028	1.2044
1260.00	1.2059	1.2075	1.2091	1.2106	1.2121
1290.00	1.2137	1.2152	1.2167	1.2182	1.2198
1320.00	1.2213	1.2228	1.2242	1.2257	1.2272
1350.00	1.2287	1.2301	1.2316	1.2331	1.2345

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 1.25in
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 1.25in

Event: 1.25 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	1.2359	1.2374	1.2388	1.2402	1.2416
1410.00	1.2431	1.2445	1.2459	1.2472	1.2486
1440.00	1.2500				

Type.... Synthetic Curve
Name.... TypeII 24hr Tag: 100 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

Type.... Synthetic Curve
Name.... TypeII 24hr Tag: 100 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 100 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 100 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0060	.0119	.0180	.0241
30.00	.0303	.0365	.0428	.0491	.0555
60.00	.0620	.0685	.0750	.0817	.0884
90.00	.0952	.1020	.1089	.1158	.1228
120.00	.1298	.1369	.1441	.1513	.1586
150.00	.1660	.1733	.1808	.1883	.1959
180.00	.2036	.2113	.2190	.2269	.2347
210.00	.2427	.2506	.2587	.2668	.2750
240.00	.2832	.2915	.3000	.3085	.3172
270.00	.3260	.3349	.3439	.3531	.3623
300.00	.3717	.3812	.3908	.4006	.4104
330.00	.4204	.4305	.4407	.4510	.4614
360.00	.4720	.4827	.4935	.5044	.5154
390.00	.5266	.5378	.5492	.5607	.5724
420.00	.5841	.5960	.6079	.6200	.6322
450.00	.6446	.6570	.6696	.6823	.6951
480.00	.7080	.7213	.7351	.7496	.7646
510.00	.7803	.7965	.8133	.8307	.8487
540.00	.8673	.8862	.9051	.9239	.9428
570.00	.9617	.9811	1.0013	1.0226	1.0448
600.00	1.0679	1.0922	1.1179	1.1451	1.1736
630.00	1.2036	1.2355	1.2697	1.3063	1.3452
660.00	1.3865	1.4318	1.4828	1.5394	1.6017
690.00	1.6697	1.8104	2.0907	2.5417	3.3504
720.00	3.9117	4.0236	4.1220	4.2069	4.2784
750.00	4.3365	4.3863	4.4330	4.4767	4.5173
780.00	4.5548	4.5900	4.6235	4.6553	4.6855
810.00	4.7141	4.7412	4.7672	4.7920	4.8156
840.00	4.8380	4.8597	4.8808	4.9017	4.9220
870.00	4.9420	4.9615	4.9807	4.9994	5.0178
900.00	5.0357	5.0532	5.0702	5.0869	5.1031
930.00	5.1190	5.1344	5.1495	5.1640	5.1783
960.00	5.1920	5.2055	5.2188	5.2321	5.2451
990.00	5.2580	5.2708	5.2834	5.2958	5.3082
1020.00	5.3203	5.3324	5.3442	5.3560	5.3675
1050.00	5.3790	5.3902	5.4014	5.4124	5.4232
1080.00	5.4339	5.4445	5.4548	5.4651	5.4752
1110.00	5.4852	5.4950	5.5046	5.5141	5.5235
1140.00	5.5327	5.5418	5.5507	5.5595	5.5681
1170.00	5.5766	5.5849	5.5931	5.6012	5.6091
1200.00	5.6168	5.6245	5.6321	5.6397	5.6472
1230.00	5.6548	5.6623	5.6698	5.6772	5.6847
1260.00	5.6920	5.6994	5.7067	5.7140	5.7213
1290.00	5.7285	5.7357	5.7429	5.7501	5.7572
1320.00	5.7643	5.7714	5.7784	5.7854	5.7924
1350.00	5.7993	5.8062	5.8132	5.8200	5.8268

Type.... Synthetic Cumulative Depth
Name.... TypeII 24hr Tag: 100 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF
Storm... TypeII 24hr Tag: 100 yr
Event: 100 yr

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	5.8336	5.8404	5.8471	5.8539	5.8605
1410.00	5.8672	5.8738	5.8804	5.8870	5.8935
1440.00	5.9000				

Type.... Tc Calcs
Name.... C.B. MIDDLE SCH

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	240.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.10 ft/sec

Segment #1 Time: 39.18 min

Total Tc: 39.18 min

Type.... Tc Calcs
Name.... C.B. MIDDLE SCH

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	370.00 ft
Slope	.007000 ft/ft
Unpaved	
Avg.Velocity	1.35 ft/sec

Segment #2 Time: 4.57 min

Segment #3: Tc: Length & Vel.

Hydraulic Length	1600.00 ft
Avg.Velocity	2.50 ft/sec

Segment #3 Time: 10.67 min

Total Tc: 62.07 min

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

==== User Defined Length & Velocity ==========

Tc = (Lf / V) / (3600sec/hr)

Where: Tc = Time of concentration, hrs
Lf = Flow length, ft
V = Velocity, ft/sec

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1370.00 ft
Slope	.020000 ft/ft
Unpaved	
Avg.Velocity	2.28 ft/sec

Segment #2 Time: 10.01 min

Total Tc: 56.84 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1680.00 ft
Slope	.010000 ft/ft
Unpaved	
Avg.Velocity	1.61 ft/sec

Segment #2 Time: 17.35 min

Total Tc: 64.19 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... NURSING HOME

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	100.00 ft
2yr, 24hr P	3.0000 in
Slope	.005000 ft/ft

Avg.Velocity .06 ft/sec

Segment #1 Time: 25.66 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1000.00 ft
Slope	.005000 ft/ft
Unpaved	

Avg.Velocity 1.14 ft/sec

Segment #2 Time: 14.61 min

==========
Total Tc: 40.27 min
==========

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2000
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.015000 ft/ft
Avg.Velocity	.15 ft/sec

Segment #1 Time: 34.42 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	350.00 ft
Slope	.010000 ft/ft
Unpaved	
Avg.Velocity	1.61 ft/sec

Segment #2 Time: 3.62 min

Segment #3: Tc: TR-55 Channel

Flow Area	84.0000 sq.ft
Wetted Perimeter	37.98 ft
Hydraulic Radius	2.21 ft
Slope	.011500 ft/ft
Mannings n	.3300
Hydraulic Length	1170.00 ft
Avg.Velocity	.82 ft/sec

Segment #3 Time: 23.72 min

Total Tc: 61.76 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

==== SCS Channel Flow ==

R = Aq / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

Tc = (Lf / V) / (3600sec/hr)

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	300.00	ft
2yr, 24hr P	3.0000	in
Slope	.007500	ft/ft
Avg.Velocity	.10	ft/sec

Segment #1 Time: 52.54 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1500.00	ft
Slope	.007500	ft/ft
Unpaved		
Avg.Velocity	1.40	ft/sec

Segment #2 Time: 17.89 min

Total Tc: 70.44 min

Type.... Tc Calcs
Name.... RESIDENTIAL NE

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	530.00 ft
Slope	.020000 ft/ft
Paved	
Avg.Velocity	2.87 ft/sec

Segment #2 Time: 3.07 min

Total Tc: 49.91 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Basin 01

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - C.B. MIDDLE SCH 2 yr
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========

Computational Time Increment	=	5.224 min
Computed Peak Time	=	736.52 min
Computed Peak Flow	=	.29 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	737.00 min
Peak Flow, Interpolated Output	=	.29 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

.9082 in
.038 ac-ft

HYG Volume... .038 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	.87 cfs
Unit peak time	Tp =	26.118 min
Unit receding limb,	Tr =	104.471 min
Total unit time,	Tb =	130.589 min

Basin C1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - C.B. MIDDLE SCH 10 yr
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========
Computational Time Increment = 5.224 min
Computed Peak Time = 736.52 min
Computed Peak Flow = .64 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 737.00 min
Peak Flow, Interpolated Output = .63 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

1.8198 in
.076 ac-ft

HYG Volume... .076 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = .87 cfs
Unit peak time Tp = 26.118 min
Unit receding limb, Tr = 104.471 min
Total unit time, Tb = 130.589 min

Basin 01

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - C.B. MIDDLE SCH 1.25in
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========

Computational Time Increment	=	5.224 min
Computed Peak Time	=	752.19 min
Computed Peak Flow	=	.01 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	.01 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

.0738 in
.003 ac-ft

HYG Volume... .003 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	.87 cfs
Unit peak time	Tp =	26.118 min
Unit receding limb,	Tr =	104.471 min
Total unit time,	Tb =	130.589 min

BASIN 01

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - C.B. MIDDLE SCH 100 yr
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========
Computational Time Increment = 5.224 min
Computed Peak Time = 736.52 min
Computed Peak Flow = 1.11 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 737.00 min
Peak Flow, Interpolated Output = 1.10 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

3.1010 in
.129 ac-ft

HYG Volume... .129 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = .87 cfs
Unit peak time Tp = 26.118 min
Unit receding limb, Tr = 104.471 min
Total unit time, Tb = 130.589 min

Type.... SCS Unit Hyd. Summary
Name.... CAMELOT Tag: 2 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 2 yr

BASIN 03

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - CAMELOT 2 yr
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========

Computational Time Increment	=	8.276 min
Computed Peak Time	=	753.09 min
Computed Peak Flow	=	32.12 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	32.10 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

1.0939 in
5.470 ac-ft

HYG Volume... 5.470 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	65.72 cfs
Unit peak time	Tp =	41.379 min
Unit receding limb,	Tr =	165.515 min
Total unit time,	Tb =	206.894 min

BASIN 03

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - CAMELOT 10 yr
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========

Computational Time Increment	=	8.276 min
Computed Peak Time	=	753.09 min
Computed Peak Flow	=	63.83 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	63.81 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

2.0809 in
10.405 ac-ft

HYG Volume... 10.405 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	65.72 cfs
Unit peak time	Tp =	41.379 min
Unit receding limb,	Tr =	165.515 min
Total unit time,	Tb =	206.894 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - CAMELOT 1.25in
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========

Computational Time Increment	=	8.276 min
Computed Peak Time	=	769.64 min
Computed Peak Flow	=	2.01 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	769.00 min
Peak Flow, Interpolated Output	=	2.01 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

.1237 in
.619 ac-ft

HYG Volume... .618 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	65.72 cfs
Unit peak time	Tp =	41.379 min
Unit receding limb,	Tr =	165.515 min
Total unit time,	Tb =	206.894 min

Type.... SCS Unit Hyd. Summary
Name.... CAMELOT Tag: 100 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 100 yr

BASIN 03

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - CAMELOT 100 yr
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========

Computational Time Increment	=	8.276 min
Computed Peak Time	=	753.09 min
Computed Peak Flow	=	106.49 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	106.46 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

3.4313 in
17.157 ac-ft

HYG Volume... 17.157 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	65.72 cfs
Unit peak time	Tp =	41.379 min
Unit receding limb,	Tr =	165.515 min
Total unit time,	Tb =	206.894 min

BASIN 06

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - FRANKLIN MEADOWS 2 yr
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	750.29 min
Computed Peak Flow	=	8.56 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	8.55 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

1.0939 in
1.367 ac-ft

HYG Volume... 1.367 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

Type.... SCS Unit Hyd. Summary
Name.... FRANKLIN MEADOWS Tag: 10 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 10 yr
Event: 10 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - FRANKLIN MEADOWS 10 yr
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	750.29 min
Computed Peak Flow	=	16.97 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	16.96 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

2.0809 in
2.601 ac-ft

HYG Volume... 2.601 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - FRANKLIN MEADOWS 1.25in
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	757.87 min
Computed Peak Flow	=	.53 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	758.00 min
Peak Flow, Interpolated Output	=	.53 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

.1237 in
.155 ac-ft

HYG Volume... .155 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - FRANKLIN MEADOWS 100 yr
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	750.29 min
Computed Peak Flow	=	28.27 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	28.26 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

3.4313 in
4.289 ac-ft

HYG Volume... 4.289 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

BASIN 05

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - J. MEM HOSP 2 yr
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	43.48 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	43.46 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

2.1611 in
7.204 ac-ft

HYG Volume... 7.204 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

Type.... SCS Unit Hyd. Summary
Name.... J. MEM HOSP Tag: 10 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 10 yr

BASIN 05

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - J. MEM HOSP 10 yr
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	67.57 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	67.54 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

3.4079 in
11.360 ac-ft

HYG Volume... 11.360 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - J. MEM HOSP 1.25in
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	11.86 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	11.85 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

.5952 in
1.984 ac-ft

HYG Volume... 1.984 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

BASIN OS

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - J. MEM HOSP 100 yr
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	96.99 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	96.96 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

4.9712 in
16.571 ac-ft

HYG Volume... 16.571 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

BASIN 02

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - NURSING HOME 2 yr
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========
Computational Time Increment = 5.369 min
Computed Peak Time = 735.59 min
Computed Peak Flow = 8.15 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 736.00 min
Peak Flow, Interpolated Output = 8.13 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

2.0712 in
.967 ac-ft

HYG Volume... .967 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 9.45 cfs
Unit peak time Tp = 26.846 min
Unit receding limb, Tr = 107.385 min
Total unit time, Tb = 134.231 min

BASIN 02

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - NURSING HOME 10 yr
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========

Computational Time Increment	=	5.369 min
Computed Peak Time	=	735.59 min
Computed Peak Flow	=	12.84 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	736.00 min
Peak Flow, Interpolated Output	=	12.80 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

3.3053 in
1.542 ac-ft

HYG Volume... 1.542 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	9.45 cfs
Unit peak time	Tp =	26.846 min
Unit receding limb,	Tr =	107.385 min
Total unit time,	Tb =	134.231 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - NURSING HOME 1.25in
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========

Computational Time Increment	=	5.369 min
Computed Peak Time	=	735.59 min
Computed Peak Flow	=	2.07 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	736.00 min
Peak Flow, Interpolated Output	=	2.07 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

.5424 in
.253 ac-ft

HYG Volume... .253 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	9.45 cfs
Unit peak time	Tp =	26.846 min
Unit receding limb,	Tr =	107.385 min
Total unit time,	Tb =	134.231 min

BASIN 02

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - NURSING HOME 100 yr
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========
Computational Time Increment = 5.369 min
Computed Peak Time = 735.59 min
Computed Peak Flow = 18.59 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 736.00 min
Peak Flow, Interpolated Output = 18.52 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

4.8594 in
2.268 ac-ft

HYG Volume... 2.268 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 9.45 cfs
Unit peak time Tp = 26.846 min
Unit receding limb, Tr = 107.385 min
Total unit time, Tb = 134.231 min

BASIN S1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - PROJ SITE 2 yr
Tc = 61.76 min
Drainage Area = 32.400 acres Runoff CN= 71

==========

Computational Time Increment	=	8.234 min
Computed Peak Time	=	757.55 min
Computed Peak Flow	=	11.25 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	757.00 min
Peak Flow, Interpolated Output	=	11.23 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 71
Area = 32.400 acres
S = 4.0056 in
0.2S = .8011 in

Cumulative Runoff

.7793 in
2.104 ac-ft

HYG Volume... 2.104 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 61.757 min (ID: PROJ SITE)
Computational Incr, Tm = 8.234 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	35.67 cfs
Unit peak time	Tp =	41.171 min
Unit receding limb,	Tr =	164.685 min
Total unit time,	Tb =	205.857 min

BASIN S1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - PROJ SITE 10 yr
Tc = 61.76 min
Drainage Area = 32.400 acres Runoff CN= 71

==========

Computational Time Increment	=	8.234 min
Computed Peak Time	=	749.32 min
Computed Peak Flow	=	25.89 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	25.88 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 71
Area = 32.400 acres
S = 4.0056 in
0.2S = .8011 in

Cumulative Runoff

1.6313 in
4.405 ac-ft

HYG Volume... 4.405 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 61.757 min (ID: PROJ SITE)
Computational Incr, Tm = 8.234 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	35.67 cfs
Unit peak time	Tp =	41.171 min
Unit receding limb,	Tr =	164.685 min
Total unit time,	Tb =	205.857 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - PROJ SITE 1.25in
Tc = 61.76 min
Drainage Area = 32.400 acres Runoff CN= 71

==========

Computational Time Increment	=	8.234 min
Computed Peak Time	=	815.19 min
Computed Peak Flow	=	.19 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	816.00 min
Peak Flow, Interpolated Output	=	.19 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 71
Area = 32.400 acres
S = 4.0056 in
0.2S = .8011 in

Cumulative Runoff

.0452 in
.122 ac-ft

HYG Volume... .122 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 61.757 min (ID: PROJ SITE)
Computational Incr, Tm = 8.234 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	35.67 cfs
Unit peak time	Tp =	41.171 min
Unit receding limb,	Tr =	164.685 min
Total unit time,	Tb =	205.857 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - PROJ SITE 100 yr
Tc = 61.76 min
Drainage Area = 32.400 acres Runoff CN= 71

==========

Computational Time Increment	=	8.234 min
Computed Peak Time	=	749.32 min
Computed Peak Flow	=	47.30 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	47.22 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 71
Area = 32.400 acres
S = 4.0056 in
0.2S = .8011 in

Cumulative Runoff

2.8556 in
7.710 ac-ft

HYG Volume... 7.710 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 61.757 min (ID: PROJ SITE)
Computational Incr, Tm = 8.234 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	35.67 cfs
Unit peak time	Tp =	41.171 min
Unit receding limb,	Tr =	164.685 min
Total unit time,	Tb =	205.857 min

Type.... SCS Unit Hyd. Summary
Name.... RESIDENTIAL NE Tag: 2 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\PRE-D.PPW
Storm... TypeII 24hr Tag: 2 yr

BASIN 04

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL NE 2 yr
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	760.72 min
Computed Peak Flow	=	17.95 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	761.00 min
Peak Flow, Interpolated Output	=	17.92 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

1.1465 in
3.344 ac-ft

HYG Volume... 3.344 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

BASIN 04

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL NE 10 yr
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	760.72 min
Computed Peak Flow	=	34.91 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	760.00 min
Peak Flow, Interpolated Output	=	34.88 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

2.1529 in
6.279 ac-ft

HYG Volume... 6.279 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL NE 1.25in
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	770.11 min
Computed Peak Flow	=	1.33 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	770.00 min
Peak Flow, Interpolated Output	=	1.33 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

.1396 in
.407 ac-ft

HYG Volume... .407 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

BASIN 04

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL NE 100 yr
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	751.32 min
Computed Peak Flow	=	57.53 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	752.00 min
Peak Flow, Interpolated Output	=	57.53 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

3.5206 in
10.268 ac-ft

HYG Volume... 10.268 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

BASIN 07

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL SOUT 2 yr
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

Computational Time Increment	=	6.654 min
Computed Peak Time	=	745.26 min
Computed Peak Flow	=	4.42 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	745.00 min
Peak Flow, Interpolated Output	=	4.41 cfs

DRAINAGE AREA
ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff
1.2563 in
.628 ac-ft

HYG Volume... .628 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

BASIN 07

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL SOUT 10 yr
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	745.26 min
Computed Peak Flow	=	8.29 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	745.00 min
Peak Flow, Interpolated Output	=	8.28 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

2.3004 in
1.150 ac-ft

HYG Volume... 1.150 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL SOUT 1.25in
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	751.92 min
Computed Peak Flow	=	.41 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	752.00 min
Peak Flow, Interpolated Output	=	.41 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

.1752 in
.088 ac-ft

HYG Volume... .088 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

BASIN 07

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = - RESIDENTIAL SOUT 100 yr
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	745.26 min
Computed Peak Flow	=	13.36 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	745.00 min
Peak Flow, Interpolated Output	=	13.36 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

3.7013 in
1.851 ac-ft

HYG Volume... 1.851 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

Index of Starting Page Numbers for ID Names

----- C -----
C.B. MIDDLE SCH... 5.01, 6.01, 6.02,
6.03, 6.04
CAMELOT... 5.03, 6.05, 6.06, 6.07,
6.08

----- F -----
FRANKLIN MEADOWS... 5.05, 6.09,
6.10, 6.11, 6.12

----- J -----
J. MEM HOSP 2 yr... 6.13, 6.14,
6.15, 6.16
J.CO. MEM HOSP... 5.07

----- N -----
NURSING HOME... 5.09, 6.17, 6.18,
6.19, 6.20

----- P -----
PROJ SITE... 5.11, 6.21, 6.22, 6.23,
6.24

----- R -----
RESIDENTIAL NE... 5.14, 6.25, 6.26,
6.27, 6.28
RESIDENTIAL SOUT... 5.16, 6.29,
6.30, 6.31, 6.32

----- T -----
Type II... 3.01, 3.02
TypeII 24hr 2 yr... 4.01, 4.03,
4.05, 4.07, 4.09, 4.11, 4.13,
4.15

----- W -----
Watershed... 1.01, 2.01, 2.02, 2.04,
2.05, 2.07, 2.08, 2.10, 2.12,
2.13

Appendix B

Calculations – Proposed Conditions

==========
JOB TITLE
==========

Post-Developed Conditions
Johnson Memorial Hospital

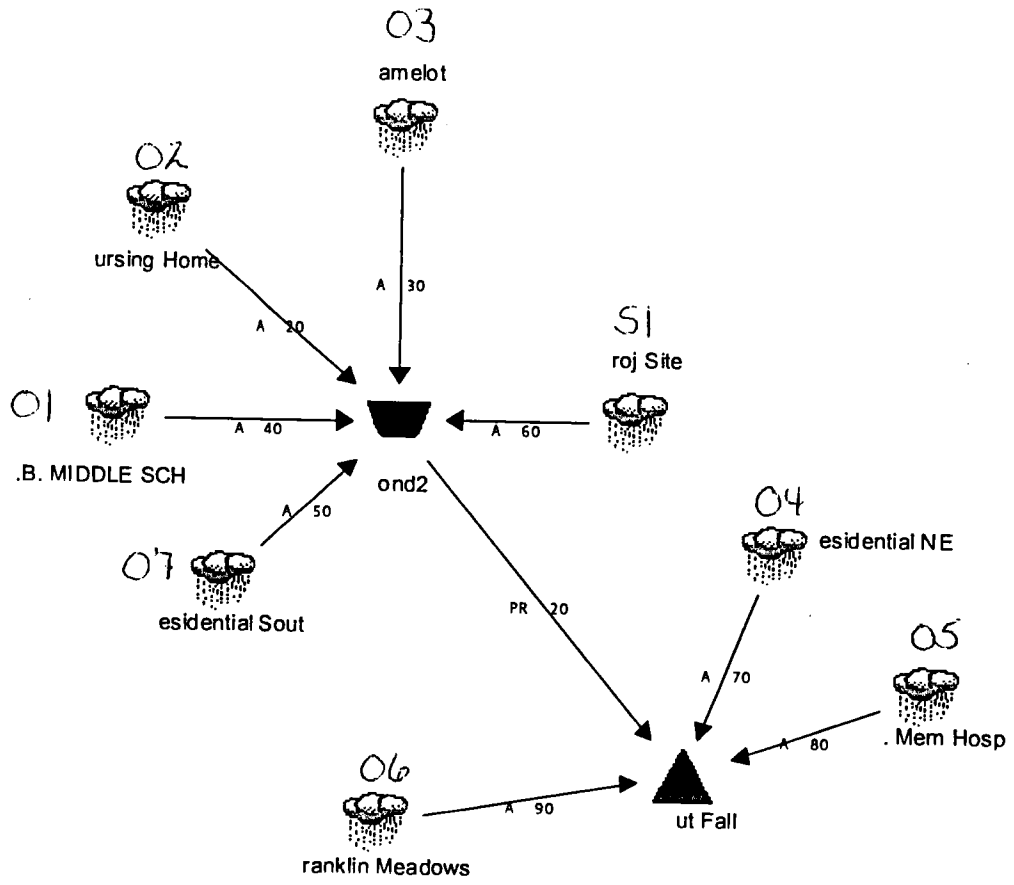

03
amelot
02
ursing Home
A 30
A 20
S1
roj Site
01
A 40
A 60
.B. MIDDLE SCH
ond2
A 50
04
esidential NE
07
esidential Sout
PR 20
05
A 70
. Mem Hosp
A 80
06
A 90
ut Fall
ranklin Meadows

Table of Contents

********** MASTER SUMMARY **********

Watershed..... Master Network Summary 1.01

********** NETWORK SUMMARIES (DETAILED) **********

Watershed..... 2 yr
Executive Summary (Nodes) 2.01
Executive Summary (Links) 2.02

Watershed..... 10 yr
Executive Summary (Nodes) 2.04
Executive Summary (Links) 2.05

Watershed..... 1.25in
Executive Summary (Nodes) 2.07
Executive Summary (Links) 2.08
Network Calcs Sequence 2.10

Watershed..... 100 yr
Executive Summary (Nodes) 2.12
Executive Summary (Links) 2.13

********** DESIGN STORMS SUMMARY **********

Type II..... Design Storms 3.01

Type II..... 2 yr
Design Storms 3.02

********** RAINFALL DATA **********

TypeII 24hr.... 2 yr
Synthetic Curve 4.01

Table of Contents (continued)

Synthetic Cumulative Depth 4.03

TypeII 24hr.... 10 yr
Synthetic Curve 4.05
Synthetic Cumulative Depth 4.07

TypeII 24hr.... 1.25in
Synthetic Curve 4.09
Synthetic Cumulative Depth 4.11

TypeII 24hr.... 100 yr
Synthetic Curve 4.13
Synthetic Cumulative Depth 4.15

********** TC CALCULATIONS **********

C.B. MIDDLE SCH Tc Calcs 5.01

CAMELOT..... Tc Calcs 5.03

FRANKLIN MEADOWS Tc Calcs 5.05

J.CO. MEM HOSP.. Tc Calcs 5.07

NURSING HOME.... Tc Calcs 5.09

PROJ SITE..... Tc Calcs 5.11

RESIDENTIAL NE.. Tc Calcs 5.13

RESIDENTIAL SOUT Tc Calcs 5.15

********** RUNOFF HYDROGRAPHS **********

C.B. MIDDLE SCH 2 yr
SCS Unit Hyd. Summary 6.01

C.B. MIDDLE SCH 10 yr
SCS Unit Hyd. Summary 6.02

C.B. MIDDLE SCH 1.25in
SCS Unit Hyd. Summary 6.03

Table of Contents (continued)

C.B. MIDDLE SCH 100 yr
SCS Unit Hyd. Summary 6.04

CAMELOT..... 2 yr
SCS Unit Hyd. Summary 6.05

CAMELOT..... 10 yr
SCS Unit Hyd. Summary 6.06

CAMELOT..... 1.25in
SCS Unit Hyd. Summary 6.07

CAMELOT..... 100 yr
SCS Unit Hyd. Summary 6.08

FRANKLIN MEADOWS 2 yr
SCS Unit Hyd. Summary 6.09

FRANKLIN MEADOWS 10 yr
SCS Unit Hyd. Summary 6.10

FRANKLIN MEADOWS 1.25in
SCS Unit Hyd. Summary 6.11

FRANKLIN MEADOWS 100 yr
SCS Unit Hyd. Summary 6.12

J. MEM HOSP..... 2 yr
SCS Unit Hyd. Summary 6.13

J. MEM HOSP..... 10 yr
SCS Unit Hyd. Summary 6.14

J. MEM HOSP..... 1.25in
SCS Unit Hyd. Summary 6.15

J. MEM HOSP..... 100 yr
SCS Unit Hyd. Summary 6.16

NURSING HOME.... 2 yr
SCS Unit Hyd. Summary 6.17

NURSING HOME.... 10 yr
SCS Unit Hyd. Summary 6.18

NURSING HOME.... 1.25in
SCS Unit Hyd. Summary 6.19

Table of Contents (continued)

NURSING HOME.... 100 yr
SCS Unit Hyd. Summary 6.20

PROJ SITE..... 2 yr
SCS Unit Hyd. Summary 6.21

PROJ SITE..... 10 yr
SCS Unit Hyd. Summary 6.22

PROJ SITE..... 1.25in
SCS Unit Hyd. Summary 6.23

PROJ SITE..... 100 yr
SCS Unit Hyd. Summary 6.24

RESIDENTIAL NE.. 2 yr
SCS Unit Hyd. Summary 6.25

RESIDENTIAL NE.. 10 yr
SCS Unit Hyd. Summary 6.26

RESIDENTIAL NE.. 1.25in
SCS Unit Hyd. Summary 6.27

RESIDENTIAL NE.. 100 yr
SCS Unit Hyd. Summary 6.28

RESIDENTIAL SOUT 2 yr
SCS Unit Hyd. Summary 6.29

RESIDENTIAL SOUT 10 yr
SCS Unit Hyd. Summary 6.30

RESIDENTIAL SOUT 1.25in
SCS Unit Hyd. Summary 6.31

RESIDENTIAL SOUT 100 yr
SCS Unit Hyd. Summary 6.32

********** TIME VS.ELEV **********

OUT FALL..... Time-Elev 7.01
Time-Elev 7.02

Table of Contents (continued)

Time-Elev 7.03
Time-Elev 7.04

********** OUTLET STRUCTURES **********

PR20..... E-Q-TW Series 8.01

********** POND ROUTING **********

POND2..... 2 yr
ICPM Node Routing Summary 9.01

POND2..... 10 yr
ICPM Node Routing Summary 9.02

POND2..... 1.25in
ICPM Node Routing Summary 9.03

POND2..... 100 yr
ICPM Node Routing Summary 9.04

Type.... Master Network Summary
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JOHNSON.RNQ Type II

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
2 yr	3.0000	Synthetic Curve	SCSTYPES	TypeII 24hr
10 yr	4.3000	Synthetic Curve	SCSTYPES	TypeII 24hr
100 yr	5.9000	Synthetic Curve	SCSTYPES	TypeII 24hr
1.25in	1.2500	Synthetic Curve	SCSTYPES	TypeII 24hr

ICPM CALCULATION TOLERANCES

Target Convergence=	.000 cfs +/-
Max. Iterations =	35 loops
ICPM Time Step =	1.00 min
Output Time Step =	1.00 min
ICPM Ending Time =	2880.00 min

* ALL BASINS EXCEPT S-1 ARE SAME IN POST-DEV AS PRE-DEV.

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
C.B. MIDDLE SCH	AREA	2	.038		736.00	.29		
C.B. MIDDLE SCH	AREA	10	.076		736.00	.63		
C.B. MIDDLE SCH	AREA	100	.129		736.00	1.10		
C.B. MIDDLE SCH	AREA	1.25	.003		746.00	.01		
CAMELOT	AREA	2	5.470		753.00	32.10		
CAMELOT	AREA	10	10.405		753.00	63.81		
CAMELOT	AREA	100	17.157		753.00	106.46		
CAMELOT	AREA	1.25	.618		762.00	2.00		
FRANKLIN MEADOWS	AREA	2	1.367		750.00	8.55		
FRANKLIN MEADOWS	AREA	10	2.601		750.00	16.96		
FRANKLIN MEADOWS	AREA	100	4.289		750.00	28.26		
FRANKLIN MEADOWS	AREA	1.25	.155		758.00	.53		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
J. MEM HOSP	AREA	2	7.204		753.00	43.46		
J. MEM HOSP	AREA	10	11.360		753.00	67.54		
J. MEM HOSP	AREA	100	16.571		753.00	96.96		
J. MEM HOSP	AREA	1.25	1.984		753.00	11.85		
NURSING HOME	AREA	2	.967		736.00	8.13		
NURSING HOME	AREA	10	1.542		736.00	12.80		
NURSING HOME	AREA	100	2.268		736.00	18.52		
NURSING HOME	AREA	1.25	.253		736.00	2.07		
*OUT FALL	T-E	2	23.918		753.00	111.30	725.00	
*OUT FALL	T-E	10	41.668		753.00	194.83	725.00	
*OUT FALL	T-E	100	65.004		753.00	282.65	725.00	
*OUT FALL	T-E	1.25	5.116		753.00	14.41	725.00	
POND2	POND	2	12.956		718.00	110.35		
POND2	POND	10	22.404		718.00	177.72		
POND2	POND	100	34.870		718.00	262.50		
POND2	POND	1.25	2.574		718.00	28.68		
POND2	OUT POND	2	12.002		764.00	43.31	734.24	4.052
POND2	OUT POND	10	21.428		765.00	77.88	735.45	6.346
POND2	OUT POND	100	33.876		773.00	104.62	737.51	10.597
POND2	OUT POND	1.25	2.570		1060.00	1.05	732.77	1.557
PROJ SITE	AREA	2	5.854		717.00	98.29		
PROJ SITE	AREA	10	9.231		717.00	151.56		
PROJ SITE	AREA	100	13.465		717.00	216.41		
PROJ SITE	AREA	1.25	1.612		718.00	27.71		
RESIDENTIAL NE	AREA	2	3.344		761.00	17.92		
RESIDENTIAL NE	AREA	10	6.279		760.00	34.88		
RESIDENTIAL NE	AREA	100	10.268		752.00	57.53		
RESIDENTIAL NE	AREA	1.25	.407		770.00	1.33		

INFLOW INTO POND

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak min	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
RESIDENTIAL SOUT AREA	AREA	2	.628		745.00	4.41		
RESIDENTIAL SOUT AREA	AREA	10	1.150		745.00	8.28		
RESIDENTIAL SOUT AREA	AREA	100	1.851		745.00	13.36		
RESIDENTIAL SOUT AREA	AREA	1.25	.088		752.00	.41		

Type.... Executive Summary (Nodes)
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 2 yr
Event: 2 yr

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.038		736.00	.29	
	CAMELOT	AREA	5.470		753.00	32.10	
	FRANKLIN MEADOWS	AREA	1.367		750.00	8.55	
	J. MEM HOSP	AREA	7.204		753.00	43.46	
	NURSING HOME	AREA	.967		736.00	8.13	
Outfall	OUT FALL	T-E	23.918		753.00	111.30	725.00
	POND2	POND	12.956		718.00	110.35	
	POND2 OUT	POND	12.002		764.00	43.31	734.24
	PROJ SITE	AREA	5.854		717.00	98.29	
	RESIDENTIAL NE	AREA	3.344		761.00	17.92	
	RESIDENTIAL SOUT	AREA	.628		745.00	4.41	

Type.... Executive Summary (Links)
Name.... Watershed
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 2 yr

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 20	ADD	UN	.967		736.00	8.13	NURSING HOME
		DL	.967		736.00	8.13	
		DN	12.956		718.00	110.35	POND2
A 30	ADD	UN	5.470		753.00	32.10	CAMELOT
		DL	5.470		753.00	32.10	
		DN	12.956		718.00	110.35	POND2
A 40	ADD	UN	.038		736.00	.29	C.B. MIDDLE SCH
		DL	.038		736.00	.29	
		DN	12.956		718.00	110.35	POND2
A 50	ADD	UN	.628		745.00	4.41	RESIDENTIAL SOUT
		DL	.628		745.00	4.41	
		DN	12.956		718.00	110.35	POND2
A 60	ADD	UN	5.854		717.00	98.29	PROJ SITE
		DL	5.854		717.00	98.29	
		DN	12.956		718.00	110.35	POND2

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points	
A 70	ADD	UN	3.344		761.00	17.92	RESIDENTIAL NE	
		DL	3.344		761.00	17.92		
		DN	23.918		753.00	111.30	OUT FALL	
A 80	ADD	UN	7.204		753.00	43.46	J. MEM HOSP	
		DL	7.204		753.00	43.46		
		DN	23.918		753.00	111.30	OUT FALL	
A 90	ADD	UN	1.367		750.00	8.55	FRANKLIN MEADOWS	
		DL	1.367		750.00	8.55		
		DN	23.918		753.00	111.30	OUT FALL	
PR 20	PONDrt	UN	12.956		718.00	110.35	POND2	IN
PR 20			12.002		764.00	43.31	POND2	OUT
		DL	12.002		764.00	43.31		
		DN	23.918		753.00	111.30	OUT FALL	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm · SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.076		736.00	.63	
	CAMELOT	AREA	10.405		753.00	63.81	
	FRANKLIN MEADOWS	AREA	2.601		750.00	16.96	
	J. MEM HOSP	AREA	11.360		753.00	67.54	
	NURSING HOME	AREA	1.542		736.00	12.80	
Outfall	OUT FALL	T-E	41.668		753.00	194.83	725.00
	POND2	POND	22.404		718.00	177.72	
	POND2 OUT	POND	21.428		765.00	77.88	735.45
	PROJ SITE	AREA	9.231		717.00	151.56	
	RESIDENTIAL NE	AREA	6.279		760.00	34.88	
	RESIDENTIAL SOUT	AREA	1.150		745.00	8.28	

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 20	ADD	UN	1.542		736.00	12.80	NURSING HOME
		DL	1.542		736.00	12.80	
		DN	22.404		718.00	177.72	POND2
A 30	ADD	UN	10.405		753.00	63.81	CAMELOT
		DL	10.405		753.00	63.81	
		DN	22.404		718.00	177.72	POND2
A 40	ADD	UN	.076		736.00	.63	C.B. MIDDLE SCH
		DL	.076		736.00	.63	
		DN	22.404		718.00	177.72	POND2
A 50	ADD	UN	1.150		745.00	8.28	RESIDENTIAL SOUT
		DL	1.150		745.00	8.28	
		DN	22.404		718.00	177.72	POND2
A 60	ADD	UN	9.231		717.00	151.56	PROJ SITE
		DL	9.231		717.00	151.56	
		DN	22.404		718.00	177.72	POND2

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 70	ADD	UN	6.279		760.00	34.88	RESIDENTIAL NE
		DL	6.279		760.00	34.88	
		DN	41.668		753.00	194.83	OUT FALL
A 80	ADD	UN	11.360		753.00	67.54	J. MEM HOSP
		DL	11.360		753.00	67.54	
		DN	41.668		753.00	194.83	OUT FALL
A 90	ADD	UN	2.601		750.00	16.96	FRANKLIN MEADOWS
		DL	2.601		750.00	16.96	
		DN	41.668		753.00	194.83	OUT FALL
PR 20	PONDrt	UN	22.404		718.00	177.72	POND2 IN
PR 20			21.428		765.00	77.88	POND2 OUT
		DL	21.428		765.00	77.88	
		DN	41.668		753.00	194.83	OUT FALL

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

---

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.003		746.00	.01	
	CAMELOT	AREA	.618		762.00	2.00	
	FRANKLIN MEADOWS	AREA	.155		758.00	.53	
	J. MEM HOSP	AREA	1.984		753.00	11.85	
	NURSING HOME	AREA	.253		736.00	2.07	
Outfall	OUT FALL	T-E	5.116		753.00	14.41	725.00
	POND2	POND	2.574		718.00	28.68	
	POND2 OUT	POND	2.570		1060.00	1.05	732.77
	PROJ SITE	AREA	1.612		718.00	27.71	
	RESIDENTIAL NE	AREA	.407		770.00	1.33	
	RESIDENTIAL SOUT	AREA	.088		752.00	.41	

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 20	ADD	UN	.253		736.00	2.07	NURSING HOME
		DL	.253		736.00	2.07	
		DN	2.574		718.00	28.68	POND2
A 30	ADD	UN	.618		762.00	2.00	CAMELOT
		DL	.618		762.00	2.00	
		DN	2.574		718.00	28.68	POND2
A 40	ADD	UN	.003		746.00	.01	C.B. MIDDLE SCH
		DL	.003		746.00	.01	
		DN	2.574		718.00	28.68	POND2
A 50	ADD	UN	.088		752.00	.41	RESIDENTIAL SOUT
		DL	.088		752.00	.41	
		DN	2.574		718.00	28.68	POND2
A 60	ADD	UN	1.612		718.00	27.71	PROJ SITE
		DL	1.612		718.00	27.71	
		DN	2.574		718.00	28.68	POND2

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 70	ADD	UN	.407		770.00	1.33	RESIDENTIAL NE
		DL	.407		770.00	1.33	
		DN	5.116		753.00	14.41	OUT FALL
A 80	ADD	UN	1.984		753.00	11.85	J. MEM HOSP
		DL	1.984		753.00	11.85	
		DN	5.116		753.00	14.41	OUT FALL
A 90	ADD	UN	.155		758.00	.53	FRANKLIN MEADOWS
		DL	.155		758.00	.53	
		DN	5.116		753.00	14.41	OUT FALL
PR 20	PONDrt	UN	2.574		718.00	28.68	POND2 IN
PR 20			2.570		1060.00	1.05	POND2 OUT
		DL	2.570		1060.00	1.05	
		DN	5.116		753.00	14.41	OUT FALL

NETWORK RUNOFF NODE SEQUENCE

Runoff Data		Apply to Node		Receiving Link	
SCS UH	Nursing Home	Subarea	NURSING HOME	Add Hyd	NURSING HOME
SCS UH	Camelot	Subarea	CAMELOT	Add Hyd	CAMELOT
SCS UH	C.B. MIDDLE SCH	Subarea	C.B. MIDDLE SCH	Add Hyd	C.B. MIDDLE SCH
SCS UH	Residential Sout	Subarea	RESIDENTIAL SOUT	Add Hyd	RESIDENTIAL SOUT
SCS UH	Proj Site	Subarea	PROJ SITE	Add Hyd	PROJ SITE
SCS UH	Residential NE	Subarea	RESIDENTIAL NE	Add Hyd	RESIDENTIAL NE
SCS UH	J. Mem Hosp	Subarea	J. MEM HOSP	Add Hyd	J. MEM HOSP
SCS UH	Franklin Meadows	Subarea	FRANKLIN MEADOWS	Add Hyd	FRANKLIN MEADOWS

NETWORK ROUTING SEQUENCE

Link Operation	UPstream Node	DNstream Node
BEGIN ICPM SEQUENCE (Top of calculation loop for one time step)		
Add Hyd A 40	Subarea C.B. MIDDLE SCH	Pond POND2
Add Hyd A 20	Subarea NURSING HOME	Pond POND2
Add Hyd A 60	Subarea PROJ SITE	Pond POND2
Add Hyd A 30	Subarea CAMELOT	Pond POND2
Add Hyd A 50	Subarea RESIDENTIAL SOUT	Pond POND2
POND ROUTE TOTAL OUTFLOW...		
Total Pond Outflow	Pond POND2	Outflow POND2 OUT
SET POND ROUTING LINK TO TOTAL POND OUTFLOW...		
Outlet PR 20	Outflow POND2 OUT	T-Elev OUT FALL
Add Hyd A 90	Subarea FRANKLIN MEADOWS	T-Elev OUT FALL
Add Hyd A 80	Subarea J. MEM HOSP	T-Elev OUT FALL
Add Hyd A 70	Subarea RESIDENTIAL NE	T-Elev OUT FALL
END ICPM SEQUENCE (Bottom of calculation loop for one time step)		

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

	Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak min	Qpeak cfs	Max WSEL ft
	C.B. MIDDLE SCH	AREA	.129		736.00	1.10	
	CAMELOT	AREA	17.157		753.00	106.46	
	FRANKLIN MEADOWS	AREA	4.289		750.00	28.26	
	J. MEM HOSP	AREA	16.571		753.00	96.96	
	NURSING HOME	AREA	2.268		736.00	18.52	
Outfall	OUT FALL	T-E	65.004		753.00	282.65	725.00
	POND2	POND	34.870		718.00	262.50	
	POND2 OUT	POND	33.876		773.00	104.62	737.51
	PROJ SITE	AREA	13.465		717.00	216.41	
	RESIDENTIAL NE	AREA	10.268		752.00	57.53	
	RESIDENTIAL SOUT	AREA	1.851		745.00	13.36	

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

---

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = 1.00 min
Output Time Step = 1.00 min
ICPM Ending Time = 2880.00 min

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points
A 20	ADD	UN	2.268		736.00	18.52	NURSING HOME
		DL	2.268		736.00	18.52	
		DN	34.870		718.00	262.50	POND2
A 30	ADD	UN	17.157		753.00	106.46	CAMELOT
		DL	17.157		753.00	106.46	
		DN	34.870		718.00	262.50	POND2
A 40	ADD	UN	.129		736.00	1.10	C.B. MIDDLE SCH
		DL	.129		736.00	1.10	
		DN	34.870		718.00	262.50	POND2
A 50	ADD	UN	1.851		745.00	13.36	RESIDENTIAL SOUT
		DL	1.851		745.00	13.36	
		DN	34.870		718.00	262.50	POND2
A 60	ADD	UN	13.465		717.00	216.41	PROJ SITE
		DL	13.465		717.00	216.41	
		DN	34.870		718.00	262.50	POND2

NETWORK SUMMARY -- LINKS
(UN=Upstream Node; DL=DNstream End of Link; DN=DNstream Node)
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Link ID	Type		HYG Vol ac-ft	Trun.	Peak Time min	Peak Q cfs	End Points	
A 70	ADD	UN	10.268		752.00	57.53	RESIDENTIAL NE	
		DL	10.268		752.00	57.53		
		DN	65.004		753.00	282.65	OUT FALL	
A 80	ADD	UN	16.571		753.00	96.96	J. MEM HOSP	
		DL	16.571		753.00	96.96		
		DN	65.004		753.00	282.65	OUT FALL	
A 90	ADD	UN	4.289		750.00	28.26	FRANKLIN MEADOWS	
		DL	4.289		750.00	28.26		
		DN	65.004		753.00	282.65	OUT FALL	
PR 20	PONDrt	UN	34.870		718.00	262.50	POND2	IN
PR 20			33.876		773.00	104.62	POND2	OUT
		DL	33.876		773.00	104.62		
		DN	65.004		753.00	282.65	OUT FALL	

File.... C:\HAESTAD\PPKW\RAINFALL\JOHNSON.RNQ
Title... Post-Developed Conditions
Johnson Memorial Hospital

DESIGN STORMS SUMMARY

Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

DESIGN STORMS SUMMARY

Design Storm File,ID = JOHNSON.RNQ Type II

Storm Tag Name = 2 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.0000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 10 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.3000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 100 yr

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.9000 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

Storm Tag Name = 1.25in

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 1.25 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1440.00 min
Resulting Start Time= .00 min Step= 6.00 min End= 1440.00 min

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

Type.... Synthetic Curve
Name.... TypeII 24hr Tag: 2 yr
File.... C:\HAESTAD\PPKW\RAINFALL\SCSTYPES.RNF

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0030	.0061	.0092	.0122
30.00	.0154	.0185	.0218	.0250	.0282
60.00	.0315	.0348	.0382	.0416	.0449
90.00	.0484	.0518	.0554	.0589	.0624
120.00	.0660	.0696	.0733	.0770	.0806
150.00	.0844	.0881	.0920	.0958	.0996
180.00	.1035	.1074	.1114	.1154	.1193
210.00	.1234	.1274	.1316	.1357	.1398
240.00	.1440	.1482	.1525	.1569	.1613
270.00	.1658	.1703	.1749	.1795	.1842
300.00	.1890	.1938	.1987	.2037	.2087
330.00	.2138	.2189	.2241	.2293	.2346
360.00	.2400	.2454	.2509	.2565	.2621
390.00	.2678	.2735	.2793	.2851	.2910
420.00	.2970	.3030	.3091	.3153	.3215
450.00	.3278	.3341	.3405	.3469	.3534
480.00	.3600	.3668	.3738	.3812	.3888
510.00	.3968	.4050	.4136	.4224	.4316
540.00	.4410	.4506	.4602	.4698	.4794
570.00	.4890	.4988	.5092	.5200	.5312
600.00	.5430	.5554	.5684	.5822	.5968
630.00	.6120	.6282	.6456	.6642	.6840
660.00	.7050	.7280	.7540	.7828	.8144
690.00	.8490	.9205	1.0631	1.2924	1.7036
720.00	1.9890	2.0459	2.0959	2.1391	2.1755
750.00	2.2050	2.2303	2.2541	2.2763	2.2969
780.00	2.3160	2.3339	2.3509	2.3671	2.3825
810.00	2.3970	2.4108	2.4240	2.4366	2.4486
840.00	2.4600	2.4710	2.4818	2.4924	2.5027
870.00	2.5129	2.5228	2.5326	2.5421	2.5514
900.00	2.5605	2.5694	2.5781	2.5866	2.5948
930.00	2.6029	2.6107	2.6184	2.6258	2.6330
960.00	2.6400	2.6469	2.6537	2.6604	2.6670
990.00	2.6736	2.6801	2.6865	2.6928	2.6991
1020.00	2.7053	2.7114	2.7174	2.7234	2.7293
1050.00	2.7351	2.7408	2.7465	2.7521	2.7576
1080.00	2.7630	2.7684	2.7737	2.7789	2.7840
1110.00	2.7891	2.7941	2.7990	2.8038	2.8086
1140.00	2.8133	2.8179	2.8224	2.8269	2.8313
1170.00	2.8356	2.8398	2.8440	2.8481	2.8521
1200.00	2.8560	2.8599	2.8638	2.8676	2.8715
1230.00	2.8753	2.8791	2.8829	2.8867	2.8905
1260.00	2.8943	2.8980	2.9017	2.9054	2.9091
1290.00	2.9128	2.9165	2.9201	2.9238	2.9274
1320.00	2.9310	2.9346	2.9382	2.9417	2.9453
1350.00	2.9488	2.9523	2.9558	2.9593	2.9628

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	2.9663	2.9697	2.9731	2.9765	2.9799
1410.00	2.9833	2.9867	2.9900	2.9934	2.9967
1440.00	3.0000				

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0043	.0087	.0131	.0175
30.00	.0221	.0266	.0312	.0358	.0405
60.00	.0452	.0499	.0547	.0596	.0644
90.00	.0694	.0743	.0793	.0844	.0895
120.00	.0946	.0998	.1050	.1103	.1156
150.00	.1210	.1263	.1318	.1373	.1428
180.00	.1484	.1540	.1596	.1653	.1711
210.00	.1769	.1827	.1886	.1944	.2004
240.00	.2064	.2125	.2186	.2248	.2312
270.00	.2376	.2441	.2506	.2573	.2641
300.00	.2709	.2778	.2848	.2919	.2991
330.00	.3064	.3137	.3212	.3287	.3363
360.00	.3440	.3518	.3597	.3676	.3756
390.00	.3838	.3920	.4003	.4087	.4171
420.00	.4257	.4343	.4431	.4519	.4608
450.00	.4698	.4788	.4880	.4973	.5066
480.00	.5160	.5257	.5358	.5463	.5573
510.00	.5687	.5805	.5928	.6054	.6186
540.00	.6321	.6459	.6596	.6734	.6871
570.00	.7009	.7150	.7298	.7453	.7614
600.00	.7783	.7960	.8148	.8345	.8554
630.00	.8772	.9004	.9254	.9520	.9804
660.00	1.0105	1.0435	1.0807	1.1220	1.1674
690.00	1.2169	1.3194	1.5237	1.8524	2.4418
720.00	2.8509	2.9324	3.0042	3.0661	3.1182
750.00	3.1605	3.1968	3.2308	3.2627	3.2923
780.00	3.3196	3.3452	3.3697	3.3929	3.4149
810.00	3.4357	3.4555	3.4744	3.4925	3.5097
840.00	3.5260	3.5418	3.5572	3.5724	3.5872
870.00	3.6018	3.6160	3.6300	3.6436	3.6570
900.00	3.6701	3.6828	3.6952	3.7074	3.7192
930.00	3.7308	3.7420	3.7530	3.7636	3.7740
960.00	3.7840	3.7938	3.8036	3.8132	3.8227
990.00	3.8321	3.8414	3.8506	3.8597	3.8687
1020.00	3.8775	3.8863	3.8949	3.9035	3.9119
1050.00	3.9203	3.9285	3.9366	3.9446	3.9525
1080.00	3.9603	3.9680	3.9756	3.9830	3.9904
1110.00	3.9977	4.0048	4.0119	4.0188	4.0256
1140.00	4.0323	4.0389	4.0454	4.0518	4.0581
1170.00	4.0643	4.0704	4.0764	4.0822	4.0880
1200.00	4.0936	4.0992	4.1047	4.1103	4.1158
1230.00	4.1213	4.1268	4.1322	4.1376	4.1431
1260.00	4.1484	4.1538	4.1591	4.1645	4.1698
1290.00	4.1750	4.1803	4.1855	4.1907	4.1959
1320.00	4.2011	4.2063	4.2114	4.2165	4.2216
1350.00	4.2266	4.2317	4.2367	4.2417	4.2467

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	4.2516	4.2566	4.2615	4.2664	4.2712
1410.00	4.2761	4.2809	4.2857	4.2905	4.2953
1440.00	4.3000				

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0013	.0025	.0038	.0051
30.00	.0064	.0077	.0091	.0104	.0118
60.00	.0131	.0145	.0159	.0173	.0187
90.00	.0202	.0216	.0231	.0245	.0260
120.00	.0275	.0290	.0305	.0321	.0336
150.00	.0352	.0367	.0383	.0399	.0415
180.00	.0431	.0448	.0464	.0481	.0497
210.00	.0514	.0531	.0548	.0565	.0583
240.00	.0600	.0618	.0636	.0654	.0672
270.00	.0691	.0710	.0729	.0748	.0768
300.00	.0788	.0808	.0828	.0849	.0870
330.00	.0891	.0912	.0934	.0956	.0978
360.00	.1000	.1023	.1046	.1069	.1092
390.00	.1116	.1140	.1164	.1188	.1213
420.00	.1238	.1263	.1288	.1314	.1340
450.00	.1366	.1392	.1419	.1446	.1473
480.00	.1500	.1528	.1558	.1588	.1620
510.00	.1653	.1688	.1723	.1760	.1798
540.00	.1838	.1878	.1918	.1958	.1998
570.00	.2038	.2079	.2122	.2167	.2214
600.00	.2263	.2314	.2369	.2426	.2487
630.00	.2550	.2618	.2690	.2768	.2850
660.00	.2938	.3034	.3142	.3262	.3394
690.00	.3538	.3836	.4430	.5385	.7098
720.00	.8288	.8525	.8733	.8913	.9065
750.00	.9188	.9293	.9392	.9485	.9571
780.00	.9650	.9725	.9796	.9863	.9927
810.00	.9988	1.0045	1.0100	1.0153	1.0203
840.00	1.0250	1.0296	1.0341	1.0385	1.0428
870.00	1.0470	1.0512	1.0552	1.0592	1.0631
900.00	1.0669	1.0706	1.0742	1.0777	1.0812
930.00	1.0845	1.0878	1.0910	1.0941	1.0971
960.00	1.1000	1.1029	1.1057	1.1085	1.1113
990.00	1.1140	1.1167	1.1194	1.1220	1.1246
1020.00	1.1272	1.1297	1.1323	1.1347	1.1372
1050.00	1.1396	1.1420	1.1444	1.1467	1.1490
1080.00	1.1513	1.1535	1.1557	1.1579	1.1600
1110.00	1.1621	1.1642	1.1662	1.1683	1.1702
1140.00	1.1722	1.1741	1.1760	1.1779	1.1797
1170.00	1.1815	1.1833	1.1850	1.1867	1.1884
1200.00	1.1900	1.1916	1.1932	1.1949	1.1965
1230.00	1.1981	1.1996	1.2012	1.2028	1.2044
1260.00	1.2059	1.2075	1.2091	1.2106	1.2121
1290.00	1.2137	1.2152	1.2167	1.2182	1.2198
1320.00	1.2213	1.2228	1.2242	1.2257	1.2272
1350.00	1.2287	1.2301	1.2316	1.2331	1.2345

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	1.2359	1.2374	1.2388	1.2402	1.2416
1410.00	1.2431	1.2445	1.2459	1.2472	1.2486
1440.00	1.2500				

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.000	.001	.002	.003	.004
30.00	.005	.006	.007	.008	.009
60.00	.011	.012	.013	.014	.015
90.00	.016	.017	.018	.020	.021
120.00	.022	.023	.024	.026	.027
150.00	.028	.029	.031	.032	.033
180.00	.035	.036	.037	.038	.040
210.00	.041	.042	.044	.045	.047
240.00	.048	.049	.051	.052	.054
270.00	.055	.057	.058	.060	.061
300.00	.063	.065	.066	.068	.070
330.00	.071	.073	.075	.076	.078
360.00	.080	.082	.084	.085	.087
390.00	.089	.091	.093	.095	.097
420.00	.099	.101	.103	.105	.107
450.00	.109	.111	.113	.116	.118
480.00	.120	.122	.125	.127	.130
510.00	.132	.135	.138	.141	.144
540.00	.147	.150	.153	.157	.160
570.00	.163	.166	.170	.173	.177
600.00	.181	.185	.189	.194	.199
630.00	.204	.209	.215	.221	.228
660.00	.235	.243	.251	.261	.271
690.00	.283	.307	.354	.431	.568
720.00	.663	.682	.699	.713	.725
750.00	.735	.743	.751	.759	.766
780.00	.772	.778	.784	.789	.794
810.00	.799	.804	.808	.812	.816
840.00	.820	.824	.827	.831	.834
870.00	.838	.841	.844	.847	.850
900.00	.854	.856	.859	.862	.865
930.00	.868	.870	.873	.875	.878
960.00	.880	.882	.885	.887	.889
990.00	.891	.893	.895	.898	.900
1020.00	.902	.904	.906	.908	.910
1050.00	.912	.914	.915	.917	.919
1080.00	.921	.923	.925	.926	.928
1110.00	.930	.931	.933	.935	.936
1140.00	.938	.939	.941	.942	.944
1170.00	.945	.947	.948	.949	.951
1200.00	.952	.953	.955	.956	.957
1230.00	.958	.960	.961	.962	.964
1260.00	.965	.966	.967	.968	.970
1290.00	.971	.972	.973	.975	.976
1320.00	.977	.978	.979	.981	.982
1350.00	.983	.984	.985	.986	.988

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	.989	.990	.991	.992	.993
1410.00	.994	.996	.997	.998	.999
1440.00	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
.00	.0000	.0060	.0119	.0180	.0241
30.00	.0303	.0365	.0428	.0491	.0555
60.00	.0620	.0685	.0750	.0817	.0884
90.00	.0952	.1020	.1089	.1158	.1228
120.00	.1298	.1369	.1441	.1513	.1586
150.00	.1660	.1733	.1808	.1883	.1959
180.00	.2036	.2113	.2190	.2269	.2347
210.00	.2427	.2506	.2587	.2668	.2750
240.00	.2832	.2915	.3000	.3085	.3172
270.00	.3260	.3349	.3439	.3531	.3623
300.00	.3717	.3812	.3908	.4006	.4104
330.00	.4204	.4305	.4407	.4510	.4614
360.00	.4720	.4827	.4935	.5044	.5154
390.00	.5266	.5378	.5492	.5607	.5724
420.00	.5841	.5960	.6079	.6200	.6322
450.00	.6446	.6570	.6696	.6823	.6951
480.00	.7080	.7213	.7351	.7496	.7646
510.00	.7803	.7965	.8133	.8307	.8487
540.00	.8673	.8862	.9051	.9239	.9428
570.00	.9617	.9811	1.0013	1.0226	1.0448
600.00	1.0679	1.0922	1.1179	1.1451	1.1736
630.00	1.2036	1.2355	1.2697	1.3063	1.3452
660.00	1.3865	1.4318	1.4828	1.5394	1.6017
690.00	1.6697	1.8104	2.0907	2.5417	3.3504
720.00	3.9117	4.0236	4.1220	4.2069	4.2784
750.00	4.3365	4.3863	4.4330	4.4767	4.5173
780.00	4.5548	4.5900	4.6235	4.6553	4.6855
810.00	4.7141	4.7412	4.7672	4.7920	4.8156
840.00	4.8380	4.8597	4.8808	4.9017	4.9220
870.00	4.9420	4.9615	4.9807	4.9994	5.0178
900.00	5.0357	5.0532	5.0702	5.0869	5.1031
930.00	5.1190	5.1344	5.1495	5.1640	5.1783
960.00	5.1920	5.2055	5.2188	5.2321	5.2451
990.00	5.2580	5.2708	5.2834	5.2958	5.3082
1020.00	5.3203	5.3324	5.3442	5.3560	5.3675
1050.00	5.3790	5.3902	5.4014	5.4124	5.4232
1080.00	5.4339	5.4445	5.4548	5.4651	5.4752
1110.00	5.4852	5.4950	5.5046	5.5141	5.5235
1140.00	5.5327	5.5418	5.5507	5.5595	5.5681
1170.00	5.5766	5.5849	5.5931	5.6012	5.6091
1200.00	5.6168	5.6245	5.6321	5.6397	5.6472
1230.00	5.6548	5.6623	5.6698	5.6772	5.6847
1260.00	5.6920	5.6994	5.7067	5.7140	5.7213
1290.00	5.7285	5.7357	5.7429	5.7501	5.7572
1320.00	5.7643	5.7714	5.7784	5.7854	5.7924
1350.00	5.7993	5.8062	5.8132	5.8200	5.8268

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = 6.00 min
Time on left represents time for first value in each row.

Time min					
1380.00	5.8336	5.8404	5.8471	5.8539	5.8605
1410.00	5.8672	5.8738	5.8804	5.8870	5.8935
1440.00	5.9000				

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	240.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.10 ft/sec

Segment #1 Time: 39.18 min

==========

Total Tc: 39.18 min

==========

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	370.00 ft
Slope	.007000 ft/ft
Unpaved	
Avg.Velocity	1.35 ft/sec

Segment #2 Time: 4.57 min

Segment #3: Tc: Length & Vel.

Hydraulic Length	1600.00 ft
Avg.Velocity	2.50 ft/sec

Segment #3 Time: 10.67 min

Total Tc: 62.07 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

==== User Defined Length & Velocity ==========

Tc = (Lf / V) / (3600sec/hr)

Where: Tc = Time of concentration, hrs
Lf = Flow length, ft
V = Velocity, ft/sec

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1370.00 ft
Slope	.020000 ft/ft
Unpaved	
Avg.Velocity	2.28 ft/sec

Segment #2 Time: 10.01 min

Total Tc: 56.84 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1680.00 ft
Slope	.010000 ft/ft
Unpaved	
Avg.Velocity	1.61 ft/sec

Segment #2 Time: 17.35 min

Total Tc: 64.19 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	100.00 ft
2yr, 24hr P	3.0000 in
Slope	.005000 ft/ft
Avg.Velocity	.06 ft/sec

Segment #1 Time: 25.66 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1000.00 ft
Slope	.005000 ft/ft
Unpaved	
Avg.Velocity	1.14 ft/sec

Segment #2 Time: 14.61 min

Total Tc: 40.27 min

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... PROJ SITE

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

TIME OF CONCENTRATION CALCULATOR

==========
Total Tc: .00 min

Calculated Tc < Min.Tc:
Use Minimum Tc...
Use Tc = 5.00 min
==========

?

Type.... Tc Calcs
Name.... PROJ SITE

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

Type.... Tc Calcs
Name.... RESIDENTIAL NE

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.007500 ft/ft
Avg.Velocity	.10 ft/sec

Segment #1 Time: 52.54 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1500.00 ft
Slope	.007500 ft/ft
Unpaved	
Avg.Velocity	1.40 ft/sec

Segment #2 Time: 17.89 min

Total Tc: 70.44 min

Type.... Tc Calcs
Name.... RESIDENTIAL NE

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

Type.... Tc Calcs
Name.... RESIDENTIAL SOUT

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	300.00 ft
2yr, 24hr P	3.0000 in
Slope	.010000 ft/ft
Avg.Velocity	.11 ft/sec

Segment #1 Time: 46.83 min

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	530.00 ft
Slope	.020000 ft/ft
Paved	
Avg.Velocity	2.87 ft/sec

Segment #2 Time: 3.07 min

==========
Total Tc: 49.91 min
==========

Type.... Tc Calcs
Name.... RESIDENTIAL SOUT

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, ft/ft

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - C.B. MIDDLE SCH 2 yr
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========

Computational Time Increment	=	5.224 min
Computed Peak Time	=	736.52 min
Computed Peak Flow	=	.29 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	737.00 min
Peak Flow, Interpolated Output	=	.29 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

.9082 in
.038 ac-ft

HYG Volume... .038 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	.87 cfs
Unit peak time	Tp =	26.118 min
Unit receding limb,	Tr =	104.471 min
Total unit time,	Tb =	130.589 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - C.B. MIDDLE SCH 10 yr
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========

Computational Time Increment	=	5.224 min
Computed Peak Time	=	736.52 min
Computed Peak Flow	=	.64 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	737.00 min
Peak Flow, Interpolated Output	=	.63 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

1.8198 in
.076 ac-ft

HYG Volume... .076 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	.87 cfs
Unit peak time	Tp =	26.118 min
Unit receding limb,	Tr =	104.471 min
Total unit time,	Tb =	130.589 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - C.B. MIDDLE SCH 1.25in
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========

Computational Time Increment	=	5.224 min
Computed Peak Time	=	752.19 min
Computed Peak Flow	=	.01 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	.01 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

.0738 in
.003 ac-ft

HYG Volume... .003 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	.87 cfs
Unit peak time	Tp =	26.118 min
Unit receding limb,	Tr =	104.471 min
Total unit time,	Tb =	130.589 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - C.B. MIDDLE SCH 100 yr
Tc = 39.18 min
Drainage Area = .500 acres Runoff CN= 74

==========

Computational Time Increment	=	5.224 min
Computed Peak Time	=	736.52 min
Computed Peak Flow	=	1.11 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	737.00 min
Peak Flow, Interpolated Output	=	1.10 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 74
Area = .500 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

3.1010 in
.129 ac-ft

HYG Volume... .129 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 39.177 min (ID: C.B. MIDDLE SCH)
Computational Incr, Tm = 5.224 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	.87 cfs
Unit peak time	Tp =	26.118 min
Unit receding limb,	Tr =	104.471 min
Total unit time,	Tb =	130.589 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - CAMELOT 2 yr
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========
Computational Time Increment = 8.276 min
Computed Peak Time = 753.09 min
Computed Peak Flow = 32.12 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 753.00 min
Peak Flow, Interpolated Output = 32.10 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

1.0939 in
5.470 ac-ft

HYG Volume... 5.470 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 65.72 cfs
Unit peak time Tp = 41.379 min
Unit receding limb, Tr = 165.515 min
Total unit time, Tb = 206.894 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - CAMELOT 10 yr
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========
Computational Time Increment = 8.276 min
Computed Peak Time = 753.09 min
Computed Peak Flow = 63.83 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 753.00 min
Peak Flow, Interpolated Output = 63.81 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

2.0809 in
10.405 ac-ft

HYG Volume... 10.405 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 65.72 cfs
Unit peak time Tp = 41.379 min
Unit receding limb, Tr = 165.515 min
Total unit time, Tb = 206.894 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - CAMELOT 1.25in
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========

Computational Time Increment	=	8.276 min
Computed Peak Time	=	769.64 min
Computed Peak Flow	=	2.01 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	769.00 min
Peak Flow, Interpolated Output	=	2.01 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

.1237 in
.619 ac-ft

HYG Volume... .618 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	65.72 cfs
Unit peak time	Tp =	41.379 min
Unit receding limb,	Tr =	165.515 min
Total unit time,	Tb =	206.894 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAE5TAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - CAMELOT 100 yr
Tc = 62.07 min
Drainage Area = 60.000 acres Runoff CN= 77

==========
Computational Time Increment = 8.276 min
Computed Peak Time = 753.09 min
Computed Peak Flow = 106.49 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 753.00 min
Peak Flow, Interpolated Output = 106.46 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 60.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

3.4313 in
17.157 ac-ft

HYG Volume... 17.157 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 62.068 min (ID: CAMELOT)
Computational Incr, Tm = 8.276 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 65.72 cfs
Unit peak time Tp = 41.379 min
Unit receding limb, Tr = 165.515 min
Total unit time, Tb = 206.894 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - FRANKLIN MEADOWS 2 yr
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	750.29 min
Computed Peak Flow	=	8.56 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	8.55 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

1.0939 in
1.367 ac-ft

HYG Volume... 1.367 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - FRANKLIN MEADOWS 10 yr
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	750.29 min
Computed Peak Flow	=	16.97 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	16.96 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

2.0809 in
2.601 ac-ft

HYG Volume... 2.601 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - FRANKLIN MEADOWS 1.25in
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========
Computational Time Increment = 7.579 min
Computed Peak Time = 757.87 min
Computed Peak Flow = .53 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 758.00 min
Peak Flow, Interpolated Output = .53 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

.1237 in
.155 ac-ft

HYG Volume... .155 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 17.94 cfs
Unit peak time Tp = 37.893 min
Unit receding limb, Tr = 151.574 min
Total unit time, Tb = 189.467 min

Type.... SCS Unit Hyd. Summary
Name.... FRANKLIN MEADOWS Tag: 100 yr
Event: 100 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 100 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - FRANKLIN MEADOWS 100 yr
Tc = 56.84 min
Drainage Area = 15.000 acres Runoff CN= 77

==========

Computational Time Increment	=	7.579 min
Computed Peak Time	=	750.29 min
Computed Peak Flow	=	28.27 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	750.00 min
Peak Flow, Interpolated Output	=	28.26 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 77
Area = 15.000 acres
S = 2.9199 in
0.2S = .5840 in

Cumulative Runoff

3.4313 in
4.289 ac-ft

HYG Volume... 4.289 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 56.840 min (ID: FRANKLIN MEADOWS)
Computational Incr, Tm = 7.579 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	17.94 cfs
Unit peak time	Tp =	37.893 min
Unit receding limb,	Tr =	151.574 min
Total unit time,	Tb =	189.467 min

Type.... SCS Unit Hyd. Summary
Name.... J. MEM HOSP Tag: 2 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 2 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - J. MEM HOSP 2 yr
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	43.48 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	43.46 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

2.1611 in
7.204 ac-ft

HYG Volume... 7.204 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - J. MEM HOSP 10 yr
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	67.57 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	67.54 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

3.4079 in
11.360 ac-ft

HYG Volume... 11.360 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

Type.... SCS Unit Hyd. Summary
Name.... J. MEM HOSP Tag: 1.25in Event: 1.25 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 1.25in

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - J. MEM HOSP 1.25in
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	11.86 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	11.85 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

.5952 in
1.984 ac-ft

HYG Volume... 1.984 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - J. MEM HOSP 100 yr
Tc = 64.19 min
Drainage Area = 40.000 acres Runoff CN= 92

==========

Computational Time Increment	=	8.558 min
Computed Peak Time	=	753.13 min
Computed Peak Flow	=	96.99 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	753.00 min
Peak Flow, Interpolated Output	=	96.96 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 40.000 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

4.9712 in
16.571 ac-ft

HYG Volume... 16.571 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 64.187 min (ID: J.CO. MEM HOSP)
Computational Incr, Tm = 8.558 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	42.37 cfs
Unit peak time	Tp =	42.792 min
Unit receding limb,	Tr =	171.166 min
Total unit time,	Tb =	213.958 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - NURSING HOME 2 yr
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========

Computational Time Increment	=	5.369 min
Computed Peak Time	=	735.59 min
Computed Peak Flow	=	8.15 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	736.00 min
Peak Flow, Interpolated Output	=	8.13 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

2.0712 in
.967 ac-ft

HYG Volume... .967 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	9.45 cfs
Unit peak time	Tp =	26.846 min
Unit receding limb,	Tr =	107.385 min
Total unit time,	Tb =	134.231 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - NURSING HOME 10 yr
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========

Computational Time Increment	=	5.369 min
Computed Peak Time	=	735.59 min
Computed Peak Flow	=	12.84 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	736.00 min
Peak Flow, Interpolated Output	=	12.80 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

3.3053 in
1.542 ac-ft

HYG Volume... 1.542 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	9.45 cfs
Unit peak time	Tp =	26.846 min
Unit receding limb,	Tr =	107.385 min
Total unit time,	Tb =	134.231 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - NURSING HOME 1.25in
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========

Computational Time Increment	=	5.369 min
Computed Peak Time	=	735.59 min
Computed Peak Flow	=	2.07 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	736.00 min
Peak Flow, Interpolated Output	=	2.07 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

.5424 in
.253 ac-ft

HYG Volume... .253 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	9.45 cfs
Unit peak time	Tp =	26.846 min
Unit receding limb,	Tr =	107.385 min
Total unit time,	Tb =	134.231 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - NURSING HOME 100 yr
Tc = 40.27 min
Drainage Area = 5.600 acres Runoff CN= 91

==========
Computational Time Increment = 5.369 min
Computed Peak Time = 735.59 min
Computed Peak Flow = 18.59 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 736.00 min
Peak Flow, Interpolated Output = 18.52 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 91
Area = 5.600 acres
S = .9890 in
0.2S = .1978 in

Cumulative Runoff

4.8594 in
2.268 ac-ft

HYG Volume... 2.268 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 40.269 min (ID: NURSING HOME)
Computational Incr, Tm = 5.369 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 9.45 cfs
Unit peak time Tp = 26.846 min
Unit receding limb, Tr = 107.385 min
Total unit time, Tb = 134.231 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - PROJ SITE 2 yr
Tc = 8.00 min
Drainage Area = 32.500 acres Runoff CN= 92

==========
Computational Time Increment = 1.067 min
Computed Peak Time = 716.80 min
Computed Peak Flow = 98.39 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 717.00 min
Peak Flow, Interpolated Output = 98.29 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 32.500 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

2.1611 in
5.853 ac-ft

HYG Volume... 5.854 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 8.000 min (ID: PROJ SITE)
Computational Incr, Tm = 1.067 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 276.18 cfs
Unit peak time Tp = 5.333 min
Unit receding limb, Tr = 21.333 min
Total unit time, Tb = 26.667 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - PROJ SITE 10 yr
Tc = 8.00 min
Drainage Area = 32.500 acres Runoff CN= 92

==========

Computational Time Increment	=	1.067 min
Computed Peak Time	=	716.80 min
Computed Peak Flow	=	151.80 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	717.00 min
Peak Flow, Interpolated Output	=	151.56 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 32.500 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

3.4079 in
9.230 ac-ft

HYG Volume... 9.231 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 8.000 min (ID: PROJ SITE)
Computational Incr, Tm = 1.067 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	276.18 cfs
Unit peak time	Tp =	5.333 min
Unit receding limb,	Tr =	21.333 min
Total unit time,	Tb =	26.667 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - PROJ SITE 1.25in
Tc = 8.00 min
Drainage Area = 32.500 acres Runoff CN= 92

==========

Computational Time Increment	=	1.067 min
Computed Peak Time	=	717.87 min
Computed Peak Flow	=	27.73 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	718.00 min
Peak Flow, Interpolated Output	=	27.71 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 32.500 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

.5952 in
1.612 ac-ft

HYG Volume... 1.612 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 8.000 min (ID: PROJ SITE)
Computational Incr, Tm = 1.067 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	276.18 cfs
Unit peak time	Tp =	5.333 min
Unit receding limb,	Tr =	21.333 min
Total unit time,	Tb =	26.667 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - PROJ SITE 100 yr
Tc = 8.00 min
Drainage Area = 32.500 acres Runoff CN= 92

==========
Computational Time Increment = 1.067 min
Computed Peak Time = 716.80 min
Computed Peak Flow = 216.83 cfs

Time Increment for HYG File = 1.00 min
Peak Time, Interpolated Output = 717.00 min
Peak Flow, Interpolated Output = 216.41 cfs
==========

DRAINAGE AREA

ID:None Selected
CN = 92
Area = 32.500 acres
S = .8696 in
0.2S = .1739 in

Cumulative Runoff

4.9712 in
13.464 ac-ft

HYG Volume... 13.465 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 8.000 min (ID: PROJ SITE)
Computational Incr, Tm = 1.067 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 276.18 cfs
Unit peak time Tp = 5.333 min
Unit receding limb, Tr = 21.333 min
Total unit time, Tb = 26.667 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL NE 2 yr
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	760.72 min
Computed Peak Flow	=	17.95 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	761.00 min
Peak Flow, Interpolated Output	=	17.92 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

1.1465 in
3.344 ac-ft

HYG Volume... 3.344 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL NE 10 yr
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	760.72 min
Computed Peak Flow	=	34.91 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	760.00 min
Peak Flow, Interpolated Output	=	34.88 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

2.1529 in
6.279 ac-ft

HYG Volume... 6.279 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL NE 1.25in
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	770.11 min
Computed Peak Flow	=	1.33 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	770.00 min
Peak Flow, Interpolated Output	=	1.33 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

.1396 in
.407 ac-ft

HYG Volume... .407 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL NE 100 yr
Tc = 70.44 min
Drainage Area = 35.000 acres Runoff CN= 78

==========

Computational Time Increment	=	9.392 min
Computed Peak Time	=	751.32 min
Computed Peak Flow	=	57.53 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	752.00 min
Peak Flow, Interpolated Output	=	57.53 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 78
Area = 35.000 acres
S = 2.7714 in
0.2S = .5543 in

Cumulative Runoff

3.5206 in
10.268 ac-ft

HYG Volume... 10.268 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 70.437 min (ID: RESIDENTIAL NE)
Computational Incr, Tm = 9.392 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	33.78 cfs
Unit peak time	Tp =	46.958 min
Unit receding limb,	Tr =	187.831 min
Total unit time,	Tb =	234.789 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 1440.00 min Rain Depth = 3.0000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL SOUT 2 yr
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	745.26 min
Computed Peak Flow	=	4.42 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	745.00 min
Peak Flow, Interpolated Output	=	4.41 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

1.2563 in
.628 ac-ft

HYG Volume... .628 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 1440.00 min Rain Depth = 4.3000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL SOUT 10 yr
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	745.26 min
Computed Peak Flow	=	8.29 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	745.00 min
Peak Flow, Interpolated Output	=	8.28 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

2.3004 in
1.150 ac-ft

HYG Volume... 1.150 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1.25 year storm
Duration = 1440.00 min Rain Depth = 1.2500 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL SOUT 1.25in
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	751.92 min
Computed Peak Flow	=	.41 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	752.00 min
Peak Flow, Interpolated Output	=	.41 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

.1752 in
.088 ac-ft

HYG Volume... .088 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 1440.00 min Rain Depth = 5.9000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
HYG File - ID = POST-D.HYG - RESIDENTIAL SOUT 100 yr
Tc = 49.91 min
Drainage Area = 6.000 acres Runoff CN= 80

==========

Computational Time Increment	=	6.654 min
Computed Peak Time	=	745.26 min
Computed Peak Flow	=	13.36 cfs
Time Increment for HYG File	=	1.00 min
Peak Time, Interpolated Output	=	745.00 min
Peak Flow, Interpolated Output	=	13.36 cfs

==========

DRAINAGE AREA

ID:None Selected
CN = 80
Area = 6.000 acres
S = 2.4844 in
0.2S = .4969 in

Cumulative Runoff

3.7013 in
1.851 ac-ft

HYG Volume... 1.851 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = 49.906 min (ID: RESIDENTIAL SOUT)
Computational Incr, Tm = 6.654 min = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak,	qp =	8.17 cfs
Unit peak time	Tp =	33.271 min
Unit receding limb,	Tr =	133.083 min
Total unit time,	Tb =	166.353 min

ICPR TIME-ELEVATION TABLE

Time, min	Elev, ft
.00	725.00
5000.00	725.00

ICPR TIME-ELEVATION TABLE

Time, min	Elev, ft
.00	725.00
5000.00	725.00

ICPR TIME-ELEVATION TABLE

Time, min	Elev, ft
.00	725.00
5000.00	725.00

ICPR TIME-ELEVATION TABLE

Time, min	Elev, ft
.00	725.00
5000.00	725.00

Type.... E-Q-TW Series
Name.... PR20

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\POND1-EQ.EQT

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft	TW,ft	TW,ft	TW,ft	TW,ft
	700.00	700.50	701.00	725.92	.00
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	.00
730.50	.35	.35	.35	.35	.00
731.00	.58	.58	.58	.58	.00
731.50	.75	.75	.75	.75	.00
732.00	.88	.88	.88	.88	.00
732.50	.99	.99	.99	.99	.00
733.00	1.10	1.10	1.10	1.10	.00
733.50	1.19	1.19	1.19	1.19	.00
733.67	1.22	1.22	1.22	1.22	.00
734.00	34.13	34.13	34.13	34.13	.00
734.50	53.52	53.52	53.52	53.52	.00
735.00	67.53	67.53	67.53	67.53	.00
735.50	79.09	79.09	79.09	79.09	.00
736.00	89.17	89.17	89.17	89.17	.00
736.50	95.48	95.48	95.48	95.48	.00
737.00	98.41	98.41	98.41	98.41	.00
737.50	104.52	104.52	104.52	104.52	.00
738.00	109.52	109.52	109.52	109.52	.00
738.50	114.48	114.48	114.48	114.48	.00
739.00	119.10	119.10	119.10	119.10	.00

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\POND1-EQ.EQT

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft	TW,ft	TW,ft	TW,ft	TW,ft
	.00	.00	.00	.00	.00
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	.00
730.50	.00	.00	.00	.00	.00
731.00	.00	.00	.00	.00	.00
731.50	.00	.00	.00	.00	.00
732.00	.00	.00	.00	.00	.00
732.50	.00	.00	.00	.00	.00
733.00	.00	.00	.00	.00	.00
733.50	.00	.00	.00	.00	.00
733.67	.00	.00	.00	.00	.00
734.00	.00	.00	.00	.00	.00
734.50	.00	.00	.00	.00	.00
735.00	.00	.00	.00	.00	.00
735.50	.00	.00	.00	.00	.00
736.00	.00	.00	.00	.00	.00
736.50	.00	.00	.00	.00	.00
737.00	.00	.00	.00	.00	.00
737.50	.00	.00	.00	.00	.00
738.00	.00	.00	.00	.00	.00
738.50	.00	.00	.00	.00	.00
739.00	.00	.00	.00	.00	.00

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft .00	TW,ft .00	TW,ft .00	TW,ft .00	TW,ft .00
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	.00
730.50	.00	.00	.00	.00	.00
731.00	.00	.00	.00	.00	.00
731.50	.00	.00	.00	.00	.00
732.00	.00	.00	.00	.00	.00
732.50	.00	.00	.00	.00	.00
733.00	.00	.00	.00	.00	.00
733.50	.00	.00	.00	.00	.00
733.67	.00	.00	.00	.00	.00
734.00	.00	.00	.00	.00	.00
734.50	.00	.00	.00	.00	.00
735.00	.00	.00	.00	.00	.00
735.50	.00	.00	.00	.00	.00
736.00	.00	.00	.00	.00	.00
736.50	.00	.00	.00	.00	.00
737.00	.00	.00	.00	.00	.00
737.50	.00	.00	.00	.00	.00
738.00	.00	.00	.00	.00	.00
738.50	.00	.00	.00	.00	.00
739.00	.00	.00	.00	.00	.00

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\POND1-EQ.EQT

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft .00	TW,ft .00	TW,ft .00	TW,ft .00	TW,ft .00
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	.00
730.50	.00	.00	.00	.00	.00
731.00	.00	.00	.00	.00	.00
731.50	.00	.00	.00	.00	.00
732.00	.00	.00	.00	.00	.00
732.50	.00	.00	.00	.00	.00
733.00	.00	.00	.00	.00	.00
733.50	.00	.00	.00	.00	.00
733.67	.00	.00	.00	.00	.00
734.00	.00	.00	.00	.00	.00
734.50	.00	.00	.00	.00	.00
735.00	.00	.00	.00	.00	.00
735.50	.00	.00	.00	.00	.00
736.00	.00	.00	.00	.00	.00
736.50	.00	.00	.00	.00	.00
737.00	.00	.00	.00	.00	.00
737.50	.00	.00	.00	.00	.00
738.00	.00	.00	.00	.00	.00
738.50	.00	.00	.00	.00	.00
739.00	.00	.00	.00	.00	.00

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\POND1-EQ.EQT

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft	TW,ft	TW,ft	TW,ft	TW,ft
	.00	.00	.00	.00	.00
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	.00
730.50	.00	.00	.00	.00	.00
731.00	.00	.00	.00	.00	.00
731.50	.00	.00	.00	.00	.00
732.00	.00	.00	.00	.00	.00
732.50	.00	.00	.00	.00	.00
733.00	.00	.00	.00	.00	.00
733.50	.00	.00	.00	.00	.00
733.67	.00	.00	.00	.00	.00
734.00	.00	.00	.00	.00	.00
734.50	.00	.00	.00	.00	.00
735.00	.00	.00	.00	.00	.00
735.50	.00	.00	.00	.00	.00
736.00	.00	.00	.00	.00	.00
736.50	.00	.00	.00	.00	.00
737.00	.00	.00	.00	.00	.00
737.50	.00	.00	.00	.00	.00
738.00	.00	.00	.00	.00	.00
738.50	.00	.00	.00	.00	.00
739.00	.00	.00	.00	.00	.00

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\POND1-EQ.EQT

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft	TW,ft	TW,ft	TW,ft	TW,ft
	.00	.00	.00	.00	.00
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	.00
730.50	.00	.00	.00	.00	.00
731.00	.00	.00	.00	.00	.00
731.50	.00	.00	.00	.00	.00
732.00	.00	.00	.00	.00	.00
732.50	.00	.00	.00	.00	.00
733.00	.00	.00	.00	.00	.00
733.50	.00	.00	.00	.00	.00
733.67	.00	.00	.00	.00	.00
734.00	.00	.00	.00	.00	.00
734.50	.00	.00	.00	.00	.00
735.00	.00	.00	.00	.00	.00
735.50	.00	.00	.00	.00	.00
736.00	.00	.00	.00	.00	.00
736.50	.00	.00	.00	.00	.00
737.00	.00	.00	.00	.00	.00
737.50	.00	.00	.00	.00	.00
738.00	.00	.00	.00	.00	.00
738.50	.00	.00	.00	.00	.00
739.00	.00	.00	.00	.00	.00

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\POND1-EQ.EQT

Elevation - Outflow - Tailwater (ICPR Rating Table)

TW Elevs. --->	TW,ft .00	TW,ft .00	TW,ft .00	TW,ft .00	TW,ft
HW Elev,ft	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs	Flow, cfs
730.00	.00	.00	.00	.00	
730.50	.00	.00	.00	.00	
731.00	.00	.00	.00	.00	
731.50	.00	.00	.00	.00	
732.00	.00	.00	.00	.00	
732.50	.00	.00	.00	.00	
733.00	.00	.00	.00	.00	
733.50	.00	.00	.00	.00	
733.67	.00	.00	.00	.00	
734.00	.00	.00	.00	.00	
734.50	.00	.00	.00	.00	
735.00	.00	.00	.00	.00	
735.50	.00	.00	.00	.00	
736.00	.00	.00	.00	.00	
736.50	.00	.00	.00	.00	
737.00	.00	.00	.00	.00	
737.50	.00	.00	.00	.00	
738.00	.00	.00	.00	.00	
738.50	.00	.00	.00	.00	
739.00	.00	.00	.00	.00	

ICPM POND ROUTING SUMMARY

HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
Inflow HYG file = POND2 IN 2 yr
Outflow HYG file = POND2 OUT 2 yr

Pond Node Data = POND2
Pond Volume Data = POND2
Pond Outlet Data = PR20

No Infiltration

INITIAL CONDITIONS

Starting WS Elev =	730.00 ft
Starting Volume =	.000 ac-ft
Starting Outflow =	.00 cfs

CALCULATION TOLERANCES

Target Convergence=	.000 cfs +/-
Max. Iterations =	35 loops
ICPM Time Step =	1.00 min
Output Time Step =	1.00 min
ICPM Ending Time =	2880.00 min

MAXIMUM STORAGE

Tp, min	Elev, ft	Vol, ac-ft
764.00	734.24	4.052

	FORWARD FLOW PEAKS Tp, min	FORWARD FLOW PEAKS Qp, cfs	REVERSE FLOW PEAKS Tp, min	REVERSE FLOW PEAKS Qp, cfs
Pond Inflow.....	718.00	110.35	.00	.00
Pond Outflow....	764.00	43.31	.00	.00

	TOTAL VOLUME IN Vol, ac-ft	TOTAL VOLUME IN Direction	TOTAL VOLUME OUT Vol, ac-ft	TOTAL VOLUME OUT Direction
Pond Inflow.....	12.956	Forward	.000	Reverse
Pond Outflow....	.000	Reverse	12.002	Forward

MASS BALANCE (ac-ft)

+	Initial Vol.....	.000
+	Total Vol IN....	12.956
-	Total Vol OUT...	12.002
-	Ending Pond Vol.	.961 <-- (At 2879.01 min Elev.= 732.30 ft)
	Difference.....	-.007 ac-ft (.051% of Inflow Volume)

Type.... ICPM Node Routing Summary
Name.... POND2 Tag: 10 yr
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 10 yr

ICPM POND ROUTING SUMMARY

HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
Inflow HYG file = POND2 IN 10 yr
Outflow HYG file = POND2 OUT 10 yr

Pond Node Data = POND2
Pond Volume Data = POND2
Pond Outlet Data = PR20

No Infiltration

INITIAL CONDITIONS

Starting WS Elev =	730.00 ft
Starting Volume =	.000 ac-ft
Starting Outflow =	.00 cfs

CALCULATION TOLERANCES

Target Convergence=	.000 cfs +/-
Max. Iterations =	35 loops
ICPM Time Step =	1.00 min
Output Time Step =	1.00 min
ICPM Ending Time =	2880.00 min

MAXIMUM STORAGE

Tp, min	Elev, ft	Vol, ac-ft
765.00	735.45	6.346

	FORWARD FLOW PEAKS Tp, min	FORWARD FLOW PEAKS Qp, cfs	REVERSE FLOW PEAKS Tp, min	REVERSE FLOW PEAKS Qp, cfs
Pond Inflow.....	718.00	177.72	.00	.00
Pond Outflow....	765.00	77.88	.00	.00

	TOTAL VOLUME IN Vol, ac-ft	TOTAL VOLUME IN Direction	TOTAL VOLUME OUT Vol, ac-ft	TOTAL VOLUME OUT Direction
Pond Inflow.....	22.404	Forward	.000	Reverse
Pond Outflow....	.000	Reverse	21.428	Forward

MASS BALANCE (ac-ft)

+ Initial Vol.....	.000	
+ Total Vol IN....	22.404	
- Total Vol OUT...	21.428	
- Ending Pond Vol.	.979	<-- (At 2879.01 min Elev.= 732.32 ft)
Difference.....	-.002 ac-ft	(.010% of Inflow Volume)

Type.... ICPM Node Routing Summary Event: 1.25 yr
Name.... POND2 Tag: 1.25in
File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW
Storm... TypeII 24hr Tag: 1.25in

ICPM POND ROUTING SUMMARY

HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
Inflow HYG file = POND2 IN 1.25in
Outflow HYG file = POND2 OUT 1.25in

Pond Node Data = POND2
Pond Volume Data = POND2
Pond Outlet Data = PR20

No Infiltration

INITIAL CONDITIONS

Starting WS Elev =	730.00 ft
Starting Volume =	.000 ac-ft
Starting Outflow =	.00 cfs

CALCULATION TOLERANCES

Target Convergence=	.000 cfs +/-
Max. Iterations =	35 loops
ICPM Time Step =	1.00 min
Output Time Step =	1.00 min
ICPM Ending Time =	2880.00 min

MAXIMUM STORAGE

Tp, min	Elev, ft	Vol, ac-ft
1126.00	732.77	1.557

	FORWARD FLOW PEAKS Tp, min	FORWARD FLOW PEAKS Qp, cfs	REVERSE FLOW PEAKS Tp, min	REVERSE FLOW PEAKS Qp, cfs
Pond Inflow.....	718.00	28.68	.00	.00
Pond Outflow....	1060.00	1.05	.00	.00

	TOTAL VOLUME IN Vol, ac-ft	TOTAL VOLUME IN Direction	TOTAL VOLUME OUT Vol, ac-ft	TOTAL VOLUME OUT Direction
Pond Inflow.....	2.574	Forward	.000	Reverse
Pond Outflow....	.000	Reverse	2.570	Forward

MASS BALANCE (ac-ft)

+ Initial Vol.....	.000	
+ Total Vol IN....	2.574	
- Total Vol OUT...	2.570	
- Ending Pond Vol.	.002	<-- (At 2879.01 min Elev.= 730.03 ft)
Difference.....	.002 ac-ft	(.083% of Inflow Volume)

ICPM POND ROUTING SUMMARY

HYG Dir = Q:\PROJECT\20010616\CALCS\DRAINAGE\
Inflow HYG file = POND2 IN 100 yr
Outflow HYG file = POND2 OUT 100 yr

Pond Node Data = POND2
Pond Volume Data = POND2
Pond Outlet Data = PR20

No Infiltration

INITIAL CONDITIONS

Starting WS Elev =	730.00 ft
Starting Volume =	.000 ac-ft
Starting Outflow =	.00 cfs

CALCULATION TOLERANCES

Target Convergence=	.000 cfs +/-
Max. Iterations =	35 loops
ICPM Time Step =	1.00 min
Output Time Step =	1.00 min
ICPM Ending Time =	2880.00 min

MAXIMUM STORAGE

Tp, min	Elev, ft	Vol, ac-ft
773.00	737.51	10.597

100YR

	FORWARD FLOW PEAKS Tp, min	FORWARD FLOW PEAKS Qp, cfs	REVERSE FLOW PEAKS Tp, min	REVERSE FLOW PEAKS Qp, cfs
Pond Inflow....	718.00	262.50	.00	.00
Pond Outflow....	773.00	104.62	.00	.00

	TOTAL VOLUME IN Vol, ac-ft	TOTAL VOLUME IN Direction	TOTAL VOLUME OUT Vol, ac-ft	TOTAL VOLUME OUT Direction
Pond Inflow.....	34.870	Forward	.000	Reverse
Pond Outflow....	.000	Reverse	33.876	Forward

MASS BALANCE (ac-ft)

+	Initial Vol.....	.000
+	Total Vol IN....	34.870
-	Total Vol OUT...	33.876
-	Ending Pond Vol.	.993 <-- (At 2879.01 min Elev.= 732.33 ft)
	Difference.....	.001 ac-ft (.004% of Inflow Volume)

Index of Starting Page Numbers for ID Names

----- C -----
C.B. MIDDLE SCH... 5.01, 6.01, 6.02,
6.03, 6.04
CAMELOT... 5.03, 6.05, 6.06, 6.07,
6.08

----- F -----
FRANKLIN MEADOWS... 5.05, 6.09,
6.10, 6.11, 6.12

----- J -----
J. MEM HOSP 2 yr... 6.13, 6.14,
6.15, 6.16
J.CO. MEM HOSP... 5.07

----- N -----
NURSING HOME... 5.09, 6.17, 6.18,
6.19, 6.20

----- O -----
OUT FALL... 7.03, 7.02, 7.01, 7.04

----- P -----
POND2 2 yr... 9.01, 9.02, 9.03,
9.04
PR20... 8.01
PROJ SITE... 5.11, 6.21, 6.22, 6.23,
6.24

----- R -----
RESIDENTIAL NE... 5.13, 6.25, 6.26,
6.27, 6.28
RESIDENTIAL SOUT... 5.15, 6.29,
6.30, 6.31, 6.32

----- T -----
Type II... 3.01, 3.02
TypeII 24hr 2 yr... 4.01, 4.03,
4.05, 4.07, 4.09, 4.11, 4.13,
4.15

----- W -----
Watershed... 1.01, 2.01, 2.02, 2.04,
2.05, 2.07, 2.08, 2.10, 2.12,
2.13

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 730.00 ft
Increment = .50 ft
Max. Elev.= 739.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Area	OT	<--->	BX	733.670	739.000
Orifice-Circular	OC	<--->	BX	730.000	739.000
Culvert-Box	BX	<--->	TW	730.000	739.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID	=	OT
Structure Type	=	Orifice-Area
# of Openings	=	1
Invert Elev.	=	733.67 ft
Area	=	12.0000 sq.ft
Top of Orifice	=	.00 ft
Datum Elev.	=	733.67 ft
Orifice Coeff.	=	.600

Structure ID	=	OC
Structure Type	=	Orifice-Circular
# of Openings	=	1
Invert Elev.	=	730.00 ft
Diameter	=	.4167 ft
Orifice Coeff.	=	.600

OUTLET STRUCTURE INPUT DATA

Structure ID	=	BX
Structure Type	=	Culvert-Box
No. Barrels	=	1
Barrel Height	=	3.00 ft
Barrel Width	=	5.00 ft
Upstream Invert	=	730.00 ft
Dnstream Invert	=	726.00 ft
Horiz. Length	=	680.00 ft
Barrel Length	=	680.01 ft
Barrel Slope	=	.00588 ft/ft

OUTLET CONTROL DATA...

Mannings n	=	.0120
Ke	=	.4000 (forward entrance loss)
Kb	=	.004574 (per ft of full flow)
Kr	=	.4000 (reverse entrance loss)
HW Convergence	=	.001 +/- ft

INLET CONTROL DATA...

Equation form	=	1
Inlet Control K	=	.0260
Inlet Control M	=	1.0000
Inlet Control c	=	.03850
Inlet Control Y	=	.8100
T1 ratio (HW/D)	=	1.175
T2 ratio (HW/D)	=	1.423
Slope Factor	=	-.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev = 733.53 ft ---> Flow = 90.93 cfs
At T2 Elev = 734.27 ft ---> Flow = 103.92 cfs

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .206 (+/- ft)
FLOW PATH: Elev= 737; Branch: OC-BX-TW

* Max. convergence errors shown may also occur for flow paths other than the ones listed above.

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
730.00	.00	700.00	.000	(no Q: OT,OC,BX)
730.50	.35	700.00	.000	OC,BX (no Q: OT)
731.00	.58	700.00	.000	OC,BX (no Q: OT)
731.50	.75	700.00	.000	OC,BX (no Q: OT)
732.00	.88	700.00	.000	OC,BX (no Q: OT)
732.50	.99	700.00	.000	OC,BX (no Q: OT)
733.00	1.10	700.00	.000	OC,BX (no Q: OT)
733.50	1.19	700.00	.000	OC,BX (no Q: OT)
733.67	1.22	700.00	.000	OC,BX (no Q: OT)
734.00	34.13	700.00	.000	OT,OC,BX
734.50	53.52	700.00	.000	OT,OC,BX
735.00	67.53	700.00	.000	OT,OC,BX
735.50	79.09	700.00	.000	OT,OC,BX
736.00	89.17	700.00	.000	OT,OC,BX
736.50	95.49	700.00	.009	OT,OC,BX
737.00	98.43	700.00	.206	OT,OC,BX
737.50	104.53	700.00	.007	OT,OC,BX
738.00	109.53	700.00	.010	OT,OC,BX
738.50	114.49	700.00	.006	OT,OC,BX
739.00	119.11	700.00	.007	OT,OC,BX

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .206 (+/- ft)
FLOW PATH: Elev= 737; Branch: OC-BX-TW

* Max. convergence errors shown may also occur for flow paths other than the ones listed above.

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
730.00	.00	700.50	.000	(no Q: OT,OC,BX)
730.50	.35	700.50	.000	OC,BX (no Q: OT)
731.00	.58	700.50	.000	OC,BX (no Q: OT)
731.50	.75	700.50	.000	OC,BX (no Q: OT)
732.00	.88	700.50	.000	OC,BX (no Q: OT)
732.50	.99	700.50	.000	OC,BX (no Q: OT)
733.00	1.10	700.50	.000	OC,BX (no Q: OT)
733.50	1.19	700.50	.000	OC,BX (no Q: OT)
733.67	1.22	700.50	.000	OC,BX (no Q: OT)
734.00	34.13	700.50	.000	OT,OC,BX
734.50	53.52	700.50	.000	OT,OC,BX
735.00	67.53	700.50	.000	OT,OC,BX
735.50	79.09	700.50	.000	OT,OC,BX
736.00	89.17	700.50	.000	OT,OC,BX
736.50	95.49	700.50	.009	OT,OC,BX
737.00	98.43	700.50	.206	OT,OC,BX
737.50	104.53	700.50	.007	OT,OC,BX
738.00	109.53	700.50	.010	OT,OC,BX
738.50	114.49	700.50	.006	OT,OC,BX
739.00	119.11	700.50	.007	OT,OC,BX

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .206 (+/- ft)
FLOW PATH: Elev= 737; Branch: OC-BX-TW

* Max. convergence errors shown may also occur for flow paths other than the ones listed above.

WS Elev, Total Q		Converge	Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
730.00	.00	701.00	.000	(no Q: OT,OC,BX)
730.50	.35	701.00	.000	OC,BX (no Q: OT)
731.00	.58	701.00	.000	OC,BX (no Q: OT)
731.50	.75	701.00	.000	OC,BX (no Q: OT)
732.00	.88	701.00	.000	OC,BX (no Q: OT)
732.50	.99	701.00	.000	OC,BX (no Q: OT)
733.00	1.10	701.00	.000	OC,BX (no Q: OT)
733.50	1.19	701.00	.000	OC,BX (no Q: OT)
733.67	1.22	701.00	.000	OC,BX (no Q: OT)
734.00	34.13	701.00	.000	OT,OC,BX
734.50	53.52	701.00	.000	OT,OC,BX
735.00	67.53	701.00	.000	OT,OC,BX
735.50	79.09	701.00	.000	OT,OC,BX
736.00	89.17	701.00	.000	OT,OC,BX
736.50	95.49	701.00	.009	OT,OC,BX
737.00	98.43	701.00	.206	OT,OC,BX
737.50	104.53	701.00	.007	OT,OC,BX
738.00	109.53	701.00	.010	OT,OC,BX
738.50	114.49	701.00	.006	OT,OC,BX
739.00	119.11	701.00	.007	OT,OC,BX

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .206 (+/- ft)
FLOW PATH: Elev= 737; Branch: OC-BX-TW

* Max. convergence errors shown may also occur for flow paths other than the ones listed above.

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
730.00	.00	726.00	.000	(no Q: OT,OC,BX)
730.50	.35	726.00	.000	OC,BX (no Q: OT)
731.00	.58	726.00	.000	OC,BX (no Q: OT)
731.50	.75	726.00	.000	OC,BX (no Q: OT)
732.00	.88	726.00	.000	OC,BX (no Q: OT)
732.50	.99	726.00	.000	OC,BX (no Q: OT)
733.00	1.10	726.00	.000	OC,BX (no Q: OT)
733.50	1.19	726.00	.000	OC,BX (no Q: OT)
733.67	1.22	726.00	.000	OC,BX (no Q: OT)
734.00	34.13	726.00	.000	OT,OC,BX
734.50	53.52	726.00	.000	OT,OC,BX
735.00	67.53	726.00	.000	OT,OC,BX
735.50	79.09	726.00	.000	OT,OC,BX
736.00	89.17	726.00	.000	OT,OC,BX
736.50	95.49	726.00	.009	OT,OC,BX
737.00	98.43	726.00	.206	OT,OC,BX
737.50	104.53	726.00	.007	OT,OC,BX
738.00	109.53	726.00	.010	OT,OC,BX
738.50	114.49	726.00	.006	OT,OC,BX
739.00	119.11	726.00	.007	OT,OC,BX

PIPE SIZING CALCULATIONS

48" Pipe
Worksheet for Circular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	48" Pipe
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.005000	ft/ft
Diameter	48.00	in

Results		
Depth	4.00	ft
Discharge	101.57	cfs
Flow Area	12.57	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.05	ft
Percent Full	100.00	
Critical Slope	0.005777	ft/ft
Velocity	8.08	ft/s
Velocity Head	1.02	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	109.25	cfs
Full Flow Capacity	101.57	cfs
Full Flow Slope	0.005000	ft/ft

54" Pipe
Worksheet for Circular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	54" Pipe
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.002500	ft/ft
Diameter	54.00	in

Results		
Depth	54.0	in
Discharge	98.32	cfs
Flow Area	15.90	ft^2
Wetted Perimeter	14.14	ft
Top Width	0.00	ft
Critical Depth	2.91	ft
Percent Full	100.00	
Critical Slope	0.004422	ft/ft
Velocity	6.18	ft/s
Velocity Head	0.59	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	105.76	cfs
Full Flow Capacity	98.32	cfs
Full Flow Slope	0.002500	ft/ft

60" Pipe
Worksheet for Circular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	60" Pipe
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.001500	ft/ft
Diameter	60.00	in

Results		
Depth	5.00	ft
Discharge	100.86	cfs
Flow Area	19.63	ft²
Wetted Perimeter	15.71	ft
Top Width	0.00	ft
Critical Depth	2.86	ft
Percent Full	100.00	
Critical Slope	0.003858	ft/ft
Velocity	5.14	ft/s
Velocity Head	0.41	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	108.50	cfs
Full Flow Capacity	100.86	cfs
Full Flow Slope	0.001500	ft/ft

Type.... Vol: Elev-Area
Name.... POND2

File.... Q:\PROJECT\20010616\CALCS\DRAINAGE\SCENARIO-05.PPW

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
730.00	-----	0	0	.000	.000
731.00	-----	8467	8467	.065	.065
732.00	-----	39561	66330	.508	.572
733.00	-----	74217	167964	1.285	1.858
734.00	-----	78675	229306	1.755	3.612
735.00	-----	83094	242623	1.857	5.469
736.00	-----	87570	255967	1.959	7.428
737.00	-----	92114	269497	2.062	9.490
738.00	-----	96717	283218	2.167	11.657
739.00	-----	101390	297133	2.274	13.931

Appendix C

Calculations – Downstream Capacity Analysis

Culvert Calculator Report
48" Culvert No. 1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	733.00 ft	Headwater Depth/ Height	1.03
Computed Headwater Elevation	728.14 ft	Discharge	59.00 cfs
Inlet Control HW Elev	727.78 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	728.14 ft	Control Type	Outlet Control

Grades			
Upstream Invert	724.03 ft	Downstream Invert	723.49 ft
Length	130.00 ft	Constructed Slope	0.004154 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	2.31 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.31 ft
Velocity Downstream	7.83 ft/s	Critical Slope	0.014273 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	728.14 ft	Upstream Velocity Head	0.45 ft
Ke	0.90	Entrance Loss	0.41 ft

Inlet Control Properties			
Inlet Control HW Elev	727.78 ft	Flow Control	Unsubmerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

© Haestad Methods, Inc.
EMH & T Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Culvert Calculator Report
48" Culvert No. 1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	733.00 ft	Headwater Depth/ Height	1.79
Computed Headwater Elevation	731.17 ft	Discharge	102.00 cfs
Inlet Control HW Elev	729.83 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	731.17 ft	Control Type	Outlet Control

Grades			
Upstream Invert	724.03 ft	Downstream Invert	723.49 ft
Length	130.00 ft	Constructed Slope	0.004154 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.06 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.06 ft
Velocity Downstream	9.89 ft/s	Critical Slope	0.019767 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	731.17 ft	Upstream Velocity Head	1.02 ft
Ke	0.90	Entrance Loss	0.92 ft

Inlet Control Properties			
Inlet Control HW Elev	729.83 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

© Haestad Methods, Inc.
EMH & T Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Culvert Calculator Report
48" Culvert No. 1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	733.00 ft	Headwater Depth/ Height	2.81
Computed Headwater Elevation	735.27 ft	Discharge	141.00 cfs
Inlet Control HW Elev	733.14 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	735.27 ft	Control Type	Outlet Control

Grades			
Upstream Invert	724.03 ft	Downstream Invert	723.49 ft
Length	130.00 ft	Constructed Slope	0.004154 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.52 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.52 ft
Velocity Downstream	12.04 ft/s	Critical Slope	0.029554 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	735.27 ft	Upstream Velocity Head	1.96 ft
Ke	0.90	Entrance Loss	1.76 ft

Inlet Control Properties			
Inlet Control HW Elev	733.14 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

© Haestad Methods, Inc.
EMH & T Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Culvert Calculator Report
48" Culvert No. 2

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	728.91 ft	Headwater Depth/ Height	4.08
Computed Headwater Elevation	736.31 ft	Discharge	201.00 cfs
Inlet Control HW Elev	736.31 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	733.46 ft	Control Type	Inlet Control

Grades			
Upstream Invert	720.00 ft	Downstream Invert	720.00 ft
Length	29.42 ft	Constructed Slope	0.000034 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.85 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.85 ft
Velocity Downstream	16.19 ft/s	Critical Slope	0.058263 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	733.46 ft	Upstream Velocity Head	3.98 ft
Ke	0.90	Entrance Loss	3.58 ft

Inlet Control Properties			
Inlet Control HW Elev	736.31 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

© Haestad Methods, Inc.
EMH & T Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Culvert Calculator Report
48" Culvert No. 2

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	728.91 ft	Headwater Depth/ Height	7.90
Computed Headwater Elevation	751.61 ft	Discharge	290.00 cfs
Inlet Control HW Elev	751.61 ft	Tailwater Elevation	0.00 ft
Outlet Control HW Elev	743.80 ft	Control Type	Inlet Control

Grades			
Upstream Invert	720.00 ft	Downstream Invert	720.00 ft
Length	29.42 ft	Constructed Slope	0.000034 ft/ft

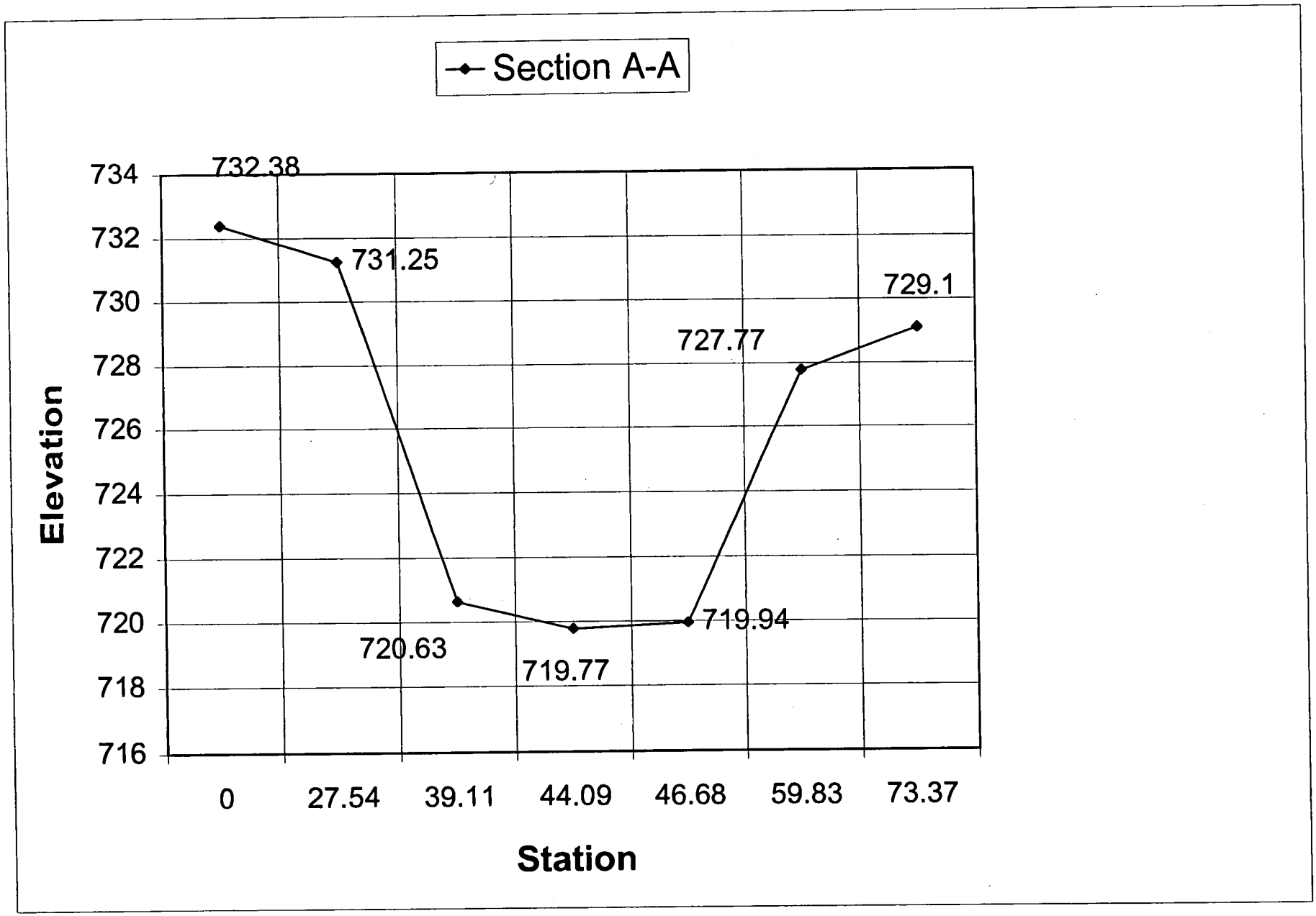
Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	3.96 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.96 ft
Velocity Downstream	23.11 ft/s	Critical Slope	0.128462 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	743.80 ft	Upstream Velocity Head	8.28 ft
Ke	0.90	Entrance Loss	7.45 ft

Inlet Control Properties			
Inlet Control HW Elev	751.61 ft	Flow Control	Submerged
Inlet Type	Projecting	Area Full	12.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

© Haestad Methods, Inc.
EMH & T Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

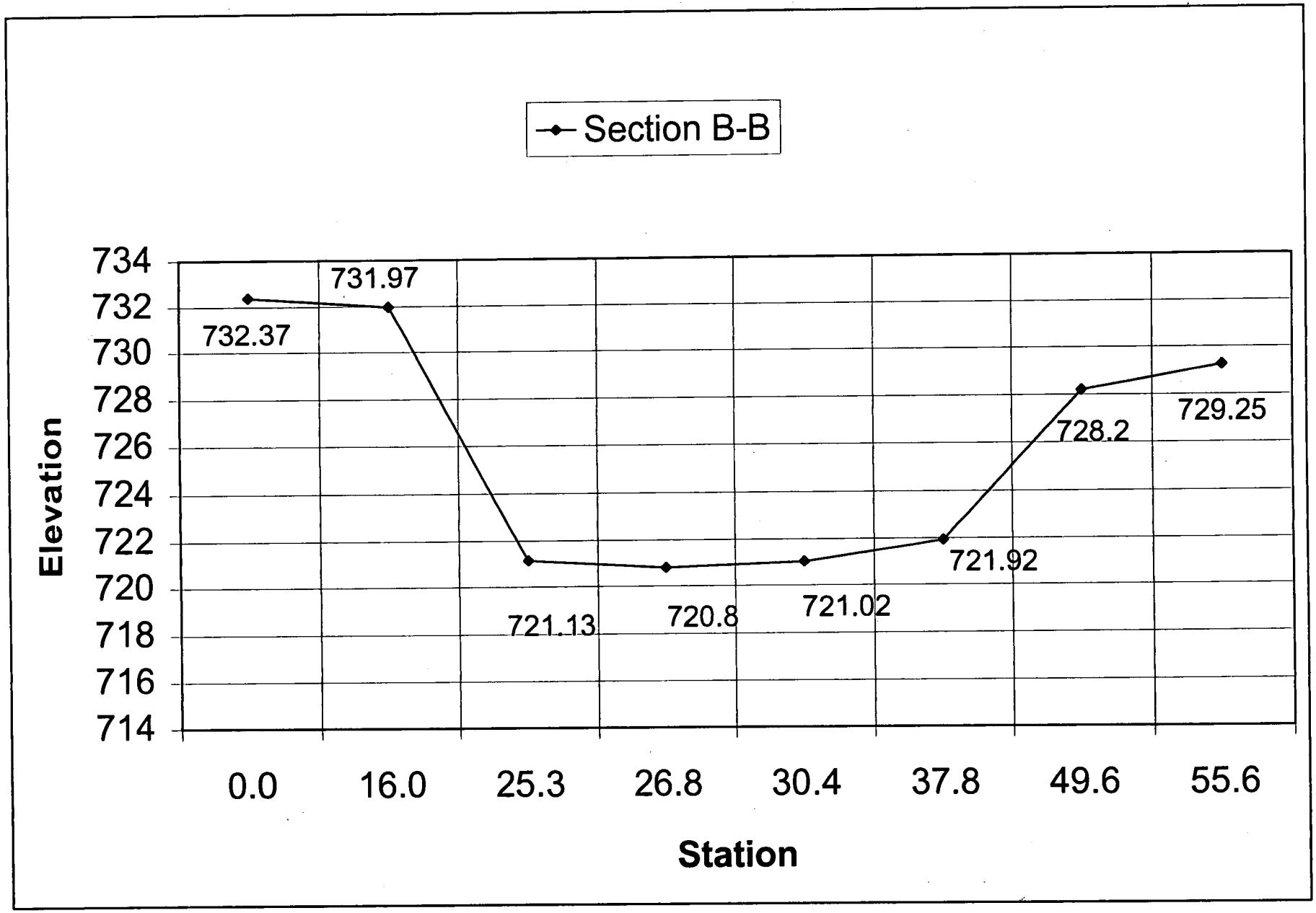

Section A-A
Elevation
734
732
730
728
726
724
722
720
718
716
732.38
731.25
720.63
719.77
719.94
727.77
729.1
0
27.54
39.11
44.09
46.68
59.83
73.37
Station

Section A-A Q 100 yr
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section A-A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.011000 ft/ft			
Elevation range: 719.77 ft to 732.38 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	732.38	0.00	73.37	0.100
27.54	731.25			
39.11	720.63			
44.09	719.77			
46.68	719.94			
59.83	727.77			
73.37	729.10			
Discharge	290.00	cfs		

Results		
Wtd. Mannings Coefficient	0.100	
Water Surface Elevation	725.74	ft
Flow Area	85.41	ft²
Wetted Perimeter	26.56	ft
Top Width	22.89	ft
Height	5.97	ft
Critical Depth	723.09	ft
Critical Slope	0.130453	ft/ft
Velocity	3.40	ft/s
Velocity Head	0.18	ft
Specific Energy	725.92	ft
Froude Number	0.31	
Flow is subcritical.		



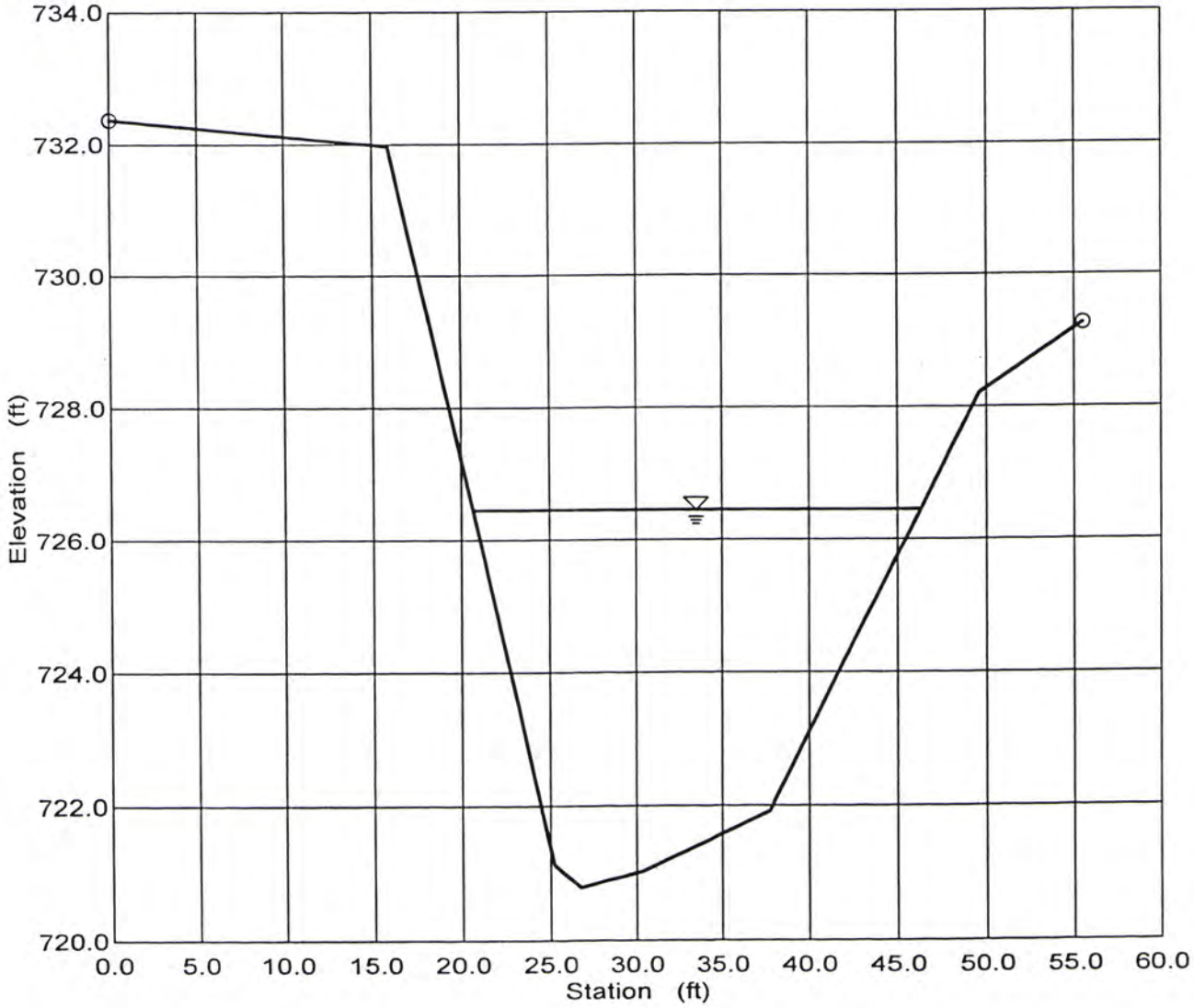
Channel Slope ~ 0.40%

n ~ 0.10

Cross Section B-B Q 10 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.100	
Channel Slope	0.004000	ft/ft
Water Surface Elevation	726.45	ft
Discharge	201.00	cfs



Section B-B Q 10 yr
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.004000	ft/ft

Elevation range: 720.80 ft to 732.37 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	732.37	0.00	55.60	0.100
16.00	731.97			
25.30	721.13			
26.80	720.80			
30.40	721.02			
37.80	721.92			
49.60	728.20			
55.60	729.25			

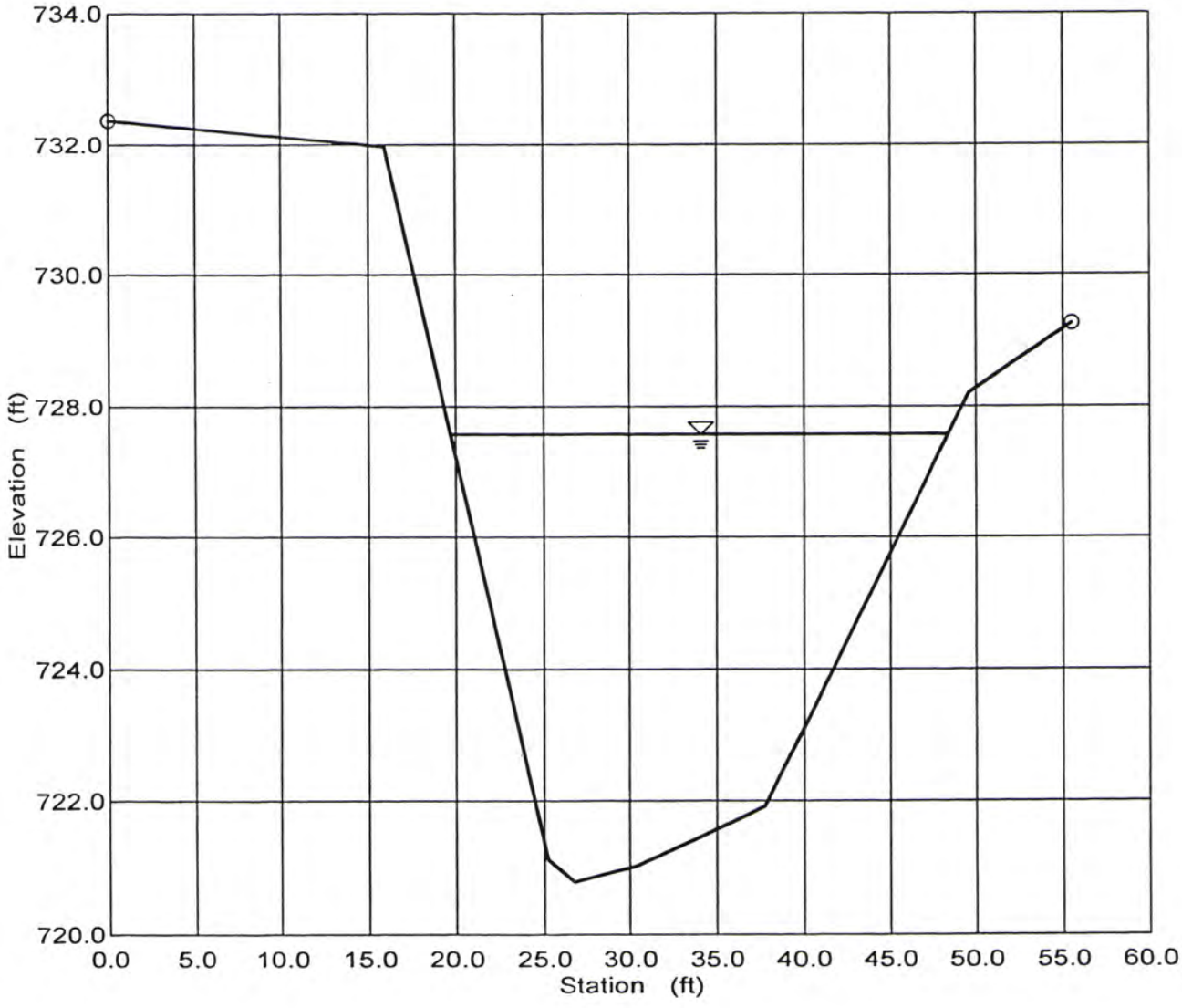
Discharge	201.00	cfs

Results		
Wtd. Mannings Coefficient	0.100	
Water Surface Elevation	726.45	ft
Flow Area	96.52	ft²
Wetted Perimeter	29.26	ft
Top Width	25.58	ft
Height	5.65	ft
Critical Depth	723.19	ft
Critical Slope	0.136776	ft/ft
Velocity	2.08	ft/s
Velocity Head	0.07	ft
Specific Energy	726.52	ft
Froude Number	0.19	
Flow is subcritical.		

Cross Section B-B Q 100 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.100	
Channel Slope	0.004000	ft/ft
Water Surface Elevation	727.55	ft
Discharge	290.00	cfs

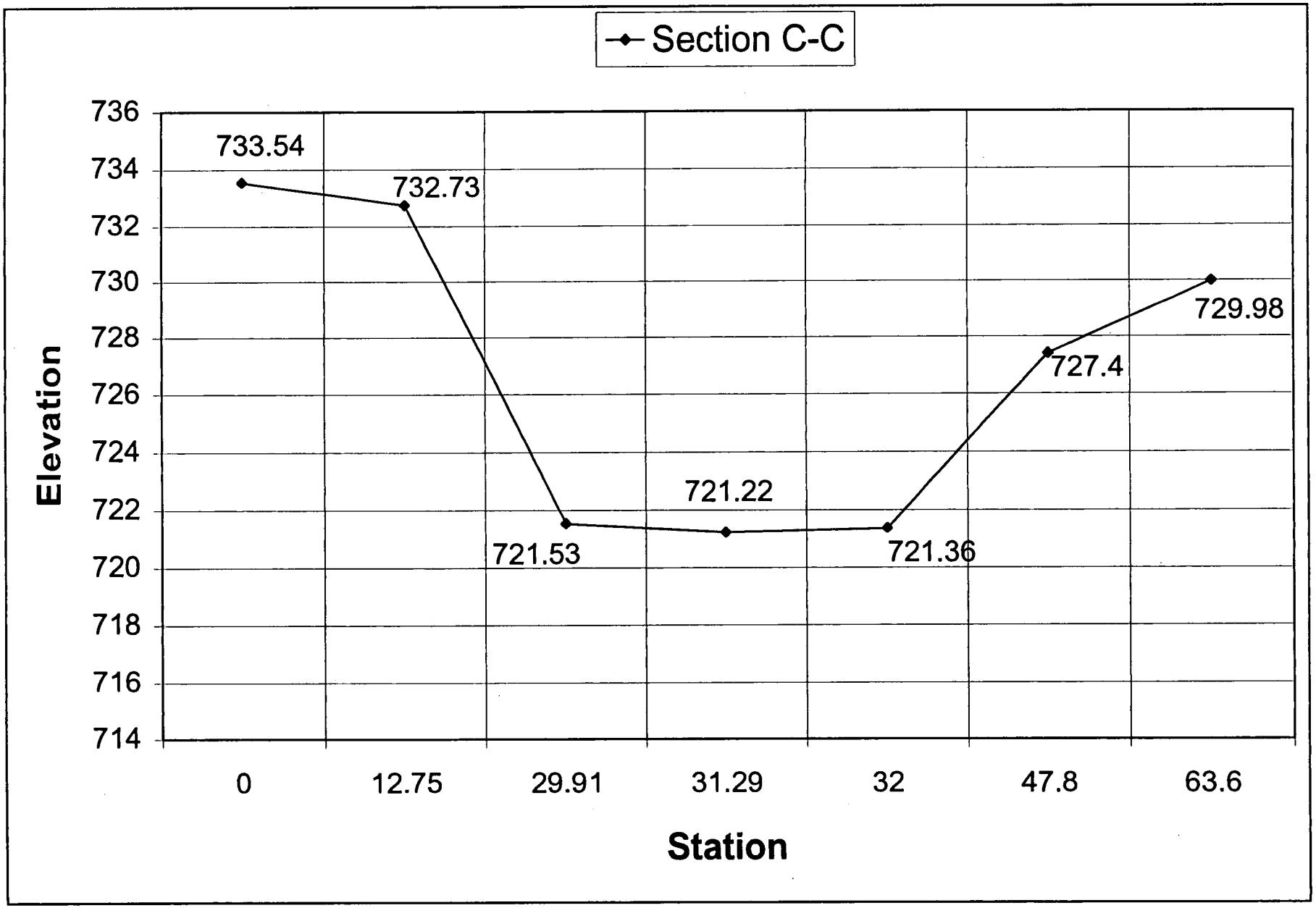


Section B-B Q 100 yr
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section B-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.004000 ft/ft			
Elevation range: 720.80 ft to 732.37 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	732.37	0.00	55.60	0.100
16.00	731.97			
25.30	721.13			
26.80	720.80			
30.40	721.02			
37.80	721.92			
49.60	728.20			
55.60	729.25			
Discharge	290.00 cfs			

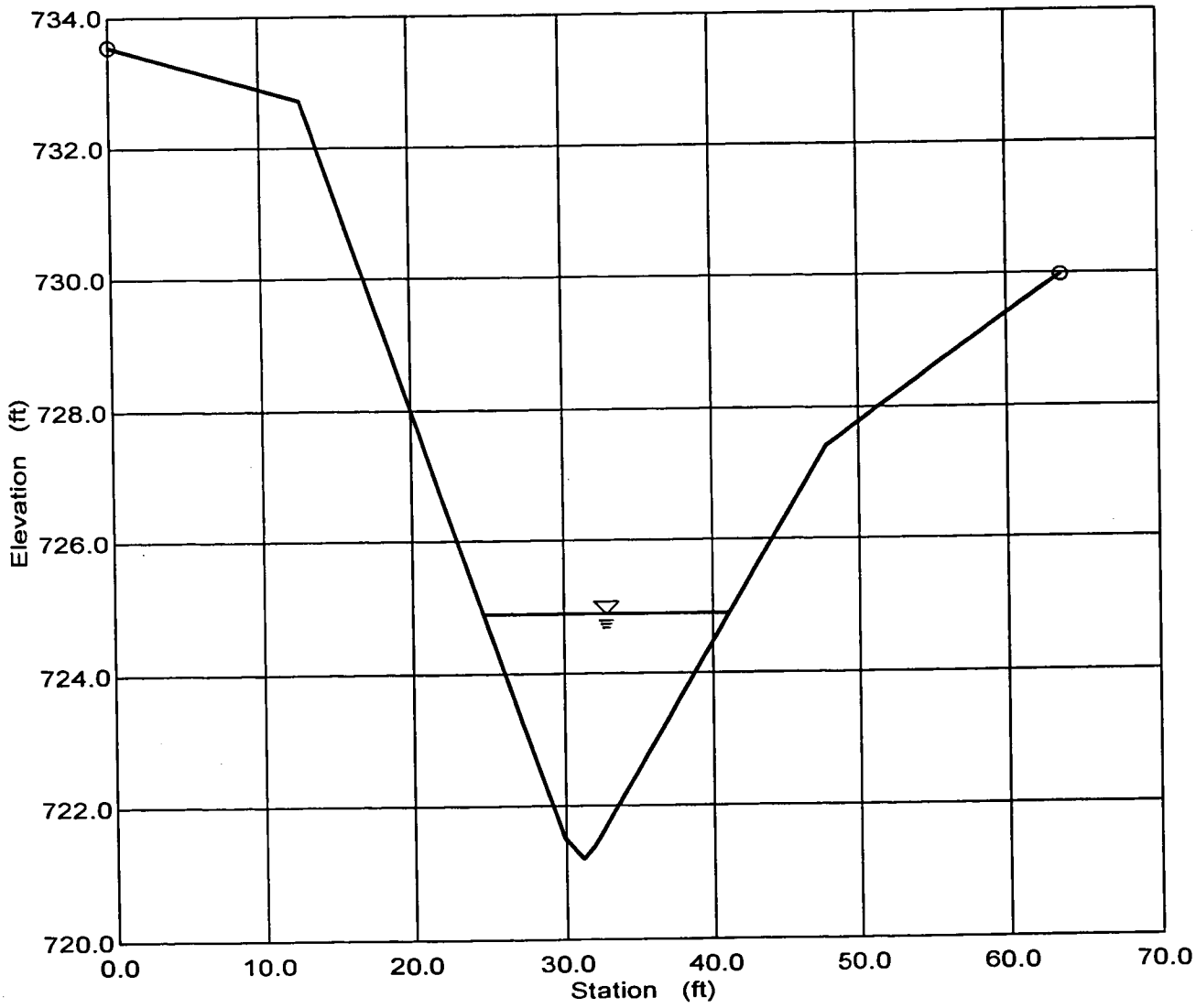
Results		
Wtd. Mannings Coefficient	0.100	
Water Surface Elevation	727.55	ft
Flow Area	126.26	ft²
Wetted Perimeter	33.04	ft
Top Width	28.59	ft
Height	6.75	ft
Critical Depth	723.68	ft
Critical Slope	0.130395	ft/ft
Velocity	2.30	ft/s
Velocity Head	0.08	ft
Specific Energy	727.63	ft
Froude Number	0.19	
Flow is subcritical.		


Section C-C
Elevation
736
734
732
730
728
726
724
722
720
718
716
714
733.54
732.73
721.53
721.22
721.36
727.4
729.98
0
12.75
29.91
31.29
32
47.8
63.6
Station

Cross Section C-C Q 2 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section C-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

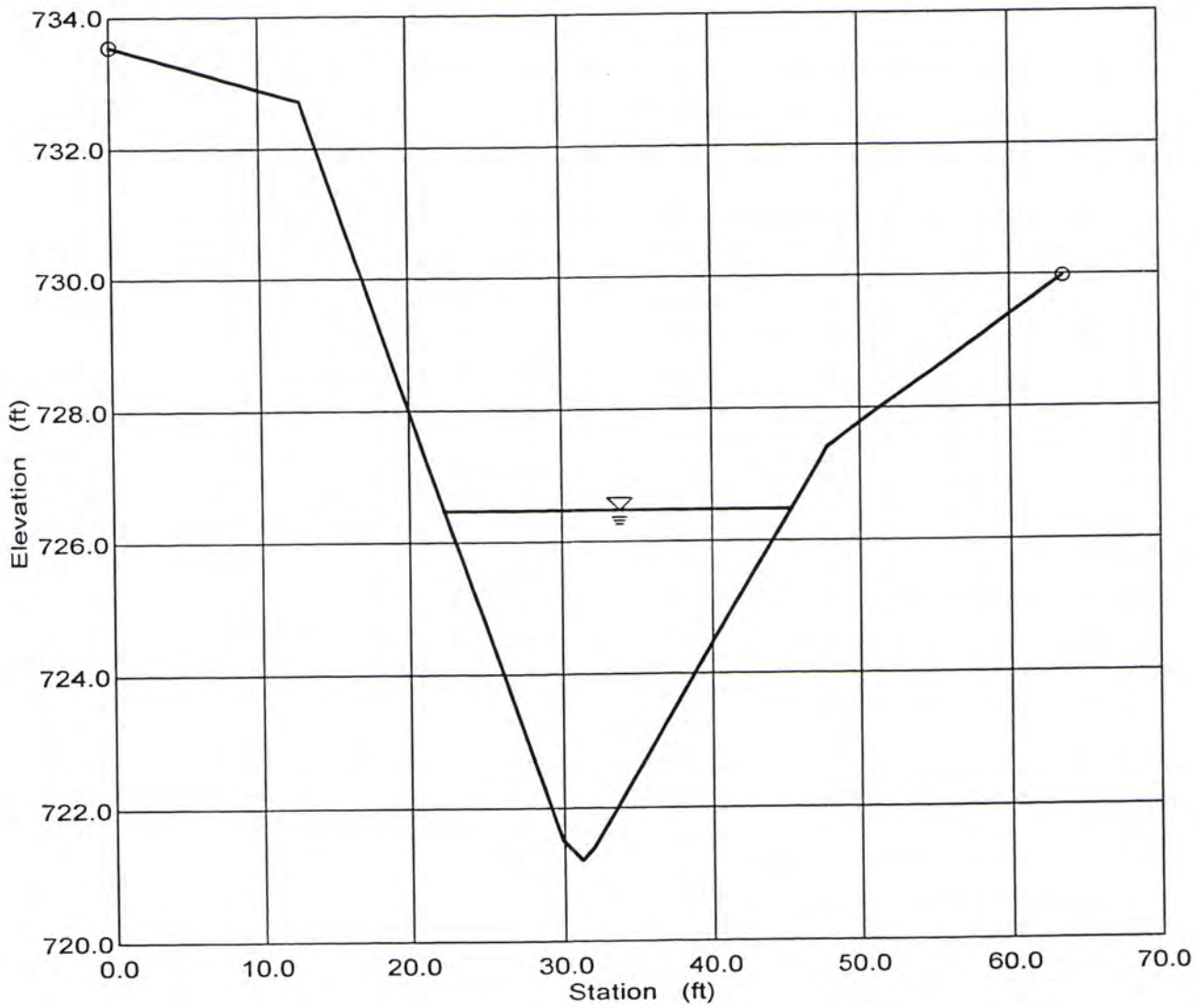
Section Data		
Wtd. Mannings Coefficient	0.050	
Channel Slope	0.007000	ft/ft
Water Surface Elevation	724.88	ft
Discharge	116.00	cfs



Cross Section C-C Q 100 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section C-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.050	
Channel Slope	0.007000	ft/ft
Water Surface Elevation	726.48	ft
Discharge	290.00	cfs



Section C-C Q 100 yr
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section C-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.007000	ft/ft

Elevation range: 721.22 ft to 733.54 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	733.54	0.00	63.60	0.050
12.80	732.73			
29.90	721.53			
31.30	721.22			
32.00	721.40			
47.80	727.40			
63.60	729.98			

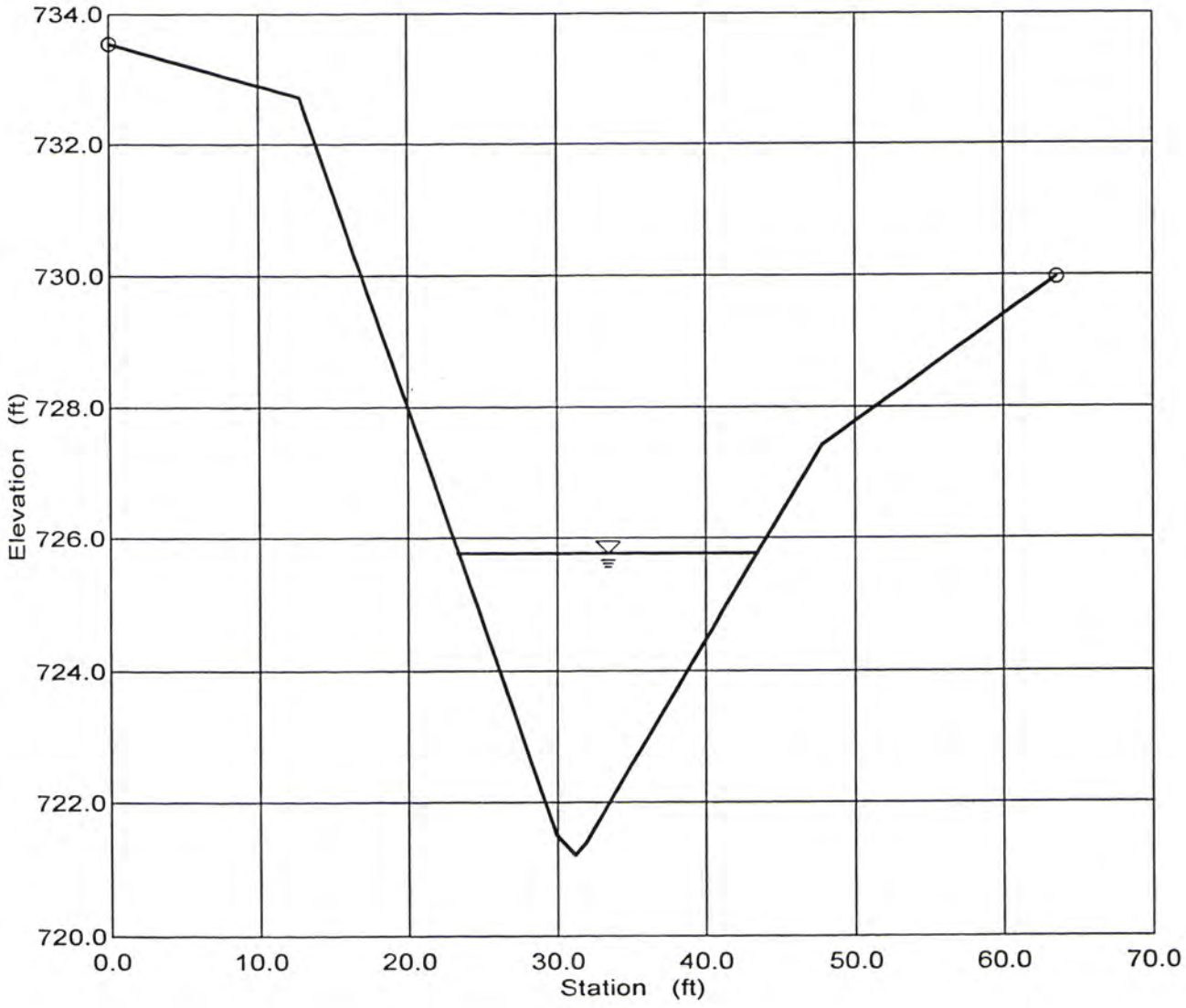
Discharge	290.00	cfs

Results		
Wtd. Mannings Coefficient	0.050	
Water Surface Elevation	726.48	ft
Flow Area	63.50	ft²
Wetted Perimeter	25.51	ft
Top Width	23.04	ft
Height	5.26	ft
Critical Depth	725.10	ft
Critical Slope	0.032674	ft/ft
Velocity	4.57	ft/s
Velocity Head	0.32	ft
Specific Energy	726.81	ft
Froude Number	0.49	
Flow is subcritical.		

Cross Section C-C Q 10 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section C-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.050	
Channel Slope	0.007000	ft/ft
Water Surface Elevation	725.77	ft
Discharge	201.00	cfs



Section C-C Q 10 yr
Worksheet for Irregular Channel

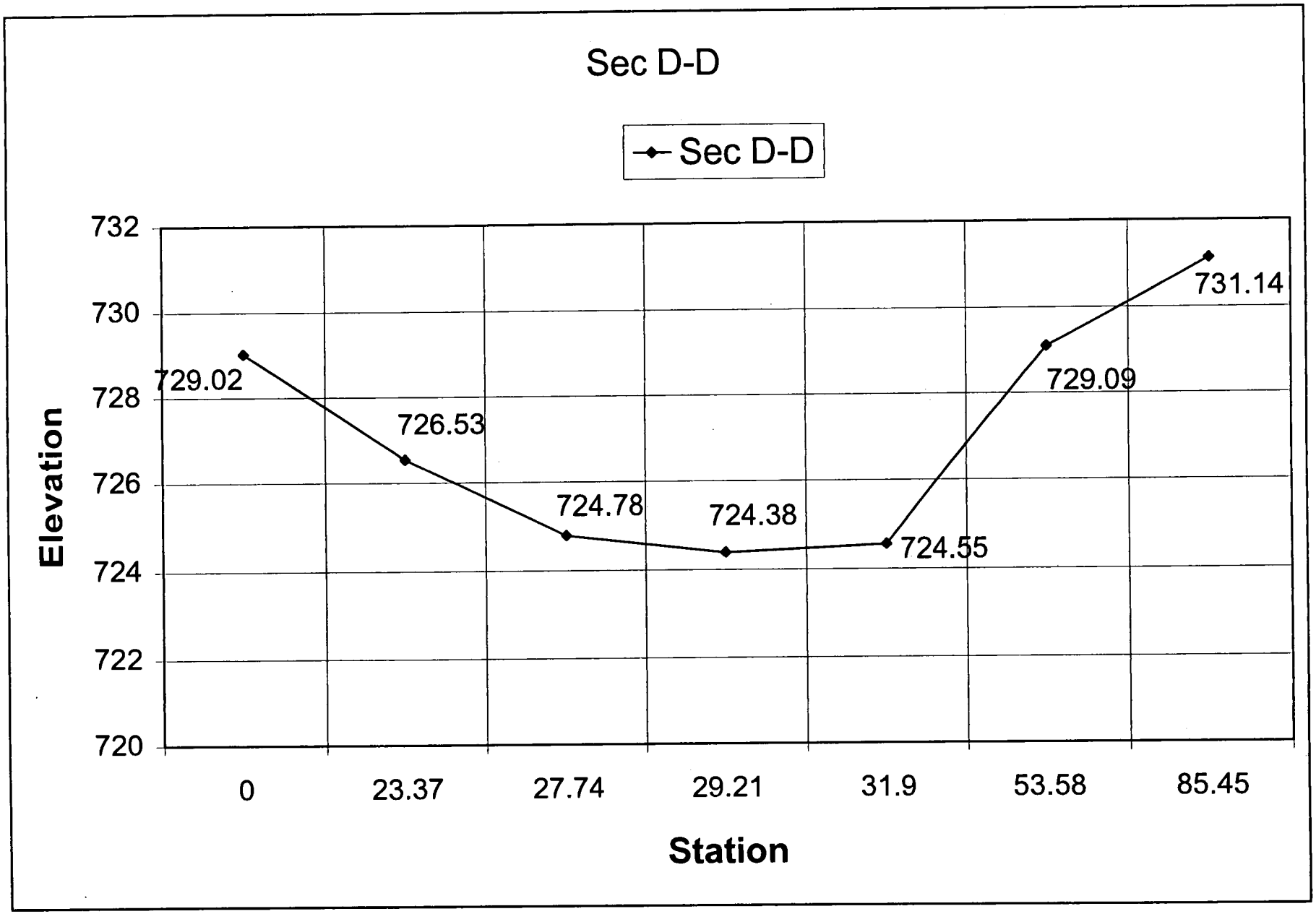
Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section C-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.007000	ft/ft
Discharge	201.00	cfs

Elevation range: 721.22 ft to 733.54 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	733.54	0.00	63.60	0.050
12.80	732.73			
29.90	721.53			
31.30	721.22			
32.00	721.40			
47.80	727.40			
63.60	729.98			

Results		
Wtd. Mannings Coefficient	0.050	
Water Surface Elevation	725.77	ft
Flow Area	48.23	ft²
Wetted Perimeter	22.22	ft
Top Width	20.10	ft
Height	4.55	ft
Critical Depth	724.54	ft
Critical Slope	0.034249	ft/ft
Velocity	4.17	ft/s
Velocity Head	0.27	ft
Specific Energy	726.04	ft
Froude Number	0.47	
Flow is subcritical.		

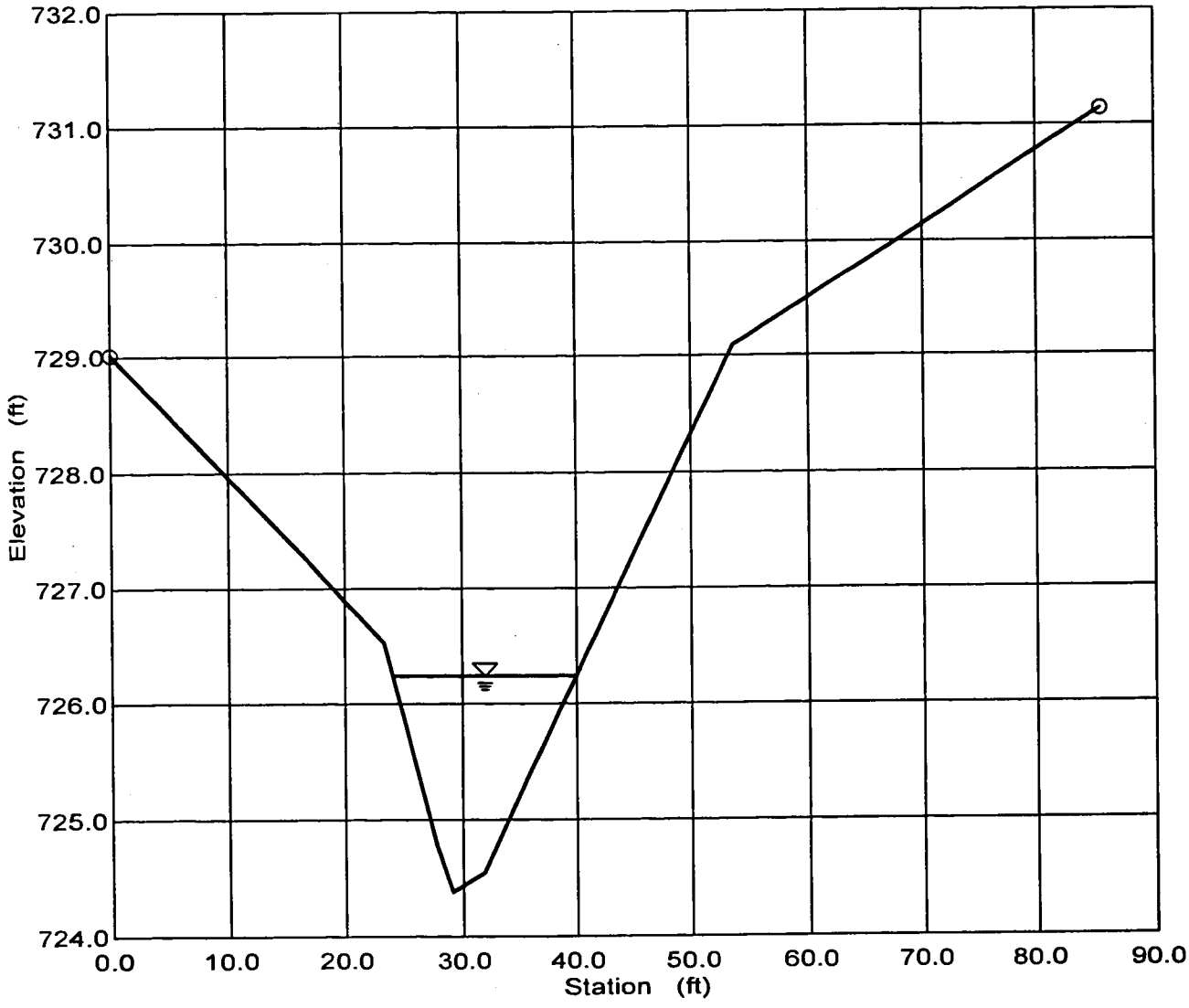


Channel Slope ~ 0.50

Section D-D Q 2 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section D-D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

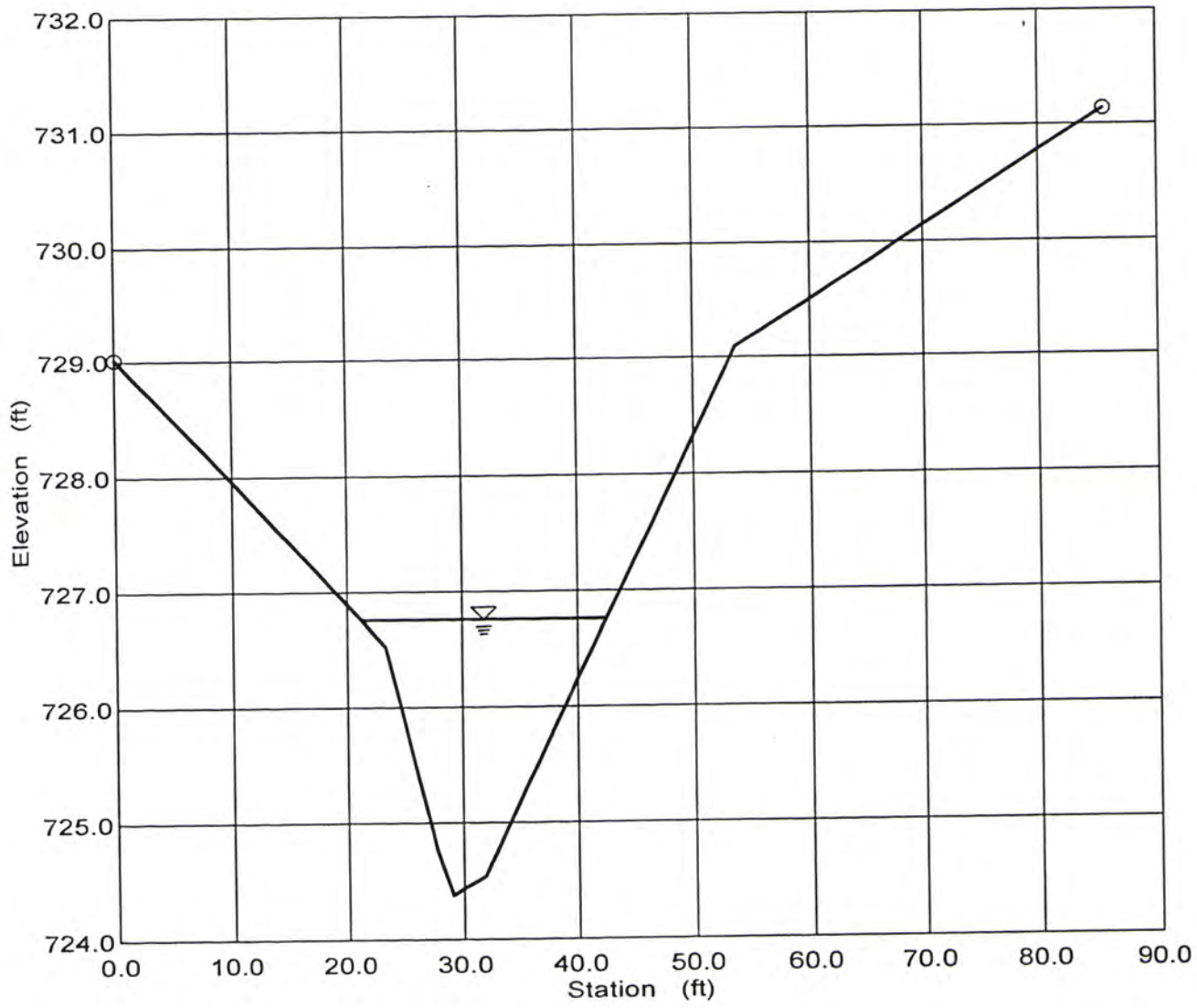
Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.005000	ft/ft
Water Surface Elevation	726.24	ft
Discharge	59.00	cfs



Section D-D Q 10 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section D-D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.005000	ft/ft
Water Surface Elevation	726.75	ft
Discharge	102.00	cfs



Section D-D Q 10 yr
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section D-D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005000	ft/ft
Elevation range: 724.38 ft to 731.14 ft.		

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	729.02	0.00	85.41	0.030
23.37	726.53			
27.74	724.78			
29.21	724.38			
31.90	724.55			
53.58	729.09			
85.41	731.14			

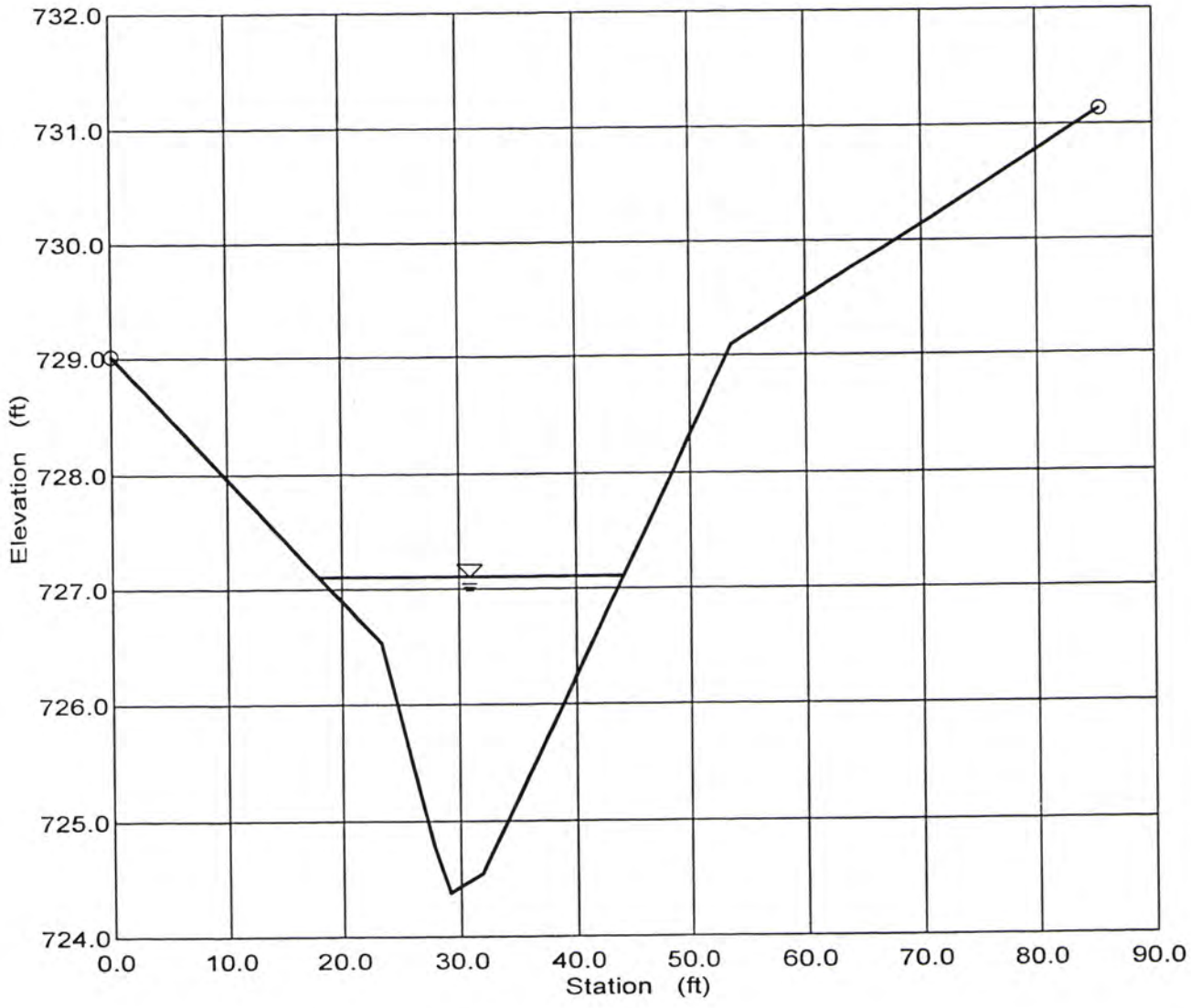
Discharge	102.00	cfs

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	726.75	ft
Flow Area	25.91	ft²
Wetted Perimeter	21.74	ft
Top Width	21.10	ft
Height	2.37	ft
Critical Depth	726.28	ft
Critical Slope	0.013370	ft/ft
Velocity	3.94	ft/s
Velocity Head	0.24	ft
Specific Energy	726.99	ft
Froude Number	0.63	
Flow is subcritical.		

Section D-D Q 100 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section D-D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.005000	ft/ft
Water Surface Elevation	727.10	ft
Discharge	141.00	cfs



Section D-D Q 100 yr
Worksheet for Irregular Channel

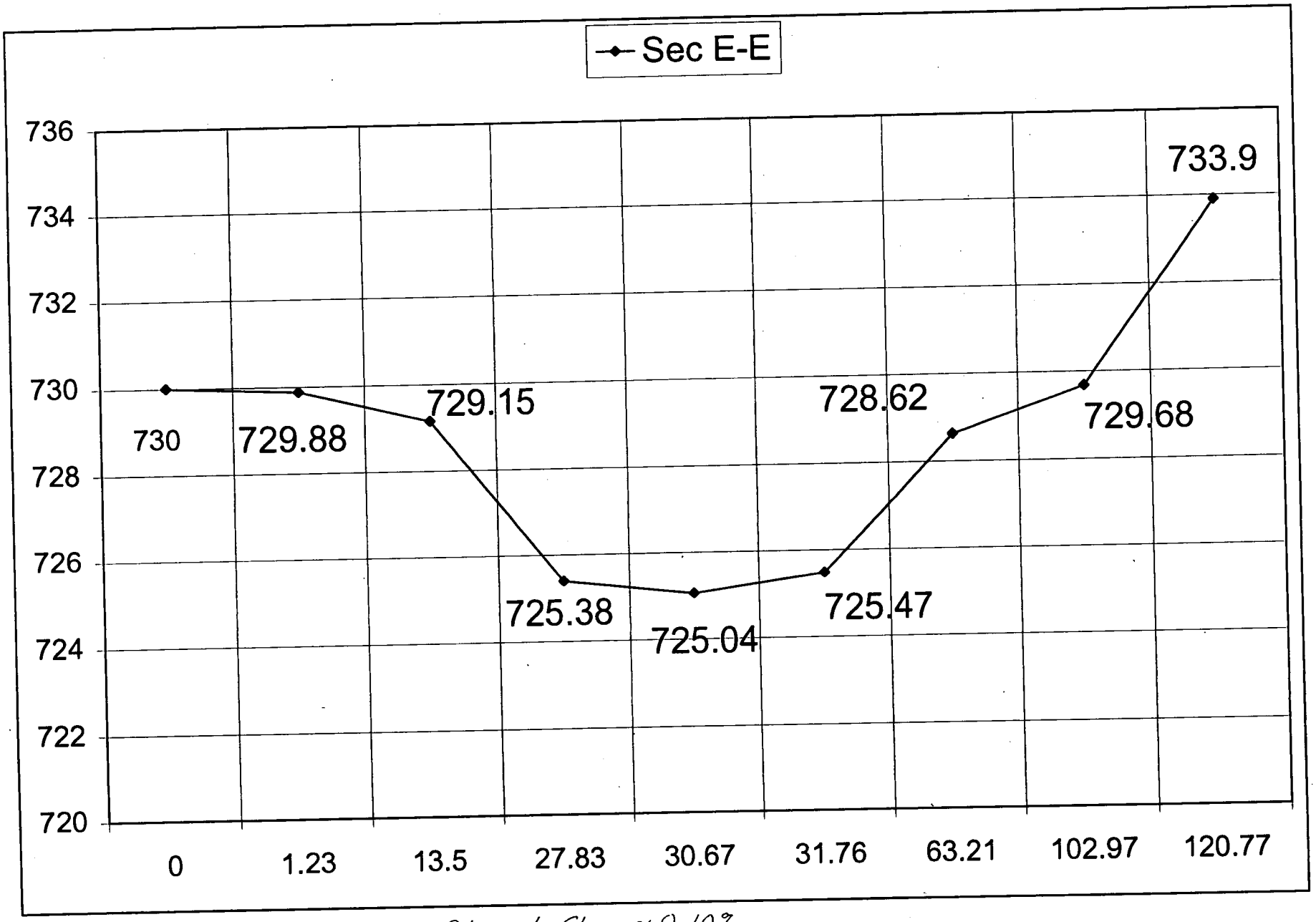
Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section D-D
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005000	ft/ft
Discharge	141.00	cfs

Elevation range: 724.38 ft to 731.14 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	729.02	0.00	85.41	0.030
23.37	726.53			
27.74	724.78			
29.21	724.38			
31.90	724.55			
53.58	729.09			
85.41	731.14			

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	727.10	ft
Flow Area	34.19	ft²
Wetted Perimeter	26.77	ft
Top Width	26.08	ft
Height	2.72	ft
Critical Depth	726.59	ft
Critical Slope	0.012859	ft/ft
Velocity	4.12	ft/s
Velocity Head	0.26	ft
Specific Energy	727.37	ft
Froude Number	0.63	
Flow is subcritical.		

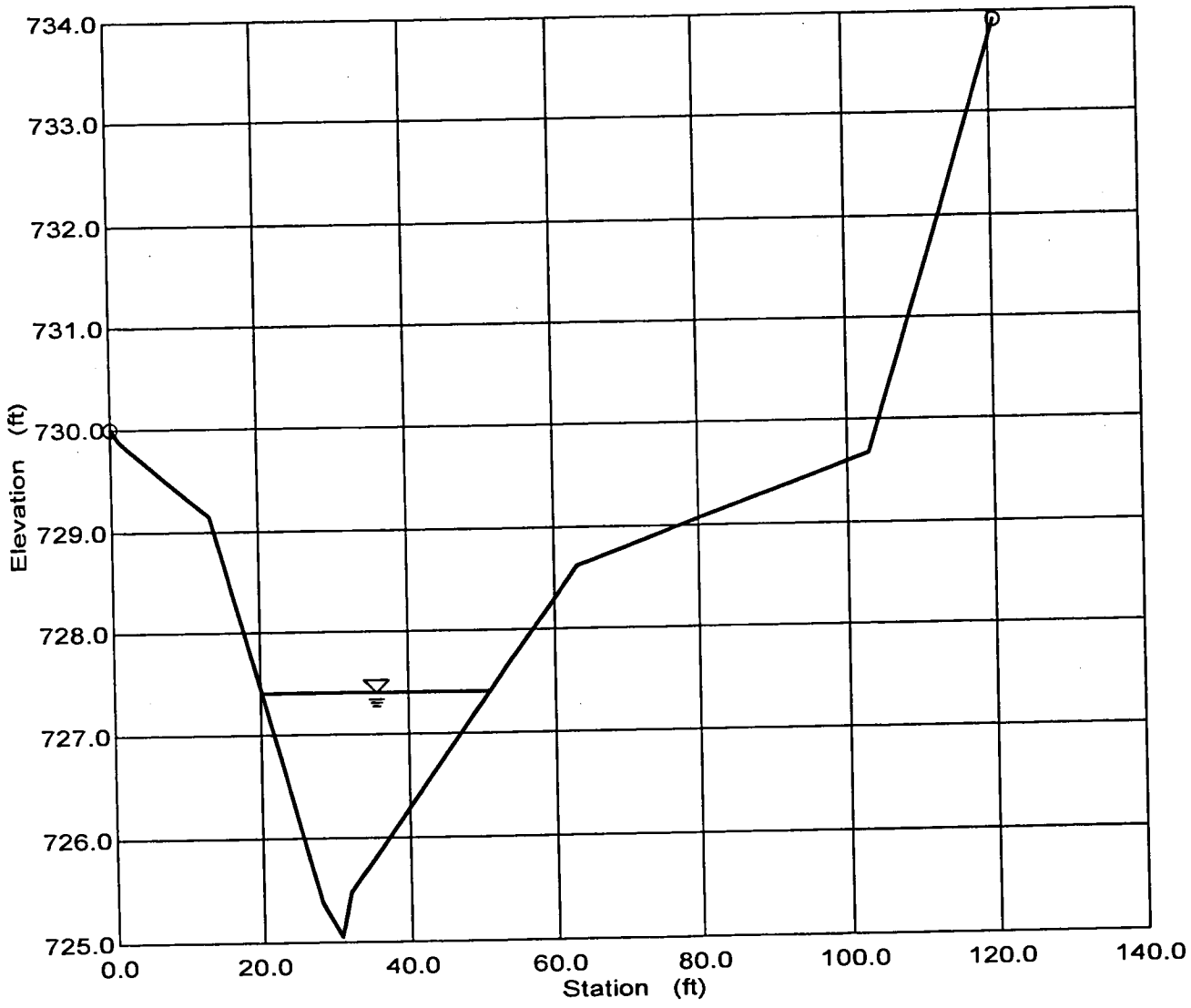


Channel Slope ~ 0.10%

Section E-E Q 2 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section E-E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

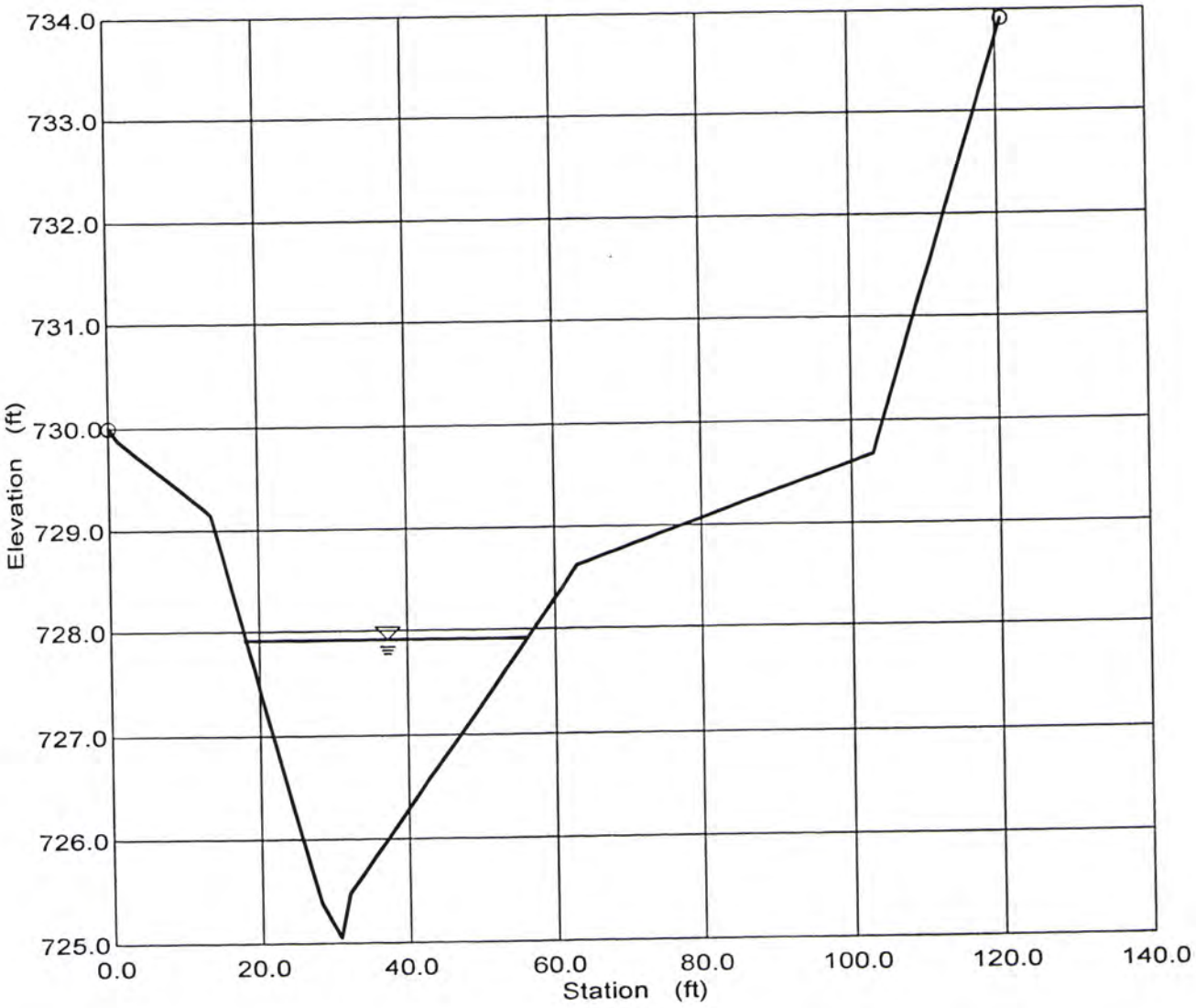
Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.001000	ft/ft
Water Surface Elevation	727.40	ft
Discharge	59.00	cfs



Section E-E Q 10 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section E-E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.001000	ft/ft
Water Surface Elevation	727.92	ft
Discharge	102.00	cfs



Section E-E Q 10 yr
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section E-E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

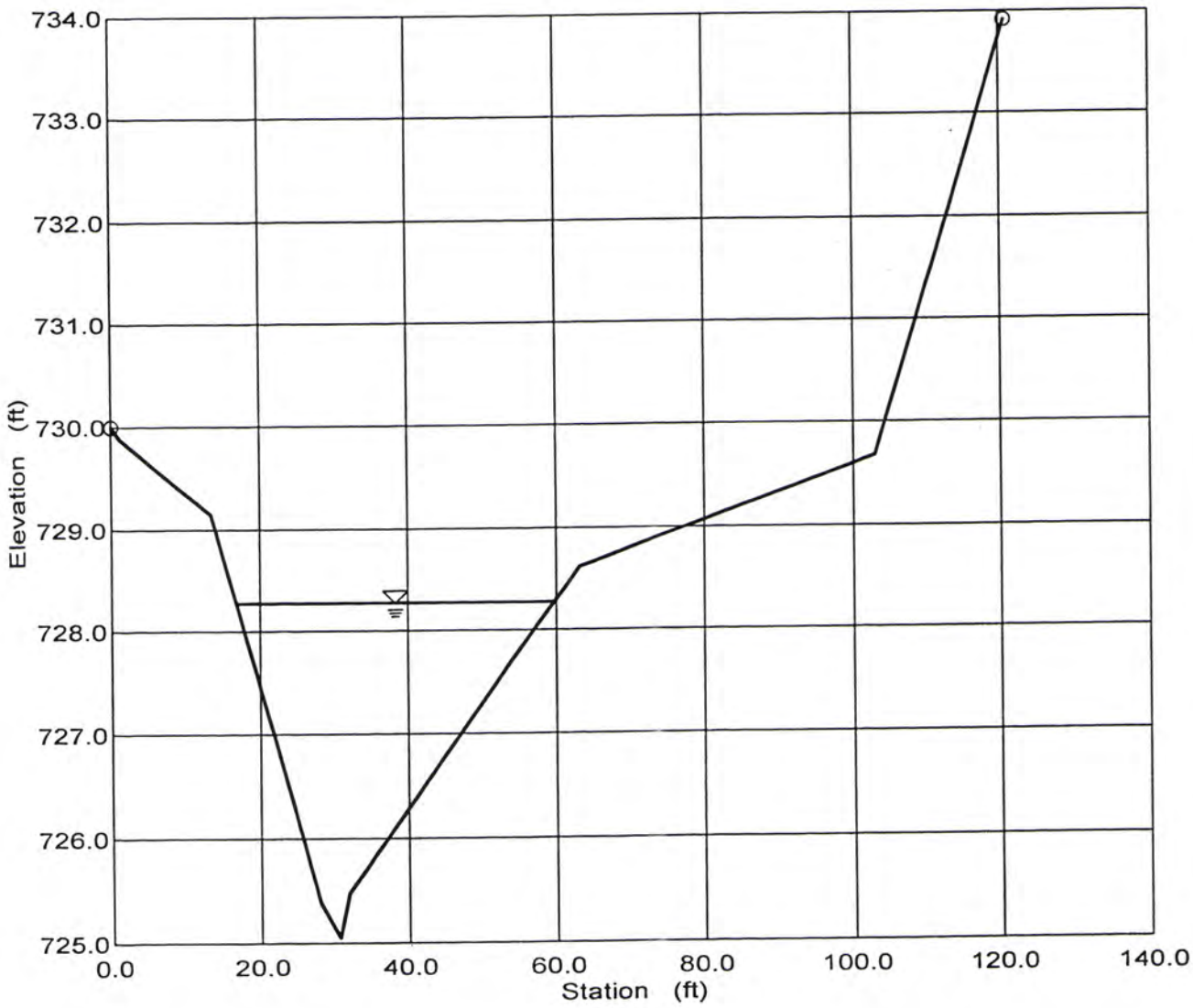
Input Data				
Channel Slope	0.001000 ft/ft			
Elevation range: 725.04 ft to 733.90 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	730.00	0.00	120.77	0.030
1.23	729.88			
13.50	729.15			
27.83	725.38			
30.67	725.04			
31.76	725.47			
63.21	728.62			
102.97	729.68			
120.77	733.90			
Discharge	102.00	cfs		

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	727.92	ft
Flow Area	52.83	ft²
Wetted Perimeter	38.60	ft
Top Width	38.05	ft
Height	2.88	ft
Critical Depth	726.83	ft
Critical Slope	0.014140	ft/ft
Velocity	1.93	ft/s
Velocity Head	0.06	ft
Specific Energy	727.98	ft
Froude Number	0.29	
Flow is subcritical.		

Section E-E Q 100 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section E-E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.001000	ft/ft
Water Surface Elevation	728.28	ft
Discharge	141.00	cfs



Section E-E Q 100 yr
Worksheet for Irregular Channel

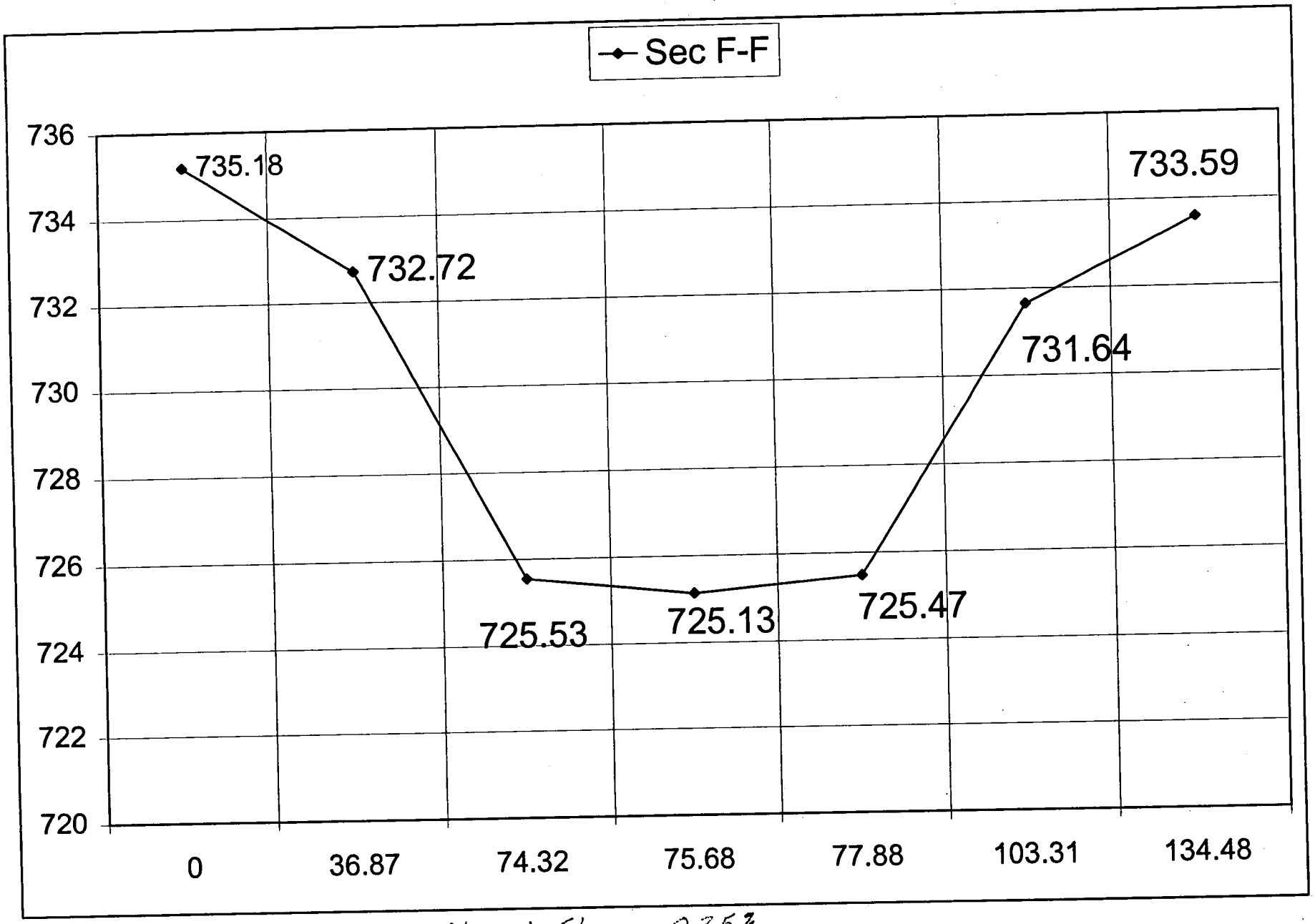
Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section E-E
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.001000	ft/ft
Elevation range: 725.04 ft to 733.90 ft.		

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	730.00	0.00	120.77	0.030
1.23	729.88			
13.50	729.15			
27.83	725.38			
30.67	725.04			
31.76	725.47			
63.21	728.62			
102.97	729.68			
120.77	733.90			

Discharge	141.00	cfs

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	728.28	ft
Flow Area	67.37	ft²
Wetted Perimeter	43.61	ft
Top Width	42.99	ft
Height	3.24	ft
Critical Depth	727.06	ft
Critical Slope	0.013544	ft/ft
Velocity	2.09	ft/s
Velocity Head	0.07	ft
Specific Energy	728.35	ft
Froude Number	0.29	
Flow is subcritical.		

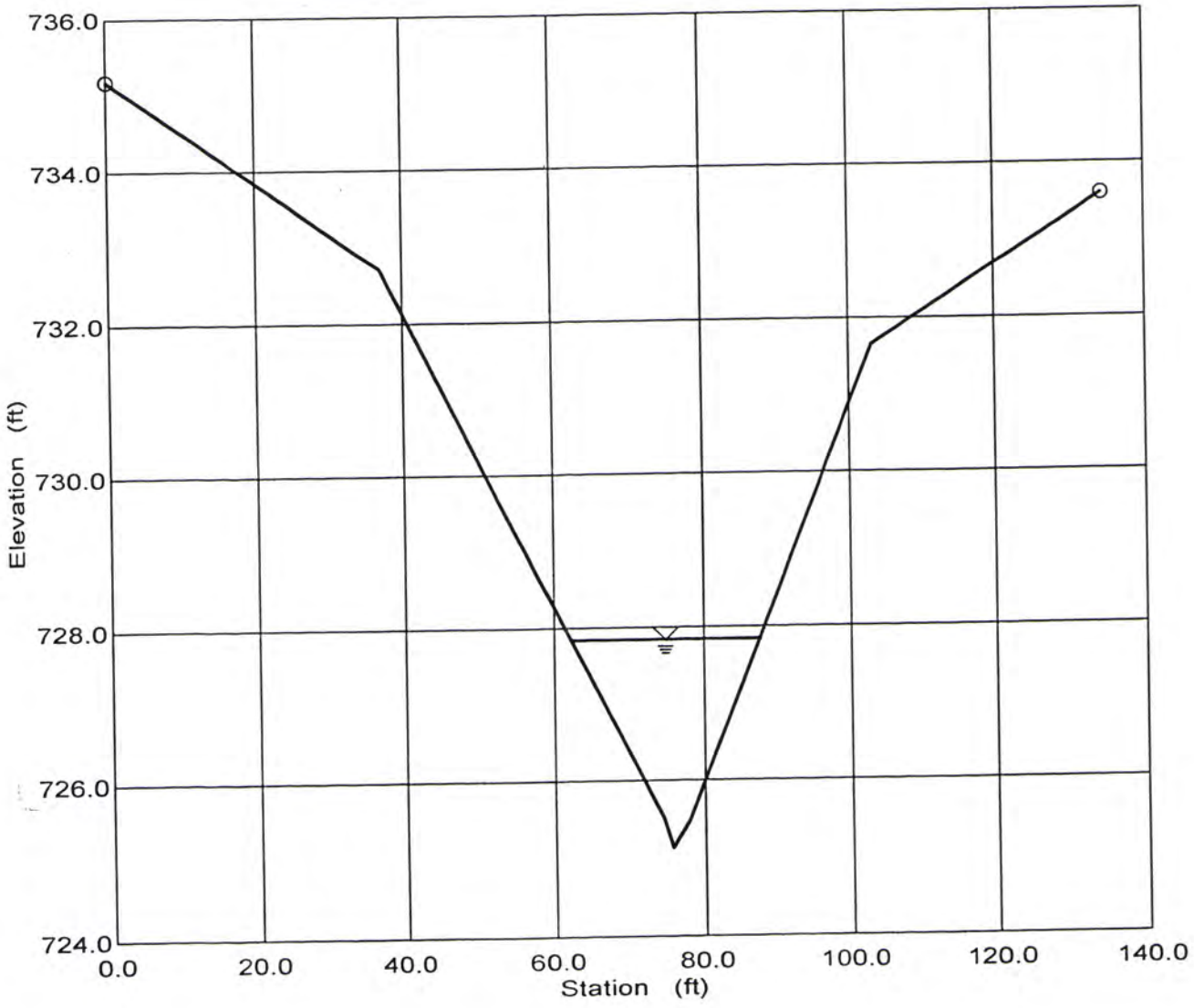


Channel Slope ~ 0.25%

Section F-F Q 10 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section F-F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.002500	ft/ft
Water Surface Elevation	727.83	ft
Discharge	102.00	cfs



Section F-F Q 10 r
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section F-F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.002500	ft/ft
Discharge	102.00	cfs

Elevation range: 725.13 ft to 735.18 ft.

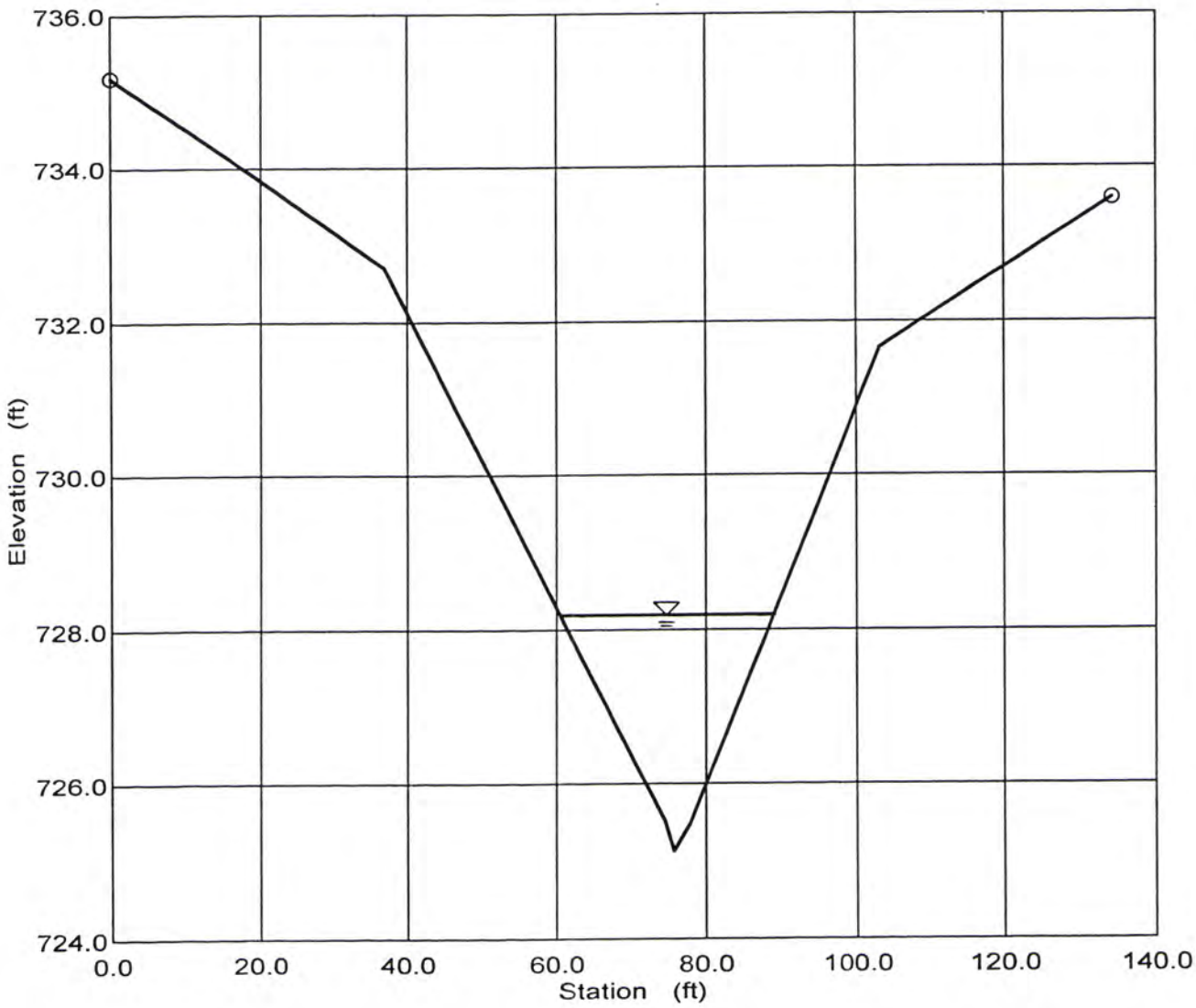
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	735.18	0.00	134.48	0.030
36.87	732.72			
74.32	725.53			
75.68	725.13			
77.88	725.47			
103.31	731.64			
134.48	733.59			

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	727.83	ft
Flow Area	34.18	ft²
Wetted Perimeter	25.84	ft
Top Width	25.25	ft
Height	2.70	ft
Critical Depth	727.09	ft
Critical Slope	0.013588	ft/ft
Velocity	2.98	ft/s
Velocity Head	0.14	ft
Specific Energy	727.97	ft
Froude Number	0.45	
Flow is subcritical.		

Section F-F Q 100 yr
Cross Section for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section F-F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.030	
Channel Slope	0.002500	ft/ft
Water Surface Elevation	728.18	ft
Discharge	141.00	cfs



Section F-F Q 100 r
Worksheet for Irregular Channel

Project Description	
Project File	q:\project\20010616\calcs\drainage\channels.fm2
Worksheet	Section F-F
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.002500	ft/ft
Elevation range: 725.13 ft to 735.18 ft.		

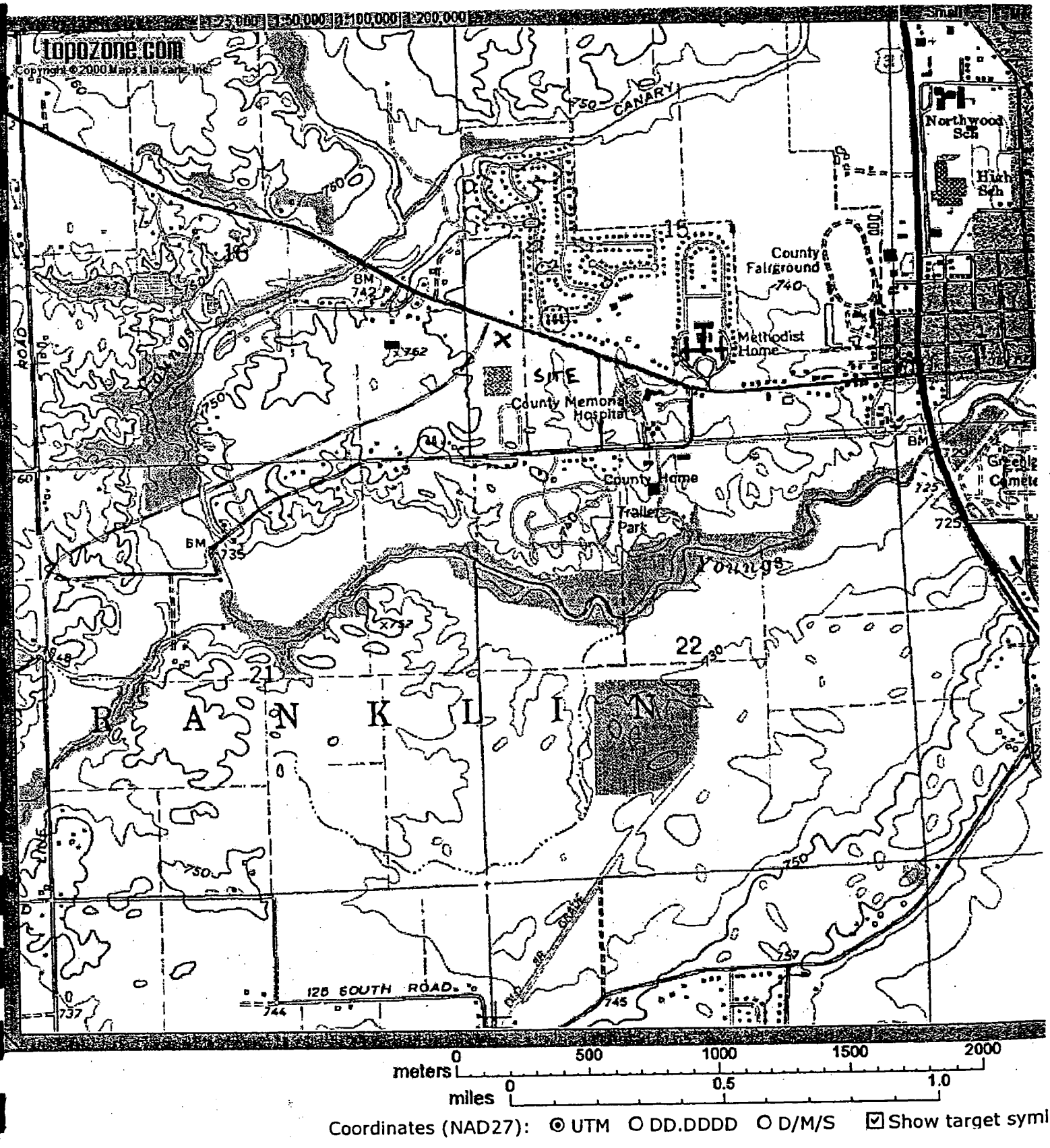
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	735.18	0.00	134.48	0.030
36.87	732.72			
74.32	725.53			
75.68	725.13			
77.88	725.47			
103.31	731.64			
134.48	733.59			

Discharge	141.00	cfs

Results		
Wtd. Mannings Coefficient	0.030	
Water Surface Elevation	728.18	ft
Flow Area	43.57	ft²
Wetted Perimeter	29.17	ft
Top Width	28.51	ft
Height	3.05	ft
Critical Depth	727.36	ft
Critical Slope	0.013014	ft/ft
Velocity	3.24	ft/s
Velocity Head	0.16	ft
Specific Energy	728.34	ft
Froude Number	0.46	
Flow is subcritical.		

Appendix D

Maps


topozone.com
Copyright © 2000 Maps a la carte, Inc.
1:25,000 1:50,000 1:100,000 1:200,000
CANARY
Northwood Sch
High Sch
County Fairground
740
Methodist Home
SITE
County Memorial Hospital
County Home
Trailer Park
BM
742
735
737
744
745
750
760
730
725
720
22
21
16
15
R A N K L I N
128 SOUTH ROAD
Creek
0 500 1000 1500 2000
meters
0 0.5 1.0
miles
Coordinates (NAD27): UTM DD.DDDD D/M/S Show target symbol

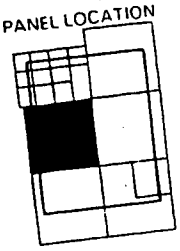
NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, INDIANA
(UNINCORPORATED AREAS)

PANEL 75 OF 150
(SEE MAP INDEX FOR PANELS NOT PRINTED)

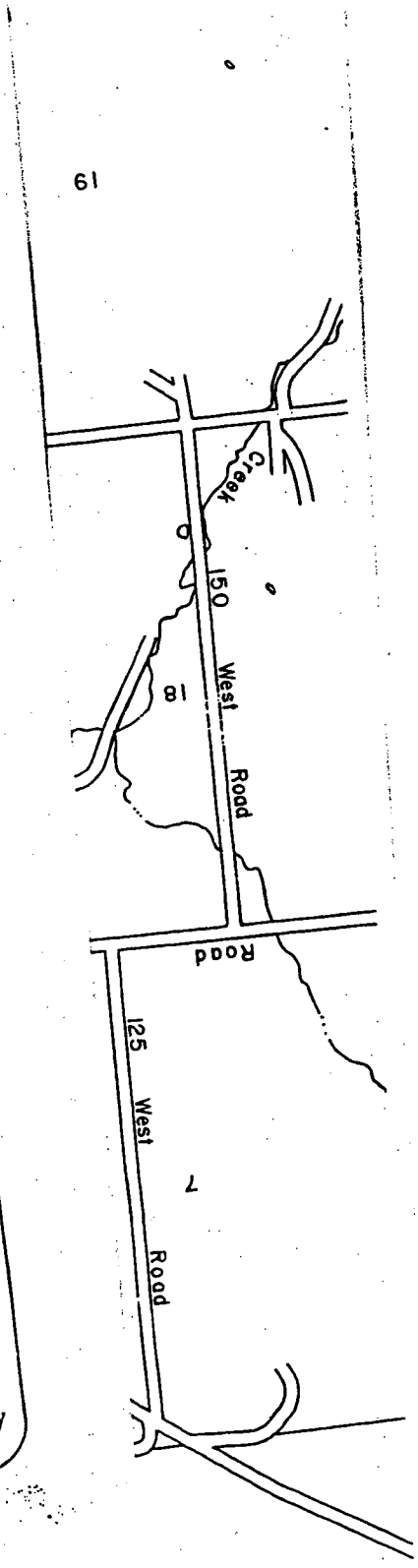
PANEL LOCATION

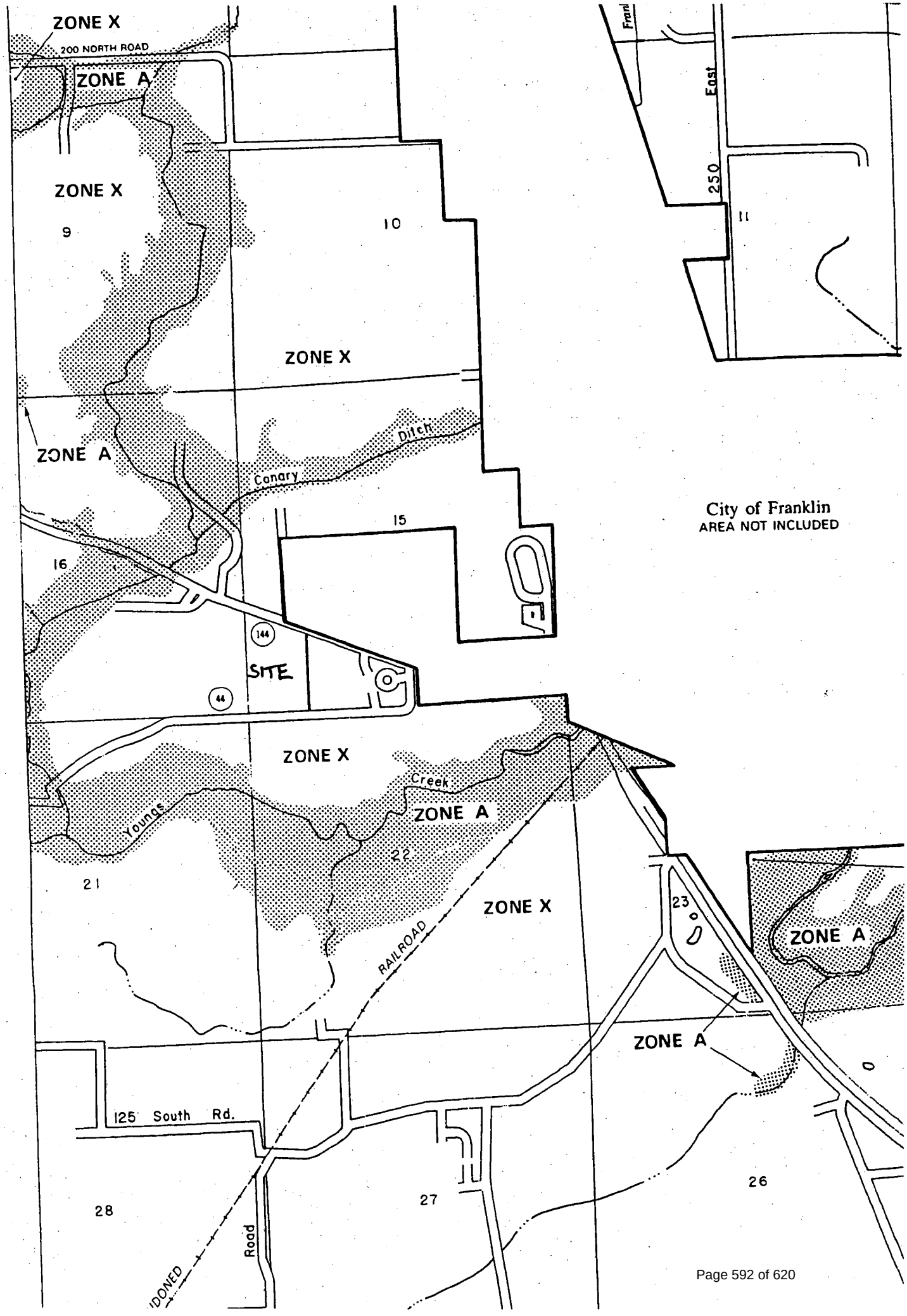


COMMUNITY-PANEL NUMBER
180111 0075 C

EFFECTIVE DATE:
MARCH 2, 1989

Federal Emergency Management Agency




ZONE X
200 NORTH ROAD
ZONE A
ZONE X
9
10
ZONE X
ZONE A
Ditch
Canary
15
16
144
SITE
44
ZONE X
Creek
Youngs
ZONE A
22
21
ZONE X
23
RAILROAD
ZONE A
ZONE A
125 South Rd.
28
27
26
Road
IDONED
Fran
East
250
11
City of Franklin
AREA NOT INCLUDED

NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY
FLOOD BOUNDARY AND FLOODWAY MAP

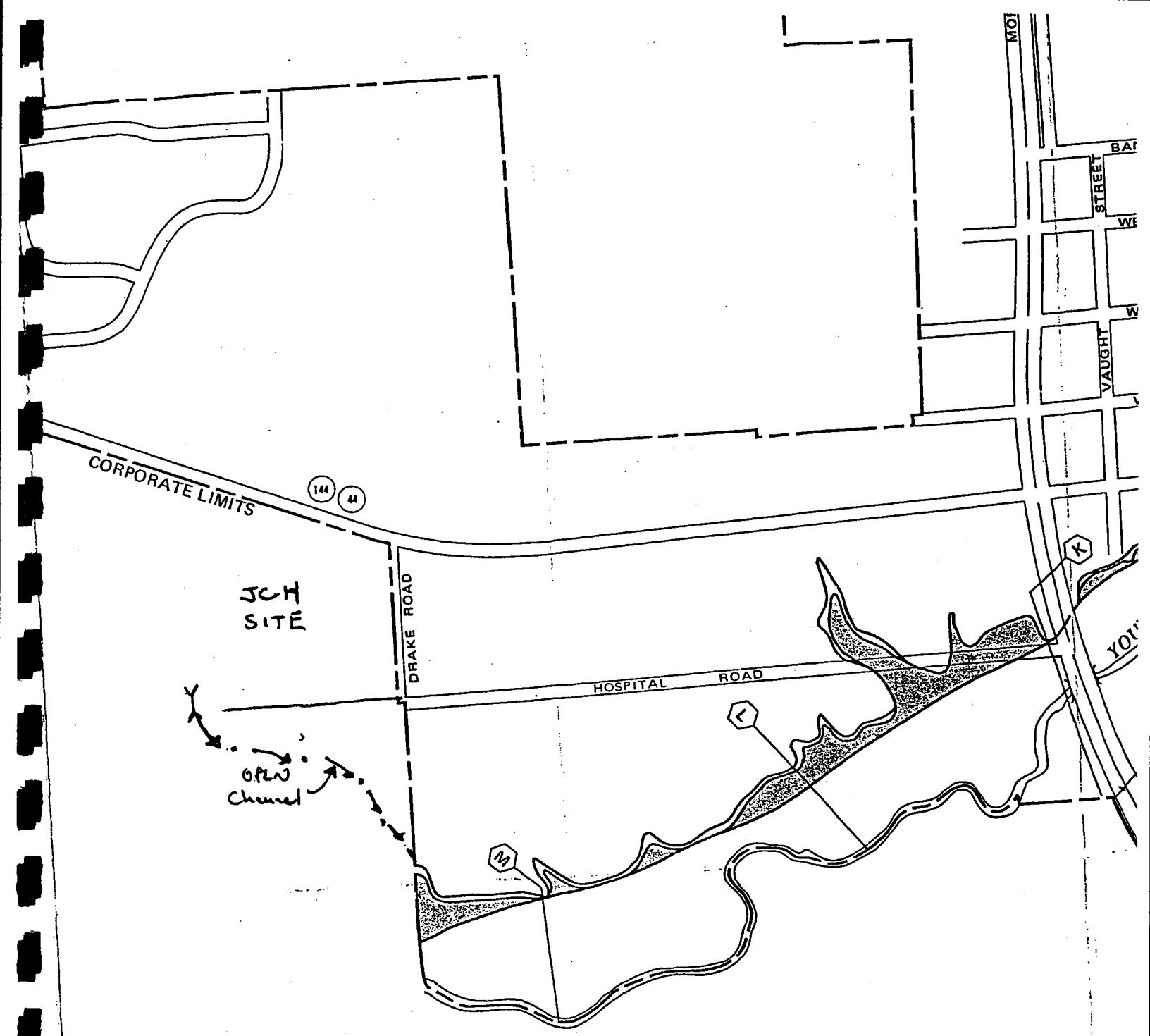
CITY OF
FRANKLIN, INDIANA
JOHNSON COUNTY

PANEL 2 OF 4
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
180114 0002 B

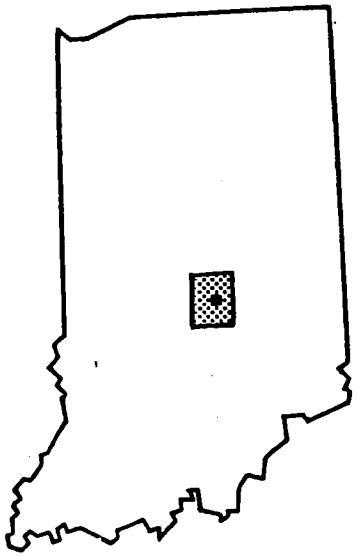
EFFECTIVE DATE:
APRIL 1, 1981

federal emergency management agency
federal insurance administration


CORPORATE LIMITS
144
44
JCH
SITE
DRAKE ROAD
HOSPITAL ROAD
K
L
M
VAUGHT
STREET

FLOOD INSURANCE STUDY



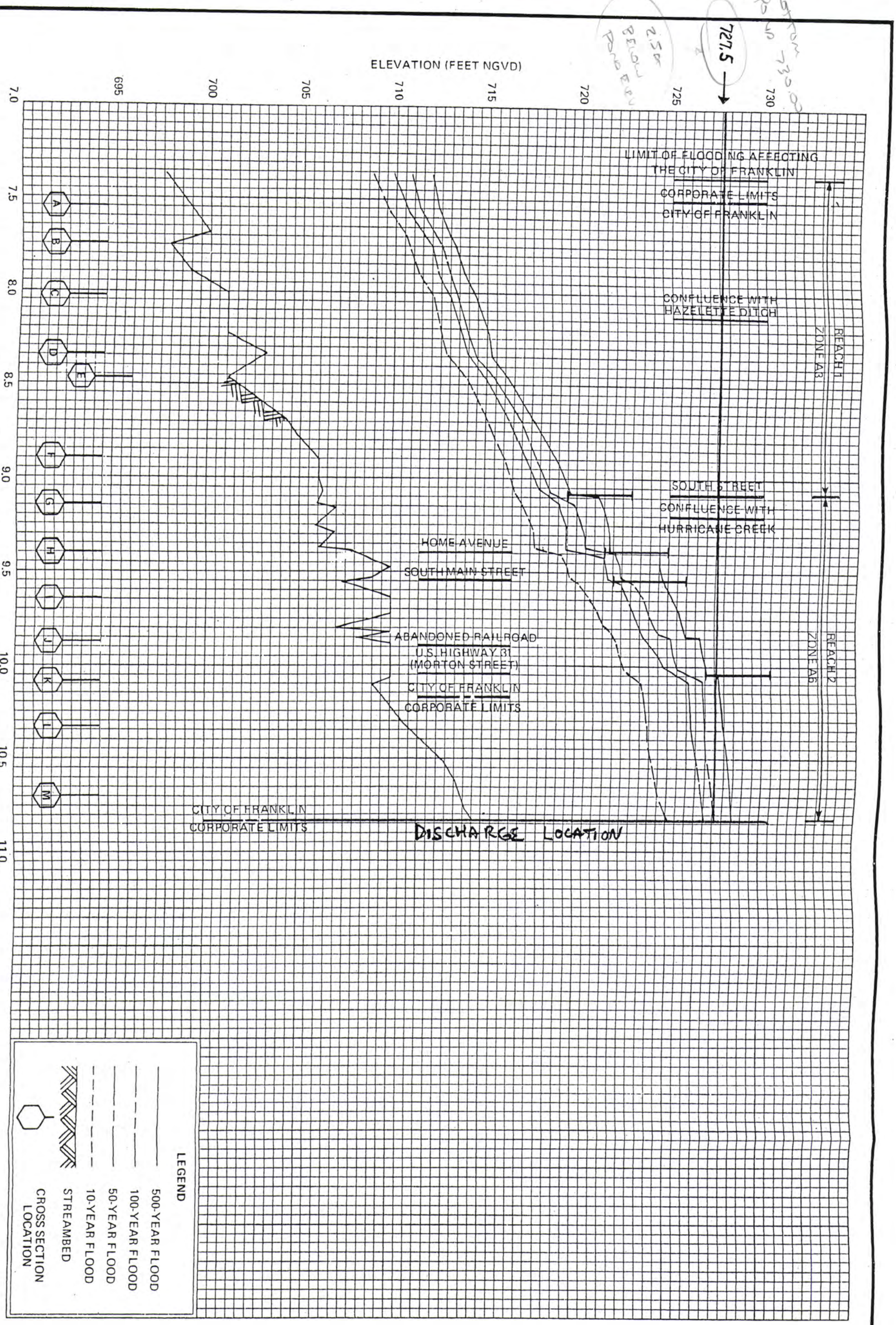


CITY OF FRANKLIN, INDIANA
JOHNSON COUNTY

OCTOBER 1, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 180114



FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF FRANKLIN, IN
(JOHNSON CO.)

FLOOD PROFILES

YOUNGS CREEK

01P

Appendix E

Hydrology Reports for Custer Baker Middle School

APPROVED PLAN

PROJECT NARRATIVE

Existing Conditions

The existing 34 acre site is located in Sections 15 and 16, Township 12 North, Range 4 East in Johnson County, Indiana. The site is west of Franklin on State Road 44. See FIGURE 1 for the *Location Map.* The existing site includes the existing Custer Baker Middle School building, paved access roads, paved parking areas, paved play areas, a cinder running track, an existing house and building and open grass areas. Per agreement with the Johnson County Planning Engineer, the existing conditions on the site can be used in developing the existing runoff values (rather than using undeveloped conditions). The existing runoff from the site is draining into an existing 30" RCP culvert at the east side of the site. The soils on the site are Miami Silt Loam, Brookston Silty Clay Loam and Crosby Silt Loam as delineated on FIGURE 2 the *Soils Map.* Miami Silt Loam is in hydrologic soil group B, Brookston Silty Clay Loam in group B/D and Crosby Silt Loam is in group C. The site is in Flood Zone C, which is an area of minimal flooding.

The elevations on the site range from a high of about 758' at the northwest corner of the site down to about 744.5' on the southeast corner of the site. The existing site is divided into 4 watersheds, Basins E-1, E-2, E-3 and E-4. FIGURE 6 is the *Existing Conditions Drainage Map.* Basins E-1 and E-2 drain to the east, Basin E-3 drains to the south and Basin E-4 drains to the north. The total peak stormwater runoff from Basins E-1 and E-2 was computed for the 2 year and 10 year storm events. This total peak runoff is the allowable discharge from the new detention basin in Basin D-1 of the developed site. The total peak stormwater runoff from Basin E-3 was computed for the 2 year and 10 year storm events. These two hydrographs were then flood routed through the two existing 12"corrugated metal pipes under Hospital Road to determine the allowable discharge from Basin D-2 of the developed site. Basin E-4 drains offsite to the north and is not used for determining any developed conditions detention requirements. Most of the area that was in existing Basin E-4 is included in developed Basin D-1.

Developed Conditions

The developed site will include the school building with the new additions, new access roads, new parking areas, new tennis courts, a new running track, open grassed areas, a dry detention basin which doubles as practice athletic fields and a small detention basin adjacent to Hospital Road. The calculations include an additional 1.2 acres of impervious surface area for future additions to the school building and/or site.

The developed site is divided into 2 watersheds, Basins D-1 and D-2. See FIGURE 7 for the *Developed Conditions Drainage Map.* Basin D-1 is a large watershed that drains into the new detention basin. The stormwater runoff from Basin D-1 is collected into a storm sewer system which drains into the new detention basin. There is an outfall structure on the 30" diameter outlet pipe with an orifice and weir that controls the flow out of the detention basin. The detention basin and outfall structure are designed to meet the Johnson County water quality and stormwater detention requirements. Basin D-2 is an 8.15 acre watershed that drains south into the two existing 12" corrugated metal pipes under Hospital Road. The only impervious development to Basin D-2 is the new access road along the southwest part of the site. An existing driveway is being removed. Due to the small amount of impervious surface added to Basin D-2, the Johnson County Planning Engineer is not requiring that any water quality volume be stored in the small detention basin required for this watershed.

Calculation Methods

The stormwater runoff calculations for the 2 year and 10 year storms were performed for the existing Basins E-1 and E-2 and E-3. All computations used the SCS Type II distribution. FIGURES 3, 4 and 5 show the rainfall depth maps for the 2, 10 and 100 year storms.

The dry detention basin D-1, was sized for the 10 year and 100 year storm events while accommodating the water quality requirement. The 10 year peak discharge rate from the detention basin is less than the existing conditions discharge rate for the 2 year storm. The 100 year discharge rate from the detention basin is less than the existing conditions discharge rate for the 10 year storm.

The small dry detention basin D-2, was sized for the 10 year and 100 year storm events. The 10 year peak discharge rate from the detention basin is less than the existing conditions discharge rate for the 2 year storm. The 100 year discharge rate from the detention basin is less than the existing conditions discharge rate for the 10 year storm.

The existing conditions discharge rates computed for Basins E-1 and E-2 are as follows:

Basin E-1	Basin E-2	Total
Q_2 = 26.04 cfs	Q_2 = 4.80 cfs	Q_2 = 30.84 cfs
Q_{10} = 45.05 cfs	Q_{10} = 10.38 cfs	Q_{10} = 55.43 cfs

The existing conditions discharge rates computed for Basin E-3 are as follows:

Basin E-3
Q_2 = 5.69 cfs
Q_{10} = 16.89 cfs

The developed conditions discharge rates computed for the Basin D-1 detention basin are as follows:

Basin D-1	Elev.	Acre-Feet Storage
Q_{10} = 22.91 cfs	743.49	2.68 Ac-Ft
Q_{100} = 31.36 cfs	744.20	4.19 Ac-Ft

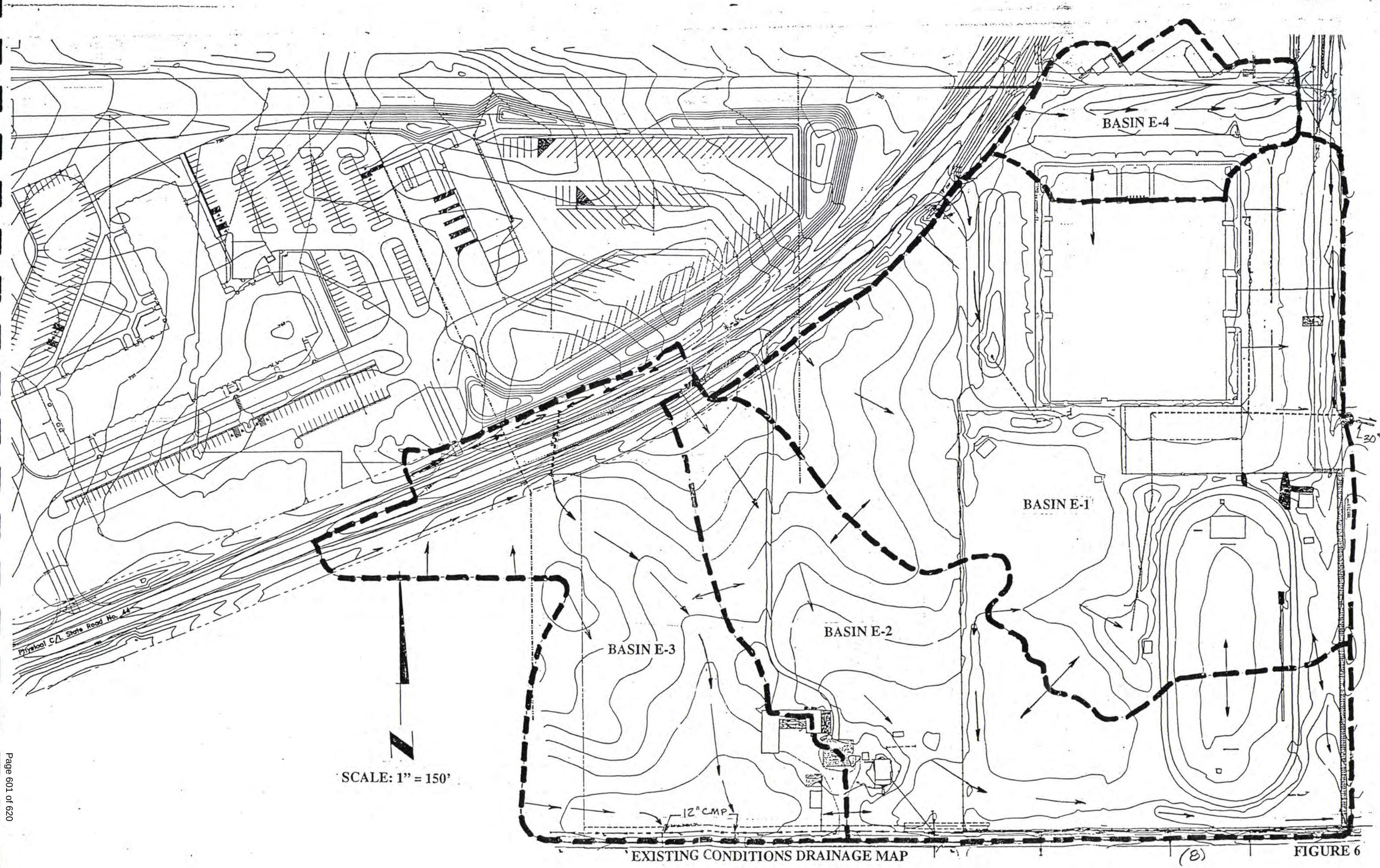
A larger discharge pipe could have been used out of Basin D-1, but the existing (and proposed replacement) culvert pipe under the new County Road (Tracey Miles Rd.) is a 30" pipe, so it did not seem prudent to use an outlet pipe larger than 30" (even though the existing and proposed culvert will be at sufficient slope to accommodate higher flows). Per agreement with the Johnson County Planning Engineer, a 2" orifice is the minimum size used to drain the water quality volume.

The developed conditions discharge rates computed for the Basin D-2 detention basin are as follows:

Basin D-2	Elev.	Acre-Feet Storage
Q_{10} = 4.75 cfs	747.84	0.59 Ac-Ft
Q_{100} = 6.18 cfs	748.26	0.92 Ac-Ft

The storm sewers and culverts were designed for the 10 year storm.

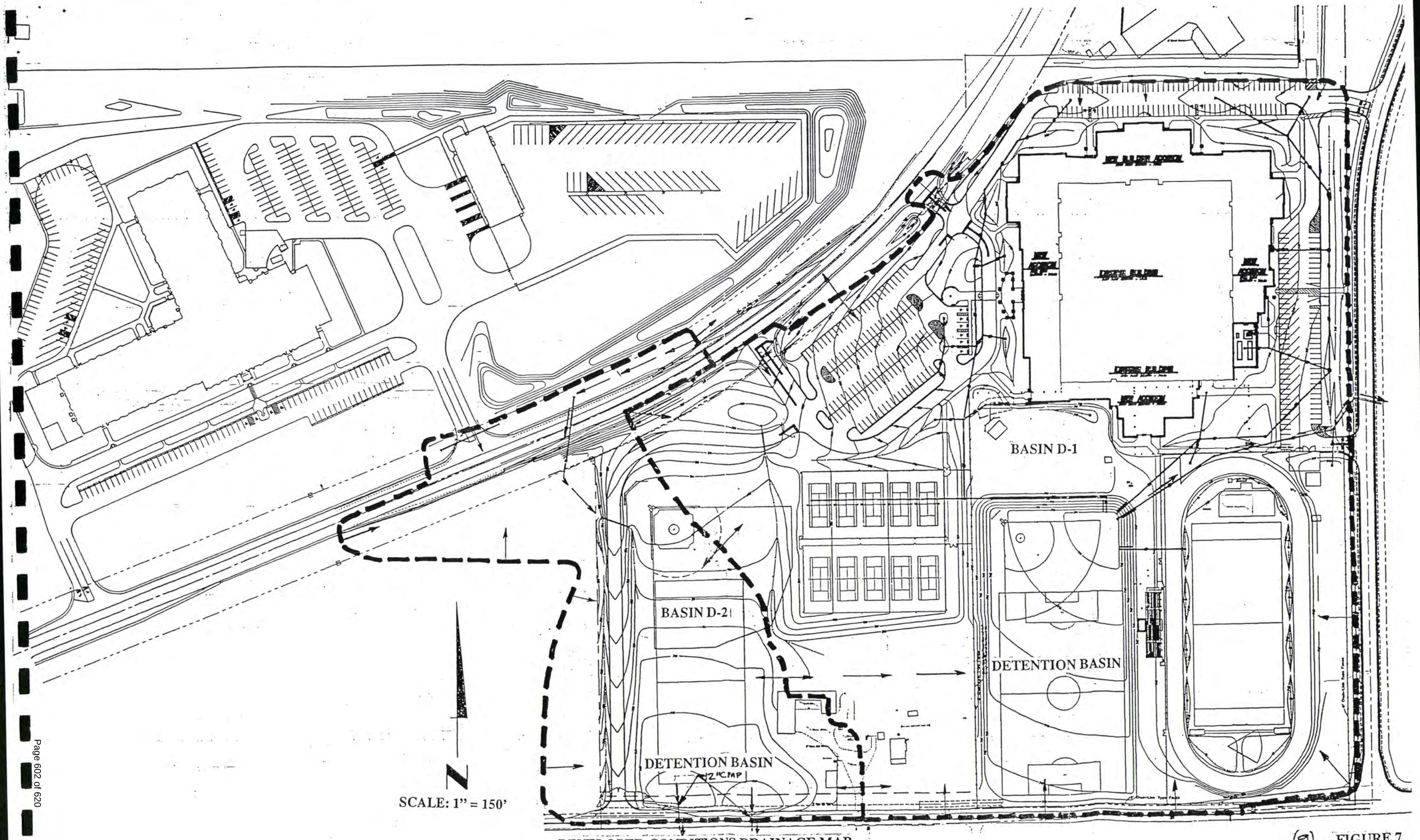
Detailed calculations now follow this narrative.



EXISTING CONDITIONS DRAINAGE MAP

(8)

FIGURE 6



DEVELOPED CONDITIONS DRAINAGE MAP

(9) FIGURE 7

PRELIMINARY

APPROVALS AND FINAL DESIGN PENDING 5/8/01

REVISED PROJECT NARRATIVE

Existing Conditions

The existing 34 acre school site is located in Sections 15 and 16, Township 12 North, Range 4 East in Johnson County, Indiana. The site is west of Franklin on State Road 44. See FIGURE 1 for the *Location Map.* The school corporation is now proposing to locate the new detention basin on approximately a 10 acre site south of Hospital Road. The existing school site includes the existing Custer Baker Middle School building, paved access roads, paved parking areas, paved play areas, a cinder running track, an existing house and building, and open grass areas. The new detention basin area is an existing farm field. Per agreement with the Johnson County Planning Engineer, the existing conditions on the site were used in developing the existing runoff values (rather than using undeveloped conditions). The soils on the site are Miami Silt Loam, Brookston Silty Clay Loam and Crosby Silt Loam as delineated on FIGURE 2 the *Soils Map.* The soils on the proposed detention basin site are Crosby Silt Loam and Miami Clay Loam. Miami Silt Loam/Miami Clay Loam are in hydrologic soil group B, Brookston Silty Clay Loam is in group B/D and Crosby Silt Loam is in group C. The site is in Flood Zone C, which is an area of minimal flooding.

The elevations on the school site range from a high of about 758' at the northwest corner of the site down to about 744.5' on the southeast corner of the site. The elevations on the proposed detention basin site range from about 748 on the north side of the site at Hospital Road down to about 728 at the outlet location. The existing site is divided into 5 watersheds, Basins E-1, E-2, E-3, E-4 and E-5. FIGURE 6A and FIGURE 6B are the *Existing Conditions Drainage Maps.* Basins E-1 and E-2 drain to the east, Basin E-3 drains to the south, Basin E-4 drains to the north and Basin E-5 drains to the south. The total peak stormwater runoff from Basins E-3 and E-5 was computed for the 2 year and 10 year storm events. The two hydrographs for Basin E-3 were flood routed through the two existing 12"corrugated metal pipes under Hospital Road to determine the allowable discharge from Basin D-2 of the developed site. The flood routed hydrographs (2 year and 10 year) from Basin E-3 were added to the respective hydrographs from Basin E-5 to get the total peak runoff. These total peak runoff rates are the allowable discharge rates for the new detention basin in Basin D-1A of the developed site. Basins E-1, E-2 and E-4 do not drain to the south and are not used for determining any developed conditions detention requirements. Most of the area that was in existing Basin E-4 is included in developed Basin D-1A.

Developed Conditions

The developed site will include the school building with the new additions, new access roads, new parking areas, new tennis courts, a new running track, open grassed areas, a small detention basin north of Hospital Road and the large detention basin south of Hospital Road. The calculations include an additional 1.2 acres of impervious surface area for future additions to the school building and/or site.

The developed site is divided into 2 watersheds, Basins D-1A and D-2. See FIGURE 7A and FIGURE 7B for the *Developed Conditions Drainage Maps.* Basin D-1A is a large watershed that drains directly into the new detention basin. Much of the stormwater runoff from Basin D-1A is collected into a storm sewer system which drains into the new detention basin. There is an outfall structure on the 24" diameter outlet pipe that has three orifices and a weir that controls the flow out of the detention basin. The detention basin and outfall structure are designed to meet the Johnson County water quality and stormwater detention requirements. Basin D-2 is an 8.15 acre watershed that drains south into the two existing 12" corrugated metal pipes under Hospital Road. The only impervious development to Basin D-2 is the new access road along the southwest part of the site. An existing driveway is being removed. Due to the small amount of impervious surface added to Basin D-2, the Johnson County Planning Engineer is not requiring that any water quality volume be stored in the small detention basin required for this watershed. The stormwater runoff from Basin D-2 flows south from the two

culverts under Hospital Road into the new detention basin. The inflow from Basin D-2 as well as the flow from Basin D-1A is accounted for in the sizing of the new detention basin.

Calculation Methods

The stormwater runoff calculations for the 2 year and 10 year storms were performed for the existing Basins E-3 and E-5. All computations used the SCS Type II distribution. FIGURES 3, 4 and 5 show the rainfall depth maps for the 2, 10 and 100 year storms.

The dry detention basin D-1A, was sized for the 10 year and 100 year storm events while accommodating the water quality requirement. The 10 year peak discharge rate from the detention basin is less than the existing conditions discharge rate for the 2 year storm. The 100 year discharge rate from the detention basin is less than the existing conditions discharge rate for the 10 year storm. The flood routed flow from Basin D-2 was also included in the inflow into the new detention basin.

The small dry detention basin D-2, was sized for the 10 year and 100 year storm events. The 10 year peak discharge rate from the detention basin is less than the existing conditions discharge rate for the 2 year storm. The 100 year discharge rate from the detention basin is less than the existing conditions discharge rate for the 10 year storm.

The existing conditions discharge rates computed for Basins E-3 and E-5 are as follows:

Basin E-3	Basin E-5	Hydrograph Summation Total Peak
$Q_2 = 5.73$ cfs	$Q_2 = 4.89$ cfs	$Q_2 = 10.52$ cfs
$Q_{10} = 17.20$ cfs	$Q_{10} = 11.50$ cfs	$Q_{10} = 28.23$ cfs

The developed conditions discharge rates computed for the Basin D-1A detention basin are as follows:

Basin D-1A	Elev.	Acre-Feet Storage
$Q_{10} = 9.33$ cfs	734.84	5.19 Ac-Ft
$Q_{100} = 18.10$ cfs	736.73	7.69 Ac-Ft

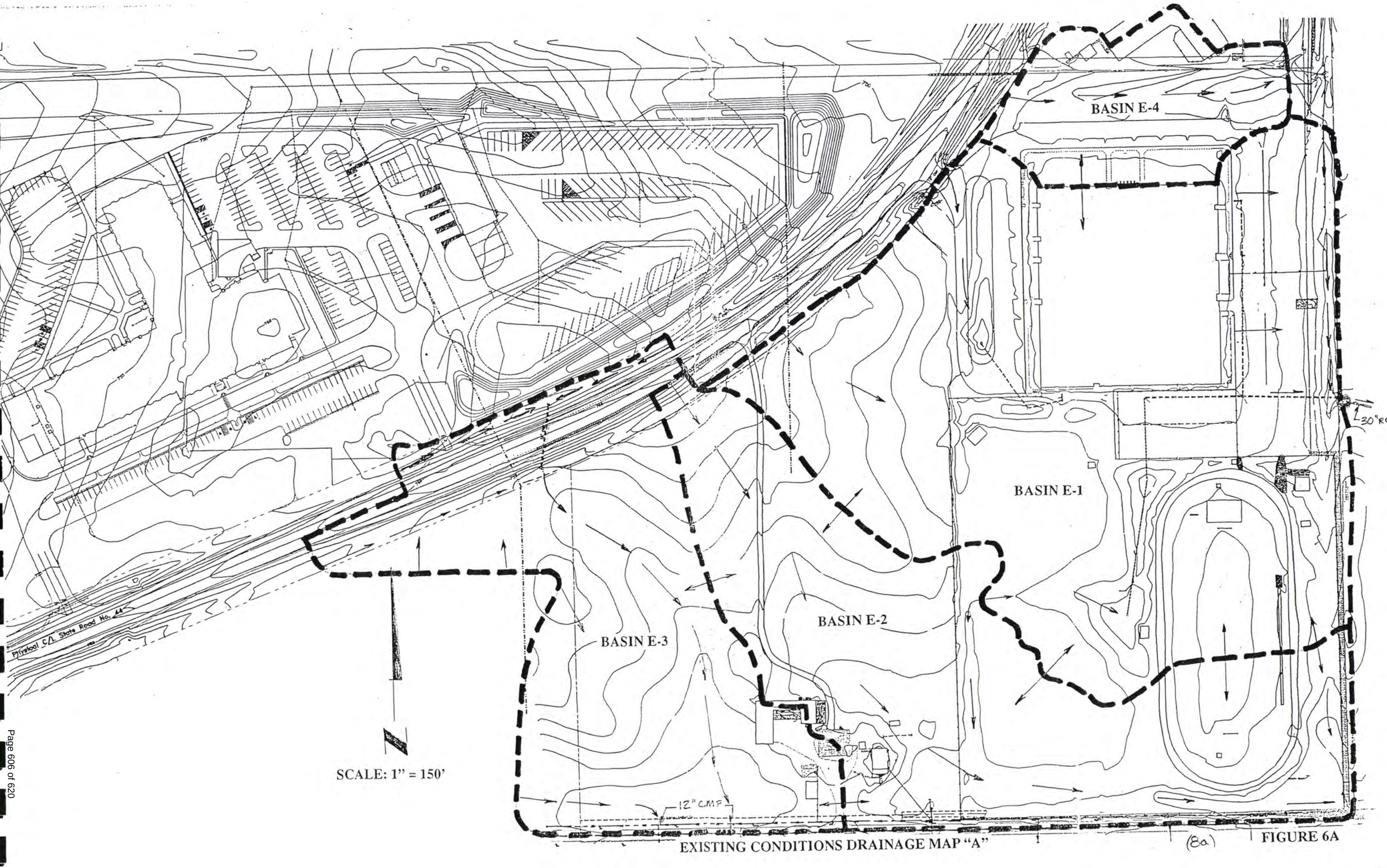
A 3" orifice was used to drain the water quality volume.

The developed conditions discharge rates computed for the Basin D-2 detention basin are as follows:

Basin D-2	Elev.	Acre-Feet Storage
$Q_{10} = 4.71$ cfs	747.83	0.58 Ac-Ft
$Q_{100} = 6.17$ cfs	748.26	1.00 Ac-Ft

The storm sewers and culverts were designed for the 10 year storm.

Detailed calculations now follow this narrative.



EXISTING CONDITIONS DRAINAGE MAP "A"

(8a)

FIGURE 6A



EXISTING CONDITIONS DRAINAGE MAP "B"

SCALE: 1" = 100'

FIGURE 6B

BASIN D-1A

BASIN D-2

DETENTION BASIN
12" CMP

NEW 12" TO 30"

STR #401

APPROX. 0.50 AC. DIRECT DISCHARGE

SCALE: 1" = 150'

TO OFF-SITE BASIN SEE FIG. 7B

DEVELOPED CONDITIONS DRAINAGE MAP "A"

(9a)

FIGURE 7A

DEVELOPED CONDITIONS DRAINAGE MAP "B"

SCALE: 1" = 100'

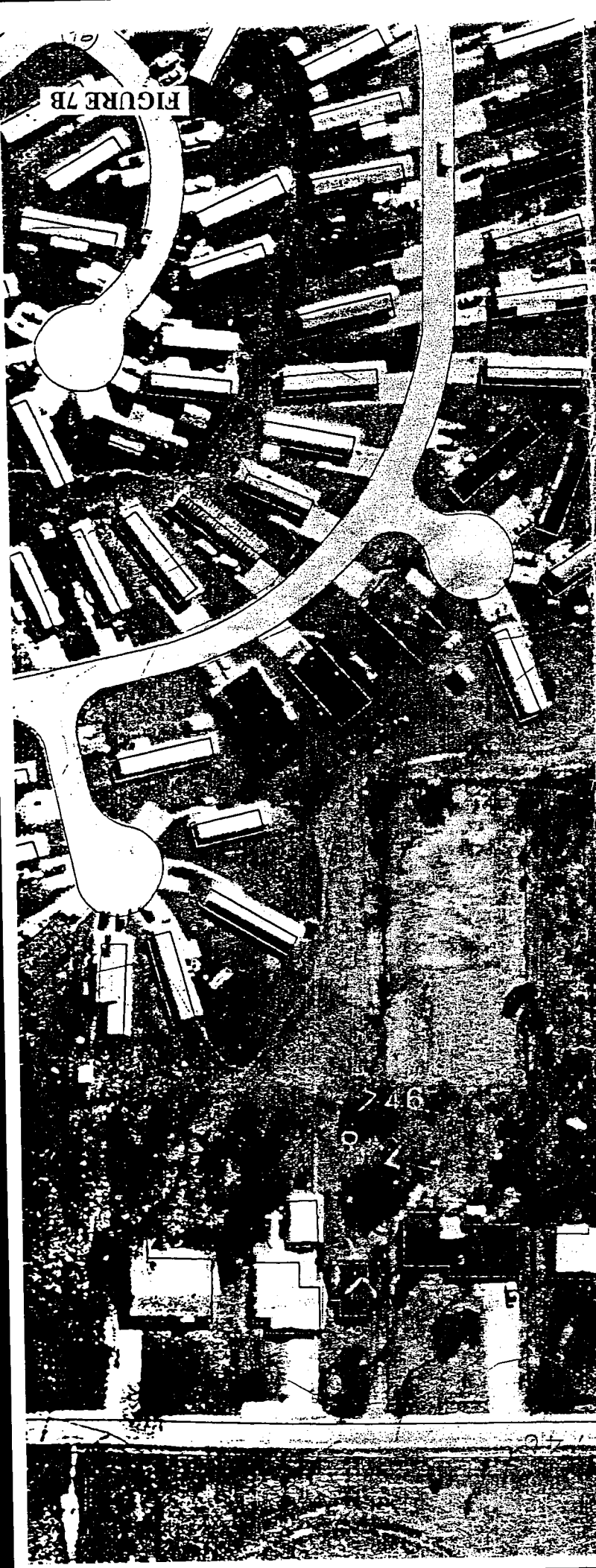


FIGURE 7B

BASIN D-1A

Appendix F

Design Calculations and Plans for Existing On-site Detention System

DRAINAGE ANALYSIS
COUNTY DITCH TO HOSPITAL ROAD

Pipes discharging to basin:
Capacity based on HW/D = 1 inlet control
End condition (1) Fig. 4 -18

1.	FCHS -	30" CMP -	22 cfs.
2.	Nursing Home -	24" CMP -	6.2 cfs.
3.	Camelot -	18" CMP -	6.2 cfs.
		36" CMP -	34 cfs.
		58" x 35" CMP -	60 cfs.
4.	Hospital -	24" RCP -	15 cfs.
5.	Residence North -	12" RCP -	2.3 cfs.
6.	Miscellaneous	2 - 6" CMP -	2.3 cfs.
		TOTAL	157 cfs.

Undeveloped area contributing to basin = 27 acres
Bare cropland use C = .5

$$T_c = \frac{1.8\,(1.1 - .5)\quad 2200}{3}{}^{1} = 50 \text{ min.}$$

$I_{10} = 2.3$ $I_{100} = 3.4$
$Q_{10} = 2.3\ (27)\ (.5) = 31$ cfs.
$Q_{100} = 3.4\ (27)\ (.5) = 46$ cfs.
Total $Q_{100} = 157 + 46 = 203$ cfs.
Existing pipe = 48" CMP $Q_{cap} = 70$ cfs.

Pipe required: 72" CMP with HW/D = 1 or 84" x 61" pipe arch due to limited cover
Available capacity at new structure no. 8 (Detention Center 8 cfs.)

COST ESTIMATES

Alternate No. 1:

Install 700 LF - 84" x 61" pipe arch (easement required = 75 feet)

700 LF - 84" x 61" @ $100/ft. =	$ 70,000.00
Relocate 6" sanitary sewer force main =	5,000.00
Reconstruct detention center storm system =	25,000.00
Fill area west of detention center for cover =	10,000.00
Relocate exit basement drains =	5,000.00
Relocate sanitary sewer =	10,000.00
Relocate telephone cable =	5,000.00
Seed and mulch =	7,500.00
Repair Hospital road =	2,500.00
Engineering and contingencies =	10,000.00
Total Cost	$150,000.00

Time frame: 90 days (delays completion of Detention Center)

Alternate No. 2:

Replace existing clay tile with 18" RCP (watertight sanitary sewer grade) @ .5% Q_{cap} = 8 cfs. and construct detention basin north side of road with earth dike (easement required = 25')

400 LF – ~~12~~ 18" RCP @ $25/ft. =		$ 10,000.00
Repair Hospital road =		2,500.00
Earthwork: 4000 cys @ $2.50 =		10,000.00
Relocate basement drains =		2,500.00
Clearing ditch =		2,500.00
Outlet structure and connect to CB #8 =		2,500.00
Seed and mulch =		5,000.00
Engineering and contingencies =		5,000.00
	Total Cost	$ 40,000.00

Time frame: 30 days

Alternate No. 3:

Construct 84" x 61" pipe arch east across Hospital and south across Highway Garage parallel to existing 54" CMP (no easement required)

1500 LF 84" x 61" @ $100/ft. =		$150,000.00
Repair Hospital Road =		25,000.00
Seed and mulch =		10,000.00
Utility relocation =		5,000.00
Fill for pipe cover =		10,000.00
Engineering and contingencies =		10,000.00
	Total cost	$210,000.00

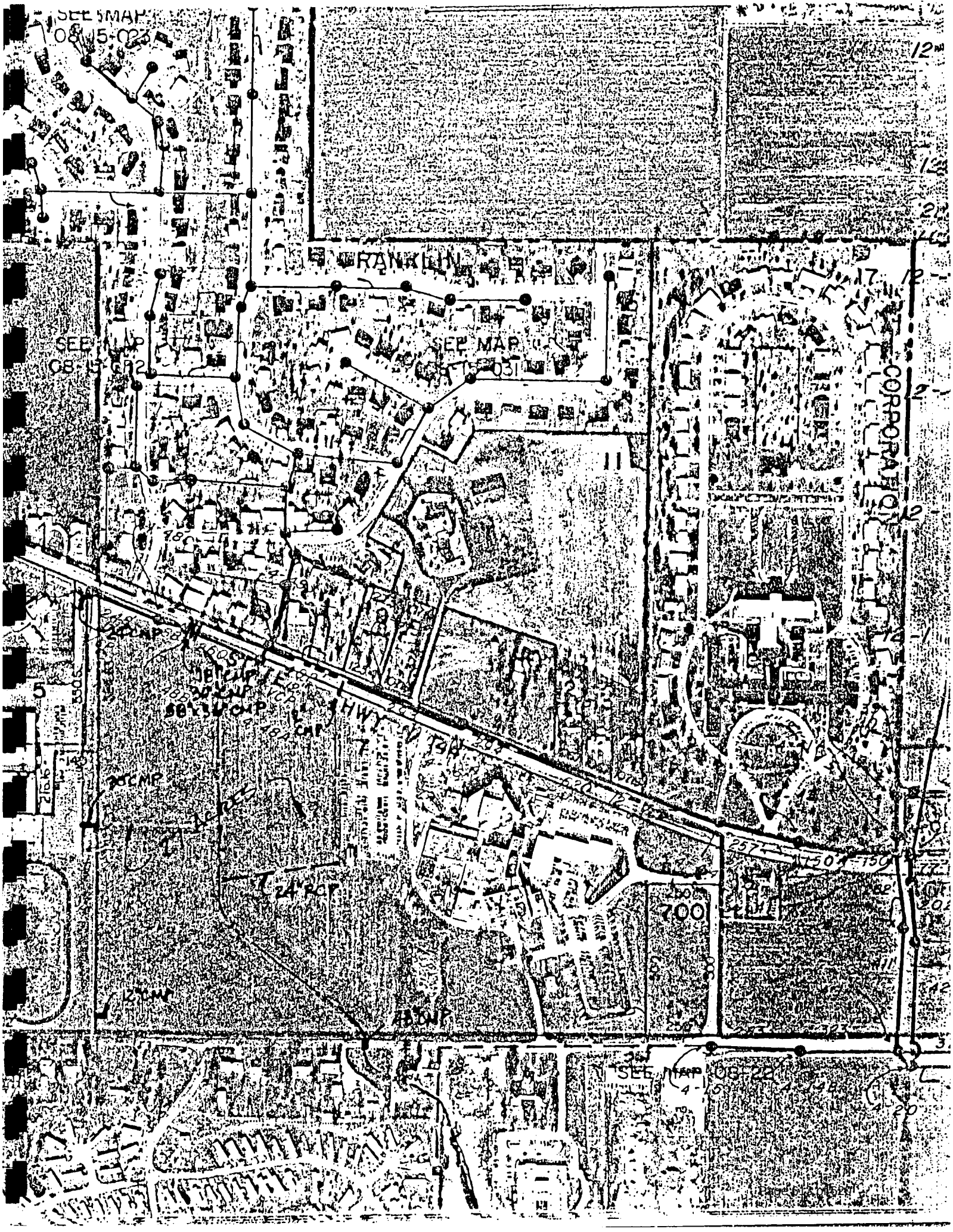
Time frame: 90 days

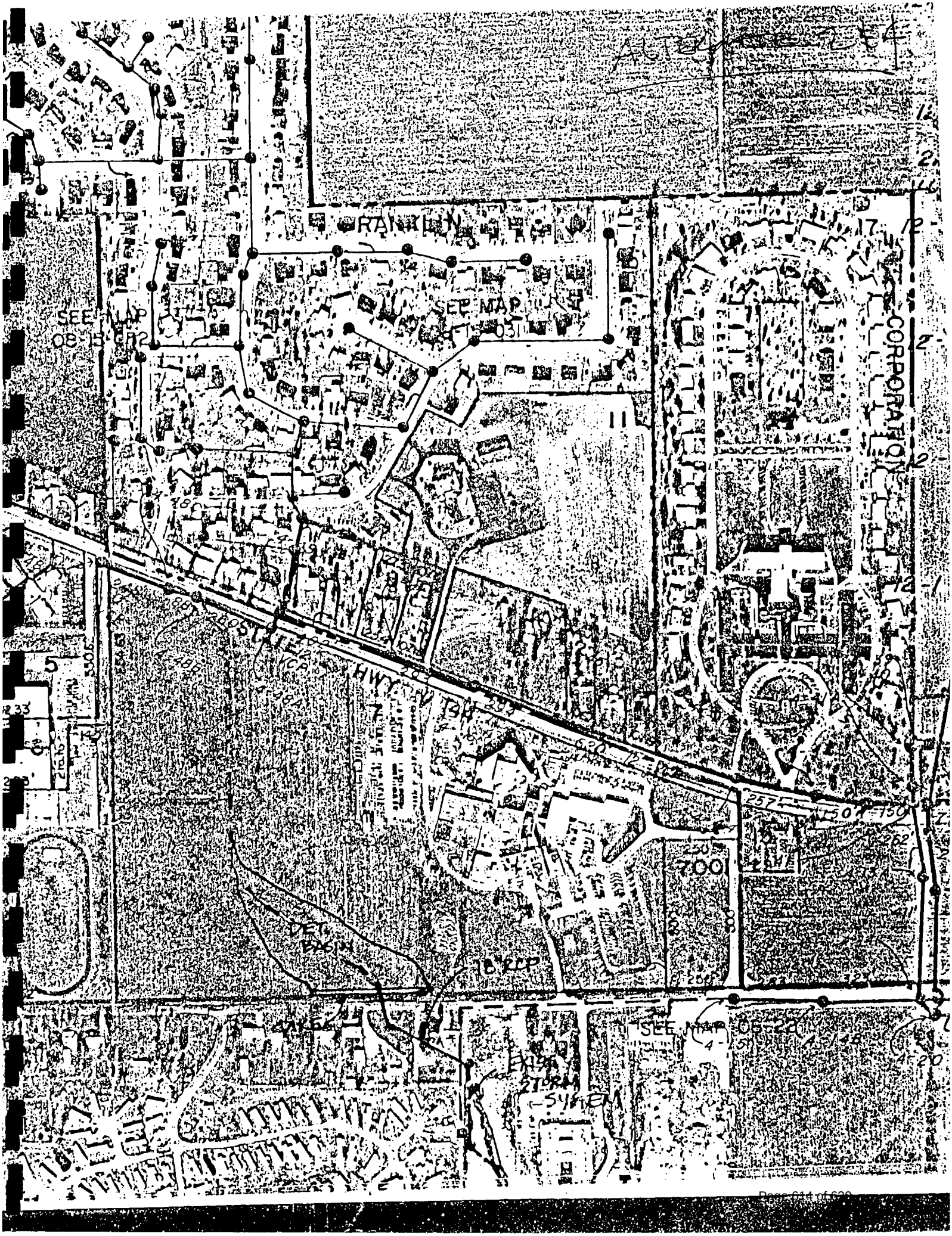
Alternate No. 4:

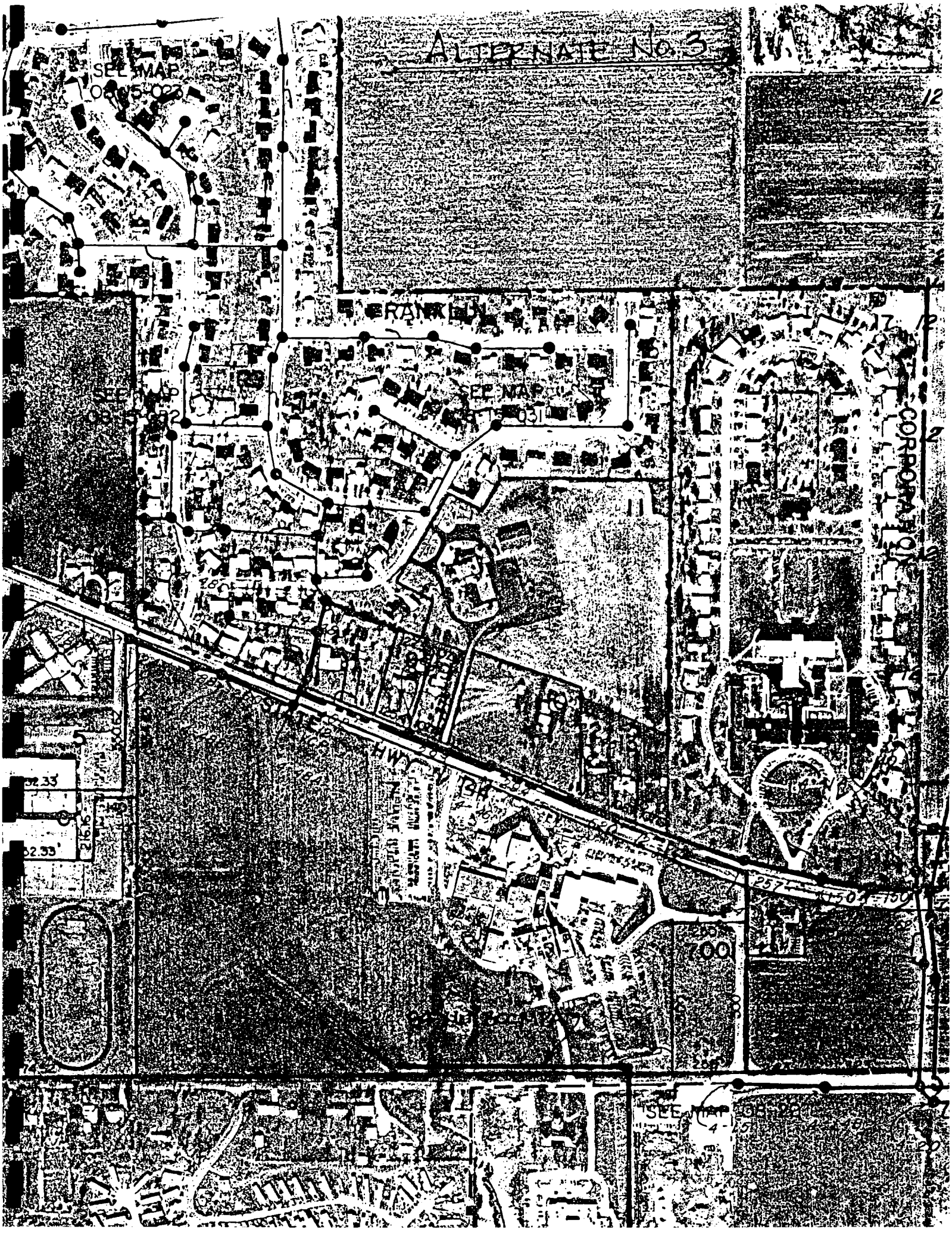
Construct 18" RCP outlet pipe east across Hospital and south across Highway Garage parallel to existing 54" CMP and construct detention basin north of Hospital Road with earth dike (no easements required)

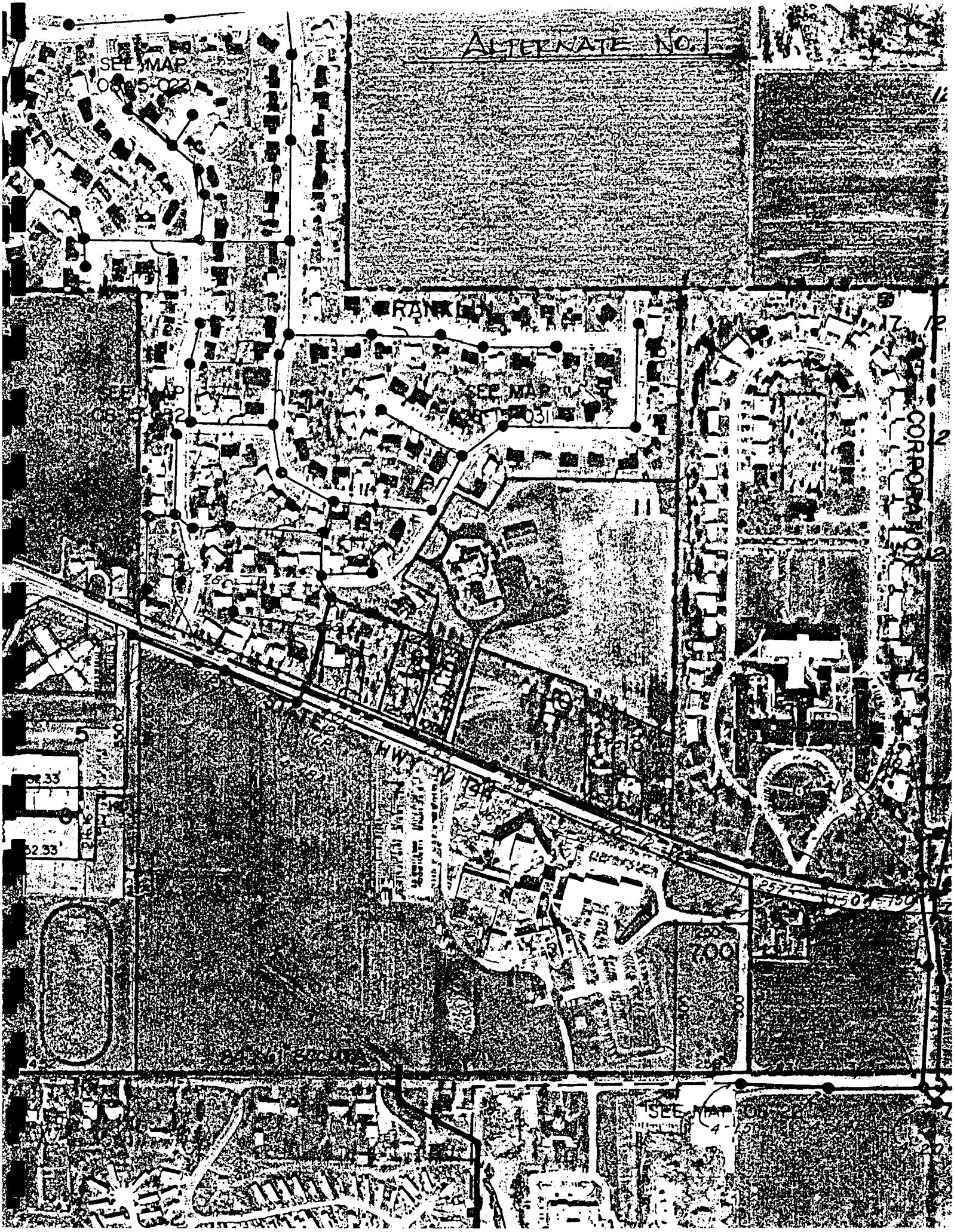
1500 LF – 18" RCP @ $20/ft. =		$ 30,000.00
Repair Hospital Road =		2,500.00
Earthwork: 4000 cys. @ $2.50/ =		10,000.00
Clearing ditch =		2,500.00
Outlet structures =		2,500.00
Seed and mulch =		5,000.00
Engineering and contingencies =		7,500.00
	Total cost	$ 60,000.00

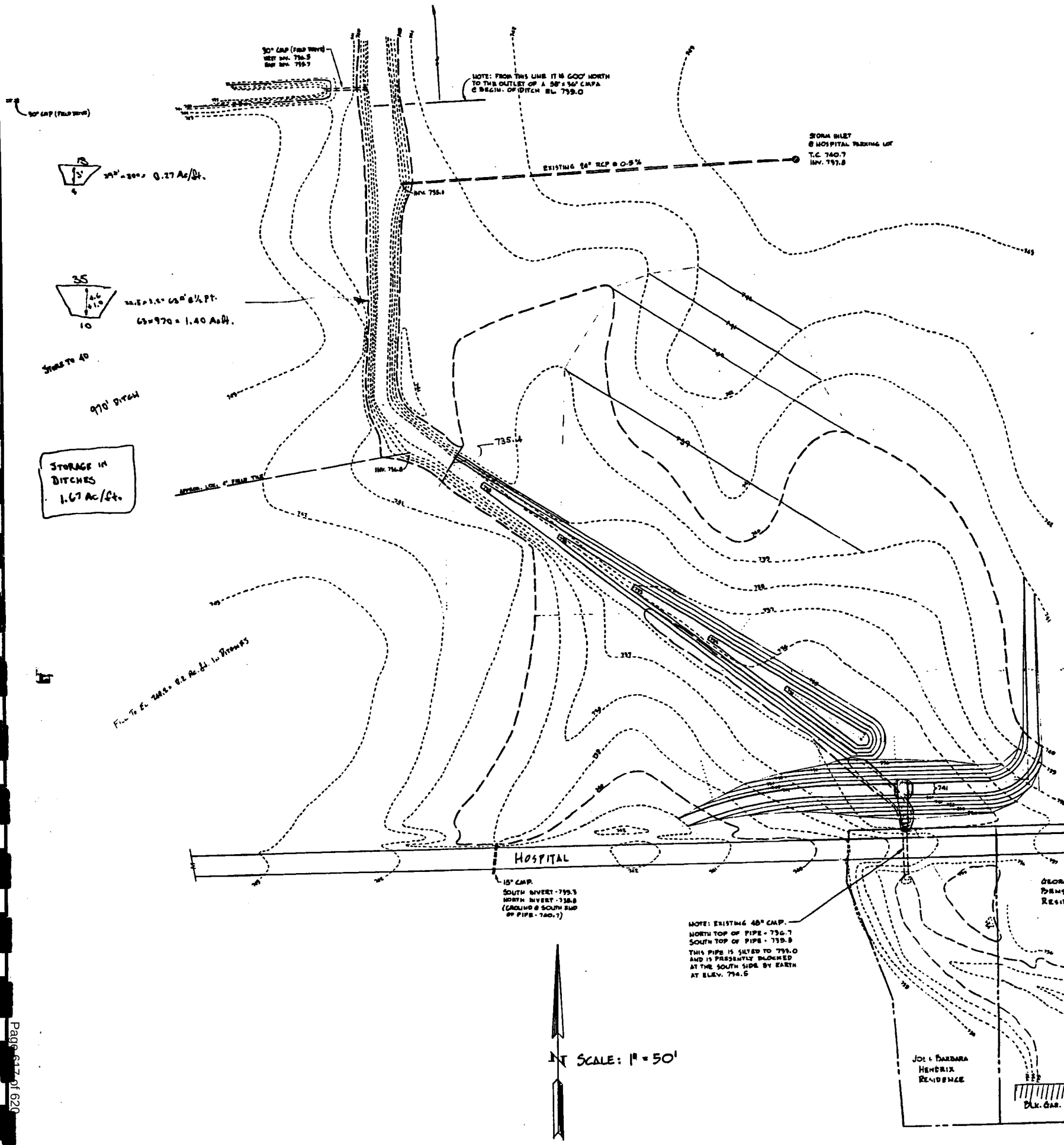
Time frame: 60 days


SEE MAP
08-15-02
FRANKLIN
SEE MAP
08-15-02
SEE MAP
08-15-03
CORPORATION
HWY
700
SEE MAP
08-22


SEE MAP
08-15-CR2
SEE MAP
03
CORPORATION
BOSTON
HWY
DET
BASIN
16" ECP
700
SEE MAP 06-22
21" RCP
54" RCP


ALTERNATE No. 3
SEE MAP
SEE MAP
SEE MAP
FRANK
CORPORATION
HWY
SEE MAP


ALTERNATE NO. 1
SEE MAP
08-15-023
SEE MAP
08-15-032
SEE MAP
08-15-031
RANK
CORPORATE
HWY
SEE MAP
08-15-021



Fill To El. 740.2 = 0.92 Ac/Ft. in Ditches

Fill To El. 740.2 = $\frac{45.46}{35.43}$ - 99.58 = 3508 A = 2 = 0.92 Ac/Ft.

Bldg - 740	$\frac{52.46}{35.43}$ - 30.82 = 3800 =	116,300	3.88 Ac/Ft	
739	$\frac{52.46}{35.43}$ - 45.46 = 6800 =	169,400	2.83	
738	51.00 - = 6800	63,688	1.56	
737	16.82 - = 6800	45,458	0.72	
736	9.45 - = 6800	24,138	0.42	
735	2.89 - = 6800 - 11,288		0.15	
734	0.35 - = 5700 - 695		0.01	
730 =	0.0 - = 5700			

Add To 740 = .0.70' = 5700 = 21,750 } - 0.50 Ac/Ft.
Add To 739 = 1.57 = 3270 = 15,375 } - 0.19 Ac/Ft.
0.0 — 0.0
0.69 Ac. Ft. Add @ North Side Cut

7.91
1.67
5.58 + .69 = 10.3 Ac-Ft. in Fill
+ 1.7 " " Ditches
12.0 Ac/Ft To Elev. 740.0
(To El. 740.1 = 12.4±

5' Bottom
Ditch Regrade - 470' @ 1.15%

DESIGNED:
DRAWN:
CHECKED:

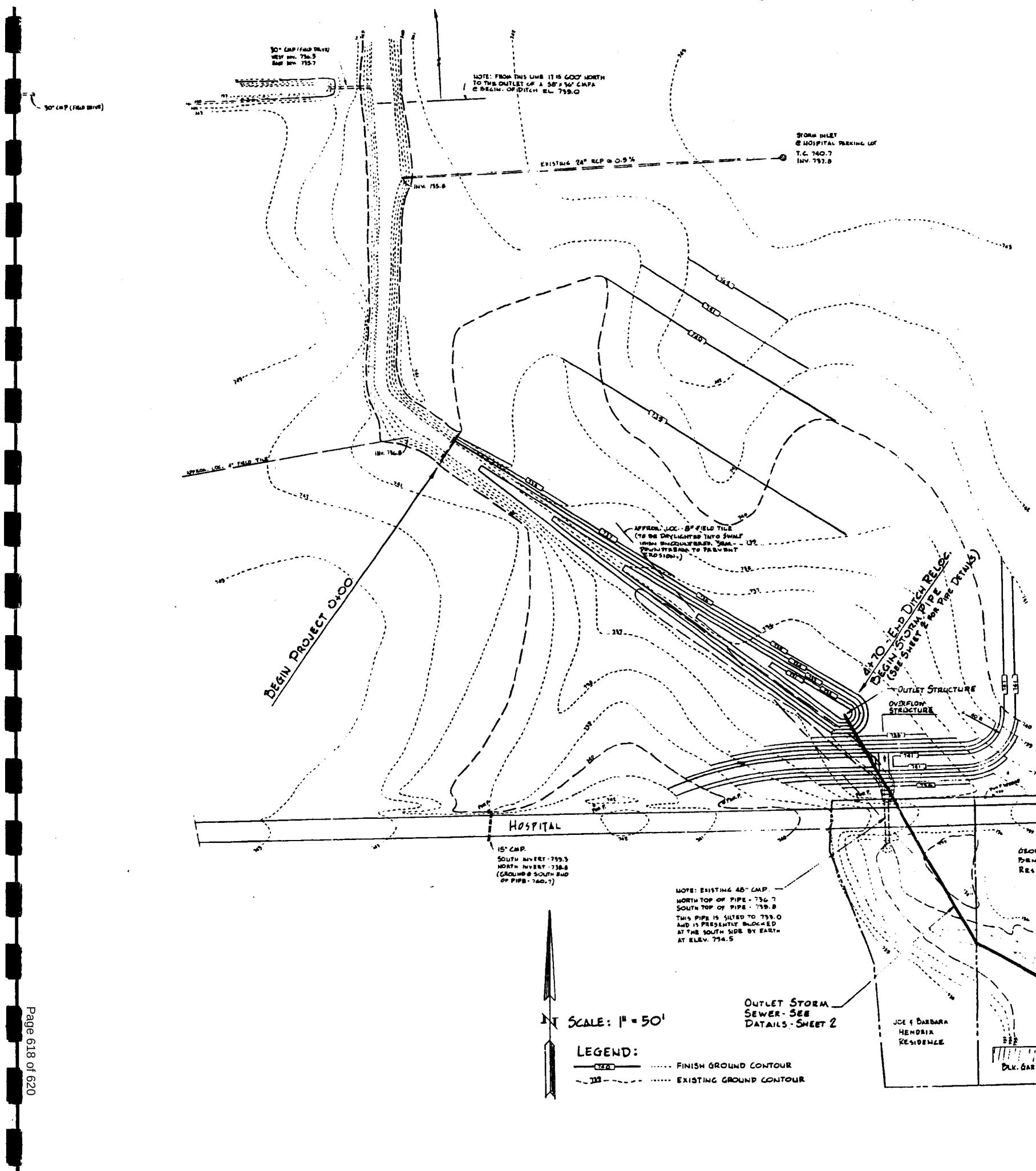
Engineers and Land Surveyors
Franklin Engineering Company
151 West Jefferson Street
Franklin, Indiana 46131
(317) 738-4549
(317) 736-7168

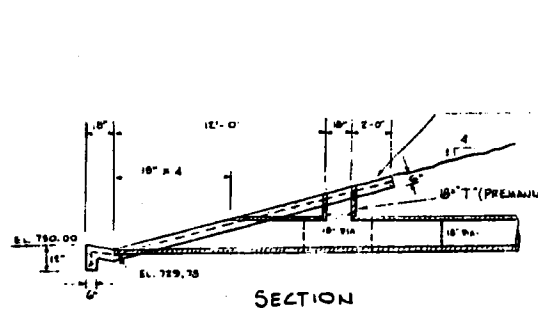
REVISIONS

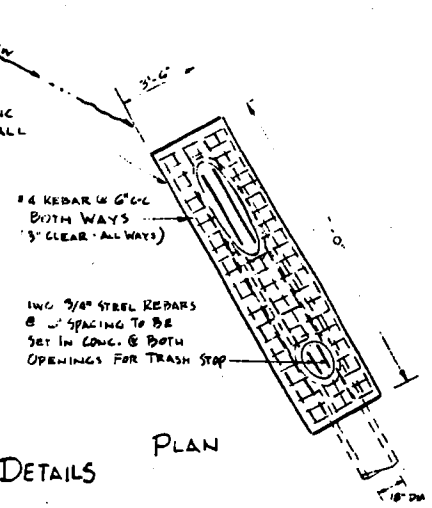
DATE	REVISION

PROJ. NO.
SCALE
DATE
FILE NO.
SHT OF

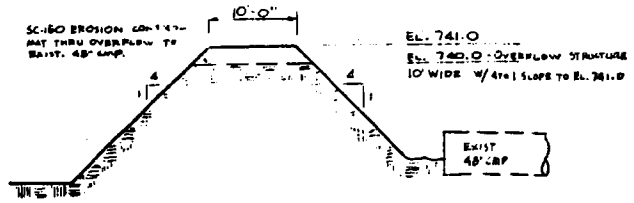
B.M. ELEV. 739.50 - FLOOR @ DOOR @ NORTH SIDE OF JUVENILE DET. CENTER.



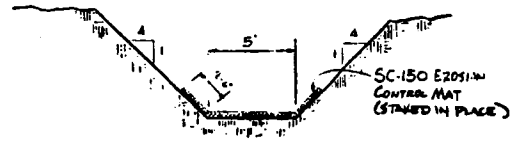




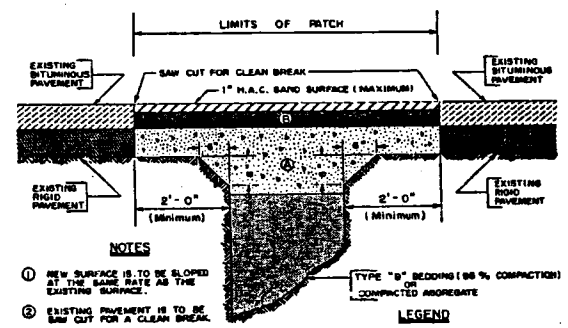
OUTLET STRUCTURE DETAILS
No Scale



DIKE DETAIL
No Scale



DITCH RELOCATION DETAIL
No Scale
470 Lft @ 1.15 %



NOTES

1. NEW SURFACE IS TO BE SLOPED AT THE SAME RATE AS THE EXISTING SURFACE.
2. EXISTING PAVEMENT IS TO BE SAW CUT FOR A CLEAN BREAK.
3. COMPACTED AGGREGATE IS TO BE LAID AT 6" LIFTS AND IS TO BE COMPACTED TO A MINIMUM OF 95%.
4. TRENCH SPOIL IS TO BE REMOVED FROM THE WORK SITE.
5. 1" H.A.C. SAND SURFACE (MAXIMUM)
6. BITUMINOUS TACK APPLIED AS PER "INDIANA DEPT. OF HIGHWAYS STANDARD SPECIFICATIONS - 1985" SECTION 409 & 902.

LEGEND

A. PLAIN CONCRETE IS TO BE FINISHED FLUSH TO THE EXISTING RIGID PAVEMENT.

B. HOT ASPHALTIC MATERIAL IS TO BE FINISHED FLUSH TO THE EXISTING BITUMINOUS MATERIAL AND IS TO BE COMPACTED AS REQUIRED IN THE "CUT ROAD SPECIAL PROVISIONS"

HOSPITAL ROAD REPAIR
No Scale

NOTE: BRUSH AND DEBRIS MAY BE BURIED ON SITE AT THE DIRECTION OF THE ENGINEER OR OWNER, OR HAULED AND DISPOSED OF AT A SUITABLE SITE ELSEWHERE.

JOHN B. WILLIAMS REGISTERED No. 17267 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGNED:
DRAWN:
CHECKED:

GENERAL PLAN

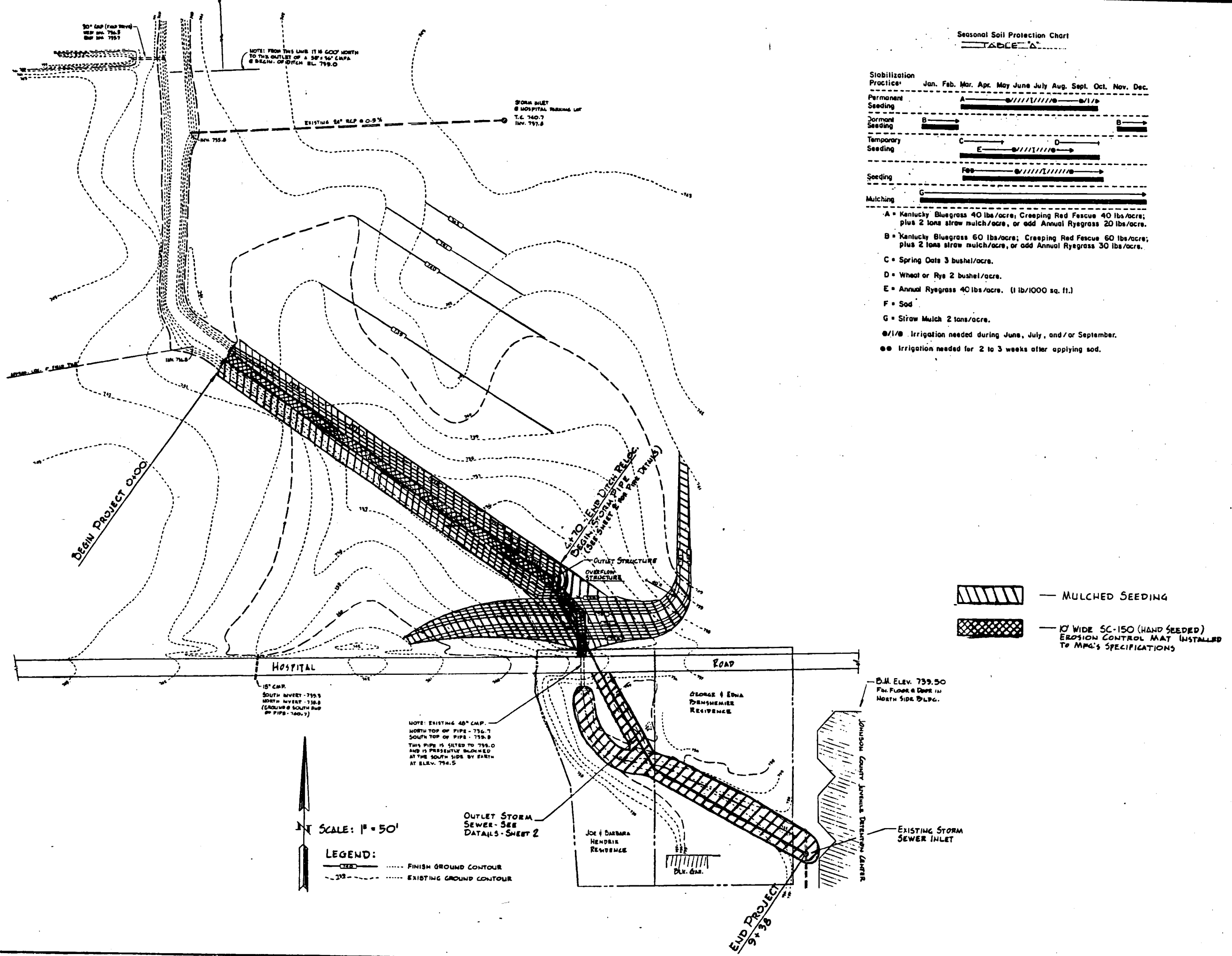
HOSPITAL ROAD STORM DETENTION FACILITY JOHNSON COUNTY, INDIANA

Engineers and Land Surveyors
Franklin Engineering Company
151 West Jefferson Street
Franklin, Indiana 46131
(317) 738-4549
(317) 736-7166

REVISIONS

DATE	REVISION

PROJ. NO. 91-895
SCALE 1" = 50'
DATE 12/6/91
FILE NO. 6743
SHT 1 OF 3



Seasonal Soil Protection Chart

TABLE "A"

Stabilization Practice*	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Permanent Seeding			A									
Dormant Seeding	B											B
Temporary Seeding			C			D						
			E									
Sodding			F••									
Mulching	G											

A = Kentucky Bluegrass 40 lbs/acre; Creeping Red Fescue 40 lbs/acre; plus 2 tons straw mulch/acre, or add Annual Ryegrass 20 lbs/acre.

B = Kentucky Bluegrass 60 lbs/acre; Creeping Red Fescue 60 lbs/acre; plus 2 tons straw mulch/acre, or add Annual Ryegrass 30 lbs/acre.

C = Spring Oats 3 bushel/acre.

D = Wheat or Rye 2 bushel/acre.

E = Annual Ryegrass 40 lbs/acre. (1 lb/1000 sq. ft.)

F = Sod

G = Straw Mulch 2 tons/acre.

•/I/• Irrigation needed during June, July, and/or September.

•• Irrigation needed for 2 to 3 weeks after applying sod.

EROSION CONTROL PLAN

HOSPITAL ROAD STORM DETENTION FACILITY
JOHNSON COUNTY, INDIANA

Steven B. Williams
Registered No. 17207
State of Indiana
Professional Engineer

Engineers and Land Surveyors
Franklin Engineering Company
151 West Jefferson Street
Franklin, Indiana 46131
(317) 738-4549
(317) 736-7168

DESIGNED:

DRAWN:

CHECKED:

REVISIONS

DATE	REVISION

PROJ. NO. 91-898

SCALE 1" = 50'

DATE 12/6/91

FILE NO. 6745

SHT 3 OF 3