Drainage Design Report

for

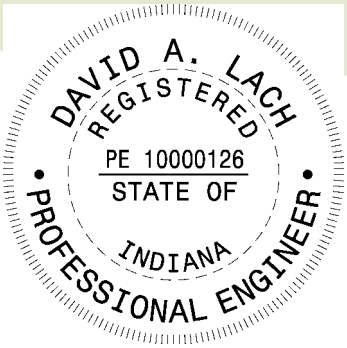
Indiana Masonic Home
Community Center

Franklin, Indiana

Prepared for:
Indiana Masonic Home
690 State Street
Franklin, Indiana 46131

May 15, 2014

Certified By:



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INDIANA PE 10000126

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DRAINAGE DESIGN SUMMARY
MASONIC HOME COMMUNITY CENTER

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Appendix A – Master Stormwater Drainage Design Report
Appendix B - Post-Developed Drainage Analysis
Appendix C – Water Quality

1.0 Introduction

This drainage report outlines the storm water management system that will serve the Masonic Home Community Center.

1.1 Project Description

The proposed initial improvements to the Masonic Home site consist of the Community Center building addition, new parking areas, driveways, utility relocations and landscaping.

1.2 Existing Conditions

The project site is located in the South watershed of the campus in accordance with the Master Drainage Plan that was approved with the Assisted Living Facility (ALF) addition. The site and drainage system to the existing detention pond drain to Young's Creek.

The Firm map panel numbers 18081C0231D and 18081C0233D, effective date August 2, 2007, indicates that the watershed lies within Zone X, "Areas determined to be outside of the 0.2% annual chance floodplain."

2.0 Post-Developed Drainage

The site has been designed in accordance with the previously approved Master Drainage Plan utilizing the existing storm water detention pond located south of the local improvements. The proposed impervious and pervious areas are in accordance with the Curve Number used in the design of the detention system.

2.1 Storm Sewer Network

Hydroflow was utilized to size the storm sewers for the proposed pipe networks for the Community Center Addition using the Rational Method. As part of the project design, the master storm drain trunk sewer is being installed to convey the runoff from the future development portion of the western watershed as well as the drainage from the Community Center Addition.

Please refer to Appendix B for the storm sewer calculations and basin map.

3.0 Water Quality Analysis

The post-developed site has been designed with the provision of water quality to remove 80% TSS. For the Community Center Addition, the water quality structure has

been sized for the local project improvements only. The future projects will be required to supply their own water quality treatment as those areas develop. The proposed treatment BMP is an Aqua-swirl concentrator, Model AS-2.

Please refer to Appendix C for the water quality calculations.

4.0 Conclusion

The proposed Community Center Addition has been designed in accordance with the previously approved Master Drainage Plan as part of the Assisted Living Facility project. Therefore, no adverse impacts are anticipated by these site improvements.

Appendix A

Master Stormwater Drainage Design Report

Drainage Design Report

for

Masonic Home Assisted Living Facility and Regional Detention Pond

Franklin, Indiana

Prepared for:
Masonic Home

April 8, 2010

Certified By:

David A. Lach, P.E., LEED, AP
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MASTER STORMWATER MANAGEMENT REPORT FOR MASONIC HOME SITE IMPROVEMENTS

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APPENDICIES

Appendix A – Pre-Developed Drainage Analysis
Appendix B - Post-Developed Drainage Analysis
Appendix C – Storm Sewer Design Calcs and Basin Map
Appendix D – Water Quality Calculations

1.0 Introduction

This drainage report outlines the storm water management system that will serve the Masonic Home Assisted Living Facility (ALF). The report will also outline the proposed regional detention pond that is being installed with the Assisted Living Facility (ALF) to provide storage capacity for the current improvements as well as provide additional storage capacity for future site improvements for the Masonic Home.

1.1 Project Description

The proposed initial improvements to the Masonic Home site consist of the ALF building addition, new parking areas, driveways, the reconstruction of an existing internal road and landscaping.

1.2 Existing Conditions

There are three watersheds being analyzed in this report. The West watershed contains 2.55 acres. The South watershed contains 22.98 acres. The East watershed contains 12.42 acres. All three watersheds drain to Young's Creek. The proposed improvements are contained within the South Watershed.

The soils maps from the US Department of Agriculture, Soil Conservation Service identifies the tributary watershed to contain six soils classifications. These are: Brookston silty clay loam (Br), Crosby Silt loam 0-2 percent slopes (CrA), Genesee loam (Ge), Hennepin loam 25-50 percent slopes (HeF), Miami clay loam 6-12 percent slopes, severely eroded (MtC3), Miami clay loam 12-18 percent slopes, severely eroded (MtD3), Ockley loam, 0-2 percent slopes (OcA), Ockley loam, 2-6 percent slopes, eroded (OcB2).

The Firm map panel numbers 18081C0231D and 18081C0233D, effective date August 2, 2007, indicates that the watershed lies within Zone X, "Areas determined to be outside of the 0.2% annual chance floodplain."

2.0 Hydrologic Method

The method used to generate runoff from the existing and proposed watersheds is the Soil Conservation Service (SCS) Hydrograph Method. This method calculates the peak storm flows for the 2-year, 10-year, and the 100-year storm event, which are used to determine the required storage volume to be provided by the detention pond.

2.1 Rainfall Distribution

The HUFF II Quartile Rainfall Distribution was used to calculate the storm water runoff for the pre- and post-developed conditions for the 1, 2, 3, 6, 12 and 24 hour storm durations.

2.2 Software

After the input data and rainfall have been estimated, *PondPack v9*, a hydraulic modeling program, is used to determine the peak flows and volumes using the SCS Unit Hydrograph Method. *PondPack v9* generates an individual hydrograph for each basin. The hydrographs are then added to generate runoff flows for ponds or to specific points of interest.

3.0 Pre-developed Conditions

3.1 Pre-developed Conditions

For all pre-developed analysis, the Masonic Home facilities were analyzed in the current state as of the date of the most recent topographic survey. This date is June 1, 2009. The impervious surface is modeled as impervious surface (CN=98), the pervious surface (open space) is modeled in the calculations as pasture, meadow, brush or woods ground cover types in good hydrologic condition as noted in the Subdivision Control Ordinance (S.C.O.). The allowable release rates are determined as follows:

10yr. post <= 2yr. pre
100yr. post <= 10yr. pre

The existing peak runoff rates from the three existing watersheds are as follows:

West Basin	**South Basin**	**East Basin**
2yr. = 0.47 cfs	2yr. = 3.90 cfs	2yr. = 2.54 cfs
10yr. = 1.50 cfs	10yr. = 11.62 cfs	10yr. = 8.10 cfs

For the pond analysis, the allowable release rates for the site are the sum of the West and South Basin peak runoff rates. This is due to the future collection of the West Basin in future build out. The East Basin is not included because it currently drains through an existing storm sewer south, then east along the north side of the treatment, discharges to a roadside ditch, then travels south to a tributary to Young's Creek prior to discharging to Young's Creek 2500' downstream of the proposed outlet location. The allowable release rates for the site are as follows:

10yr. post allowable = 4.37 cfs
100yr. post allowable = 13.12 cfs

Please refer to Appendix A for the pre-developed drainage analysis calculations and basin map.

4.0 Post-Developed Drainage Analysis

The post-developed drainage analysis consists of one regional detention pond to control the amount of runoff releasing from the proposed ALF site and associated improvements. Additional storage is maintained in the pond for future development of the Masonic Home property.

The master planned detention pond is being proposed in the South basin to account for as much of the increases in the impervious surface as possible in the master plan. The West watershed will be taken to the South Watershed by future storm sewer network through the master planned detention pond. This is shown on the post-developed basin map (Appendix B) as future storm sewer conveyance. A large portion of the East basin will also be taken to the master planned detention pond as future development occurs. A stub has been provided for future connection. It is a wet detention facility with a normal pool area of 0.87 acres. It will be built with the incorporation of the ALF to the Masonic Home. It is designed to release the 10yr. and 100yr. post-developed peak discharges at lower rates that the allowable 2yr. and 10yr. pre-developed peak discharges, respectively.

4.1 Post-Developed Site Conditions Peak Flow Rates at Discharge Points

The following summarizes the peak flow rates released from the site in the proposed condition for the fully master planned detention basin. The results are as follows:

South Basin
10yr. = 3.16 cfs
100yr. = 9.23 cfs

These results show that the post developed release rates for the master planned detention pond are lower than the allowable release rates.

Please refer to Appendix B for the post-developed drainage analysis calculations and basin map.

4.2 Storm Sewer Network

Stormcad was utilized to size the storm sewers for the proposed pipe networks for the ALF using the Rational Method.

Please refer to Appendix C for the storm sewer calculations and basin map.

4.3 Emergency Spillway

An emergency spillway has been designed for the pond in the event that the outlet structure gets completely clogged and is unable to discharge the rainfall. It has been designed to pass 1.25 times the peak discharge into the pond.

Please refer to Appendix B for the emergency spillway sizing calculation.

5.0 Water Quality Analysis

The post-developed site has been designed with the provision of water quality to remove 80% TSS. For the Assisted Living Facility and proposed future East basin watershed areas being routed through proposed storm sewer network, a hydrodynamic separator was chosen as the appropriate post-construction best management practice (BMP). The water quality treatment flow from the first inch of runoff from the proposed ALF site and future east basin areas has been calculated to be 9.49 cfs. An Aqua-swirl AS-8 has been chosen to provide treatment to the stormwater prior to discharging into the pond. The AS-8 can accommodate up to 11.2 cfs.

When the future West basin area is developed and future conveyance is run, an additional hydrodynamic separator will be designed and incorporated in the site to provide adequate stormwater treatment prior to discharging into the wet pond detention facility.

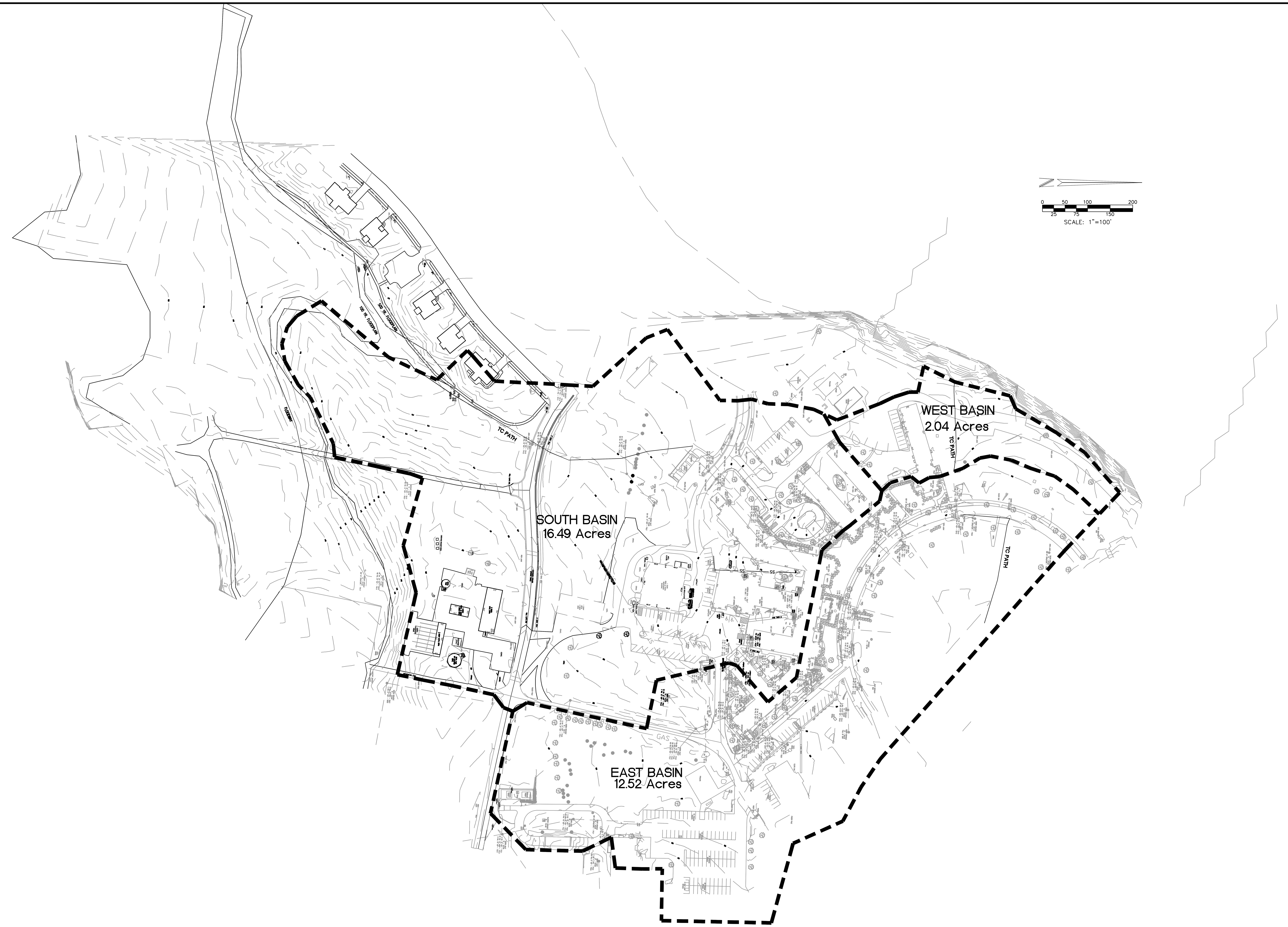
Please refer to Appendix D for the water quality calculations.

6.0 Conclusions

The proposed regional detention facility has been designed to provide adequate storage for the proposed ALF improvements for the Masonic Home as well as for future improvements. Any further developments outside of the watershed presented will need to provide detention and be designed in accordance with City of Franklin standards. Therefore, no adverse impacts are anticipated by these site improvements.

Appendix A

Pre-Developed Drainage Analysis



EXISTING DRAINAGE ANALYSIS

ASSISTED LIVING FACILITY

MASONIC HOME

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Project Address 02

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Sheet EX-1

Date 04-08-10

Project Number 0090364-20010

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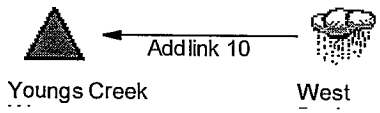
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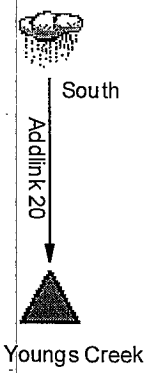
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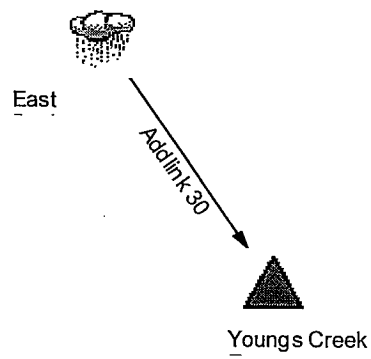
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JOB TITLE
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Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

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MASTER DESIGN STORM SUMMARY

Network Storm Collection: Indy 2Q

Return Event	Total Depth in	Rainfall Type	RNF ID
230	1.0000	Synthetic Curve	Indy Huff 2Q 30m
21	1.2500	Synthetic Curve	Indy Huff 2Q 1hr
22	1.5200	Synthetic Curve	Indy Huff 2Q 2hr
23	1.6800	Synthetic Curve	Indy Huff 2Q 3hr
26	1.9800	Synthetic Curve	Indy Huff 2Q 6hr
212	2.4000	Synthetic Curve	Indy Huff 2Q 12h
224	2.6400	Synthetic Curve	Indy Huff 2Q 24h
1030	1.5500	Synthetic Curve	Indy Huff 2Q 30m
101	1.9600	Synthetic Curve	Indy Huff 2Q 1hr
102	2.4000	Synthetic Curve	Indy Huff 2Q 2hr
103	2.6400	Synthetic Curve	Indy Huff 2Q 3hr
106	3.1200	Synthetic Curve	Indy Huff 2Q 6hr
1012	3.6000	Synthetic Curve	Indy Huff 2Q 12h
1024	4.0800	Synthetic Curve	Indy Huff 2Q 24h
10030	2.2500	Synthetic Curve	Indy Huff 2Q 30m
1001	2.8800	Synthetic Curve	Indy Huff 2Q 1hr
1002	3.5000	Synthetic Curve	Indy Huff 2Q 2hr
1003	3.8700	Synthetic Curve	Indy Huff 2Q 3hr
1006	4.5000	Synthetic Curve	Indy Huff 2Q 6hr
10012	5.1600	Synthetic Curve	Indy Huff 2Q 12h
10024	6.0000	Synthetic Curve	Indy Huff 2Q 24h

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
EAST BASIN	AREA	2	.050		.5500	1.79		
EAST BASIN	AREA	2	.122		.9500	2.54		
EAST BASIN	AREA	2	.227		1.2000	2.31		
EAST BASIN	AREA	2	.300		1.6000	2.30		
EAST BASIN	AREA	2	.456		3.0500	1.92		
EAST BASIN	AREA	2	.708		6.0000	1.61		
EAST BASIN	AREA	2	.865		10.8000	.97		
EAST BASIN	AREA	10	.240		.5500	7.62		
EAST BASIN	AREA	10	.445		.7000	8.10		
EAST BASIN	AREA	10	.708		1.1000	7.94		
EAST BASIN	AREA	10	.865		1.5500	6.98		
EAST BASIN	AREA	10	1.205		2.8000	5.11		
EAST BASIN	AREA	10	1.570		6.0000	3.39		
EAST BASIN	AREA	10	1.956		10.8000	2.14		
EAST BASIN	AREA	100	.614		.5000	18.61		
EAST BASIN	AREA	100	1.031		.6500	19.26		
EAST BASIN	AREA	100	1.493		1.0500	17.10		
EAST BASIN	AREA	100	1.785		1.5000	14.39		
EAST BASIN	AREA	100	2.306		2.7500	9.63		
EAST BASIN	AREA	100	2.877		4.8500	5.92		
EAST BASIN	AREA	100	3.630		10.8000	3.82		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
SOUTH BASIN	AREA	2	.096		.6000	2.74		
SOUTH BASIN	AREA	2	.210		1.0000	3.90		
SOUTH BASIN	AREA	2	.368		1.2500	3.60		
SOUTH BASIN	AREA	2	.476		1.6500	3.52		
SOUTH BASIN	AREA	2	.702		3.0000	2.91		
SOUTH BASIN	AREA	2	1.060		6.0500	2.35		
SOUTH BASIN	AREA	2	1.281		10.8500	1.42		
SOUTH BASIN	AREA	10	.387		.6000	10.32		
SOUTH BASIN	AREA	10	.687		.8500	11.62		
SOUTH BASIN	AREA	10	1.060		1.1500	11.09		
SOUTH BASIN	AREA	10	1.281		1.6000	9.92		
SOUTH BASIN	AREA	10	1.755		2.8500	7.28		
SOUTH BASIN	AREA	10	2.259		6.0000	4.75		
SOUTH BASIN	AREA	10	2.788		10.8000	3.00		
SOUTH BASIN	AREA	100	.926		.5500	24.09		
SOUTH BASIN	AREA	100	1.515		.7500	25.60		
SOUTH BASIN	AREA	100	2.152		1.1000	23.03		
SOUTH BASIN	AREA	100	2.553		1.5500	19.85		
SOUTH BASIN	AREA	100	3.266		2.8000	13.38		
SOUTH BASIN	AREA	100	4.040		4.9000	8.23		
SOUTH BASIN	AREA	100	5.056		10.8000	5.24		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
WEST BASIN	AREA	2	.010		.5500	.38		
WEST BASIN	AREA	2	.023		.9000	.47		
WEST BASIN	AREA	2	.041		1.1000	.44		
WEST BASIN	AREA	2	.054		1.5500	.43		
WEST BASIN	AREA	2	.080		2.8000	.34		
WEST BASIN	AREA	2	.123		5.9500	.28		
WEST BASIN	AREA	2	.150		10.8000	.17		
WEST BASIN	AREA	10	.043		.5000	1.46		
WEST BASIN	AREA	10	.079		.6500	1.50		
WEST BASIN	AREA	10	.123		1.0500	1.43		
WEST BASIN	AREA	10	.150		1.5000	1.23		
WEST BASIN	AREA	10	.207		2.7500	.88		
WEST BASIN	AREA	10	.268		6.0000	.58		
WEST BASIN	AREA	10	.332		10.8000	.36		
WEST BASIN	AREA	100	.107		.4500	3.41		
WEST BASIN	AREA	100	.177		.6000	3.51		
WEST BASIN	AREA	100	.255		1.0500	2.99		
WEST BASIN	AREA	100	.303		1.4500	2.47		
WEST BASIN	AREA	100	.390		2.7500	1.63		
WEST BASIN	AREA	100	.484		4.8000	1.00		
WEST BASIN	AREA	100	.608		10.8000	.64		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*YOUNGS CREEK E	JCT	2	.050		.5500	1.79		
*YOUNGS CREEK E	JCT	2	.122		.9500	2.54		
*YOUNGS CREEK E	JCT	2	.227		1.2000	2.31		
*YOUNGS CREEK E	JCT	2	.300		1.6000	2.30		
*YOUNGS CREEK E	JCT	2	.456		3.0500	1.92		
*YOUNGS CREEK E	JCT	2	.708		6.0000	1.61		
*YOUNGS CREEK E	JCT	2	.865		10.8000	.97		
*YOUNGS CREEK E	JCT	10	.240		.5500	7.62		
*YOUNGS CREEK E	JCT	10	.445		.7000	8.10		
*YOUNGS CREEK E	JCT	10	.708		1.1000	7.94		
*YOUNGS CREEK E	JCT	10	.865		1.5500	6.98		
*YOUNGS CREEK E	JCT	10	1.205		2.8000	5.11		
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*YOUNGS CREEK E	JCT	100	.614		.5000	18.61		
*YOUNGS CREEK E	JCT	100	1.031		.6500	19.26		
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*YOUNGS CREEK E	JCT	100	1.785		1.5000	14.39		
*YOUNGS CREEK E	JCT	100	2.306		2.7500	9.63		
*YOUNGS CREEK E	JCT	100	2.877		4.8500	5.92		
*YOUNGS CREEK E	JCT	100	3.630		10.8000	3.82		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*YOUNGS CREEK S	JCT	2	.096		.6000	2.74		
*YOUNGS CREEK S	JCT	2	.210		1.0000	3.90		
*YOUNGS CREEK S	JCT	2	.368		1.2500	3.60		
*YOUNGS CREEK S	JCT	2	.476		1.6500	3.52		
*YOUNGS CREEK S	JCT	2	.702		3.0000	2.91		
*YOUNGS CREEK S	JCT	2	1.060		6.0500	2.35		
*YOUNGS CREEK S	JCT	2	1.281		10.8500	1.42		
*YOUNGS CREEK S	JCT	10	.387		.6000	10.32		
*YOUNGS CREEK S	JCT	10	.687		.8500	11.62		
*YOUNGS CREEK S	JCT	10	1.060		1.1500	11.09		
*YOUNGS CREEK S	JCT	10	1.281		1.6000	9.92		
*YOUNGS CREEK S	JCT	10	1.755		2.8500	7.28		
*YOUNGS CREEK S	JCT	10	2.259		6.0000	4.75		
*YOUNGS CREEK S	JCT	10	2.788		10.8000	3.00		
*YOUNGS CREEK S	JCT	100	.926		.5500	24.09		
*YOUNGS CREEK S	JCT	100	1.515		.7500	25.60		
*YOUNGS CREEK S	JCT	100	2.152		1.1000	23.03		
*YOUNGS CREEK S	JCT	100	2.553		1.5500	19.85		
*YOUNGS CREEK S	JCT	100	3.266		2.8000	13.38		
*YOUNGS CREEK S	JCT	100	4.040		4.9000	8.23		
*YOUNGS CREEK S	JCT	100	5.056		10.8000	5.24		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*YOUNGS CREEK W	JCT	2	.010		.5500	.38		
*YOUNGS CREEK W	JCT	2	.023		.9000	.47		
*YOUNGS CREEK W	JCT	2	.041		1.1000	.44		
*YOUNGS CREEK W	JCT	2	.054		1.5500	.43		
*YOUNGS CREEK W	JCT	2	.080		2.8000	.34		
*YOUNGS CREEK W	JCT	2	.123		5.9500	.28		
*YOUNGS CREEK W	JCT	2	.150		10.8000	.17		
*YOUNGS CREEK W	JCT	10	.043		.5000	1.46		
*YOUNGS CREEK W	JCT	10	.079		.6500	1.50		
*YOUNGS CREEK W	JCT	10	.123		1.0500	1.43		
*YOUNGS CREEK W	JCT	10	.150		1.5000	1.23		
*YOUNGS CREEK W	JCT	10	.207		2.7500	.88		
*YOUNGS CREEK W	JCT	10	.268		6.0000	.58		
*YOUNGS CREEK W	JCT	10	.332		10.8000	.36		
*YOUNGS CREEK W	JCT	100	.107		.4500	3.41		
*YOUNGS CREEK W	JCT	100	.177		.6000	3.51		
*YOUNGS CREEK W	JCT	100	.255		1.0500	2.99		
*YOUNGS CREEK W	JCT	100	.303		1.4500	2.47		
*YOUNGS CREEK W	JCT	100	.390		2.7500	1.63		
*YOUNGS CREEK W	JCT	100	.484		4.8000	1.00		
*YOUNGS CREEK W	JCT	100	.608		10.8000	.64		

Type.... Design Storms
Name.... Indy 2Q

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 230

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 30m
Storm Frequency = 2 yr
Total Rainfall Depth= 1.0000 in
Duration Multiplier = 1
Resulting Duration = .5000 hrs
Resulting Start Time= .0000 hrs Step= .0250 hrs End= .5000 hrs

Storm Tag Name = 21

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 1hr
Storm Frequency = 2 yr
Total Rainfall Depth= 1.2500 in
Duration Multiplier = 1
Resulting Duration = 1.0000 hrs
Resulting Start Time= .0000 hrs Step= .0500 hrs End= 1.0000 hrs

Storm Tag Name = 22

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 2hr
Storm Frequency = 2 yr
Total Rainfall Depth= 1.5200 in
Duration Multiplier = 1
Resulting Duration = 2.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 2.0000 hrs

Storm Tag Name = 23

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 3hr
Storm Frequency = 2 yr
Total Rainfall Depth= 1.6800 in
Duration Multiplier = 1
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 26

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 6hr
Storm Frequency = 2 yr
Total Rainfall Depth= 1.9800 in
Duration Multiplier = 1
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 212

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 12h
Storm Frequency = 2 yr
Total Rainfall Depth= 2.4000 in
Duration Multiplier = 1
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 12.0000 hrs

Storm Tag Name = 224

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 24h
Storm Frequency = 2 yr
Total Rainfall Depth= 2.6400 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

Storm Tag Name = 1030

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 30m
Storm Frequency = 10 yr
Total Rainfall Depth= 1.5500 in
Duration Multiplier = 1
Resulting Duration = .5000 hrs
Resulting Start Time= .0000 hrs Step= .0250 hrs End= .5000 hrs

Storm Tag Name = 101

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 1hr
Storm Frequency = 10 yr
Total Rainfall Depth= 1.9600 in
Duration Multiplier = 1
Resulting Duration = 1.0000 hrs
Resulting Start Time= .0000 hrs Step= .0500 hrs End= 1.0000 hrs

Storm Tag Name = 102

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 2hr
Storm Frequency = 10 yr
Total Rainfall Depth= 2.4000 in
Duration Multiplier = 1
Resulting Duration = 2.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 2.0000 hrs

Type.... Design Storms
Name.... Indy 2Q

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 103

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 3hr
Storm Frequency = 10 yr
Total Rainfall Depth= 2.6400 in
Duration Multiplier = 1
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 106

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 6hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.1200 in
Duration Multiplier = 1
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

Storm Tag Name = 1012

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 12h
Storm Frequency = 10 yr
Total Rainfall Depth= 3.6000 in
Duration Multiplier = 1
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 12.0000 hrs

Storm Tag Name = 1024

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 24h
Storm Frequency = 10 yr
Total Rainfall Depth= 4.0800 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

Storm Tag Name = 10030

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 30m
Storm Frequency = 100 yr
Total Rainfall Depth= 2.2500 in
Duration Multiplier = 1
Resulting Duration = .5000 hrs
Resulting Start Time= .0000 hrs Step= .0250 hrs End= .5000 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 1001

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 1hr
Storm Frequency = 100 yr
Total Rainfall Depth= 2.8800 in
Duration Multiplier = 1
Resulting Duration = 1.0000 hrs
Resulting Start Time= .0000 hrs Step= .0500 hrs End= 1.0000 hrs

Storm Tag Name = 1002

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 2hr
Storm Frequency = 100 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 2.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 2.0000 hrs

Storm Tag Name = 1003

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 3hr
Storm Frequency = 100 yr
Total Rainfall Depth= 3.8700 in
Duration Multiplier = 1
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 1006

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 6hr
Storm Frequency = 100 yr
Total Rainfall Depth= 4.5000 in
Duration Multiplier = 1
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

Storm Tag Name = 10012

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 12h
Storm Frequency = 100 yr
Total Rainfall Depth= 5.1600 in
Duration Multiplier = 1
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 12.0000 hrs

Type.... Design Storms
Name.... Indy 2Q

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 10024

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 24h
Storm Frequency = 100 yr
Total Rainfall Depth= 6.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6600	in
Slope	.020000	ft/ft
Avg.Velocity	.11	ft/sec

Segment #1 Time: .2609 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	139.00	ft
Slope	.020000	ft/ft
Unpaved		
Avg.Velocity	2.28	ft/sec

Segment #2 Time: .0169 hrs

Segment #3: Tc: TR-55 Shallow

Hydraulic Length	103.00	ft
Slope	.010000	ft/ft
Paved		
Avg.Velocity	2.03	ft/sec

Segment #3 Time: .0141 hrs

==========
Total Tc: .2919 hrs
==========

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.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, %

==== 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.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	100.00 ft
2yr, 24hr P	2.6600 in
Slope	.010000 ft/ft
Avg.Velocity	.08 ft/sec

Segment #1 Time: .3442 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	222.00 ft
Slope	.016000 ft/ft
Unpaved	
Avg.Velocity	2.04 ft/sec

Segment #2 Time: .0302 hrs

Segment #3: Tc: Length & Vel.

Hydraulic Length	252.00 ft
Avg.Velocity	4.00 ft/sec

Segment #3 Time: .0175 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

Segment #4: Tc: TR-55 Channel

Flow Area	16.0000	sq.ft
Wetted Perimeter	28.66	ft
Hydraulic Radius	.56	ft
Slope	.015000	ft/ft
Mannings n	.0250	
Hydraulic Length	105.00	ft
Avg.Velocity	4.95	ft/sec

Segment #4 Time: .0059 hrs

Total Tc: .3978 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.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, %

==== 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.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.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

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

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

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

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6600	in
Slope	.025000	ft/ft

Avg.Velocity .12 ft/sec

Segment #1 Time: .2386 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	18.00	ft
Slope	.015000	ft/ft

Unpaved

Avg.Velocity 1.98 ft/sec

Segment #2 Time: .0025 hrs

Segment #3: Tc: TR-55 Shallow

Hydraulic Length	24.00	ft
Slope	.020000	ft/ft

Unpaved

Avg.Velocity 2.28 ft/sec

Segment #3 Time: .0029 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

Segment #4: Tc: TR-55 Shallow

Hydraulic Length 60.00 ft
Slope .100000 ft/ft
Unpaved

Avg.Velocity 5.10 ft/sec

Segment #4 Time: .0033 hrs

Total Tc: .2473 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.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, %

==== 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.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
impervious	98	4.480			98.00
Pasture, grassland, or range - good	61	5.630			61.00
Pasture, grassland, or range - good	74	2.410			74.00
COMPOSITE AREA & WEIGHTED CN --->		12.520			76.74 (77)

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
impervious	98	6.060			98.00
Pasture, grassland, or range - good	61	4.950			61.00
Pasture, grassland, or range - good	74	5.480			74.00
COMPOSITE AREA & WEIGHTED CN --->		16.490			78.92 (79)

File.... O:\2009\090364\20010\calcs\Engr\Detention\EX DRNG 04-06-10.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
impervious	98	.760			98.00
Pasture, grassland, or range - good	74	.570			74.00
Pasture, grassland, or range - good	61	.710			61.00
COMPOSITE AREA & WEIGHTED CN --->		2.040			78.42 (78)

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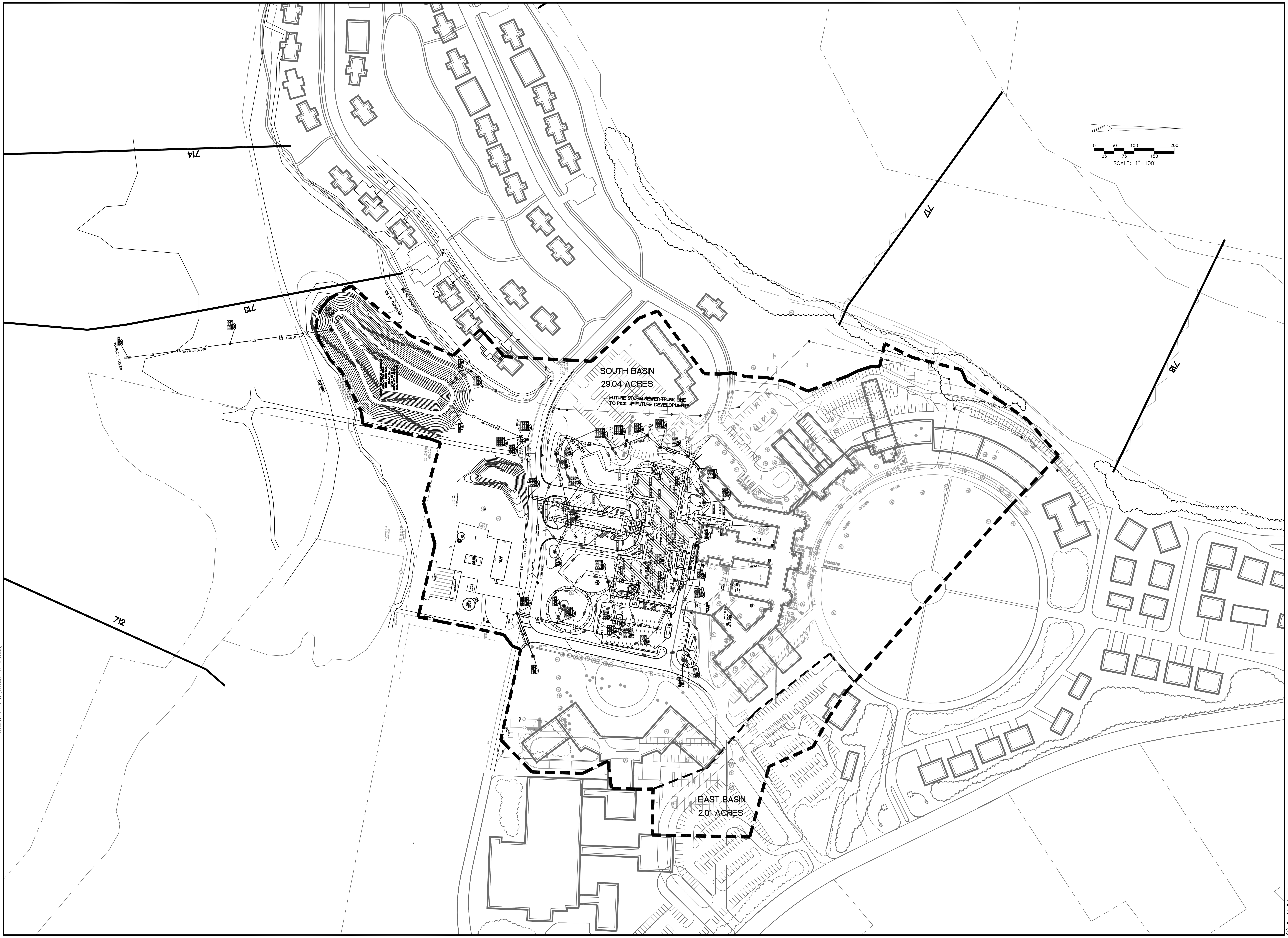
Appendix B

Post-Developed Drainage Analysis for Master Planned Detention Pond



Revisions

Mark	Date	Description
	-	
	-	
	-	
	-	
	-	

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- LAND SURVEYING
- GIS
- OWNER'S REPRESENTATION

PROPOSED DRAINAGE ANALYSIS

ASSISTED LIVING FACILITY

MASONIC HOME

Project Address 01
Project Address 02

CERTIFIED BY:

Date 00-00-00

COVERING
PROPOSED DRAINAGE ANALYSIS
DESIGN

"HOLEY MOLEY" SAYS CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU DIG
IT'S THE LAW
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CALL TOLL FREE
1-800-428-5200
FOR CALLS OUTSIDE OF INDIANA

Drawn By: --

Checked By: --

Quality Assurance: --

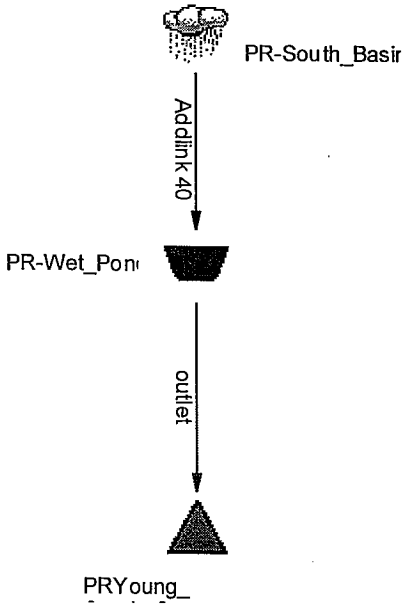
Scale: 0 Scale: 1" = ##

Sheet PR-1

Date 04-08-10

Project Number 0090364-20010

PROPOSED



Job File: O:\2009\090364\20010\calcs\Engr\Detention\PR DRNG 04-06-10_TW COND.PPW
Rain Dir: O:\2009\090364\20010\calcs\Engr\Detention\

==========
JOB TITLE
==========

Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

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MASTER DESIGN STORM SUMMARY

Network Storm Collection: Indy 2Q

Return Event	Total Depth in	Rainfall Type	RNF ID
101	1.9600	Synthetic Curve	Indy Huff 2Q 1hr
102	2.4000	Synthetic Curve	Indy Huff 2Q 2hr
103	2.6400	Synthetic Curve	Indy Huff 2Q 3hr
106	3.1200	Synthetic Curve	Indy Huff 2Q 6hr
1012	3.6000	Synthetic Curve	Indy Huff 2Q 12h
1024	4.0800	Synthetic Curve	Indy Huff 2Q 24h
1001	2.8800	Synthetic Curve	Indy Huff 2Q 1hr
1002	3.5000	Synthetic Curve	Indy Huff 2Q 2hr
1003	3.8700	Synthetic Curve	Indy Huff 2Q 3hr
1006	4.5000	Synthetic Curve	Indy Huff 2Q 6hr
10012	5.1600	Synthetic Curve	Indy Huff 2Q 12h
10024	6.0000	Synthetic Curve	Indy Huff 2Q 24h

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 70 loops
ICPM Time Step = .0500 hrs
Output Time Step = .0500 hrs
ICPM Ending Time = 48.0000 hrs

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 70 loops
ICPM Time Step = .0500 hrs
Output Time Step = .0500 hrs
ICPM Ending Time = 48.0000 hrs

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
PR-SOUTH_BASIN	AREA	10	2.259		.5500	49.84		
PR-SOUTH_BASIN	AREA	10	3.137		.9500	37.75		
PR-SOUTH_BASIN	AREA	10	3.635		1.4000	29.65		
PR-SOUTH_BASIN	AREA	10	4.659		2.7000	19.10		
PR-SOUTH_BASIN	AREA	10	5.712		4.8000	11.74		
PR-SOUTH_BASIN	AREA	10	6.784		7.2000	6.94		
PR-SOUTH_BASIN	AREA	100	4.144		.5500	90.97		
PR-SOUTH_BASIN	AREA	100	5.490		.9500	64.96		
PR-SOUTH_BASIN	AREA	100	6.313		1.3500	50.02		
PR-SOUTH_BASIN	AREA	100	7.736		1.8500	30.76		
PR-SOUTH_BASIN	AREA	100	9.247		4.8000	18.62		
PR-SOUTH_BASIN	AREA	100	11.195		7.2000	11.82		
PR-WET_POND	POND	10	2.259		.5500	49.84		
PR-WET_POND	POND	10	3.137		.9500	37.75		
PR-WET_POND	POND	10	3.635		1.4000	29.65		
PR-WET_POND	POND	10	4.659		2.7000	19.10		
PR-WET_POND	POND	10	5.712		4.8000	11.74		
PR-WET_POND	POND	10	6.784		7.2000	6.94		
PR-WET_POND	POND	100	4.144		.5500	90.97		
PR-WET_POND	POND	100	5.490		.9500	64.96		
PR-WET_POND	POND	100	6.313		1.3500	50.02		
PR-WET_POND	POND	100	7.736		1.8500	30.76		
PR-WET_POND	POND	100	9.247		4.8000	18.62		
PR-WET_POND	POND	100	11.195		7.2000	11.82		

ICPM CALCULATION TOLERANCES

Target Convergence= .000 cfs +/-
Max. Iterations = 70 loops
ICPM Time Step = .0500 hrs
Output Time Step = .0500 hrs
ICPM Ending Time = 48.0000 hrs

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
PR-WET_POND	OUT POND	10	2.116		1.2000	2.29	712.19	2.118
PR-WET_POND	OUT POND	10	2.976		2.1500	2.67	712.87	2.853
PR-WET_POND	OUT POND	10	3.464		3.1500	2.83	713.17	3.198
PR-WET_POND	OUT POND	10	4.467		6.0500	3.04	713.62	3.723
PR-WET_POND	OUT POND	10	5.481		8.3000	2.88	713.80	3.936
PR-WET_POND	OUT POND	10	6.419		19.2500	3.16	713.80	3.938
PR-WET_POND	OUT POND	100	3.968		1.2500	4.40	713.78	3.914
PR-WET_POND	OUT POND	100	5.305		2.1000	9.23	714.47	4.763
PR-WET_POND	OUT POND	100	6.120		2.3000	9.13	714.75	5.117
PR-WET_POND	OUT POND	100	7.522		3.4000	8.61	714.89	5.297
PR-WET_POND	OUT POND	100	8.981		5.7500	7.50	714.95	5.378
PR-WET_POND	OUT POND	100	10.739		24.0000	5.37	715.05	5.508
*PRYOUNG_ CREEK_S	T-E	10	2.116		1.2000	2.29	713.00	
*PRYOUNG_ CREEK_S	T-E	10	2.976		2.1500	2.67	713.00	
*PRYOUNG_ CREEK_S	T-E	10	3.464		3.1500	2.83	713.00	
*PRYOUNG_ CREEK_S	T-E	10	4.467		6.0500	3.04	713.00	
*PRYOUNG_ CREEK_S	T-E	10	5.481		8.3000	2.88	713.00	
*PRYOUNG_ CREEK_S	T-E	10	6.419		19.2500	3.16	713.00	
*PRYOUNG_ CREEK_S	T-E	100	3.968		1.2500	4.40	713.00	
*PRYOUNG_ CREEK_S	T-E	100	5.305		2.1000	9.23	713.00	
*PRYOUNG_ CREEK_S	T-E	100	6.120		2.3000	9.13	713.00	
*PRYOUNG_ CREEK_S	T-E	100	7.522		3.4000	8.61	713.00	
*PRYOUNG_ CREEK_S	T-E	100	8.981		5.7500	7.50	713.00	
*PRYOUNG_ CREEK_S	T-E	100	10.739		24.0000	5.37	713.00	

Type.... Design Storms
Name.... Indy 2Q

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 101

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 1hr
Storm Frequency = 10 yr
Total Rainfall Depth= 1.9600 in
Duration Multiplier = 1
Resulting Duration = 1.0000 hrs
Resulting Start Time= .0000 hrs Step= .0500 hrs End= 1.0000 hrs

Storm Tag Name = 102

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 2hr
Storm Frequency = 10 yr
Total Rainfall Depth= 2.4000 in
Duration Multiplier = 1
Resulting Duration = 2.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 2.0000 hrs

Storm Tag Name = 103

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 3hr
Storm Frequency = 10 yr
Total Rainfall Depth= 2.6400 in
Duration Multiplier = 1
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 106

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 6hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.1200 in
Duration Multiplier = 1
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

Storm Tag Name = 1012

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 12h
Storm Frequency = 10 yr
Total Rainfall Depth= 3.6000 in
Duration Multiplier = 1
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 12.0000 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 1024

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 24h
Storm Frequency = 10 yr
Total Rainfall Depth= 4.0800 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

Storm Tag Name = 1001

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 1hr
Storm Frequency = 100 yr
Total Rainfall Depth= 2.8800 in
Duration Multiplier = 1
Resulting Duration = 1.0000 hrs
Resulting Start Time= .0000 hrs Step= .0500 hrs End= 1.0000 hrs

Storm Tag Name = 1002

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 2hr
Storm Frequency = 100 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 2.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 2.0000 hrs

Storm Tag Name = 1003

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 3hr
Storm Frequency = 100 yr
Total Rainfall Depth= 3.8700 in
Duration Multiplier = 1
Resulting Duration = 3.0000 hrs
Resulting Start Time= .0000 hrs Step= .1500 hrs End= 3.0000 hrs

Storm Tag Name = 1006

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 6hr
Storm Frequency = 100 yr
Total Rainfall Depth= 4.5000 in
Duration Multiplier = 1
Resulting Duration = 6.0000 hrs
Resulting Start Time= .0000 hrs Step= .3000 hrs End= 6.0000 hrs

Type.... Design Storms
Name.... Indy 2Q

File.... O:\2009\090364\20010\calcs\Engr\Detention\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Indy 2Q

Storm Tag Name = 10012

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 12h
Storm Frequency = 100 yr
Total Rainfall Depth= 5.1600 in
Duration Multiplier = 1
Resulting Duration = 12.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 12.0000 hrs

Storm Tag Name = 10024

Data Type, File, ID = Synthetic Storm Indy Huff 2Q 24h
Storm Frequency = 100 yr
Total Rainfall Depth= 6.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.2000 hrs End= 24.0000 hrs

File.... O:\2009\090364\20010\calcs\Engr\Detention\PR DRNG 04-06-10_TW COND.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	94.00 ft
2yr, 24hr P	2.6400 in
Slope	.050000 ft/ft
Avg.Velocity	.15 ft/sec

Segment #1 Time: .1727 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	42.00 ft
Slope	.010000 ft/ft
Unpaved	
Avg.Velocity	1.61 ft/sec

Segment #2 Time: .0072 hrs

==========
Total Tc: .1800 hrs
==========

File.... O:\2009\090364\20010\calcs\Engr\Detention\PR DRNG 04-06-10_TW COND.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, %

==== 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.... O:\2009\090364\20010\calcs\Engr\Detention\PR DRNG 04-06-10_TW COND.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
impervious	98	20.000			98.00
Open Space Group B	61	6.020			61.00
Open Space Group C	74	3.020			74.00
COMPOSITE AREA & WEIGHTED CN --->		29.040			87.83 (88)

File.... O:\2009\090364\20010\calcs\Engr\Detention\PR DRNG 04-06-10_TW COND.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
710.00	-----	.8700	.0000	.000	.000
711.00	-----	.9600	2.7439	.915	.915
712.00	-----	1.0400	2.9992	1.000	1.914
713.00	-----	1.1300	3.2541	1.085	2.999
714.00	-----	1.2200	3.5241	1.175	4.174
715.00	-----	1.3100	3.7942	1.265	5.438
716.00	-----	1.4100	4.0791	1.360	6.798
717.00	-----	1.5100	4.3791	1.460	8.258

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Index of Starting Page Numbers for ID Names

----- I -----
Indy 2Q... 2.01

----- P -----
PR-SOUTH_BASIN... 3.01, 4.01
PR-WET_POND... 5.01

----- W -----
Watershed... 1.01

Emergency Spillway Calculation

Project Description

Friction Method	Manning Formula
Solve For	Bottom Width

Input Data

Roughness Coefficient	0.069	
Channel Slope	0.05000	ft/ft
Normal Depth	0.75	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Discharge	115.00	ft³/s

← $Q = 1.25 \times Q_{PEAK\,INTO\,POND}$
$= 1.25(90.97) = 113.71 \sim 115$

Results

Bottom Width	37.57	ft
Flow Area	30.43	ft²
Wetted Perimeter	43.75	ft
Hydraulic Radius	0.70	ft
Top Width	43.57	ft
Critical Depth	0.65	ft
Critical Slope	0.08229	ft/ft
Velocity	3.78	ft/s
Velocity Head	0.22	ft
Specific Energy	0.97	ft
Froude Number	0.80	
Flow Type	Subcritical	

← USED 40' BOTTOM WIDTH

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.75	ft
Critical Depth	0.65	ft
Channel Slope	0.05000	ft/ft

Appendix C

Storm Sewer Design Calcs and Map

UTILITY PLAN LEGEND

PROPOSED CONSTRUCTION

SANITARY CLEANOUT	801 SANITARY STRUCTURE NUMBER
SANITARY LATERAL	TC 715.50 SANITARY CASTING ELEVATION
SANITARY LINE/MANHOLE	S.S.E. SANITARY SEWER EASEMENT
EASEMENT LINE	S.S.,D.& U.E. SANITARY SEWER, DRAINAGE & UTILITY EASEMENT
END SECTION, STORM SEWER, AND MANHOLE	CURB INLET
SWALE W/SSD @ 0.70% SWALE WITH SUBSURFACE DRAIN (SSD)	STORM SEWER INLETS
SUBSURFACE DRAIN (SSD)	IE 715.50 STORM SEWER INVERT ELEVATION
701 STORM SEWER STRUCTURE NUMBER	TC 715.50 TOP OF CASTING ELEVATION
W — W WATER LINE	"TEE"
WATER VALVE	45° ELBOW
FIRE HYDRANT	90° ELBOW
WM WATER METER	22° ELBOW
THRUST BLOCK	11° ELBOW
B.O. BLOW OFF ASSEMBLY	REDUCER
PIV POST INDICATOR VALVE (PIV)	FDC FIRE DEPARTMENT CONNECTION
E — E OVERHEAD ELECTRIC	ELECTRIC PEDESTAL
BEC BURIED ELECTRIC	EM ELECTRIC METER
E ELECTRIC MANHOLE	STREET LIGHT
POWER POLE	AREA LIGHT
E.T. TRANSFORMER	
CTV OVERHEAD CABLE TELEVISION	C CABLE RISER PEDESTAL
BCTV BURIED CABLE TELEVISION	GAS VALVE
G — G GAS LINE	GM GAS METER
T — T — T OVERHEAD TELEPHONE LINE	
BTC — BTC BURIED TELEPHONE LINE	

Revisions Mark	Date	Description

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- ARCHITECTURE
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- INTERIOR DESIGN
- CIVIL / TRANSPORTATION ENGINEERS
- LAND PLANNING
- LAND SURVEYING
- GIS
- OWNER'S REPRESENTATION

STORM SEWER BASIN MAP

ASSISTED LIVING FACILITY

INDIANA MASONIC HOME

FRANKLIN, IN

CERTIFIED BY:

Date

COVERING

DESIGN

"HOLEY MOLEY" SAYS CALL AT LEAST TWO FULL WORKING DAYS BEFORE YOU DIG IT'S THE LAW

1-800-382-5544 CALL TOLL FREE
1-800-428-5200 FOR CALLS OUTSIDE OF INDIANA

Drawn By: --

Checked By: --

Quality Assurance: --

Scale: 0 Scale: 1" = 40'

Sheet ST-1

Date 04-08-10

Project Number 0090364-20010

Drawing: O:\2009\090364\20010\CALCS\ENGR\STORM\STORMCAD 04-06-10.DWG
Layout Tab: EXH-1
File Last Updated: Thu,8 Apr 2010

Scenario: Base

Inlet Report

10yr.

Label	Calculated Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Area (acres)	Inlet C	Inlet CA (acres)	Time of Concentration (min)	External CA (acres)	External Time of Concentration (min)	Additional Flow (cfs)	Additional Carryover (cfs)	Known Flow (cfs)	Inlet	Inlet Location	Description	Total Inlet Rational Flow (cfs)
705	3+46	719.50	true	719.50	710.87	1.49	0.37	0.54	10.20	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		2.99
706	6+39	723.50	true	723.50	711.61	1.05	0.62	0.66	8.23	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		3.97
709	9+42	721.02	true	721.02	714.34	0.24	0.77	0.18	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		1.30
710	10+31	721.22	true	721.22	714.86	0.39	0.73	0.29	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		2.02
711	11+58	722.10	true	722.10	715.49	0.77	0.76	0.59	17.40	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		2.56
712	11+76	721.50	true	721.50	716.17	0.31	0.65	0.20	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		1.42
714	9+60	721.00	true	721.00	716.50	0.22	0.61	0.14	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		0.95
715	10+59	722.20	true	722.20	717.00	0.07	0.90	0.06	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		0.44
716	7+89	719.76	true	719.76	716.06	0.73	0.70	0.51	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		3.61
717	7+54	721.00	true	721.00	714.05	5.44	0.73	3.99	15.70	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		18.02
718	4+43	719.47	true	719.47	712.61	0.61	0.70	0.42	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		2.99
719	5+73	717.00	true	717.00	713.19	0.55	0.53	0.29	10.80	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		1.58
721	7+39	720.00	true	720.00	714.06	0.37	0.67	0.25	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		1.74
722	8+32	720.80	true	720.80	715.36	0.24	0.72	0.17	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		1.22
723	8+77	721.00	true	721.00	715.81	0.15	0.69	0.10	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		0.73
724	9+48	721.00	true	721.00	716.41	0.08	0.53	0.04	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		0.30
725	9+89	723.65	true	723.65	717.01	0.10	0.90	0.09	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		0.63
726	10+74	720.00	true	720.00	717.41	0.75	0.55	0.41	15.85	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		1.86
727	4+93	719.50	true	719.50	715.40	0.62	0.70	0.43	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		3.05
728	5+69	719.00	true	719.00	715.80	0.15	0.34	0.05	7.81	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag		0.32

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Scenario: Base

Node Report

104R

Label	Area (acres)	Inlet C	Inlet CA (acres)	External CA (acres)	System CA (acres)	Time of Concentration (min)	External Time of Concentration (min)	Upstream Time Of Concentration (min)	System Flow Time (min)	System Intensity (in/hr)	System Rational Flow (cfs)	Additional Flow (cfs)	Additional Carryover (cfs)	Known Flow (cfs)	Upstream Additional Flow (cfs)	Total System Flow (cfs)	Ground Elevation (ft)	Rim Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Local Intensity (in/hr)	Local Rational Flow (cfs)	Description
701					9.43				21.65	3.90	37.11					37.11	714.00	714.00	710.00	710.00			
702					9.43				21.08	3.96	37.63					37.63	717.50	717.50	712.73	712.69			
704					9.43				21.03	3.96	37.68					37.68	717.50	717.50	713.06	712.77			
705	1.49	0.37	0.54	0.00	9.43	10.20	0.00	20.59	20.59	4.01	38.09	0.00	0.00	0.00	0.00	38.09	719.50	719.50	713.38	713.33	5.44	2.99	
706	1.05	0.62	0.66	0.00	6.62	8.23	0.00	19.63	19.63	4.10	27.34	0.00	0.00	0.00	0.00	27.34	723.50	723.50	713.78	713.69	6.01	3.97	
707					1.97				19.27	4.13	8.22					8.22	721.60	721.60	714.64	714.62			
708					1.46				18.60	4.20	6.18					6.18	721.31	721.31	715.24	715.12			
709	0.24	0.77	0.18	0.00	1.46	5.00	0.00	18.43	18.43	4.22	6.20	0.00	0.00	0.00	0.00	6.20	721.02	721.02	715.47	715.35	6.99	1.30	
710	0.39	0.73	0.29	0.00	1.08	5.00	0.00	18.02	18.02	4.26	4.62	0.00	0.00	0.00	0.00	4.62	721.22	721.22	715.87	715.76	6.99	2.02	
711	0.77	0.76	0.59	0.00	0.79	17.40	0.00	5.07	17.40	4.32	3.44	0.00	0.00	0.00	0.00	3.44	722.10	722.10	716.43	716.33	4.32	2.56	
712	0.31	0.65	0.20	0.00	0.20	5.00	0.00	0.00	5.00	6.99	1.42	0.00	0.00	0.00	0.00	1.42	721.50	721.50	716.68	716.68	6.99	1.42	
714	0.22	0.61	0.14	0.00	0.20	5.00	0.00	5.74	5.74	6.77	1.35	0.00	0.00	0.00	0.00	1.35	721.00	721.00	717.12	717.04	6.99	0.95	
715	0.07	0.90	0.06	0.00	0.06	5.00	0.00	0.00	5.00	6.99	0.44	0.00	0.00	0.00	0.00	0.44	722.20	722.20	717.30	717.30	6.99	0.44	
716	0.73	0.70	0.51	0.00	0.51	5.00	0.00	0.00	5.00	6.99	3.61	0.00	0.00	0.00	0.00	3.61	719.76	719.76	716.83	716.83	6.99	3.61	
717	5.44	0.73	3.99	0.00	3.99	15.70	0.00	0.00	15.70	4.48	18.02	0.00	0.00	0.00	0.00	18.02	721.00	721.00	715.65	715.65	4.48	18.02	
718	0.61	0.70	0.42	0.00	2.27	5.00	0.00	18.58	18.58	4.20	9.62	0.00	0.00	0.00	0.00	9.62	719.47	719.47	714.13	713.97	6.99	2.99	
719	0.55	0.53	0.29	0.00	1.36	10.80	0.00	17.98	17.98	4.26	5.85	0.00	0.00	0.00	0.00	5.85	717.00	717.00	714.45	714.36	5.33	1.58	
720					1.07				17.72	4.28	4.62					4.62	719.00	719.00	714.58	714.51			
721	0.37	0.67	0.25	0.00	1.07	5.00	0.00	17.22	17.22	4.33	4.67	0.00	0.00	0.00	0.00	4.67	720.00	720.00	715.11	715.02	6.99	1.74	
722	0.24	0.72	0.17	0.00	0.82	5.00	0.00	16.93	16.93	4.36	3.61	0.00	0.00	0.00	0.00	3.61	720.80	720.80	716.31	716.13	6.99	1.22	
723	0.15	0.69	0.10	0.00	0.65	5.00	0.00	16.76	16.76	4.38	2.87	0.00	0.00	0.00	0.00	2.87	721.00	721.00	716.57	716.49	6.99	0.73	
724	0.08	0.53	0.04	0.00	0.55	5.00	0.00	16.49	16.49	4.41	2.42	0.00	0.00	0.00	0.00	2.42	721.00	721.00	717.11	717.03	6.99	0.30	
725	0.10	0.90	0.09	0.00	0.50	5.00	0.00	16.32	16.32	4.42	2.24	0.00	0.00	0.00	0.00	2.24	723.65	723.65	717.79	717.69	6.99	0.63	
726	0.75	0.55	0.41	0.00	0.41	15.85	0.00	0.00	15.85	4.47	1.86	0.00	0.00	0.00	0.00	1.86	720.00	720.00	718.13	718.13	4.47	1.86	
727	0.62	0.70	0.43	0.00	0.48	5.00	0.00	8.44	8.44	5.95	2.90	0.00	0.00	0.00	0.00	2.90	719.50	719.50	716.28	716.13	6.99	3.05	
728	0.15	0.34	0.05	0.00	0.05	7.81	0.00	0.00	7.81	6.14	0.32	0.00	0.00	0.00	0.00	0.32	719.00	719.00	716.28	716.28	6.14	0.32	
734					0.82				17.09	4.35	3.60					3.60	719.80	719.80	715.35	715.31			

Scenario: Base

Pipe Report

1046

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description	Average Velocity (ft/s)
701-702	702	701	N/A	N/A	N/A	9.43	3.96	37.63	185.00	0.002216	42 inch	0.013	47.36	710.41	710.00	717.50	714.00	3.59	0.50	712.69	711.91		5.46
702-704	704	702	N/A	N/A	N/A	9.43	3.96	37.68	18.00	0.002778	42 inch	0.013	53.02	710.46	710.41	717.50	717.50	3.54	3.59	712.77	712.73		5.98
704-705	705	704	1.49	0.37	0.54	9.43	4.01	38.09	143.00	0.002168	42 inch	0.013	46.84	710.87	710.56	719.50	717.50	5.13	3.44	713.33	713.06		5.43
705-706	706	705	1.05	0.62	0.66	6.62	4.10	27.34	293.00	0.002184	42 inch	0.013	47.02	711.61	710.97	723.50	719.50	8.39	5.03	713.69	713.38		5.07
705-718	718	705	0.61	0.70	0.42	2.27	4.20	9.62	97.00	0.002474	24 inch	0.013	11.25	712.61	712.37	719.47	719.50	4.86	5.13	713.97	713.58		4.02
706-707	707	706	N/A	N/A	N/A	1.97	4.13	8.22	104.00	0.004135	24 inch	0.013	14.55	713.54	713.11	721.60	723.50	6.06	8.39	714.62	714.13		4.77
706-717	717	706	5.44	0.73	3.99	3.99	4.48	18.02	115.00	0.002174	36 inch	0.013	31.10	714.05	713.80	721.00	723.50	3.95	6.70	715.65	715.16		4.56
707-708	708	707	N/A	N/A	N/A	1.46	4.20	6.18	159.00	0.003019	24 inch	0.013	12.43	714.12	713.64	721.31	721.60	5.19	5.96	715.12	714.64		3.95
707-716	716	707	0.73	0.70	0.51	0.51	6.99	3.61	46.00	0.010000	15 inch	0.013	6.46	716.06	715.60	719.76	721.60	2.45	4.75	716.83	716.27		5.41
708-709	709	708	0.24	0.77	0.18	1.46	4.22	6.20	40.00	0.003000	24 inch	0.013	12.39	714.34	714.22	721.02	721.31	4.68	5.09	715.35	715.24		3.95
709-710	710	709	0.39	0.73	0.29	1.08	4.26	4.62	89.00	0.003034	21 inch	0.013	8.73	714.86	714.59	721.22	721.02	4.61	4.68	715.76	715.47		3.68
709-714	714	709	0.22	0.61	0.14	0.20	6.77	1.35	18.00	0.004444	12 inch	0.013	2.38	716.50	716.42	721.00	721.02	3.50	3.60	717.04	716.91		3.12
710-711	711	710	0.77	0.76	0.59	0.79	4.32	3.44	127.00	0.002992	18 inch	0.013	5.75	715.49	715.11	722.10	721.22	5.11	4.61	716.33	715.87		3.40
711-712	712	711	0.31	0.65	0.20	0.20	6.99	1.42	18.00	0.010000	12 inch	0.013	3.56	716.17	715.99	721.50	722.10	4.33	5.11	716.68	716.43		4.28
714-715	715	714	0.07	0.90	0.06	0.06	6.99	0.44	99.00	0.004040	12 inch	0.013	2.26	717.00	716.60	722.20	721.00	4.20	3.40	717.30	717.12		2.24
718-719	719	718	0.55	0.53	0.29	1.36	4.26	5.85	130.00	0.002538	21 inch	0.013	7.98	713.19	712.86	717.00	719.47	2.06	4.86	714.36	714.13		3.63
718-727	727	718	0.62	0.70	0.43	0.48	5.95	2.90	50.00	0.015000	12 inch	0.013	4.36	715.40	714.65	719.50	719.47	3.10	3.82	716.13	715.25		5.94
719-720	720	719	N/A	N/A	N/A	1.07	4.28	4.62	47.00	0.001915	21 inch	0.013	6.93	713.38	713.29	719.00	717.00	3.87	1.96	714.51	714.45		3.09
720-721	721	720	0.37	0.67	0.25	1.07	4.33	4.67	119.00	0.003613	18 inch	0.013	6.31	714.06	713.63	720.00	719.00	4.44	3.87	715.02	714.58		3.91
721-734	734	721	N/A	N/A	N/A	0.82	4.35	3.60	35.00	0.006571	15 inch	0.013	5.24	714.54	714.31	719.80	720.00	4.01	4.44	715.31	715.11		4.60
722-723	723	722	0.15	0.69	0.10	0.65	4.38	2.87	45.00	0.007778	15 inch	0.013	5.70	715.81	715.46	721.00	720.80	3.94	4.09	716.49	716.31		4.65
723-724	724	723	0.08	0.53	0.04	0.55	4.41	2.42	71.00	0.007042	15 inch	0.013	5.42	716.41	715.91	721.00	721.00	3.34	3.84	717.03	716.57		4.29
724-725	725	724	0.10	0.90	0.09	0.50	4.42	2.24	41.00	0.006098	12 inch	0.013	2.78	717.01	716.76	723.65	721.00	5.64	3.24	717.69	717.40		3.94
725-726	726	725	0.75	0.55	0.41	0.41	4.47	1.86	85.00	0.003529	12 inch	0.013	2.12	717.41	717.11	720.00	723.65	1.59	5.54	718.13	717.79		3.04
727-728	728	727	0.15	0.34	0.05	0.05	6.14	0.32	76.00	0.003947	12 inch	0.013	2.24	715.80	715.50	719.00	719.50	2.20	3.00	716.28	716.28		2.01
734-722	722	734	0.24	0.72	0.17	0.82	4.36	3.61	58.00	0.012414	15 inch	0.013	7.20	715.36	714.64	720.80	719.80	4.19	3.91	716.13	715.27		5.87

Scenario: Base

Inlet Report

100YR

Label	Calculated Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Area (acres)	Inlet C	Inlet CA (acres)	Time of Concentration (min)	External CA (acres)	External Time of Concentration (min)	Additional Flow (cfs)	Additional Carryover (cfs)	Known Flow (cfs)	Inlet	Inlet Location	Description
705	3+46	719.50	true	719.50	710.87	1.49	0.37	0.54	10.20	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
706	6+39	723.50	true	723.50	711.61	1.05	0.62	0.66	8.23	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
709	9+42	721.02	true	721.02	714.34	0.24	0.77	0.18	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
710	10+31	721.22	true	721.22	714.86	0.39	0.73	0.29	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
711	11+58	722.10	true	722.10	715.49	0.77	0.76	0.59	17.40	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
712	11+76	721.50	true	721.50	716.17	0.31	0.65	0.20	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
714	9+60	721.00	true	721.00	716.50	0.22	0.61	0.14	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
715	10+59	722.20	true	722.20	717.00	0.07	0.90	0.06	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
716	7+89	719.76	true	719.76	716.06	0.73	0.70	0.51	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
717	7+54	721.00	true	721.00	714.05	5.44	0.73	3.99	15.70	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
718	4+43	719.47	true	719.47	712.61	0.61	0.70	0.42	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
719	5+73	717.00	true	717.00	713.19	0.55	0.53	0.29	10.80	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
721	7+39	720.00	true	720.00	714.06	0.37	0.67	0.25	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
722	8+32	720.80	true	720.80	715.36	0.24	0.72	0.17	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
723	8+77	721.00	true	721.00	715.81	0.15	0.69	0.10	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
724	9+48	721.00	true	721.00	716.41	0.08	0.53	0.04	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
725	9+89	723.65	true	723.65	717.01	0.10	0.90	0.09	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
726	10+74	720.00	true	720.00	717.41	0.75	0.55	0.41	15.85	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
727	4+93	719.50	true	719.50	715.40	0.62	0.70	0.43	5.00	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	
728	5+69	719.00	true	719.00	715.80	0.15	0.34	0.05	7.81	0.00	0.00	0.00	0.00	0.00	Generic Default 10	In Sag	

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Scenario: Base

Node Report

100yr.

Label	Area (acres)	Inlet C	Inlet CA (acres)	External CA (acres)	System CA (acres)	Time of Concentration (min)	External Time of Concentration (min)	Upstream Time Of Concentration (min)	System Flow Time (min)	System Intensity (in/hr)	System Rational Flow (cfs)	Additional Flow (cfs)	Additional Carryover (cfs)	Known Flow (cfs)	Upstream Additional Flow (cfs)	Total System Flow (cfs)	Ground Elevation (ft)	Rim Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Local Intensity (in/hr)	Local Rational Flow (cfs)	Description
701					9.43				21.36	5.67	53.91					53.91	714.00	714.00	710.00	710.00			
702					9.43				20.81	5.74	54.61					54.61	717.50	717.50	713.38	713.31			
704					9.43				20.76	5.75	54.67					54.67	717.50	717.50	713.85	713.43			
705	1.49	0.37	0.54	0.00	9.43	10.20	0.00	20.35	20.35	5.81	55.20	0.00	0.00	0.00	0.00	55.20	719.50	719.50	714.31	714.24	7.72	4.24	
706	1.05	0.62	0.66	0.00	6.62	8.23	0.00	19.46	19.46	5.93	39.53	0.00	0.00	0.00	0.00	39.53	723.50	723.50	714.78	714.67	8.45	5.58	
707					1.97				19.12	5.97	11.87					11.87	721.60	721.60	715.14	715.11			
708					1.46				18.51	6.06	8.91					8.91	721.31	721.31	715.62	715.43			
709	0.24	0.77	0.18	0.00	1.46	5.00	0.00	18.35	18.35	6.08	8.94	0.00	0.00	0.00	0.00	8.94	721.02	721.02	715.86	715.70	9.69	1.80	
710	0.39	0.73	0.29	0.00	1.08	5.00	0.00	17.98	17.98	6.13	6.65	0.00	0.00	0.00	0.00	6.65	721.22	721.22	716.20	716.06	9.69	2.79	
711	0.77	0.76	0.59	0.00	0.79	17.40	0.00	5.06	17.40	6.21	4.95	0.00	0.00	0.00	0.00	4.95	722.10	722.10	716.71	716.57	6.21	3.68	
712	0.31	0.65	0.20	0.00	0.20	5.00	0.00	0.00	5.00	9.69	1.97	0.00	0.00	0.00	0.00	1.97	721.50	721.50	716.77	716.77	9.69	1.97	
714	0.22	0.61	0.14	0.00	0.20	5.00	0.00	5.67	5.67	9.43	1.88	0.00	0.00	0.00	0.00	1.88	721.00	721.00	717.27	717.16	9.69	1.32	
715	0.07	0.90	0.06	0.00	0.06	5.00	0.00	0.00	5.00	9.69	0.62	0.00	0.00	0.00	0.00	0.62	722.20	722.20	717.36	717.36	9.69	0.62	
716	0.73	0.70	0.51	0.00	0.51	5.00	0.00	0.00	5.00	9.69	5.01	0.00	0.00	0.00	0.00	5.01	719.76	719.76	716.97	716.97	9.69	5.01	
717	5.44	0.73	3.99	0.00	3.99	15.70	0.00	0.00	15.70	6.44	25.88	0.00	0.00	0.00	0.00	25.88	721.00	721.00	716.02	716.02	6.44	25.88	
718	0.61	0.70	0.42	0.00	2.27	5.00	0.00	18.87	18.87	6.01	13.75	0.00	0.00	0.00	0.00	13.75	719.47	719.47	715.22	714.97	9.69	4.14	
719	0.55	0.53	0.29	0.00	1.36	10.80	0.00	18.25	18.25	6.09	8.37	0.00	0.00	0.00	0.00	8.37	717.00	717.00	715.73	715.58	7.57	2.24	
720					1.07				17.97	6.13	6.60					6.60	719.00	719.00	715.93	715.81			
721	0.37	0.67	0.25	0.00	1.07	5.00	0.00	17.44	17.44	6.20	6.68	0.00	0.00	0.00	0.00	6.68	720.00	720.00	716.58	716.41	9.69	2.41	
722	0.24	0.72	0.17	0.00	0.82	5.00	0.00	17.07	17.07	6.25	5.18	0.00	0.00	0.00	0.00	5.18	720.80	720.80	717.56	717.25	9.69	1.68	
723	0.15	0.69	0.10	0.00	0.65	5.00	0.00	16.85	16.85	6.28	4.11	0.00	0.00	0.00	0.00	4.11	721.00	721.00	717.85	717.74	9.69	1.02	
724	0.08	0.53	0.04	0.00	0.55	5.00	0.00	16.43	16.43	6.34	3.48	0.00	0.00	0.00	0.00	3.48	721.00	721.00	718.15	718.06	9.69	0.41	
725	0.10	0.90	0.09	0.00	0.50	5.00	0.00	16.27	16.27	6.36	3.23	0.00	0.00	0.00	0.00	3.23	723.65	723.65	718.70	718.49	9.69	0.88	
726	0.75	0.55	0.41	0.00	0.41	15.85	0.00	0.00	15.85	6.41	2.67	0.00	0.00	0.00	0.00	2.67	720.00	720.00	719.18	719.18	6.41	2.67	
727	0.62	0.70	0.43	0.00	0.48	5.00	0.00	8.38	8.38	8.39	4.09	0.00	0.00	0.00	0.00	4.09	719.50	719.50	716.49	716.26	9.69	4.22	
728	0.15	0.34	0.05	0.00	0.05	7.81	0.00	0.00	7.81	8.61	0.44	0.00	0.00	0.00	0.00	0.44	719.00	719.00	716.50	716.50	8.61	0.44	
734					0.82				17.30	6.22	5.15					5.15	719.80	719.80	716.87	716.80			

Scenario: Base

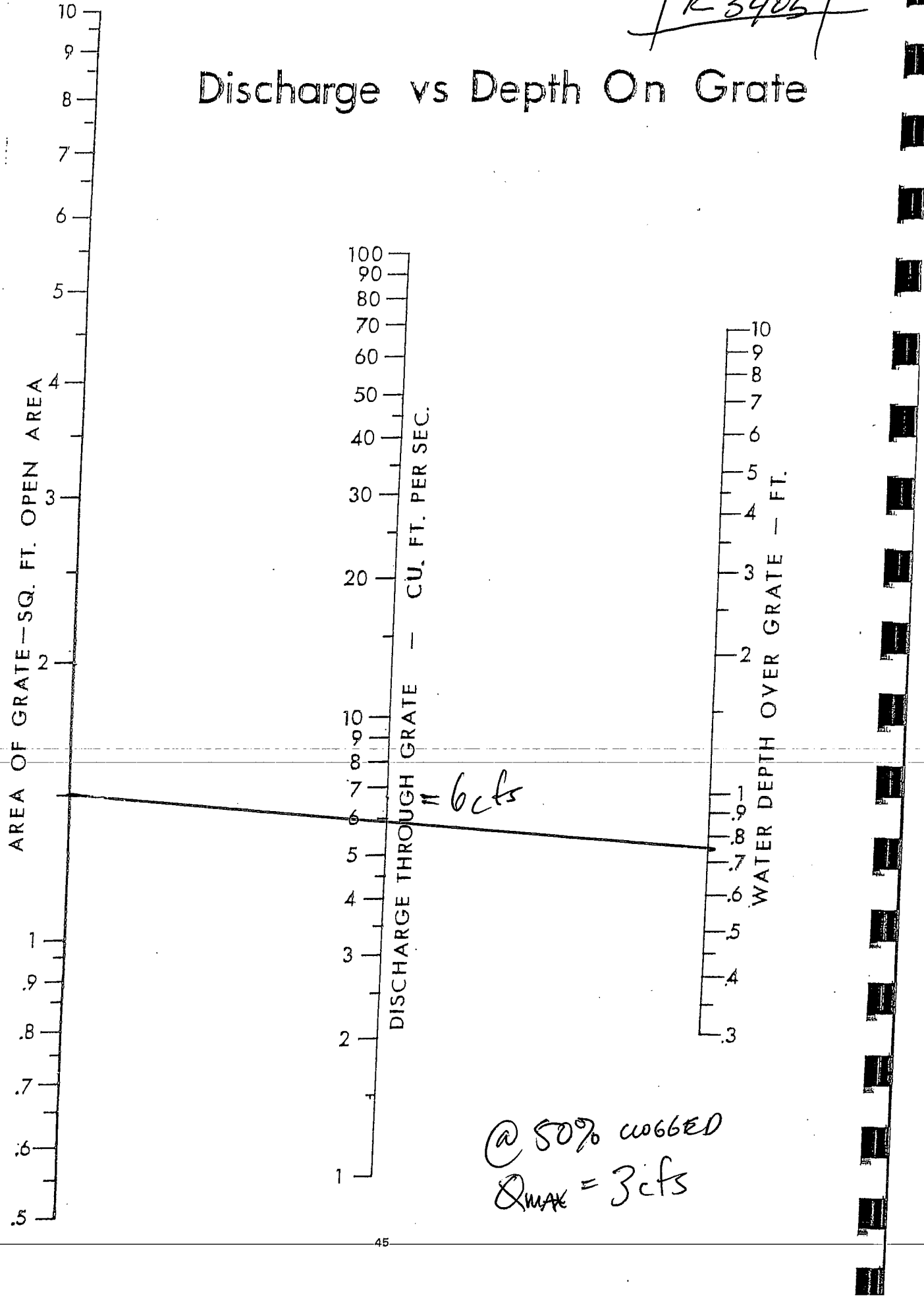
Pipe Report

100yr.

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Description	Average Velocity (ft/s)
701-702	702	701	N/A	N/A	N/A	9.43	5.74	54.61	185.00	0.002216	42 inch	0.013	47.36	710.41	710.00	717.50	714.00	3.59	0.50	713.31	712.31		5.68
702-704	704	702	N/A	N/A	N/A	9.43	5.75	54.67	18.00	0.002778	42 inch	0.013	53.02	710.46	710.41	717.50	717.50	3.54	3.59	713.43	713.38		6.27
704-705	705	704	1.49	0.37	0.54	9.43	5.81	55.20	143.00	0.002168	42 inch	0.013	46.84	710.87	710.56	719.50	717.50	5.13	3.44	714.24	713.85		5.74
705-706	706	705	1.05	0.62	0.66	6.62	5.93	39.53	293.00	0.002184	42 inch	0.013	47.02	711.61	710.97	723.50	719.50	8.39	5.03	714.67	714.31		5.48
705-718	718	705	0.61	0.70	0.42	2.27	6.01	13.75	97.00	0.002474	24 inch	0.013	11.25	712.61	712.37	719.47	719.50	4.86	5.13	714.97	714.61		4.38
706-707	707	706	N/A	N/A	N/A	1.97	5.97	11.87	104.00	0.004135	24 inch	0.013	14.55	713.54	713.11	721.60	723.50	6.06	8.39	715.11	714.89		5.16
706-717	717	706	5.44	0.73	3.99	3.99	6.44	25.88	115.00	0.002174	36 inch	0.013	31.10	714.05	713.80	721.00	723.50	3.95	6.70	716.02	715.44		4.92
707-708	708	707	N/A	N/A	N/A	1.46	6.06	8.91	159.00	0.003019	24 inch	0.013	12.43	714.12	713.64	721.31	721.60	5.19	5.96	715.43	715.14		4.30
707-716	716	707	0.73	0.70	0.51	0.51	9.69	5.01	46.00	0.010000	15 inch	0.013	6.46	716.06	715.60	719.76	721.60	2.45	4.75	716.97	716.43		5.81
708-709	709	708	0.24	0.77	0.18	1.46	6.08	8.94	40.00	0.003000	24 inch	0.013	12.39	714.34	714.22	721.02	721.31	4.68	5.09	715.70	715.62		4.29
709-710	710	709	0.39	0.73	0.29	1.08	6.13	6.65	89.00	0.003034	21 inch	0.013	8.73	714.86	714.59	721.22	721.02	4.61	4.68	716.06	715.86		3.99
709-714	714	709	0.22	0.61	0.14	0.20	9.43	1.88	18.00	0.004444	12 inch	0.013	2.38	716.50	716.42	721.00	721.02	3.50	3.60	717.16	717.00		3.35
710-711	711	710	0.77	0.76	0.59	0.79	6.21	4.95	127.00	0.002992	18 inch	0.013	5.75	715.49	715.11	722.10	721.22	5.11	4.61	716.57	716.20		3.66
711-712	712	711	0.31	0.65	0.20	0.20	9.69	1.97	18.00	0.010000	12 inch	0.013	3.56	716.17	715.99	721.50	722.10	4.33	5.11	716.77	716.71		4.65
714-715	715	714	0.07	0.90	0.06	0.06	9.69	0.62	99.00	0.004040	12 inch	0.013	2.26	717.00	716.60	722.20	721.00	4.20	3.40	717.36	717.27		2.45
718-719	719	718	0.55	0.53	0.29	1.36	6.09	8.37	130.00	0.002538	21 inch	0.013	7.98	713.19	712.86	717.00	719.47	2.06	4.86	715.58	715.22		3.48
718-727	727	718	0.62	0.70	0.43	0.48	8.39	4.09	50.00	0.015000	12 inch	0.013	4.36	715.40	714.65	719.50	719.47	3.10	3.82	716.26	715.42		6.31
719-720	720	719	N/A	N/A	N/A	1.07	6.13	6.60	47.00	0.001915	21 inch	0.013	6.93	713.38	713.29	719.00	717.00	3.87	1.96	715.81	715.73		2.75
720-721	721	720	0.37	0.67	0.25	1.07	6.20	6.68	119.00	0.003613	18 inch	0.013	6.31	714.06	713.63	720.00	719.00	4.44	3.87	716.41	715.93		3.78
721-734	734	721	N/A	N/A	N/A	0.82	6.22	5.15	35.00	0.006571	15 inch	0.013	5.24	714.54	714.31	719.80	720.00	4.01	4.44	716.80	716.58		4.20
722-723	723	722	0.15	0.69	0.10	0.65	6.28	4.11	45.00	0.007778	15 inch	0.013	5.70	715.81	715.46	721.00	720.80	3.94	4.09	717.74	717.56		3.35
723-724	724	723	0.08	0.53	0.04	0.55	6.34	3.48	71.00	0.007042	15 inch	0.013	5.42	716.41	715.91	721.00	721.00	3.34	3.84	718.06	717.85		2.84
724-725	725	724	0.10	0.90	0.09	0.50	6.36	3.23	41.00	0.006098	12 inch	0.013	2.78	717.01	716.76	723.65	721.00	5.64	3.24	718.49	718.15		4.11
725-726	726	725	0.75	0.55	0.41	0.41	6.41	2.67	85.00	0.003529	12 inch	0.013	2.12	717.41	717.11	720.00	723.65	1.59	5.54	719.18	718.70		3.40
727-728	728	727	0.15	0.34	0.05	0.05	8.61	0.44	76.00	0.003947	12 inch	0.013	2.24	715.80	715.50	719.00	719.50	2.20	3.00	716.50	716.49		2.22
734-722	722	734	0.24	0.72	0.17	0.82	6.25	5.18	58.00	0.012414	15 inch	0.013	7.20	715.36	714.64	720.80	719.80	4.19	3.91	717.25	716.87		4.22

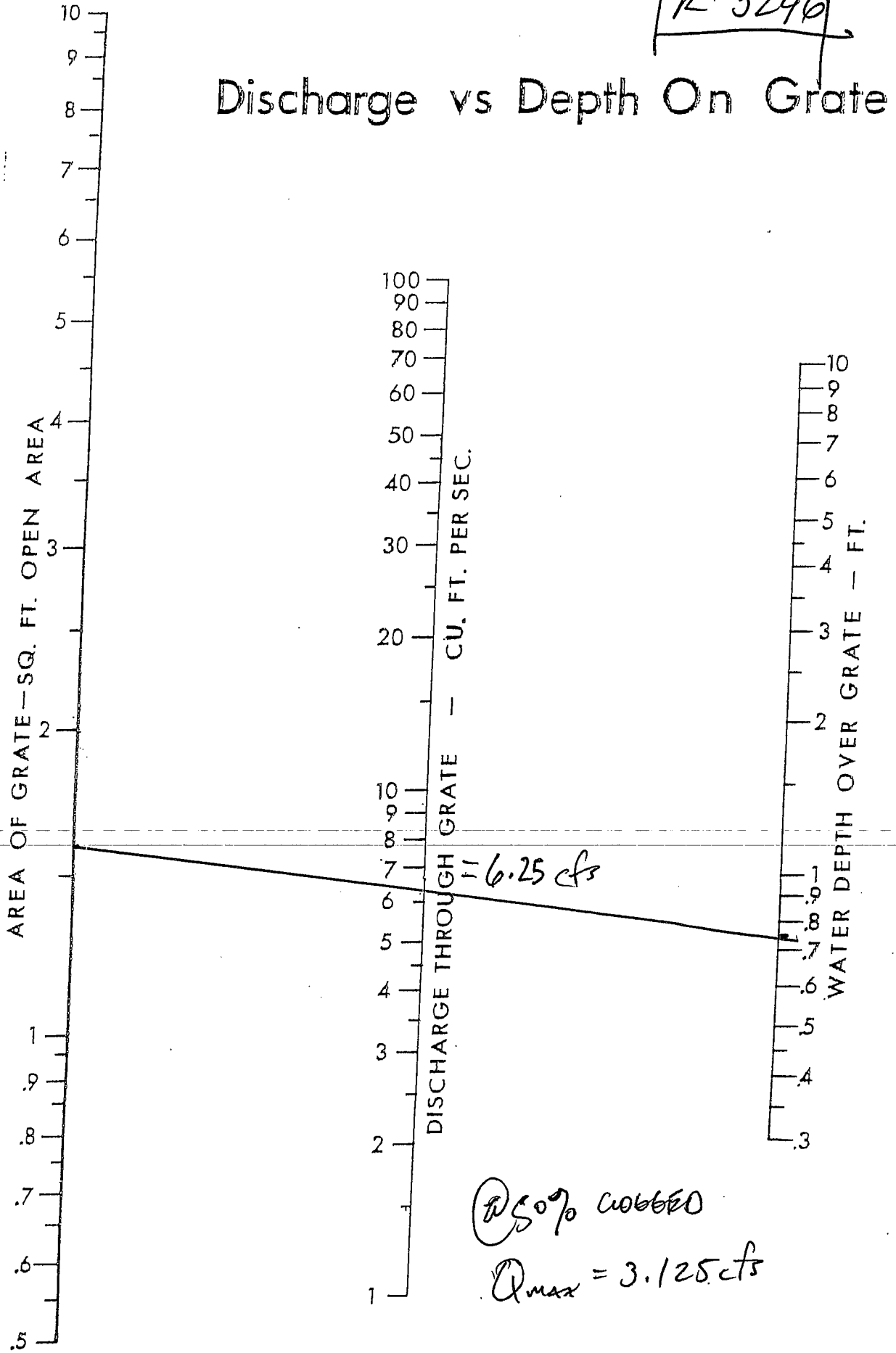
R-3405

Discharge vs Depth On Grate



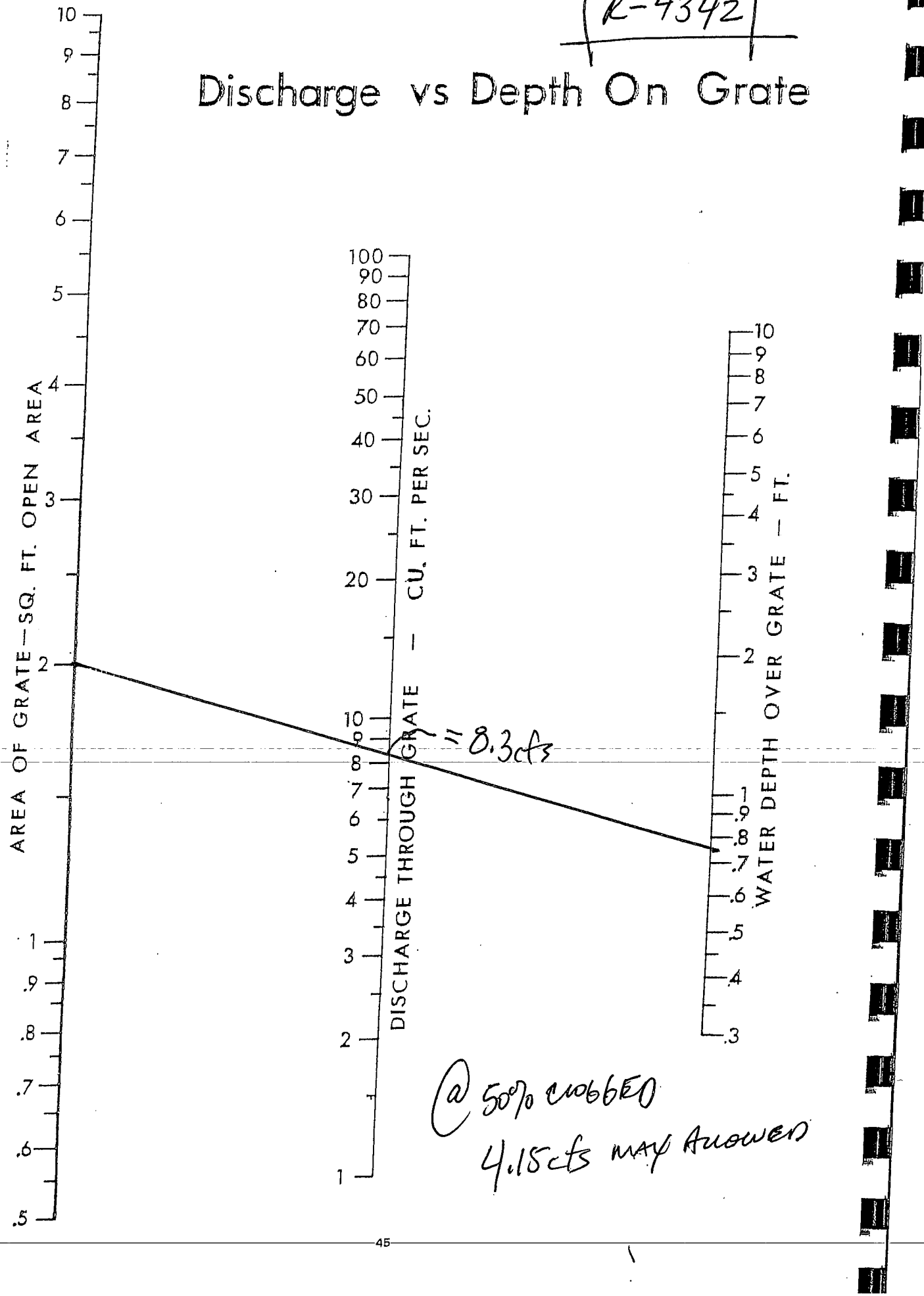
R-3246

Discharge vs Depth On Grate



R-4342

Discharge vs Depth On Grate



Type.... TC Calcs
Name.... 705

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	48.00	ft
2yr, 24hr P	2.6400	in
Slope	.018750	ft/ft
Avg.Velocity	.09	ft/sec

Segment #1 Time: .1494 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	132.00	ft
Slope	.012000	ft/ft
Unpaved		
Avg.Velocity	1.77	ft/sec

Segment #2 Time: .0207 hrs

==========
Total Tc: .1701 hrs
==========

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.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, %

==== 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.... 706

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	13.00	ft
2yr, 24hr P	2.6400	in
Slope	.230000	ft/ft

Avg.Velocity .19 ft/sec

Segment #1 Time: .0193 hrs

Segment #2: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	35.00	ft
2yr, 24hr P	2.6400	in
Slope	.020000	ft/ft

Avg.Velocity .09 ft/sec

Segment #2 Time: .1131 hrs

Segment #3: Tc: TR-55 Shallow

Hydraulic Length	40.00	ft
Slope	.020000	ft/ft

Unpaved

Avg.Velocity 2.28 ft/sec

Segment #3 Time: .0049 hrs

==========
Total Tc: .1372 hrs
==========

Type.... Tc Calcs
Name.... 706

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.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, %

==== 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... 711

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	78.00	ft
2yr, 24hr P	2.6400	in
Slope	.010000	ft/ft
Avg.Velocity	.08	ft/sec

Segment #1 Time: .2832 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	119.00	ft
Slope	.035000	ft/ft
Paved		
Avg.Velocity	3.80	ft/sec

Segment #2 Time: .0087 hrs

==========
Total Tc: .2919 hrs
==========

Type.... Tc Calcs
Name.... 711

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.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, %

==== 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.... 717

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6400	in
Slope	.020000	ft/ft
Avg.Velocity	.11	ft/sec

Segment #1 Time: .2619 hrs

Total Tc: .2619 hrs

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.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, %

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	94.00	ft
2yr, 24hr P	2.6400	in
Slope	.050000	ft/ft
Avg.Velocity	.15	ft/sec

Segment #1 Time: .1727 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	42.00	ft
Slope	.010000	ft/ft
Unpaved		
Avg.Velocity	1.61	ft/sec

Segment #2 Time: .0072 hrs

==========
Total Tc: .1800 hrs
==========

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, %

==== 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.... 726

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.6400	in
Slope	.020000	ft/ft

Avg.Velocity .11 ft/sec

Segment #1 Time: .2619 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	46.00	ft
Slope	.110000	ft/ft
Unpaved		

Avg.Velocity 5.35 ft/sec

Segment #2 Time: .0024 hrs

==========
Total Tc: .2642 hrs
==========

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.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, %

==== 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... 728

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	59.00	ft
2yr, 24hr P	2.6400	in
Slope	.040000	ft/ft
Avg.Velocity	.13	ft/sec

Segment #1 Time: .1301 hrs

==========
Total Tc: .1301 hrs
==========

Type.... Tc Calcs
Name.... 728

File.... O:\2009\090364\20010\calcs\Engr\Storm\TC'S.PPW

Tc Equations used...

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

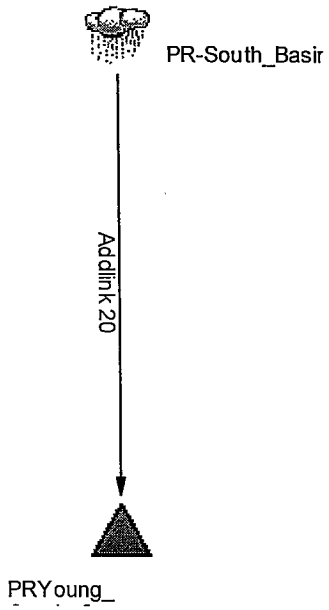
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

Appendix D

Water Quality Calculations

WATER QUALITY CALCS.



Job File: O:\2009\090364\20010\calcs\Engr\Water Quality\WATERQUALITY22510.PPW
Rain Dir: O:\2009\090364\20010\calcs\Engr\Water Quality\

==========
JOB TITLE
==========

Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

Table of Contents

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********** HYG ADDITION **********

PRYOUNG_ CREEK_S 1 inch
Node: Addition Summary 5.01

MASTER DESIGN STORM SUMMARY

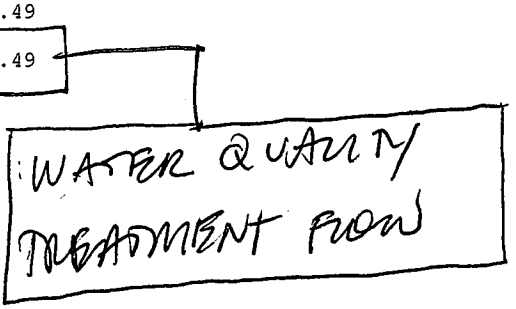
Network Storm Collection: Johnson2,10,100

Return Event	Total Depth in	Rainfall Type	RNF ID
1 inch	1.0000	Synthetic Curve	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)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
PR-SOUTH_BASIN	AREA	2	.526		11.9500	9.49		
*PRYOUNG_ CREEK_S	JCT	2	.526		11.9500	9.49		



Type.... Design Storms
Name.... Johnson2,10,100

File.... O:\2009\090364\20010\calcs\Engr\Water Quality\
Title... Project Date: 9/15/2009
Project Engineer: JRN
Project Title: Masonic ALF
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Johnson2,10,100

Storm Tag Name = 1 inch

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 1.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File.... O:\2009\090364\20010\calcs\Engr\Water Quality\WATERQUALITY22510.PPW

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .0833 hrs

Total Tc: .0833 hrs

File.... O:\2009\090364\20010\calcs\Engr\Water Quality\WATERQUALITY22510.PPW

Tc Equations used...

==== User Defined ==========

Tc = Value entered by user

Where: Tc = Time of concentration

File.... O:\2009\090364\20010\calcs\Engr\Water Quality\WATERQUALITY22510.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
impervious	98	12.880			98.00
Open Space Group B	61	2.170			61.00
Open Space Group C	74	.630			74.00
COMPOSITE AREA & WEIGHTED CN --->		15.680			91.92 (92)

SUMMARY FOR HYDROGRAPH ADDITION
at Node: PRYOUNG_ CREEK_S

HYG Directory: O:\2009\090364\20010\calcs\Engr\Water Quality\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
ADDLINK 20	PR-SOUTH_BASIN	work_pad.hyg	PR-SOUTH_BASIN	1 inch

INFLOWS TO: PRYOUNG_ CREEK_S

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
work_pad.hyg	PR-SOUTH_BASIN	1 inch	.526	11.9500	9.49

TOTAL FLOW INTO: PRYOUNG_ CREEK_S

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
work_pad.hyg	PRYOUNG_ CREEK_S	1 inch	.526	11.9500	9.49

TOTAL NODE INFLOW...
HYG file = O:\2009\090364\20010\calcs\Engr\Water Quality\work_pad.hyg
HYG ID = PRYOUNG_ CREEK_S
HYG Tag = 1 inch

Peak Discharge =	9.49 cfs
Time to Peak =	11.9500 hrs
HYG Volume =	.526 ac-ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs					
9.8500	.00	.00	.00	.01	.01
10.1000	.01	.02	.02	.02	.03
10.3500	.03	.04	.04	.05	.05
10.6000	.06	.07	.07	.08	.09
10.8500	.10	.11	.12	.13	.14
11.1000	.16	.18	.20	.22	.24
11.3500	.27	.30	.33	.36	.54
11.6000	.78	1.27	1.91	2.84	3.99
11.8500	6.25	9.22	9.49	8.69	6.11
12.1000	2.83	1.95	1.68	1.54	1.43
12.3500	1.33	1.23	1.12	1.01	.94
12.6000	.87	.83	.81	.78	.76
12.8500	.73	.71	.68	.66	.64
13.1000	.62	.60	.59	.58	.56
13.3500	.55	.54	.52	.51	.50
13.6000	.49	.48	.47	.46	.45
13.8500	.44	.43	.42	.41	.40
14.1000	.39	.39	.38	.38	.38
14.3500	.37	.37	.37	.36	.36
14.6000	.36	.35	.35	.35	.34
14.8500	.34	.34	.33	.33	.33
15.1000	.32	.32	.32	.31	.31
15.3500	.30	.30	.30	.29	.29
15.6000	.29	.28	.28	.28	.27
15.8500	.27	.27	.26	.26	.25
16.1000	.25	.25	.25	.25	.25
16.3500	.25	.24	.24	.24	.24
16.6000	.24	.24	.24	.24	.23
16.8500	.23	.23	.23	.23	.23
17.1000	.23	.23	.22	.22	.22
17.3500	.22	.22	.22	.22	.22

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .0500 hrs
Time on left represents time for first value in each row.

Time hrs				
17.6000	.21	.21	.21	.21	.21
17.8500	.21	.21	.21	.20	.20
18.1000	.20	.20	.20	.20	.20
18.3500	.19	.19	.19	.19	.19
18.6000	.19	.19	.19	.18	.18
18.8500	.18	.18	.18	.18	.18
19.1000	.17	.17	.17	.17	.17
19.3500	.17	.17	.17	.16	.16
19.6000	.16	.16	.16	.16	.16
19.8500	.15	.15	.15	.15	.15
20.1000	.15	.15	.15	.15	.15
20.3500	.15	.15	.15	.15	.15
20.6000	.15	.15	.15	.15	.14
20.8500	.14	.14	.14	.14	.14
21.1000	.14	.14	.14	.14	.14
21.3500	.14	.14	.14	.14	.14
21.6000	.14	.14	.14	.14	.14
21.8500	.14	.14	.14	.14	.14
22.1000	.14	.14	.14	.14	.14
22.3500	.14	.14	.14	.14	.14
22.6000	.14	.14	.14	.14	.13
22.8500	.13	.13	.13	.13	.13
23.1000	.13	.13	.13	.13	.13
23.3500	.13	.13	.13	.13	.13
23.6000	.13	.13	.13	.13	.13
23.8500	.13	.13	.13	.13	.08
24.1000	.02	.00	.00		

Index of Starting Page Numbers for ID Names

----- J -----
Johnson2,10,100... 2.01

----- P -----
PR-SOUTH_BASIN... 3.01, 4.01
PRYOUNG_ CREEK_S 1 inch... 5.01

----- W -----
Watershed... 1.01

Aqua-Swirl™ Sizing Chart *(English)*

Aqua-Swirl™ Model	Swirl Chamber Diameter	Maximum Stub-Out Pipe Outer Diameter		Water Quality Treatment Flow[2]	Oil/Debris Storage Capacity	Sediment Storage Capacity
	(ft.)	(in.)		(cfs)	(gal)	(ft^3)
		On/Offline	CFD[1]			
AS-2	2.50	8	12	1.1	37	10
AS-3	3.25	10	16	1.8	110	20
AS-4	4.25	12	18	3.2	190	32
AS-5	5.00	12	24	4.4	270	45
AS-6	6.00	14	30	6.3	390	65
AS-7	7.00	16	36	8.6	540	90
AS-8	8.00	18	42	11.2	710	115
AS-9	9.00	20	48	14.2	910	145
AS-10	10.0	22	48	17.5	1130	180
AS-12	12.0	24	48	25.2	1698	270
AS-XX*	Custom	--	--	>26	--	--

Higher water quality treatment flow rates can be designed with multiple swirls.

1) *The Aqua-Swirl™ Conveyance Flow Diversion (CFD) provides full treatment of the "first flush," while the peak design storm is diverted and channeled through the main conveyance pipe. Please refer to your local representative for more information.*

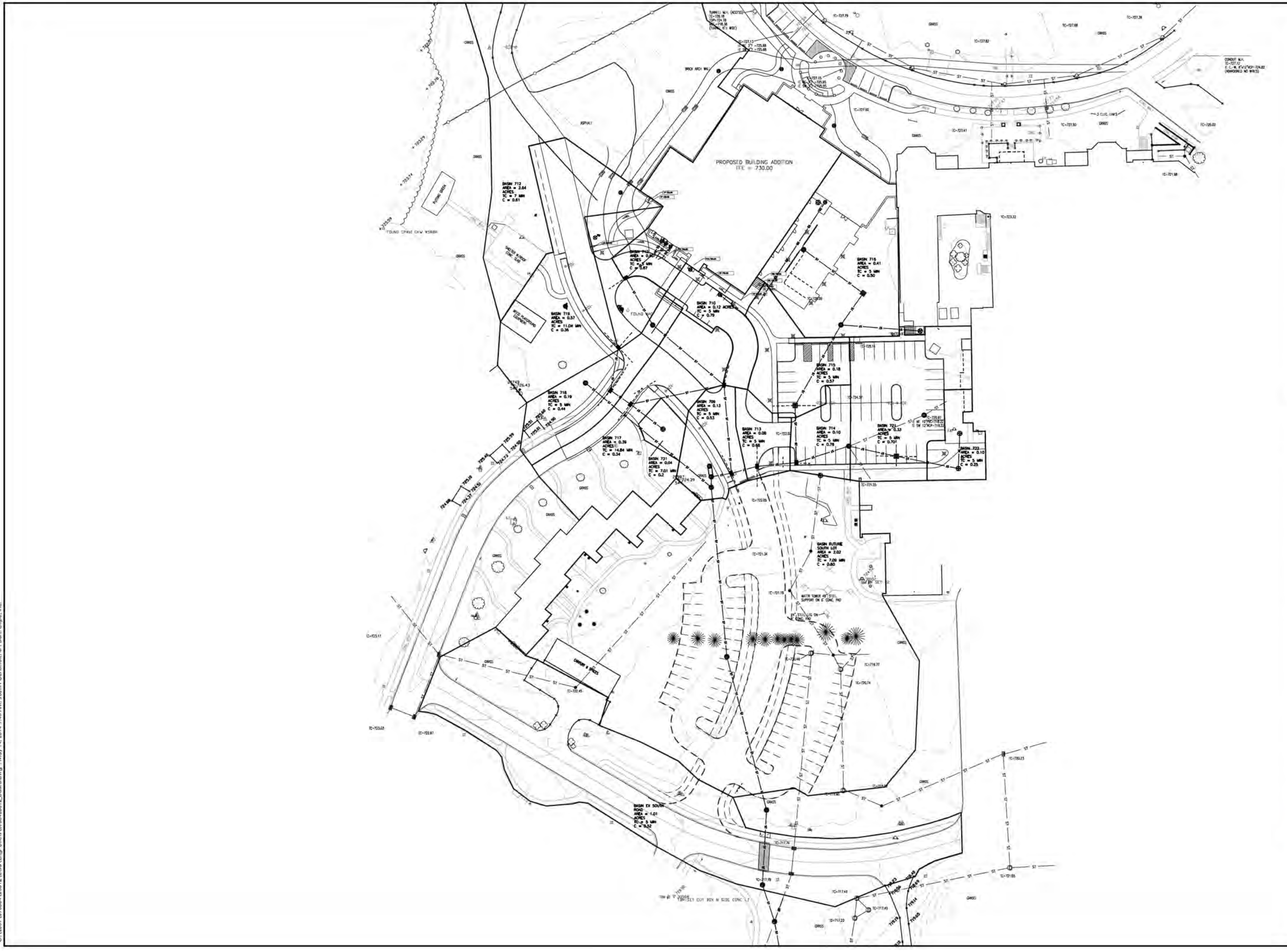
2) *Many regulatory agencies are establishing "water quality treatment flow rates" for their areas based on the initial movement of pollutants into the storm drainage system. The treatment flow rate of the Aqua-Swirl™ system is engineered to meet or exceed the local water quality treatment criteria. This "water quality treatment flow rate" typically represents approximately 90% to 95% of the total annual runoff volume.*

The design and orientation of the Aqua-Swirl™ generally entails some degree of customization. Local regulations vary widely for the sizing of all stormwater quality treatment devices. Always consult your AquaShield representative for current sizing requirements for your area. You may find contact information for all AquaShield representatives at www. AquaShieldinc.com, or under the AquaShield tab of the technical manual. You may also contact AquaShield™ inc. at 1-888-344-9044. CAD details and specifications are available upon request.

AquaShield™ • 2705 Kanasita Dr. Chattanooga, TN 37343 • (888) 344-9044 • Fax: (423) 826-2112

Appendix B

Post-Developed Drainage Analysis



BASIN MAP

INDIANA MASONIC HOME COMMUNITY CENTER

Revisions		
Mark	Date	Description

Cripe®
Architects + Engineers
Solutions by Design Since 1937

3939 PRIORITY WAY SOUTH DRIVE, SUITE 400
INDIANAPOLIS, INDIANA 46240
(317) 844-6777 FAX (317) 706-6464
E-Mail cripe@cripe.biz

- ARCHITECTURE
- EQUIPMENT PLANNING
- INTERIOR DESIGN
- CIVIL / TRANSPORTATION ENGINEERS
- LAND PLANNING
- LAND SURVEYING
- GIS
- OWNER'S REPRESENTATION

CERTIFIED BY:

DAVID A. LACH
REGISTERED
PE 10000128
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Date 05-14-2014

COVERING
STORMWATER POLLUTION
PREVENTION PLAN
DESIGN

Drawn By: JO

Checked By: DL

Quality Assurance: —

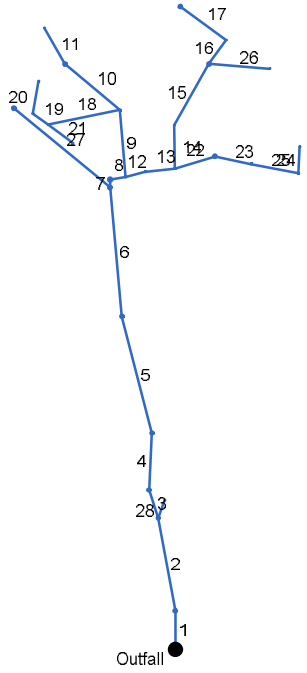
Scale: 0 Scale: 1" = 40'

EXHIBIT

Date 05-15-2014

Project Number 090364-20000

Hydraflow Storm Sewers Extension for AutoCAD® Civil 3D® 2013 Plan



Project File: storm 2014-05-13.stm	Number of lines: 28	Date: 5/14/2014

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	50.248	0.00	9.92	0.00	0.00	5.92	0.0	43.1	2.5	14.95	24.28	5.17	30	0.30	710.75	710.90	712.18	712.32	712.00	717.49	P702 - 701
2	1	122.714	0.00	9.92	0.00	0.00	5.92	0.0	42.7	2.5	15.04	33.56	6.21	30	0.57	711.00	711.70	712.41	712.87	717.49	717.46	P703 - 702
3	2	38.246	0.00	9.34	0.00	0.00	5.68	0.0	42.6	2.5	14.47	21.70	8.22	24	0.78	712.20	712.50	713.39	713.69	717.46	717.78	P704 - 703
4	3	74.137	0.00	9.34	0.00	0.00	5.68	0.0	42.4	2.6	14.50	22.04	8.28	24	0.81	712.60	713.20	713.78	714.38	717.78	718.29	P705 - 704
5	4	156.614	2.20	9.34	0.60	1.32	5.68	7.1	42.1	2.6	14.58	18.57	6.61	24	0.57	713.30	714.20	714.63	715.53	718.29	721.76	P706 - 705
6	5	168.254	0.00	7.14	0.00	0.00	4.36	0.0	41.7	2.6	11.27	18.89	6.49	24	0.59	714.30	715.30	715.53	716.41	721.76	723.39	P707 - 706
7	6	10.294	0.00	4.50	0.00	0.00	2.75	0.0	41.6	2.6	7.12	24.15	4.26	24	0.97	715.30	715.40	716.41	716.14	723.39	723.13	P708 - 707
8	7	20.153	0.13	4.50	0.55	0.07	2.75	5.0	41.5	2.6	7.13	24.41	4.29	24	0.99	715.50	715.70	716.24	716.44	723.13	721.35	P709 - 708
9	8	87.419	0.12	2.37	0.80	0.10	1.43	5.0	15.6	4.6	6.58	14.90	5.94	18	1.72	717.20	718.70	717.90	719.40	721.35	724.50	P710-709
10	9	92.415	0.00	0.61	0.00	0.00	0.53	0.0	5.2	7.1	3.79	4.75	5.77	12	1.51	721.00	722.40	721.68	723.08	724.50	726.50	P711 - 710
11	10	53.670	0.61	0.61	0.87	0.53	0.53	5.0	5.0	7.2	3.83	4.86	5.86	12	1.58	722.50	723.35	723.17	724.02	726.50	728.19	P712-711
12	8	26.283	0.08	2.00	0.69	0.06	1.25	5.0	41.5	2.6	3.24	5.28	3.10	15	0.57	716.65	716.80	717.36	717.51	721.35	721.40	P713 - 709
13	12	38.994	0.16	1.92	0.57	0.09	1.20	5.0	41.4	2.6	3.10	5.60	3.12	15	0.64	716.90	717.15	717.56	717.81	721.40	720.92	P714-713
14	13	56.508	0.18	0.88	0.60	0.11	0.44	5.0	9.7	5.7	2.51	5.89	3.60	15	0.71	717.25	717.65	717.82	718.22	720.92	722.80	STR 715 - 714
15	14	91.664	0.28	0.70	0.38	0.11	0.33	5.0	9.2	5.8	1.94	2.70	3.74	12	0.49	717.90	718.35	718.53	718.98	722.80	726.90	P716 - 715 (1)
16	15	38.202	0.28	0.41	0.38	0.11	0.22	5.0	6.2	6.8	1.46	3.95	3.25	12	1.05	721.50	721.90	721.92	722.32	726.90	725.90	P716 - 715
17	16	73.065	0.13	0.13	0.85	0.11	0.11	5.0	5.0	7.2	0.80	9.03	4.05	12	5.47	722.00	726.00	722.32	726.20	725.90	729.65	P726-716
18	9	94.526	0.40	1.64	0.37	0.15	0.80	14.8	14.8	4.7	3.79	9.79	3.65	18	0.74	718.80	719.50	719.45	720.15	724.50	723.36	P717 - 710
19	18	24.109	0.19	1.20	0.47	0.09	0.64	5.0	11.3	5.3	3.45	4.50	3.29	15	0.41	719.75	719.85	720.77	720.82	723.36	723.36	P718 - 717
20	19	43.034	1.01	1.01	0.55	0.56	0.56	11.0	11.0	5.4	3.01	4.77	2.78	15	0.46	719.95	720.15	721.06	721.12	723.36	724.30	P719 - 718
21	18	40.392	0.04	0.04	0.28	0.01	0.01	7.0	7.0	6.5	0.07	4.70	1.14	12	1.49	719.75	720.35	720.15	720.44	723.36	723.40	P731-717
22	13	54.377	0.45	0.88	0.90	0.41	0.67	5.0	41.2	2.6	1.73	3.10	2.02	12	0.64	717.65	718.00	718.18	718.53	720.92	723.59	P729-714

Project File: storm 2014-05-13.stm | Number of lines: 28 | Run Date: 5/14/2014

NOTES:Intensity = 57.70 / (Inlet time + 8.80) ^ 0.79 ; Return period =Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	47.964	0.33	0.43	0.71	0.23	0.26	5.0	40.9	2.6	0.68	4.13	2.50	12	1.15	718.10	718.65	718.53	718.92	723.59	722.20	P721-729
24	23	62.567	0.09	0.10	0.27	0.02	0.03	5.0	36.5	2.8	0.07	4.28	1.08	12	1.23	718.75	719.52	718.92	719.61	722.20	722.80	P722-721
25	24	34.712	0.01	0.01	0.20	0.00	0.00	5.0	5.0	7.2	0.01	2.36	0.34	12	0.37	719.52	719.65	719.71	719.73	722.80	722.70	PIPE - (43)
26	15	78.582	0.01	0.01	0.85	0.01	0.01	5.0	5.0	7.2	0.06	0.43	1.01	6	0.51	718.85	719.25	719.18	719.38	726.90	721.95	P724-721
27	6	161.657	2.64	2.64	0.61	1.61	1.61	7.0	7.0	6.5	10.43	29.16	5.07	24	1.42	716.30	718.59	717.13	719.42	723.39	724.40	P720-707
28	2	24.298	0.58	0.58	0.40	0.23	0.23	5.0	5.0	7.2	1.67	18.72	5.40	15	7.16	712.00	713.74	712.87	713.99	717.46	720.00	PIPE - (36)

Project File: storm 2014-05-13.stm | Number of lines: 28 | Run Date: 5/14/2014

NOTES:Intensity = 57.70 / (Inlet time + 8.80) ^ 0.79 ; Return period =Yrs. 10 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	702	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	703	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	704	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	705	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	706	8.51	0.00	0.00	8.51	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
6	707	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7	708	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
8	709	0.52	0.00	0.52	0.00	Comb	4.0	1.00	0.38	1.00	2.00	Sag	2.00	0.050	0.020	0.000	0.16	4.80	0.16	4.80	0.0	Off
9	710	0.69	0.00	0.69	0.00	Comb	4.0	1.00	0.26	1.00	2.00	Sag	2.00	0.050	0.020	0.000	0.18	5.95	0.18	5.95	0.0	Off
10	711	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
11	712	3.83	0.00	3.83	0.00	Comb	4.0	1.00	1.42	1.00	2.00	Sag	2.00	0.050	0.020	0.013	0.45	19.65	0.45	19.65	0.0	Off
12	713	0.40	0.00	0.40	0.00	Comb	4.0	1.00	0.15	1.00	2.00	Sag	2.00	0.050	0.020	0.000	0.16	5.15	0.16	5.15	0.0	Off
13	714	0.66	0.00	0.66	0.00	Comb	4.0	1.00	0.67	1.00	2.00	Sag	2.00	0.050	0.020	0.000	0.18	5.75	0.18	5.75	0.0	Off
14	715	0.78	0.00	0.78	0.00	Grate	4.0	0.00	0.60	1.00	2.00	Sag	2.00	0.050	0.020	0.000	0.19	6.45	0.19	6.45	0.0	Off
15	726	0.77	0.00	0.00	0.77	MH	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.00	0.00	0.00	0.00	0.0	Off
16	716	0.77	0.00	0.77	0.00	Grate	0.0	0.00	0.29	1.00	2.00	Sag	2.00	0.050	0.020	0.013	0.30	12.00	0.30	12.00	0.0	Off
17	727	0.80	0.00	0.00	0.80	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
18	717	0.70	0.00	0.70	0.00	Comb	4.0	1.00	0.24	1.00	2.00	Sag	2.00	0.050	0.020	0.013	0.19	6.30	0.19	6.30	0.0	Off
19	718	0.64	0.00	0.64	0.00	Comb	4.0	1.00	0.24	1.00	2.00	Sag	2.00	0.050	0.020	0.013	0.18	5.90	0.18	5.90	0.0	Off
20	719	3.01	0.00	3.01	0.00	Comb	4.0	1.00	1.49	1.00	2.00	Sag	2.00	0.050	0.020	0.013	0.39	16.65	0.39	16.65	0.0	Off
21	731	0.07	0.00	0.07	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.30	12.00	0.30	12.00	0.0	Off
22	729	2.92	0.00	0.00	2.92	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
23	721	1.69	0.00	1.69	0.00	Grate	0.0	0.00	0.63	1.00	2.00	Sag	2.00	0.050	0.020	0.000	0.30	12.00	0.30	12.00	0.0	Off

Project File: storm 2014-05-13.stm | Number of lines: 28 | Run Date: 5/14/2014

NOTES: Inlet N-Values = 0.016; Intensity = 57.70 / (Inlet time + 8.80) ^ 0.79; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	722	0.18	0.00	0.18	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.30	12.00	0.30	12.00	0.0	Off
25	723	0.01	0.00	0.01	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.30	12.00	0.30	12.00	0.0	Off
26	724	0.06	0.00	0.06	0.00	Genr	0.0	0.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.013	0.30	12.00	0.30	12.00	0.0	Off
27	720	10.43	0.00	0.00	10.43	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off
28	739	1.67	0.00	0.00	1.67	None	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: storm 2014-05-13.stm | Number of lines: 28 | Run Date: 5/14/2014

NOTES: Inlet N-Values = 0.016; Intensity = 57.70 / (Inlet time + 8.80) ^ 0.79; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Appendix C

Water Quality

Masonic Amenities Tc=5min

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Proposed	Johnson2,10,100 - Synthetic Curve, 2 yrs	2	0.070	12.000	1.06

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
BMP	Johnson2,10,100 - Synthetic Curve, 2 yrs	2	0.070	12.000	1.06

Masonic Amenities

Index

M

Master Network Summary...1