CREEKSIDE ADDITION PHASE 2

DRAINAGE CALCULATIONS – SUMMARY

8/10/2022

DESCRIPTION OF PROJECT

Creekside Addition phase 2 is an approximately 14.34 acres residential development located in the City of Bryant, Arkansas approximately a mile north of midland Road. There are four drainage basins on the site. All basins will be detained in a pipe network storage located back of the curb and between lots. The detention for the storage network will be underground in 36”, 30’’, 24’’, and 18” RCP or HDPE pipe.

Stormwater Calculations were prepared with the intent to comply with the City of Bryant’s Drainage Code. The primary intent of this analysis is to produce a drainage system adequately sized to convey post development runoff while attenuating post development discharge levels equal to or less than pre development flows.

Hydraulic calculations were made using the Rational Method. Design frequencies were analyzed for 2, 5, 10, 25, 50, and 100 year return periods.

These calculations are divided into the following sections:

Summary of Drainage Basins

Summary of Inlets

Summary of Pipes

Pipe Network Storage Summary

Appendices

Exhibit A – Pre-Development Drainage Basins

Exhibit B – Post-Development Drainage Basins

CREEKSIDE ADDITION PHASE 2

DRAINAGE CALCULATIONS – SUMMARY

8/10/2022

SUMMARY OF DRAINAGE BASINS

PRE-DEVELOPMENT CONDITIONS

The entire area for pre-existing drainage area of the site drains to low land to the northeast. There is a drainage basin west of the site that flows through the site then discharges onto the northeast. This discharge will not be captured.

POST-DEVELOPMENT CONDITIONS

As previously described, this site is being developed into a subdivision. Slopes range from 1% to 6%. Basin 1 and 2 drains to the northeast of the site and collected separately. Basin 3 and 4 drains to the southeast of the site and detained jointly. Runoff drains from the developed areas to underground detention in the back of the curb of the proposed road.

SUMMARY OF INLETS

On the drainage plan you will see labels for all of the inlets for these calculations. The flows shown are for the 25-year return storm. The distance from the face of the curb to the center of the street is 15 feet.

SUMMARY OF PIPES

All pipes used in this project are HDPE and RCP. Therefore, a manning's of 0.012 was used on all pipes in the analysis.

PIPE NETWORK STORAGE SUMMARY

The pipe network storage in these calculations detains flows from all of the developed areas of the site. Three pipe network storages are provided. The pipe network storage 1 is located in the north portion of the development. It is made of 518 linear feet of 30'' and 36" pipes and has a volume of 3,575 cf.

The pipe network storage 2 is located between lots. It is made of 143 linear feet of 30'' HDPE pipe and has a volume of 735 cf.

The pipe network storage 3 is located in the south portion of the development. It is made of 828 linear feet of 30'' and 36" pipes and has a volume of 3,185 cf. Water collected in the storm water system is discharged into the pipe network via curb inlets.

Concrete control structures are constructed at the end of the pipe network storage. This control structure uses a slotted weir to limit the discharge through the structure to that of the 2, 10, 25, and 100-year pre-development flow. The pipe network storage is designed to hold the 100-year storm event.

PRE-BASIN 4
C=0.48
I=6.5 IN/HR
A=3.41 AC
Q_{100} =10.54 CFS

PRE-BASIN 3
C=0.48
I=6.4 IN/HR
A=9.42 AC
Q_{100} =28.92 CFS

PRE-BASIN 2
C=0.48
I=6.0 IN/HR
A=6.07 AC
Q_{100} =17.39 CFS

PRE-BASIN 1
C=0.49
I=7.0 IN/HR
A=7.13 AC
Q_{100} =24.46 CFS

WETLANDS BOUNDARY

PROPOSED DETENTION POND

FM-4 FM-4 FM-4 FM-4 FM-3 FM-3

100 50 0 100

BY	REVISION	DATE

GNE Designing our client's success

GarNat Engineering, LLC
P.O. Box 116 (72018)
2909 Military Rd
Benton, AR 72015
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Fx (888) 900-3068
garnatengineering@gmail.com

CREEKSIDE ADDITION PHASE 2
ALL OF LOT 101 AND PART OF LOT 99
AND PART OF LOT 100, MIDLAND FARM SUBDIVISION
PART OF THE NE 1/4 NW 1/4, PART OF THE W 1/2 SE 1/4 NW 1/4 NE 1/4 SW 1/4 ALL IN
1/4 NW 1/4 AND THE NW 1/4 NE 1/4 SW 1/4 ALL IN
SECTION 12, T-1-S, R-14-W,
SALINE COUNTY, ARKANSAS

DRAFT

CONTENTS:
PRE DEVELOPMENT BASIN

PROJECT NO:
18054

DATE:
JULY 2022

SHEET NO:
1

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CREEKSIDE ADDITION PHASE 2
ALL OF LOT 101 AND PART OF LOT 99
AND PART OF LOT 100, MIDLAND FARM SUBDIVISION
PART OF THE NE 1/4 NW 1/4, PART OF THE W 1/2 SE 1/4 NW 1/4 NE 1/4 SW 1/4 ALL IN
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SECTION 12, T-1-S, R-14-W,
SALINE COUNTY, ARKANSAS

DRAFT

CONTENTS:

POST DEVELOPMENT BASIN

PROJECT NO:
18054

DATE:
JULY 2022

SHEET NO:
2

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Stormwater Calcs - Creekside Addition Phase 2
Using Rational Method

Pre-development

Calculated Tc values - Drainage Basin 1

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	100	feet	L1 =	500	feet		
n1 =	0.15	Sheet Flow	n1 =	0.07	Medium Brush and Trees	Sluggish Reaches, weedy, deep pools	
S1 =	0.09	ft/ft	S1 =	0.05	ft/ft		
$I_{assumed}$ =	6.10	inches	$I_{assumed}$ =	6.10	inches		
$Tc_{calculated}$	284	seconds	$Tc_{calculated}$	563	seconds		
$Tc_{calculated}$	4.73	minutes	$Tc_{calculated}$	9.39	minutes		
Tc =	14.12	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual				
I =	6.10	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual				
Use Tc =	**17.00**	minutes	I_{100} =	7.4	Inches	I_{10} =	5.3 Inches
			I_{50} =	6.8	Inches	I_5 =	4.8 Inches
			I_{25} =	6.10	Inches	I_2 =	4.1 Inches

Calculated Tc values - Drainage Basin 2

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	100	feet	L1 =	970	feet		
n1 =	0.15	Sheet Flow	n1 =	0.07	Medium Brush and Trees		
S1 =	0.07	ft/ft	S1 =	0.05	ft/ft		
$I_{assumed}$ =	5.30	inches	$I_{assumed}$ =	5.30	inches		
$Tc_{calculated}$	324	seconds	$Tc_{calculated}$	887	seconds		
$Tc_{calculated}$	5.40	minutes	$Tc_{calculated}$	14.78	minutes		
Tc =	20.18	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual				
I =	5.30	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual				
Use Tc =	**20.00**	minutes	I_{100} =	6.5	Inches	I_{10} =	4.8 Inches
			I_{50} =	5.9	Inches	I_5 =	4.3 Inches
			I_{25} =	5.30	Inches	I_2 =	3.6 Inches

Calculated Tc values - Drainage Basin 3

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	100	feet	L1 =	400	feet	L1 =	450	feet	
n1 =	0.15	Sheet Flow	n1 =	0.03	Clean, Straight	n1 =	0.07	Medium Brush and Trees	
S1 =	0.05	ft/ft	S1 =	0.04	ft/ft	S1 =	0.04	ft/ft	
$I_{assumed}$ =	5.20	inches	$I_{assumed}$ =	5.20	inches	$I_{assumed}$ =	5.20	inches	
$Tc_{calculated}$	361	seconds	$Tc_{calculated}$	338	seconds	$Tc_{calculated}$	603	seconds	
$Tc_{calculated}$	6.02	minutes	$Tc_{calculated}$	5.63	minutes	$Tc_{calculated}$	10.05	minutes	
Tc =	21.70	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual						
I =	5.20	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual						
Use Tc =	**21.50**	minutes	I_{100} =	6.4	Inches	I_{10} =	4.8	Inches	
			I_{50} =	5.8	Inches	I_5 =	4.2	Inches	
			I_{25} =	5.20	Inches	I_2 =	3.6	Inches	

Calculated Tc values - Drainage Basin 4

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	100	feet	L1 =	140	feet	L1 =	470	feet	
n1 =	0.15	Sheet Flow	n1 =	0.03	Clean, Straight	n1 =	0.07	Medium Brush and Trees	
S1 =	0.04	ft/ft	S1 =	0.04	ft/ft	S1 =	0.03	ft/ft	
$I_{assumed}$ =	5.30	inches	$I_{assumed}$ =	5.30	inches	$I_{assumed}$ =	5.30	inches	
$Tc_{calculated}$	383	seconds	$Tc_{calculated}$	179	seconds	$Tc_{calculated}$	669	seconds	
$Tc_{calculated}$	6.39	minutes	$Tc_{calculated}$	2.98	minutes	$Tc_{calculated}$	11.16	minutes	
Tc =	20.52	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual						
I =	5.30	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual						
Use Tc =	**20.50**	minutes	I_{100} =	6.5	Inches	I_{10} =	4.9	Inches	
			I_{50} =	5.9	Inches	I_5 =	4.3	Inches	
			I_{25} =	5.30	Inches	I_2 =	3.7	Inches	

Stormwater Calcs - Creekside Addition Phase 2
Using Rational Method

Post-development

Calculated Tc values - Drainage Basin 1

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

$Tc = \frac{i6 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$

L1 =	100	feet	L1 =	275	feet	L1 =	190	feet	L1 =	310	feet
n1 =	0.15	Sheet Flow	n1 =	0.07	Medium Brush and Trees	n1=	0.03	Clean, Straight	n1 =	0.013	Asphalt
S1 =	0.09	ft/ft	S1 =	0.09	ft/ft	S1 =	0.04	ft/ft	S1 =	0.03	ft/ft
$I_{assumed}$ =	5.70	inches	$I_{assumed}$ =	5.70	inches	$I_{assumed}$ =	5.70	inches	$I_{assumed}$ =	5.70	inches
$Tc_{calculated}$	292	seconds	$Tc_{calculated}$	339	seconds	$Tc_{calculated}$	208	seconds	$Tc_{calculated}$	184	seconds
$Tc_{calculated}$	4.86	minutes	$Tc_{calculated}$	5.65	minutes	$Tc_{calculated}$	3.47	minutes	$Tc_{calculated}$	3.07	minutes

Tc =	17.06	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	5.70	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc =	**17.00**	minutes	I_{100} =	7 Inches	I_{10} = 5.1 Inches
			I_{50} =	6.3 Inches	I_5 = 4.6 Inches
			I_{25} =	5.7 Inches	I_2 = 3.9 Inches

Calculated Tc values - Drainage Basin 2

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

$Tc = \frac{i6 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	100	feet	L1 =	415	feet	L1 =	150	feet	L1 =	435	feet
n1 =	0.15	Sheet Flow	n1 =	0.07	Medium Brush and Trees	n1 =	0.03	Clean, Straight	n1 =	0.013	Asphalt
S1 =	0.07	ft/ft	S1 =	0.06	ft/ft	S1 =	0.04	ft/ft	S1 =	0.005	ft/ft
$I_{assumed}$ =	5.00	inches	$I_{assumed}$ =	5.00	inches	$I_{assumed}$ =	5.00	inches	$I_{assumed}$ =	5.00	inches
$Tc_{calculated}$	332	seconds	$Tc_{calculated}$	516	seconds	$Tc_{calculated}$	191	seconds	$Tc_{calculated}$	408	seconds
$Tc_{calculated}$	5.53	minutes	$Tc_{calculated}$	8.61	minutes	$Tc_{calculated}$	3.18	minutes	$Tc_{calculated}$	6.80	minutes

Tc =	24.11	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	5.00	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc =	**24.00**	minutes	I_{100} =	6 Inches	I_{10} = 4.5 Inches
			I_{50} =	5.5 Inches	I_5 = 4.0 Inches
			I_{25} =	5.0 Inches	I_2 = 3.4 Inches

Calculated Tc values - Drainage Basin 3

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

$Tc = \frac{i6 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	100	feet	L1 =	400	feet	L1 =	770	feet
n1 =	0.15	Sheet Flow	n1 =	0.03	Clean, Straight	n1 =	0.013	Asphalt/Culvert
S1 =	0.04	ft/ft	S1 =	0.04	ft/ft	S1 =	0.005	ft/ft
$I_{assumed}$ =	5.20	inches	$I_{assumed}$ =	5.20	inches	$I_{assumed}$ =	5.20	inches
$Tc_{calculated}$	386	seconds	$Tc_{calculated}$	338	seconds	$Tc_{calculated}$	565	seconds
$Tc_{calculated}$	6.44	minutes	$Tc_{calculated}$	5.63	minutes	$Tc_{calculated}$	9.42	minutes

Tc =	21.49	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	5.20	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc =	**21.50**	minutes	I_{100} =	6.4 Inches	I_{10} = 4.7 Inches
			I_{50} =	5.8 Inches	I_5 = 4.2 Inches
			I_{25} =	5.2 Inches	I_2 = 3.6 Inches

Calculated Tc values - Drainage Basin 4

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

$Tc = \frac{i6 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	100	feet	L1 =	365	feet	L1 =	260	feet	L1 =	70	feet
n1 =	0.15	Smooth Concrete/Asphalt	n1 =	0.03	Clean, Straight	n1 =	0.07	Medium Brush and	n1 =	0.013	Asphalt/Culvert
S1 =	0.04	ft/ft	S1 =	0.04	ft/ft	S1 =	0.03	ft/ft	S1 =	0.005	ft/ft
$I_{assumed}$ =	5.10	inches	$I_{assumed}$ =	5.10	inches	$I_{assumed}$ =	5.10	inches	$I_{assumed}$ =	5.10	inches
$Tc_{calculated}$	389	seconds	$Tc_{calculated}$	322	seconds	$Tc_{calculated}$	477	seconds	$Tc_{calculated}$	135	seconds
$Tc_{calculated}$	6.49	minutes	$Tc_{calculated}$	5.37	minutes	$Tc_{calculated}$	7.94	minutes	$Tc_{calculated}$	2.25	minutes

Tc =	22.05	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	5.10	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc =	**22.00**	minutes	I_{100} =	6.2 Inches	I_{10} = 4.6 Inches
			I_{50} =	5.7 Inches	I_5 = 4.1 Inches
			I_{25} =	5.1 Inches	I_2 = 3.5 Inches

Stormwater Calcs - Creekside Addition Phase 2
using Rational Method

Pre-development

Calculated C values - Drainage Basin 1

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Table 400-2 of City of Bryant Drainage Manual)
Pasture/Range								
Forest/Woodlands	7.13	0.52	0.48	0.45	0.41	0.39	0.35	Steep, Over 7%
Total Area =	**7.13**	**0.52**	**0.48**	**0.45**	**0.41**	**0.39**	**0.35**	

Calculated C values - Drainage Basin 2

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Table 400-2 of City of Bryant Drainage Manual)
Pasture/Range	2.28	0.53	0.49	0.46	0.42	0.4	0.37	Steep, Over 7%
Forest/Woodlands	3.79	0.47	0.43	0.4	0.36	0.34	0.31	Average, 2-7%
Total Area =	**6.07**	**0.49**	**0.45**	**0.42**	**0.38**	**0.36**	**0.33**	

Calculated C values - Drainage Basin 3

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Table 400-2 of City of Bryant Drainage Manual)
Pasture/Range	4.56	0.53	0.49	0.46	0.42	0.4	0.37	Steep, Over 7%
Forest/Woodlands	4.86	0.47	0.43	0.4	0.36	0.34	0.31	Average, 2-7%
Total Area =	**9.42**	**0.50**	**0.46**	**0.43**	**0.39**	**0.37**	**0.34**	

Calculated C values - Drainage Basin 4

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Table 400-2 of City of Bryant Drainage Manual)
Pasture/Range	0.93	0.49	0.45	0.42	0.38	0.36	0.33	Average, 2-7%
Forest/Woodlands	2.48	0.47	0.43	0.4	0.36	0.34	0.31	Average, 2-7%
Total Area =	**3.41**	**0.48**	**0.44**	**0.41**	**0.37**	**0.35**	**0.32**	

Stormwater Calcs - Creekside Addition Phase 2
using Rational Method

Post-development

Calculated C values - Drainage Basin 1

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2
Single Family House	5.83	0.7	0.65	0.6	0.5	0.4	0.35
Off-Site	1.30	0.52	0.48	0.45	0.41	0.39	0.35
Total Area =	**7.13**	**0.67**	**0.62**	**0.57**	**0.48**	**0.40**	**0.35**

(C values taken from Table 400-2 of City of Bryant Drainage Manual)

Residential Table 2.1 City of Little Rock Manual
Steep, Over 7%

Calculated C values - Drainage Basin 2

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2
Single Family House	4.05	0.7	0.65	0.6	0.5	0.4	0.35
Off-Site	2.02	0.49	0.45	0.42	0.38	0.36	0.33
Total Area =	**6.07**	**0.63**	**0.58**	**0.54**	**0.46**	**0.39**	**0.34**

(C values taken from Table 400-2 of City of Bryant Drainage Manual)

Residential Table 2.1 City of Little Rock Manual

Calculated C values - Drainage Basin 3

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2
Single Family House	3.98	0.70	0.65	0.60	0.50	0.40	0.35
Off-Site	5.44	0.49	0.45	0.42	0.38	0.36	0.33
Total Area =	**9.42**	**0.58**	**0.53**	**0.50**	**0.43**	**0.38**	**0.34**

(C values taken from Table 400-2 of City of Bryant Drainage Manual)

Residential Table 2.1 City of Little Rock Manual

Calculated C values - Drainage Basin 4

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2
Single Family House	1.61	0.70	0.65	0.60	0.50	0.40	0.35
Off-Site	1.80	0.49	0.45	0.42	0.38	0.36	0.33
Total Area =	**3.41**	**0.59**	**0.54**	**0.50**	**0.44**	**0.38**	**0.34**

(C values taken from Table 400-2 of City of Bryant Drainage Manual)

Residential Table 2.1 City of Little Rock Manual

Stormwater Calcs - Creekside Addition Phase 2
using Rational Method

Pre-development

Drainage Basin 1

Q_{100} =	27.44 CFS	Q_{50}=	23.27 CFS	Q_{25} =	19.57 CFS	Q_{10} =	15.49 CFS	Q_5 =	13.35 CFS	Q_2 =	10.23 CFS
c =	0.52	c =	0.48	c =	0.45	c =	0.41	c =	0.39	c =	0.35
i=	7.40 in/hr	i=	6.80 in/hr	i=	6.10 in/hr	i=	5.30 in/hr	i=	4.80 in/hr	i=	4.10 in/hr
A=	7.13 acres	A=	7.13 acres	A=	7.13 acres	A=	7.13 acres	A=	7.13 acres	A=	7.13 acres

Drainage Basin 2

Q_{100} =	19.43 CFS	Q_{50}=	16.21 CFS	Q_{25} =	13.59 CFS	Q_{10} =	11.15 CFS	Q_5 =	9.46 CFS	Q_2 =	7.27 CFS
c =	0.49	c =	0.45	c =	0.42	c =	0.38	c =	0.36	c =	0.33
i=	6.50 in/hr	i=	5.90 in/hr	i=	5.30 in/hr	i=	4.80 in/hr	i=	4.30 in/hr	i=	3.60 in/hr
A=	6.07 acres	A=	6.07 acres	A=	6.07 acres	A=	6.07 acres	A=	6.07 acres	A=	6.07 acres

Drainage Basin 3

Q_{100} =	30.09 CFS	Q_{50}=	25.08 CFS	Q_{25} =	21.02 CFS	Q_{10} =	17.59 CFS	Q_5 =	14.60 CFS	Q_2 =	11.50 CFS
c =	0.50	c =	0.46	c =	0.43	c =	0.39	c =	0.37	c =	0.34
i=	6.40 in/hr	i=	5.80 in/hr	i=	5.20 in/hr	i=	4.80 in/hr	i=	4.20 in/hr	i=	3.60 in/hr
A=	9.42 acres	A=	9.42 acres	A=	9.42 acres	A=	9.42 acres	A=	9.42 acres	A=	9.42 acres

Drainage Basin 4

Q_{100} =	10.54 CFS	Q_{50}=	8.76 CFS	Q_{25} =	7.33 CFS	Q_{10} =	6.11 CFS	Q_5 =	5.07 CFS	Q_2 =	3.98 CFS
c =	0.48	c =	0.44	c =	0.41	c =	0.37	c =	0.35	c =	0.32
i=	6.50 in/hr	i=	5.90 in/hr	i=	5.30 in/hr	i=	4.90 in/hr	i=	4.30 in/hr	i=	3.70 in/hr
A=	3.41 acres	A=	3.41 acres	A=	3.41 acres	A=	3.41 acres	A=	3.41 acres	A=	3.41 acres

Post-development

Drainage Basin 1

Q_{100} =	33.30 CFS	Q_{50}=	27.81 CFS	Q_{25} =	23.27 CFS	Q_{10} =	17.58 CFS	Q_5 =	13.06 CFS	Q_2 =	9.73 CFS
c =	0.67	c =	0.62	c =	0.57	c =	0.48	c =	0.40	c =	0.35
i=	7.00 in/hr	i=	6.30 in/hr	i=	5.70 in/hr	i=	5.10 in/hr	i=	4.60 in/hr	i=	3.90 in/hr
A=	7.13 acres	A=	7.13 acres	A=	7.13 acres	A=	7.13 acres	A=	7.13 acres	A=	7.13 acres

Drainage Basin 2

Q_{100} =	22.95 CFS	Q_{50}=	19.48 CFS	Q_{25} =	16.39 CFS	Q_{10} =	12.57 CFS	Q_5 =	9.39 CFS	Q_2 =	7.09 CFS
c =	0.63	c =	0.58	c =	0.54	c =	0.46	c =	0.39	c =	0.34
i=	6.00 in/hr	i=	5.50 in/hr	i=	5.00 in/hr	i=	4.50 in/hr	i=	4.00 in/hr	i=	3.40 in/hr
A=	6.07 acres	A=	6.07 acres	A=	6.07 acres	A=	6.07 acres	A=	6.07 acres	A=	6.07 acres

Drainage Basin 3

Q_{100} =	34.89 CFS	Q_{50}=	29.20 CFS	Q_{25} =	24.30 CFS	Q_{10} =	19.07 CFS	Q_5 =	14.91 CFS	Q_2 =	11.48 CFS
c =	0.58	c =	0.53	c =	0.50	c =	0.43	c =	0.38	c =	0.34
i=	6.40 in/hr	i=	5.80 in/hr	i=	5.20 in/hr	i=	4.70 in/hr	i=	4.20 in/hr	i=	3.60 in/hr
A=	9.42 acres	A=	9.42 acres	A=	9.42 acres	A=	9.42 acres	A=	9.42 acres	A=	9.42 acres

Drainage Basin 4

Q_{100} =	12.46 CFS	Q_{50}=	10.58 CFS	Q_{25} =	8.78 CFS	Q_{10} =	6.85 CFS	Q_5 =	5.30 CFS	Q_2 =	4.05 CFS
c =	0.59	c =	0.54	c =	0.50	c =	0.44	c =	0.38	c =	0.34
i=	6.20 in/hr	i=	5.70 in/hr	i=	5.10 in/hr	i=	4.60 in/hr	i=	4.10 in/hr	i=	3.50 in/hr
A=	3.41 acres	A=	3.41 acres	A=	3.41 acres	A=	3.41 acres	A=	3.41 acres	A=	3.41 acres

Detention Volume

Pond-1
for Q100

Cundev=	0.52	
Iundev=	7.40	in/hr
Cdev=	0.67	
Idev=	7.00	in/hr
R=	0.82	
A=	4.26	acres
Tc=	17.00	minutes
	60	sec/min

Detention Volume= 3,573 cubic feet

Pond-2
for Q100

Cundev=	0.49	
Iundev=	6.50	in/hr
Cdev=	0.63	
Idev=	6.00	in/hr
R=	0.58	
A=	0.88	acres
Tc=	24.00	minutes
	60	sec/min

Detention Volume= 734 cubic feet

Pond-3
for Q100

Cundev=	0.50	
Iundev=	6.40	in/hr
Cdev=	0.58	
Idev=	6.40	in/hr
R=	0.51	
A=	4.84	acres
Tc=	21.50	minutes
	60	sec/min

Detention Volume= 3,184 cubic feet

R= (Cdev*Idev)-(Cundev*Iundev)
Detention Volume= R*A*Tc*60

Stormwater Calcs - Creekside Addition Phase 2
using Rational Method
Detention Culverts

Pond 1

PIPE NAME	DIAMETER (IN)	LENGTH (FT)	AREA (SF)	VOLUME (CF)
DETENTION PIPE 1	36.00	179	7.07	1265.28
DETENTION PIPE 2	36.00	173	7.07	1222.86
DETENTION PIPE 3	36.00	92	7.07	650.31
DETENTION PIPE 4	36.00	32	7.07	226.19
DETENTION PIPE 4	30.00	42	4.91	206.17
STORM DRAINAGE BOX	48.00	4	12.57	50.27
TOTAL		522		3621.08

Pond 2

PIPE NAME	DIAMETER (IN)	LENGTH (FT)	AREA (SF)	VOLUME (CF)
DETENTION PIPE 1	30.00	143	4.91	701.95
STORM DRAINAGE BOX	48.00	4	12.57	50.27
			0.00	0.00
			0.00	0.00
TOTAL		147		752.22

Pond 3

PIPE NAME	DIAMETER (IN)	LENGTH (FT)	AREA (SF)	VOLUME (CF)
DETENTION PIPE 1	30.00	381	4.91	1870.23
DETENTION PIPE 2	24.00	381	3.14	1196.95
DETENTION PIPE 3	18.00	33	1.77	58.32
DETENTION PIPE 4	18.00	33	1.77	58.32
STORM DRAINAGE BOX	48.00	4	12.57	50.27
TOTAL		832		3234.07

Stormwater Calcs - Creekside Addition Phase 2
Box Culvert Capacity

Q_{10} =	106.55	CFS
Q_{25} =	117.20	CFS
Q_{100} =	133.19	CFS

Manning's Equation Method	
Contributing Basin, Ac	68.30
Design Flow, Qd=	117.20
No. Barrels	1
Height of Barrel=	2
Width of Barrel=	4
Area Opening One Barrel=	8
Wetted Perimeter One Barrel=	8
Hydraulic Radius of One Barrel=	1.00
Roughness, N=	0.012
Slope, S=	1.50%
Flow Capacity, Qcap of One Barrel=	121.33
Total Flow Capacity, Qct=	121.33

OK

97%

Stormwater Calcs - Creekside Addition Phase 2
Pipe Capacity

Outlet Pipes **Q25**

Pipe	From	To	Design Flow (cfs):	Slope (ft/ft):	Diameter (inches)	No. Pipes	Manning's	Area Full (sf)	Wetted Perimeter Full (ft)	Hydraulic Radius Full (ft)	Flow Capacity (cfs)	% Capacity
18'' HDPE	JB-3	FES-1	11.69	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	65%
18'' HDPE	CI-13	FES-2	10.80	0.0113	18	1	0.012	1.77	4.712	0.375	12.10	89%

Drainage Pipes **Q25**

Pipe	From	To	Design Flow (cfs):	Slope (ft/ft):	Diameter (inches)	No. Pipes	Manning's	Area Full (sf)	Wetted Perimeter Full (ft)	Hydraulic Radius Full (ft)	Flow Capacity (cfs)	% Capacity
18'' RCP	CI-1	CI-2	4.84	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	27%
18'' RCP	CI-2	CI-3	6.25	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	35%
18'' RCP	CI-9	CI-10	5.90	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	33%
18'' HDPE	CI-10	JB-2	7.08	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	39%
18'' HDPE	JB-2	CI-12	8.27	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	46%
18'' RCP	CI-15	CI-12	2.40	0.0250	18	1	0.012	1.77	4.712	0.375	17.99	13%

Stormwater Calcs -
using Rational Method
Weir & Detention Pond Sizing - Pond 1

Storm Event	Flow (cfs)
Q2 - Pre	6.11
Q5 - Pre	7.97
Q10 - Pre	9.26
Q25 - Pre	11.69
Q50 - Pre	13.90
Q100 - Pre	16.39
Q25 - Post	13.91

Rectangular Weir

Q2

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.25**
H	**1.5**
Q (cfs)	**5.74**

15"

Q10

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.25**
H	**2**
Q (cfs)	**8.84**

15"

Q25

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.25**
H	**2.5**
Q (cfs)	**12.35**

15"

Q100

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.25**
H	**3**
Q (cfs)	**16.24**

15"

Stormwater Calcs -
using Rational Method
Weir & Detention Pond Sizing - Pond 2

Storm Event	Flow (cfs)
Q2 - Pre	1.05
Q5 - Pre	1.37
Q10 - Pre	1.62
Q25 - Pre	1.97
Q50 - Pre	2.35
Q100 - Pre	2.82
Q25 - Post	2.38

Rectangular Weir

Q2

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**0.25**
H	**1**
Q (cfs)	**0.63**

3"

Q10

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**0.25**
H	**1.5**
Q (cfs)	**1.15**

3"

Q25

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**0.25**
H	**2**
Q (cfs)	**1.77**

3"

Q100

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**0.25**
H	**2.5**
Q (cfs)	**2.47**

3"

Stormwater Calcs -
using Rational Method
Weir & Detention Pond Sizing - Pond 2

Storm Event	Flow (cfs)
Q2 - Pre	5.91
Q5 - Pre	7.50
Q10 - Pre	9.04
Q25 - Pre	10.80
Q50 - Pre	12.89
Q100 - Pre	15.46
Q25 - Post	11.56

Rectangular Weir

Q2

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.5**
H	**1.33**
Q (cfs)	**5.75**

18"

Q10

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.5**
H	**1.75**
Q (cfs)	**8.68**

Q25

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.5**
H	**2**
Q (cfs)	**10.61**

Q100

Q (cfs)	**CLH^1.5**
C	**2.5**
L	**1.5**
H	**2.5**
Q (cfs)	**14.82**

Cl-9 4' DIA ARDOT TYPE MO W_3'-6" WING
ROAD STA:9+68.2
RIM:338.09
INV OUT:333.59-18" RCP

Cl-9
C=0.50
I=7.2 IN/HR
A=1.17 AC
Q_{10}=4.21 CFS

Pipe - (16) 49'-18" RCP@2.500%

Cl-16 4' DIA ARDOT TYPE MO
ROAD STA:4+64.1
RIM:331.81
INV OUT:326.26-18" RCP

Cl-15 4' DIA ARDOT TYPE MO
ROAD STA:7+68.9
INV OUT:328.82-

Cl-16
C=0.90
I=7.2 IN/HR
A=0.29 AC
Q_{10}=1.88 CFS

Cl-15
C=0.50
I=7.2 IN/HR
A=1.37 AC
Q_{10}=4.93 CFS

Cl-17
C=0.50
I=7.2 IN/HR
A=0.35 AC
Q_{10}=1.26 CFS

FES-3
FL:326.41-48" X 24"

Pipe - (23) 32'-18" RCP@0.120%

Cl-14
C=0.90
I=7.2 IN/HR
A=0.22 AC
Q_{10}=1.43 CFS

FES-4
FL:326.00-48" X 24"

(19) 454'-24" ADS@-0.080%

Cl-14 5' DIA ARDOT TYPE MO
ROAD STA:0+10.4
RIM:329.24
INV IN:326.58-24" ADS
INV IN:326.00-18" RCP

Cl-13 5' DIA ARDOT TYPE MO & WEIR-3
ROAD STA:4+64.2
RIM:331.76
INV IN:326.22-30" ADS
INV IN:326.22-18" RCP
INV OUT:326.22-24" ADS
INV OUT:326.22-18" ADS

Cl-13
C=0.90
I=7.2 IN/HR
A=0.24 AC
Q_{10}=1.56 CFS

DIA ARDOT TYPE MO
ROAD STA:7+70.0
RIM:333.88
INV IN:328.00-18" ADS
INV IN:328.00-18" RCP
INV OUT:326.40-30" ADS

FES-2
FL:326.00-18" ADS

Cl-12
C=0.50
I=7.2 IN/HR
A=0.26 AC
Q_{10}=0.91 CFS

Cl-1
C=0.50
I=7.2 IN/HR
A=0.96 AC
Q_{10}=3.46 CFS

Pipe - (13) 40'-18" RCP@-2.500%

Cl-10
C=0.50
I=7.2 IN/HR
A=0.33 AC
Q_{10}=1.15 CFS

JB-2 4'X4' ARDOT TYPE E
ROAD STA:8+14.8
RIM:334.59
IN:329.53-18" ADS
OUT:329.43-18" ADS

57'-18" ADS@2.500%

Cl-2 4' DIA ARDOT TYPE MO

Cl-2
C=0.50
I=7.2 IN/HR
A=0.28 AC
Q_{10}=1.01 CFS

Cl-3 5' DIA ARDOT TYPE MO
ROAD STA:6+16.0
RIM:339.18
INV IN:330.66-36" ADS
INV OUT:333.75-18" RCP

Cl-3
C=0.90
I=7.2 IN/HR
A=0.04 AC
Q_{10}=0.26 CFS

Cl-8 5' DIA ARDOT TYPE MO
ROAD STA:0+00.0
RIM:335.87
INV OUT:330.08-30" ADS

Cl-8
C=0.50
I=7.2 IN/HR
A=0.88 AC
Q_{10}=3.17 CFS

Pipe - (5) 143'-30" ADS@0.058%

JB-1 5'X5' ARDOT TYPE E & WEIR-2
ROAD STA:1+42.7
RIM:333.71
INV IN:330.00-30" ADS

Cl-5
C=0.50
I=7.2 IN/HR
A=0.87 AC
Q_{10}=3.13 CFS

Pipe - (12) 179'-36" ADS@-0.046%

Cl-5 5' DIA ARDOT TYPE M
ROAD STA:7+95.3
RIM:335.93
INV IN:330.59-36" RCP

Pipe - (20) 32'-36" RCP@-0.040%

Cl-4
C=0.50
I=7.2 IN/HR
A=0.20 AC
Q_{10}=0.72 CFS

TYPE MO
STA:7+95.0
RIM:335.92
-36" ADS
-36" ADS
-36" RCP

Pipe - (11) 173'-36" ADS@-0.040%

FES-1
FL:330.07-18" ADS

Cl-7
C=0.50
I=7.2 IN/HR
A=1.89 AC
Q_{10}=6.80 CFS

Cl-7 5' DIA ARDOT TYPE MO W_3'-6" WING
ROAD STA:10+86.7
RIM:334.92
INV OUT:330.56-30" RCP

Pipe - (9) 42'-30" RCP@0.046%

Cl-6 5' DIA ARDOT TYPE MO
ROAD STA:10+60.7
RIM:334.89
INV IN:330.94-36" ADS
INV IN:330.54-30" RCP

Cl-6
C=0.50
I=7.2 IN/HR
A=0.51 AC
Q_{10}=1.84 CFS

ADS@-0.046%

E & WEIR-1

RIM:335.21
INV OUT:330.50-18" ADS
INV OUT:330.50-36" ADS
INV OUT:330.50-36" ADS

Pipe - (8) 17'-18" ADS@2.500%

N

80 40 0 80

BY	REVISION	DATE

GNE Designing our client's success

GarNat Engineering, LLC
P.O. Box 116 (72018)
2909 Military Rd
Benton, AR 72015
Ph (501) 408-4650
Fx (888) 900-3068
garnatengineering@gmail.com

CREEKSIDE ADDITION PHASE 2
ALL OF LOT 101 AND PART OF LOT 99
AND PART OF LOT 100, MIDLAND FARM SUBDIVISION
PART OF THE NE 1/4 NW 1/4, PART OF THE W 1/2 SE
1/4 NW 1/4 AND THE NW 1/4 SW 1/4 ALL IN
SECTION 12, T-1-S, R-14-W,
SALINE COUNTY, ARKANSAS

PRELIMINARY

CONTENTS:

INLET BASIN MAP

PROJECT NO:
18054

DATE:
AUGUST 2022

SHEET NO:
3

J:\Projects\2018 Projects\18054 Creekside Addition\Drawings\DWGs\18054-ADSDR-Creekside-Addition-Phase-2-PM-031722-Drainage Basin.dwg

Stormwater Calcs - Creekside Addition Phase 2
Using Rational Method

Post-development Basin

Calculated Tc values - Drainage Basin CI-1

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	700	feet
n1 =	0.013	Smooth Concrete/Asphalt
S1 =	0.031	ft/ft
$I_{assumed}$ =	7.20	inches
$Tc_{calculated}$	271	seconds
$Tc_{calculated}$	4.52	minutes
Tc =	4.52	minutes
I =	7.20	inches
Use Tc =	**5.00**	minutes

Calculated Tc values - Drainage Basin CI-7

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	650	feet
n1 =	0.013	Smooth Concrete/Asphalt
S1 =	0.031	ft/ft
$I_{assumed}$ =	7.20	inches
$Tc_{calculated}$	259	seconds
$Tc_{calculated}$	4.32	minutes
Tc =	4.32	minutes
I =	7.20	inches
Use Tc =	**5.00**	minutes

Stormwater Calcs - Creekside Addition Phase 2
using Rational Method
POST-DEV C VALUES

CI-1

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.96	0.5	0.6	0.7	Residential
Total Area =	**0.96**	**0.50**	**0.60**	**0.70**	

CI-2

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.28	0.5	0.6	0.7	Residential
Total Area =	**0.28**	**0.50**	**0.60**	**0.70**	

CI-3

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.04	0.5	0.6	0.7	Residential
Total Area =	**0.04**	**0.50**	**0.60**	**0.70**	

CI-4

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.20	0.5	0.6	0.7	Residential
Total Area =	**0.20**	**0.50**	**0.60**	**0.70**	

CI-5

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.87	0.5	0.6	0.7	Residential
Total Area =	**0.87**	**0.50**	**0.60**	**0.70**	

CI-6

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.51	0.5	0.6	0.7	Residential
Total Area =	**0.51**	**0.50**	**0.60**	**0.70**	

CI-7

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	1.89	0.5	0.6	0.7	Residential
Total Area =	1.89	**0.50**	**0.60**	**0.70**	

CI-8

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.88	0.5	0.6	0.7	Residential
Total Area =	**0.88**	**0.50**	**0.60**	**0.70**	

CI-9

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	1.17	0.5	0.6	0.7	Residential
Total Area =	**1.17**	**0.50**	**0.60**	**0.70**	

CI-10

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.33	0.5	0.6	0.7	Residential
Total Area =	**0.33**	**0.50**	**0.60**	**0.70**	

CI-11

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.17	0.5	0.6	0.7	Residential
Total Area =	**0.17**	**0.50**	**0.60**	**0.70**	

CI-12

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.26	0.5	0.6	0.7	Residential
Total Area =	**0.26**	**0.50**	**0.60**	**0.70**	

CI-13

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.24	0.9	0.92	0.97	Residential
Total Area =	**0.24**	**0.90**	**0.92**	**0.97**	

CI-14

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.22	0.9	0.92	0.97	Residential
Total Area =	**0.22**	**0.90**	**0.92**	**0.97**	

CI-15

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.35	0.5	0.6	0.7	Residential
Total Area =	**0.35**	**0.50**	**0.60**	**0.70**	

CI-16

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	0.29	0.9	0.92	0.97	Residential
Total Area =	**0.29**	**0.90**	**0.92**	**0.97**	

CI-17

	Area	C_{10}	C_{25}	C_{100}	(C values taken from Table 400-2 of City of Bryant Drainage Manual)
	1.37	0.5	0.6	0.7	Residential
Total Area =	**1.37**	**0.50**	**0.60**	**0.70**	

Stormwater Calcs - Creekside Addition Phase 2
using Rational Method
Post Development Flowrates

CI-1

Q_{10} =	3.46	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.96	acres

CI-2

Q_{10} =	1.01	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.28	acres

CI-3

Q_{10} =	0.14	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.04	acres

CI-4

Q_{10} =	0.72	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.20	acres

CI-5

Q_{10} =	3.13	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.87	acres

CI-6

Q_{10} =	1.84	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.51	acres

CI-7

Q_{10} =	6.80	CFS
c =	0.50	
i=	7.20	in/hr
A=	1.89	acres

CI-8

Q_{10} =	3.17	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.88	acres

CI-9

Q_{10} =	4.21	CFS
c =	0.50	
i=	7.20	in/hr
A=	1.17	acres

CI-10

Q_{10} =	1.19	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.33	acres

CI-11

Q_{10} =	0.61	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.17	acres

CI-12

Q_{10} =	0.94	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.26	acres

CI-13

Q_{10} =	1.56	CFS
c =	0.90	
i=	7.20	in/hr
A=	0.24	acres

CI-14

Q_{10} =	1.43	CFS
c =	0.90	
i=	7.20	in/hr
A=	0.22	acres

CI-15

Q_{10} =	1.26	CFS
c =	0.50	
i=	7.20	in/hr
A=	0.35	acres

CI-16

Q_{10} =	1.88	CFS
c =	0.90	
i=	7.20	in/hr
A=	0.29	acres

CI-17

Q_{10} =	4.93	CFS
c =	0.50	
i=	7.20	in/hr
A=	1.37	acres

Creekside Addition Phase 2 GUTTER SPREAD 10-YR STORM

CI-1

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	3.46	cfs	Q= Flowrate(cfs)
n	0.012		n=manning's number
k_u	0.56		k=0.56
S_x	0.028		S_x= cross slope
S_L	0.031		S_L= longitudinal slope
T	**6.78**	ft	T= Gutter Spread

CI-2

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.01	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.017	
T	**4.58**	ft

CI-3

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	0.14	cfs
n	0.012	
k_u	0.56	
S_x	0.028	
S_L	0.03	
T	**2.10**	ft

CI-4

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	0.72	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**3.68**	ft

CI-5

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	3.13	cfs
n	0.012	
k_u	0.56	
S_x	0.028	
S_L	0.03	
T	**6.58**	ft

CI-6

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.84	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**5.22**	ft

CI-7

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	6.80	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**8.43**	ft

CI-8

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	3.17	cfs
n	0.012	
k_u	0.56	
S_x	0.028	
S_L	0.03	
T	**6.61**	ft

CI-9

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	4.21	cfs
n	0.012	
k_u	0.56	
S_x	0.028	
S_L	0.03	
T	**7.35**	ft

CI-10

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.19	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**4.38**	ft

CI-11

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	0.61	cfs
n	0.012	
k_u	0.56	
S_x	0.02	
S_L	0.02	
T	**4.75**	ft

CI-12

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	0.94	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**4.00**	ft

CI-13

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.56	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**4.84**	ft

CI-14

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.43	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**4.69**	ft

CI-15

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.26	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**4.48**	ft

CI-16

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	1.88	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**5.20**	ft

CI-17

$$T = \left(\frac{Q^* n}{k_u^* S_x^{1.67} * S_L^{0.5}} \right)^{.375}$$

Q	4.93	cfs
n	0.012	
k_u	0.56	
S_x	0.03	
S_L	0.03	
T	**7.47**	ft

Creekside Addition Phase 2 - CURB INLETS

10-YEAR STORM

Area #	Area	I	C	Q (cfs)	Weir Q=3.0LY^1.5 Q (cfs)	Y (ft)	Required L (ft)	Actual L (ft)	
CI-1	0.96	7.20	0.50	3.46	3.46	0.49	**3.36**	**4**	4' box
CI-2	0.28	7.20	0.50	1.01	1.01	0.49	**0.98**	**4**	4' box
CI-3	0.04	7.20	0.90	0.26	0.26	0.49	**0.25**	**5**	5' box
CI-4	0.20	7.20	0.50	0.72	0.72	0.49	**0.70**	**5**	5' box
CI-5	0.87	7.20	0.50	3.13	3.13	0.49	**3.04**	**5**	5' box
CI-6	0.51	7.20	0.50	1.84	1.84	0.49	**1.78**	**5**	5' box
CI-7	1.89	7.20	0.50	6.80	6.80	0.49	**6.61**	**7'-6"**	5' box with 3'-6" wing
CI-8	0.88	7.20	0.50	3.17	3.17	0.49	**3.08**	**5**	5' box
CI-9	1.17	7.20	0.50	4.21	4.21	0.49	**4.09**	**7'-6"**	4' box with 3'-6" wing
CI-10	0.33	7.20	0.50	1.19	1.19	0.49	**1.15**	**4**	4' box
CI-11	0.17	7.20	0.50	0.61	0.61	0.49	**0.59**	**4**	4' box
CI-12	0.26	7.20	0.50	0.94	0.94	0.49	**0.91**	**5**	5' box
CI-13	0.24	7.20	0.90	1.56	1.56	0.49	**1.51**	**5**	5' box
CI-14	0.22	7.20	0.50	0.79	0.79	0.49	**0.77**	**5**	5' box
CI-15	0.35	7.20	0.50	1.26	1.26	0.49	**1.22**	**4**	4' box
CI-16	0.29	7.20	0.90	1.88	1.88	0.49	**1.83**	**4**	4' box
CI-17	1.37	7.20	0.50	4.93	4.93	0.49	**4.79**	**7'-6"**	4' box with 3'-6" wing