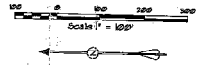


# DRAINAGE SYSTEM LAYOUT 1



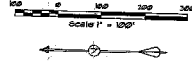
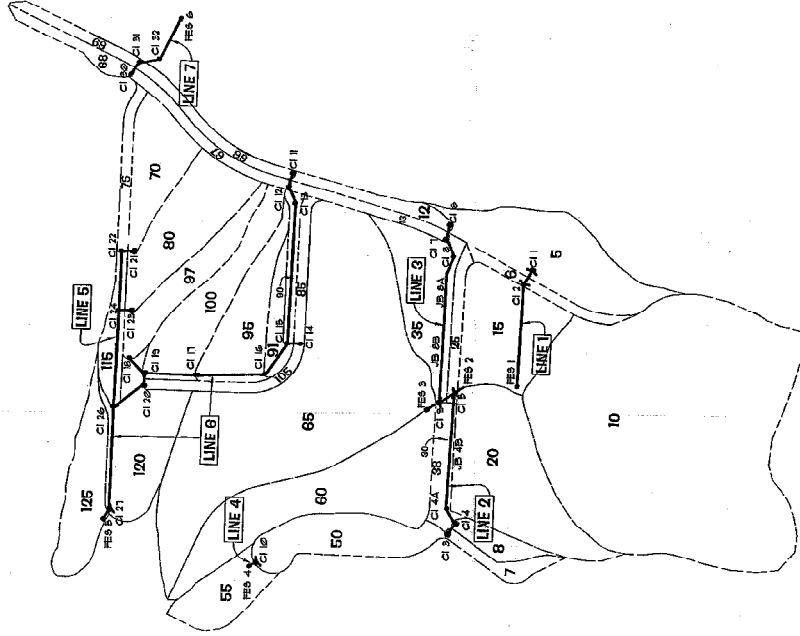
DESIGN BY  
 JOHN W. SHERMAN  
 CHECKED BY  
 JOHN W. SHERMAN  
 DATE  
 08/11/2010  
 SCALE  
 1" = 100'  
 JOB  
 FORT BELLEVILLE COMMUNITY CENTER  
 SHEET  
 1  
 OF 1 SHEET

**INTEGRITY ENGINEERING, INC.**  
 1001 N. WASHINGTON ST.  
 SUITE 200  
 FORT BELLEVILLE, IL 62201  
 PHONE: 618-291-1111  
 FAX: 618-291-1112  
 www.integrity-engineering.com

DESIGNED FOR  
 STORMWATER DRAINAGE  
 FOR THE CITY OF  
 FORT BELLEVILLE, ILLINOIS  
 RESIDENTIAL, BROWARD  
 COUNTY, FLORIDA  
 PROJECT NO. 10-001-001  
 LAYOUT 1

**ROLLA**  
 City of Rolla  
 100 N. MAIN ST.  
 ROLLA, MO 65801  
 PHONE: 573-391-8659

REVISIONS



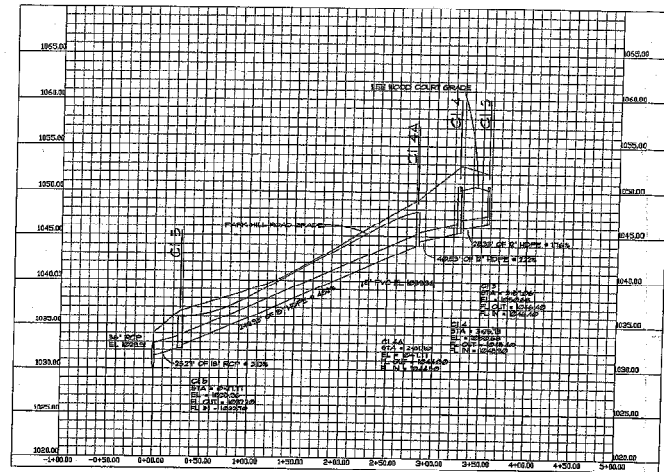
# DRAINAGE SYSTEM LAYOUT 2

PROJECT	STORMWATER DESIGN EXAMINE
DATE	04.11.2024
DESIGNER	RESIDENTIAL SUBDIVISION
SCALE	1" = 100'
DATE	04.11.2024
PROJECT	STORMWATER DESIGN EXAMINE
SHEET	2
TOTAL SHEETS	10 OF 10

**INTEGRITY ENGINEERING, INC.**  
 616 So. 100th St., Suite 100  
 Fort Worth, TX 76116  
 Phone: (817) 336-7800 / Fax: (817) 336-7811  
 www.integrity-engineering.com

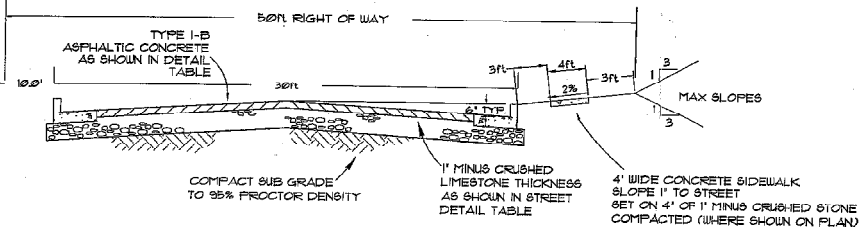
PROFESSIONAL ENGINEER  
 RESIDENTIAL SUBDIVISION  
 STORMWATER DRAINAGE SYSTEM  
 SHEET 2

**ROLLA**  
 City of Rolla  
 Department of Public Works  
 102 Main St. Rolla, MO  
 Phone: 314-364-6225



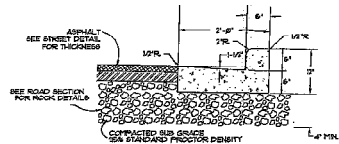
**LINE 2 PROFILE**

SCALE: 1" = 50'



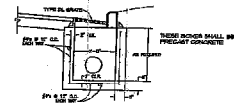
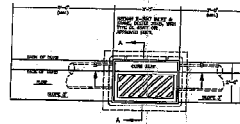
**TYPICAL 30' WIDE STREET SECTION**

N.T.S.

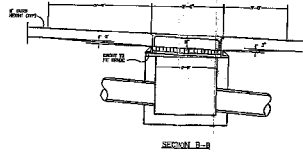


**TYPICAL CURB DETAIL**

N.T.S.



SECTION A-A



SECTION B-B

**CURB INLET TYPE A**

N.T.S.

**TYPE B CURB INLET:**

TYPE B SHALL BE SIMILAR TO TYPE A EXCEPT A DOUBLE INLET AND 6' LONG BOX

City of Rolla  
**ROLLA**  
 MISSOURI  
 PUBLIC WORKS  
 100 WEST BROADWAY  
 ROLLA, MISSOURI 65801  
 PHONE: 573-367-8559

PROJECT: STORMWATER TRENCH DRAINAGE  
 LOCATION: MAIN ST. AND  
 11TH ST.  
 RESURFACE SUBDIVISION  
 STORMWATER DRAINAGE SYSTEM  
 2/1/2021

**NIEGRITY ENGINEERING, INC.**  
 1015 S. MAIN ST. SUITE 100  
 ROLLA, MISSOURI 65801  
 PHONE: 573-367-8559  
 FAX: 573-367-8560  
 www.niegrity.com

DATE: 2/1/2021  
 DRAWN: NOT TO SCALE  
 JOB: STORMWATER DRAINAGE  
 SHEET: 3  
 OF 3 SHEETS

Table 8-1. Post-development time of concentration calculations for each inlet. Calculated using the Kirby-Hastings equation for overland flow and the Kirby equation for channelized flow.

SUBBASIN NO. INLET NO.	5				10				15				20				25				30				35				40				45				50																																																															
	C1	C2	FES 2	C13	C14	C15	C16	C17	C18	C19	C20	FES 1	C21	C22	C23	C24	C25	C26	C27	C28	C29	FES 3	C30	C31	C32	C33	C34	C35	C36	C37	C38	FES 4	C39	C40	C41	C42	C43	C44	C45	C46	C47	C48	C49	C50	C51	C52	C53	C54	C55	C56	C57	C58	C59	C60	C61	C62	C63	C64	C65	C66	C67	C68	C69	C70	C71	C72	C73	C74	C75	C76	C77	C78	C79	C80	C81	C82	C83	C84	C85	C86	C87	C88	C89	C90	C91	C92	C93	C94	C95	C96	C97	C98	C99	C100						
<b>OVERLAND FLOW: KERRY - HATHAWAY</b>																																																																																																				
Manning resistance coeff., n	0.40																																																																																																			
length of flow, L <sub>f</sub>	170																																																																																																			
high elevation	1071																																																																																																			
low elevation	1066																																																																																																			
low elevation slope, S <sub>f</sub>	0.029																																																																																																			
travel time, t <sub>o</sub>	8.23																																																																																																			
<b>CHANNELIZED FLOW: KIRKICH</b>																																																																																																				
length of flow, L <sub>f</sub>	210																																																																																																			
high elevation	1500																																																																																																			
low elevation	1060																																																																																																			
low elevation slope, S <sub>f</sub>	0.05																																																																																																			
travel time, t <sub>c</sub>	2.2																																																																																																			
<b>SUMMARY</b>																																																																																																				
Postdev flow	18.7																																																																																																			
Channelized flow	1.8																																																																																																			
Inlet time of concentration	20.5																																																																																																			

Table 8-2. Summary table of design calculations for sizing inlets. Rational equation is used to calculate flow to each inlet. Gutter flow is calculated using Izzard's equation. Inlet capacity is figured from design charts.

Line	Street	Flow to Inlet										Gutter Flow				Inlet Capacity				
		Inlet Number	Subbasin	Inlet Time (min)	Rational C	Rainfall Intensity (in/hr)	Contributing Area (ac)	Direct Runoff Q (cfs)	Bypass from Upstream (cfs)	Total Flow to Inlet (cfs)	On Grade / Swamp	Longitudinal Street Slope (%)	Depth of flow at curb (ft)	Width of flow in street (ft)	80% curb capacity (cfs)	80% curb opening cap. (cfs)	total inlet capacity (cfs)	number of inlets at location	TOTAL Capacity (cfs)	Inlet Bypass (cfs)
1	Country Ridge Rd	C1	5	16	0.5	4.6	1.59	3.7	0.7	S	-	0.20	3.45	-	-	-	2	-	-	
	Country Ridge Rd	C2	6	11	0.7	5.4	0.24	0.9	3.9	S	-	-	-	-	-	-	2	-	-	
	Off-Park Hill Rd	FES 2	10,15,20	20	0.5	4.6	10.91	25.1	-	-	-	-	-	-	-	-	-	-	-	
2	Lee Wood Court	C3	7	9	0.7	6.2	0.21	0.9	0.9	O.G.	9.0%	0.14	2.00	0.99	0.28	1.27	1	1.3	-	
	Lee Wood Court	C4	8	9	0.7	6.2	0.25	1.1	1.1	O.G.	9.0%	0.15	2.27	1.10	0.30	1.40	1	1.4	-	
	Park Hill Road	C5	25,30	3	0.7	6.2	0.36	1.6	1.6	S	-	0.10	-	-	-	-	2	-	-	
3	Country Ridge Rd	C6	12	4	0.7	6.2	0.26	1.1	1.1	O.G.	4.0%	0.18	2.82	1.10	0.34	1.44	1	1.4	-	
	Country Ridge Rd	C7	13	4	0.7	6.2	0.22	1.0	1.0	O.G.	4.0%	0.17	2.68	1.05	0.33	1.38	1	1.4	-	
	Park Hill Road	C9	35,38	19	0.5	4.6	1.29	3.0	3.0	S	-	0.15	2.15	-	-	-	2	-	-	
4	Park Hill Road	C10	10	15	0.7	5.4	0.91	3.4	3.4	S	-	0.15	2.15	-	-	-	2	-	-	
	Det. basin ent. 1		55,60,65	22	0.5	4.6	8.06	18.5	-	-	-	-	-	-	-	-	-	-	-	
6	Country Ridge Rd	C11	66	9	0.7	6.2	0.27	1.2	1.2	O.G.	0.5%	0.24	4.60	1.01	0.48	1.49	1	1.5	-	
	Country Ridge Rd	C12	67	9	0.7	6.2	0.27	1.2	1.2	O.G.	0.5%	0.24	4.60	1.01	0.48	1.49	1	1.5	-	
	Bristol Drive	C14	85	4	0.7	6.2	0.21	0.9	0.9	O.G.	9.0%	0.14	2.00	0.99	0.28	1.27	1	1.3	-	
	Bristol Drive	C15	90	8	0.7	6.2	0.22	1.0	1.0	O.G.	9.0%	0.15	2.14	1.05	0.29	1.34	1	1.3	-	
	Bristol Drive	C16	91	17	0.5	4.6	0.28	0.6	0.6	O.G.	9.0%	0.13	1.78	0.78	0.25	1.02	1	1.0	-	
	Bristol Drive	C17	95	18	0.5	4.6	0.85	2.0	2.0	O.G.	4.0%	0.21	3.71	1.48	0.41	1.80	1	1.9	0.1	
	Palmer Court	C18	97	19	0.5	4.6	0.69	1.6	0.8	2.4	O.G.	6.9%	0.20	3.45	1.59	0.39	1.98	1	2.0	0.4
	Bristol Drive	C19	100	19	0.5	4.6	1.03	2.4	0.1	2.4	O.G.	4.7%	0.22	3.86	1.64	0.42	2.06	1	2.1	0.4
	Bristol Drive	C20	105	4	0.7	6.2	0.24	1.0	1.0	O.G.	4.7%	0.17	2.57	1.05	0.52	1.39	1	1.4	-	
	5	Palmer Court	C21	70	14	0.5	4.6	0.80	2.2	2.2	O.G.	8.4%	0.19	3.28	1.57	0.38	1.95	1	2.0	0.2
Palmer Court		C22	75	4	0.7	6.2	0.23	1.0	1.0	O.G.	8.4%	0.15	2.19	1.05	0.30	1.34	1	1.3	-	
Palmer Court		C23	80	17	0.5	4.6	1.18	2.7	0.2	2.9	O.G.	8.4%	0.21	3.59	1.74	0.40	2.14	1	2.1	0.8
Palmer Court		C25	115	15	0.5	4.6	0.35	0.9	0.9	O.G.	6.9%	0.15	2.18	1.00	0.30	1.29	1	1.3	-	
Palmer Court		C27	120	14	0.5	4.6	1.15	3.1	0.8	3.9	S	-	-	-	-	-	2	-	-	
7	Det. basin ent. 2		125	20	0.5	4.6	0.84	1.9	-	-	-	-	-	-	-	-	-	-	-	
	Country Ridge Rd	C130	68	4	0.7	6.2	0.22	1.0	1.0	O.G.	1.5%	0.20	3.39	0.97	0.39	1.35	1	1.4	-	
Country Ridge Rd	C131	69	4	0.7	6.2	0.18	0.8	0.8	O.G.	1.5%	0.19	3.06	0.87	0.36	1.23	1	1.2	-		

Table 8-3. Subbasin Areas

Subbasin	Area (ac)
5	1.59
6	0.24
7	0.21
8	0.25
10	7.77
12	0.26
13	0.22
15	1.27
20	1.87
25	0.22
30	0.14
35	1.07
38	0.22
30	0.91
55	2.07
60	0.55
65	5.44
66	0.27
67	0.27
68	0.22
69	0.18
70	0.80
75	0.23
80	1.18
85	0.21
90	0.22
91	0.28
95	0.85
97	0.69
100	1.03
105	0.24
115	0.35
120	1.15
125	0.84

**City of Rolla**  
 102 West Main Street, 3rd Floor  
 Rolla, Missouri 65866  
 Phone: 573-364-8659

PROJECT FOR:  
 STORMWATER REDUCTION  
 AND CONTROL  
 RESIDENTIAL HENDERSON  
 STORMWATER DRAINAGE SYSTEM  
 LAMAR CT

**INTEGRITY ENGINEERING, INC.**  
 400 N. 10th St., Suite 200  
 Rolla, MO 65866  
 Phone: (573) 364-8659

Checked By: \_\_\_\_\_  
 Drawn By: \_\_\_\_\_  
 Created By: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 Job No.: \_\_\_\_\_  
 Job Name: \_\_\_\_\_  
 Job Location: \_\_\_\_\_  
 Job Date: \_\_\_\_\_  
 Job Status: \_\_\_\_\_  
 Job Type: \_\_\_\_\_  
 Job Category: \_\_\_\_\_  
 Job Subcategory: \_\_\_\_\_  
 Job Description: \_\_\_\_\_  
 Job Notes: \_\_\_\_\_  
 Job Attachments: \_\_\_\_\_  
 Job History: \_\_\_\_\_  
 Job Comments: \_\_\_\_\_  
 Job Actions: \_\_\_\_\_  
 Job Permissions: \_\_\_\_\_  
 Job Roles: \_\_\_\_\_  
 Job Groups: \_\_\_\_\_  
 Job Users: \_\_\_\_\_  
 Job Groups: \_\_\_\_\_  
 Job Users: \_\_\_\_\_  
 Job Groups: \_\_\_\_\_  
 Job Users: \_\_\_\_\_