CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

STORM SEWER PIPE SIZING

Job No:	316-884
Project:	Charleston Row III
Calc. By:	ARG
Date:	06/28/22

10-yr 24-hr Storm Rainfall (in) =	5.15
Manning's Coefficient *"n"* =	0.013
HWL/Tailwater Elev. (ft) =	682.00
Junction Losses (ft) =	0.1

Structure ID		Drainage Area "A" (acres)			Runoff Coefficient "C"	Time of Concentration "Tc" (min)				Rainfall Intensity "I" (in/hr)	Offsite or Additional Tributary Flow (cfs)	Runoff "Q" (cfs)			Pipe Data						Elevations (ft)					Hydraulic Grade Line "HGL"				
Upstream	Downstream	Increment	Tributary	Total		To Upstream Catchment	Catchment	In Pipe	To Downstream Catchment			Increment	Tributary	Total	Length (ft)	Diameter (in)	Slope (%)	Manning's Coefficient *"n"*	Capacity (cfs)	Velocity (fps)	Rim Upstream	Invert Downstream	Pipe Cover	Invert Upstream	Invert Downstream	Slope (%)	Velocity (fps)	Discharge (cfs)	Elevation Upstream	Elevation Downstream
STM7	STM6	0.04	0.00	0.04	0.60	0.0	5.0	0.5	5.5	7.4	0.0	0.2	0.0	0.2	128	8	1.00%	0.010	1.6	4.5	697.50	693.22	2.19	694.50	693.22	0.01%	3.3	0.2	694.68	693.54
STM6	STM5	0.04	0.04	0.08	0.95	5.5	5.0	0.2	5.6	7.3	0.0	0.3	0.2	0.4	49	10	1.00%	0.010	2.8	5.2	697.70	692.73	3.49	693.22	692.73	0.02%	3.8	0.4	693.44	692.95
STM5	STM3	0.06	0.08	0.14	0.95	5.6	5.0	0.1	5.7	7.2	0.0	0.4	0.4	0.9	32	10	1.00%	0.010	2.8	5.2	697.70	689.83	6.56	690.15	689.83	0.09%	4.7	0.9	690.48	690.16
STM4	STM3	0.17	0.00	0.17	0.95	0.0	5.0	0.2	5.2	7.4	0.0	1.2	0.0	1.2	67	10	1.00%	0.010	2.8	5.2	697.00	692.83	2.51	693.50	692.83	0.18%	5.0	1.2	693.87	693.20
STM3	STM2	0.10	0.31	0.41	0.95	5.7	5.0	0.2	5.9	7.2	0.0	0.7	2.0	2.7	55	12	1.00%	0.013	3.6	4.5	697.00	688.00	7.28	688.55	688.00	0.57%	5.0	2.7	689.19	688.64
STM2	STM1A	0.00	0.41	0.41	0.95	5.9	5.0	0.2	6.1	7.1	0.0	0.0	2.7	2.7	35	12	0.60%	0.013	2.8	3.5	693.00	681.50	10.12	681.71	681.50	0.56%	4.0	2.7	682.91	682.72
STM1A	STM1	0.00	0.41	0.41	0.00	6.1	5.0	3.1	9.2	7.1	0.0	0.0	2.7	2.7	35	12	0.00%	0.010	0.1	0.2	684.50	681.50	1.83	681.50	681.50	0.33%	3.4	2.7	682.62	682.50

1230 East Diehl Road, Suite 200 • NAPERVILLE, IL 60563 • (630) 963-6026

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

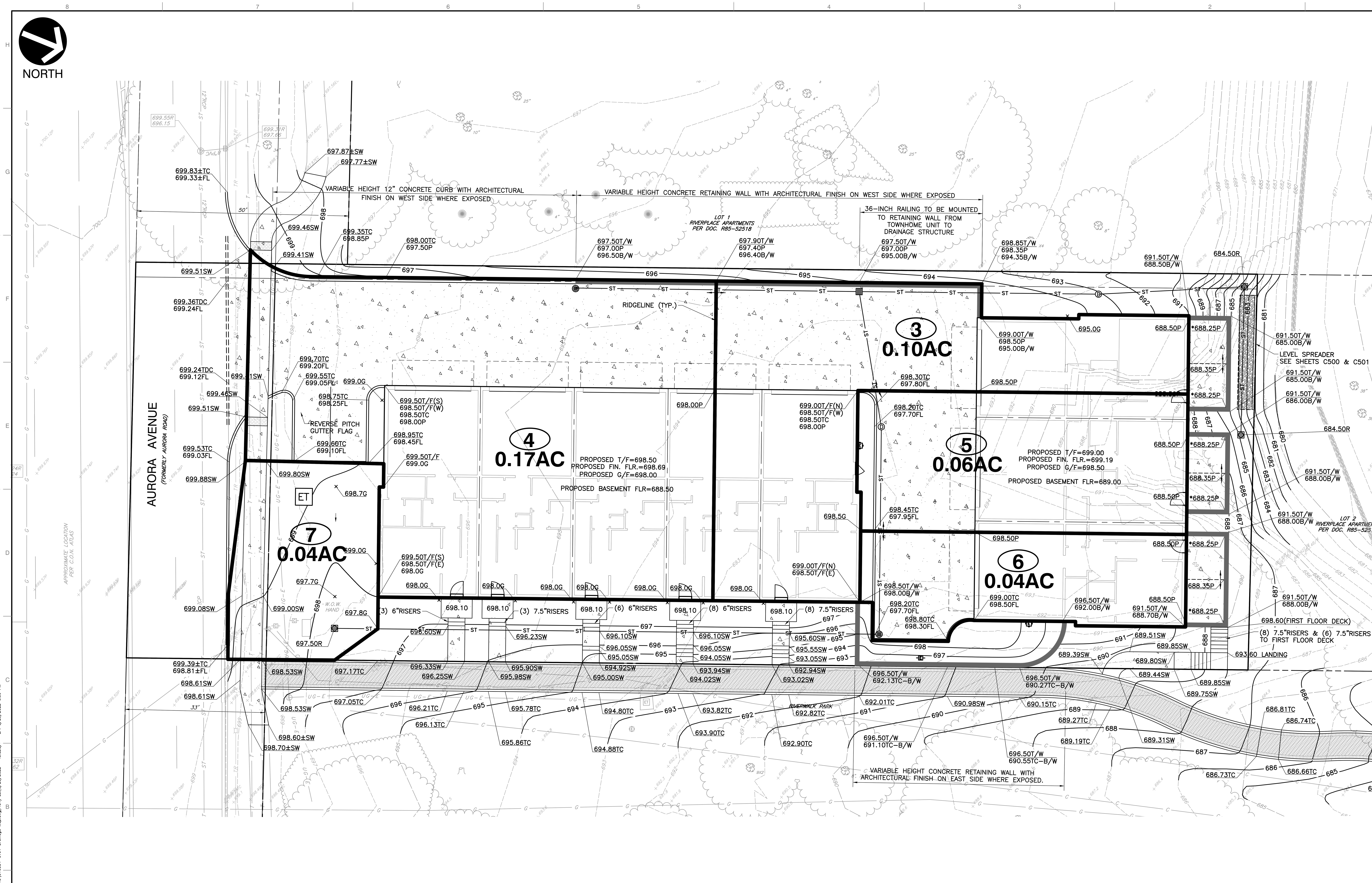
STORM SEWER PIPE SIZING

Job No:	316-884
Project:	Charleston Row III
Calc. By:	ARG
Date:	06/28/22

100-yr 24-hr Storm Rainfall (in) =	8.57
Manning's Coefficient *"n"* =	0.013
HWL/Tailwater Elev. (ft) =	682.00
Junction Losses (ft) =	0.1

Structure ID		Drainage Area "A" (acres)			Runoff Coefficient "C"	Time of Concentration "Tc" (min)				Rainfall Intensity "I" (in/hr)	Offsite or Additional Tributary Flow (cfs)	Runoff "Q" (cfs)			Pipe Data						Elevations (ft)					Hydraulic Grade Line "HGL"				
Upstream	Downstream	Increment	Tributary	Total		To Upstream Catchment	Catchment	In Pipe	To Downstream Catchment			Increment	Tributary	Total	Length (ft)	Diameter (in)	Slope (%)	Manning's Coefficient *"n"*	Capacity (cfs)	Velocity (fps)	Rim Upstream	Invert Downstream	Pipe Cover	Invert Upstream	Invert Downstream	Slope (%)	Velocity (fps)	Discharge (cfs)	Elevation Upstream	Elevation Downstream
STM7	STM6	0.04	0.00	0.04	0.60	0.0	5.0	0.5	5.5	12.3	0.0	0.3	0.0	0.3	128	8	1.00%	0.010	1.6	4.5	697.50	693.22	2.19	694.50	693.22	0.04%	3.6	0.3	694.71	693.61
STM6	STM5	0.04	0.04	0.08	0.95	5.5	5.0	0.2	5.6	12.1	0.0	0.5	0.3	0.7	49	10	1.00%	0.010	2.8	5.2	697.70	692.73	3.49	693.22	692.73	0.07%	4.4	0.7	693.51	693.02
STM5	STM3	0.06	0.08	0.14	0.95	5.6	5.0	0.1	5.7	12.0	0.0	0.7	0.7	1.4	32	10	1.00%	0.010	2.8	5.2	697.70	689.83	6.56	690.15	689.83	0.25%	5.2	1.4	690.57	690.25
STM4	STM3	0.17	0.00	0.17	0.95	0.0	5.0	0.2	5.2	12.3	0.0	2.0	0.0	2.0	67	10	1.00%	0.010	2.8	5.2	697.00	692.83	2.51	693.50	692.83	0.49%	5.7	2.0	694.02	693.35
STM3	STM2	0.10	0.31	0.41	0.95	5.7	5.0	0.2	5.9	11.9	0.0	1.1	3.4	4.5	55	12	1.00%	0.013	3.6	4.5	697.00	688.00	7.28	688.55	688.00	1.59%	5.7	4.5	689.87	689.00
STM2	STM1A	0.00	0.41	0.41	0.95	5.9	5.0	0.2	6.1	11.9	0.0	0.0	4.5	4.5	35	12	0.60%	0.013	2.8	3.5	693.00	681.50	10.12	681.71	681.50	1.56%	5.7	4.5	683.47	682.92
STM1A	STM1	0.00	0.41	0.41	0.00	6.1	5.0	3.1	9.2	11.8	0.0	0.0	4.4	4.4	35	12	0.00%	0.010	0.1	0.2	684.50	681.50	1.83	681.50	681.50	0.91%	5.6	4.4	682.82	682.50

1230 East Diehl Road, Suite 200 • NAPERVILLE, IL 60563 • (630) 963-6026



REFERENCE

1. EXISTING CONDITIONS ARE BASED UPON FIELD OBSERVATIONS MADE ON JANUARY 28, 2022 BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
2. FIELD DATUM: ILLINOIS STATE PLANE NAVD83 (2011) NAVD88 (VRS) GEOID18 – U.S. SURVEY FOOT.
3. UNDERGROUND UTILITY INFORMATION SHOWN HEREON IS BASED UPON FIELD OBSERVATIONS, ATLAS MAPS PROVIDED BY THE CITY OF NAPERVILLE AND THOSE PUBLIC UTILITY COMPANIES OPERATING UNDER FRANCHISE OR CONTRACT WITH THE CITY OF NAPERVILLE.

REVISION RECORD

NO	DATE	DESCRIPTION
1	06/17/2022	REVISE PER CITY REVIEW DATED 06/02/22

Civil & Environmental Consultants, Inc.
1230 East Diehl Road, Suite 200 - Naperville, IL 60563
630-963-6026 · 877-963-6026
www.cecinc.com

CHARLESTON DEVELOPMENT GROUP, INC.
CHARLESTON ROW III
445 AURORA AVENUE
NAPERVILLE, IL 60540

CHARLESTON ROW

DRAINAGE MAP

DATE:	APRIL 26, 2022	DRAWN BY:	FWB
DWG SCALE:	1" = 10'	CHECKED BY:	DRAFT
PROJECT NO:	316-884.AW00	APPROVED BY:	DRAFT

DRAWING NO.: 1

SHEET 1 OF 1

PIPE LEVEL SPREADER DIMENSION CALCULATIONS

PREPARED BY: JMP CHECKED BY: JGC

DATE: 6/8/2022 DATE: 6/29/2022

INFLUENT PIPE DATA		PIPED LEVEL SPREADER CALCULATIONS				
Spreader No.	Q_{100} (CFS)	A (sf)	Q_P (cfs)	Q_L (cfs)	$L_{REQUIRED}$ (ft)	**$L_{PROPOSED}$ (ft)**
1	4.40	0.028	4.40	0.120	36.78	**35.00**

Notes:

PERFORATED PIPE = 12" CONTECH A-2000 PERFORATED PIPE @ 0.00% SLOPE

Q_{100} = 100 YEAR FLOW RATE

Q_P = PROPOSED DISCHARGE FLOW RATE = Q_{100}

Q_L = PIPE DISCHARGE CAPACITY PER LINEAR FOOT

$L_{REQUIRED}$ = LENGTH OF LEVEL SPREADER REQUIRED

$Q_P = Q_{100}$ = 4.60 CFS

$Q_L = C_D * A * (2GH)^{0.5}$, WHERE:

C_D = ORIFICE DISCHARGE COEFFICIENT = 0.60

A = PERFORATION CROSS SECTIONAL AREA PER FOOT = 4.00 IN^2 (SEE ATTACHED) = 0.0278 SF

G = ACCELERATION DUE TO GRAVITY = 32.22 FT/SEC^2

H = AVERAGE HEIGHT OF WATER ABOVE PERFORATION. WHEN PIPE IS FLOWING FULL, H = 0.80 FT

$Q_L = 0.6 * 0.0278\ SF * (2 * 32.2\ FT/SEC^2 * 0.8FT)^{0.5}$

Q_L = 0.120 CFS / FT

$L_{REQUIRED} = Q_P / Q_L$ = 4.40 CFS / 0.120 CFS / FT = 36.67 FT. Design Length = 35 Ft => Okay