DRAINAGE ADDENDUM 1 FOR
MIDTOWN COLLECTION AT PATHWAYS FILING NO. 2 &
FOURSQUARE COLLECTION AT PATHWAYS FILING NO. 2
DRAINAGE STATEMENT

Engineer's Statement

This report and plan for the drainage design of **Midtown Collection at Pathways Filing No. 2 & Foursquare Collection at Pathways Filing No. 2** was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal):_____

Marc A. Whorton Colorado P.E. No. 37155 Date

Developer's Statement

Classic Companies. hereby certifies that the drainage facilities for **Midtown Collection at Pathways Filing No. 2 & Foursquare Collection at Pathways Filing No. 2** shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of **Midtown Collection at Pathways Filing No. 2 & Foursquare Collection at Pathways Filing No. 2**, guarantee that final drainage design review will absolve **Classic Companies.** and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Classic Companies
Name of Developer

_____
Signature

Jim Boulton, Vice President
Printed Name

2138 Flying Horse Club Dr.
Colorado Springs, CO 80921
Address:

City of Colorado Springs Statement:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

_____ _____
For City Engineer Date

619 N. Cascade Avenue, Suite 200 Colorado Springs, CO 80903
OFC (719) 785-0790 FAX (719) 785-0799
www.classicconsulting.net

August 31, 2021

City of Colorado Springs
Engineering Development Review Division
30 South Nevada, Suite 401
Colorado Springs, CO 80903

ATTN: Ms. Erin Powers

RE: Drainage Addendum 1 for Midtown Collection at Pathways Filing No. 2 &
Foursquare Collection at Pathways Filing No. 2

Dear Erin:

Please consider this the Drainage Addendum 1 for Midtown Collection at Pathways Filing No. 2 & Foursquare Collection at Pathways Filing No. 2. This letter is being written to accompany the Midtown Collection at Pathways Filing No. 2 Public and Private Storm Sewer Construction Plans. All proposed storm sewer for Foursquare Collection at Pathways Filing No. 2 was previously approved and now constructed along with Filing No. 1.

This letter will include the required 5-year and 100-year Hydraulic Grade Line (HGL) calculations for the proposed construction drawings for Midtown Collection at Pathways Filing 2. All other downstream storm system design drawings were approved and have now been constructed with Midtown Collection at Pathways and Foursquare Collection at Pathways Filing 1 subdivisions. Also included in this addendum are the required drainage and bridge fees for both Filing No. 2 subdivisions. Please see the "MDDP for Pathways Development and Final Drainage Report for Midtown Collection at Pathways Filing No. 1 & Foursquare Collection at Pathways Filing No. 1" by CCES approved May 2020 and "Drainage Addendum 1 for Midtown Collection at Pathways Filing No. 1 & Foursquare Collection at Pathways Filing No. 1" by CCES approved February 2021, for all drainage information. Overall basin areas and drainage patterns from this original report remain the same as previously approved. The downstream public pond facility was approved and now constructed along with the Filing No. 1 subdivisions.

SUMMARY

These Filing 2 subdivisions within the Pathways development, including overall basin areas, drainage patterns and quantities remain consistent with the previously approved drainage report as mentioned above. The following represent the 2021 drainage and bridge fees and attached are both the 5-year and 100-year HGL's for the proposed construction drawings for Midtown Collection at Pathways Filing 2.

DRAINAGE AND BRIDGE FEES

This entire development lies within the Cottonwood Creek Drainage Basin. Drainage fees will be paid at time of platting and help support projects throughout the basin. The following represents both the

Midtown Collection at Pathways Filing No. 2 and Foursquare Collection at Pathways Filing No. 2 required drainage and bridge fees:

Midtown Collection at Pathways Filing No. 2:	4.134 acres
Foursquare Collection at Pathways Filing No. 2:	5.729 acres

The approved basin fees for 2021 are as follows:

Midtown Collection at Pathways Filing No. 2

$14,751/acre x 4.134 acres (Drainage fee)	$	60,980.63
$1,216/acre x 4.134 acres (Bridge fee)	$	5,026.94
$778/acre x 4.134 acres (Surcharge fee)	$	3,216.25
	Total	**$ 69,223.82**

Foursquare Collection at Pathways Filing No. 2

$14,751/acre x 5.729 acres (Drainage fee)	$	84,508.48
$1,216/acre x 5.729 acres (Bridge fee)	$	6,966.46
$778/acre x 5.729 acres (Surcharge fee)	$	4,457.16
	Total	**$ 95,932.10**

If you have any questions or comments regarding this drainage addendum, please do not hesitate to call me directly.

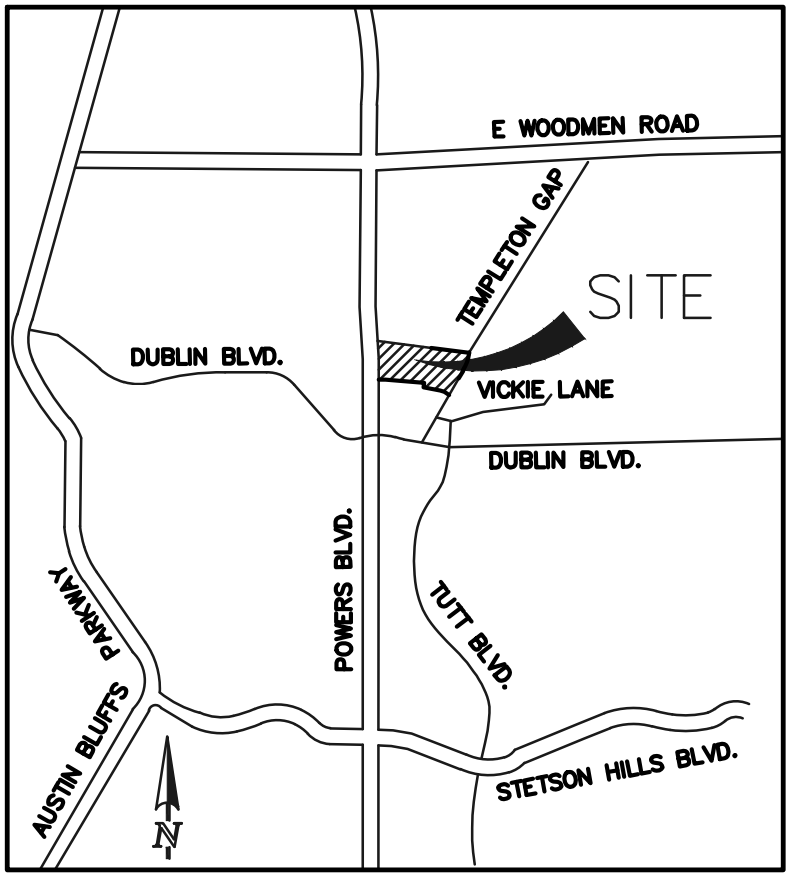
Respectfully submitted,

Marc A. Whorton, P.E.
Project Manager

maw/124720/drainage letter-adend.doc

VICINITY MAP

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

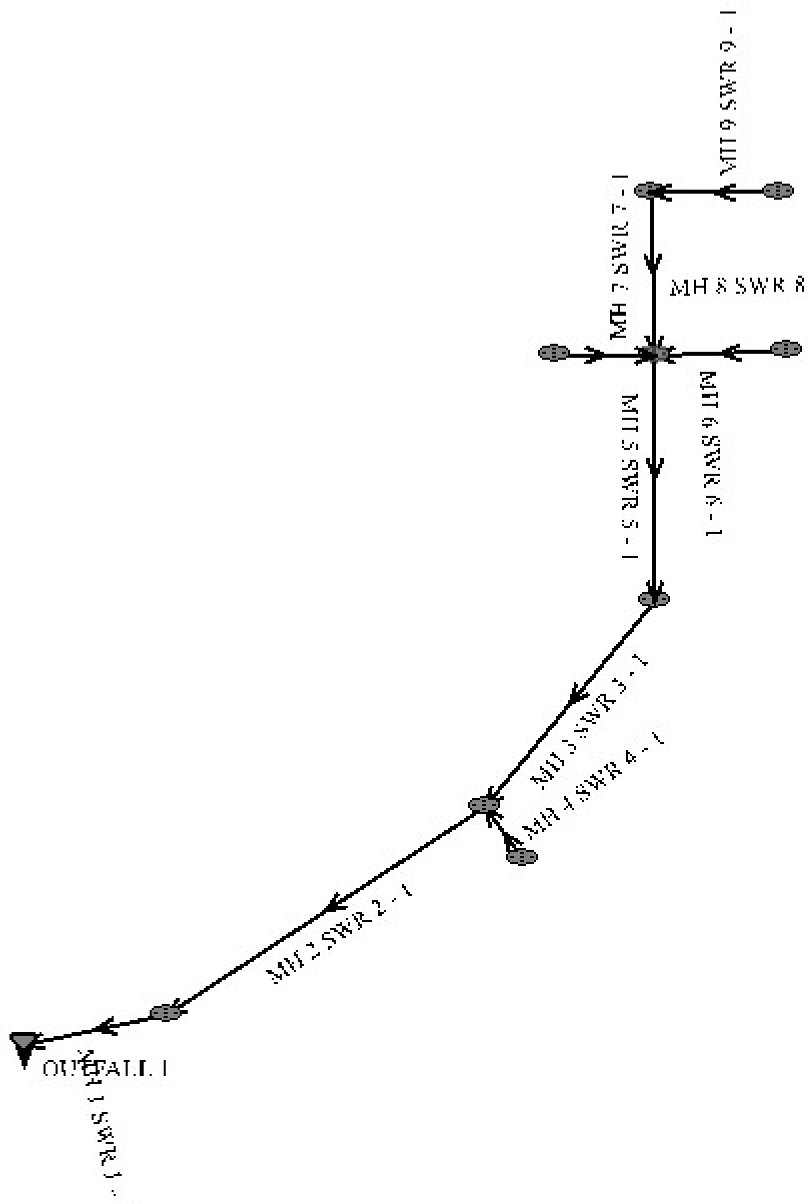


VICINITY MAP

NOT TO SCALE

HGL CALCULATIONS
(MIDTOWN COLLECTION AT PATHWAYS FILING NO. 2)

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS


MH 9 SWR 9 - 1
MH 7 SWR 7 - 1
MH 8 SWR 8
MH 6 SWR 6 - 1
MH 5 SWR 5 - 1
MH 3 SWR 3 - 1
MH 4 SWR 4 - 1
MH 2 SWR 2 - 1
OUTFALL 1
MH 1 SWR 1 - 1

System Input Summary – 5yr. HGL

Rainfall Parameters

Rainfall Return Period: 5
Rainfall Calculation Method: Formula

One Hour Depth (in): 0.42
Rainfall Constant "A": 28.5
Rainfall Constant "B": 10
Rainfall Constant "C": 0.786

Rational Method Constraints

Minimum Urban Runoff Coeff.: 0.20
Maximum Rural Overland Len. (ft): 500
Maximum Urban Overland Len. (ft): 300
Used UDFCD Tc. Maximum: Yes

Sizer Constraints

Minimum Sewer Size (in): 18.00
Maximum Depth to Rise Ratio: 0.90
Maximum Flow Velocity (fps): 18.0
Minimum Flow Velocity (fps): 2.0

Backwater Calculations:

Tailwater Elevation (ft): 6818.38

Manhole Input Summary:

		Given Flow		Sub Basin Information						
Element Name	Ground Elevation (ft)	Total Known Flow (cfs)	Local Contribution (cfs)	Drainage Area (Ac.)	Runoff Coefficient	5yr Coefficient	Overland Length (ft)	Overland Slope (%)	Gutter Length (ft)	Gutter Velocity (fps)
OUTFALL 1	6824.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 1 SWR 1 - 1	6829.13	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 2 SWR 2 - 1	6831.68	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 3 SWR 3 - 1	6833.76	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 5 SWR 5 - 1	6833.16	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 8 SWR 8 - 1	6833.87	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 9 SWR 9 - 1	6839.33	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 6 SWR 6 - 1	6833.35	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 7 SWR 7 - 1	6833.35	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 4 SWR 4 - 1	6831.70	18.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Manhole Output Summary:

	Local Contribution					Total Design Flow				
Element Name	Overland Time (min)	Gutter Time (min)	Basin Tc (min)	Intensity (in/hr)	Local Contrib (cfs)	Coeff. Area	Intensity (in/hr)	Manhole Tc (min)	Peak Flow (cfs)	Comment
OUTFALL 1	0.00	0.00	0.00	0.00	0.00	13.20	1.89	0.44	25.00	

MH 1 SWR 1 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	
MH 2 SWR 2 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	
MH 3 SWR 3 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	
MH 5 SWR 5 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	
MH 8 SWR 8 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	
MH 9 SWR 9 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	
MH 6 SWR 6 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	
MH 7 SWR 7 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
MH 4 SWR 4 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.00	

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	**Sewer Length (ft)**	**Downstream Invert (ft)**	**Slope (%)**	**Upstream Invert (ft)**	**Mannings n**	**Bend Loss**	**Lateral Loss**	**Cross Section**	**Rise (ft or in)**	**Span (ft or in)**
MH 1 SWR 1 - 1	93.36	6819.90	1.1	6820.97	0.013	0.03	1.00	CIRCULAR	36.00 in	36.00 in
MH 2 SWR 2 - 1	260.63	6821.47	1.0	6824.08	0.013	0.08	1.00	CIRCULAR	36.00 in	36.00 in
MH 3 SWR 3 - 1	175.98	6824.58	0.8	6825.96	0.013	0.11	1.00	CIRCULAR	30.00 in	30.00 in
MH 5 SWR 5 - 1	75.44	6826.46	1.0	6827.22	0.013	0.08	1.00	CIRCULAR	30.00 in	30.00 in
MH 8 SWR 8 - 1	78.00	6828.22	1.0	6829.00	0.013	0.05	1.00	CIRCULAR	18.00 in	18.00 in
MH 9 SWR 9 - 1	50.83	6829.50	1.0	6830.00	0.013	1.32	1.00	CIRCULAR	18.00 in	18.00 in
MH 6 SWR 6 - 1	26.17	6827.72	1.0	6827.98	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 7 SWR 7 - 1	4.17	6828.23	1.7	6828.30	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 4 SWR 4 - 1	8.00	6824.58	1.0	6824.66	0.013	1.32	0.00	CIRCULAR	30.00 in	30.00 in

Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition	Flow (cfs)	Surcharged Length (ft)	Comment
MH 1 SWR 1 - 1	71.61	10.13	19.35	6.46	14.68	9.23	1.70	Supercritical	25.00	0.00	
MH 2 SWR 2 - 1	66.92	9.47	19.35	6.46	15.24	8.78	1.58	Supercritical	25.00	0.00	
MH 3 SWR 3 - 1	36.42	7.42	12.00	4.91	10.16	6.15	1.38	Supercritical	9.00	0.00	
MH 5 SWR 5 - 1	41.29	8.41	12.00	4.91	9.51	6.73	1.56	Supercritical	9.00	0.00	
MH 8 SWR 8 - 1	10.53	5.96	7.90	4.02	6.57	5.14	1.42	Supercritical	3.00	0.00	
MH 9 SWR 9 - 1	10.45	5.91	7.90	4.02	6.60	5.11	1.41	Supercritical	3.00	0.00	
MH 6 SWR 6 - 1	22.60	7.19	10.39	4.60	8.44	6.08	1.49	Supercritical	6.00	0.00	
MH 7 SWR 7 - 1	13.63	7.71	4.47	2.92	3.30	4.50	1.81	Supercritical	1.00	0.00	
MH 4 SWR 4 - 1	41.15	8.38	17.24	6.17	13.88	8.10	1.51	Supercritical	18.00	0.00	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
- If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
- If the sewer is pressurized, full flow represents the pressurized flow conditions.

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	Peak Flow (cfs)	Cross Section	Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	Comment
MH 1 SWR 1 - 1	25.00	CIRCULAR	36.00 in	36.00 in	27.00 in	27.00 in	36.00 in	36.00 in	7.07	
MH 2 SWR 2 - 1	25.00	CIRCULAR	36.00 in	36.00 in	27.00 in	27.00 in	36.00 in	36.00 in	7.07	
MH 3 SWR 3 - 1	9.00	CIRCULAR	30.00 in	30.00 in	18.00 in	18.00 in	30.00 in	30.00 in	4.91	
MH 5 SWR 5 - 1	9.00	CIRCULAR	30.00 in	30.00 in	18.00 in	18.00 in	30.00 in	30.00 in	4.91	
MH 8 SWR 8 - 1	3.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 9 SWR 9 - 1	3.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 6 SWR 6 - 1	6.00	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	
MH 7 SWR 7 - 1	1.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 4 SWR 4 - 1	18.00	CIRCULAR	30.00 in	30.00 in	24.00 in	24.00 in	30.00 in	30.00 in	4.91	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
- Sewer sizes should not decrease downstream.
- All hydraulics where calculated using the 'Used' parameters.

Grade Line Summary:

Tailwater Elevation (ft): 6818.38

	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
Element Name	**Downstream (ft)**	**Upstream (ft)**	**Bend Loss (ft)**	**Lateral Loss (ft)**	**Downstream (ft)**	**Upstream (ft)**	**Downstream (ft)**	**Friction Loss (ft)**	**Upstream (ft)**
MH 1 SWR 1 - 1	6819.90	6820.97	0.00	0.00	6821.12	6822.58	6822.45	0.78	6823.23
MH 2 SWR 2 - 1	6821.47	6824.08	0.02	0.00	6822.74	6825.69	6823.94	2.40	6826.34
MH 3 SWR 3 - 1	6824.58	6825.96	0.01	0.14	6826.40	6826.96	6826.49	0.85	6827.33
MH 5 SWR 5 - 1	6826.46	6827.22	0.00	0.00	6827.25	6828.22	6827.96	0.64	6828.59
MH 8 SWR 8 - 1	6828.22	6829.00	0.00	0.01	6828.77	6829.66	6829.18	0.73	6829.91
MH 9 SWR 9 - 1	6829.50	6830.00	0.06	0.00	6830.05	6830.66	6830.46	0.45	6830.91
MH 6 SWR 6 - 1	6827.72	6827.98	0.07	0.00	6828.42	6828.85	6829.00	0.18	6829.17
MH 7 SWR 7 - 1	6828.23	6828.30	0.01	0.00	6828.51	6828.73	6828.82	0.00	6828.82
MH 4 SWR 4 - 1	6824.58	6824.66	0.28	0.00	6825.97	6826.36	6826.76	0.00	6826.76

- Bend and Lateral losses only apply when there is an outgoing sewer. The system outfall, sewer #0, is not considered a sewer.
- Bend loss = Bend K * V_fi ^ 2/(2*g)
- Lateral loss = V_fo ^ 2/(2*g)- Junction Loss K * V_fi ^ 2/(2*g).
- Friction loss is always Upstream EGL - Downstream EGL.

System Input Summary – 100 yr. HGL

Rainfall Parameters

Rainfall Return Period: 100
Rainfall Calculation Method: Formula

One Hour Depth (in): 0.42
Rainfall Constant "A": 28.5
Rainfall Constant "B": 10
Rainfall Constant "C": 0.786

Rational Method Constraints

Minimum Urban Runoff Coeff.: 0.20
Maximum Rural Overland Len. (ft): 500
Maximum Urban Overland Len. (ft): 300
Used UDFCD Tc. Maximum: Yes

Sizer Constraints

Minimum Sewer Size (in): 18.00
Maximum Depth to Rise Ratio: 0.90
Maximum Flow Velocity (fps): 18.0
Minimum Flow Velocity (fps): 2.0

Backwater Calculations:

Tailwater Elevation (ft): 6819.95

Manhole Input Summary:

		Given Flow		Sub Basin Information						
Element Name	Ground Elevation (ft)	Total Known Flow (cfs)	Local Contribution (cfs)	Drainage Area (Ac.)	Runoff Coefficient	5yr Coefficient	Overland Length (ft)	Overland Slope (%)	Gutter Length (ft)	Gutter Velocity (fps)
OUTFALL 1	6824.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 1 SWR 1 - 1	6829.13	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 2 SWR 2 - 1	6831.68	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 3 SWR 3 - 1	6833.76	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 5 SWR 5 - 1	6833.16	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 8 SWR 8 - 1	6833.87	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 9 SWR 9 - 1	6839.33	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 6 SWR 6 - 1	6833.35	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 7 SWR 7 - 1	6833.35	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 4 SWR 4 - 1	6831.70	34.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Manhole Output Summary:

	Local Contribution					Total Design Flow				
Element Name	Overland Time (min)	Gutter Time (min)	Basin Tc (min)	Intensity (in/hr)	Local Contrib (cfs)	Coeff. Area	Intensity (in/hr)	Manhole Tc (min)	Peak Flow (cfs)	Comment
OUTFALL 1	0.00	0.00	0.00	0.00	0.00	25.96	1.93	0.22	50.00	

MH 1 SWR 1 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	
MH 2 SWR 2 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	
MH 3 SWR 3 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	
MH 5 SWR 5 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	
MH 8 SWR 8 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	
MH 9 SWR 9 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	
MH 6 SWR 6 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	
MH 7 SWR 7 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	
MH 4 SWR 4 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.00	

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	**Sewer Length (ft)**	**Downstream Invert (ft)**	**Slope (%)**	**Upstream Invert (ft)**	**Mannings n**	**Bend Loss**	**Lateral Loss**	**Cross Section**	**Rise (ft or in)**	**Span (ft or in)**
MH 1 SWR 1 - 1	93.36	6819.90	1.1	6820.97	0.013	0.03	1.00	CIRCULAR	36.00 in	36.00 in
MH 2 SWR 2 - 1	260.63	6821.47	1.0	6824.08	0.013	0.08	1.00	CIRCULAR	36.00 in	36.00 in
MH 3 SWR 3 - 1	175.98	6824.58	0.8	6825.96	0.013	0.11	1.00	CIRCULAR	30.00 in	30.00 in
MH 5 SWR 5 - 1	75.44	6826.46	1.0	6827.22	0.013	0.08	1.00	CIRCULAR	30.00 in	30.00 in
MH 8 SWR 8 - 1	78.00	6828.22	1.0	6829.00	0.013	0.05	1.00	CIRCULAR	18.00 in	18.00 in
MH 9 SWR 9 - 1	50.83	6829.50	1.0	6830.00	0.013	1.32	1.00	CIRCULAR	18.00 in	18.00 in
MH 6 SWR 6 - 1	26.17	6827.72	1.0	6827.98	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 7 SWR 7 - 1	4.17	6828.23	1.7	6828.30	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 4 SWR 4 - 1	8.00	6824.58	1.0	6824.66	0.013	1.32	0.00	CIRCULAR	30.00 in	30.00 in

Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition	Flow (cfs)	Surcharged Length (ft)	Comment
MH 1 SWR 1 - 1	71.61	10.13	27.61	8.59	22.16	10.96	1.54	Supercritical	50.00	0.00	
MH 2 SWR 2 - 1	66.92	9.47	27.61	8.59	23.20	10.38	1.41	Supercritical	50.00	0.00	
MH 3 SWR 3 - 1	36.42	7.42	18.68	6.53	16.34	7.68	1.29	Supercritical Jump	21.00	131.40	
MH 5 SWR 5 - 1	41.29	8.41	18.68	6.53	15.15	8.45	1.49	Supercritical	21.00	0.00	
MH 8 SWR 8 - 1	10.53	5.96	12.29	5.45	10.72	6.38	1.30	Supercritical	7.00	0.00	
MH 9 SWR 9 - 1	10.45	5.91	12.29	5.45	10.78	6.34	1.29	Supercritical	7.00	0.00	
MH 6 SWR 6 - 1	22.60	7.19	14.93	5.84	12.44	7.30	1.42	Supercritical	12.00	0.00	
MH 7 SWR 7 - 1	13.63	7.71	10.32	4.77	7.54	7.12	1.82	Supercritical	5.00	0.00	
MH 4 SWR 4 - 1	41.15	8.38	23.79	8.15	20.79	9.37	1.32	Pressurized	34.00	8.00	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
- If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
- If the sewer is pressurized, full flow represents the pressurized flow conditions.

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	Peak Flow (cfs)	Cross Section	Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	Comment
MH 1 SWR 1 - 1	50.00	CIRCULAR	36.00 in	36.00 in	33.00 in	33.00 in	36.00 in	36.00 in	7.07	
MH 2 SWR 2 - 1	50.00	CIRCULAR	36.00 in	36.00 in	33.00 in	33.00 in	36.00 in	36.00 in	7.07	
MH 3 SWR 3 - 1	21.00	CIRCULAR	30.00 in	30.00 in	27.00 in	27.00 in	30.00 in	30.00 in	4.91	
MH 5 SWR 5 - 1	21.00	CIRCULAR	30.00 in	30.00 in	24.00 in	24.00 in	30.00 in	30.00 in	4.91	
MH 8 SWR 8 - 1	7.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 9 SWR 9 - 1	7.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 6 SWR 6 - 1	12.00	CIRCULAR	24.00 in	24.00 in	21.00 in	21.00 in	24.00 in	24.00 in	3.14	
MH 7 SWR 7 - 1	3.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 4 SWR 4 - 1	34.00	CIRCULAR	30.00 in	30.00 in	30.00 in	30.00 in	30.00 in	30.00 in	4.91	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
- Sewer sizes should not decrease downstream.
- All hydraulics where calculated using the 'Used' parameters.

Grade Line Summary:

Tailwater Elevation (ft): 6819.95

	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
Element Name	**Downstream (ft)**	**Upstream (ft)**	**Bend Loss (ft)**	**Lateral Loss (ft)**	**Downstream (ft)**	**Upstream (ft)**	**Downstream (ft)**	**Friction Loss (ft)**	**Upstream (ft)**
MH 1 SWR 1 - 1	6819.90	6820.97	0.00	0.00	6821.75	6823.27	6823.61	0.81	6824.42
MH 2 SWR 2 - 1	6821.47	6824.08	0.06	0.00	6823.40	6826.38	6825.08	2.45	6827.53
MH 3 SWR 3 - 1	6824.58	6825.96	0.03	0.49	6827.77	6828.03	6828.05	0.34	6828.39
MH 5 SWR 5 - 1	6826.46	6827.22	0.02	0.00	6828.06	6828.78	6828.83	0.61	6829.44
MH 8 SWR 8 - 1	6828.22	6829.00	0.01	0.04	6829.11	6830.02	6829.75	0.74	6830.48
MH 9 SWR 9 - 1	6829.50	6830.00	0.32	0.00	6830.40	6831.02	6831.02	0.46	6831.48
MH 6 SWR 6 - 1	6827.72	6827.98	0.30	0.00	6829.48	6829.48	6829.74	0.09	6829.83
MH 7 SWR 7 - 1	6828.23	6828.30	0.16	0.00	6828.94	6829.47	6829.65	0.00	6829.65
MH 4 SWR 4 - 1	6824.58	6824.66	0.98	0.00	6827.77	6827.82	6828.51	0.05	6828.57

- Bend and Lateral losses only apply when there is an outgoing sewer. The system outfall, sewer #0, is not considered a sewer.
- Bend loss = Bend K * V_fi ^ 2/(2*g)
- Lateral loss = V_fo ^ 2/(2*g)- Junction Loss K * V_fi ^ 2/(2*g).
- Friction loss is always Upstream EGL - Downstream EGL.