

— HGL

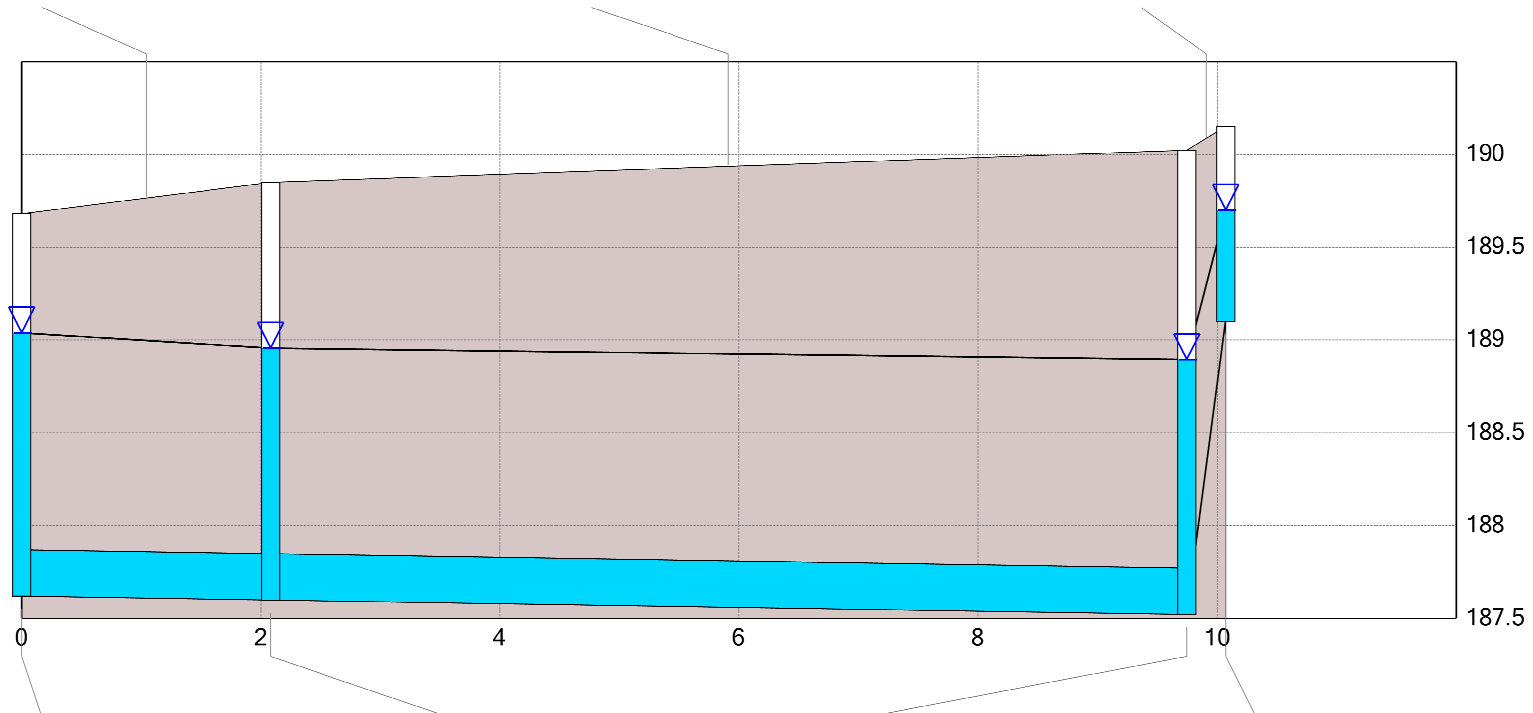
Time: 9/2/2022 2:00:00 AM

Conduit 6
Flow = 0.053 m³/s
Length = 2.08 m
Depth = 0.25 m
Velocity = 1.082 m/s
Slope = 0.0101 m/m
Invert1 = 187.62 m
Invert2 = 187.599 m

Conduit 7
Flow = 0.053 m³/s
Length = 7.666 m
Depth = 0.25 m
Velocity = 1.08 m/s
Slope = 0.01 m/m
Invert1 = 187.599 m
Invert2 = 187.522 m

Pump Pump-1
Flow = 0.053 m³/s

Velocity = 0 m/s



Storage 1
CWSEL = 189.0384 m
Max. CWSEL = 189.0384 m
Rim Elev. = 189.68 m
Invert Elev. = 187.62 m

Junction Jun-6
CWSEL = 188.9558 m
Max. CWSEL = 188.9558 m
Rim Elev. = 189.849 m
Invert Elev. = 187.599 m

Junction Jun-7
CWSEL = 188.895 m
Max. CWSEL = 188.895 m
Rim Elev. = 190.022 m
Invert Elev. = 187.522 m

Outfall Out-1
CWSEL = 189.7 m
Max. CWSEL = 189.7 m
Rim Elev. = 190.151 m
Invert Elev. = 189.1 m

HGL

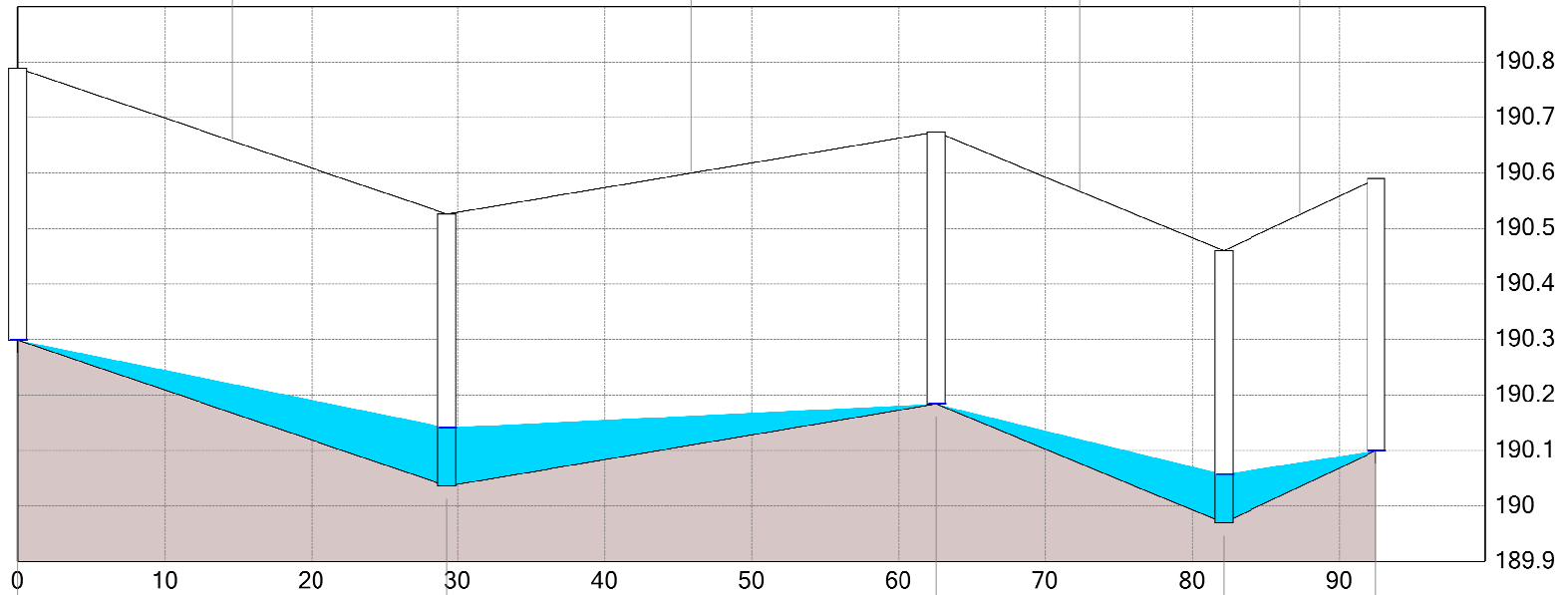
Time: 9/2/2022 1:45:00 AM

Conduit 1
Flow = 0 m³/s
Length = 29.253 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.00899 m/m
Invert1 = 190.299 m
Invert2 = 190.036 m

Conduit 2
Flow = 0 m³/s
Length = 33.306 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.00444 m/m
Invert1 = 190.184 m
Invert2 = 190.036 m

Conduit 3
Flow = 0 m³/s
Length = 19.564 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.0109 m/m
Invert1 = 190.184 m
Invert2 = 189.97 m

Conduit 4
Flow = 0 m³/s
Length = 10.39 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.0125 m/m
Invert1 = 190.1 m
Invert2 = 189.97 m



Junction Jun-1
CWSEL = 190.299 m
Max. CWSEL = 190.299 m
Rim Elev. = 190.789 m
Invert Elev. = 190.299 m

Junction Jun-2
CWSEL = 190.1416 m
Max. CWSEL = 190.1416 m
Rim Elev. = 190.526 m
Invert Elev. = 190.036 m

Junction Jun-3
CWSEL = 190.184 m
Max. CWSEL = 190.184 m
Rim Elev. = 190.674 m
Invert Elev. = 190.184 m

Junction Jun-4
CWSEL = 190.0575 m
Max. CWSEL = 190.0575 m
Rim Elev. = 190.46 m
Invert Elev. = 189.97 m

Junction Jun-5
CWSEL = 190.1 m
Max. CWSEL = 190.1 m
Rim Elev. = 190.59 m
Invert Elev. = 190.1 m

OUTPUT REPORT - 100YEAR SCS TYPE II - PUMPED OUTFLOW

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Element Count

Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 13
Number of links 14
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
Raingage1	SCS-100YEAR	INTENSITY	120 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A1	0.57	98.62	80.00	2.0000	Raingage1	Jun-2
A2	0.22	37.19	80.00	2.0000	Raingage1	Jun-4
A3	0.06	5.79	0.00	5.0000	Raingage1	1

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
Jun-1	JUNCTION	190.30	0.49	0.0	
Jun-2	JUNCTION	190.04	0.49	0.0	
Jun-3	JUNCTION	190.18	0.49	0.0	
Jun-4	JUNCTION	189.97	0.49	0.0	
Jun-5	JUNCTION	190.10	0.49	0.0	
Jun-6	JUNCTION	187.60	2.25	0.0	
Jun-7	JUNCTION	187.52	2.50	0.0	
STM MH#1	JUNCTION	188.35	1.94	0.0	
STM MH#2	JUNCTION	188.17	2.02	0.0	
STM MH#3	JUNCTION	188.00	2.05	0.0	
Out-1	OUTFALL	189.10	0.00	0.0	
Out-2	OUTFALL	189.10	0.40	0.0	
1	STORAGE	187.62	2.06	0.0	

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
1	Jun-1	Jun-2	CONDUIT	29.3	0.8991	0.0130
2	Jun-3	Jun-2	CONDUIT	33.3	0.4444	0.0130
3	Jun-3	Jun-4	CONDUIT	19.6	1.0939	0.0130
4	Jun-5	Jun-4	CONDUIT	10.4	1.2513	0.0130
5	STM MH#3	1	CONDUIT	11.3	1.0001	0.0153
6	1	Jun-6	CONDUIT	2.1	1.0097	0.0153
7	Jun-6	Jun-7	CONDUIT	7.7	1.0045	0.0130
8	Jun-6	Out-2	CONDUIT	7.5	0.6000	0.0130
Pipe - (3)	STM MH#1	STM MH#2	CONDUIT	55.4	0.2797	0.0130
Pipe - (4)	STM MH#2	STM MH#3	CONDUIT	24.0	0.2791	0.0130
Pump-1	Jun-7	Out-1	TYPE2 PUMP			
Orifice-1	Jun-2	STM MH#1	ORIFICE			
Orifice-2	Jun-4	STM MH#3	ORIFICE			
Orifice-3	Jun-2	STM MH#2	ORIFICE			

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
1	Road-Section	0.48	5.39	0.21	20.00	1	14.11
2	Road-Section	0.48	5.39	0.21	20.00	1	9.92
3	Road-Section	0.48	5.39	0.21	20.00	1	15.57
4	Road-Section	0.48	5.39	0.21	20.00	1	16.65
5	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
6	CIRCULAR	0.25	0.05	0.06	0.25	1	0.05
7	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
8	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
Pipe - (3)	CIRCULAR	0.45	0.16	0.11	0.45	1	0.15
Pipe - (4)	CIRCULAR	0.45	0.16	0.11	0.45	1	0.15

 Transect Summary

Transect Road-Section

Area:	0.0005	0.0019	0.0042	0.0074	0.0116
	0.0167	0.0228	0.0297	0.0376	0.0465
	0.0562	0.0669	0.0785	0.0910	0.1045
	0.1192	0.1355	0.1526	0.1702	0.1884
	0.2072	0.2266	0.2465	0.2670	0.2881
	0.3097	0.3320	0.3547	0.3781	0.4020
	0.4265	0.4516	0.4772	0.5034	0.5301
	0.5575	0.5854	0.6139	0.6429	0.6725
	0.7027	0.7335	0.7648	0.7967	0.8291
	0.8622	0.8958	0.9299	0.9647	1.0000
Hrad:	0.0214	0.0429	0.0643	0.0858	0.1072
	0.1287	0.1501	0.1716	0.1930	0.2145
	0.2359	0.2574	0.2788	0.3003	0.3217
	0.3324	0.3605	0.3994	0.4362	0.4712
	0.5042	0.5356	0.5653	0.5935	0.6202
	0.6456	0.6698	0.6927	0.7145	0.7353
	0.7551	0.7739	0.7919	0.8090	0.8253
	0.8409	0.8558	0.8700	0.8836	0.8966
	0.9091	0.9210	0.9324	0.9433	0.9538
	0.9638	0.9734	0.9827	0.9915	1.0000
Width:	0.0261	0.0522	0.0783	0.1044	0.1305
	0.1566	0.1827	0.2088	0.2349	0.2610
	0.2871	0.3132	0.3393	0.3654	0.3915
	0.4386	0.4720	0.4880	0.5040	0.5200
	0.5360	0.5520	0.5680	0.5840	0.6000
	0.6160	0.6320	0.6480	0.6640	0.6800
	0.6960	0.7120	0.7280	0.7440	0.7600
	0.7760	0.7920	0.8080	0.8240	0.8400
	0.8560	0.8720	0.8880	0.9040	0.9200
	0.9360	0.9520	0.9680	0.9840	1.0000

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CMS

Process Models:

Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed YES
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method DYNWAVE
 Surcharge Method EXTRAN
 Starting Date 09/02/2022 00:00:00
 Ending Date 09/04/2022 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:15:00
 Wet Time Step 00:01:00
 Dry Time Step 00:01:00
 Routing Time Step 0.50 sec
 Variable Time Step YES
 Maximum Trials 8
 Number of Threads 1
 Head Tolerance 0.001500 m

Control Actions Taken

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.091	108.000
Evaporation Loss	0.000	0.000
Infiltration Loss	0.007	8.694
Surface Runoff	0.082	97.447
Final Storage	0.002	1.864
Continuity Error (%)	-0.005	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000

Wet Weather Inflow	0.082	0.824
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.082	0.824
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.006	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	0.50 sec
Maximum Time Step	:	0.50 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
0.500 - 0.500 sec	:	100.00 %
0.500 - 0.500 sec	:	0.00 %
0.500 - 0.500 sec	:	0.00 %
0.500 - 0.500 sec	:	0.00 %
0.500 - 0.500 sec	:	0.00 %

Subcatchment Runoff Summary

Peak Runoff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Runoff Coeff	mm	mm	mm	mm	mm	mm	mm	10^6 ltr
Subcatchment								
CMS								
A1	108.00	0.00	0.00	6.80	84.40	14.80	99.21	0.57
0.04 0.919								
A2	108.00	0.00	0.00	6.80	84.40	14.80	99.21	0.21
0.02 0.919								
A3	108.00	0.00	0.00	34.51	0.00	73.49	73.49	0.04
0.00 0.680								

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
Jun-1	JUNCTION	0.00	0.00	190.30	0 00:00	0.00
Jun-2	JUNCTION	0.00	0.03	190.07	0 14:00	0.03
Jun-3	JUNCTION	0.00	0.00	190.18	0 00:00	0.00
Jun-4	JUNCTION	0.00	0.03	190.00	0 14:00	0.03
Jun-5	JUNCTION	0.00	0.00	190.10	0 00:00	0.00
Jun-6	JUNCTION	0.07	0.54	188.14	0 14:01	0.54
Jun-7	JUNCTION	0.04	2.09	189.61	0 13:50	0.56
STM MH#1	JUNCTION	0.02	0.11	188.47	0 14:00	0.11
STM MH#2	JUNCTION	0.03	0.18	188.35	0 14:00	0.18
STM MH#3	JUNCTION	0.03	0.23	188.24	0 14:00	0.23
Out-1	OUTFALL	0.60	0.60	189.70	0 00:00	0.60
Out-2	OUTFALL	0.00	0.00	189.10	0 00:00	0.00
1	STORAGE	0.07	0.60	188.22	0 14:01	0.60

Node Inflow Summary

Maximum Lateral Inflow	Maximum Total Inflow	Time of Max Occurrence	Lateral Inflow Volume	Total Inflow Volume	Flow Balance Error
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Node	Type	CMS	CMS	days hr:min	10^6 ltr	10^6 ltr	Percent
Jun-1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-2	JUNCTION	0.041	0.041	0 14:00	0.567	0.567	-0.001
Jun-3	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-4	JUNCTION	0.015	0.015	0 14:00	0.214	0.214	-0.001
Jun-5	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-6	JUNCTION	0.000	0.080	0 13:50	0	0.824	0.000
Jun-7	JUNCTION	0.000	0.104	0 13:50	0	0.824	-0.012
STM MH#1	JUNCTION	0.000	0.021	0 14:00	0	0.284	-0.004
STM MH#2	JUNCTION	0.000	0.041	0 14:00	0	0.567	0.040
STM MH#3	JUNCTION	0.000	0.057	0 14:00	0	0.781	0.010
Out-1	OUTFALL	0.000	0.053	0 09:54	0	0.824	0.000
Out-2	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
1	STORAGE	0.004	0.061	0 13:50	0.0426	0.824	-0.017

← TOTAL INFLOW TO POND

Node Surcharge Summary

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
Jun-7	JUNCTION	4.13	1.841	0.409

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
1	0.010	2	0	0	0.100	22	0 14:01	0.080

← REQUIRED STORAGE

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out-1	46.32	0.010	0.053	0.824
Out-2	0.00	0.000	0.000	0.000
System	23.16	0.010	0.053	0.824

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
1	CHANNEL	0.000	0 00:00	0.00	0.00	0.04
2	CHANNEL	0.000	0 00:00	0.00	0.00	0.04
3	CHANNEL	0.000	0 00:00	0.00	0.00	0.03
4	CHANNEL	0.000	0 00:00	0.00	0.00	0.03
5	CONDUIT	0.057	0 13:50	1.08	0.23	0.63
6	CONDUIT	0.080	0 13:50	1.64	1.58	1.00
7	CONDUIT	0.104	0 13:50	2.16	1.74	1.00
8	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
Pipe - (3)	CONDUIT	0.021	0 14:00	0.53	0.14	0.29
Pipe - (4)	CONDUIT	0.041	0 14:00	0.81	0.27	0.36
Pump-1	PUMP	0.053	0 09:54		1.00	
Orifice-1	ORIFICE	0.021	0 14:00			
Orifice-2	ORIFICE	0.015	0 14:00			
Orifice-3	ORIFICE	0.021	0 14:00			

Flow Classification Summary

Adjusted ----- Fraction of Time in Flow Class -----

Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
1	1.00	0.28	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.00	0.28	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.00	0.31	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.00	0.31	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.00	0.09	0.00	0.00	0.06	0.00	0.00	0.85	0.03	0.00
6	1.00	0.09	0.00	0.00	0.91	0.00	0.00	0.00	0.43	0.00
7	1.00	0.09	0.00	0.00	0.14	0.77	0.00	0.00	0.00	0.00
8	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe - (3)	1.00	0.09	0.00	0.00	0.09	0.00	0.00	0.82	0.08	0.00
Pipe - (4)	1.00	0.09	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00

 Conduit Surcharge Summary

Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
6	4.06	4.30	4.36	1.35	2.20
7	3.00	4.36	4.13	0.01	0.01

 Pumping Summary

Pump	Percent Utilized	Number of Start-Ups	Min	Avg	Max	Total	Power Usage Kw-hr	% Time Off Pump Curve	
			Flow CMS	Flow CMS	Flow CMS	Volume 10^6 ltr		Low	High
Pump-1	46.32	1	0.00	0.01	0.05	0.823	4.67	0.0	0.0

Analysis begun on: Wed Sep 7 09:57:38 2022
 Analysis ended on: Wed Sep 7 09:57:41 2022
 Total elapsed time: 00:00:03



OUTPUT REPORT - UST - PUMPED OUTFLOW

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

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*****
Element Count
*****
Number of rain gages ..... 1
Number of subcatchments ... 3
Number of nodes ..... 13
Number of links ..... 14
Number of pollutants ..... 0
Number of land uses ..... 0
    
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*****
Raingage Summary
*****
Name           Data Source           Data Type           Recording Interval
-----
Raingage1      UST                    INTENSITY          15 min.
    
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*****
Subcatchment Summary
*****
Name           Area           Width           %Imperv           %Slope Rain Gage           Outlet
-----
A1             0.57          98.62          80.00            2.0000 Raingage1           Jun-2
A2             0.22          37.19          80.00            2.0000 Raingage1           Jun-4
A3             0.06          5.79           0.00            5.0000 Raingage1           1
    
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*****
Node Summary
*****
Name           Type           Invert Elev.           Max. Depth           Ponded Area           External Inflow
-----
Jun-1          JUNCTION       190.30          0.49              0.0
Jun-2          JUNCTION       190.04          0.49              0.0
Jun-3          JUNCTION       190.18          0.49              0.0
Jun-4          JUNCTION       189.97          0.49              0.0
Jun-5          JUNCTION       190.10          0.49              0.0
Jun-6          JUNCTION       187.60          2.25              0.0
Jun-7          JUNCTION       187.52          2.50              0.0
STM MH#1       JUNCTION       188.35          1.94              0.0
STM MH#2       JUNCTION       188.17          2.02              0.0
STM MH#3       JUNCTION       188.00          2.05              0.0
Out-1          OUTFALL        189.10          0.00              0.0
Out-2          OUTFALL        189.10          0.40              0.0
1              STORAGE        187.62          2.06              0.0
    
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*****
Link Summary
*****
Name           From Node           To Node           Type           Length           %Slope Roughness
-----
1              Jun-1              Jun-2            CONDUIT        29.3            0.8991 0.0130
2              Jun-3              Jun-2            CONDUIT        33.3            0.4444 0.0130
3              Jun-3              Jun-4            CONDUIT        19.6            1.0939 0.0130
4              Jun-5              Jun-4            CONDUIT        10.4            1.2513 0.0130
5              STM MH#3           1                CONDUIT        11.3            1.0001 0.0153
6              1                  Jun-6            CONDUIT        2.1             1.0097 0.0153
7              Jun-6              Jun-7            CONDUIT        7.7             1.0045 0.0130
8              Jun-6              Out-2            CONDUIT        7.5             0.6000 0.0130
Pipe - (3)     STM MH#1           STM MH#2         CONDUIT        55.4            0.2797 0.0130
Pipe - (4)     STM MH#2           STM MH#3         CONDUIT        24.0            0.2791 0.0130
Pump-1         Jun-7              Out-1            TYPE2 PUMP
Orifice-1      Jun-2              STM MH#1         ORIFICE
Orifice-2      Jun-4              STM MH#3         ORIFICE
Orifice-3      Jun-2              STM MH#2         ORIFICE
    
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*****
Cross Section Summary
*****
Conduit           Shape           Full Depth           Full Area           Hyd. Rad.           Max. Width           No. of Barrels           Full Flow
-----
1              Road-Section    0.48                5.39                0.21                20.00                1                14.11
2              Road-Section    0.48                5.39                0.21                20.00                1                9.92
3              Road-Section    0.48                5.39                0.21                20.00                1                15.57
4              Road-Section    0.48                5.39                0.21                20.00                1                16.65
5              CIRCULAR        0.45                0.16                0.11                0.45                1                0.24
6              CIRCULAR        0.25                0.05                0.06                0.25                1                0.05
7              CIRCULAR        0.25                0.05                0.06                0.25                1                0.06
8              CIRCULAR        0.20                0.03                0.05                0.20                1                0.03
Pipe - (3)     CIRCULAR        0.45                0.16                0.11                0.45                1                0.15
Pipe - (4)     CIRCULAR        0.45                0.16                0.11                0.45                1                0.15
    
```

 Transect Summary

Transect Road-Section

Area:	0.0005	0.0019	0.0042	0.0074	0.0116
	0.0167	0.0228	0.0297	0.0376	0.0465
	0.0562	0.0669	0.0785	0.0910	0.1045
	0.1192	0.1355	0.1526	0.1702	0.1884
	0.2072	0.2266	0.2465	0.2670	0.2881
	0.3097	0.3320	0.3547	0.3781	0.4020
	0.4265	0.4516	0.4772	0.5034	0.5301
	0.5575	0.5854	0.6139	0.6429	0.6725
	0.7027	0.7335	0.7648	0.7967	0.8291
	0.8622	0.8958	0.9299	0.9647	1.0000
Hrad:	0.0214	0.0429	0.0643	0.0858	0.1072
	0.1287	0.1501	0.1716	0.1930	0.2145
	0.2359	0.2574	0.2788	0.3003	0.3217
	0.3324	0.3605	0.3994	0.4362	0.4712
	0.5042	0.5356	0.5653	0.5935	0.6202
	0.6456	0.6698	0.6927	0.7145	0.7353
	0.7551	0.7739	0.7919	0.8090	0.8253
	0.8409	0.8558	0.8700	0.8836	0.8966
	0.9091	0.9210	0.9324	0.9433	0.9538
	0.9638	0.9734	0.9827	0.9915	1.0000
Width:	0.0261	0.0522	0.0783	0.1044	0.1305
	0.1566	0.1827	0.2088	0.2349	0.2610
	0.2871	0.3132	0.3393	0.3654	0.3915
	0.4386	0.4720	0.4880	0.5040	0.5200
	0.5360	0.5520	0.5680	0.5840	0.6000
	0.6160	0.6320	0.6480	0.6640	0.6800
	0.6960	0.7120	0.7280	0.7440	0.7600
	0.7760	0.7920	0.8080	0.8240	0.8400
	0.8560	0.8720	0.8880	0.9040	0.9200
	0.9360	0.9520	0.9680	0.9840	1.0000

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CMS

Process Models:

Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed YES
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method DYNWAVE
 Surcharge Method EXTRAN
 Starting Date 09/02/2022 00:00:00
 Ending Date 09/04/2022 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:15:00
 Wet Time Step 00:01:00
 Dry Time Step 00:01:00
 Routing Time Step 0.50 sec
 Variable Time Step YES
 Maximum Trials 8
 Number of Threads 1
 Head Tolerance 0.001500 m

Control Actions Taken

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.127	149.985
Evaporation Loss	0.000	0.000
Infiltration Loss	0.008	9.145
Surface Runoff	0.118	139.018
Final Storage	0.002	1.864
Continuity Error (%)	-0.028	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000

```

Wet Weather Inflow ..... 0.118 1.176
Groundwater Inflow ..... 0.000 0.000
RDII Inflow ..... 0.000 0.000
External Inflow ..... 0.000 0.000
External Outflow ..... 0.118 1.175
Flooding Loss ..... 0.000 0.000
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Time-Step Critical Elements
*****
None

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      : 0.50 sec
Average Time Step      : 0.50 sec
Maximum Time Step      : 0.50 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging  : 0.01
Time Step Frequencies  :
  0.500 - 0.500 sec    : 100.00 %
  0.500 - 0.500 sec    : 0.00 %
  0.500 - 0.500 sec    : 0.00 %
  0.500 - 0.500 sec    : 0.00 %
  0.500 - 0.500 sec    : 0.00 %

```

```

*****
Subcatchment Runoff Summary
*****

```

Peak Runoff		Total	Total	Total	Total	Imperv	Perv	Total	Total
Runoff	Coeff	Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff	Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10^6 ltr
CMS									
A1	0.23	149.98	0.00	0.00	7.14	118.03	22.86	140.89	0.81
A2	0.09	149.98	0.00	0.00	7.14	118.03	22.86	140.89	0.30
A3	0.02	149.98	0.00	0.00	36.41	0.00	113.58	113.58	0.07

```

*****
Node Depth Summary
*****

```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
Jun-1	JUNCTION	0.00	0.00	190.30	0 00:00	0.00
Jun-2	JUNCTION	0.01	0.11	190.14	0 09:15	0.11
Jun-3	JUNCTION	0.00	0.00	190.18	0 00:00	0.00
Jun-4	JUNCTION	0.00	0.09	190.06	0 09:15	0.09
Jun-5	JUNCTION	0.00	0.00	190.10	0 00:00	0.00
Jun-6	JUNCTION	0.12	1.50	189.10	0 09:46	1.50
Jun-7	JUNCTION	0.10	2.26	189.78	0 09:06	1.51
STM MH#1	JUNCTION	0.05	1.20	189.56	0 09:15	1.20
STM MH#2	JUNCTION	0.07	1.27	189.44	0 09:15	1.27
STM MH#3	JUNCTION	0.08	1.19	189.19	0 09:45	1.19
Out-1	OUTFALL	1.05	1.05	190.15	0 00:00	1.05
Out-2	OUTFALL	0.00	0.00	189.10	0 00:00	0.00
1	STORAGE	0.13	1.56	189.18	0 09:46	1.56

```

*****
Node Inflow Summary
*****

```

Maximum Lateral Inflow	Maximum Total Inflow	Time of Max Occurrence	Lateral Inflow Volume	Total Inflow Volume	Flow Balance Error
------------------------	----------------------	------------------------	-----------------------	---------------------	--------------------

Node	Type	CMS	CMS	days hr:min	10^6 ltr	10^6 ltr	Percent
Jun-1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-2	JUNCTION	0.230	0.230	0 09:15	0.806	0.806	-0.001
Jun-3	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-4	JUNCTION	0.087	0.087	0 09:15	0.304	0.304	-0.001
Jun-5	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-6	JUNCTION	0.000	0.082	0 09:06	0	1.18	0.001
Jun-7	JUNCTION	0.000	0.108	0 09:06	0	1.18	-0.007
STM MH#1	JUNCTION	0.000	0.115	0 09:15	0	0.403	-0.010
STM MH#2	JUNCTION	0.000	0.230	0 09:15	0	0.806	0.133
STM MH#3	JUNCTION	0.000	0.316	0 09:15	0	1.11	-0.012
Out-1	OUTFALL	0.000	0.053	0 04:51	0	1.18	0.000
Out-2	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
1	STORAGE	0.019	0.335	0 09:15	0.0658	1.17	-0.068

TOTAL INFLOW TO POND

Node Surcharge Summary

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
Jun-7	JUNCTION	5.68	2.007	0.243
STM MH#1	JUNCTION	1.51	0.634	0.736
STM MH#2	JUNCTION	1.93	0.704	0.746
STM MH#3	JUNCTION	2.29	0.616	0.868

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
1	0.023	5	0	0	0.353	77	0 09:46	0.082

REQUIRED STORAGE

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out-1	53.37	0.013	0.053	1.175
Out-2	0.00	0.000	0.000	0.000
System	26.69	0.013	0.053	1.175

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
1	CHANNEL	0.000	0 00:00	0.00	0.00	0.11
2	CHANNEL	0.000	0 00:00	0.00	0.00	0.11
3	CHANNEL	0.000	0 00:00	0.00	0.00	0.09
4	CHANNEL	0.000	0 00:00	0.00	0.00	0.09
5	CONDUIT	0.316	0 09:15	1.99	1.30	1.00
6	CONDUIT	0.082	0 09:06	1.68	1.62	1.00
7	CONDUIT	0.108	0 09:06	2.21	1.80	1.00
8	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
Pipe - (3)	CONDUIT	0.115	0 09:15	0.72	0.76	1.00
Pipe - (4)	CONDUIT	0.229	0 09:15	1.44	1.52	1.00
Pump-1	PUMP	0.053	0 04:51		1.00	
Orifice-1	ORIFICE	0.115	0 09:15			
Orifice-2	ORIFICE	0.087	0 09:15			
Orifice-3	ORIFICE	0.115	0 09:15			

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
1	1.00	0.25	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.00	0.25	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.00	0.28	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.00	0.28	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.00	0.02	0.00	0.00	0.09	0.00	0.00	0.89	0.02	0.00
6	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
7	1.00	0.02	0.00	0.00	0.55	0.43	0.00	0.00	0.39	0.00
8	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe - (3)	1.00	0.02	0.00	0.00	0.15	0.00	0.00	0.83	0.02	0.00
Pipe - (4)	1.00	0.02	0.00	0.00	0.06	0.00	0.00	0.91	0.00	0.00

Conduit Surge Summary

Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
5	2.50	2.57	2.72	0.20	0.17
6	5.00	5.16	5.17	3.51	3.61
7	4.98	5.17	5.68	0.01	0.01
Pipe - (3)	1.79	1.79	2.14	0.01	0.01
Pipe - (4)	2.19	2.21	2.33	0.23	0.22

Pumping Summary

Pump	Percent Utilized	Number of Start-Ups	Min	Avg	Max	Total	Power Usage Kw-hr	% Time Off Pump Curve	
			Flow CMS	Flow CMS	Flow CMS	Volume 10^6 ltr		Low	High
Pump-1	53.37	1	0.00	0.01	0.05	1.175	6.54	0.0	0.0

Analysis begun on: Wed Sep 7 10:25:45 2022
Analysis ended on: Wed Sep 7 10:25:48 2022
Total elapsed time: 00:00:03



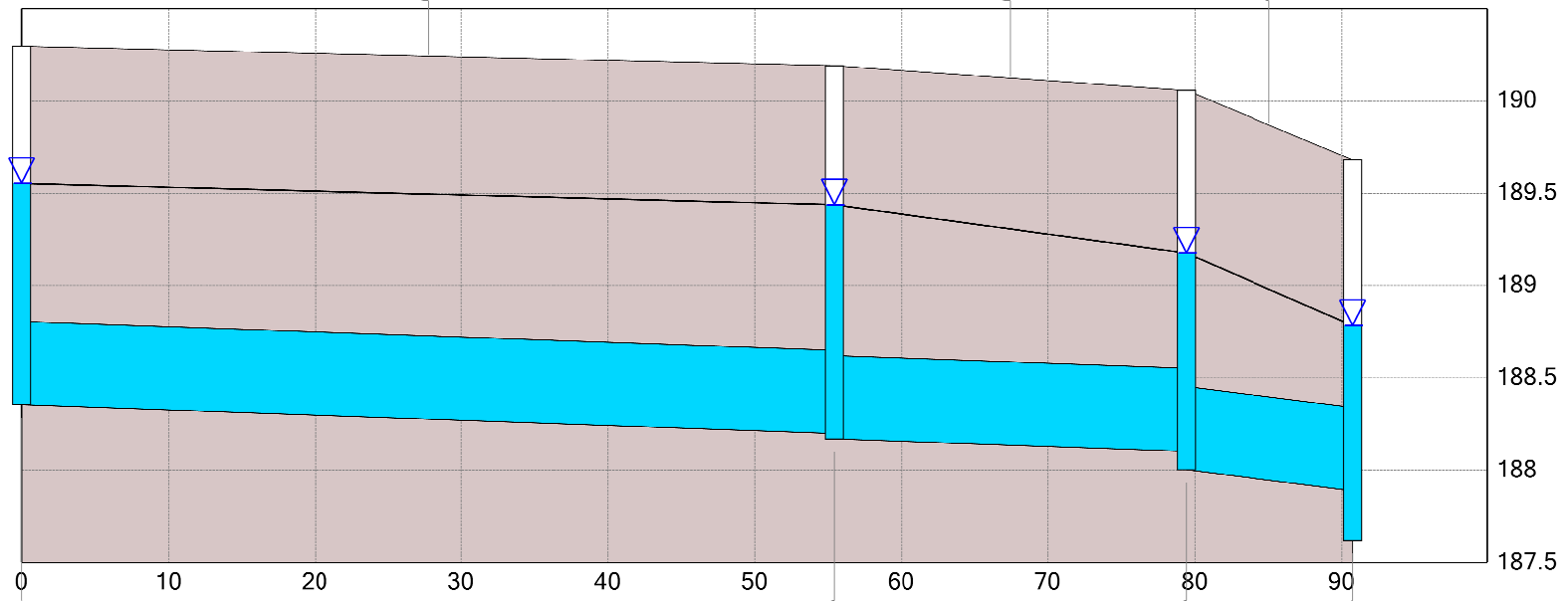
HGL

Time: 9/2/2022 9:15:00 AM

Conduit Pipe - (3)
Flow = 0.115 m³/s
Length = 55.42 m
Depth = 0.45 m
Velocity = 0.721 m/s
Slope = 0.0028 m/m
Invert1 = 188.355 m
Invert2 = 188.2 m

Conduit Pipe - (4)
Flow = 0.229 m³/s
Length = 24.003 m
Depth = 0.45 m
Velocity = 1.442 m/s
Slope = 0.00279 m/m
Invert1 = 188.17 m
Invert2 = 188.103 m

Conduit 5
Flow = 0.316 m³/s
Length = 11.3 m
Depth = 0.45 m
Velocity = 1.985 m/s
Slope = 0.01 m/m
Invert1 = 188.003 m
Invert2 = 187.89 m



Junction STM MH#1
CWSEL = 189.5532 m
Max. CWSEL = 189.5532 m
Rim Elev. = 190.295 m
Invert Elev. = 188.355 m

Junction STM MH#2
CWSEL = 189.437 m
Max. CWSEL = 189.437 m
Rim Elev. = 190.19 m
Invert Elev. = 188.17 m

Junction STM MH#3
CWSEL = 189.1758 m
Max. CWSEL = 189.1758 m
Rim Elev. = 190.057 m
Invert Elev. = 188.003 m

Storage 1
CWSEL = 188.7829 m
Max. CWSEL = 188.7829 m
Rim Elev. = 189.68 m
Invert Elev. = 187.62 m

— HGL

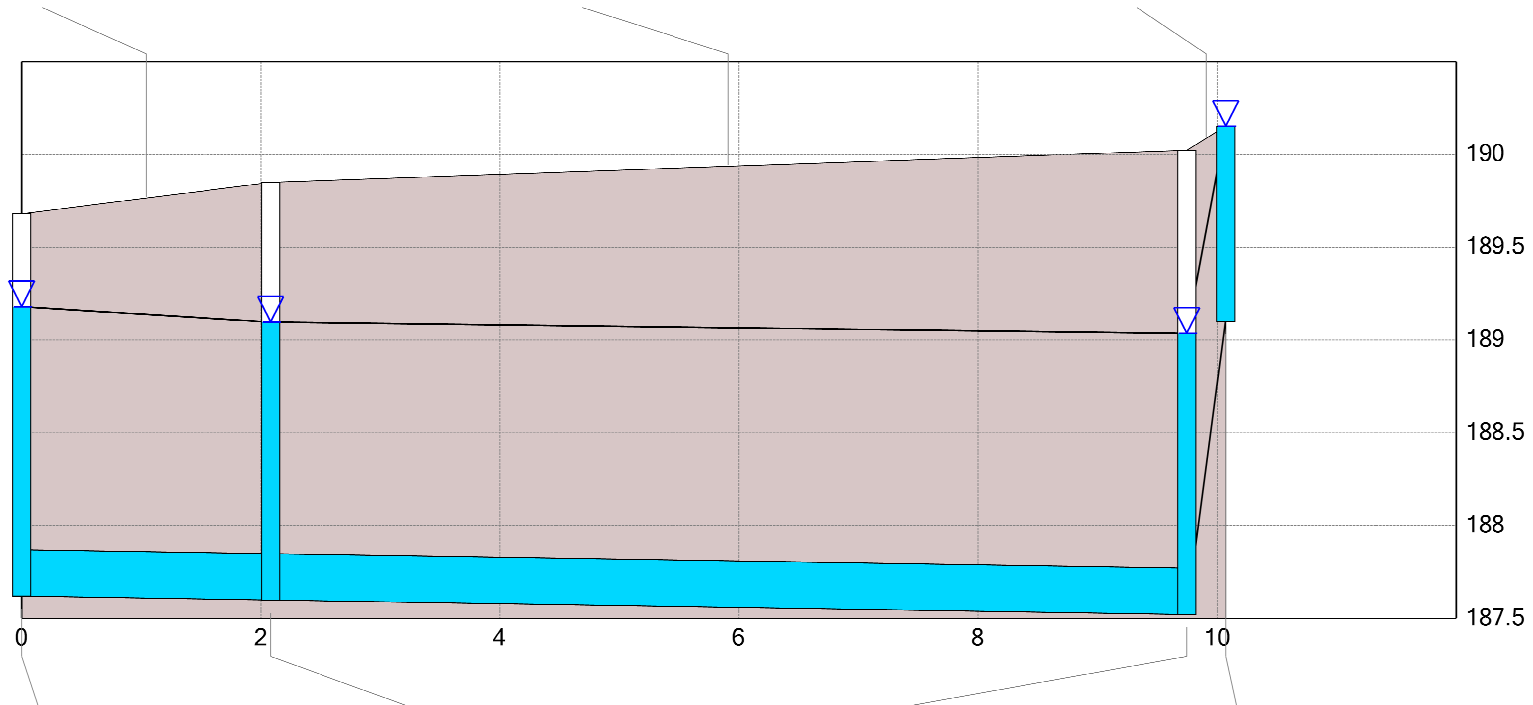
Time: 9/2/2022 9:45:00 AM

Conduit 6
Flow = 0.053 m³/s
Length = 2.08 m
Depth = 0.25 m
Velocity = 1.08 m/s
Slope = 0.0101 m/m
Invert1 = 187.62 m
Invert2 = 187.599 m

Conduit 7
Flow = 0.053 m³/s
Length = 7.666 m
Depth = 0.25 m
Velocity = 1.08 m/s
Slope = 0.01 m/m
Invert1 = 187.599 m
Invert2 = 187.522 m

Pump Pump-1
Flow = 0.053 m³/s

Velocity = 0 m/s



Storage 1
CWSEL = 189.1787 m
Max. CWSEL = 189.1787 m
Rim Elev. = 189.68 m
Invert Elev. = 187.62 m

Junction Jun-6
CWSEL = 189.0964 m
Max. CWSEL = 189.0964 m
Rim Elev. = 189.849 m
Invert Elev. = 187.599 m

Junction Jun-7
CWSEL = 189.0356 m
Max. CWSEL = 189.0356 m
Rim Elev. = 190.022 m
Invert Elev. = 187.522 m

Outfall Out-1
CWSEL = 190.151 m
Max. CWSEL = 190.151 m
Rim Elev. = 190.151 m
Invert Elev. = 189.1 m

— HGL

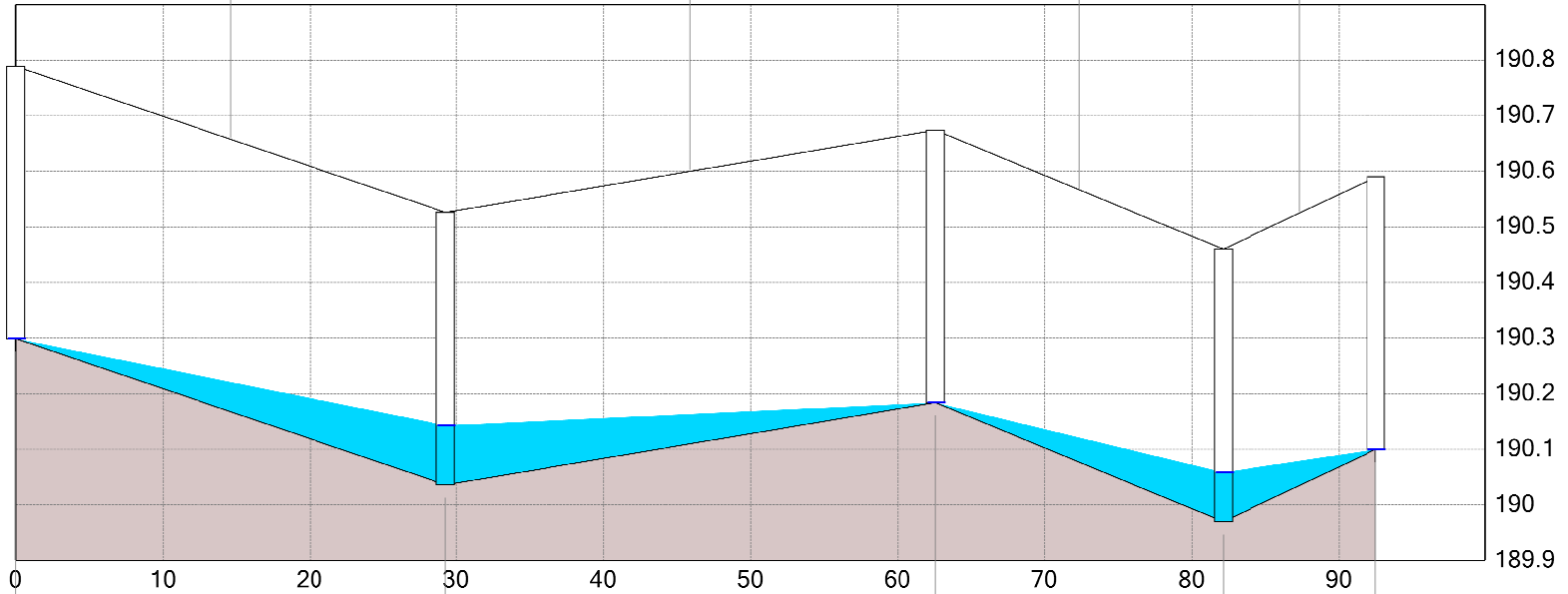
Time: 9/2/2022 9:15:00 AM

Conduit 1
Flow = 0 m³/s
Length = 29.253 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.00899 m/m
Invert1 = 190.299 m
Invert2 = 190.036 m

Conduit 2
Flow = 0 m³/s
Length = 33.306 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.00444 m/m
Invert1 = 190.184 m
Invert2 = 190.036 m

Conduit 3
Flow = 0 m³/s
Length = 19.564 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.0109 m/m
Invert1 = 190.184 m
Invert2 = 189.97 m

Conduit 4
Flow = 0 m³/s
Length = 10.39 m
Depth = 0.48 m
Velocity = 0 m/s
Slope = 0.0125 m/m
Invert1 = 190.1 m
Invert2 = 189.97 m



Junction Jun-1
CWSEL = 190.299 m
Max. CWSEL = 190.299 m
Rim Elev. = 190.789 m
Invert Elev. = 190.299 m

Junction Jun-2
CWSEL = 190.1431 m
Max. CWSEL = 190.1431 m
Rim Elev. = 190.526 m
Invert Elev. = 190.036 m

Junction Jun-3
CWSEL = 190.184 m
Max. CWSEL = 190.184 m
Rim Elev. = 190.674 m
Invert Elev. = 190.184 m

Junction Jun-4
CWSEL = 190.0587 m
Max. CWSEL = 190.0587 m
Rim Elev. = 190.46 m
Invert Elev. = 189.97 m

Junction Jun-5
CWSEL = 190.1 m
Max. CWSEL = 190.1 m
Rim Elev. = 190.59 m
Invert Elev. = 190.1 m

OUTPUT REPORT - 100YEAR 4 HOUR CHICAGO STORM - GRAVITY OUTFLOW (PUMP FAILURE)

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Element Count

Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 13
Number of links 14
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
Raingage1	5-Year-Chicago	INTENSITY	15 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A1	0.57	98.62	80.00	2.0000	Raingage1	Jun-2
A2	0.22	37.19	80.00	2.0000	Raingage1	Jun-4
A3	0.06	5.79	0.00	5.0000	Raingage1	1

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
Jun-1	JUNCTION	190.30	0.49	0.0	
Jun-2	JUNCTION	190.04	0.49	0.0	
Jun-3	JUNCTION	190.18	0.49	0.0	
Jun-4	JUNCTION	189.97	0.49	0.0	
Jun-5	JUNCTION	190.10	0.49	0.0	
Jun-6	JUNCTION	187.60	2.25	0.0	
Jun-7	JUNCTION	187.52	2.50	0.0	
STM MH#1	JUNCTION	188.35	1.94	0.0	
STM MH#2	JUNCTION	188.17	2.02	0.0	
STM MH#3	JUNCTION	188.00	2.05	0.0	
Out-1	OUTFALL	189.10	0.00	0.0	
Out-2	OUTFALL	189.10	0.40	0.0	
1	STORAGE	187.62	2.06	0.0	

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
1	Jun-1	Jun-2	CONDUIT	29.3	0.8991	0.0130
2	Jun-3	Jun-2	CONDUIT	33.3	0.4444	0.0130
3	Jun-3	Jun-4	CONDUIT	19.6	1.0939	0.0130
4	Jun-5	Jun-4	CONDUIT	10.4	1.2513	0.0130
5	STM MH#3	1	CONDUIT	11.3	1.0001	0.0153
6	1	Jun-6	CONDUIT	2.1	1.0097	0.0153
7	Jun-6	Jun-7	CONDUIT	7.7	1.0045	0.0130
8	Jun-6	Out-2	CONDUIT	7.5	0.6000	0.0130
Pipe - (3)	STM MH#1	STM MH#2	CONDUIT	55.4	0.2797	0.0130
Pipe - (4)	STM MH#2	STM MH#3	CONDUIT	24.0	0.2791	0.0130
Pump-1	Jun-7	Out-1	TYPE2 PUMP			
Orifice-1	Jun-2	STM MH#1	ORIFICE			
Orifice-2	Jun-4	STM MH#3	ORIFICE			
Orifice-3	Jun-2	STM MH#2	ORIFICE			

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
1	Road-Section	0.48	5.39	0.21	20.00	1	14.11
2	Road-Section	0.48	5.39	0.21	20.00	1	9.92
3	Road-Section	0.48	5.39	0.21	20.00	1	15.57
4	Road-Section	0.48	5.39	0.21	20.00	1	16.65
5	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
6	CIRCULAR	0.25	0.05	0.06	0.25	1	0.05
7	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
8	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
Pipe - (3)	CIRCULAR	0.45	0.16	0.11	0.45	1	0.15
Pipe - (4)	CIRCULAR	0.45	0.16	0.11	0.45	1	0.15

 Transect Summary

Transect Road-Section

Area:	0.0005	0.0019	0.0042	0.0074	0.0116
	0.0167	0.0228	0.0297	0.0376	0.0465
	0.0562	0.0669	0.0785	0.0910	0.1045
	0.1192	0.1355	0.1526	0.1702	0.1884
	0.2072	0.2266	0.2465	0.2670	0.2881
	0.3097	0.3320	0.3547	0.3781	0.4020
	0.4265	0.4516	0.4772	0.5034	0.5301
	0.5575	0.5854	0.6139	0.6429	0.6725
	0.7027	0.7335	0.7648	0.7967	0.8291
	0.8622	0.8958	0.9299	0.9647	1.0000
Hrad:	0.0214	0.0429	0.0643	0.0858	0.1072
	0.1287	0.1501	0.1716	0.1930	0.2145
	0.2359	0.2574	0.2788	0.3003	0.3217
	0.3324	0.3605	0.3994	0.4362	0.4712
	0.5042	0.5356	0.5653	0.5935	0.6202
	0.6456	0.6698	0.6927	0.7145	0.7353
	0.7551	0.7739	0.7919	0.8090	0.8253
	0.8409	0.8558	0.8700	0.8836	0.8966
	0.9091	0.9210	0.9324	0.9433	0.9538
	0.9638	0.9734	0.9827	0.9915	1.0000
Width:	0.0261	0.0522	0.0783	0.1044	0.1305
	0.1566	0.1827	0.2088	0.2349	0.2610
	0.2871	0.3132	0.3393	0.3654	0.3915
	0.4386	0.4720	0.4880	0.5040	0.5200
	0.5360	0.5520	0.5680	0.5840	0.6000
	0.6160	0.6320	0.6480	0.6640	0.6800
	0.6960	0.7120	0.7280	0.7440	0.7600
	0.7760	0.7920	0.8080	0.8240	0.8400
	0.8560	0.8720	0.8880	0.9040	0.9200
	0.9360	0.9520	0.9680	0.9840	1.0000

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CMS
 Process Models:
 Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed YES
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method DYNWAVE
 Surcharge Method EXTRAN
 Starting Date 09/02/2022 00:00:00
 Ending Date 09/04/2022 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:15:00
 Wet Time Step 00:01:00
 Dry Time Step 00:01:00
 Routing Time Step 0.50 sec
 Variable Time Step YES
 Maximum Trials 8
 Number of Threads 1
 Head Tolerance 0.001500 m

Control Actions Taken

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.042	49.475
Evaporation Loss	0.000	0.000
Infiltration Loss	0.006	7.171
Surface Runoff	0.034	40.465
Final Storage	0.002	1.863
Continuity Error (%)	-0.049	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000

Wet Weather Inflow	0.034	0.342
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.000	0.000
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.034	0.337
Continuity Error (%)	1.440	

Highest Continuity Errors

Node Jun-7 (50.73%)
Node Jun-6 (36.45%)
Node STM MH#1 (4.27%)
Node STM MH#2 (3.66%)

Time-Step Critical Elements

None

Highest Flow Instability Indexes

Link 7 (7)

Routing Time Step Summary

Minimum Time Step : 0.50 sec
Average Time Step : 0.50 sec
Maximum Time Step : 0.50 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
0.500 - 0.500 sec : 100.00 %
0.500 - 0.500 sec : 0.00 %
0.500 - 0.500 sec : 0.00 %
0.500 - 0.500 sec : 0.00 %
0.500 - 0.500 sec : 0.00 %

Subcatchment Runoff Summary

Peak Runoff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Runoff Coeff	mm	mm	mm	mm	mm	mm	mm	10 ⁶ ltr
Subcatchment	CMS							
A1	49.47	0.00	0.00	5.59	37.60	4.31	41.91	0.24
0.13 0.847								
A2	49.47	0.00	0.00	5.59	37.60	4.31	41.91	0.09
0.05 0.847								
A3	49.47	0.00	0.00	28.73	0.00	20.76	20.76	0.01
0.00 0.420								

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
Jun-1	JUNCTION	0.00	0.00	190.30	0 00:00	0.00
Jun-2	JUNCTION	0.00	0.07	190.11	0 01:45	0.07
Jun-3	JUNCTION	0.00	0.00	190.18	0 00:00	0.00
Jun-4	JUNCTION	0.00	0.06	190.03	0 01:45	0.06
Jun-5	JUNCTION	0.00	0.00	190.10	0 00:00	0.00
Jun-6	JUNCTION	1.41	1.46	189.06	1 23:16	1.46
Jun-7	JUNCTION	1.48	1.54	189.06	1 17:29	1.54
STM MH#1	JUNCTION	0.67	0.71	189.06	0 19:28	0.71
STM MH#2	JUNCTION	0.85	0.89	189.06	0 20:03	0.89
STM MH#3	JUNCTION	1.01	1.06	189.06	1 06:15	1.06
Out-1	OUTFALL	1.05	1.05	190.15	0 00:00	1.05
Out-2	OUTFALL	0.00	0.00	189.10	0 00:00	0.00
1	STORAGE	1.38	1.44	189.06	1 23:19	1.44

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
Jun-1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-2	JUNCTION	0.132	0.132	0 01:45	0.24	0.24	-0.004
Jun-3	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-4	JUNCTION	0.050	0.050	0 01:45	0.0904	0.0904	-0.003
Jun-5	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-6	JUNCTION	0.000	0.001	0 01:02	0	0.00468	57.344
Jun-7	JUNCTION	0.000	0.001	0 01:02	0	0.00062	102.984
STM MH#1	JUNCTION	0.000	0.066	0 01:45	0	0.12	4.465
STM MH#2	JUNCTION	0.000	0.123	0 01:45	0	0.235	3.799
STM MH#3	JUNCTION	0.000	0.166	0 01:45	0	0.317	0.873
Out-1	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
Out-2	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
1	STORAGE	0.004	0.169	0 01:45	0.012	0.329	0.403

TOTAL INFLOW TO POND

Node Surcharge Summary

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
Jun-7	JUNCTION	46.67	1.291	0.959
STM MH#1	JUNCTION	45.15	0.137	1.233
STM MH#2	JUNCTION	45.95	0.322	1.128
STM MH#3	JUNCTION	46.26	0.489	0.995

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
1	0.309	68	0	0	0.322	71	1 23:19	0.001

REQUIRED STORAGE

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out-1	0.00	0.000	0.000	0.000
Out-2	0.00	0.000	0.000	0.000
System	0.00	0.000	0.000	0.000

ZERO RELEASE

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
1	CHANNEL	0.000	0 00:00	0.00	0.00	0.08
2	CHANNEL	0.000	0 00:00	0.00	0.00	0.08
3	CHANNEL	0.000	0 00:00	0.00	0.00	0.06
4	CHANNEL	0.000	0 00:00	0.00	0.00	0.06
5	CONDUIT	0.165	0 01:45	1.32	0.68	1.00
6	CONDUIT	0.001	0 01:02	0.38	0.03	1.00
7	CONDUIT	0.001	0 01:02	0.31	0.02	1.00
8	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
Pipe - (3)	CONDUIT	0.060	0 01:41	0.64	0.40	1.00
Pipe - (4)	CONDUIT	0.118	0 01:45	1.04	0.78	1.00

```

Pump-1          PUMP          0.000    0 00:00          0.00
Orifice-1       ORIFICE       0.066    0 01:45
Orifice-2       ORIFICE       0.050    0 01:45
Orifice-3       ORIFICE       0.066    0 01:45

```

```

*****
Flow Classification Summary
*****

```

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
1	1.00	0.63	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.00	0.63	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.00	0.66	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.00	0.66	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.02	0.00	0.00
6	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
7	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
8	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe - (3)	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.01	0.00
Pipe - (4)	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.02	0.00	0.00

```

*****
Conduit Surcharge Summary
*****

```

Conduit	Hours Full			Hours Above Full	Hours Capacity
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
5	46.31	46.31	46.32	0.01	0.01
6	46.58	46.58	46.60	0.01	0.01
7	46.60	46.60	46.67	0.01	0.01
Pipe - (3)	45.76	45.76	46.17	0.01	0.01
Pipe - (4)	46.27	46.27	46.27	0.01	0.02

```

*****
Pumping Summary
*****

```

Pump	Percent Utilized	Number of Start-Ups	Min	Avg	Max	Total	Power Usage Kw-hr	% Time Off Pump Curve	
			Flow CMS	Flow CMS	Flow CMS	Volume 10^6 ltr		Low	High
Pump-1	0.00	0	0.00	0.00	0.00	0.000	0.00	0.0	0.0

```

Analysis begun on: Wed Sep 7 10:32:24 2022
Analysis ended on: Wed Sep 7 10:32:26 2022
Total elapsed time: 00:00:02

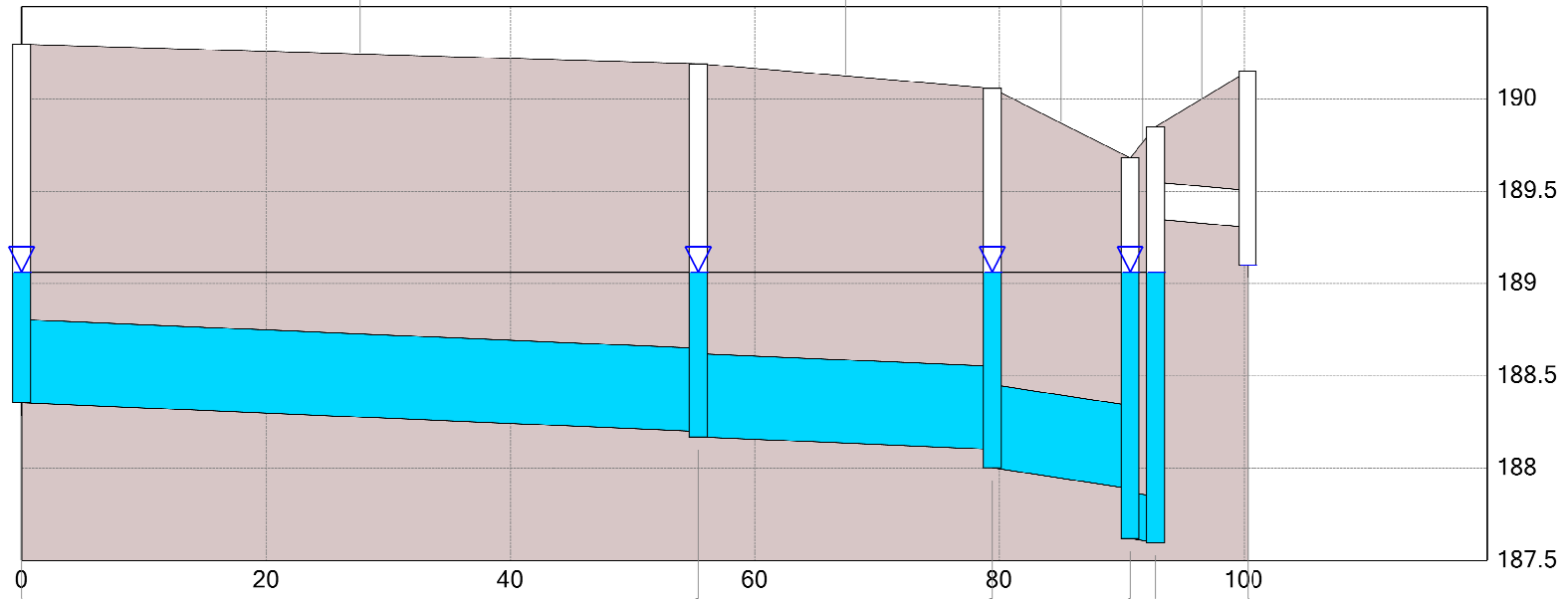
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PUMP FAILURE

— HGL

Time: 9/2/2022 9:15:00 AM

Links:	Pipe - (3)	Pipe - (4)	5	6	8
Q=0 m ³ /s	Q=0 m ³ /s	Q=0 m ³ /s	Q=0 m ³ /s	Q=0 m ³ /s	Q=0 m ³ /s
L=55.42 m	L=24.003 m	L=11.3 m	L=2.08 m	L=7.5 m	
D=0.45 m	D=0.45 m	D=0.45 m	D=0.25 m	D=0.2 m	
V=0 m/s	V=0 m/s	V=0 m/s	V=0 m/s	V=0 m/s	
S=0.0028 m/m	S=0.00279 m/m	S=0.01 m/m	S=0.0101 m/m	S=0.006 m/m	
I1=188.355 m	I1=188.17 m	I1=188.003 m	I1=187.62 m	I1=189.349 m	
I2=188.2 m	I2=188.103 m	I2=187.89 m	I2=187.599 m	I2=189.304 m	



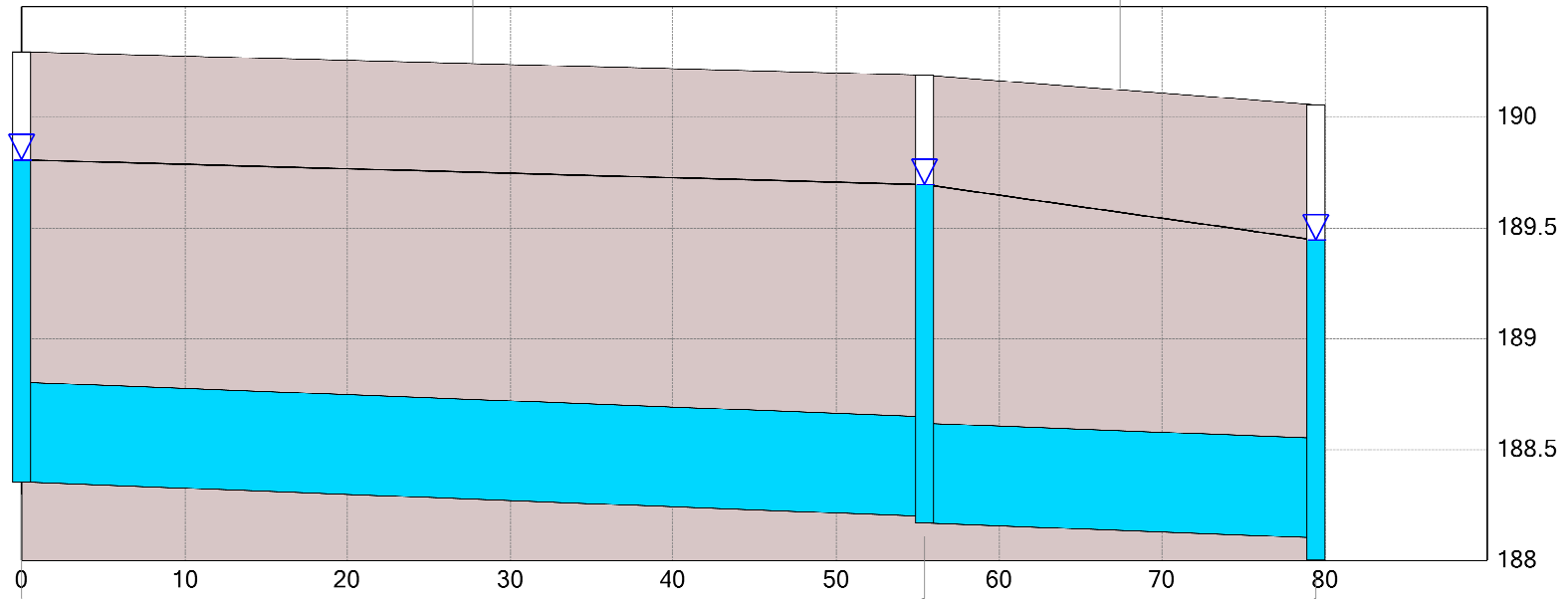
Nodes:	STM MH#1	STM MH#2	STM MH#3	1	Jun-6	Out-2
H=189.0608 m	H=189.0608 m	H=189.0608 m	H=189.0608 m	H=189.0608 m	H=189.0608 m	H=189.1 m
M=189.0608 m	M=189.0608 m	M=189.0608 m	M=189.0608 m	M=189.0608 m	M=189.0608 m	M=189.1 m
R=190.295 m	R=190.19 m	R=190.057 m	R=189.68 m	R=189.849 m	R=190.151 m	
I=188.355 m	I=188.17 m	I=188.003 m	I=187.62 m	I=187.599 m	I=189.1 m	

— HGL

Time: 9/2/2022 1:45:00 AM

Conduit Pipe - (3)
Flow = 0.112 m³/s
Length = 55.42 m
Depth = 0.45 m
Velocity = 0.706 m/s
Slope = 0.0028 m/m
Invert1 = 188.355 m
Invert2 = 188.2 m

Conduit Pipe - (4)
Flow = 0.225 m³/s
Length = 24.003 m
Depth = 0.45 m
Velocity = 1.412 m/s
Slope = 0.00279 m/m
Invert1 = 188.17 m
Invert2 = 188.103 m



Junction STM MH#1
CWSEL = 189.8082 m
Max. CWSEL = 189.8082 m
Rim Elev. = 190.295 m
Invert Elev. = 188.355 m

Junction STM MH#2
CWSEL = 189.6967 m
Max. CWSEL = 189.6967 m
Rim Elev. = 190.19 m
Invert Elev. = 188.17 m

Junction STM MH#3
CWSEL = 189.4462 m
Max. CWSEL = 189.4462 m
Rim Elev. = 190.057 m
Invert Elev. = 188.003 m

**OUTPUT REPORT - 100YEAR 4 HOUR CHICAGO STORM - PUMPED FAILURE
(GRAVITY OUTFLOW)**

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Element Count

Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 13
Number of links 14
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
Raingage1	100-YearChicago-Storm	INTENSITY	15 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A1	0.57	98.62	80.00	2.0000	Raingage1	Jun-2
A2	0.22	37.19	80.00	2.0000	Raingage1	Jun-4
A3	0.06	5.79	0.00	5.0000	Raingage1	1

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
Jun-1	JUNCTION	190.30	0.49	0.0	
Jun-2	JUNCTION	190.04	0.49	0.0	
Jun-3	JUNCTION	190.18	0.49	0.0	
Jun-4	JUNCTION	189.97	0.49	0.0	
Jun-5	JUNCTION	190.10	0.49	0.0	
Jun-6	JUNCTION	187.60	2.25	0.0	
Jun-7	JUNCTION	187.52	2.50	0.0	
STM MH#1	JUNCTION	188.35	1.94	0.0	
STM MH#2	JUNCTION	188.17	2.02	0.0	
STM MH#3	JUNCTION	188.00	2.05	0.0	
Out-1	OUTFALL	189.10	0.00	0.0	
Out-2	OUTFALL	189.10	0.40	0.0	
1	STORAGE	187.62	2.06	0.0	

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
1	Jun-1	Jun-2	CONDUIT	29.3	0.8991	0.0130
2	Jun-3	Jun-2	CONDUIT	33.3	0.4444	0.0130
3	Jun-3	Jun-4	CONDUIT	19.6	1.0939	0.0130
4	Jun-5	Jun-4	CONDUIT	10.4	1.2513	0.0130
5	STM MH#3	1	CONDUIT	11.3	1.0001	0.0153
6	1	Jun-6	CONDUIT	2.1	1.0097	0.0153
7	Jun-6	Jun-7	CONDUIT	7.7	1.0045	0.0130
8	Jun-6	Out-2	CONDUIT	7.5	0.6000	0.0130
Pipe - (3)	STM MH#1	STM MH#2	CONDUIT	55.4	0.2797	0.0130
Pipe - (4)	STM MH#2	STM MH#3	CONDUIT	24.0	0.2791	0.0130
Pump-1	Jun-7	Out-1	TYPE2 PUMP			
Orifice-1	Jun-2	STM MH#1	ORIFICE			
Orifice-2	Jun-4	STM MH#3	ORIFICE			
Orifice-3	Jun-2	STM MH#2	ORIFICE			

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
1	Road-Section	0.48	5.39	0.21	20.00	1	14.11
2	Road-Section	0.48	5.39	0.21	20.00	1	9.92
3	Road-Section	0.48	5.39	0.21	20.00	1	15.57
4	Road-Section	0.48	5.39	0.21	20.00	1	16.65
5	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
6	CIRCULAR	0.25	0.05	0.06	0.25	1	0.05
7	CIRCULAR	0.25	0.05	0.06	0.25	1	0.06
8	CIRCULAR	0.20	0.03	0.05	0.20	1	0.03
Pipe - (3)	CIRCULAR	0.45	0.16	0.11	0.45	1	0.15
Pipe - (4)	CIRCULAR	0.45	0.16	0.11	0.45	1	0.15

 Transect Summary

Transect Road-Section

Area:	0.0005	0.0019	0.0042	0.0074	0.0116
	0.0167	0.0228	0.0297	0.0376	0.0465
	0.0562	0.0669	0.0785	0.0910	0.1045
	0.1192	0.1355	0.1526	0.1702	0.1884
	0.2072	0.2266	0.2465	0.2670	0.2881
	0.3097	0.3320	0.3547	0.3781	0.4020
	0.4265	0.4516	0.4772	0.5034	0.5301
	0.5575	0.5854	0.6139	0.6429	0.6725
	0.7027	0.7335	0.7648	0.7967	0.8291
	0.8622	0.8958	0.9299	0.9647	1.0000
Hrad:	0.0214	0.0429	0.0643	0.0858	0.1072
	0.1287	0.1501	0.1716	0.1930	0.2145
	0.2359	0.2574	0.2788	0.3003	0.3217
	0.3324	0.3605	0.3994	0.4362	0.4712
	0.5042	0.5356	0.5653	0.5935	0.6202
	0.6456	0.6698	0.6927	0.7145	0.7353
	0.7551	0.7739	0.7919	0.8090	0.8253
	0.8409	0.8558	0.8700	0.8836	0.8966
	0.9091	0.9210	0.9324	0.9433	0.9538
	0.9638	0.9734	0.9827	0.9915	1.0000
Width:	0.0261	0.0522	0.0783	0.1044	0.1305
	0.1566	0.1827	0.2088	0.2349	0.2610
	0.2871	0.3132	0.3393	0.3654	0.3915
	0.4386	0.4720	0.4880	0.5040	0.5200
	0.5360	0.5520	0.5680	0.5840	0.6000
	0.6160	0.6320	0.6480	0.6640	0.6800
	0.6960	0.7120	0.7280	0.7440	0.7600
	0.7760	0.7920	0.8080	0.8240	0.8400
	0.8560	0.8720	0.8880	0.9040	0.9200
	0.9360	0.9520	0.9680	0.9840	1.0000

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CMS
 Process Models:
 Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed YES
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method DYNWAVE
 Surcharge Method EXTRAN
 Starting Date 09/02/2022 00:00:00
 Ending Date 09/04/2022 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:15:00
 Wet Time Step 00:01:00
 Dry Time Step 00:01:00
 Routing Time Step 0.50 sec
 Variable Time Step YES
 Maximum Trials 8
 Number of Threads 1
 Head Tolerance 0.001500 m

Control Actions Taken

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.069	81.588
Evaporation Loss	0.000	0.000
Infiltration Loss	0.006	7.206
Surface Runoff	0.061	72.565
Final Storage	0.002	1.863
Continuity Error (%)	-0.057	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000

Wet Weather Inflow	0.061	0.614
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.020	0.199
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.041	0.409
Continuity Error (%)	0.896	

Highest Continuity Errors

Node Jun-7 (39.52%)
Node STM MH#1 (2.47%)
Node STM MH#2 (1.99%)
Node Jun-6 (1.01%)

Time-Step Critical Elements

None

Highest Flow Instability Indexes

Link 7 (10)
Link 5 (3)
Link Pipe - (4) (2)

Routing Time Step Summary

Minimum Time Step : 0.50 sec
Average Time Step : 0.50 sec
Maximum Time Step : 0.50 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.10
Percent Not Converging : 0.01
Time Step Frequencies :
0.500 - 0.500 sec : 100.00 %
0.500 - 0.500 sec : 0.00 %
0.500 - 0.500 sec : 0.00 %
0.500 - 0.500 sec : 0.00 %
0.500 - 0.500 sec : 0.00 %

Subcatchment Runoff Summary

Peak Runoff		Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Runoff	Coeff	mm	mm	mm	mm	mm	mm	mm	10 ⁶ ltr
Subcatchment		CMS							
A1	0.23	81.59	0.00	0.00	5.61	63.31	10.72	74.03	0.42
A2	0.09	81.59	0.00	0.00	5.61	63.31	10.72	74.03	0.16
A3	0.01	81.59	0.00	0.00	28.91	0.00	52.70	52.70	0.03

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
Jun-1	JUNCTION	0.00	0.00	190.30	0 00:00	0.00
Jun-2	JUNCTION	0.00	0.11	190.14	0 01:45	0.11
Jun-3	JUNCTION	0.00	0.00	190.18	0 00:00	0.00
Jun-4	JUNCTION	0.00	0.09	190.06	0 01:45	0.09
Jun-5	JUNCTION	0.00	0.00	190.10	0 00:00	0.00
Jun-6	JUNCTION	1.71	1.97	189.57	0 02:17	1.97
Jun-7	JUNCTION	1.78	2.05	189.57	0 02:17	2.05
STM MH#1	JUNCTION	0.98	1.46	189.82	0 01:45	1.45
STM MH#2	JUNCTION	1.16	1.53	189.70	0 01:45	1.53
STM MH#3	JUNCTION	1.32	1.61	189.61	0 02:16	1.61
Out-1	OUTFALL	1.05	1.05	190.15	0 00:00	1.05
Out-2	OUTFALL	0.00	0.00	189.10	0 00:00	0.00

1 STORAGE 1.69 1.99 189.61 0 02:17 1.99

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
Jun-1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-2	JUNCTION	0.226	0.226	0 01:45	0.423	0.423	-0.002
Jun-3	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-4	JUNCTION	0.085	0.085	0 01:45	0.16	0.16	-0.002
Jun-5	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Jun-6	JUNCTION	0.000	0.036	0 02:17	0	0.203	1.022
Jun-7	JUNCTION	0.000	0.001	0 00:48	0	0.000767	65.357
STM MH#1	JUNCTION	0.000	0.113	0 01:45	0	0.212	2.534
STM MH#2	JUNCTION	0.000	0.225	0 01:45	0	0.419	2.035
STM MH#3	JUNCTION	0.000	0.310	0 01:45	0	0.571	0.464
Out-1	OUTFALL	0.000	0.000	0 00:00	0	0	0.000 ltr
Out-2	OUTFALL	0.000	0.036	0 02:17	0	0.199	0.000
1	STORAGE	0.015	0.324	0 01:45	0.0305	0.599	0.305

TOTAL INFLOW TO POND

Node Surcharge Summary

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
Jun-6	JUNCTION	0.47	0.024	0.276
Jun-7	JUNCTION	46.89	1.801	0.449
STM MH#1	JUNCTION	46.41	0.891	0.479
STM MH#2	JUNCTION	46.42	0.965	0.485
STM MH#3	JUNCTION	46.42	1.042	0.442

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
1	0.383	84	0	0	0.445	97	0 02:17	0.036

REQUIRED STORAGE

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out-1	0.00	0.000	0.000	0.000
Out-2	24.54	0.005	0.036	0.199
System	12.27	0.005	0.036	0.199

GRAVITY OUTFLOW

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
1	CHANNEL	0.000	0 00:00	0.00	0.00	0.11
2	CHANNEL	0.000	0 00:00	0.00	0.00	0.11
3	CHANNEL	0.000	0 00:00	0.00	0.00	0.09
4	CHANNEL	0.000	0 00:00	0.00	0.00	0.09
5	CONDUIT	0.309	0 01:45	1.94	1.28	1.00
6	CONDUIT	0.036	0 02:17	0.73	0.71	1.00
7	CONDUIT	0.001	0 00:48	0.32	0.02	1.00

8	CONDUIT	0.036	0	02:17	1.20	1.42	0.91
Pipe - (3)	CONDUIT	0.112	0	01:45	0.71	0.74	1.00
Pipe - (4)	CONDUIT	0.225	0	01:45	1.41	1.49	1.00
Pump-1	PUMP	0.000	0	00:00		0.00	
Orifice-1	ORIFICE	0.113	0	01:45			
Orifice-2	ORIFICE	0.085	0	01:45			
Orifice-3	ORIFICE	0.113	0	01:45			

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
1	1.00	0.62	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	1.00	0.62	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	1.00	0.66	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.00	0.66	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1.00	0.01	0.00	0.00	0.97	0.00	0.00	0.02	0.00	0.00
6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
7	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
8	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
Pipe - (3)	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.01	0.00
Pipe - (4)	1.00	0.01	0.00	0.00	0.97	0.00	0.00	0.02	0.00	0.00

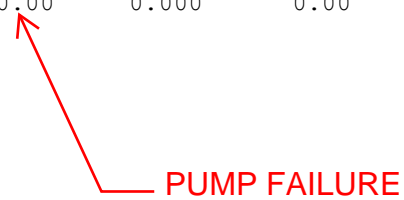
Conduit Surchage Summary

Conduit	Hours Full			Hours	
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Hours Capacity Limited
5	46.43	46.45	46.43	0.19	0.22
6	46.75	46.75	46.78	0.01	0.81
7	46.78	46.78	46.89	0.01	0.01
8	0.01	0.47	0.01	0.88	0.01
Pipe - (3)	46.42	46.42	46.43	0.01	0.01
Pipe - (4)	46.43	46.43	46.43	0.21	0.22

Pumping Summary

Pump	Percent Utilized	Number of Start-Ups	Min Flow CMS	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr	Power Usage Kw-hr	% Time Off Pump Curve	
								Low	High
Pump-1	0.00	0	0.00	0.00	0.00	0.000	0.00	0.0	0.0

Analysis begun on: Wed Sep 7 10:35:45 2022
Analysis ended on: Wed Sep 7 10:35:48 2022
Total elapsed time: 00:00:03

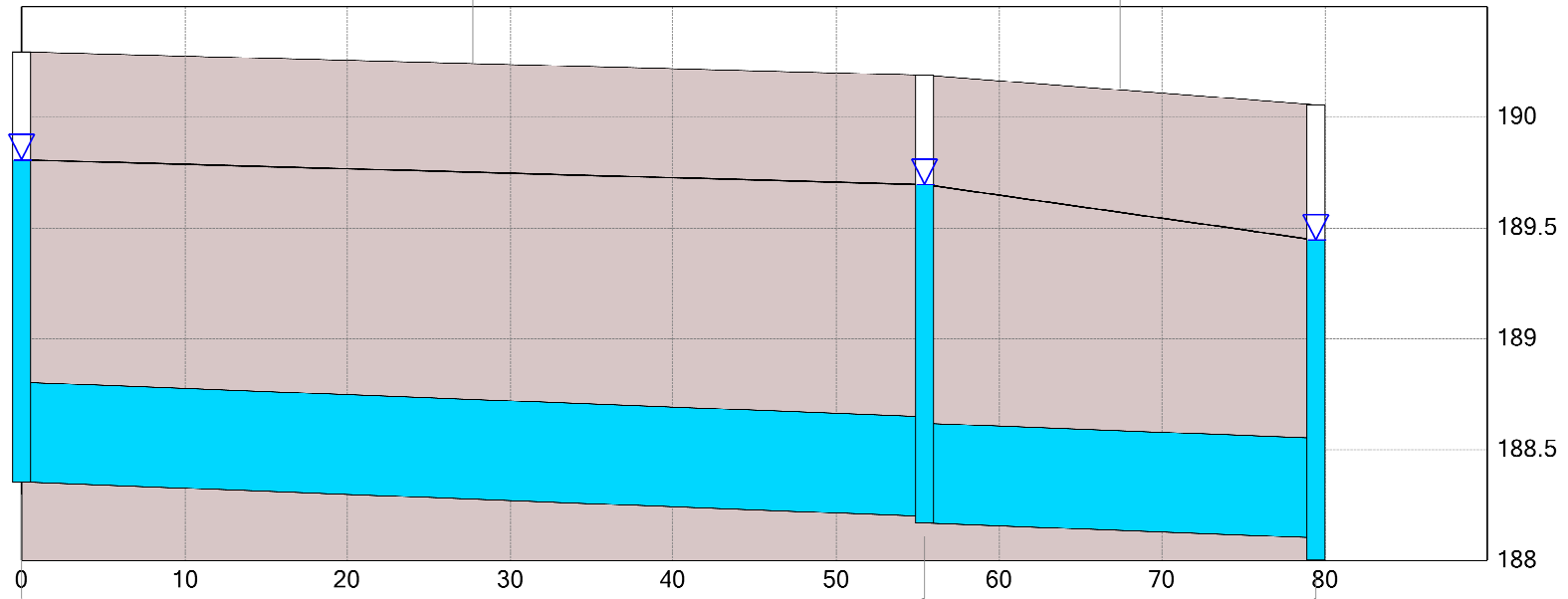


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Time: 9/2/2022 1:45:00 AM

Conduit Pipe - (3)
Flow = 0.112 m³/s
Length = 55.42 m
Depth = 0.45 m
Velocity = 0.706 m/s
Slope = 0.0028 m/m
Invert1 = 188.355 m
Invert2 = 188.2 m

Conduit Pipe - (4)
Flow = 0.225 m³/s
Length = 24.003 m
Depth = 0.45 m
Velocity = 1.412 m/s
Slope = 0.00279 m/m
Invert1 = 188.17 m
Invert2 = 188.103 m



Junction STM MH#1
CWSEL = 189.8082 m
Max. CWSEL = 189.8082 m
Rim Elev. = 190.295 m
Invert Elev. = 188.355 m

Junction STM MH#2
CWSEL = 189.6967 m
Max. CWSEL = 189.6967 m
Rim Elev. = 190.19 m
Invert Elev. = 188.17 m

Junction STM MH#3
CWSEL = 189.4462 m
Max. CWSEL = 189.4462 m
Rim Elev. = 190.057 m
Invert Elev. = 188.003 m

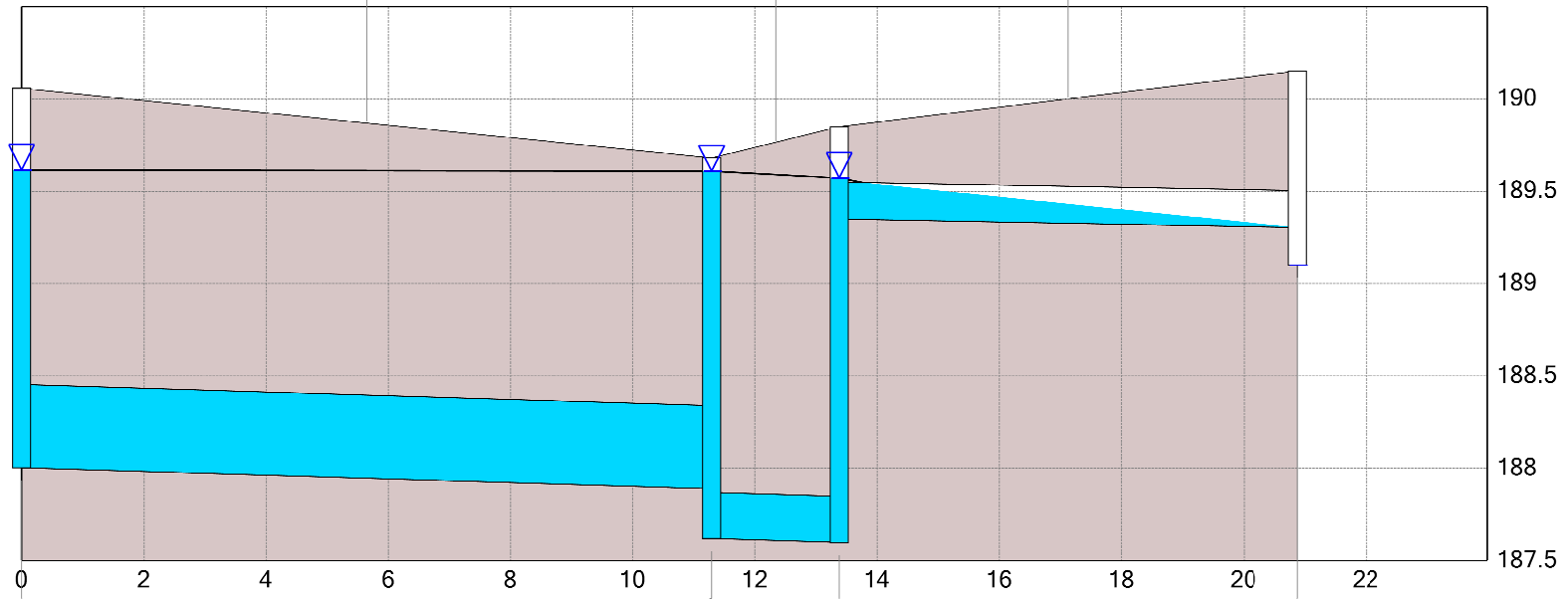
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Time: 9/2/2022 2:15:00 AM

Conduit 5
Flow = 0.038 m³/s
Length = 11.3 m
Depth = 0.45 m
Velocity = 0.238 m/s
Slope = 0.01 m/m
Invert1 = 188.003 m
Invert2 = 187.89 m

Conduit 6
Flow = 0.036 m³/s
Length = 2.08 m
Depth = 0.25 m
Velocity = 0.728 m/s
Slope = 0.0101 m/m
Invert1 = 187.62 m
Invert2 = 187.599 m

Conduit 8
Flow = 0.036 m³/s
Length = 7.5 m
Depth = 0.2 m
Velocity = 1.195 m/s
Slope = 0.006 m/m
Invert1 = 189.349 m
Invert2 = 189.304 m



Junction STM MH#3
CWSEL = 189.614 m
Max. CWSEL = 189.614 m
Rim Elev. = 190.057 m
Invert Elev. = 188.003 m

Storage 1
CWSEL = 189.6083 m
Max. CWSEL = 189.6083 m
Rim Elev. = 189.68 m
Invert Elev. = 187.62 m

Junction Jun-6
CWSEL = 189.5709 m
Max. CWSEL = 189.5709 m
Rim Elev. = 189.849 m
Invert Elev. = 187.599 m

Outfall Out-2
CWSEL = 189.1 m
Max. CWSEL = 189.1 m
Rim Elev. = 190.151 m
Invert Elev. = 189.1 m

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



6TH CONCESSION DEVELOPMENT

WINDSOR, CANADA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-7200.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

- STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
- STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

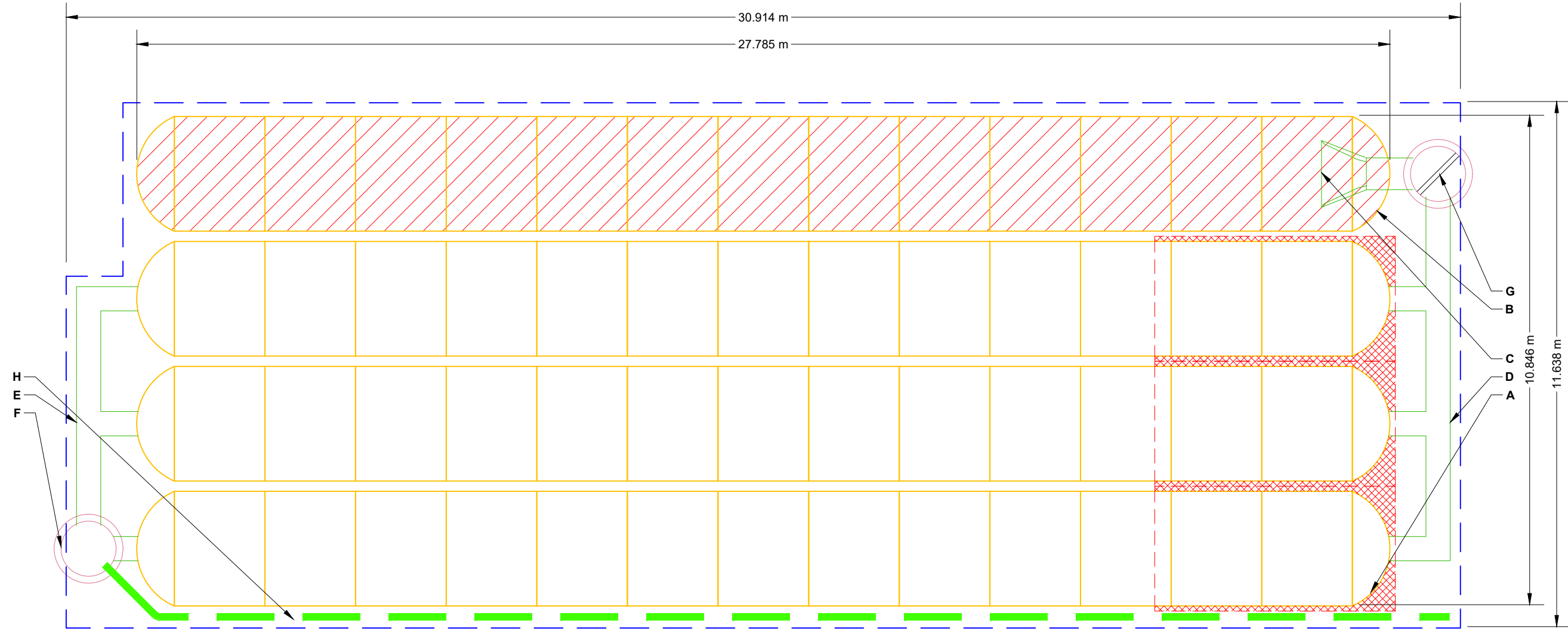
NOTES FOR CONSTRUCTION EQUIPMENT




- STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
- FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS		*INVERT ABOVE BASE OF CHAMBER				
				PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
52	STORMTECH MC-7200 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	103.886					
8	STORMTECH MC-7200 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	102.515					
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	102.362	PREFABRICATED END CAP	A	450 mm BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP18B / TYP OF ALL 450 mm BOTTOM CONNECTIONS	50 mm	
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	102.362					
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	102.362	PREFABRICATED END CAP	B	600 mm BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	57 mm	
452.9	INSTALLED SYSTEM VOLUME (m ³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	102.057	FLAMP	C	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MC720024RAMP		
		TOP OF MC-7200 CHAMBER:	101.753	MANIFOLD	D	450 mm x 450 mm BOTTOM MANIFOLD, ADS N-12	50 mm	
		600 mm ISOLATOR ROW PLUS INVERT:	100.286	MANIFOLD	E	450 mm x 450 mm BOTTOM MANIFOLD, ADS N-12	50 mm	
		450 mm x 450 mm BOTTOM MANIFOLD INVERT:	100.279	CONCRETE STRUCTURE	F	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		227 L/s OUT
354.9	SYSTEM AREA (m ²)	450 mm x 450 mm BOTTOM MANIFOLD INVERT:	100.279	CONCRETE STRUCTURE	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		467 L/s IN
85.1	SYSTEM PERIMETER (m)	450 mm BOTTOM CONNECTION INVERT:	100.279	CONCRETE STRUCTURE				
		BOTTOM OF MC-7200 CHAMBER:	100.229	W/WEIR				
		UNDERDRAIN INVERT:	100.000	UNDERDRAIN	H	150 mm ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
		BOTTOM OF STONE:	100.000					



-  ISOLATOR ROW PLUS (SEE DETAIL)
-  PLACE MINIMUM 5.334 m OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
-  BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

6TH CONCESSION DEVELOPMENT
WINDSOR, CANADA

DATE: _____ DRAWN: CN
PROJECT #: _____ CHECKED: N/A

StormTech®
Chamber System

888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 100

SHEET
2 OF 5

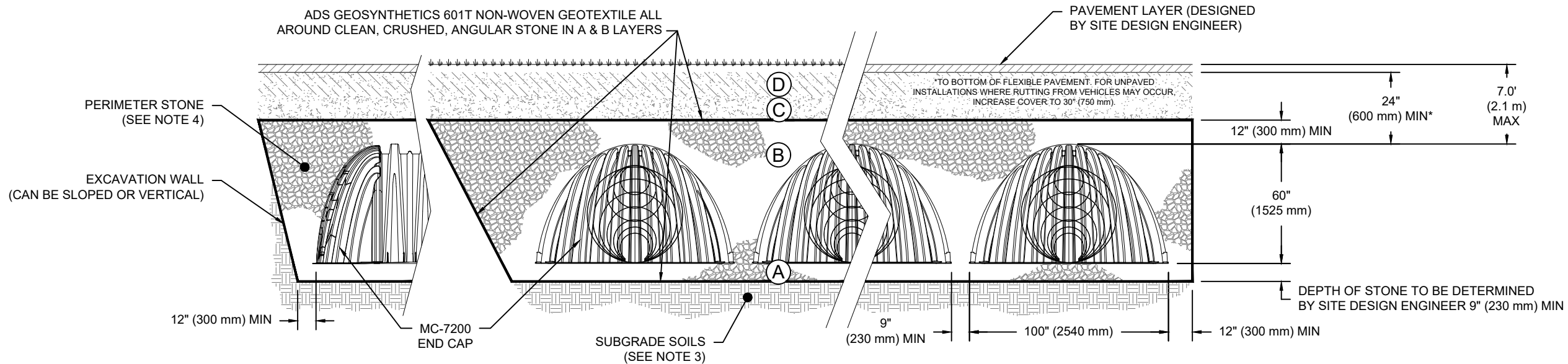
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE AASHTO M43 ¹ 3, 4	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE AASHTO M43 ¹ 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
- MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

6TH CONCESSION DEVELOPMENT
WINDSOR, CANADA

DRAWN: CN
DATE:
PROJECT #:
CHECKED: N/A

DESCRIPTION

CHK

DRW

DATE

DATE

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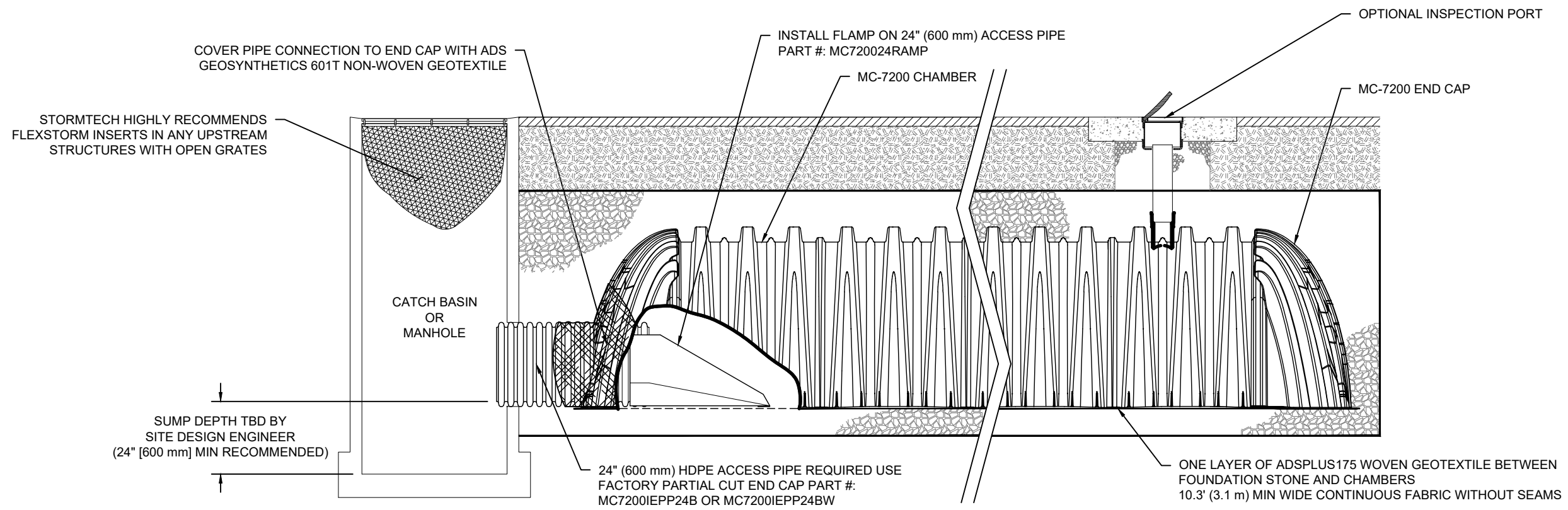
StormTech®
Chamber System

888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

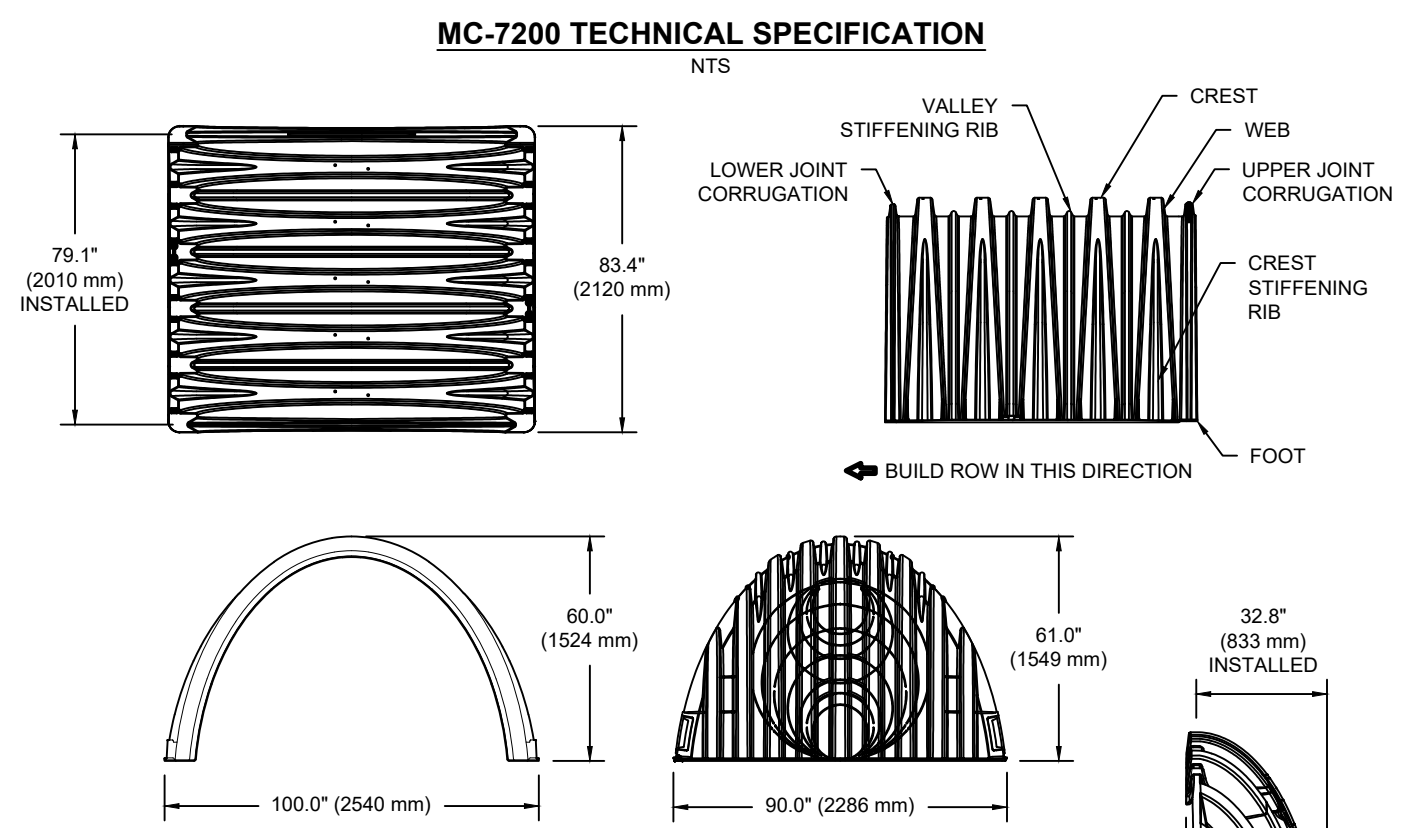
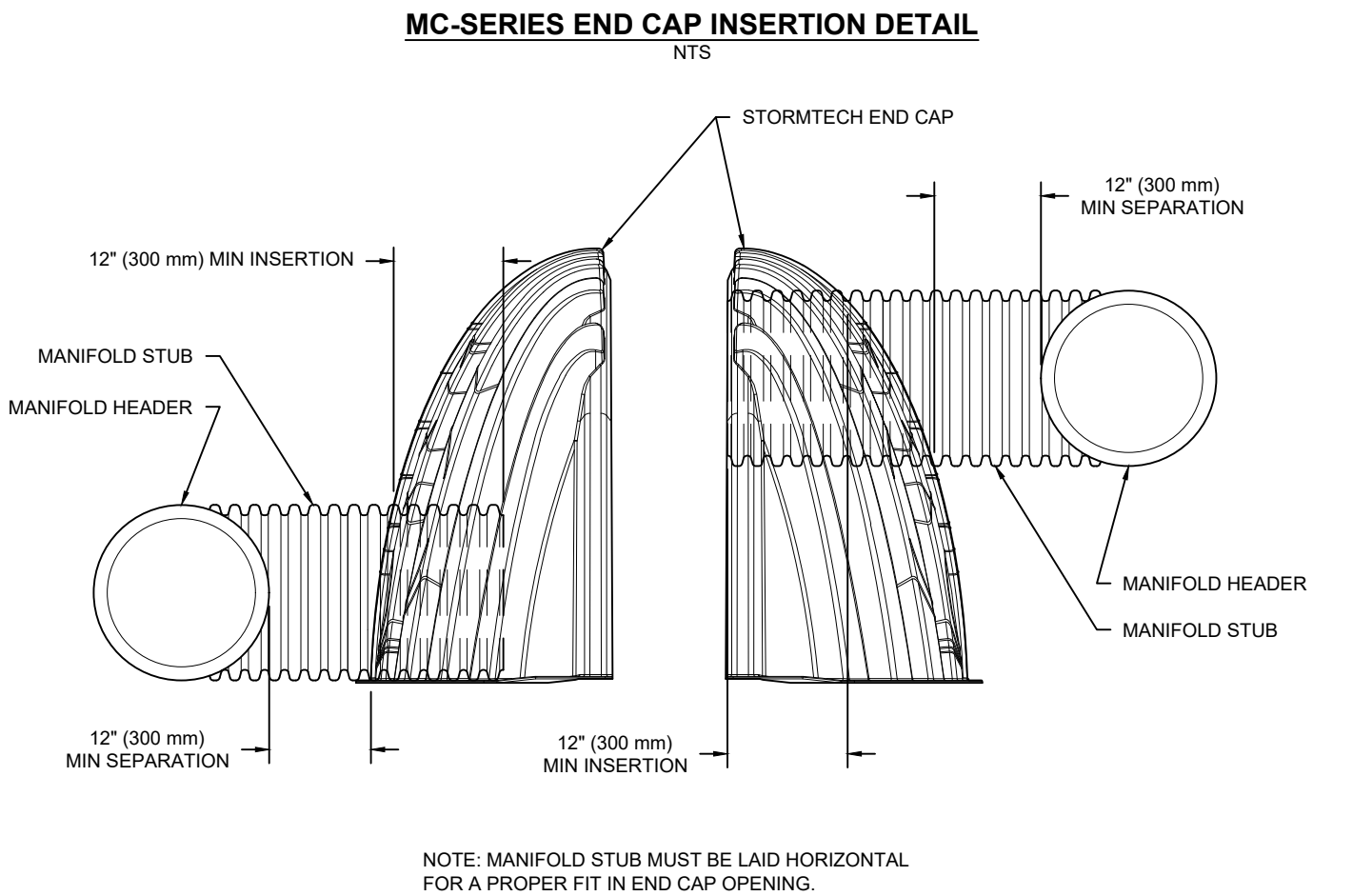
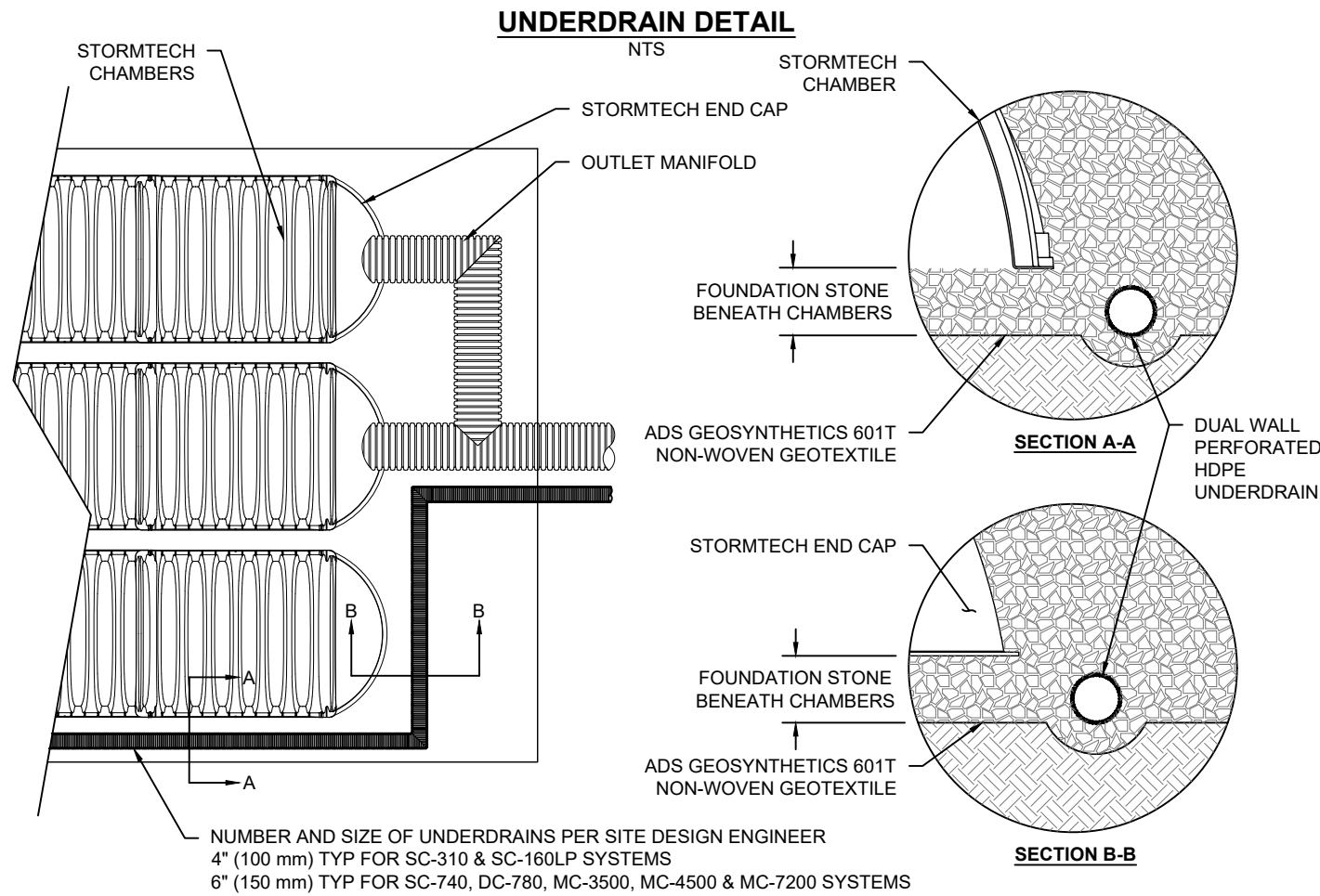
INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
 - A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
 - A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

- 1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- 2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

6TH CONCESSION DEVELOPMENT WINDSOR, CANADA		DRAWN: CN	CHECKED: N/A
		DATE:	PROJECT #:
	DESCRIPTION	CHK	DATE
		DRW	DATE
StormTech® Chamber System		888-892-2694 WWW.STORMTECH.COM	
4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473			
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NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m ³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m ³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

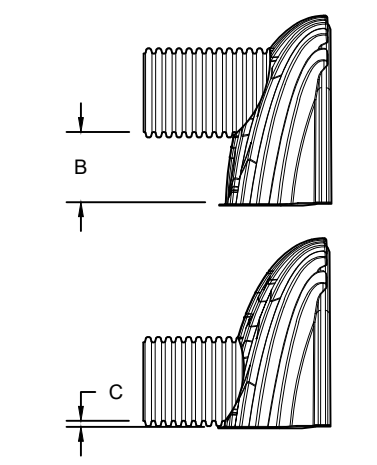
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m ³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m ³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW		---	1.97" (50 mm)
MC7200IEPP18B		---	
MC7200IEPP18BW		---	
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW		---	2.26" (57 mm)
MC7200IEPP24B	---		
MC7200IEPP24BW	---		
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

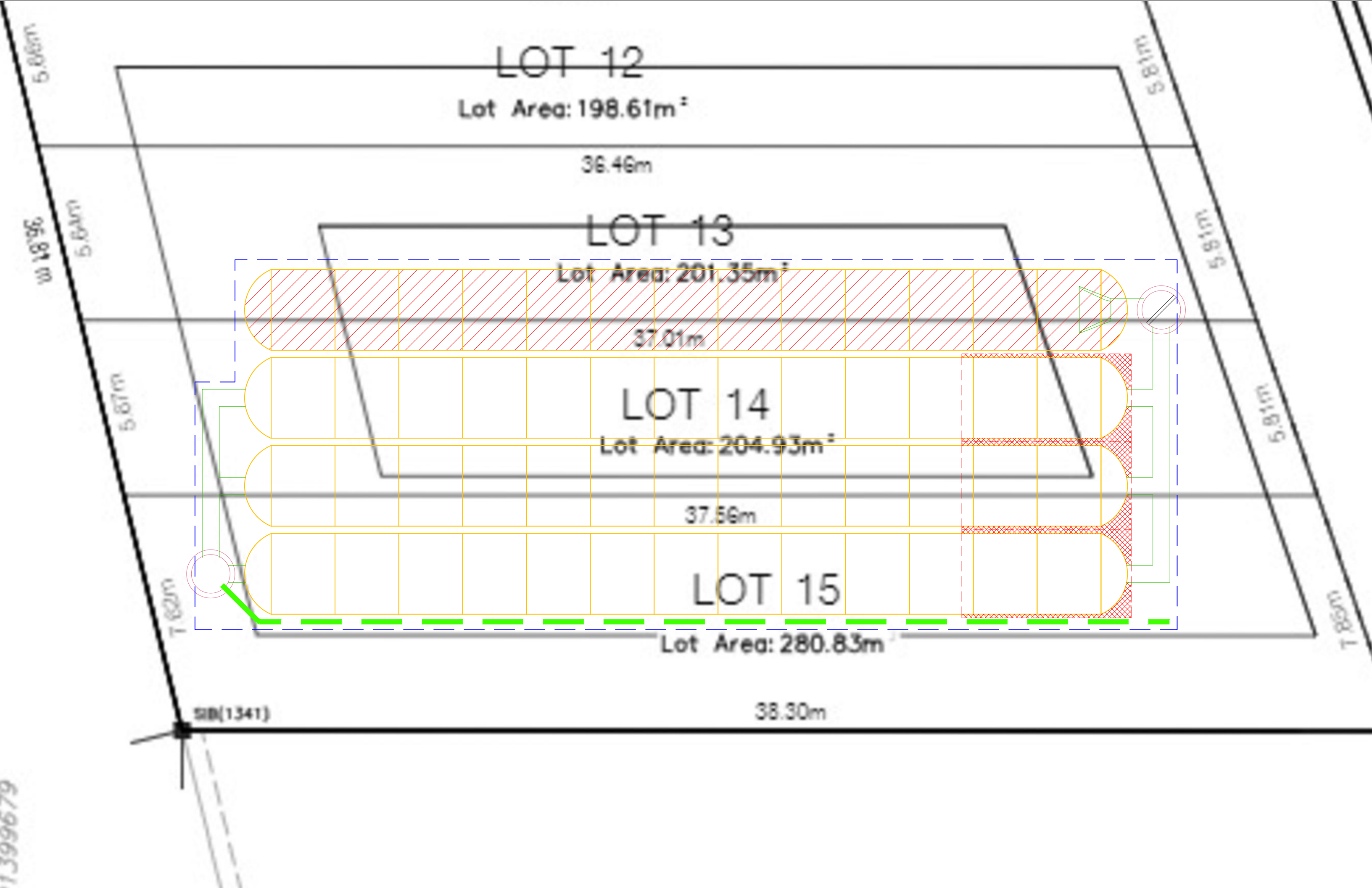
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

6TH CONCESSION DEVELOPMENT WINDSOR, CANADA	DRAWN: CN CHECKED: N/A	DATE: PROJECT #:	DESCRIPTION CHK DRW DATE
	888-892-2694 WWW.STORMTECH.COM	4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473	SHEET 5 OF 5

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LOT 12

Lot Area: 198.61m²

36.46m

LOT 13

Lot Area: 201.35m²

37.01m

LOT 14

Lot Area: 204.93m²

37.56m

LOT 15

Lot Area: 280.83m²

38.30m

5.86m

5.84m

5.87m

1.82m

5.81m

5.81m

5.81m

1.85m

SB(1341)

1399679

Project: 6th Concession Development

Chamber Model -
 Units -
 Number of Chambers -
 Number of End Caps -
 Voids in the stone (porosity) -
 Base of Stone Elevation -
 Amount of Stone Above Chambers -
 Amount of Stone Below Chambers -

MC-7200
Metric
52
8
40
100.000
305
229



Include Perimeter Stone in Calculations

Click for Stage Area Data

[Click Here for Imperial](#)

354.94 sq.meters Min. Area - 314.62 sq.meters

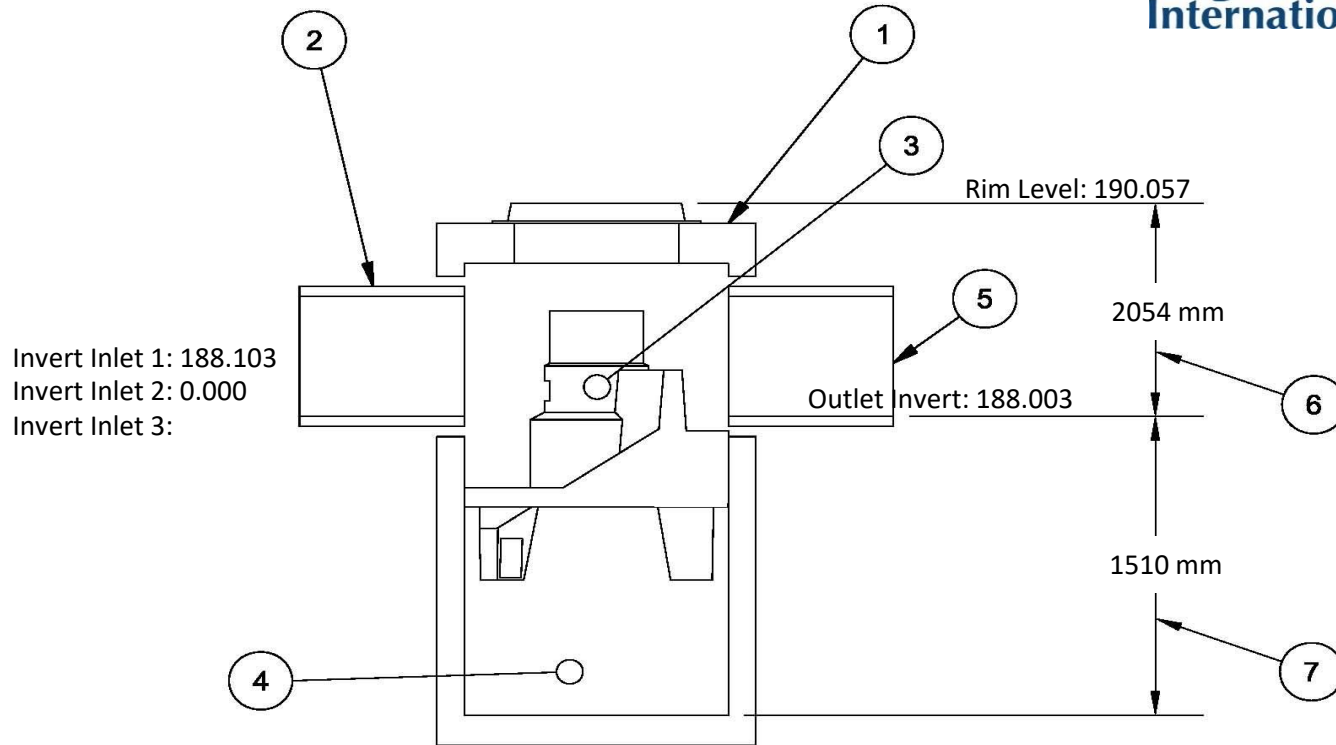
StormTech MC-7200 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
2057	0.00	0.00	0.00	0.00	3.604	3.60	452.74	102.06
2032	0.00	0.00	0.00	0.00	3.604	3.60	449.13	102.03
2007	0.00	0.00	0.00	0.00	3.604	3.60	445.53	102.01
1981	0.00	0.00	0.00	0.00	3.604	3.60	441.92	101.98
1956	0.00	0.00	0.00	0.00	3.604	3.60	438.32	101.96
1930	0.00	0.00	0.00	0.00	3.604	3.60	434.72	101.93
1905	0.00	0.00	0.00	0.00	3.604	3.60	431.11	101.91
1880	0.00	0.00	0.00	0.00	3.604	3.60	427.51	101.88
1854	0.00	0.00	0.00	0.00	3.604	3.60	423.90	101.85
1829	0.00	0.00	0.00	0.00	3.604	3.60	420.30	101.83
1803	0.00	0.00	0.00	0.00	3.604	3.60	416.69	101.80
1778	0.00	0.00	0.00	0.00	3.604	3.60	413.09	101.78
1753	0.00	0.00	0.09	0.00	3.568	3.66	409.49	101.75
1727	0.01	0.00	0.28	0.01	3.489	3.78	405.83	101.73
1702	0.01	0.00	0.41	0.01	3.438	3.85	402.05	101.70
1676	0.01	0.00	0.53	0.01	3.388	3.93	398.20	101.68
1651	0.01	0.00	0.67	0.02	3.327	4.02	394.27	101.65
1626	0.02	0.00	1.09	0.02	3.158	4.27	390.25	101.63
1600	0.03	0.00	1.61	0.03	2.947	4.59	385.97	101.60
1575	0.04	0.00	1.94	0.04	2.813	4.79	381.38	101.57
1549	0.04	0.01	2.21	0.04	2.705	4.95	376.59	101.55
1524	0.05	0.01	2.44	0.05	2.610	5.10	371.64	101.52
1499	0.05	0.01	2.64	0.06	2.525	5.22	366.54	101.50
1473	0.05	0.01	2.83	0.06	2.449	5.34	361.32	101.47
1448	0.06	0.01	3.00	0.07	2.377	5.45	355.98	101.45
1422	0.06	0.01	3.16	0.07	2.311	5.54	350.53	101.42
1397	0.06	0.01	3.31	0.08	2.248	5.64	344.99	101.40
1372	0.07	0.01	3.45	0.09	2.190	5.73	339.35	101.37
1346	0.07	0.01	3.58	0.09	2.134	5.81	333.62	101.35
1321	0.07	0.01	3.71	0.10	2.081	5.89	327.81	101.32
1295	0.07	0.01	3.83	0.11	2.030	5.97	321.92	101.30
1270	0.08	0.01	3.94	0.11	1.982	6.04	315.96	101.27
1245	0.08	0.01	4.05	0.12	1.936	6.11	309.92	101.24
1219	0.08	0.02	4.16	0.12	1.892	6.17	303.81	101.22
1194	0.08	0.02	4.26	0.13	1.850	6.24	297.64	101.19
1168	0.08	0.02	4.35	0.13	1.810	6.30	291.40	101.17
1143	0.09	0.02	4.45	0.14	1.771	6.35	285.11	101.14
1118	0.09	0.02	4.53	0.14	1.734	6.41	278.75	101.12
1092	0.09	0.02	4.62	0.15	1.699	6.46	272.34	101.09
1067	0.09	0.02	4.70	0.15	1.663	6.52	265.88	101.07
1041	0.09	0.02	4.78	0.16	1.630	6.57	259.37	101.04
1016	0.09	0.02	4.85	0.16	1.597	6.61	252.80	101.02
991	0.09	0.02	4.93	0.17	1.566	6.66	246.18	100.99
965	0.10	0.02	5.00	0.17	1.537	6.71	239.52	100.97
940	0.10	0.02	5.06	0.18	1.508	6.75	232.82	100.94
914	0.10	0.02	5.13	0.18	1.480	6.79	226.07	100.91
889	0.10	0.02	5.19	0.19	1.454	6.83	219.28	100.89
864	0.10	0.02	5.25	0.19	1.428	6.87	212.45	100.86
838	0.10	0.02	5.31	0.19	1.404	6.91	205.58	100.84
813	0.10	0.02	5.36	0.19	1.380	6.94	198.67	100.81
787	0.10	0.03	5.42	0.20	1.356	6.98	191.73	100.79
762	0.11	0.03	5.47	0.20	1.334	7.01	184.75	100.76
737	0.11	0.03	5.52	0.21	1.313	7.04	177.75	100.74
711	0.11	0.03	5.57	0.21	1.294	7.07	170.70	100.71
686	0.11	0.03	5.61	0.21	1.274	7.10	163.63	100.69
660	0.11	0.03	5.66	0.22	1.255	7.13	156.53	100.66
635	0.11	0.03	5.70	0.22	1.237	7.16	149.41	100.64
610	0.11	0.03	5.74	0.22	1.220	7.18	142.25	100.61
584	0.11	0.03	5.78	0.22	1.205	7.20	135.07	100.58
559	0.11	0.03	5.81	0.23	1.188	7.23	127.87	100.56
533	0.11	0.03	5.85	0.23	1.173	7.25	120.64	100.53
508	0.11	0.03	5.88	0.23	1.159	7.27	113.39	100.51
483	0.11	0.03	5.91	0.23	1.146	7.29	106.11	100.48
457	0.11	0.03	5.94	0.24	1.133	7.31	98.82	100.46
432	0.11	0.03	5.97	0.24	1.121	7.33	91.51	100.43
406	0.12	0.03	6.00	0.24	1.110	7.35	84.18	100.41
381	0.12	0.03	6.02	0.24	1.100	7.36	76.83	100.38
356	0.12	0.03	6.05	0.24	1.090	7.38	69.47	100.36
330	0.12	0.03	6.07	0.24	1.079	7.39	62.10	100.33
305	0.12	0.03	6.09	0.25	1.070	7.41	54.70	100.30
279	0.12	0.03	6.11	0.25	1.061	7.42	47.30	100.28
254	0.12	0.03	6.14	0.25	1.047	7.44	39.88	100.25
229	0.00	0.00	0.00	0.00	3.604	3.60	32.44	100.23
203	0.00	0.00	0.00	0.00	3.604	3.60	28.84	100.20
178	0.00	0.00	0.00	0.00	3.604	3.60	25.23	100.18
152	0.00	0.00	0.00	0.00	3.604	3.60	21.63	100.15
127	0.00	0.00	0.00	0.00	3.604	3.60	18.02	100.13
102	0.00	0.00	0.00	0.00	3.604	3.60	14.42	100.10
76	0.00	0.00	0.00	0.00	3.604	3.60	10.81	100.08
51	0.00	0.00	0.00	0.00	3.604	3.60	7.21	100.05
25	0.00	0.00	0.00	0.00	3.604	3.60	3.60	100.03

Stage Area Data

Depth (meter)	Elevation (meter)	Area (m2)	Area (hectare)
0.00	100.00	141.90	0.0142
0.05	100.05	141.90	0.0142
0.08	100.08	141.90	0.0142
0.10	100.10	141.90	0.0142
0.13	100.13	141.90	0.0142
0.15	100.15	141.90	0.0142
0.18	100.18	141.90	0.0142
0.20	100.20	141.90	0.0142
0.23	100.23	141.90	0.0142
0.25	100.25	292.91	0.0293
0.28	100.28	292.08	0.0292
0.30	100.30	291.58	0.0292
0.33	100.33	291.04	0.0291
0.36	100.36	290.40	0.0290
0.38	100.38	289.81	0.0290
0.41	100.41	289.24	0.0289
0.43	100.43	288.56	0.0289
0.46	100.46	287.86	0.0288
0.48	100.48	287.11	0.0287
0.51	100.51	286.31	0.0286
0.53	100.53	285.47	0.0285
0.56	100.56	284.61	0.0285
0.58	100.58	283.57	0.0284
0.61	100.61	282.72	0.0283
0.63	100.64	281.70	0.0282
0.66	100.66	280.65	0.0281
0.69	100.69	279.55	0.0280
0.71	100.71	278.34	0.0278
0.74	100.74	277.20	0.0277
0.76	100.76	275.96	0.0276
0.79	100.79	274.66	0.0275
0.81	100.81	273.24	0.0273
0.84	100.84	271.87	0.0272
0.86	100.86	270.43	0.0270
0.89	100.89	268.92	0.0269
0.91	100.91	267.35	0.0267
0.94	100.94	265.72	0.0266
0.97	100.97	264.02	0.0264
0.99	100.99	262.26	0.0262
1.02	101.02	260.43	0.0260
1.04	101.04	258.52	0.0259
1.07	101.07	256.55	0.0257
1.09	101.09	254.44	0.0254
1.12	101.12	252.37	0.0252
1.14	101.14	250.17	0.0250
1.17	101.17	247.89	0.0248
1.19	101.19	245.51	0.0246
1.22	101.22	243.03	0.0243
1.24	101.24	240.43	0.0240
1.27	101.27	237.72	0.0238
1.30	101.30	234.87	0.0235
1.32	101.32	231.88	0.0232
1.35	101.35	228.74	0.0229
1.37	101.37	225.46	0.0225
1.40	101.40	221.98	0.0222
1.42	101.42	218.28	0.0218
1.45	101.45	214.39	0.0214
1.47	101.47	210.15	0.0210
1.50	101.50	205.63	0.0206
1.52	101.52	200.62	0.0201
1.55	101.55	195.03	0.0195
1.57	101.57	188.63	0.0189
1.60	101.60	180.75	0.0181
1.63	101.63	168.26	0.0168
1.65	101.65	158.29	0.0158
1.68	101.68	154.68	0.0155
1.70	101.70	151.75	0.0152
1.73	101.73	148.70	0.0149
1.75	101.75	144.04	0.0144
1.78	101.78	141.90	0.0142
1.80	101.80	141.90	0.0142
1.83	101.83	141.90	0.0142
1.85	101.85	141.90	0.0142
1.88	101.88	141.90	0.0142
1.91	101.91	141.90	0.0142
1.93	101.93	141.90	0.0142
1.96	101.96	141.90	0.0142
1.98	101.98	141.90	0.0142
2.01	102.01	141.90	0.0142
2.03	102.03	141.90	0.0142
2.06	102.06	141.90	0.0142

Hydro First Defense® - HC



All drawing elevations are metres.

FD-4HC Specification

1	Vortex Chamber Diameter	1200 mm
2	Inlet Pipe Diameter	450 mm
3	Oil Storage Capacity	723.00 L
4	Min. Provided Sediment Storage Capacity	0.54 m ³
5	Outlet Pipe Diameter	450 mm
6	Height(Final Grade to Outlet Invert)	2054 mm
7	Sump Depth(Outlet Invert to Sump)	1800 mm
Total Depth		3854 mm

Notes:
