Appendix 2-1. MPCA Design Flow Determination Worksheet

Existing Peak Hour and Peak Instantaneous Wet Weather Flow Determinations

Minnesota Pollution Control Agency

Water Quality

Wastewater Review and Guidance

Design Flow and Loading Determination Guidelines for Wastewater Treatment Plants

Water/Wastewater Technical Review and Guidance/#5.20, February 2002

	A. Determine peak hourly wet weather design flows (PHWWF)	Flow, mgd
1	Present peak hourly dry weather flow	30.7
2	Present peak hourly flow during high ground water period (no run off)	38.3
3	Present peak hourly dry weather flow	30.7
4	Present peak hourly infiltration	7.6
5	Present peak hourly dry weather flow during high ground water period and runoff at point of greatest distance between curves Y and Z	48.3
6	Present hourly flow during high ground water (no runoff) at same time of day as (5) measurement	36.7
7	Present peak hourly inflow	11.6
8	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event	41.8
9	Present peak hourly infiltration	7.6
10	Peak hourly infiltration cost effective to eliminate	0.0
11	Peak infiltration after rehabilitation	7.6
12	Present peak hourly adjusted inflow	41.8
13	Peak hourly inflow cost effective to eliminate	0.0
14	Peak hourly inflow after rehaibilitation	41.8
15	Population increase:	
16	Peak hourly flow from planned industrial increase	0.0
17	Estimated peak hourly flow from future unidentified industries	0.0
18	Peak hourly flow from other future increases	0.0
19	Peak hourly wet weather design flow [1+11+ sum(14...18)]	80.1
	B. Determine peak instantaneous wet weather design flow (PIWWF)	
20	Peak hourly wet weather design flow [same as (19)]	80.1
21	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event [same as (8)]	41.8
22	Present peak inflow adjusted for a 25-year 1 hour rainfall event	63.7
23	Peak instantaneous wet weather design flow [20-21+22]	102[a]

a. Use 107 mgd for conservatism and estimate of 2014 peak hour flow - see below

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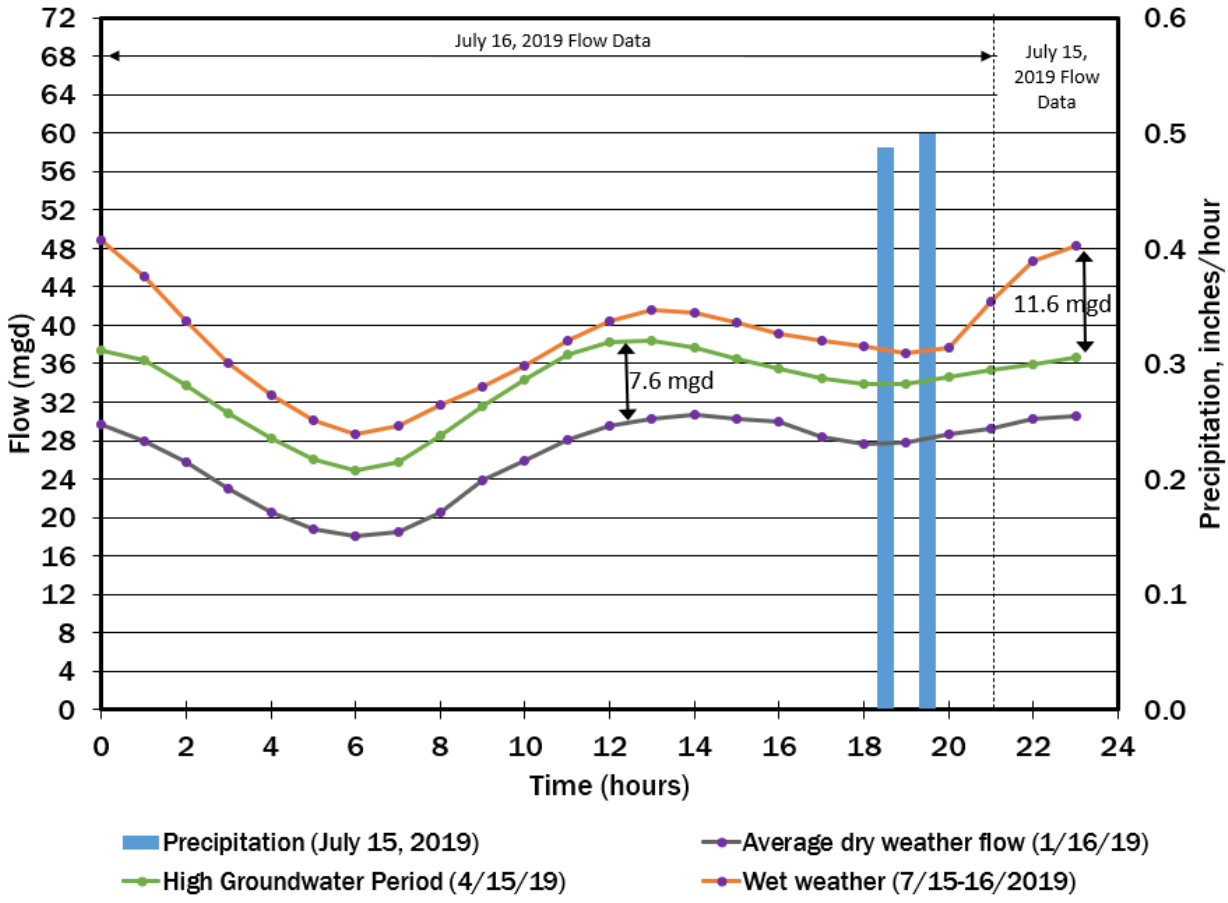
July 16, 2019 Flow Data
July 15, 2019 Flow Data
7.6 mgd
11.6 mgd
Flow (mgd)
Precipitation, inches/hour
Time (hours)
Precipitation (July 15, 2019)
Average dry weather flow (1/16/19)
High Groundwater Period (4/15/19)
Wet weather (7/15-16/2019)

2050 Peak Hour and Peak Instantaneous Wet Weather Flow Determinations

Minnesota Pollution Control Agency

Water Quality

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Design Flow and Loading Determination Guidelines for Wastewater Treatment Plants

Water/Wastewater Technical Review and Guidance/#5.20, February 2002

		2050
A. Determine peak hourly wet weather design flows (PHWWF)		Flow, mgd
1	Present peak hourly dry weather flow	30.7
2	Present peak hourly flow during high ground water period (no run off)	38.3
3	Present peak hourly dry weather flow	30.7
4	Present peak hourly infiltration	7.6
5	Present peak hourly dry weather flow during high ground water period and runoff at point of greatest distance between curves Y and Z	48.3
6	Present hourly flow during high ground water (no runoff) at same time of day as (5) measurement	36.7
7	Present peak hourly inflow	11.6
8	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event	41.8
9	Present peak hourly infiltration	7.6
10	Peak hourly infiltration cost effective to eliminate	0.0
11	Peak infiltration after rehabilitation	7.6
12	Present peak hourly adjusted inflow	41.8
13	Peak hourly inflow cost effective to eliminate	0.0
14	Peak hourly inflow after rehaibilitation	41.8
15	Population increase: 14 mgd * MCES Peaking Factor of 2.0	28.0
16	Peak hourly flow from planned industrial increase	0.0
17	Estimated peak hourly flow from future unidentified industries	0.0
18	Peak hourly flow from other future increases	0.0
19	Peak hourly wet weather design flow [1+11+ sum(14...18)]	108.1
B. Determine peak instantaneous wet weather design flow (PIWWF)		
20	Peak hourly wet weather design flow [same as (19)]	
21	Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event [same as (8)]	
22	Present peak inflow adjusted for a 25-year 1 hour rainfall event	
23	Peak instantaneous wet weather design flow,(Current PIWWF + 14 mgd*2.0)	135.0

Brown AND Caldwell