# Clear Water Review 2020 and Beyond

Heart of the Valley Metropolitan Sewerage District Kaukauna, Wisconsin June 30, 2021



Maximizing Return on Previous Wastewater Investments

## **Clear Water Reviews for Sustainability**

### <u>Sustainability Plan Goals</u> Maintain or extend the hydraulic capacity of the WRRF and interceptor system by maintaining or decreasing clear water intrusion



## **Annual Clear Water Review Program**

#### <u>Three Performance Indicators</u>

- 1. WRRF Flows
- 2. CMAR Findings
- 3. Antecedent Moisture Model (AMM) Analysis

## **2020 WRRF Flows**

YEAR	PLANT FLOW (million gallons)	ANNUAL REPORTED PRECIPITATION (inches)	NUMBER OF SECONDARY TREATMENT DIVERSIONS	VOLUME OF BLENDED FLOW (million gallons/year)
2010	2,391.17	32.25	3	16.618
2011	2,359.30	30.08	1	3.998
2012	1,844.61	17.89	0	0
2013	2,014.11	27.14	1	0.562
2014	2,079.44	29.34	2	3.549
2015	1,887.99	29.93	3	2.185
2016	2,020.67	27.71	0	0
2017	2,094.20	26.89	0	0
2018	2,127.69	31.01	5	2.062
2019	2,446.47	40.14	4	1.115
2020	2,170.39	28.11	1	0.686

## **2020 WRRF Blending Event**

RAINFALL EVENT	RAIN DATES	RAINFALL DURATION	RAINFALL AVERAGE (inches)	* PLANT DIVERSION OCCURRED ON	
1	10/22 – 10/23	22 hours	2.54		
2	5/17 – 5/18	1.2 days	2.36		
3	7/9 – 7/10	17 hours	2.09		
4	5/28	7 hours	1.85	5/28	
5	6/20	17 hours	1.18		
6	6/22 – 6/23	1.3 days	1.15	May 28, 2020 blendir	ng even <sup>.</sup>
7	11/10	14 hours	1.14	occurred during fo "largest" but most in	ring fourth
8	6/9 - 6/10	1.1 days	0.76	rainfall event	
9	9/11 - 9/12	12 hours	0.66		
10	4/12	10 hours	0.56		1 -

## **2020 WRRF Performance was Good**

Volume Blended Divided by Volume Received at WRRF 0.2 over 24-Hour Period 0.3

(Mgal/Mgal)



38

No Diverted Flow 2012, 2016, 2017

## **2020 CMAR Findings**

## **No Reported Hydraulic Capacity Issues**

## **AMM Analysis**



## **Example from 2020 Analysis**

**3-Year Rolling Averages of Peak Flows** 



- Qp (2016, 2017, 2018)
- A Qp (2017, 2018, 2019)
- Qp (2018, 2019, 2020)
- --- Program Reference Line
- Qp (2016, 2017, 2018) Trendline
- Qp (2017, 2018, 2019) Trendline

— Qp (2018, 2019, 2020) Trendline

## **AMM Analysis**



# 2021 is a Transition Year for the AMM Analysis



## District Philosophy

## use best available technology (BAT) when wise to do so

## 2006 – Used Three BATs to Evaluate I/I Performance

- 1. Ultrasonic Flow Meters
- 2. Antecedent Moisture (AM) Model
- 3. Collection System Model



That Progressive Approach Achieved an Important Objective

## avoided \$30MM in infrastructure improvements at the time, which is equivalent to \$48MM today

## 2006 – Used Three BATs to Evaluate I/I Performance

- 1. Ultrasonic Flow Meters
- 2. Antecedent Moisture (AM) Model [Innovative, Embryonic Technology]
- 3. Collection System Model



## **BATs Today**

- 1. Ultrasonic Flow Meters Laser Flow Meters
- Antecedent Moisture (AM) Model [Proprietary, Not Supported]
  Collection System Model with Integral Robust Antecedent Model



## **Better Data + Better Tools = Better Information**

#### **Laser Flow Meters**

Remarkable Accuracy

#### **Collection System Model with Robust Antecedent Model**

Commercially Available and Supported

System Can Be Readily Re-Calibrated Annually

## Previous AMM Results Produced a Somewhat Confusing Report Card



### **Better Data + Better Tools = Better Report Card**



## **Annual Clear Water Analysis Moving Forward**



## **Annual Clear Water Analysis Moving Forward**



## Schedule

- 1. Collect Flow Data Balance of 2021 in 15-minute Increments
- 2. Develop and Calibrate Model Early 2022
- 3. Present New AMM Analysis Q1 2022

## **Questions? Thank You!**