

**CITY OF ST. JOSEPH WATER FILTRATION PLANT**  
**OPERATIONAL REPORT**  
**AUGUST 2016**



**Mission Statement**

WSJOB- The City and Authority working together to provide safe drinking water of the highest quality to all of our customers at the lowest possible price.

## WATER PLANT REPORT-AUGUST 2016

Water demand in August was down by 9,404,091 gallons or 4.9% from last year. This year 185,026,439 gallons were delivered which compares to 194,430,530 gallons delivered in August of 2015. The August 2016 pumpage ranked 21<sup>st</sup> in the thirty year tabulation dating back to 1987 and reflects the first decline in pumpage since May of this year.

### **GENERAL ACTIVITIES**

#### Filtration Capacity Study/Phase 1 SCIP

MDEQ approval of the Filtration Capacity Study was granted in July and testing began in August. There will be two rounds of testing; in August during the high water demand period and in October during Fall run-off. The August round is now complete. In August test filters in filter banks 5-8 and 9-12 were operated at 3.3 gpm/sq.ft. and 4.4 gpm/sq.ft respectively. These filters are currently rated at 2.0 gpm/sq.ft.

CH2M Hill conducted the hydraulic capacity assessment of the filter piping on July 20<sup>th</sup> and reviewed the filter test plan with plant staff. Dr. Alex Yavitch of Optimization Solutions who developed the alum model for the water plant is extending this work to the development of a model to simulate high turbidity applied water based on filter performance data obtained by plant staff and CH2M Hill. This should enable the capacity assessment to be done without adversely affecting finished water quality. In addition, we have learned from Dr. Yavitch that high turbidity water produced under natural operating conditions cannot be artificially induced in the clarifiers. Interestingly, real world upset conditions were experienced in August caused by thermal upsets resulting from dramatic raw water temperature changes and heavy organics loading from the St. Joseph River run-off. Staff met with Dr. Yavitch prior to these events who accurately predicted that the WTP's upflow clarifiers and primary coagulant alum would be challenged. He recommended that the plant supplement its current alum feed with a cationic polymer. This would improve finished water turbidity and yield longer filter runs. In addition, it would enable the plant to reduce alum feed which would lead to improved corrosion chemistry in the distribution system thereby lowering lead and copper levels. The system has been in compliance with the federal Lead & Copper Rule since the promulgation of the rule in 1991.

The filtration rate capacity study was identified in the Strategic Capital Improvement Plan (SCIP). This study will address hydraulic limitations in the filter piping and assess the feasibility of rerating filters 5-12 to handle the increased flow upon retirement of filters 1-4. A hydraulic study will also be done on the filter piping to determine whether it can handle the flow. A new DWRF project plan will have to be done for the SCIP. The last project plan was completed in 2007 and included the intake, E&P improvements and clarifier upgrades. The 2017 DWRF project plan will include improvements at the WTP and in the distribution system.

#### Intake Inspections/Repair

In June and early July several blockages of the south intake were experienced. These were probably residual effects of the emergency riser separation from the intake pipe in 2014 and 2015. Divers from Underwater Construction inspected the repair plate on the riser joint and found it to be fully intact.

In addition, they made visual inspections of the lake bottom from shore to the intake cribs and found no irregularities that would be indicative of a break in the intake pipe itself. After more than forty full wheelbarrows of material consisting of sand, zebra mussels, rocks and gravel at least partial hydraulic capacity was restored to the south intake. Thus far plant demands have limited testing to 9.0 MGD. The south intake which was built in 1955 now serves as an emergency and maintenance back up to the north intake built in 2011.

The inspections of the North Intake proceeded upon restoration of operation on the South Intake. Underwater Construction found 100% zebra mussel growth on the cribs at varying thicknesses of from two to five inches. Sand was found in the bottom of the cribs and in the inlet pipes. The sand inside the inlets was 30" and level. There was some tapering of the sand which rose to three feet in the structures. The emergency intake located 1,500' from the cribs and 3000' from shore was opened and a penetration dive was made to approximately 820' toward the cribs wherein the sand level reached two feet. The intake pipe is 48" in diameter.

After completion of the inspection the North intake was left out of service for one week. Upon attempting to place the intake back in service on July 15<sup>th</sup>, an extremely heavy chlorine demand was observed in the clarifiers. The chlorine residual dropped to zero. This was probably due to material that had been stirred up by the diver in the pipe the week before. This created a treatment emergency wherein staff responded immediately by switching back to the south intake and increasing chlorine feed. In addition, the filters were shut off and the water from the clarifiers was transferred to the reclaim basin and returned to Lake Michigan to protect finished water reservoir water quality. Due to the diligent efforts of plant staff finished water met CT requirements and exceeded minimum required chlorine levels. The north intake water in pipe was later flushed to the lake with raw water from the south intake after system water storage had returned to normal. Once this was accomplished the north intake was placed back into service and no further problems were experienced. In the future staff will routinely flush either intake after it has been down for any length of time prior to placing it back into service. In addition, since there is no flow meter in the wet wells to measure water volume that has been backflushed, staff is evaluating meters, installation and meter location in order to accurately determine backwash volume. This will assure that the pipe is evacuated of all standing raw water while preventing overpumping which can be an issue during the high water demand summer season. (It is necessary to shut down treatment in the water plant while the intakes are being flushed).

The north intake will be cleaned from the wye to and including the intake structures during the week of September 12<sup>th</sup>. Three quotes were submitted for this work from qualified commercial diving firms.

#### MDEQ Certification Examinations

Mark Thornton will be taking the MDEQ F-2 examination in November. Mark Thornton and Rory Dickey are registered for Short Course II which is a preparatory course for operators who are taking F-1 and F-2 level exams.

#### Travel & Training

Staff attended CMMS training for the recently purchased *Cityworks* software.

CGS conducted OSHA compliance training at the WTP. A test was given to all attendees and the results were filed at the WTP. Benton Charter Township staff attended as well. The City of St. Joseph and Benton Charter Township have partnered to combine safety training for their water plants.

# MONTHLY MAINTENANCE NOTES

August 2016

Normal PM Maint. done Monthly	Check all High Service and Low Service Pumps, BPS pumps, Service BPS Chlorinators, Change out air filters on VFD Drives and Air Handlers. Mow and grounds work at Plant, Booster Stations and Water Towers
8/1 to 8/4/16	Installed new exhaust fan, duct heater and duct work in dechlorination building for reservoirs
08/03/16	Installed new blower motor on unit heater in 9 -12 Filter Room
08/04/16	Repaired overflow pipe screen at Marquette Woods Booster station. (even though station is out of service this will maintain the tank integrity)
08/10/16	Installed new seals on traveling screen access doors in South Low Service
08/12/16	Repaired surface wash on # 10 filter, (LH rear wash indicator capped)
08/16/16	Installed new blower motor on 2nd unit heater in 9 -12 Filter Room
08/16/16	installed new sump pump and piping in 30" flow meter pit
08/23/16	Installed New Sewage lift pump and piping in south boiler room sewage pit
8/10 to 8/23/16	Mead & White - Rewired dechlorination building for reservoirs which included all control wiring and added vent fans and heater unit
08/25/16	Corpro - Finished installation of Cathodic Protection system for the City Tower (conduit and wiring). Tested system and put into service
08/26/16	Corpro - Wet Inspection of Cathodic Protection Systems for Lincoln and Royalton Towers. Repaired the Royalton rectifier, installed new control board.
08/26/16	Installed Re-built timer for center blow-off valve on Clarifier # 2
08/29/16	Flushed supply lines to Tower Level sensors at Lincoln & Royalton Towers

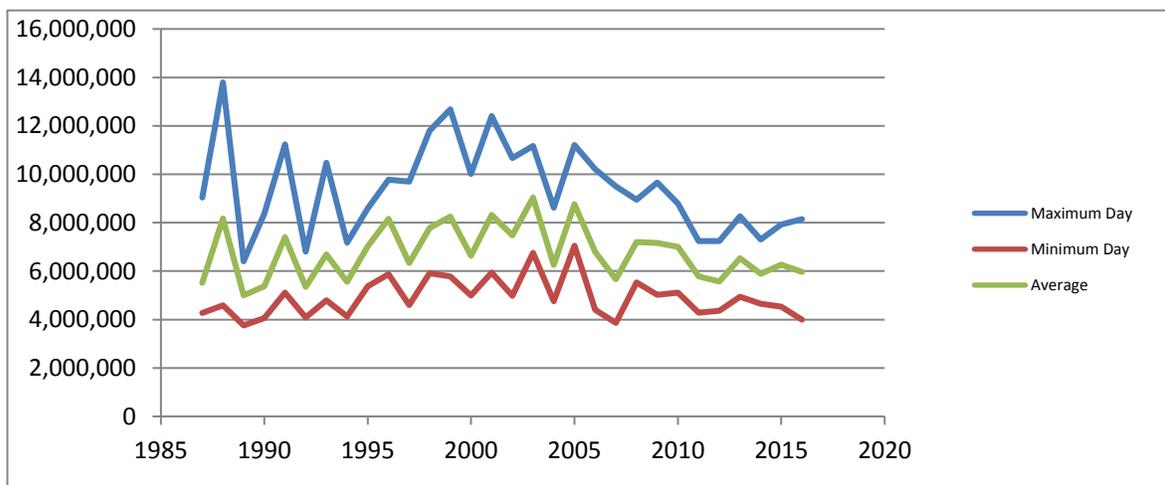
# ST. JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED

**AUGUST 2016**

Year	Average	Maximum Day	Minimum Day	Monthly Total
1987	5,518,048	9,041,700	4,264,300	171,059,500
1988	8,166,742	13,790,300	4,579,700	253,169,000
1989	4,998,858	6,406,100	3,756,600	154,964,600
1990	5,370,532	8,375,600	4,056,300	166,486,500
1991	7,392,468	11,239,000	5,109,200	229,166,500
1992	5,346,310	6,811,600	4,083,000	165,735,600
1993	6,691,755	10,468,500	4,790,400	207,444,400
1994	5,561,642	7,170,500	4,130,300	172,410,900
1995	7,034,273	8,593,600	5,372,900	218,062,470
1996	8,158,177	9,772,200	5,867,700	252,903,500
1997	6,330,674	9,696,100	4,605,450	196,250,900
1998	7,773,318	11,795,100	5,917,750	240,972,850
1999	8,255,698	12,680,200	5,783,800	255,926,650
2000	6,629,348	10,009,700	4,989,500	205,509,800
2001	8,322,605	12,404,900	5,933,100	258,000,750
2002	7,478,446	10,672,950	4,983,000	231,831,820
2003	9,037,933	11,170,890	6,752,480	280,175,910
2004	6,250,413	8,623,040	4,755,000	193,762,800
2005	8,764,049	11,214,800	7,047,450	271,685,510
2006	6,798,473	10,203,500	4,397,500	210,752,660
2007	5,666,680	9,494,940	3,866,010	175,667,080
2008	7,203,586	8,951,090	5,526,180	223,311,180
2009	7,166,000	9,659,870	5,023,750	222,153,750
2010	7,009,806	8,789,707	5,116,885	217,304,014
2011	5,782,834	7,245,993	4,280,792	179,267,863
2012	5,566,518	7,236,370	4,361,455	172,562,086
2013	6,536,095	8,261,486	4,940,058	202,618,956
2014	5,890,040	7,310,516	4,649,473	182,591,246
2015	6,271,953	7,928,690	4,530,628	194,430,530
2016	5,968,595	8,147,438	3,991,942	185,026,439

**Monthly Rank-August 1987-2016**

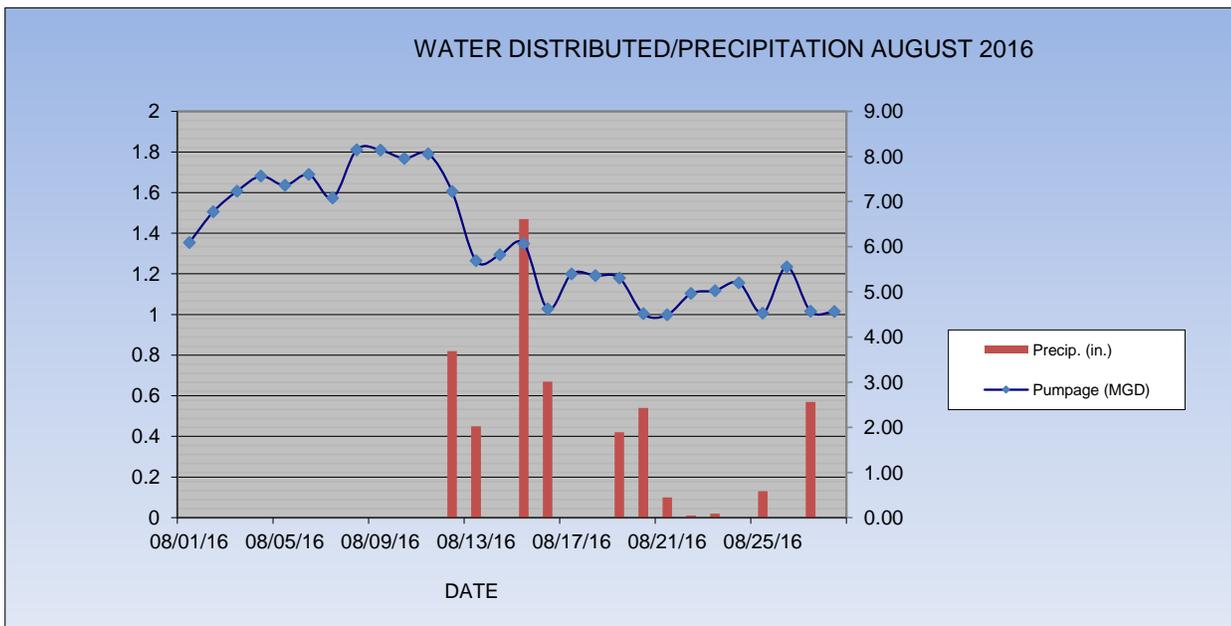
Ranking	Year	Monthly Total
1	2003	280,175,910
2	2005	271,685,510
3	2001	258,000,750
4	1999	255,926,650
5	1988	253,169,000
6	1996	252,903,500
7	1998	240,972,850
8	2002	231,831,820
9	1991	229,166,500
10	2008	223,311,180
11	2009	222,153,750
12	1995	218,062,470
13	2010	217,304,014
14	2006	210,752,660
15	1993	207,444,400
16	2000	205,509,800
17	2013	202,618,956
18	1997	196,250,900
19	2015	194,430,530
20	2004	193,762,800
<b>21</b>	<b>2016</b>	<b>185,026,439</b>
22	2014	182,591,246
23	2011	179,267,863
24	2007	175,667,080
25	2012	172,562,086
26	1994	172,410,900
27	1987	171,059,500
28	1990	166,486,500
29	1992	165,735,600
30	1989	154,964,600



**ST JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED/RAINFALL  
AUGUST 2016**

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	RAINFALL (in)	Day to Day Comparison 2016/2015	
				2016	2015
08/01/16	6,090,922	6.09	0	6,090,922	7,615,413
08/02/16	6,773,616	6.77	0	6,773,616	7,152,805
08/03/16	7,232,400	7.23	0	7,232,400	6,406,080
08/04/16	7,565,057	7.57	0	7,565,057	6,270,413
08/05/16	7,359,070	7.36	0	7,359,070	7,239,608
08/06/16	7,601,940	7.60	0	7,601,940	7,497,504
08/07/16	7,082,975	7.08	0	7,082,975	7,476,647
08/08/16	8,147,438	8.15	0	8,147,438	7,061,625
08/09/16	8,143,106	8.14	0	8,143,106	6,787,787
08/10/16	7,956,958	7.96	0	7,956,958	7,088,267
08/11/16	8,057,675	8.06	0	8,057,675	7,056,498
08/12/16	7,222,188	7.22	0.82	7,222,188	7,928,690
08/13/16	5,687,563	5.69	0.45	5,687,563	7,637,431
08/14/16	5,820,824	5.82	0	5,820,824	6,983,571
08/15/16	6,065,834	6.07	1.47	6,065,834	5,822,015
08/16/16	4,621,143	4.62	0.67	4,621,143	6,741,456
08/17/16	5,399,478	5.40	0	5,399,478	6,501,690
08/18/16	5,358,966	5.36	0	5,358,966	5,637,698
08/19/16	5,307,401	5.31	0.42	5,307,401	4,869,292
08/20/16	4,515,250	4.52	0.54	4,515,250	5,724,636
08/21/16	4,491,959	4.49	0.1	4,491,959	5,656,783
08/22/16	4,963,261	4.96	0.01	4,963,261	6,164,456
08/23/16	5,028,084	5.03	0.02	5,028,084	5,270,621
08/24/16	5,201,764	5.20	0	5,201,764	6,082,116
08/25/16	4,525,747	4.53	0.13	4,525,747	4,964,876
08/26/16	5,553,986	5.55	0	5,553,986	5,293,458
08/27/16	4,571,786	4.57	0.57	4,571,786	5,549,435
08/28/16	4,564,865	4.56	0	4,564,865	5,634,100
08/29/16	5,557,012	5.56	0	5,557,012	5,154,426
08/30/16	3,991,942	3.99	1.8	3,991,942	4,630,505
08/31/16	4,566,229	4.57	0	4,566,229	4,530,628
<b>TOTAL</b>	<b>185,026,439</b>	<b>185.03</b>	<b>7.00</b>	<b>185,026,439</b>	<b>194,430,530</b>

<b>Average Day</b>	<b>5,968,595</b>
<b>Maximum Day</b>	<b>8,147,438</b>
<b>Minimum Day</b>	<b>3,991,942</b>



SOUTHWEST MICHIGAN REGIONAL SANITARY SEWER & WATER AUTHORITY  
CLEVELAND BOOSTER STATION

HILLTOP BOOSTER STATION

DATE	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl <sub>2</sub> PRE mg/l	Cl <sub>2</sub> POST mg/l	Cl <sub>2</sub> MON mg/l	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl <sub>2</sub> PRE mg/l	Cl <sub>2</sub> POST mg/l	Cl <sub>2</sub> MON mg/l	BOOSTER MGD
1-Aug	2.608	88	12.48	0.57	1.18	1.61	1.68	1.213	37	5.25	0.52	1.21	1.45	1.57	3.821
2-Aug	3.086	115	16.30	0.63	1.32	1.47	1.58	2.163	66	9.36	0.52	1.33	1.86	2.04	5.249
3-Aug	2.665	121	17.16	0.77	1.39	1.98	2.18	1.675	73	10.35	0.74	1.27	2.07	2.16	4.339
4-Aug	3.229	139	19.71	0.73	1.26	1.47	1.58	1.698	56	7.94	0.56	1.22	1.61	1.61	4.927
5-Aug	3.230	12	1.70	0.06	1.40	1.54	1.72	2.124	63	8.93	0.50	1.31	1.73	1.89	5.353
6-Aug	3.518	153	21.69	0.74				1.803	41	5.81	0.39				5.321
7-Aug	3.518	153	21.69	0.74				1.803	41	5.81	0.39				5.321
8-Aug	3.518	153	21.69	0.74	1.38	1.42	1.51	1.803	41	5.81	0.39	1.35	1.64	1.68	5.321
9-Aug	3.919	127	18.01	0.55	1.43	1.64	1.68	2.356	120	17.01	0.87	1.36	1.82	1.93	6.276
10-Aug	3.202	144	20.42	0.76	1.40	1.64	1.71	1.996	83	11.77	0.71	1.50	1.76	1.84	5.198
11-Aug	4.070	159	22.54	0.66	1.40	1.66	1.82	1.943	85	12.05	0.74	1.30	1.75	1.95	6.014
12-Aug	3.955	158	22.40	0.68	1.33	1.46	1.60	1.910	68	9.64	0.61	1.37	1.53	1.73	5.864
13-Aug	3.075	142	20.13	0.78				1.254	57	8.08	0.77				4.329
14-Aug	3.075	142	20.13	0.78				1.254	57	8.08	0.77				4.329
15-Aug	3.075	142	20.13	0.78	1.34	1.63	1.67	1.254	57	8.08	0.77	1.28	1.74	1.82	4.329
16-Aug	2.227	120	17.01	0.92	1.79	1.43	1.55	0.825	23	3.26	0.47	1.32	1.54	1.64	3.053
17-Aug	1.496	71	10.07	0.81	2.04	1.77	1.89	2.043	57	8.08	0.47	2.20	2.14	2.31	3.539
18-Aug	2.824	129	18.29	0.78	2.01	1.76	1.94	1.081	42	5.95	0.66	2.20	1.86	2.10	3.905
19-Aug	2.528	119	16.87	0.80	1.32	1.49	1.60	1.210	37	5.25	0.52	1.28	1.55	1.68	3.738
20-Aug	1.620	79	11.20	0.83				1.247	49	6.95	0.67				2.867
21-Aug	1.620	79	11.20	0.83				1.247	49	6.95	0.67				2.867
22-Aug	1.620	79	11.20	0.83	1.23	1.45	1.50	1.247	49	6.95	0.67	1.28	1.61	1.63	2.867
23-Aug	2.011	124	17.58	1.05	1.29	1.61	1.70	1.157	58	8.22	0.85	1.29	1.82	1.93	3.168
24-Aug	2.188	134	19.00	1.04	1.42	1.64	1.65	1.452	68	9.64	0.80	1.35	1.70	1.77	3.640
25-Aug	1.951	114	16.16	0.99	1.23	1.58	1.63	1.445	50	7.09	0.59	1.22	1.62	1.83	3.396
26-Aug	2.117	126	17.86	1.01	2.20	1.93	2.25	1.303	65	9.22	0.85	1.44	1.93	1.96	3.420
27-Aug	2.095	114	16.16	0.92				1.193	46	6.52	0.66				3.288
28-Aug	2.095	114	16.16	0.92				1.193	46	6.52	0.66				3.288
29-Aug	2.095	114	16.16	0.92	1.58	1.95	2.04	1.193	46	6.52	0.66	1.47	2.11	2.23	3.288
30-Aug	1.920	122	17.30	1.08	1.63	1.81	1.95	0.849	37	5.25	0.74	1.77	1.67	1.76	2.769
31-Aug	2.755	76	10.78	0.47	1.57	1.93	2.01	0.686	35	4.96	0.87	1.46	1.81	2.05	3.441
TOTAL	82.906	3,662	519.2					45.618	1,702	241.31					128.524
AVE DAY	2.674		16.7	0.78	1.5	1.6	1.8	1.4715		7.8	0.65	1.43	1.75	1.87	4.146
MAX	4.070		22.5	1.08	2.2	2.0	2.3	2.3565		17.0	0.87	2.2	2.14	2.31	6.276
MIN	1.496		1.7	0.06	1.2	1.4	1.5	0.6863		3.3	0.39	1.21	1.45	1.57	2.769
MONTHLY TOTALS:	Cleveland	Total MG Treated	82.906	SJCT EAST				Hilltop	Total MG Treated	45.618	Cleveland Pump Station:				82.906
		Untreated	0.000	Average Day		0.263			Untreated	0.000	Hilltop Pump Station:				45.618
Total Authority Flow:	132.864			Month Total		8.149					TOTAL AUTHORITY (Trted.)				128.524

**DISTRIBUTION REPORT**

*For the Month of August 2016*

Activity	Number/Description		
Water Main Breaks	2		
MISS DIGS	401		
Delinquent Shut Off	0		
Delinquent Shut Off (Broken Payment Plans)	0		
Hydrants (Repaired/Replaced)	1	Replacement: Niles & Hollywood. Shaft housing/retainer ring.	
	1	Repair: Silver Beach (SJ), broken	
Valve Turning			
Valves	0		
Taps (1")	3	4084 Silver Oaks (RCT)	New construction
		4262 Hollywood (SJCT)	New tap for existing building, from well.
		1925 Hidden Pines Trail (LCT)	New construction
Cross Connection Control (Hydro Designs)			
Repair of Curb box/Shut-Off Valves	0		
Service Repair	0		
Service Replacements	3	1104 Flanders Place (leaking lead service replaced)	
		432 Howard Ave (replaced lead service)	
		1014 Michigan (moved service)	
Meter pit/service replacement	1		
Water Quality Complaint(s)	0		
Hydrant flushing to maintain water quality	1	105,000 gallons (Choice Dental)	
		105,000 gallons (Tryon School) RCT	
Hydrant Flushing (Stage 2 Rule)			
Service line complaints (customer side)			
Staff Education/Training	30	CMMS Cityworks software training	
Overtime-Total	72.5	(Including Sanitary and Storm)	
Turn Off	7	(Note: For delinquent Shut off see above)	
Turn On	6		
Finals	156		
<b>Meter Repair/Replacement</b>		Audit Meter	
		Verify Read	
Meter Repair		Move Mxu Box	
Per detail		New Installation	17
Meter leaking	2	New Installation-Benton Harbor	1
Stopped Meter	11	Replaced/various reasons (e.g.downsize, defective)	6
Faulty Register		Rockwell Replacement	
Frozen Meter		Mxu Replaced	8
Move Meter Inside		Sprinkler meter removed/line capped	1
Hard to read	21	Removals/demo	1
Replace/Adding Sprinkler Meter		Curb box location	1
Damage to Meter		Broken Remote	
New Plumbing	1	Noisy Meter	2
New siding		Upgrade 5/8" to 3/4" (upgrade to 1")	
Meter sent out for testing		Meter Change/Benton Harbor	

**CITY OF ST. JOSEPH WATER MAIN BREAK REPORT**

For the Month/Year of: August 2016

#	Date	Location	Main Size	Gallons Lost	Break Type	Valves Turned	City Twp	Labor	Remarks
1	8/10/2016	Dozer Drive	6	5,000	Radial, circ.	2	SJCT	27.0	Near hwy, E. of Bluffwood, W of Ridgeview, 5 ft cover, clay, cathodic
2	8/27/2016	Hollywood & Palladium Dr.	12	23,000	Hole 3"	2	SJCT	27.0	6 ft deep, clay, no cathodic
3									
4									
5									
TOTALS				28,000		4		54.0	

**MONTHLY CLIMATOLOGICAL SUMMARY**

**AUGUST**

**2016**

**NAME: sjwwweather**

**St. Joseph Water Plant - 1701 Lions Park Drive - St. Joseph, MI**

DAY	MEAN TEMP	NORM MEAN TEMP	HIGH TEMP	TIME	NORM HIGH TEMP	REC HIGH TEMP	YEAR	LOW TEMP	TIME	NORM LOW TEMP	REC LOW TEMP	YEAR	HEAT DEG DAYS	COOL DEG DAYS	RAIN	AVG WIND SPEED	HIGH	TIME	DOM DIR
1	71.8	71	77.8	8:00p	82	98	1988	66.4	7:30a	60	41	1990	0	6.8	0	4.2	13	7:30p	NNE
2	73.8	71	81.4	9:00p	82	99	1988	67	7:00a	60	38	1948	0	8.8	0	3.6	12	5:00p	NNE
3	77	71	83.1	4:30p	82	98	1991	69.5	7:00a	60	45	1990	0	12	0	3.1	12	6:30p	ESE
4	80.4	71	89.7	6:30p	82	97	1956	71.4	6:30a	60	45	1951	0	15.4	0	2.5	16	12:00m	SE
5	77	71	82.1	4:00p	82	97	1988	72.1	12:00m	59	42	1957	0	12	0	4.4	22	3:00a	NNE
6	74.8	71	77.5	12:30p	82	91	1965	71.6	1:30a	59	44	1948	0	9.8	0	7.4	17	11:30a	N
7	72.3	71	81.2	12:00p	82	91	1984	65	5:30a	59	39	1989	0	7.3	0	6	20	6:30p	N
8	74.8	71	87	2:30p	82	96	1988	65.8	5:30a	59	40	1990	0	9.8	0	3.5	16	4:30p	NE
9	74.3	71	84.1	6:30p	82	97	1988	65.1	7:00a	59	41	1964	0	9.3	0	2.2	9	9:00a	NNE
10	78.5	71	84.3	9:00p	81	92	1984	71.7	7:30a	59	46	1964	0	13.5	0	3.6	11	4:30p	N
11	80.8	71	86.8	5:00p	81	89	1995	76	4:00a	59	45	1982	0	15.8	0	6	18	7:00p	SSW
12	79.1	70	86.4	12:00p	81	95	1988	73.8	11:30p	59	43	1992	0	14.1	0.82	6	34	2:00p	SSW
13	75.5	70	81	3:30p	81	95	1988	72.5	12:00m	58	45	1986	0	10.5	0.45	7.9	23	9:00a	SW
14	76.6	70	83.9	8:00p	81	93	1995	70.9	6:30a	58	39	1990	0	11.6	0	3.4	11	3:00p	WSW
15	72.9	70	80.9	2:00p	81	93	1995	68.6	6:30a	58	38	1964	0	7.9	1.47	3.1	16	10:30p	SE
16	75.6	70	83	7:30p	81	97	1988	70.4	12:30a	58	43	1979	0	10.6	0.67	5.9	22	8:00a	N
17	76.3	70	86.2	7:30p	81	100	1988	70.7	4:30a	58	40	1992	0	11.3	0	6.2	19	12:00p	SSE
18	75.5	70	83.7	6:30p	81	97	1988	69.3	8:00a	58	42	1958	0	10.5	0	4.4	19	2:30p	SE
19	74.3	69	80.6	5:00p	80	95	1983	69.1	7:00a	58	44	1992	0	9.3	0.42	6.5	22	9:30a	SSE
20	73.8	69	77.7	5:00p	80	95	1983	69.4	1:30p	57	39	1992	0	8.8	0.54	11	43	1:30p	SE
21	70.2	69	73.2	6:30p	80	98	1983	67.7	11:00a	57	43	1950	0	5.2	0.1	18.9	33	12:30a	WNW
22	71.2	69	78.7	8:00p	80	91	1948	62.1	8:00a	57	40	1985	0.4	6.6	0.01	5.3	18	1:30a	ESE
23	72.1	69	81.9	6:00p	80	95	1948	61.8	7:30a	57	46	1949	0.3	7.5	0.02	6.4	20	1:00p	SE
24	74.7	69	81.8	6:00p	80	95	1948	68.5	1:30a	57	41	1984	0	9.7	0	6.4	26	2:30p	SSE
25	75.5	69	81.7	6:00p	80	93	1948	70.5	12:00m	57	40	1956	0	10.5	0.13	8.5	24	8:30a	SW
26	74.1	68	77	3:30p	79	96	1948	69	12:00m	56	45	1963	0	9.1	0	6.9	16	7:00p	N
27	75.2	68	89.1	7:00p	79	94	1953	67.7	4:30a	56	47	1988	0	10.2	0.57	3.4	25	8:00a	SSE
28	76.4	68	79	1:00a	79	94	1953	72.4	12:00m	56	37	1982	0	11.4	0	5.9	17	12:30p	N
29	76.2	68	87.7	1:30p	79	94	1953	68.3	5:30a	56	38	1982	0	11.2	0	2.7	11	12:00p	E
30	74.3	68	82.5	6:30p	79	93	1953	67.7	10:00a	56	40	1986	0	9.3	1.8	3	23	5:30a	SE
31	71.4	67	74.9	10:30a	78	95	1953	68.3	9:30p	55	46	1989	0	6.4	0	10.6	30	7:00p	N
AVE	75.0	70											0.0	10.1	0.2	5.8	19.9		N
MAX	80.8	71	89.7			100		76		60	47		0.4	15.8	1.80	18.9	43.0		
MIN	70.2	67	73.2					61.8		55	37		0	5.2	0	2.2	9		
TOTAL															7				

Max Rain: 1.8 ON 08/30/16  
 Days of Rain: 11 (>.01 in) 9 (>.1 in) 2 (>1 in)