

CITY OF ST. JOSEPH WATER FILTRATION PLANT
OPERATIONAL REPORT
JULY 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-JULY 2016

Water demand in July was up by 25,807,709 gallons or 14.2% from last year. This year 202,035,888 gallons were delivered which compares to 181,689,860 gallons delivered July of 2015. The July 2016 pumpage ranked 15th in the thirty year tabulation dating back to 1987 and reflects the second straight year of increased water demand since the historic low of 162,504,136 gallons in 2014.

GENERAL ACTIVITIES

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 15th, 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).

Filtration Capacity Study/Phase 1 SCIP

MDEQ approval of the Filtration Capacity Study was received July 7th begin in July and be complete by December 5, 2016. CH2M Hill conducted the hydraulic capacity assessment of the filter piping on July 20th and review the filter test plan. Dr. Alex Yavitch of Optimization Solutions will model high turbidity applied water based on filter performance data obtained by plant staff and CH2M Hill. This will 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.

Testing began during the week of August 1st. There will be two rounds of testing; in August during the high water demand period and in October during Fall run-off.

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 DWRP 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 DWRP project plan will include the City of St. Joseph distribution system and be submitted in late 2016 upon completion of the filter study. The bid review committee recommended CH2M Hill. The WSJOB and St. Joseph City Commission approved the recommendation. Filter trial runs will begin in June. The study will be complete by December 2016.

OSHA PSM Inspection

Michigan OSHA Department of Licensing and Regulatory Affairs completed its audit of the Water Plant's Process Safety Management Program (PSM) which consisted of four full day visits during the months of June and August. USEPA audited the plant's Risk Management Program (RMP) in 2012. This was the first audit of the PSM program by MIOSHA since the inception of the rule in 1999. Both programs pertain to on site chlorine storage and management. Three issues were found pertaining to the process hazard assessment methodology, required Pulmonary Fitness Tests for staff who must wear respirators and the chlorine exhaust fan. A full report is expected in August. Staff is currently working to resolve the outstanding issues. The auditor complemented water plant staff and the SJWTP PSM program.

The water plant is subject to PSM because chlorine which is used in the water treatment process is considered a highly hazardous chemical. Process safety management is an analytical tool that was developed to prevent releases of any substance defined as a "highly hazardous chemicals" by the EPA or OSHA. Process Safety Management (PSM) refers to a set of inter-related approaches to manage hazards associated with the process industries and is intended to reduce the frequency and severity of incidents resulting from releases of chemicals and other energy sources (US OSHA 1993).

These standards are composed of organizational and operational procedures, design guidance, audit programs, and a host of other methods as summarized below.

1. Develop and maintain written safety information identifying workplace chemical and process hazards, equipment used in the processes, and technology used in the processes;
2. Perform a workplace hazard assessment, including, as appropriate, identification of potential sources of accidental releases, identification of any previous release within the facility that had a potential for catastrophic consequences in the workplace, estimation of workplace effects of a range of releases, and estimation of the health and safety effects of such a range on employees;
3. Consult with employees and their representatives on the development and conduct of hazard assessments and the development of chemical accident prevention plans and provide access to these and other records required under the standard;
4. Establish a system to respond to the workplace hazard assessment findings, which shall address prevention, mitigation, and emergency responses;
5. Review periodically the workplace hazard assessment and response system;
6. Develop and implement written operating procedures for the chemical processes, including procedures for each operating phase, operating limitations, and safety and health considerations;
7. Provide written safety and operating information for employees and employee training in operating procedures, by emphasizing hazards and safe practices that must be developed and made available;
8. Ensure contractors and contract employees are provided with appropriate information and training;
9. Train and educate employees and contractors in emergency response procedures in a manner as comprehensive and effective as that required by the regulation promulgated pursuant to section 126(d) of the Superfund Amendments and Reauthorization Act;
10. Establish a quality assurance program to ensure that initial process-related equipment, maintenance materials, and spare parts are fabricated and installed consistent with design specifications;
11. Establish maintenance systems for critical process-related equipment, including written procedures, employee training, appropriate inspections, and testing of such equipment to ensure ongoing mechanical integrity;
12. Conduct pre-startup safety reviews of all newly installed or modified equipment;
13. Establish and implement written procedures managing change to process chemicals, technology, equipment and facilities; and
14. Investigate every incident that results in or could have resulted in a major accident in the workplace, with any findings to be reviewed by operating personnel and modifications made, if appropriate.

The St. Joseph Water Plant will no longer be subject to the PSM and RMP regulations when the chlorination system is converted to Sodium Hypochlorite (bleach) in 2019 as part of Phase 1 of the Strategic Capital Improvement Plan (SCIP).

Travel & Training

Greg attended the summer meeting of the Michigan Section AWWA as a trustee elect to the governing board.

Monthly Maintenance Notes

JULY 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
07/05/16	Switched Plant over to South Low Service @ 7:00am for inspection of North Intake, experienced heavy sand build up and had to switch back to North Low Service @ 4:00pm
07/06/16	Switched plant over to South Low Service @ 7:00am
07/08/16	UCC - Inspection Dive on North Intake emergency riser and cribs
07/11/16	RS Technical - Yearly service, calibration and inspection of all Chlorine equipment, Vacuum Regulators, Chlorinators, Leak Detectors, etc.
07/12/16	Installed new antenna cable for Radar
07/13/16	DA Dodd - Repaired janitor sink in north boiler room
07/14/16	Installed new GFI outlet for Filters 1-4 sample pump
7/18 to 7/21/16	Filter # 5 - Removed mud balls, installed new surface wash nozzles and caps and added (1) full bag of anthracite left over from filters 9 - 12 rebuild, to bring the level of media up closer to the surface wash wands per spec
07/19/16	Cleaned North Low Service wet wells and intake chamber, Blew back intake using South L.S. from 10:30 am to 12:30 pm.
07/20/16	Switched over to North Low Service for plant supply
07/21/16	Hach - Quarterly service and calibration on all filter turbidimeters and TOC machine.
07/22/16	Cleaned center blow off line for Clarifier # 3
07/25/16	Backwashed and Chlorinated Filter # 5
07/26/16	Installed New Lead Pump Float in north sump pit
07/26/16	Repaired sprinkler head in north lawn by outfall discharge
07/27/16	Installed New Control Board for Filter # 8 Effluent Valve
07/29/16	Plumbed in particle counter supply lines to filters 5 & 10 for Filter Test Study

**ST. JOSEPH WATER FILTRATION PLANT
1701 LIONS PARK DRIVE
SAINT JOSEPH, MI. 49085**

**By: Greg Alimenti
St. Joseph Water Plant
700 Broad St.
Saint Joseph, MI. 49085-1276
(269) 983-1240**

JULY 2016

DISTRIBUTION:	
Total Gallons	207,497,569
Average Day	6,693,470
Maximum Day	8,663,012
Minimum Day	5,034,551

TREATMENT:	
Total Low Service	212,385,939
Wash Water Gals.	3,522,230
Wash Water %	1.69%
Plant Use Gals.	1,853,917
Plant Use %	0.89%

FILTRATION:		
Ave. Filter Run	129.7	hours
Ave. Filter Rate	2.24	g/sqft/min
Filter Eff. Index	92.6	
Ave. Loss of Head	9.8	feet
Plant Sewer Usage		

LABORATORY REPORT		
Average of	Raw	Tap
Chlorides mg/L	17.8	20.6
Fluoride mg/L	0.11	0.74
Alkalinity mg/L	113	98
Hardness mg/L	137	134
pH	8.2	7.4
Calcium mg/L	38	37
Magnesium mg/L	10	10
Turbidity NTU	4.13	0.03
Temperature °F	69	
Total Coliform		0.0
Chlorine Residual		
		mg/L Free
Mixing Basin		0.84
Applied		1.81
Tap		1.50
Distribution		0.96

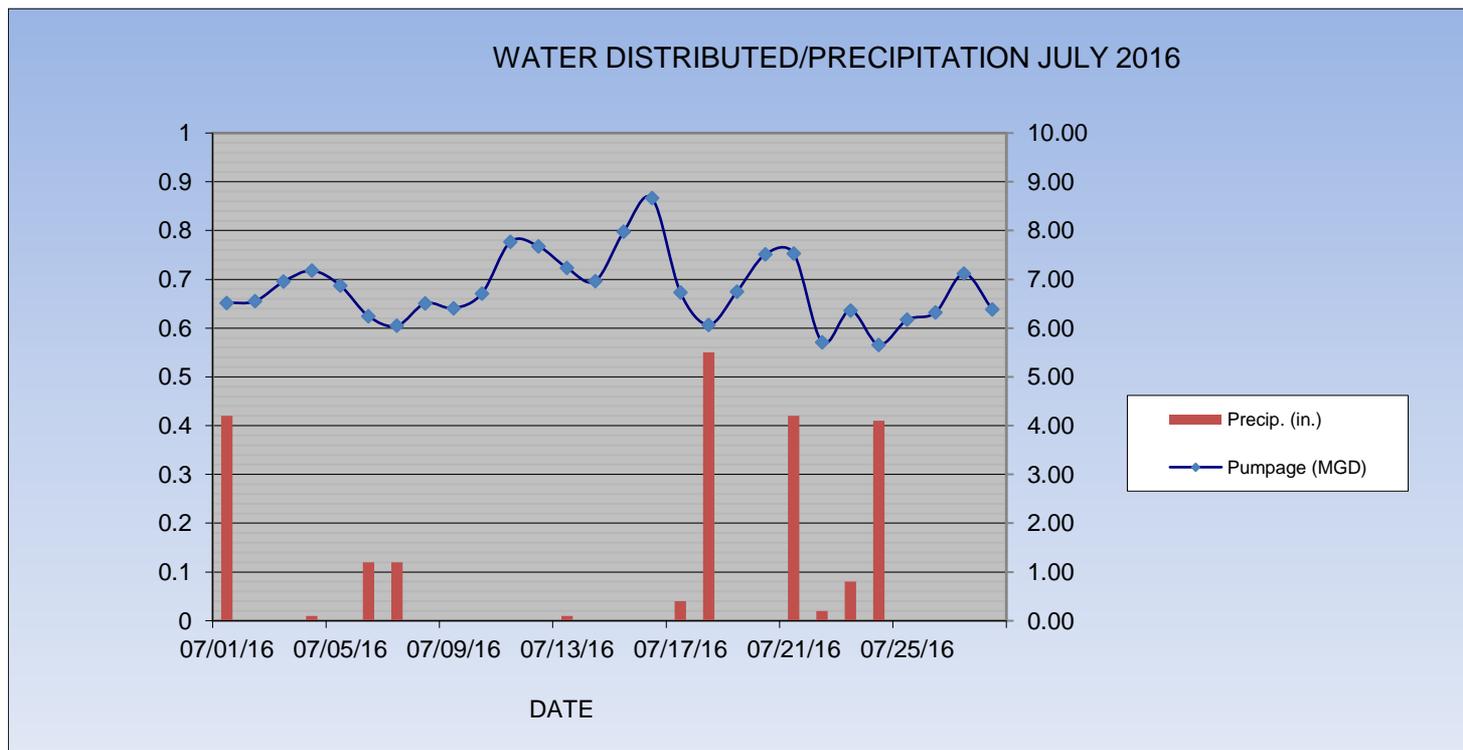
TREATMENT CHEMICAL SUMMARY:					
	Applied mg/L	Total Lbs.	Cost	Inventory lbs.	Days Supply
		CHEMICAL			
Alum (Al ⁺³)	1.86	3,277	\$10,792.79	108,620	1027
Chlorine (Cl ₂)	3.50	6,237	\$1,675.88	11,955	59
Fluoride (F ₂)	0.73	1,288	\$2,256.06	7,271	175

		REMARKS:			
Total Cost all Chemicals	\$14,724.74				
Chemical Cost per Mil. Gallon Treated	\$69.33				
Chemical Cost per Mil. Gallon Delivered	\$70.96				
PLANT UTILITIES SUMMARY					
Electric:					
Total KWH	361,200	***includes measure of melted snow			
Total Power Cost	\$ 25,284.00	visit the City of Saint Joseph's Home page at www.sjcity.com			
Power Cost per Million Gallon Treated	\$ 119.05	e-mail comments to either: operator@sjcity.com or galiment@sjcity.com			
Power Cost per Million Gallon Delivered	\$ -	WEATHER CONDITIONS AT THE PLANT		Air Temp. °F	
Gallons Pumped per KWH	587	SJWW Weather Computer		Avg.	
		Rain Guage, Inches		Max.	
		days it rained***		Min.	
Natural Gas:		Wind Speed, Avg		Lake Temp. °F	
Metered Cubic Feet	0	Wind Speed, Max		Avg.	69.0
Natural Gas Cost	\$36.74	Prevailing Wind Dir.	North	Max.	79.5
Emergency Power Diesel Fuel Inv., Gals.	North 0	Lake Level (USACE)	212,385,939	Min.	52.2
	South 0				

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

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	RAINFALL (in)	Day to Day Comparison 2016/2015	
				2016	2015
07/01/16	6,516,731	6.52	0.42	6,516,731	5,353,590
07/02/16	6,552,693	6.55	0	6,552,693	5,686,592
07/03/16	6,952,675	6.95	0	6,952,675	6,664,261
07/04/16	7,177,997	7.18	0.01	7,177,997	6,584,369
07/05/16	6,873,923	6.87	0	6,873,923	6,607,201
07/06/16	6,244,581	6.24	0.12	6,244,581	7,347,334
07/07/16	6,046,401	6.05	0.12	6,046,401	5,099,574
07/08/16	6,508,829	6.51	0	6,508,829	4,721,707
07/09/16	6,407,457	6.41	0	6,407,457	5,328,682
07/10/16	6,711,380	6.71	0	6,711,380	4,960,579
07/11/16	7,767,004	7.77	0	7,767,004	5,721,992
07/12/16	7,675,516	7.68	0	7,675,516	5,427,768
07/13/16	7,235,102	7.24	0.01	7,235,102	5,338,682
07/14/16	6,966,746	6.97	0	6,966,746	4,792,386
07/15/16	7,973,699	7.97	0	7,973,699	5,509,056
07/16/16	8,663,012	8.66	0	8,663,012	4,817,373
07/17/16	6,734,614	6.73	0.04	6,734,614	5,380,130
07/18/16	6,067,624	6.07	0.55	6,067,624	4,793,989
07/19/16	6,749,990	6.75	0	6,749,990	4,557,243
07/20/16	7,514,275	7.51	0	7,514,275	5,442,890
07/21/16	7,527,262	7.53	0.42	7,527,262	5,312,141
07/22/16	5,712,233	5.71	0.02	5,712,233	6,016,613
07/23/16	6,361,725	6.36	0.08	6,361,725	5,647,996
07/24/16	5,658,678	5.66	0.41	5,658,678	6,482,331
07/25/16	6,170,911	6.17	0	6,170,911	6,173,002
07/26/16	6,320,385	6.32	0	6,320,385	6,692,842
07/27/16	7,115,494	7.12	0	7,115,494	6,415,389
07/28/16	6,385,317	6.39	0	6,385,317	7,517,424
07/29/16	6,498,611	6.50	0.23	6,498,611	7,310,743
07/30/16	5,034,551	5.03	0.08	5,034,551	6,904,817
07/31/16	5,372,153	5.37	0	5,372,153	7,081,162
TOTAL	207,497,569	207.50	2.51	207,497,569	181,689,860

Average Day	6,693,470
Maximum Day	8,663,012
Minimum Day	5,034,551



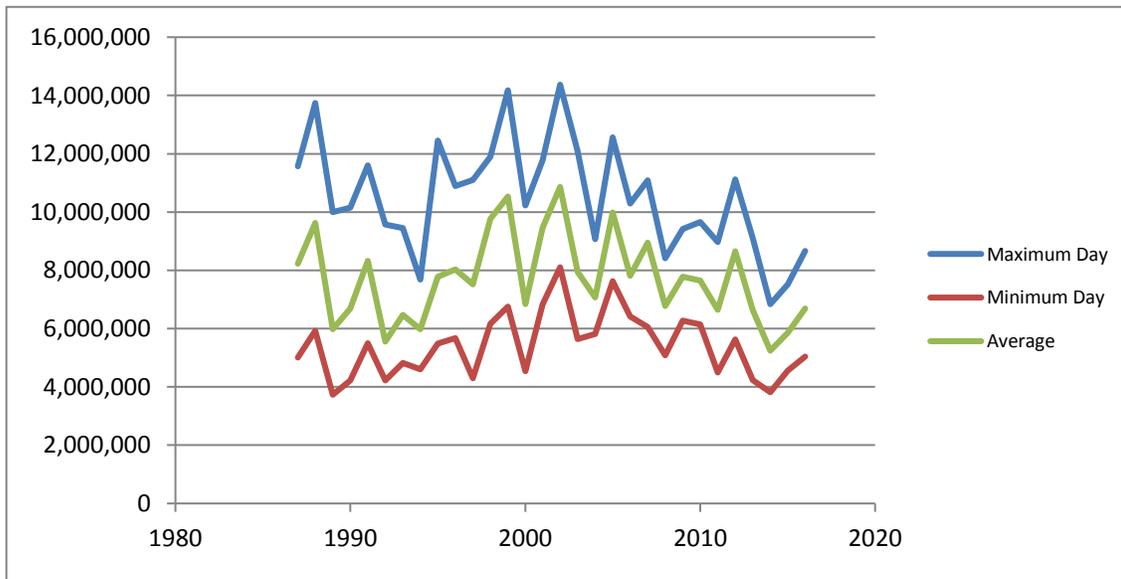
City of St. Joseph

Water Delivered July 2016

Year	Average	Maximum Day	Minimum Day	Monthly Total
1987	8,224,284	11,572,500	5,010,300	254,952,800
1988	9,620,248	13,737,100	5,929,400	298,227,700
1989	5,980,219	9,999,600	3,730,800	185,386,800
1990	6,689,352	10,154,500	4,221,100	207,369,900
1991	8,321,697	11,597,100	5,494,600	257,972,600
1992	5,557,800	9,576,200	4,215,800	172,291,800
1993	6,470,832	9,449,600	4,821,100	200,595,800
1994	5,978,371	7,683,600	4,608,400	185,329,500
1995	7,776,994	12,455,700	5,483,800	241,086,800
1996	8,032,152	10,895,700	5,675,000	248,996,700
1997	7,521,474	11,098,600	4,295,500	233,165,700
1998	9,769,487	11,894,800	6,166,850	302,854,100
1999	10,527,027	14,182,550	6,753,150	326,337,850
2000	6,836,392	10,222,400	4,538,500	211,928,150
2001	9,464,765	11,781,300	6,835,250	293,407,700
2002	10,861,105	14,369,900	8,104,000	336,694,250
2003	7,944,660	12,081,270	5,645,120	246,284,450
2004	7,070,745	9,064,000	5,811,500	219,193,080
2005	9,984,444	12,561,030	7,625,810	309,517,750
2006	7,817,399	10,287,500	6,416,500	242,339,370
2007	8,949,160	11,088,240	6,060,000	277,423,970
2008	6,773,159	8,410,730	5,088,510	209,967,920
2009	7,775,545	9,418,490	6,271,750	251,041,900
2010	7,648,984	9,661,039	6,148,012	237,118,518
2011	6,648,500	8,965,640	4,490,325	206,103,485
2012	8,654,039	11,115,883	5,632,433	268,275,220
2013	6,631,766	9,103,735	4,229,465	205,584,737
2014	5,242,069	6,837,467	3,820,178	162,504,136
2015	5,860,963	7,517,424	4,557,243	181,689,860
2016	6,693,470	8,663,012	5,034,551	207,497,569

Monthly Total Ranking-July 1987-2016

Rank	Year	Monthly Total
1	2002	336,694,250
2	1999	326,337,850
3	2005	309,517,750
4	1998	302,854,100
5	1988	298,227,700
6	2001	293,407,700
7	2007	277,423,970
8	2012	268,275,220
9	1991	257,972,600
10	1987	254,952,800
11	2009	251,041,900
12	1996	248,996,700
13	2003	246,284,450
14	2006	242,339,370
15	1995	241,086,800
16	2010	237,118,518
17	1997	233,165,700
18	2004	219,193,080
19	2000	211,928,150
20	2008	209,967,920
21	2016	207,497,569
22	1990	207,369,900
23	2011	206,103,485
24	2013	205,584,737
25	1993	200,595,800
26	1989	185,386,800
27	1994	185,329,500
28	2015	181,689,860
29	1992	172,291,800
30	2014	162,504,136



CLEVELAND BOOSTER STATION

HILLTOP BOOSTER STATION

DATE	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl ₂ PRE mg/l	Cl ₂ POST mg/l	Cl ₂ MON mg/l	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl ₂ PRE mg/l	Cl ₂ POST mg/l	Cl ₂ MON mg/l	BOOSTER MGD
1-Jul	3.642	140	19.85	0.65	2.20	1.74	1.77	1.582	57	8.08	0.61	1.67	1.47	1.50	5.224
2-Jul	2.947	119	16.87	0.69				1.778	66	9.36	0.63				4.724
3-Jul	2.947	119	16.87	0.69				1.778	66	9.36	0.63				4.724
4-Jul	2.947	119	16.87	0.69				1.778	66	9.36	0.63				4.724
5-Jul	2.947	119	16.87	0.69	2.14	1.70	1.87	1.778	66	9.36	0.63	1.50	1.69	1.76	4.724
6-Jul	2.099	108	15.31	0.87	2.20	1.85	1.86	2.816	43	6.10	0.26	1.39	1.61	1.68	4.915
7-Jul	2.358	125	17.72	0.90	2.20	1.93	2.01	1.617	52	7.37	0.55	2.20	1.63	1.75	3.974
8-Jul	2.800	136	19.28	0.83	2.20	1.96	2.04	1.557	40	5.67	0.44	2.20	1.81	2.05	4.356
9-Jul	3.140	101	14.32	0.55				1.443	23	3.26	0.27				4.582
10-Jul	3.140	101	14.32	0.55				1.443	23	3.26	0.27				4.582
11-Jul	3.140	101	14.32	0.55	1.41	1.87	1.99	1.443	23	3.26	0.27	1.35	1.57	1.66	4.582
12-Jul	3.556	112	15.88	0.54	2.20	1.60	1.68	1.941	67	9.50	0.59	1.37	1.82	1.88	5.496
13-Jul	3.467	112	15.88	0.55	1.26	1.62	1.75	2.758	61	8.65	0.38	1.43	1.68	1.74	6.225
14-Jul	2.503	101	14.32	0.69	1.96	1.99	2.00	1.694	30	4.25	0.30	1.42	1.78	1.76	4.197
15-Jul	1.576	61	8.65	0.66	1.32	1.51	1.63	3.633	55	7.80	0.26	1.27	1.54	1.57	5.209
16-Jul	2.694	80	11.34	0.50				2.403	37	5.25	0.26				5.097
17-Jul	2.694	80	11.34	0.50				2.403	37	5.25	0.26				5.097
18-Jul	2.694	80	11.34	0.50	1.21	1.38	1.49	2.403	37	5.25	0.26	1.15	1.36	1.42	5.097
19-Jul	3.330	129	18.29	0.66	2.20	1.73	1.79	1.739	72	10.21	0.70	1.41	1.83	1.85	5.069
20-Jul	2.562	95	13.47	0.63	1.39	1.84	1.96	1.586	43	6.10	0.46	1.39	1.77	1.83	4.148
21-Jul	3.472	107	15.17	0.52	2.14	1.75	1.77	1.882	67	9.50	0.61	1.37	1.81	1.85	5.355
22-Jul	2.967	104	14.75	0.60	1.30	1.51	1.58	1.562	39	5.53	0.42	1.74	1.35	1.46	4.529
23-Jul	2.878	104	14.75	0.61				1.126	22	3.12	0.33				4.003
24-Jul	2.878	104	14.75	0.61				1.126	22	3.12	0.33				4.003
25-Jul	2.878	104	14.75	0.61	2.20	2.05	2.43	1.126	22	3.12	0.33	1.32	1.82	1.87	4.003
26-Jul	3.088	104	14.75	0.57	2.20	1.86	1.87	1.011	40	5.67	0.67	1.41	1.79	1.90	4.099
27-Jul	2.920	96	13.61	0.56	1.50	1.77	1.89	1.718	51	7.23	0.50	1.50	1.80	1.88	4.638
28-Jul	2.621	88	12.48	0.57	1.42	1.71	1.72	1.865	39	5.53	0.36	1.54	1.79	1.85	4.486
29-Jul	2.874	100	14.18	0.59	1.47	1.77	1.90	1.695	32	4.54	0.32	1.45	1.83	1.87	4.568
30-Jul	2.608	88	12.48	0.57				1.213	37	5.25	0.52				3.821
31-Jul	2.608	88	12.48	0.57				1.213	37	5.25	0.52				3.821
TOTAL	88.968	3,225	457.2					55.105	1,372	194.52					144.073
AVE DAY	2.870		14.7	0.62	1.8	1.8	1.9	1.7776		6.3	0.44	1.50	1.69	1.76	4.648
MAX	3.642		19.8	0.90	2.2	2.1	2.4	3.6330		10.2	0.70	2.2	1.83	2.05	6.225
MIN	1.576		8.6	0.50	1.2	1.4	1.5	1.0112		3.1	0.26	1.15	1.35	1.42	3.821
MONTHLY TOTALS:	Cleveland	Total MG Treated	88.968	88.968	SJCT EAST				Hilltop	Total MG Treated	55.105	Cleveland Pump Station:			88.968
		Untreated	0.000		Average Day			0.276		Untreated	0.000	Hilltop Pump Station:			55.105
Total Authority Flow:	149.0449				Month Total			8.567				TOTAL AUTHORITY (Trted.)			144.073

MONTHLY CLIMATOLOGICAL SUMMARY

July

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	64.1	71	72.1	12:30a	82	95	1963	61.1	12:00m	59	39	1982	1.5	0.6	0.42	15.4	33	9:00a	N
2	64.2	71	71.7	4:00p	82	96	1974	56.6	6:30a	60	40	1988	2.3	1.5	0	2.7	9	1:00a	NE
3	68.9	71	80.1	4:00p	82	95	1974	57.6	6:00a	60	39	1988	1.8	5.8	0	2.6	15	2:30p	E
4	68.8	71	75.3	11:30a	82	96	1990	63.3	7:00a	60	43	1996	0.2	4	0.01	2.9	12	11:00a	N
5	75.1	71	87.9	6:00p	82	95	1990	68.5	2:00a	60	43	1996	0	10.1	0	4.3	15	8:30a	SSW
6	76.1	72	85.2	8:30p	82	97	1991	70	8:00a	60	43	1972	0	11.1	0.12	7.2	27	10:00a	SW
7	76	72	86.9	5:00p	82	95	1980	71.2	11:00p	60	43	1983	0	11	0.12	4.6	19	9:30p	SSW
8	74.2	72	82.4	6:30p	82	95	1980	69.9	8:30a	60	39	1984	0	9.2	0	7	21	10:00p	SSW
9	68.9	72	71.6	3:30a	82	95	1988	67.1	10:00a	60	49	1963	0	3.9	0	13.5	28	7:00a	N
10	72.1	72	81.1	8:30p	82	95	1976	62.6	6:30a	60	45	1962	0.2	7.3	0	3.2	12	6:00p	N
11	79.3	72	89.9	5:30p	82	93	1984	68.8	4:30a	60	41	1996	0	14.3	0	5.3	21	4:30p	SE
12	79.7	72	89.6	2:30p	82	95	1987	72.7	7:30a	60	48	1975	0	14.7	0	7.2	28	3:00p	SSW
13	77.4	72	86.4	2:00p	82	99	1995	71.1	7:30a	60	48	1990	0	12.4	0.01	8	47	10:00p	SW
14	75.5	72	81.7	4:00p	82	100	1995	70.9	6:30a	61	46	1950	0	10.5	0	16.2	35	1:30a	SW
15	70.2	72	75.1	12:30a	82	99	1995	65.6	11:00p	61	47	1960	0	5.2	0	13.9	24	6:30p	N
16	67.5	72	77.5	5:30p	82	99	1988	60.4	7:00a	61	46	1987	1.1	3.6	0	5.2	20	12:30a	N
17	71.4	72	82.1	3:00p	82	95	1986	60.2	5:00a	61	45	1985	1.2	7.6	0.04	7.6	33	1:30p	SSW
18	74.6	72	82.6	7:30p	82	93	1986	70.1	2:00a	61	48	1979	0	9.6	0.55	7.6	39	1:00a	SW
19	74.9	72	84.9	3:30p	82	95	1991	66.7	6:00a	61	47	1979	0	9.9	0	3.6	14	7:30p	SE
20	80	72	93.6	7:30p	82	96	1980	68.5	5:30a	61	46	1951	0	15	0	2.7	13	8:30a	WSW
21	78	72	84	7:30p	82	95	1983	71.2	2:30p	61	44	1970	0	13	0.42	7	41	2:00p	SSE
22	78.8	72	85.8	7:00p	82	96	1983	73.8	7:30a	61	47	1970	0	13.8	0.02	7	50	1:30a	SW
23	80.8	72	91.5	4:00p	82	96	1983	73.4	7:30a	60	44	1985	0	15.8	0.08	3.3	31	12:00m	SSE
24	78.7	72	88.8	7:30p	82	94	1965	71.3	4:30a	60	42	1957	0	13.7	0.41	6.9	30	2:00a	SSW
25	77.9	72	85.6	7:00p	82	92	1964	73.4	12:00m	60	50	1990	0	12.9	0	7.3	26	5:00a	N
26	77.2	72	88	2:00p	82	92	1966	67.8	7:00a	60	49	1961	0	12.2	0	3.6	13	4:30p	N
27	76.9	72	86.4	7:00p	82	91	1949	68	5:00a	60	45	1991	0	11.9	0	3.4	11	5:30p	SE
28	76.8	72	83.5	12:00p	82	99	1983	70.2	7:00a	60	51	1992	0	11.8	0	3.7	14	4:30p	N
29	74.1	72	84.5	3:00p	82	100	1983	68.5	7:00a	60	46	1968	0	9.1	0.23	2.6	13	11:30a	ENE
30	69.7	72	76.3	1:00p	82	104	1999	65	9:00a	60	47	1984	0	4.7	0.08	5.2	20	6:00p	NNE
31	69.4	72	75.1	7:00p	82	100	1999	63.8	5:00a	60	46	1993	0	4.5	0	3.9	11	1:30p	NNE
AVE	74.103	71.8387											0.3	9.4	0.1	6.3	23.4		N
MAX	80.8	72	93.6			104		73.8		61	51		2.3	15.8	0.55	16.2	50.0		
MIN	64.1	71	71.6					56.6		59	39		0	0.6	0	2.6	9		
TOTAL															2.51				

Max Rain: 0.55 ON 07/18/16
 Days of Rain: 11 (>.01 in) 7 (>.1 in) 0 (>1 in)