

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

Water demand in August was down by 1,491,923 gallons or 1.04% from last year. This year 142,354,204 gallons were delivered which compares to 143,846,127 gallons delivered in September of 2015. The September 2016 pumpage ranked 23rd in the thirty year tabulation dating back to 1987 and reflects the second monthly decline in pumpage since May of this year.

GENERAL ACTIVITIES

Filtration Capacity Study/Phase 1 SCIP

The first phase of the filter rate study was completed in August. The second and final phase of the study will be conducted in October. The study was divided into two testing periods in order to capture summer high water demand and the seasonal fall lake turnover. 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. Interestingly, the October testing will be complicated by the fact that water demand drops off significantly in the fall which will necessitate running high rate filter tests individually and not in tandem as can be done during the summer. On a practical basis this means we will probably testing filters well into November.

While the rate study was underway, CH2M engineers completed the on-site portion of the hydraulic assessment. As projected in the SCIP and confirmed in the assessment staff observed first hand the hydraulic limitations in the influent piping in filter gallery 5-8. During high water demand filter levels in the test filters dropped to very low levels when two or more filters were operating simultaneously. In fact, this condition produced excessive turbulence which presented a problem since it could have caused shearing of the floc particles. For purposes of the study filters in filter bank 9-12 were placed into service and test filters in 5-8 were reduced in number to a single filter during the tests. In terms of future planning we now know and have confirmed that the influent piping will have to be upsized.

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. Staff is exploring polymer feed systems. Recently, they learned that the Benton Harbor Water Plant was interested in selling their polymer feed equipment and visited the plant during the week of October 3rd to look at the system.

Since the feed rate is very low and can be accomplished with a metering pump and small drum size tank staff is favoring the installation of a new system. Once a decision is made, an application to MDEQ will be made for a permit.

Intake Inspections/Repair

Solomon diving was hired in September to clean the intake structures and connecting pipe of the North intake. They found 30" of sand in the pipe which increased to four feet in the structures. This information confirmed what Underwater Construction had documented earlier in the summer. Solomon reported that the material consisted of a fine light sand layer of approximately 12-15" in thickness on top and a moderately dense heavy sand/clay on the bottom of the pipe. They were able to pump the light sand out within a matter of hours. The heavy sand took the better part of a day for each leg of the structure. They found no diminution of sand as they proceeded inside the pipe and in fact reported 24" at the pipe wye some 70 feet in. We do however know from the inspection done by Underwater that this level drops to 3"-4" at the emergency riser some 1500' inside the pipe.

Solomon pressure washed the inside and outside of the intake structures and removed all of the zebra mussels, driftwood and sand. They reported the presence of one loose anchor bolt on the bottom of the south structure which will be difficult to tighten since the nut is buried under the floor of the structure.

In consultation with FTC&H a deflector is being designed and will be placed on one of the structures this year if weather permits. The deflector will redirect sand away from the openings. FTC&H is the design and construction engineer of record for the north intake which was built in 2010 and placed into service in 2011.

St. Joseph Township Interconnect Metering Project

The *cut and caps* at the Elmside and Elvern locations are complete as well as the installation of the meter and pit at Colfax & Nickerson. The contractor, John Boettcher Sewer & Excavating of Mishawaka, IN set the pit and meter at Woodward and Empire on October 6th and 7th. At this time St. Joseph has confirmed that the system valves on the SJCT side are closed and holding. On Friday attempts were made to isolate the Benton Harbor side to no avail. Plans were checked and Bob Fowler, retired distribution and water plant foreman from the City of Benton Harbor graciously assisted at our request. He noted that there may be a connection to an 8" water main that was abandoned in the 1970's. At this point the City of Benton Harbor will have to expand its shut off area and provide notice to its affected customers which may include the Benton Harbor High School. Mike O'Malley who just returned in August to the City of Benton Harbor is trying to locate record accurate record drawings and incorporate what we've learned from Bob.

MDEQ Certification Examinations

Mark will be taking the MDEQ F-2 examination in November and Rory will be taking it in May.

Travel & Training

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

Greg and Shawn attended the Michigan Section AWWA Annual Conference and Exhibition at Boyne Highlands Resort in Harbor Springs during the week of September 12th.

Jeff attended the Michigan Section Fall Regional in Kalamazoo.

Greg attended the Michigan Section Fall Regional in Livonia.

Mark and Rory attended Short Course II at the Kettunen Center.

Monthly Maintenance Notes

September 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
09/01/16	Installed new control valve for sprinklers on south side of North Low Service
09/06/16	Repaired Clarifier # 3 Turbidimeter.
09/08/16	Cleaned South Low Service Wet Well
09/09/16	Repaired chlorinator pump at Cleveland BPS.
09/09/16	Installed New De-chlorination pump and new drum of Sodium Bisulfite in Reservoir De-chlorination building. Vented drum outside of building.
09/12/16	Installed new light fixture in Chlorine Storage room
09/13/16	Installed new check ball assemblies on Chlorinator pump at Cleveland BPS
9/13 to 9/16/16	Solomon Diving - cleaning of south crib and pipe to "Y" on North Intake
9/14 to 9/20/16	Installed New CL17 Chlorine Analyzers for Clarifiers 2 & 3, conduit and signal cable.
09/21/16	Repaired Generator at Royalton Tower, installed new Voltage Regulator
09/21/16	Mead & White - Installed new indicator light sockets in Panel P-7 for Clarifiers 2 & 3 rotor and scraper drive power supplies
09/22/16	Removed sink and counter from old lab, painted wall and window frames
09/26/16	Repaired flouride leak on supply pump # 2
09/26/16	Installed new check ball assemblies on Chlorinator pump at Hilltop BPS

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

SEPTEMBER 2016

DISTRIBUTION:	
Total Gallons	142,354,204
Average Day	4,745,140
Maximum Day	6,444,850
Minimum Day	3,444,061

TREATMENT:	
Total Low Service	145,975,017
Wash Water Gals.	1,680,882
Wash Water %	1.13%
Plant Use Gals.	1,745,418
Plant Use %	1.21%

FILTRATION:		
Ave. Filter Run	98.9	hours
Ave. Filter Rate	2.13	g/sqft/min
Filter Eff. Index	300.7	
Ave. Loss of Head	2.1	feet
Plant Sewer Usage		
	1118	\$ 2,644.93

LABORATORY REPORT		
Average of	Raw	Tap
Chlorides mg/L	17.5	18.0
Fluoride mg/L	0.13	0.71
Alkalinity mg/L	112	97
Hardness mg/L	141	139
pH	8.2	7.4
Calcium mg/L	38	38
Magnesium mg/L	11	11
Turbidity NTU	2.67	0.03
Temperature °F	65	
Total Coliform		0.0
Chlorine Residual		
		mg/L Free
Mixing Basin		0.85
Applied		1.89
Tap		1.53
Distribution		0.82

TREATMENT CHEMICAL SUMMARY:					
	Applied mg/L	Total Lbs.	Cost	Inventory lbs.	Days Supply
		CHEMICAL			
Alum (Al ⁺³)	1.86	2,263	\$7,452.47	5,323	71
Chlorine (Cl ₂)	3.26	3,941	\$1,058.95	10,577	81
Fluoride (F ₂)	0.72	873	\$1,530.34	36,353	237

		REMARKS:			
Total Cost all Chemicals	\$10,041.76				
Chemical Cost per Mil. Gallon Treated	\$68.79				
Chemical Cost per Mil. Gallon Delivered	\$ 148.18				
PLANT UTILITIES SUMMARY					
Electric:					
Total KWH	276,000	***includes measure of melted snow			
Total Power Cost	\$ 19,320.00	visit the City of Saint Joseph's Home page at www.sjcity.com			
Power Cost per Million Gallon Treated	\$ 132.35	e-mail comments to either: operator@sjcity.com or galiment@sjcity.com			
Power Cost per Million Gallon Delivered	\$ 148.18	WEATHER CONDITIONS AT THE PLANT		Air Temp. °F	
Gallons Pumped per KWH	0	SJWW Weather Computer		Avg.	69.7
		Rain Guage, Inches	0.92	Max.	80.8
		days it rained***	11	Min.	53.8
Natural Gas:		Wind Speed, Avg	6.4	Lake Temp. °F	
Metered Cubic Feet	0	Wind Speed, Max	22.7	Avg.	65.1
Natural Gas Cost	\$54.28	Prevailing Wind Dir.	NNE	Max	77.8
Emergency Power Diesel Fuel Inv., Gals.	North F 800	Lake Level (USACE)	579.82	Min	52.6
	South F 2400				

DISTRIBUTION REPORT

For the Month of September 2016

Activity	Number/Description		
Water Main Breaks	2		
MISS DIGS	366		
Delinquent Shut Off	20	14 City, 2 RCT, 4 SJCT	
Delinquent Shut Off (Broken Payment Plans)	0		
Hydrants (Repaired/Replaced)	4	Cap repair (2 in RCT), (2 in LCT).	
Valve Turning			
Valves	6	3 at Napier/Colfax Interconnect, 3 Colfax Nickerson meter pit (exercised)	
Taps (1")	3	1234 Langly Ave (2") LMC Temporary service for cons project. 1924 N. Donna Dr. (1") New construction 1192 Forrestbrook Dr. (LCT) (1") New construction	
Cross Connection Control (Hydro Designs)			
Repair of Curb box/Shut-Off Valves	3	1ea in LCT, 1ea SJCT, 1ea City	
Service Repair	0		
Service Replacements	2	1014 Michigan (replaced lead service) 1014 1/2 Michigan (replace lead service)	
Meter pit/service replacement			
Water Quality Complaint(s)	0		
Hydrant flushing to maintain water quality			
Hydrant Flushing (Stage 2 Rule)			
Service line complaints (customer side)			
Staff Education/Training			
Overtime-Total	55	(Including Sanitary and Storm)	
Other		Interconnect at Nickerson and Colfax completed 10/5/2016 Repaired sinkhole at 2212 Langley water main trench	
Turn Off	6	(Note: For delinquent Shut off see above)	
Turn On	3		
Finals	133		
Meter Repair/Replacement		Audit Meter	
		Verify Read	
Meter Repair		Move Mxu Box	
Per detail		New Installation	9
Meter leaking	6	New Installation-Benton Harbor	
Stopped Meter	13	Replaced/various reasons (e.g.downsize, defective)	4
Faulty Register		Rockwell Replacement	
Frozen Meter	2	Mxu Replaced	4
Move Meter Inside	1	Sprinkler meter removed/line capped	
Hard to read	9	Removals/demo	1
Replace/Adding Sprinkler Meter	1	Curb box location	
Damage to Meter		Broken Remote	
New Plumbing	3	Noisy Meter	
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

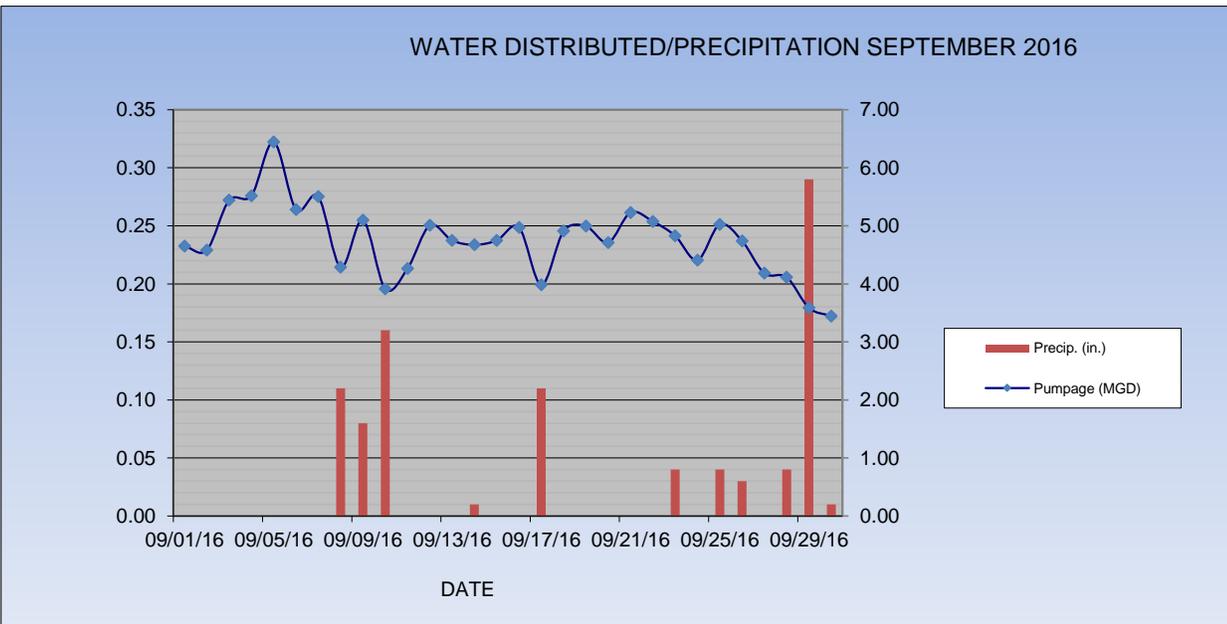
For the Month/Year of: September 2016

#	Date	Location	Main Size	Gallons Lost	Break Type	Valves Turned	City Twp	Labor	Remarks
1	9/5/2016	479 Ansley Dr.	6	72,000	Circumf crack	2	SJCT	10.0	6.5 ft. deep, sandy soils, B&Z, No cathodic
2	9/29/2016	3749 Lane Court	6	13,900	Circular break		SJCT	18.0	6.0 ft. deep, sandy soils. Calc loss .0625" cb for 1 hr.
3									
4									
5									
	TOTALS			85,900		2		28.0	

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

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	RAINFALL (in)	Day to Day Comparison 2016/2015	
				2016	2015
09/01/16	4,652,338	4.65	0.00	4,652,338	5,118,807
09/02/16	4,580,982	4.58	0.00	4,580,982	5,759,407
09/03/16	5,440,904	5.44	0.00	5,440,904	5,418,153
09/04/16	5,516,677	5.52	0.00	5,516,677	6,482,276
09/05/16	6,444,850	6.44	0.00	6,444,850	5,495,502
09/06/16	5,280,347	5.28	0.00	5,280,347	4,993,044
09/07/16	5,503,419	5.50	0.00	5,503,419	5,227,638
09/08/16	4,285,677	4.29	0.11	4,285,677	5,181,045
09/09/16	5,099,167	5.10	0.08	5,099,167	4,214,397
09/10/16	3,913,464	3.91	0.16	3,913,464	4,627,315
09/11/16	4,262,221	4.26	0.00	4,262,221	4,220,160
09/12/16	5,007,398	5.01	0.00	5,007,398	4,365,480
09/13/16	4,747,057	4.75	0.00	4,747,057	4,304,008
09/14/16	4,673,334	4.67	0.01	4,673,334	4,839,376
09/15/16	4,747,462	4.75	0.00	4,747,462	5,040,132
09/16/16	4,972,386	4.97	0.00	4,972,386	4,801,449
09/17/16	3,982,580	3.98	0.11	3,982,580	4,989,879
09/18/16	4,908,982	4.91	0.00	4,908,982	3,938,438
09/19/16	4,992,676	4.99	0.00	4,992,676	4,224,313
09/20/16	4,711,303	4.71	0.00	4,711,303	4,181,946
09/21/16	5,229,287	5.23	0.00	5,229,287	4,070,587
09/22/16	5,075,166	5.08	0.00	5,075,166	4,291,218
09/23/16	4,827,668	4.83	0.04	4,827,668	5,128,417
09/24/16	4,407,705	4.41	0.00	4,407,705	4,709,061
09/25/16	5,024,131	5.02	0.04	5,024,131	5,088,893
09/26/16	4,739,599	4.74	0.03	4,739,599	4,600,519
09/27/16	4,181,925	4.18	0.00	4,181,925	4,689,183
09/28/16	4,114,523	4.11	0.04	4,114,523	5,131,685
09/29/16	3,586,915	3.59	0.29	3,586,915	4,266,846
09/30/16	3,444,061	3.44	0.01	3,444,061	4,446,954
TOTAL	142,354,204	142.35	0.92	142,354,204	143,846,128

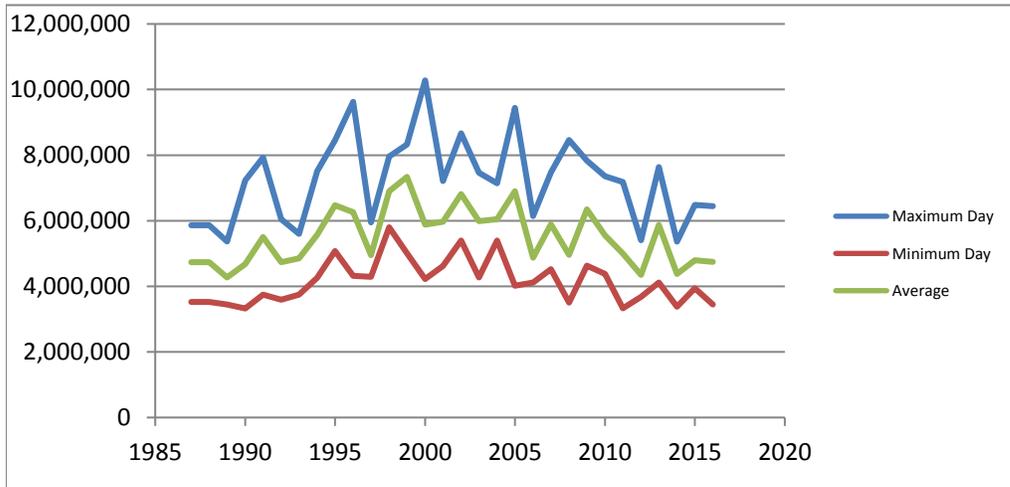
Average Day	4,745,140
Maximum Day	6,444,850
Minimum Day	3,444,061



ST. JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED
SEPTEMBER 2016

Year	Average	Maximum Day	Minimum Day	Monthly Total
1987	4,739,067	5,865,900	3,526,600	142,172,000
1988	4,739,067	5,865,900	3,526,600	142,172,000
1989	4,271,113	5,368,300	3,450,800	128,133,400
1990	4,676,653	7,229,900	3,325,000	140,299,600
1991	5,502,837	7,930,800	3,743,200	165,085,100
1992	4,733,427	6,050,100	3,590,400	142,002,800
1993	4,853,200	5,596,400	3,751,200	145,596,000
1994	5,568,387	7,512,800	4,264,800	167,051,600
1995	6,472,583	8,451,550	5,076,500	194,177,500
1996	6,259,632	9,624,850	4,321,200	187,788,950
1997	4,952,985	5,948,300	4,287,100	148,589,550
1998	6,902,892	7,962,050	5,800,250	207,086,750
1999	7,336,767	8,327,900	5,011,800	220,103,000
2000	5,881,432	10,278,600	4,218,550	176,442,950
2001	5,965,884	7,213,500	4,621,540	178,976,510
2002	6,816,819	8,670,050	5,394,500	204,504,580
2003	5,990,605	7,463,190	4,273,450	179,718,150
2004	6,050,319	7,144,670	5,396,500	181,509,570
2005	6,900,181	9,446,000	4,014,000	207,005,420
2006	4,875,917	6,143,500	4,117,750	146,277,500
2007	5,886,785	7,470,800	4,525,000	176,603,560
2008	4,955,846	8,465,750	3,500,570	148,675,370
2009	6,349,200	7,827,500	4,630,930	190,476,740
2010	5,552,512	7,354,162	4,381,232	166,575,350
2011	4,999,212	7,178,146	3,326,840	149,976,363
2012	4,344,215	5,408,899	3,676,975	130,326,456
2013	5,868,671	7,634,417	4,115,276	176,060,131
2014	4,375,296	5,362,360	3,377,456	131,258,890
2015	4,794,871	6,482,276	3,938,438	143,846,127
2016	4,745,140	6,444,850	3,444,061	142,354,204

Ranking	Year	Monthly Total
1	1999	220,103,000
2	1998	207,086,750
3	2005	207,005,420
4	2002	204,504,580
5	1995	194,177,500
6	2009	190,476,740
7	1996	187,788,950
8	2004	181,509,570
9	2003	179,718,150
10	2001	178,976,510
11	2007	176,603,560
12	2000	176,442,950
13	2013	176,060,131
14	1994	167,051,600
15	2010	166,575,350
16	1991	165,085,100
17	2011	149,976,363
18	2008	148,675,370
19	1997	148,589,550
20	2006	146,277,500
21	1993	145,596,000
22	2015	143,846,127
23	2016	142,354,204
24	1987	142,172,000
25	1988	142,172,000
26	1992	142,002,800
27	1990	140,299,600
28	2014	131,258,890
29	2012	130,326,456
30	1989	128,133,400



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-Sep	1.244	42	5.95	0.57	1.46	1.68	1.77	0.694	40	5.67	0.98	2.20	2.13	2.40	1.938
2-Sep	1.750	61	8.65	0.59	1.35	1.35	1.54	1.043	51	7.23	0.83	1.46	1.46	1.54	2.793
3-Sep	2.891	84	11.91	0.49				1.392	44	6.24	0.54				4.283
4-Sep	2.891	84	11.91	0.49				1.392	44	6.24	0.54				4.283
5-Sep	2.891	84	11.91	0.49				1.392	44	6.24	0.54				4.283
6-Sep	2.891	84	11.91	0.49	1.34	1.47	1.63	1.392	44	6.24	0.54	1.22	1.54	1.79	4.283
7-Sep	2.941	103	14.60	0.60	1.69	1.51	1.65	0.074	2	0.28	0.46	1.41	1.29	1.42	3.015
8-Sep	2.493	10	1.42	0.07	1.31	1.30	1.37	1.059	35	4.96	0.56	1.32	1.69	1.73	3.552
9-Sep	0.332	0	0.00	0.00	0.95	1.04	1.07	2.224	75	10.63	0.57	1.31	1.83	1.95	2.556
10-Sep	2.039	108	15.31	0.90				0.938	38	5.39	0.69				2.977
11-Sep	2.039	108	15.31	0.90				0.938	38	5.39	0.69				2.977
12-Sep	2.039	108	15.31	0.90	1.38	1.16	1.32	0.938	38	5.39	0.69	1.28	1.61	1.70	2.977
13-Sep	2.329	129	18.29	0.94	1.53	1.81	1.95	1.133	42	5.95	0.63	1.46	1.82	1.89	3.462
14-Sep	1.389	78	11.06	0.95	1.70	1.37	1.48	1.294	79	11.20	1.04	2.18	1.96	1.96	2.683
15-Sep	2.614	132	18.71	0.86	1.94	1.61	1.70	0.621	31	4.40	0.85	1.54	2.12	2.19	3.236
16-Sep	1.763	8	1.13	0.08	1.28	1.30	1.31	1.372	68	9.64	0.84	2.20	1.92	1.96	3.135
17-Sep	2.226	132	18.71	1.01				0.800	30	4.25	0.64				3.025
18-Sep	2.226	132	18.71	1.01				0.800	30	4.25	0.64				3.025
19-Sep	2.226	132	18.71	1.01	1.56	1.72	1.84	0.800	30	4.25	0.64	1.56	1.75	1.81	3.025
20-Sep	2.544	158	22.40	1.06	1.63	1.66	1.71	1.419	81	11.48	0.97	2.20	1.78	1.94	3.963
21-Sep	2.703	172	24.39	1.08	1.81	1.69	1.82	0.483	24	3.40	0.84	2.20	1.93	2.18	3.186
22-Sep	2.579	155	21.98	1.02	2.20	1.75	1.91	1.130	56	7.94	0.84	2.20	2.04	2.17	3.709
23-Sep	2.603	145	20.56	0.95	1.46	1.53	1.70	0.265	13	1.84	0.84	1.49	1.87	2.02	2.867
24-Sep	2.816	169	23.96	1.02				0.240	13	1.84	0.92				3.056
25-Sep	2.816	169	23.96	1.02				0.240	13	1.84	0.92				3.056
26-Sep	2.816	169	23.96	1.02	2.20	2.14	2.31	0.240	13	1.84	0.92	2.20	1.74	1.78	3.056
27-Sep	0.847	33	4.68	0.66	1.52	1.61	1.68	2.628	84	11.91	0.54	2.20	1.64	1.81	3.475
28-Sep	1.339	99	14.04	1.26	1.35	1.66	1.73	0.802	36	5.10	0.76	1.30	1.33	1.39	2.140
29-Sep	1.323	96	13.61	1.23	1.37	1.35	1.39	1.838	53	7.51	0.49	1.32	1.52	1.61	3.160
30-Sep	1.550	72	10.21	0.79	1.33	1.63	1.81	1.124	42	5.95	0.64	1.75	1.79	1.86	2.674
TOTAL	65.148	3,056	433.3					30.703	1,231	174.53					95.851
AVE DAY	2.172		14.4	0.78	1.5	1.5	1.7	1.0234		5.8	0.72	1.71	1.75	1.86	3.195
MAX	2.941		24.4	1.26	2.2	2.1	2.3	2.6278		11.9	1.04	2.2	2.13	2.4	4.283
MIN	0.332		0.0	0.00	1.0	1.0	1.1	0.0741		0.3	0.46	1.22	1.29	1.39	1.938
MONTHLY TOTALS:	Cleveland	Total MG Treated	65.148	SJCT EAST				Hilltop	Total MG Treated	30.703	Cleveland Pump Station:				64.816
		Untreated	64.816	Average Day		0.227			Treated	30.703	Hilltop Pump Station:				30.703
Total Authority Flow:	99.611		0.332	Month Total		6.797			Untreated	0.000	TOTAL AUTHORITY (Trted.)				95.519

	TOC Compliance							
	Treated	Source	Formula		Req. TOC	Actual	Alternative	Compl. Perf.
	Tap	Tap	Ratio	Alka- linity	Removal	Ratio/ Remov	Criteria Complied Y/N	
October	1.23	1.58	22.2	109	25	0.89	Yes	1.00
November	1.21	1.56	22.4	113	25	0.90	Yes	1.00
December	1.27	1.46	13.0	111	25	0.52	Yes	1.00
January 2016	1.38	1.86	25.8	111	25	1.03	N(Removal)	1.03
February	1.27	1.76	27.8	122	15	1.86	N(Removal)	1.86
March	1.62	2.32	30.2	140	15	2.01	N(Removal)	2.01
April	2.07	2.39	13.4	130	15	0.89	Yes	1.00
May	1.52	1.94	21.6	120	25	0.87	Yes	1.00
June	1.24	1.61	23.0	120	25	0.92	Yes	1.00
July	1.41	1.81	22.1	113	25	0.88	Yes	1.00
August	1.28	1.59	19.5	108	25	0.78	Yes	1.00
September 2016	1.39	1.85	24.9	110	25	0.99	Yes	1.00
Quarter Avg.								
Annual Avg.	1.41	1.81						1.21

2/22/2016
 3/15/2016
 4/12/2016
 5/11/2016
 6/12/2016
 7/11/2016
 8/9/2016
 9/13/2016

STAGE 2 D/DBPR MONITORING-HALOACETIC ACIDS

September 2016 Report

WSSN 6310

SITE: DBP1

Date	12/09/15
Location	Blossomland
Dibromoacetic acid	<1
Dichloroacetic acid	9.4
Monobromoacetic acid	<1
Monochloroacetic acid	<2
Trichloroacetic acid	18
Total HAA5	27.4

Date	03/16/16
Location	Blossomland
Dibromoacetic acid	<1
Dichloroacetic acid	9.7
Monobromoacetic acid	<1
Monochloroacetic acid	<2
Trichloroacetic acid	15
Total HAA5	24.7

Date	06/08/16
Location	Blossomland
Dibromoacetic acid	<1
Dichloroacetic acid	10
Monobromoacetic acid	<1
Monochloroacetic acid	<2
Trichloroacetic acid	12
Total HAA5	22

Date	09/14/16
Location	Blossomland
Dibromoacetic acid	<1
Dichloroacetic acid	8.7
Monobromoacetic acid	<1
Monochloroacetic acid	<2
Trichloroacetic acid	14
Total HAA5	22.7

RAA

24 µg/l

STAGE 2 D/DBPR MONITORING-TTHM

September 2016

WSSN 6310

SITE: DBP1

Date	12/09/15
Location	Blossomland
Bromodichloromethane	11
Bromoform	<0.5
Chloroform	25
Dibromochloromethane	3.4
Total Trihalomethanes	39.4

Date	03/16/16
Location	Blossomland
Bromodichloromethane	9.2
Bromoform	<0.5
Chloroform	18
Dibromochloromethane	2.6
Total Trihalomethanes	29.8

Date	06/08/16
Location	Blossomland
Bromodichloromethane	12
Bromoform	<0.5
Chloroform	22
Dibromochloromethane	3.9
Total Trihalomethanes	37.9

Date	09/14/16
Location	Blossomland
Bromodichloromethane	13
Bromoform	<0.5
Chloroform	35
Dibromochloromethane	4.3
Total Trihalomethanes	52.3

RAA

40 µg/l

LABORATORY REPORT

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

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Disinfection Byproducts									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	EEA ID #
75-27-4	Bromodichloromethane	524.2	---	0.5	13	ug/L	---	09/16/16 05:21	3545752
75-25-2	Bromoform	524.2	---	0.5	< 0.5	ug/L	---	09/16/16 05:21	3545752
67-66-3	Chloroform	524.2	---	0.5	35	ug/L	---	09/16/16 05:21	3545752
124-48-1	Dibromochloromethane	524.2	---	0.5	4.3	ug/L	---	09/16/16 05:21	3545752
---	Total Trihalomethanes	524.2	80 *	0.5	52.3	ug/L	---	09/16/16 05:21	3545752
631-64-1	Dibromoacetic acid	552.2	---	1.0	< 1.0	ug/L	09/21/16 08:39	09/22/16 01:07	3545753
79-43-6	Dichloroacetic acid	552.2	---	1.0	8.7	ug/L	09/21/16 08:39	09/22/16 01:07	3545753
79-08-3	Monobromoacetic acid	552.2	---	1.0	< 1.0	ug/L	09/21/16 08:39	09/22/16 01:07	3545753
79-11-8	Monochloroacetic acid	552.2	---	2.0	< 2.0	ug/L	09/21/16 08:39	09/22/16 01:07	3545753
76-03-9	Trichloroacetic acid	552.2	---	1.0	14	ug/L	09/21/16 08:39	09/22/16 01:07	3545753
---	Total HAA5	552.2	60 *	2.0	22.7	ug/L	09/21/16 08:39	09/22/16 01:07	3545753

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

MONTHLY CLIMATOLOGICAL SUMMARY

September 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	65.6	67	70	7:00p	78	98	1953	60.9	10:00a	55	42	1970	0.9	1.5	0	5.5	19	5:30p	NNE
2	63.6	67	71.5	6:30p	78	98	1953	56	7:00a	55	41	1994	2.6	1.2	0	4.4	19	6:30p	NNE
3	64.9	67	73	7:30p	78	94	1953	56.4	7:30a	55	40	1974	2.3	2.2	0	3.1	12	7:00p	NNE
4	70.2	67	82.9	7:30p	78	91	1964	59.6	8:00a	55	37	1997	1.3	6.6	0	2.2	13	1:30p	E
5	75.8	66	88.3	6:30p	77	92	1959	64.7	4:30a	54	40	1984	0	10.8	0	4.8	18	4:30p	SE
6	80.8	66	88.4	7:30p	77	96	1954	73.9	7:30a	54	37	1962	0	15.8	0	7.9	23	7:00p	SSW
7	80.7	66	86.4	8:00p	77	96	1960	75.2	6:00a	54	36	1988	0	15.7	0	9.6	23	10:00a	SSW
8	74.9	66	77.5	1:00a	77	95	1960	72.5	11:30p	54	34	1951	0	9.9	0.11	10.9	25	7:30a	SW
9	74.2	65	80	2:00p	76	93	1955	68.7	8:00a	53	40	1951	0	9.2	0.08	3.2	12	4:00p	SE
10	69.8	65	72.3	9:30a	76	93	1983	64.6	9:00p	53	39	1988	0	4.8	0.16	13	41	8:30p	SW
11	69.7	65	79.4	7:00p	76	91	1952	62.3	12:00m	53	40	1958	0.1	4.8	0	7	30	12:30a	N
12	68.9	65	79.9	7:00p	76	92	1952	58.9	8:00a	53	33	1964	1.8	5.6	0	4.2	21	1:00p	SE
13	71.3	64	81	5:30p	75	92	1962	63.5	5:30a	52	32	1985	0.2	6.4	0	7.4	21	11:00a	SW
14	69	64	75.9	3:00p	75	92	1962	63.1	12:00m	52	33	1985	0.2	4.1	0.01	5.3	20	12:30a	NNE
15	68	64	78.9	5:30p	75	90	1991	58.9	7:30a	52	34	1966	1.6	4.6	0	2.2	12	1:00p	E
16	71.7	63	85	3:30p	74	89	1948	60.4	7:30a	51	35	1986	1.2	7.9	0	4.9	21	2:00p	SSE
17	71.9	63	77	6:30p	74	91	1955	68.5	7:00a	51	32	1990	0	6.9	0.11	8.4	21	3:00a	SW
18	69.8	63	77.8	2:30p	74	90	1955	62.6	7:00a	51	36	1959	0.2	5.1	0	2.7	9	11:30a	WNW
19	71.9	62	82	6:30p	73	88	1978	60.8	7:00a	51	37	1981	1	7.9	0	5.6	18	10:30p	SE
20	74.4	62	83.7	2:00p	73	88	1978	67.5	12:00m	50	36	1956	0	9.4	0	5.2	25	1:30a	ENE
21	71.9	62	79.9	1:00p	73	90	1970	65.7	7:00a	50	30	1991	0	6.9	0	4	24	9:30a	E
22	74.7	61	83.9	6:00p	72	87	1959	67.9	7:00a	50	34	1999	0	9.7	0	3.4	15	12:30p	SE
23	71	61	74.8	1:00a	72	86	1959	64.5	12:00m	49	31	1954	0	6	0.04	3.8	19	5:30p	NNE
24	66.6	61	76.8	6:30p	71	86	1960	58.9	7:00a	49	28	1989	1.8	3.4	0	2.8	15	2:00a	ENE
25	71.2	60	84.8	5:30p	71	86	1986	61.3	8:00a	49	29	1989	1	7.2	0.04	3.8	19	12:00m	SE
26	65.7	60	69.9	12:30a	71	92	1998	60.6	5:00a	48	36	1962	0.6	1.2	0.03	22.7	39	8:00p	W
27	63.9	60	67.4	4:30p	70	92	1998	56.6	12:00m	48	23	1989	1.5	0.4	0	19.9	44	12:30p	WSW
28	57.4	59	66	4:30p	70	86	1952	53.8	8:00a	48	24	1991	7.6	0	0.04	4.3	25	7:00p	NNE
29	60.9	59	68.3	4:30p	70	96	1953	57.7	12:30a	47	29	1991	4.4	0.3	0.29	5.7	21	3:30p	NE
30	61.7	59	68.6	2:00p	69	93	1953	56.7	7:30a	47	27	1984	3.6	0.3	0.01	4.5	19	2:30p	NNE
31																			
AVE	69.7	63.3											1.1	5.9	0.0	6.4	21.4		NNE
MAX	80.8	67.0	88.4			98		75.2		55	42		7.6	15.8	0.29	22.7	44.0		
MIN	57.4	59.0	66.0					53.8		47	23		0	0	0	2.2	9		
TOTAL															0.92				

Max Rain: 0.29 ON 09/29/16
 Days of Rain: 9 (>.01 in) 4 (>.1 in) 0 (>1 in)