

CITY OF ST. JOSEPH WATER FILTRATION PLANT
OPERATIONAL REPORT
NOVEMBER 2015



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-NOVEMBER 2015

Water demand in November was up by 2,691,943 gallons or 3.3% from last year. This is a continuation of a trend that began in August. This year 84,642,630 gallons were delivered which compares to 81,950,687 gallons delivered November of 2014. The November 2015 pumpage ranked 27th in the thirty year tabulation dating back to 1986. Minimum day water demand was below that of last November indicating that this upward trend will likely not be sustainable.

GENERAL ACTIVITIES

Intake Operation

Plant staff switched from the north intake to the south in anticipation of the storm force winds forecasted for the second week of November. This was done in order to minimize sand uptake in the north intake during storm events as recommended by Guy Meadows of Michigan Technological University last fall. Initial attempts to flow the older south intake were unsuccessful due to probable sand in the intake structures. Plant staff successfully backflushed the sand on November 11th and restored service. This intake became blocked again as storm force winds in excess of 50 knots and the resultant high waves and strong currents brought in heavy loads of plant material (leaves, branches, seaweed and sea grass). Plant staff cleared the material from the traveling screen and were able to restore operation. It is noteworthy that the south intake which had been out of service since June 22nd had accumulated enough sand to prevent flow over the course of the last several months. Operating procedures will be modified to include a bi-monthly maintenance flow test to assure that this intake will be available in the event of an emergency with the north intake. The south intake serves as an emergency back up and provides a water source to enable the backflushing of frazil ice or sand in the north.

In early December, Underwater Construction was hired inspect both the north and south intakes. In the North (built in 2011) a thin but nearly complete layer of zebra and quagga mussels were found on the inside and outside of the intake structures. Sand was found on the floors of the structures extending into the intake pipes. The north structure had 24" of sand at the intake pipe inlet which tapered down to 8" to 10" at a distance of 5' into the pipe. The south structure had 8"-10" of sand at the intake pipe inlet which tapered down to 6" to 8" at a distance of 5' into the pipe. Rock rip rap on around the outside of the structures extended to a height of 2.5'-3' on the north structure and 4'-5' around the south. The halos were intact and looked good.

Divers found the South intake (built in 1955) to be in sound condition. However, the emergency riser located on the intake pipe some 500' in from the intake structures was found to have separated from the pipe. The emergency riser is simply a 24" capped pipe spool which functions to provide emergency access to the pipe and an emergency water supply should the intake become blocked or fail in some way. Given the concern with December weather, upon consultation with Underwater Construction it was decided to temporarily cap the opening until repairs could be accomplished in the spring.

Inspect Marquette Wood Reservoir

As reported at the November WSJOB monthly meeting, plant staff inspected the 1.5 MG Marquette Woods Reservoir. The reservoir was mothballed in 2010 and has remained empty since that time. A certified structural engineer was not present for the inspection. Nonetheless, staff reported no evidence of moisture incursion in the roof or walls. The center wooden baffle wall was found to be in excellent condition and the valves operated freely by hand. The locked access hatch was secure. Photographs were taken.

General Plan & Reliability Study

Plant staff is assisting the engineering department and FTC&H as they update the City of St. Joseph General Plan and Reliability Study. A concurrent effort is under way in the Authority water system. Both plans are due and will be submitted on time to MDEQ in December. Wightman & Associates is updated the Authority plan. General plans and reliability studies fall under Rule 1606 of the Safe Drinking Water Act (Public Act 399 as Amended).

Applied Water Continuous On Line Chlorine Monitoring Capability

Staff is working with ABCS and West Michigan Instrumentation to install chlorine monitors in the clarifiers to measure applied water chlorine residual. This will enable operators to respond more effectively to changing raw water conditions which are manifested in the clarifiers. This is vital since the shift in chlorine feed from almost all of the dose in the wet well a 50/50 mix wet well/clarifier effluent (applied water). As has been reported earlier the shift in chlorine feed is being done to reduce the formation of disinfection byproducts and hence improve finished water quality.

TOC Data Logging

Concurrent with the installation of continuous on line chlorine monitoring capability staff is working on interfacing the on-line TOC analyzer with the process computer. This will enable the logging and trending of data which is currently being recorded by hand and transferred to paper reports.

Water Plant Operator Position

The water plant operator position at the water plant is again vacant. Ryan Patzer bid who had just successfully completed training bid on a truck driver position in the public works department. The job was posted and applicants are currently under review.

City Water Tower Mixer and Cathodic Protection

The City-owned water tower located on Cleveland Avenue North of Hilltop Road was built in 2010 to replace a fifty year old tank which had reached the end of its service life and was no longer optimally located to provide service to the system which was expanding to the south. The water tower serves a vital role in the City of St. Joseph water distribution system by providing a means to manage pressure, provide fire protection and serve as an emergency water supply.

An inspection conducted in May of 2015 revealed abrasion damage to the painted surface of the riser tube on the interior of the tank. The damage according Dixon Engineering was likely caused by ice. Competitive quotes were sought by City staff for a suitable mixer that would prevent icing. Due to limitations of access into the tank and a limited number of vendors only one proposal responsive to tank specifications was considered. Environmental Sales of Southfield, MI will furnish a GS-12 Gridbee submersible mixing system. Dixon Engineering will install and inspect the unit and complete the MDEQ permit.

Corrosion control equipment furnished by Corpro of Medina, OH was also installed while the tank was empty. The tank was taken out of service on October 30th and placed back on line on November 9th. The mixer is on line and should eliminate damaging ice accumulation during the coming winter. In addition, mixing in the tank will prevent thermal stratification and improve water quality.

School Tours

School tours were down in November after a heavy October. On December 11th the plant hosted a small middle school group from Lakeshore Public Schools.

SWMRSS&WA Sanitary Survey

MDEQ District Engineer Gary Wozniak met with plant staff and SWMRSS&WA contract engineer Mary Nykamp of Wightman & Associates. Site visits were made to both Hilltop and Cleveland Booster stations as well as the Royalton and Lincoln Township Water Towers. The final report was received on October 14th. No deficiencies were noted. There were five recommendations made including the following: Update the General Plan and Reliability Study, continue to analyze water loss, initiate use of a hygrometer to ensure dosage accuracy at the booster stations, color-code the chlorine feed lines per AWWA standards and update the Emergency Response Plan to reflect current contact information. To date the chlorine line lines at the booster stations have been painted, a hygrometer has been ordered and the draft ERP is under staff review. Valuable input has been received from staff and will be incorporated in the plan which will be complete in December.

Fairplain Interconnects

The Fairplain interconnect project has been postponed until Spring 2016.

Travel & Training

Greg Alimenti attended a meeting of the Berrien Water Supervisors Group held in St. Joseph.

**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**

November 2015

DISTRIBUTION:	
Total Gallons	84,642,630
Average Day	2,821,421
Maximum Day	3,500,571
Minimum Day	2,170,166

TREATMENT:	
Total Low Service	87,401,130
Wash Water Gals.	1,109,284
Wash Water %	1.20%
Plant Use Gals.	1,696,098
Plant Use %	1.96%

FILTRATION:		
Ave. Filter Run	67.7	hours
Ave. Filter Rate	1.85	g/sqft/min
Filter Eff. Index	425.1	
Ave. Loss of Head	1.0	feet
Plant Sewer Usage		

LABRATORY REPORT		
Average of	Raw	Tap
Chlorides mg/L	18.9	21.1
Fluoride mg/L	0.13	0.73
Alkalinity mg/L	119	103
Hardness mg/L	143	139
pH	8.1	7.4
Calcium mg/L	42	41
Magnesium mg/L	10	9
Turbidity NTU	4.47	0.03
Temperature °F	52	
Total Coliform		0.0
Chlorine Residual		mg/L Free
Mixing Basin		0.89
Applied		1.42
Tap		1.62
Distribution		0.93

TREATMENT CHEMICAL SUMMARY:					
	Applied mg/L	Total Lbs.	Cost	Inventory lbs.	Days Supply
		CHEMICAL			
Alum (Al ⁺³)	1.77	1,288	\$4,241.57	116,435	122
Chlorine (Cl ₂)	3.23	2,347	\$630.64	13,567	173
Fluoride (F ₂)	0.72	523	\$915.48	40,190	

		REMARKS:			
Total Cost all Chemicals	\$5,787.68				
Chemical Cost per Mil. Gallon Treated	\$66.22				
Chemical Cost per Mil. Gallon Delivered	\$68.38				
PLANT UTILITIES SUMMARY					
Electric:					
Total KWH	195,600	***includes measure of melted snow			
Total Power Cost	\$ 13,692.00	visit the City of Saint Joseph's Home page at www.sjcity.com			
Power Cost per Million Gallon Treated	\$ 156.66	e-mail comments to either: operator@sjcity.com or galimenti@sjcity.com			
Power Cost per Million Gallon Delivered		WEATHER CONDITIONS AT THE PLANT		Air Temp. °F	
Gallons Pumped per KWH		SJWW Weather Computer		Avg.	49
		Rain Guage, Inches	2.09	Max.	71.5
		days it rained***	9	Min.	22.1
Natural Gas:		Wind Speed, Avg	11.2	Lake Temp. °F	
Metered Cubic Feet	0	Wind Speed, Max	60	Avg.	52.2
Natural Gas Cost	\$36.74	Prevailing Wind Dir.	North	Max	55.8
Emergency Power Diesel Fuel Inv., Gals.	North	Lake Level (USACE)	579.1	Min	47.1
	South				

Monthly Maintenance Notes

November 2015

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
11/03/15	Dixon Eng. - Installed Mixer in City Water Tower
11/04/15	Corpro - Installed Cathodic Protection System in City Water Tower (work done in bowl of the tank only)
11/05/15	Shoreline Power - Installed control panel for mixer and provided power to mixer control and cathodic protection panel.
11/05/15	Started filling city tower at 7:30am to 5 % for chlorination period, done at 9:00am. Started filling for bacti samples at 3:30 pm, done at 12:30 am, shut off to system.
11/09/15	City Tower back in service at 9:00 am
11/11/15	Back flushed South Intake using North Low Service station, (11:00 am to 12:30pm) Plant back online at 1:00 pm using South Low Service
11/16/15	Cleaned South Low Service Wet Well to free up traveling screen after storm event. Found 4 to 5 ft. of sand around traveling screen and several large pieces of wood jammed into gear teeth on screen. Back on line @ 8:00 pm
11/16/15	Certified Crane - Inspection and service of all plant cranes and hoists per OSHA standards
11/18/15	Cleaned North Low Service Intake Chamber, North and South Wet Wells
11/19/15	Installed new blower motor in unit heater #2 at Hilltop BPS
11/24/15	Installed new blower motor on unit heater in clarifier 2 & 3 room
11/24/15	UCC - Inspection of North Low Service Intake Cribs and South Low Service Intake. Found that the top section of the south intake emergency riser had broken free and that we were drawing water in from that point and not the intake structure. Switched plant back over to North Intake until repair or cap can be installed on the south emergency riser
11/25/15	Installed new blower motors on unit heater #1 at Hilltop BPS and unit heater #1 at Cleveland BPS
11/30/15	Shut down Clarifier # 2 and started draining for yearly pm and service

SOUTHWEST MICHIGAN REGIONAL SANITARY SEWER & WATER AUTHORITY
CLEVELAND BOOSTER STATION

HILLTOP BOOSTER STATION

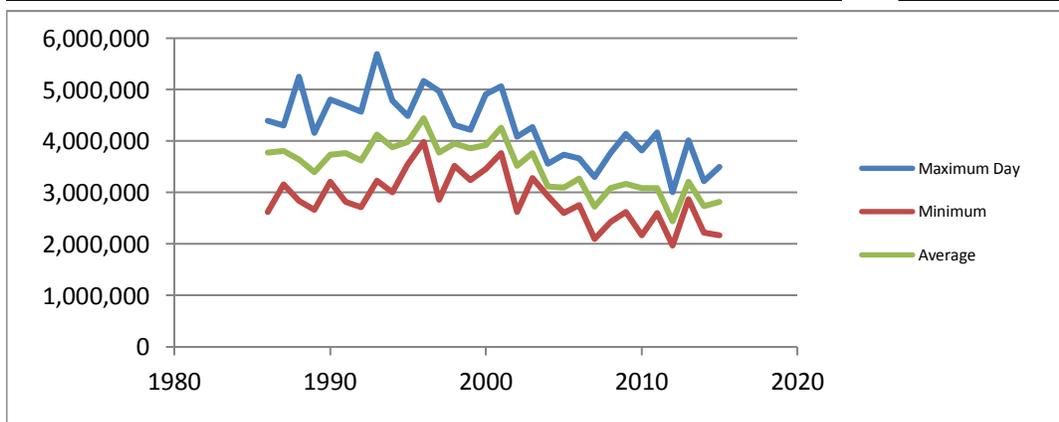
DATE	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl ₂ PRE mg/l	Cl ₂ POST mg/l	Cl ₂ MON mg/l	FLOW MGD	FEED GAL	CHL LBS/DAY	CHLORINE APPLIED mg/l	Cl ₂ PRE mg/l	Cl ₂ POST mg/l	Cl ₂ MON mg/l	BOOSTER MGD
1-Nov	0.555	25	3.54	0.77				0.942	20	2.84	0.36				1.497
2-Nov	0.555	25	3.54	0.77	1.23	1.23	1.28	0.942	20	2.84	0.36	1.45	1.48	1.50	1.497
3-Nov	0.001	0	0.00	0.00	1.12	1.13	1.16	1.492	34	4.82	0.39	1.55	1.97	2.21	1.493
4-Nov	0.000	0	0.00	0.00	1.01	1.04	1.04	1.834	77	10.92	0.71	1.50	2.05	2.27	1.834
5-Nov	0.000	0	0.00	0.00	0.97	0.97	1.02	1.687	35	4.96	0.35	1.48	1.81	2.05	1.687
6-Nov	0.001	0	0.00	0.00	1.13	1.19	1.21	1.501	26	3.69	0.29	1.45	1.69	1.87	1.503
7-Nov	0.138	4	0.57	0.49				1.551	48	6.81	0.53				1.689
8-Nov	0.138	4	0.57	0.49				1.551	48	6.81	0.53				1.689
9-Nov	0.138	4	0.57	0.49	1.67	1.75	1.88	1.551	48	6.81	0.53	2.20	2.03	2.24	1.689
10-Nov	1.818	0	0.00	0.00				0.002	0	0.00	0.00				1.819
11-Nov	1.818	0	0.00	0.00	1.41	1.39	1.49	0.002	0	0.00	0.00	5.00	5.00	5.00	1.819
12-Nov	1.567	64	9.07	0.69	1.61	1.45	1.57	0.000	0	0.00	0.00	4.35	1.37	1.57	1.567
13-Nov	1.660	65	9.22	0.67	1.94	1.80	1.94	0.048	3	0.43	1.05	1.51	1.65	1.76	1.709
14-Nov	0.409	11	1.56	0.46				1.196	38	5.39	0.54				1.605
15-Nov	0.409	11	1.56	0.46				1.196	38	5.39	0.54				1.605
16-Nov	0.409	11	1.56	0.46	1.37	1.61	1.72	1.196	38	5.39	0.54	2.14	1.88	2.02	1.605
17-Nov	0.721	32	4.54	0.75	1.50	1.46	1.59	0.626	13	1.84	0.35	1.28	1.56	1.68	1.348
18-Nov	0.000	0	0.00	0.00	1.29	1.27	1.39	1.553	22	3.12	0.24	1.81	1.60	1.67	1.553
19-Nov	1.818	66	9.36	0.62	2.20	1.89	1.98	0.000	0	0.00	0.00	1.98	1.39	1.45	1.818
20-Nov	1.703	69	9.78	0.69	2.13	1.99	2.08	0.000	0	0.00	0.00	1.38	1.31	1.34	1.703
21-Nov	0.527	21	2.98	0.68				1.172	16	2.27	0.23				1.698
22-Nov	0.527	21	2.98	0.68				1.172	16	2.27	0.23				1.698
23-Nov	0.527	21	2.98	0.68	2.00	1.62	1.82	1.172	16	2.27	0.23	1.59	1.43	1.52	1.698
24-Nov	0.000	0	0.00	0.00	1.61	1.55	1.66	2.068	26	3.69	0.21	1.29	1.49	1.76	2.068
25-Nov	1.511	61	8.65	0.69	1.28	1.54	1.72	0.118	7	0.99	1.01	1.45	1.73	2.01	1.630
26-Nov	0.650	34	4.82	0.89				0.998	22	3.12	0.37				1.648
27-Nov	0.650	34	4.82	0.89				0.998	22	3.12	0.37				1.648
28-Nov	0.650	34	4.82	0.89				0.998	22	3.12	0.37				1.648
29-Nov	0.650	34	4.82	0.89				0.998	22	3.12	0.37				1.648
30-Nov	0.650	34	0.00	0.00	1.98	1.92	2.13	0.998	22	3.12	0.37	2.18	1.91	2.07	1.648
TOTAL	20.202	685	92.3					29.560	699	99.10					49.762
AVE DAY	0.673		3.1	0.47	1.5	1.5	1.6	0.9853		3.3	0.37	1.98	1.85	2.00	1.659
MAX	1.818		9.8	0.89	2.2	2.0	2.1	2.0682		10.9	1.05	5	5	5	2.068
MIN	0.000		0.0	0.00	1.0	1.0	1.0	0.0000		0.0	0.00	1.28	1.31	1.34	1.348
MONTHLY TOTALS:	Cleveland	Total MG Treated	20.202	SJCT EAST				Hilltop	Total MG Treated	29.560	Cleveland Pump Station:				19.55
		Untreated	0.652	Average Day		0.159			Treated	29.556	Hilltop Pump Station:				29.556
Total Authority Flow:	54.0301			Month Total		4.779			Untreated	0.004	TOTAL AUTHORITY (Trted.)				49.106

ST. JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED

NOVEMBER 2015

Year	Average	Maximum Day	Minimum	Monthly Total
1986	3,778,080	4,393,000	2,620,300	113,342,400
1987	3,810,773	4,301,500	3,156,200	114,323,200
1988	3,647,963	5,249,400	2,837,900	109,438,900
1989	3,400,317	4,163,000	2,660,300	102,009,500
1990	3,736,293	4,806,000	3,215,400	112,088,800
1991	3,767,847	4,698,400	2,817,000	113,035,400
1992	3,627,230	4,566,400	2,713,900	108,816,900
1993	4,128,737	5,692,700	3,226,800	123,862,100
1994	3,884,147	4,791,400	3,009,000	116,524,400
1995	3,983,600	4,483,450	3,548,500	119,508,000
1996	4,444,210	5,170,950	3,983,750	133,326,300
1997	3,781,002	4,971,500	2,861,500	113,430,050
1998	3,956,542	4,309,600	3,519,500	118,696,520
1999	3,862,057	4,222,000	3,238,600	115,861,700
2000	3,925,378	4,906,750	3,458,750	117,761,350
2001	4,260,085	5,069,850	3,767,830	127,802,550
2002	3,523,023	4,091,750	2,626,010	105,690,700
2003	3,764,779	4,275,250	3,284,340	112,943,380
2004	3,121,532	3,563,000	2,932,000	93,645,960
2005	3,100,771	3,738,500	2,601,010	93,023,130
2006	3,272,130	3,661,750	2,762,000	98,163,900
2007	2,727,424	3,304,320	2,094,500	81,822,720
2008	3,083,225	3,763,500	2,424,250	92,496,750
2009	3,173,639	4,134,540	2,624,360	95,209,160
2010	3,086,018	3,816,617	2,170,172	92,580,535
2011	3,086,301	4,173,075	2,600,107	92,589,043
2012	2,440,805	3,008,047	1,969,902	73,224,159
2013	3,207,103	4,011,705	2,873,629	96,213,088
2014	2,731,690	3,218,063	2,225,326	81,950,687
2015	2,821,421	3,500,571	2,170,166	84,642,630

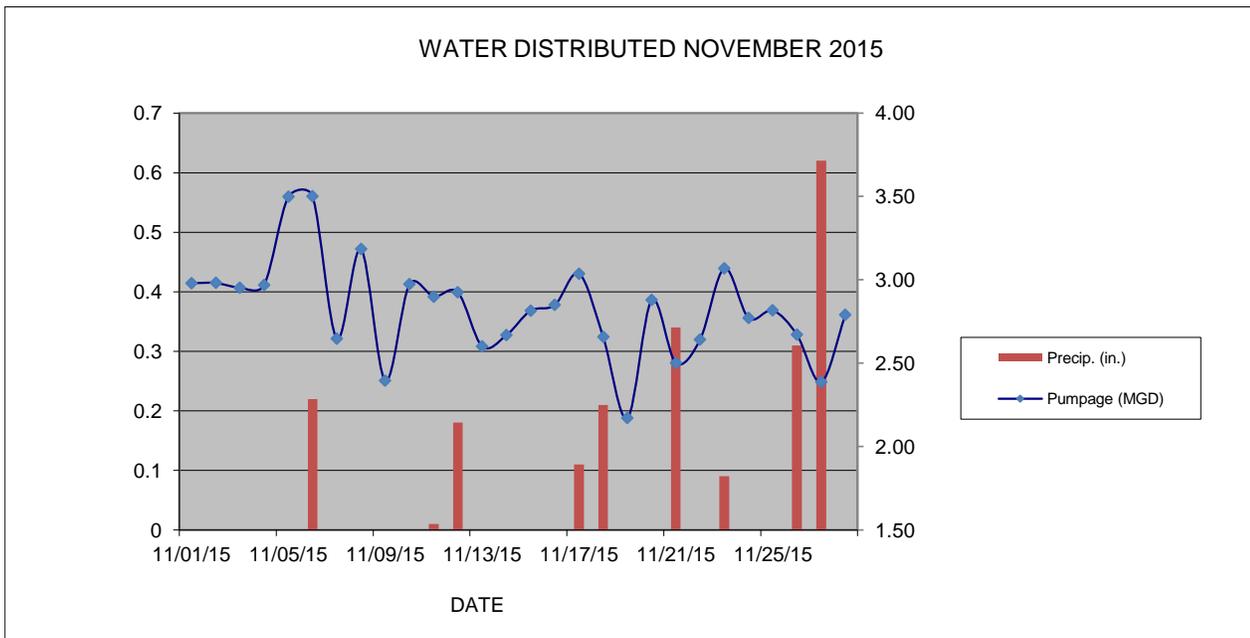
Rank	Year	Monthly Total
1	1996	133,326,300
2	2001	127,802,550
3	1993	123,862,100
4	1995	119,508,000
5	1998	118,696,520
6	2000	117,761,350
7	1994	116,524,400
8	1999	115,861,700
9	1987	114,323,200
10	1997	113,430,050
11	1986	113,342,400
12	1991	113,035,400
13	2003	112,943,380
14	1990	112,088,800
15	1988	109,438,900
16	1992	108,816,900
17	2002	105,690,700
18	1989	102,009,500
19	2006	98,163,900
20	2013	96,213,088
21	2009	95,209,160
22	2004	93,645,960
23	2005	93,023,130
24	2011	92,589,043
25	2010	92,580,535
26	2008	92,496,750
27	2015	84,642,630
28	2014	81,950,687
29	2007	81,822,720
30	2012	73,224,159



**ST JOSEPH WATER PLANT PUMPAGE-WATER DELIVERED/RAINFALL
NOVEMBER 2015**

DATE	PUMPAGE (gallons)	PUMPAGE (MGD)	Rainfall (in)*	November 2014
11/01/15	2,980,524	2.98	0	2,511,406
11/02/15	2,981,085	2.98	0	2,225,326
11/03/15	2,953,535	2.95	0	3,218,063
11/04/15	2,969,534	2.97	0	2,797,755
11/05/15	3,498,430	3.50	0	2,801,524
11/06/15	3,500,571	3.50	0.22	2,389,696
11/07/15	2,648,312	2.65	0	2,727,624
11/08/15	3,183,803	3.18	0	2,601,266
11/09/15	2,395,440	2.40	0	3,025,339
11/10/15	2,973,366	2.97	0	2,786,315
11/11/15	2,899,416	2.90	0.01	2,611,999
11/12/15	2,924,997	2.92	0.18	2,695,330
11/13/15	2,601,714	2.60	0	2,923,586
11/14/15	2,667,642	2.67	0	2,537,880
11/15/15	2,814,953	2.81	0	2,637,109
11/16/15	2,848,653	2.85	0	2,507,667
11/17/15	3,037,389	3.04	0.11	3,204,852
11/18/15	2,657,327	2.66	0.21	2,644,418
11/19/15	2,170,166	2.17	0	2,891,886
11/20/15	2,878,322	2.88	0	2,809,013
11/21/15	2,501,313	2.50	0.34	2,744,847
11/22/15	2,641,243	2.64	0	2,742,733
11/23/15	3,068,880	3.07	0.09	2,949,640
11/24/15	2,771,416	2.77	0	2,888,702
11/25/15	2,816,318	2.82	0	2,931,229
11/26/15	2,670,786	2.67	0.31	2,646,707
11/27/15	2,387,339	2.39	0.62	2,638,728
11/28/15	2,789,323	2.79	0	2,703,134
11/29/15	2,673,719	2.67	0	2,502,990
11/30/15	2,737,115	2.74	0	2,653,925
TOTAL	84,642,630	84.64	2.09	81,950,687

Average Day	2,821,421
Maximum Day	3,500,571
Minimum Day	2,170,166



DISTRIBUTION REPORT

For the Month of November 2015

Activity		Number/Description	
Water Main Breaks		1	
MISS DIGS		183	
Delinquent Shut Off		16	SJ 15, RCT 1
Delinquent Shut Off (Broken Payment Plans)			
Hydrants (Repaired/Replaced)		8	Bad cap gasket, square wrench caps, bad caps, does not drain or drains slow, tight stem, missing steamer chain
Valves		0	
Taps (2")		2	5717 Lincoln Avenue (LCT) New const. 3368 Niles Road (RCT) New const.
Taps (1")		1	477 Upton Drive (City) Replace
Cross Connection Control (Hydro Designs)			
Service Work (System Valves)		0	
Repair of Curb box/Shut-Off Valves		1	301 Main St. (City) Repair
Service Repair		0	
Service Replacement		0	
Water Quality Complaint(s)		0	
Hydrant Flushing to maintain water quality		0	
Hydrant Flushing (Stage 2 Rule)			
Staff Education/Training		0	
Overtime-Total		123	(Including Sanitary and Storm)
Turn Off		9	(Note: For delinquent Shut off see above)
Turn On		20	
Finals		90	
Meter Repair/Replacement			
			Audit Meter
			Verify Read
			2
Meter Repair			Move Mxu Box
Per detail			New Installation
			15
Meter leaking		4	New Installation-Benton Harbor
Stopped Meter		8	Replaced/various reasons (1 downsize, 1 defective)
			5
Faulty Register			Rockwell Replacement
Frozen Meter		2	Mxu Replaced
			4
Move Meter Inside			Sprinkler meter removed/line capped
			3
Hard to read		18	Removals/demo
			3
Replace/Adding Sprinkler Meter			Curb box location
			1
Damage to Trt			Broken Remote
New Plumbing			Noisy Meter
New siding		1	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: November 2015

#	Date	Location	Main Size	Gallons Lost	Break Type	Valves Turned	City Twp	Labor	Remarks
1	11/7/2015	1592 North Riviera Drive	20	50,000	Crack, pit, hole	7	SJCT	50.0	Soil cover 5.5 ft. Clay loamy mix. 20"x30" band, 20"x16"
2	11/10/2015	1592 North Riviera Drive	20	500		6		38.5	nearby to cover bad spot
									Oversize band needed due to observed pitting on pipe.
TOTALS				50,500		13		88.5	

MONTHLY CLIMATOLOGICAL SUMMARY

November 2015

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	54.7	35	59.1	9:00p	42	69	1970	51.2	8:00a	27	11	1964	10.3	0	0	15.9	34	5:00a	SW
2	60.3	35	69.2	6:00p	42	69	1982	51.8	8:00a	27	1	1976	5	0.3	0	9.3	31	11:00a	SE
3	60.1	35	69.5	2:00p	41	67	1982	51.9	7:00a	27	-2	1976	5.2	0.3	0	3.6	16	1:00a	SE
4	62.5	34	70.6	5:00p	41	64	1970	54.8	7:30a	26	10	1978	3.6	1.1	0	5.6	17	9:30p	SE
5	65.9	34	71.5	2:00p	41	65	1982	62	6:30a	26	5	1991	0.7	1.6	0	9.4	32	11:30p	SSW
6	54.4	33	66.8	3:30a	40	61	1951	49.5	11:00a	26	11	1954	10.8	0.2	0.22	19.6	56	4:30a	W
7	49.9	33	52.2	3:00p	40	58	1951	48.3	5:30a	25	7	1950	15.1	0	0	16.4	30	1:30a	WNW
8	45.8	33	52.5	5:00p	39	60	1991	36.6	7:30a	25	2	1977	19.2	0	0	5.4	17	12:00p	ESE
9	45.7	32	56	2:00p	39	62	1991	36.5	7:00a	24	3	1989	19.3	0	0	4.2	13	5:30p	SE
10	48.5	32	56.5	3:30p	38	64	1971	43.1	12:00m	24	4	1978	16.5	0	0	3.6	13	7:00a	SE
11	52.3	31	65.1	2:30p	38	63	1949	39.8	7:00a	24	3	1978	12.7	0	0.01	7.4	38	10:30p	SSE
12	49.6	31	56.4	4:00a	37	62	1949	46	11:30p	23	-4	1958	15.4	0	0.18	33.4	60	6:00a	WSW
13	44.5	30	46.9	2:00a	37	65	1975	42.9	11:30a	23	-4	1958	20.5	0	0	29.8	51	7:00a	W
14	48	30	55.3	4:30p	37	65	1975	42.9	6:30a	23	3	1958	17	0	0	10.2	24	1:00a	SSE
15	55	30	61	6:30p	36	62	1971	51.2	12:30a	22	-5	1989	10	0	0	12	29	3:30a	SSW
16	53.9	29	64.1	1:00p	36	64	1984	45.7	8:30a	22	-6	1989	11.1	0	0	6	23	12:30a	SSE
17	55.7	29	60.9	3:00p	35	59	1984	48.4	2:00a	21	-8	1989	9.3	0	0.11	6	29	10:00p	SSE
18	58.7	28	64.5	2:00p	35	53	1957	52.1	12:00m	21	-2	1989	6.3	0	0.21	11.3	44	2:30p	SSE
19	46.3	28	52.1	12:30a	34	55	1957	43.1	12:00m	21	0	1983	18.7	0	0	29.7	54	7:30p	WSW
20	41.3	28	43.4	12:30a	34	58	1949	34.6	12:00m	20	-5	1983	23.7	0	0	18.5	48	1:30a	W
21	33.5	27	36.2	9:30p	33	60	1949	31.8	6:30p	20	-3	1989	31.5	0	0.34	5.8	40	9:00p	NE
22	29.5	27	35.2	12:30a	33	58	1957	22.1	8:30p	19	-4	1989	35.5	0	0	14.4	33	3:00a	WNW
23	35.7	26	43.2	6:30p	33	57	1982	24.9	12:30a	19	-15	1989	29.3	0	0.09	10.7	28	12:00p	SSE
24	40.1	26	44.8	5:00p	32	58	1982	32.6	7:00a	19	-7	1989	24.9	0	0	4.3	15	4:30a	ESE
25	46.9	26	54.5	3:00p	32	66	1982	37.8	4:30a	18	-5	1983	18.1	0	0	7.6	29	12:30p	SSE
26	56.4	25	61.8	5:00p	31	58	1982	49.7	3:00a	18	-2	1983	8.6	0	0.31	10.2	35	9:00p	S
27	45.6	25	61	12:30a	31	56	1959	37.4	12:00m	18	-2	1990	19.4	0	0.62	13.5	33	9:00a	NNE
28	35.8	24	38.5	2:30p	30	65	1984	32.4	12:00m	17	1	1950	29.2	0	0	5.1	19	5:00p	NNE
29	33.9	24	41.1	3:00p	30	64	1984	27.9	8:00a	17	-2	1961	31.1	0	0	2.8	15	2:00p	E
30	40.8	24	49	4:00p	29	58	1965	31.7	5:30a	16	-7	1983	24.2	0	0	3.7	24	11:00p	ENE
AVE													16.7	0.1	0.1	11.2	31.0		SSE
MAX	65.9	35	71.5			69		62		27	11		35.5	1.6	0.62	33.4	60.0		
MIN	29.5	24	35.2					22.1		16	-15		0.7	0	0	2.8	13		
TOTAL															2.09				

Max Rain: 0.62 ON 11/27/15
 Days of Rain: 8 (>.01 in) 7 (>.1 in) 0 (>1 in)