GLWA
Great Lakes Water Authority

Water: RAW
Year: 2023

Plant Name: Lake Huron (LH)

WATER QUALITY DEPARTMENT
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary

Monthly Mineral Analyses Annual Averages

Parameter	Units	Max.	Min.	Avg.	01/10/2023 Jan	02/14/2023 Feb	03/14/2023 Mar	04/11/2023 Apr	05/16/2023 May	06/13/2023 Jun	07/11/2023 Jul	08/15/2024 Aug	09/12/2024 Sep	10/10/2024 Oct	11/06/2024 Nov	12/12/2024 Dec	← Sample Dates MCL	Sec.Std	RL	STDEV
Turbidity	N.T.U.	3.68	0.22	**0.93**	0.24	1.10	3.68	3.10	0.33	0.33	0.76	0.35	0.54	0.25	0.22	0.24	*0.3/95% (1)*			**1.19**
Total Solids	mg/L	146	103	**126**	127	120	135	130	146	131	129	127	135	124	110	103		*500*	*10*	**11**
Total Dissolved Solids	mg/L	151	93	**121**	126	126	113	131	151	124	135	124	110	113	107	93		*500*	*10*	**15**
Aluminum	mg/L	0.217	0.004	**0.027**	0.005	0.014	0.217	0.010	0.012	0.009	0.015	0.008	0.019	0.009	0.004	0.005		*0.05-0.2*	*0.001*	**0.060**
Iron	mg/L	0.7	0.2	**0.3**	0.4	0.4	0.7	0.3	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.2		*0.3*	*0.1*	**0.141**
Copper	mg/L	0.010	0.005	**0.007**	0.006	0.005	0.010	0.006	0.006	0.005	0.005	0.008	0.009	0.008	0.009	0.007	*1.3 (AL)*		*0.001*	**0.002**
Magnesium	mg/L	8.1	7.3	**7.6**	7.7	7.8	7.3	7.7	7.8	8.1	7.8	7.6	7.5	7.5	7.5	7.4			*0.1*	**0.21**
Calcium	mg/L	27.4	24.8	**25.8**	25.0	25.9	25.2	24.8	26.9	27.4	26.6	25.5	25.6	25.1	25.2	26.5			*0.1*	**0.8**
Sodium	mg/L	5.6	4.6	**4.9**	4.8	5.6	4.7	4.8	5.1	5.4	5.1	4.7	4.6	4.6	4.9	4.8		*20 (2)*	*0.1*	**0.32**
Potassium	mg/L	1.1	0.9	**1.0**	1.0	1.0	1.0	0.9	1.0	1.1	1.0	1.0	1.0	1.0	1.0	0.9			*0.1*	**0.05**
Manganese	mg/L	0.016	ND	**0.002**	<0.001	0.002	0.016	<0.001	<0.001	<0.001	0.001	< 0.001	0.002	< 0.001	< 0.001	<0.001		*0.05*	*0.001*	**0.007**
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.013	0.003	**0.007**	0.008	0.006	0.012	0.008	0.008	0.008	0.003	0.007	0.006	0.005	0.004	0.013		*5*	*0.001*	**0.00**
Silica	mg/L	18.5	1.7	**3.4**	2.1	AE	2.4	2.2	1.7	1.9	1.7	1.8	1.7	18.5	1.9	1.9			*0.4*	**5.0**
Sulfate	mg/L	16.9	15.3	**16.1**	16.4	15.9	15.7	15.8	16.9	16.0	16.2	16.7	16.6	15.7	15.3	16.6				**0.5**
Chloride	mg/L	9.0	7.0	**8.1**	9.0	8.0	8.0	7.5	9.0	7.0	9.0	7.9	8.0	8.0	8.0	8.0		*250*	*5*	**0.6**
Phosphorus	mg/L	ND	ND	**0.00**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	< 0.05	< 0.05	<0.05			*0.05*	
Free Carbon Dioxide	mg/L	1.4	0.8	**1.1**	1.1	1.4	1.3	1.4	1.1	1.4	0.8	0.8	1.0	1.0	1.0	1.3				**0.2**
Total Hardness (3), (4), (5)	mg/L	144	84	**112**	84	116	108	122	120	144	136	123	100	100	100	96				**18**
Total Alkalinity (3)	mg/L	102	81	**87**	82	90	92	88	92	102	84	83	84	83	84	81				**6**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	101	80	**86**	81	89	91	87	91	101	82	81	83	82	83	80				**6**
Non-Carbonate Hardness (3)	mg/L	52	2	**25**	2	26	16	34	28	42	52	40	16	17	16	15				**14**
Chemical Oxygen Demand	mg/L	16.3	3.2	**6.5**	6.6	3.2	16.3	7.2	AE	11.8	3.8	5.5	4.2	4.3	4.6	4.2			*2*	**4.0**
Dissolved Oxygen	mg/L	12.8	8.5	**10.5**	12.0	12.8	AE	12.7	11.2	9.9	10.5	8.5	8.9	8.9	9.6	10.8				**1.5**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.53	0.33	**0.38**	0.33	0.36	0.42	0.37	0.53	0.45	0.36	0.37	0.37	0.35	0.34	0.35	*10*	*10*	*0.1*	**0.06**
Fluoride	mg/L	0.43	0.07	**0.11**	0.07	0.07	0.12	0.08	0.08	0.10	0.08	0.08	0.08	0.08	0.08	0.43	*4*		*0.5*	**0.10**
pH		8.31	8.10	**8.18**	8.17	8.10	8.14	8.10	8.20	8.17	8.31	8.30	8.20	8.20	8.20	8.10	*6.5-8.5*	*6.5-8.5*		**0.07**
Specific Conductance @ 25 °C.	µmhos	212	166	**178**	212	206	NA	196	166	194	203	185	201	206	198	174				**14**
Temperature	°C	23.0	9.0	**17.4**	15.6	14.2	9.0	15.5	17.5	18.3	20.7	23.0	21.7	19.9	18.2	14.6				**3.9**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter (ppm)	(4) By Titration
AL: Action Level	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
RL: Reporting Limit	(6) Reported results are below the low calibration standard but above the instrument detection limit.
< : Less than	NA = Not available
AE: Analytical Error	ND = Not detected above the reporting limit
IN: Invalid Sample	

Maximum	Minimum	Average	
8.4	4.9	6.5	GPG

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Chemist II: Patrick Williford

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Water: TAP
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Turbidity	N.T.U.	0.09	0.05	**0.07**	0.08	0.06	0.08	0.05	0.09	0.05	0.07	0.09	0.09	0.05	0.08	0.06	*0.3/95% (1)*			**0.02**
Total Solids	mg/L	146	61	**122**	61	126	128	133	146	133	134	134	141	119	113	92		*500*	*10*	**24**
Total Dissolved Solids	mg/L	153	103	**123**	132	124	115	133	153	126	130	131	112	113	110	103		*500*	*10*	**14**
Aluminum	mg/L	0.071	0.018	**0.042**	0.044	0.033	0.018	0.027	0.037	0.033	0.068	0.071	0.066	0.039	0.046	0.026		*0.05-0.2*	*0.001*	**0.018**
Iron	mg/L	0.4	0.2	**0.3**	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.2	0.3	0.2		*0.3*	*0.1*	**0.065**
Copper	mg/L	0.001	ND	**0.000**	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.001	*1.3 (AL)*		*0.001*	**0.000**
Magnesium	mg/L	7.9	7.0	**7.7**	7.7	7.8	7.8	7.6	7.9	7.9	7.9	7.6	7.8	7.6	7.5	7.0			*0.1*	**0.25**
Calcium	mg/L	27.2	25.0	**25.9**	25.1	25.9	25.9	25.0	27.0	26.8	27.2	25.4	25.8	25.5	25.0	26.2			*0.1*	**0.8**
Sodium	mg/L	5.5	4.5	**4.9**	4.7	5.0	4.9	4.8	5.1	5.5	5.1	4.7	4.5	4.6	5.0	5.0		*20 (2)*	*0.1*	**0.27**
Potassium	mg/L	1.1	0.9	**1.0**	1.0	1.0	0.9	0.9	1.0	1.1	1.1	1.0	1.0	1.0	1.0	0.9			*0.1*	**0.05**
Manganese	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001		*0.05*	*0.001*	
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.008	ND	**0.002**	0.003	0.002	0.001	0.002	0.002	0.003	0.002	0.002	0.002	0.002	< 0.001	0.008		*5*	*0.001*	**0.00**
Silica	mg/L	2.5	2.0	**2.2**	2.3	AE	2.5	2.4	2.0	2.2	2.0	2.0	2.1	2.2	2.3	2.3			*0.4*	**0.2**
Sulfate	mg/L	21.0	17.9	**19.2**	19.9	21.0	20.4	20.7	19.5	20.0	17.9	18.3	18.4	17.9	17.9	18.3				**1.2**
Chloride	mg/L	10.0	8.5	**9.3**	8.5	8.5	9.0	8.5	9.5	9.0	10.0	9.3	9.5	10.0	9.5	10.0		*250*	*5*	**0.6**
Phosphorus	mg/L	0.56	0.40	**0.45**	0.42	0.56	0.46	0.40	0.47	0.42	0.41	0.44	0.43	0.46	0.43	0.43			*0.05*	**0.04**
Free Carbon Dioxide	mg/L	8.4	4.4	**6.2**	4.4	6.0	7.5	6.8	6.7	8.4	5.9	4.7	6.1	4.9	6.0	6.4				**1.2**
Total Hardness (3), (4), (5)	mg/L	140	96	**113**	96	106	126	114	120	140	140	109	100	101	98	100				**16**
Total Alkalinity (3)	mg/L	92	74	**81**	80	76	84	86	90	92	82	74	77	77	76	80				**6**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	92	74	**81**	80	76	84	86	90	92	82	74	77	77	76	80				**6**
Non-Carbonate Hardness (3)	mg/L	58	16	**31**	16	30	42	28	30	48	58	35	23	24	22	20				**12**
Chemical Oxygen Demand	mg/L	12.8	ND	**4.7**	2.7	2.2	11.6	5.8	AE	12.8	4.9	< 2	2.1	3.3	3.5	2.6			*2*	**3.9**
Dissolved Oxygen	mg/L	13.3	8.5	**10.8**	12.2	13.3	13.0	12.8	11.7	10.0	9.0	8.6	9.2	8.5	9.8	11.3				**1.8**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.55	0.33	**0.38**	0.34	0.34	0.41	0.38	0.55	0.41	0.35	0.37	0.37	0.35	0.33	0.34	*10*	*10*	*0.1*	**0.06**
Fluoride	mg/L	0.79	0.59	**0.73**	0.59	0.68	0.67	0.70	0.78	0.78	0.71	0.74	0.79	0.77	0.75	0.76	*4*		*0.5*	**0.06**
pH		7.56	7.34	**7.43**	7.56	7.40	7.35	7.40	7.43	7.34	7.44	7.50	7.40	7.50	7.40	7.40	*6.5-8.5*	*6.5-8.5*		**0.06**
Specific Conductance @ 25 °C.	µmhos	210	166	**197**	202	204	210	193	166	202	207	193	201	208	200	181				**13**
Temperature	°C	23.7	2.7	**15.1**	10.5	9.2	2.7	11.3	16.6	17.6	20.6	23.7	21.7	18.4	16.2	13.0				**6.0**

Legend	Notes:
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Turbidity	N.T.U.	21.00	1.20	**3.78**	1.50	1.30	21.00	5.10	4.00	2.30	1.70	1.60	2.00	2.30	1.20	1.40	*0.3/95% (1)*			**5.55**
Total Solids	mg/L	178	107	**133**	128	123	178	150	157	136	132	107	141	120	115	113		*500*	*10*	**21**
Total Dissolved Solids	mg/L	167	64	**113**	133	64	136	142	167	109	123	102	105	103	93	79		*500*	*10*	**29**
Aluminum	mg/L	0.447	0.034	**0.096**	0.049	0.035	0.447	0.163	0.114	0.053	0.042	0.067	0.042	0.060	0.034	0.049		*0.05-0.2*	*0.001*	**0.117**
Iron	mg/L	1.0	0.2	**0.4**	0.4	0.4	1.0	0.6	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.2	*12.000*	*0.3*	*0.1*	**0.207**
Copper	mg/L	0.060	0.021	**0.038**	0.045	0.047	0.049	0.060	0.045	0.037	0.021	0.030	0.031	0.033	0.031	0.030	*1.3 (AL)*		*0.001*	**0.011**
Magnesium	mg/L	8.1	7.1	**7.4**	7.7	7.6	8.1	7.4	7.3	7.3	7.1	7.9	7.1	7.1	7.1	7.3			*0.1*	**0.34**
Calcium	mg/L	31.0	24.4	**26.3**	25.8	25.7	31.0	26.8	27.9	25.8	24.4	25.8	25.4	25.1	24.8	27.4			*0.1*	**1.8**
Sodium	mg/L	8.9	4.6	**5.5**	4.7	5.1	8.9	6.2	6.2	5.5	5.1	5.1	4.6	4.6	4.9	5.1		*20 (2)*	*0.1*	**1.20**
Potassium	mg/L	1.3	0.9	**1.0**	1.0	1.0	1.3	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.0	1.0			*0.1*	**0.10**
Manganese	mg/L	0.009	0.001	**0.003**	0.002	0.001	0.009	0.003	0.003	0.002	0.002	0.003	0.002	0.002	0.002	0.001		*0.05*	*0.001*	**0.002**
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.010	ND	**0.003**	0.006	0.002	0.004	0.005	0.003	0.001	0.001	< 0.001	<0.001	< 0.001	< 0.001	0.010		*5*	*0.001*	**0.00**
Silica	mg/L	3.9	1.2	**2.0**	2.1	AE	3.9	2.4	1.9	1.2	1.4	1.6	1.7	2.1	1.9	1.9			*0.4*	**0.7**
Sulfate	mg/L	22.1	15.7	**17.2**	16.3	16.2	22.1	17.6	18.4	16.8	16.0	16.6	16.3	16.6	15.7	17.4				**1.7**
Chloride	mg/L	15.5	7.5	**9.1**	7.5	8.0	15.5	9.5	11.0	8.0	9.0	8.6	7.5	8.0	8.5	8.5		*250*	*5*	**2.2**
Phosphorus	mg/L	ND	ND	**0.00**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	< 0.05	< 0.05	<0.05			*0.05*	
Free Carbon Dioxide	mg/L	1.5	0.5	**1.1**	1.1	1.3	1.5	1.2	1.0	1.4	0.7	0.5	0.7	1.1	1.1	1.2				**0.3**
Total Hardness (3), (4), (5)	mg/L	200	94	**120**	94	108	134	112	110	170	200	101	102	104	102	106				**32**
Total Alkalinity (3)	mg/L	130	84	**93**	86	92	110	86	94	130	92	84	87	86	86	86				**14**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	128	81	**92**	85	91	108	85	92	128	90	81	85	85	85	85				**13**
Non-Carbonate Hardness (3)	mg/L	108	8	**27**	8	16	24	26	16	40	108	17	15	18	16	20				**27**
Chemical Oxygen Demand	mg/L	16.8	3.3	**6.6**	3.7	5.4	14.6	4.7	AE	16.8	6.3	4.2	4.6	4.8	3.3	4.7			*2*	**4.6**
Dissolved Oxygen	mg/L	13.4	8.0	**10.7**	12.6	13.4	10.6	11.8	11.0	8.8	9.4	8.0	AE	8.7	11.1	12.2				**1.7**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	1.49	0.31	**0.53**	0.44	0.34	1.49	0.72	0.89	0.43	0.31	0.42	0.34	0.33	0.34	0.37	*10*	*10*	*0.1*	**0.35**
Fluoride	mg/L	0.40	0.07	**0.11**	0.08	0.07	0.09	0.08	0.11	0.12	0.07	0.08	0.08	0.08	0.08	0.40	*4*		*0.5*	**0.09**
pH		8.52	8.14	**8.25**	8.20	8.14	8.15	8.15	8.28	8.27	8.39	8.52	8.38	8.17	8.19	8.15	*6.5-8.5*	*6.5-8.5*		**0.12**
Specific Conductance @ 25 °C.	µmhos	212	179	**183**	201	200	NA	210	183	207	202	194	200	212	203	179				**10**
Temperature	°C	23.5	3.6	**13.0**	3.6	3.7	4.0	8.0	14.3	17.5	23.0	23.5	22.1	16.9	11.3	7.6				**7.6**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter (ppm)	(4) By Titration
AL: Action Level	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
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Maximum	Minimum	Average	
11.6	5.5	7.0	GPG

Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2023

Plant Name: Southwest (SW)

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary

Monthly Mineral Analyses Annual Averages

Parameter	Units	Max.	Min.	Avg.	01/10/2023 Jan	02/14/2023 Feb	03/14/2023 Mar	04/11/2023 Apr	05/16/2023 May	06/13/2023 Jun	07/11/2023 Jul	08/15/2024 Aug	09/12/2024 Sep	10/10/2024 Oct	11/06/2024 Nov	12/12/2024 Dec	← Sample Dates MCL	Sec.Std	RL	STDEV
Turbidity	N.T.U.	1.80	0.01	**0.22**	0.20	0.12	0.04	0.05	0.04	0.04	1.80	0.05	AE	0.04	0.05	0.01	*0.3/95% (1)*			**0.51**
Total Solids	mg/L	174	120	**139**	139	132	174	136	158	133	127	137	148	131	120	128		*500*	*10*	**15**
Total Dissolved Solids	mg/L	165	97	**127**	136	132	136	146	165	126	135	111	97	112	120	110		*500*	*10*	**19**
Aluminum	mg/L	0.084	0.021	**0.045**	0.021	0.030	0.039	0.024	0.066	0.047	0.061	0.084	0.065	0.046	0.026	0.026		*0.05-0.2*	*0.001*	**0.020**
Iron	mg/L	0.5	0.2	**0.3**	0.4	0.4	0.5	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2		*0.3*	*0.1*	**0.074**
Copper	mg/L	0.001	ND	**0.001**	< 0.001	0.001	0.001	< 0.001	0.001	0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.001	*1.3 (AL)*		*0.001*	**0.000**
Magnesium	mg/L	8.8	7.4	**7.9**	7.5	7.7	8.8	7.9	8.0	8.2	7.9	7.8	7.9	7.8	7.7	7.4			*0.1*	**0.37**
Calcium	mg/L	33.3	25.2	**27.4**	25.2	25.6	33.3	27.6	29.7	28.0	26.1	25.4	27.0	26.8	26.7	27.5			*0.1*	**2.2**
Sodium	mg/L	9.4	4.7	**5.6**	4.8	5.2	9.4	6.3	6.2	5.6	5.3	5.2	4.7	4.7	5.2	5.2		*20 (2)*	*0.1*	**1.30**
Potassium	mg/L	1.3	0.9	**1.1**	0.9	1.0	1.3	1.0	1.2	1.1	1.0	1.0	1.1	1.0	1.1	1.0			*0.1*	**0.10**
Manganese	mg/L	0.002	ND	**0.000**	<0.001	<0.001	0.001	0.002	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001		*0.05*	*0.001*	**0.000**
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.002	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	0.002		*5*	*0.001*	
Silica	mg/L	2.7	1.3	**2.0**	2.3	AE	2.7	2.3	1.9	1.3	1.6	1.8	1.9	2.2	2.2	2.2			*0.4*	**0.4**
Sulfate	mg/L	36.0	23.4	**26.3**	26.0	25.6	36.0	29.4	27.3	25.8	24.3	24.1	23.5	23.4	23.8	26.6				**3.5**
Chloride	mg/L	14.5	7.5	**10.3**	9.0	7.5	14.5	11.0	12.5	9.5	8.5	10.2	10.0	10.0	10.5	10.5		*250*	*5*	**1.8**
Phosphorus	mg/L	0.73	0.41	**0.52**	0.46	0.50	0.52	0.52	0.48	0.55	0.47	0.46	0.41	0.73	0.51	0.63			*0.05*	**0.09**
Free Carbon Dioxide	mg/L	13.9	6.0	**9.5**	7.8	9.6	13.9	11.1	10.3	9.2	10.0	6.0	8.4	8.6	9.1	9.9				**1.9**
Total Hardness (3), (4), (5)	mg/L	166	103	**120**	110	118	128	134	130	166	130	103	103	104	104	114				**19**
Total Alkalinity (3)	mg/L	94	70	**80**	74	94	78	80	90	94	76	71	84	73	74	70				**9**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	94	70	**80**	74	94	78	80	90	94	76	71	84	73	74	70				**9**
Non-Carbonate Hardness (3)	mg/L	72	19	**41**	36	24	50	54	40	72	54	32	19	31	30	44				**15**
Chemical Oxygen Demand	mg/L	11.7	2.0	**4.4**	3.5	2.0	11.7	5.0	AE	7.2	5.2	3.2	2.4	3.8	2.1	2.6			*2*	**2.9**
Dissolved Oxygen	mg/L	14.9	8.0	**10.5**	12.8	13.1	8.9	11.6	11.3	9.1	8.7	8.0	8.7	8.4	10.9	14.9				**2.2**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	1.47	0.29	**0.50**	0.34	0.37	1.47	0.63	0.76	0.45	0.29	0.38	0.33	0.32	0.34	0.38	*10*	*10*	*0.1*	**0.33**
Fluoride	mg/L	0.84	0.10	**0.62**	0.53	0.70	0.59	0.46	0.69	0.70	0.62	0.84	0.73	0.73	0.70	0.10	*4*		*0.5*	**0.19**
pH		7.37	7.05	**7.23**	7.28	7.29	7.05	7.16	7.24	7.31	7.18	7.37	7.30	7.23	7.21	7.15	*6.5-8.5*	*6.5-8.5*		**0.09**
Specific Conductance @ 25 °C.	µmhos	297	182	**213**	211	211	297	214	182	208	210	203	205	216	210	188				**28**
Temperature	°C	23.2	2.3	**12.6**	2.3	3.0	3.3	7.3	13.3	17.5	22.7	23.2	51.5	19.8	10.2	6.5				**13.8**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
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Maximum	Minimum	Average	
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Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: RAW
Year: 2023

Plant Name: **Belle Isle (WWP-SPW-NE)**

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary

Monthly Mineral Analyses Annual Averages

Parameter	Units	Max.	Min.	Avg.	01/10/2023 Jan	02/14/2023 Feb	03/14/2023 Mar	04/11/2023 Apr	05/16/2023 May	06/13/2023 Jun	07/11/2023 Jul	08/15/2024 Aug	09/12/2024 Sep	10/10/2024 Oct	11/06/2024 Nov	12/12/2024 Dec	← Sample Dates MCL	Sec.Std	RL	STDEV
Turbidity	N.T.U.	8.00	0.53	**1.98**	0.96	1.47	2.70	8.00	0.87	0.53	0.55	0.62	1.02	2.92	1.80	2.36	*0.3/95% (1)*			**2.07**
Total Solids	mg/L	147	114	**130**	127	125	130	143	147	134	130	125	130	128	114	132		*500*	*10*	**9**
Total Dissolved Solids	mg/L	149	96	**123**	129	130	123	140	149	124	134	122	107	108	114	96		*500*	*10*	**15**
Aluminum	mg/L	0.224	0.020	**0.060**	0.030	0.048	0.066	0.224	0.036	0.048	0.037	0.053	0.020	AE	0.040	AE		*0.05-0.2*	*0.001*	**0.059**
Iron	mg/L	0.7	0.3	**0.4**	0.4	0.4	0.5	0.7	0.3	0.3	0.3	0.5	0.3	0.4	0.3	0.3		*0.3*	*0.1*	**0.121**
Copper	mg/L	0.003	ND	**0.001**	< 0.001	0.001	0.001	0.001	0.002	0.003	0.001	0.001	< 0.001	< 0.001	0.001	0.003	*1.3 (AL)*		*0.001*	**0.001**
Magnesium	mg/L	8.4	7.1	**7.6**	7.7	7.3	7.7	7.3	7.7	8.4	7.9	7.7	7.9	7.2	7.1	7.1			*0.1*	**0.41**
Calcium	mg/L	29.0	24.5	**26.3**	25.7	25.5	26.6	26.0	26.7	29.0	26.7	25.9	27.2	25.3	24.5	26.6			*0.1*	**1.1**
Sodium	mg/L	5.7	4.2	**5.1**	4.8	5.5	5.4	5.6	5.5	5.7	5.2	4.8	4.6	4.5	5.0	4.2		*20 (2)*	*0.1*	**0.49**
Potassium	mg/L	1.2	1.0	**1.0**	1.0	1.0	1.0	1.2	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0			*0.1*	**0.07**
Manganese	mg/L	0.005	0.001	**0.003**	0.002	0.002	0.002	0.004	0.002	0.002	0.005	0.005	0.002	0.005	0.001	0.002		*0.05*	*0.001*	**0.002**
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.006	ND	**0.002**	<0.001	0.002	0.002	0.002	0.006	0.002	<0.001	< 0.001	<0.001	0.001	< 0.001	0.004		*5*	*0.001*	**0.00**
Silica	mg/L	2.7	1.5	**1.9**	2.2	AE	2.2	2.7	1.5	1.5	1.7	1.8	1.7	2.0	2.0	2.0			*0.4*	**0.3**
Sulfate	mg/L	19.9	15.6	**16.8**	16.3	16.5	15.8	18.1	16.3	16.7	15.7	16.7	19.9	15.6	16.7	17.1				**1.2**
Chloride	mg/L	11.5	7.5	**8.5**	7.5	11.5	8.5	9.5	8.5	8.0	8.5	7.9	8.0	7.5	8.0	8.5		*250*	*5*	**1.1**
Phosphorus	mg/L	ND	ND	**0.00**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	< 0.05	< 0.05	<0.05			*0.05*	
Free Carbon Dioxide	mg/L	5.4	0.6	**1.4**	1.5	1.1	1.3	1.4	0.8	1.3	0.7	0.6	1.0	1.1	5.4	0.9				**1.3**
Total Hardness (3), (4), (5)	mg/L	136	96	**114**	100	110	136	114	130	134	132	102	103	102	104	96				**15**
Total Alkalinity (3)	mg/L	130	82	**92**	94	92	88	92	98	130	88	85	86	85	86	82				**13**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	128	81	**91**	93	91	87	91	96	128	86	83	84	84	86	81				**12**
Non-Carbonate Hardness (3)	mg/L	48	4	**21**	6	18	48	22	32	4	44	17	17	17	18	14				**14**
Chemical Oxygen Demand	mg/L	15.7	2.4	**6.5**	7.6	2.4	10.5	5.2	AE	15.7	5.0	4.5	4.3	6.0	5.8	4.5			*2*	**3.7**
Dissolved Oxygen	mg/L	13.8	8.1	**10.4**	12.4	13.4	13.8	11.0	11.4	9.7	10.2	8.1	8.2	9.1	8.7	9.1				**2.0**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.68	0.31	**0.39**	0.32	0.35	0.41	0.68	0.37	0.49	0.32	0.34	0.37	0.31	0.36	0.37	*10*	*10*	*0.1*	**0.10**
Fluoride	mg/L	0.75	0.07	**0.14**	0.07	0.08	0.07	0.08	0.08	0.12	0.08	0.08	0.08	0.08	0.08	0.75	*4*		*0.5*	**0.19**
pH		8.43	7.50	**8.19**	8.10	8.21	8.14	8.11	8.38	8.29	8.42	8.43	8.25	8.20	7.50	8.26	*6.5-8.5*	*6.5-8.5*		**0.24**
Specific Conductance @ 25 °C.	µmhos	222	145	**193**	222	200	145	206	169	192	201	187	201	211	205	180				**21**
Temperature	°C	22.9	5.4	**13.6**	5.4	5.5	7.4	8.9	13.3	18.4	22.9	22.8	22.0	17.0	11.9	8.0				**6.8**

Legend	Notes:
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Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2023

Plant Name: Water Works Park (WWP)

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

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Monthly Mineral Analyses Annual Averages

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Turbidity	N.T.U.	0.17	0.04	**0.09**	0.06	0.05	0.06	0.07	0.07	0.12	0.17	0.14	0.12	0.08	0.06	0.04	*0.3/95% (1)*			**0.04**
Total Solids	mg/L	158	119	**136**	139	128	129	158	153	138	134	143	136	127	119	131		*500*	*10*	**11**
Total Dissolved Solids	mg/L	150	105	**127**	132	133	117	150	148	133	133	118	109	128	121	105		*500*	*10*	**14**
Aluminum	mg/L	0.160	0.021	**0.074**	0.026	0.025	0.025	0.021	0.085	0.109	0.160	0.153	0.148	0.068	0.042	0.032		*0.05-0.2*	*0.001*	**0.055**
Iron	mg/L	0.4	0.2	**0.3**	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.2		*0.3*	*0.1*	**0.068**
Copper	mg/L	0.001	ND	**0.000**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	*1.3 (AL)*		*0.001*	
Magnesium	mg/L	8.3	7.4	**7.8**	7.7	7.7	8.0	7.9	7.7	8.3	7.9	7.8	7.7	7.6	7.8	7.4			*0.1*	**0.22**
Calcium	mg/L	28.4	25.4	**26.6**	25.6	25.4	26.9	26.9	26.6	28.2	26.0	26.2	26.4	26.0	26.7	28.4			*0.1*	**0.9**
Sodium	mg/L	7.1	4.6	**5.3**	4.8	5.3	5.6	7.1	5.9	5.7	5.3	4.8	4.6	4.6	5.2	5.0		*20 (2)*	*0.1*	**0.70**
Potassium	mg/L	1.3	1.0	**1.0**	1.0	1.0	1.0	1.3	1.0	1.1	1.0	1.0	1.0	1.0	1.1	1.0			*0.1*	**0.08**
Manganese	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001		*0.05*	*0.001*	
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.022	ND	**0.002**	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	< 0.001	<0.001	0.002	< 0.001	0.022		*5*	*0.001*	**0.01**
Silica	mg/L	2.6	1.6	**2.1**	2.5	AE	2.4	2.6	1.7	1.6	1.9	2.0	2.0	2.2	2.2	2.3			*0.4*	**0.3**
Sulfate	mg/L	28.0	20.1	**22.5**	23.3	22.0	23.4	28.0	22.5	22.3	20.3	20.3	20.1	22.2	22.1	23.3				**2.1**
Chloride	mg/L	15.0	8.5	**10.8**	8.5	9.5	15.0	13.0	11.0	10.0	11.0	9.8	10.0	10.0	11.0	10.5		*250*	*5*	**1.7**
Phosphorus	mg/L	0.56	0.35	**0.46**	0.49	0.49	0.47	0.43	0.56	0.49	0.35	0.45	0.41	0.50	0.44	0.49			*0.05*	**0.05**
Free Carbon Dioxide	mg/L	11.3	5.5	**7.0**	10.6	6.7	8.0	11.3	6.5	6.1	5.5	5.6	5.7	5.9	6.0	5.7				**2.0**
Total Hardness (3), (4), (5)	mg/L	152	96	**114**	96	124	108	114	128	138	152	102	102	104	105	100				**17**
Total Alkalinity (3)	mg/L	90	72	**80**	90	80	82	84	82	90	80	75	77	74	77	72				**6**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	90	72	**80**	90	80	82	84	82	90	80	75	77	74	77	72				**6**
Non-Carbonate Hardness (3)	mg/L	72	6	**34**	6	44	26	30	46	48	72	27	25	30	28	28				**16**
Chemical Oxygen Demand	mg/L	11.5	ND	**3.6**	3.4	3.5	11.5	6.4	AE	<2	4.2	2.8	<2	< 2	4.8	2.7			*2*	**2.9**
Dissolved Oxygen	mg/L	13.9	8.3	**10.3**	12.4	13.1	13.9	10.9	9.8	9.9	8.9	8.3	8.6	9.3	9.0	9.4				**1.9**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.66	0.32	**0.39**	0.33	0.33	0.39	0.66	0.37	0.45	0.32	0.34	0.35	0.33	0.36	0.40	*10*	*10*	*0.1*	**0.10**
Fluoride	mg/L	0.86	0.13	**0.58**	0.73	0.86	0.57	0.60	0.77	0.74	0.64	0.76	0.56	0.64		0.13	*4*		*0.5*	**0.19**
pH		7.47	7.17	**7.37**	7.23	7.38	7.31	7.17	7.40	7.47	7.46	7.43	7.43	7.40	7.41	7.40	*6.5-8.5*	*6.5-8.5*		**0.09**
Specific Conductance @ 25 °C.	µmhos	221	161	**199**	206	203	161	221	175	207	206	196	203	215	211	189				**17**
Temperature	°C	23.0	6.7	**14.0**	6.7	8.1	6.9	9.4	14.0	18.5	23.0	23.0	21.7	17.0	11.2	8.5				**6.4**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter (ppm)	(4) By Titration
AL: Action Level	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
RL: Reporting Limit	(6) Reported results are below the low calibration standard but above the instrument detection limit.
< : Less than	NA = Not available
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IN: Invalid Sample	

Maximum	Minimum	Average	
8.8	5.6	6.6	GPG

Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2023

Plant Name: Northeast (NE)

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary

Monthly Mineral Analyses Annual Averages

Parameter	Units	Max.	Min.	Avg.	Jan 01/10/2023	Feb 02/14/2023	Mar 03/14/2023	Apr 04/11/2023	May 05/16/2023	Jun 06/13/2023	Jul 07/11/2023	Aug 08/15/2024	Sep 09/12/2024	Oct 10/10/2024	Nov 11/06/2024	Dec 12/12/2024	MCL	Sec.Std	RL	STDEV
					← Sample Dates															
Turbidity	N.T.U.	3.00	0.03	**0.30**	0.08	0.06	3.00	0.08	0.04	0.04	0.04	0.05	0.03	0.04	0.06	0.05	*0.3/95% (1)*			**0.85**
Total Solids	mg/L	157	113	**133**	136	119	127	157	143	136	135	113	152	129	117	128		*500*	*10*	**13**
Total Dissolved Solids	mg/L	159	101	**129**	137	126	135	159	155	132	136	122	114	121	115	101		*500*	*10*	**17**
Aluminum	mg/L	0.071	0.018	**0.038**	0.034	0.030	0.028	0.042	0.037	0.042	0.054	0.071	0.045	0.018	0.021	0.032		*0.05-0.2*	*0.001*	**0.015**
Iron	mg/L	0.4	0.2	**0.3**	0.4	0.3	0.4	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2		*0.3*	*0.1*	**0.059**
Copper	mg/L	0.003	0.001	**0.001**	0.001	0.001	0.001	0.002	0.002	0.003	0.001	0.001	0.001	0.001	0.001	0.001	*1.3 (AL)*		*0.001*	**0.001**
Magnesium	mg/L	8.3	6.7	**7.7**	7.6	7.6	7.8	7.8	7.8	8.3	7.9	7.8	7.9	7.7	7.8	6.7			*0.1*	**0.38**
Calcium	mg/L	28.6	24.9	**26.6**	25.4	24.9	26.8	26.7	27.8	28.6	26.5	25.4	26.7	26.2	26.6	27.5			*0.1*	**1.1**
Sodium	mg/L	7.3	4.6	**5.4**	5.0	5.1	5.8	7.3	5.7	5.8	5.4	4.9	4.7	4.6	5.2	5.1		*20 (2)*	*0.1*	**0.72**
Potassium	mg/L	1.3	0.9	**1.0**	1.0	0.9	1.0	1.3	1.1	1.1	1.0	1.0	1.0	1.0	1.1	0.9			*0.1*	**0.09**
Manganese	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001		*0.05*	*0.001*	
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.003	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	< 0.001	<0.001	< 0.001	< 0.001	0.002		*5*	*0.001*	**0.00**
Silica	mg/L	2.8	1.6	**2.1**	2.4	AE	2.3	2.8	2.0	1.6	1.8	2.0	2.0	2.2	2.2	2.1			*0.4*	**0.3**
Sulfate	mg/L	34.9	22.3	**25.8**	24.3	23.7	27.4	34.9	23.7	24.3	22.6	22.3	25.6	26.7	26.5	27.9				**3.4**
Chloride	mg/L	14.0	7.5	**10.4**	10.5	7.5	10.5	14.0	11.0	10.5	10.5	10.0	10.0	9.5	10.5	10.5		*250*	*5*	**1.4**
Phosphorus	mg/L	0.66	0.36	**0.47**	0.45	0.49	0.48	0.49	0.41	0.51	0.36	0.37	0.39	0.51	0.52	0.66			*0.05*	**0.08**
Free Carbon Dioxide	mg/L	16.4	6.7	**10.0**	8.0	7.4	11.3	16.4	9.0	9.9	8.6	6.7	10.3	10.9	11.2	10.5				**2.5**
Total Hardness (3), (4), (5)	mg/L	138	98	**113**	98	110	110	120	136	130	138	102	102	104	104	100				**14**
Total Alkalinity (3)	mg/L	94	68	**81**	90	74	86	88	88	90	94	73	73	70	72	68				**10**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	94	68	**80**	90	74	86	88	88	90	94	73	73	70	72	68				**10**
Non-Carbonate Hardness (3)	mg/L	48	8	**32**	8	36	24	32	48	40	44	29	29	34	32	32				**10**
Chemical Oxygen Demand	mg/L	9.2	ND	**4.6**	4.2	<2	9.2	5.6	AE	8.6	5.9	4.4	2.5	4.6	2.9	2.8			*2*	**2.3**
Dissolved Oxygen	mg/L	13.5	7.3	**10.2**	12.6	13.5	11.6	11.7	11.6	9.5	8.1	7.3	8.1	8.4	9.8	10.1				**2.0**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.64	0.30	**0.38**	0.32	0.33	0.40	0.64	0.40	0.45	0.30	0.32	0.33	0.32	0.35	0.39	*10*	*10*	*0.1*	**0.09**
Fluoride	mg/L	0.86	0.50	**0.63**	0.62	0.61	0.63	0.65	0.64	0.62	0.54	0.66	0.62	0.56	0.50	0.86	*4*		*0.5*	**0.09**
pH		7.35	7.03	**7.21**	7.35	7.30	7.18	7.03	7.29	7.26	7.34	7.34	7.15	7.11	7.11	7.11	*6.5-8.5*	*6.5-8.5*		**0.11**
Specific Conductance @ 25 °C.	µmhos	262	177	**213**	209	214	262	228	177	212	213	200	219	218	212	191				**21**
Temperature	°C	23.2	6.7	**15.0**	8.0	6.7	8.4	10.9	15.5	17.6	23.1	23.2	21.0	17.9	14.4	12.9				**5.8**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter (ppm)	(4) By Titration
AL: Action Level	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
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Maximum	Minimum	Average	
8.0	5.7	6.5	GPG

Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2023

Plant Name: **Springwells (SPW)**

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary

Monthly Mineral Analyses Annual Averages

Parameter	Units	Max.	Min.	Avg.	01/10/2023 Jan	02/14/2023 Feb	03/14/2023 Mar	04/11/2023 Apr	05/16/2023 May	06/13/2023 Jun	07/11/2023 Jul	08/15/2024 Aug	09/12/2024 Sep	10/10/2024 Oct	11/06/2024 Nov	12/12/2024 Dec	← Sample Dates MCL	Sec.Std	RL	STDEV
Turbidity	N.T.U.	1.08	0.03	**0.14**	0.09	0.10	1.08	0.04	0.04	0.05	0.04	0.05	0.08	0.08	0.03	0.05	*0.3/95% (1)*			**0.30**
Total Solids	mg/L	153	115	**138**	145	129	140	153	150	135	131	142	152	129	115	130		*500*	*10*	**11**
Total Dissolved Solids	mg/L	156	102	**129**	140	124	125	156	144	128	138	124	127	129	114	102		*500*	*10*	**14**
Aluminum	mg/L	0.077	0.018	**0.038**	0.024	0.021	0.020	0.056	0.056	0.030	0.046	0.077	0.046	0.045	0.023	0.018		*0.05-0.2*	*0.001*	**0.019**
Iron	mg/L	0.4	0.2	**0.3**	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.3	0.2		*0.3*	*0.1*	**0.062**
Copper	mg/L	0.003	ND	**0.001**	0.001	< 0.001	< 0.001	0.002	0.003	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	*1.3 (AL)*		*0.001*	**0.001**
Magnesium	mg/L	8.4	7.2	**7.9**	7.7	8.0	8.4	8.1	7.8	8.4	7.9	7.7	7.8	7.7	7.8	7.2			*0.1*	**0.33**
Calcium	mg/L	28.5	25.3	**26.9**	25.3	25.9	27.6	27.7	27.1	28.5	26.5	25.9	26.8	26.1	27.0	27.9			*0.1*	**1.0**
Sodium	mg/L	7.0	4.6	**5.3**	4.9	5.0	5.6	7.0	5.6	5.7	5.4	4.9	4.7	4.6	5.2	5.0		*20 (2)*	*0.1*	**0.64**
Potassium	mg/L	1.3	1.0	**1.0**	1.0	1.0	1.1	1.3	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.0			*0.1*	**0.08**
Manganese	mg/L	0.001	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001		*0.05*	*0.001*	
Lead	mg/L	ND	ND	**0.000**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.003	ND	**0.001**	0.001	<0.001	<0.001	0.001	0.003	0.002	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.001		*5*	*0.001*	**0.00**
Silica	mg/L	2.9	1.1	**2.1**	2.4	AE	2.4	2.9	1.8	1.1	1.9	1.9	2.0	2.3	2.2	2.1			*0.4*	**0.4**
Sulfate	mg/L	32.3	22.5	**25.0**	27.8	24.2	25.6	32.3	25.3	24.9	23.6	23.5	24.9	22.6	22.5	22.7				**2.8**
Chloride	mg/L	11.5	9.5	**10.4**	9.5	10.0	10.0	11.5	10.0	10.5	11.5	9.8	10.5	10.0	11.0	11.0		*250*	*5*	**0.7**
Phosphorus	mg/L	0.61	0.37	**0.49**	0.52	0.49	0.61	0.42	0.55	0.50	0.37	0.49	0.51	0.50	0.44	0.52			*0.05*	**0.06**
Free Carbon Dioxide	mg/L	11.6	4.4	**8.4**	11.6	7.8	9.3	11.4	11.1	11.6	5.7	5.8	6.7	4.4	9.1	7.0				**2.6**
Total Hardness (3), (4), (5)	mg/L	146	90	**116**	90	122	124	136	134	146	132	102	102	102	104	100				**18**
Total Alkalinity (3)	mg/L	94	70	**77**	80	74	74	70	92	94	80	71	73	73	74	72				**8**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	94	70	**77**	80	74	74	70	92	94	80	71	73	73	74	72				**8**
Non-Carbonate Hardness (3)	mg/L	66	10	**39**	10	48	50	66	42	52	52	31	29	29	30	28				**15**
Chemical Oxygen Demand	mg/L	11.1	ND	**4.5**	3.4	4.4	11.1	4.0	AE	9.2	4.2	3.9	<2	3.2	3.1	2.8			*2*	**2.8**
Dissolved Oxygen	mg/L	20.0	7.2	**11.4**	13.0	13.8	20.0	12.5	11.7	10.1	7.2	7.7	7.9	9.9	10.3	13.3				**3.5**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	< 0.1	<0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.63	0.32	**0.38**	0.35	0.33	0.39	0.63	0.39	0.46	0.32	0.33	0.33	0.32	0.36	0.39	*10*	*10*	*0.1*	**0.09**
Fluoride	mg/L	0.86	0.10	**0.59**	0.61	0.59	0.66	0.86	0.65	0.74	0.48	0.65	0.64	0.62	0.52	0.10	*4*		*0.5*	**0.18**
pH		7.52	7.09	**7.28**	7.14	7.28	7.20	7.09	7.22	7.21	7.45	7.39	7.34	7.52	7.21	7.31	*6.5-8.5*	*6.5-8.5*		**0.13**
Specific Conductance @ 25 °C.	µmhos	219	180	**191**	215	209	NA	219	180	214	214	211	208	217	212	192				**12**
Temperature	°C	23.4	3.4	**13.2**	4.5	4.9	3.4	7.7	17.3	17.9	23.0	23.4	22.0	16.5	10.3	7.0				**7.7**

Legend
MCL: Maximum Contaminant Level
Sec.Std: Secondary Standard
NTU: Nephelometric Turbidity Unit
mg/L: Milligram Per Liter (ppm)
AL: Action Level
RL: Reporting Limit
< : Less than
AE: Analytical Error
IN: Invalid Sample

Notes:

(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
(2) EPA Guidance Level
(3) As Calcium Carbonate
(4) By Titration
(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
(6) Reported results are below the low calibration standard but above the instrument detection limit.
NA = Not available
ND = Not detected above the reporting limit

Maximum	Minimum	Average	
8.5	5.2	6.7	GPG

Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2023

Plant Name: Detroit (WWP-SPW-NE-SW)

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary

Monthly Mineral Analyses Annual Averages

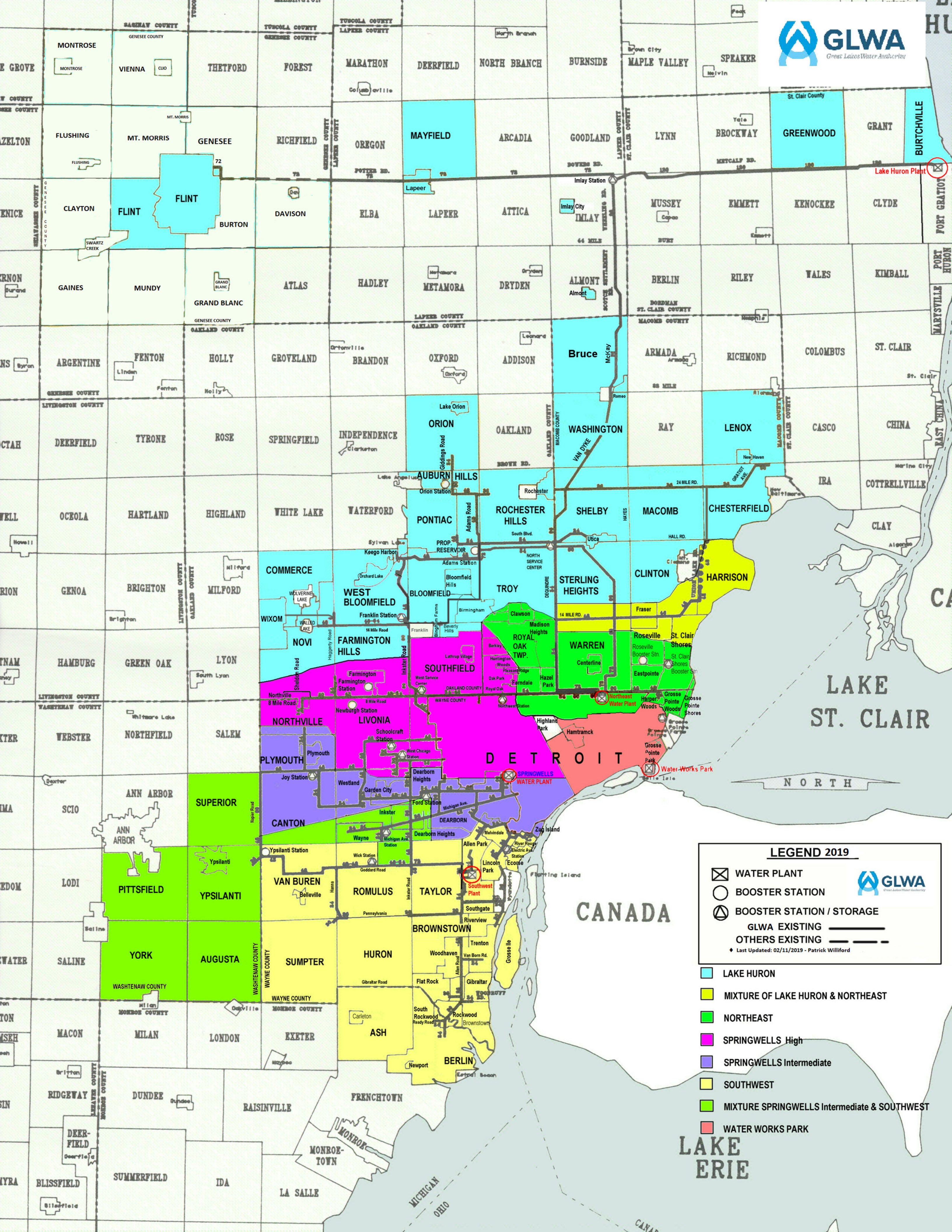
Parameter	Units	Max.	Min.	Avg.	01/10/2023 Jan	02/14/2023 Feb	03/14/2023 Mar	04/11/2023 Apr	05/16/2023 May	06/13/2023 Jun	07/11/2023 Jul	08/15/2024 Aug	09/12/2024 Sep	10/10/2024 Oct	11/06/2024 Nov	12/12/2024 Dec	*MCL*	*Sec.Std*	*RL*	*STDEV*
					← *Sample Dates*															
Turbidity	N.T.U.	3.00	0.01	**0.19**	0.11	0.08	1.05	0.06	0.05	0.06	0.51	0.07	0.06	0.06	0.05	0.04	*0.3/95% (1)*			**0.30**
Total Solids	mg/L	174	113	**136**	140	127	143	151	151	136	132	134	147	129	118	129		*500*	*10*	**10**
Total Dissolved Solids	mg/L	165	97	**128**	136	129	128	153	153	130	135	119	112	122	117	105		*500*	*10*	**15**
Aluminum	mg/L	0.160	0.018	**0.049**	0.026	0.026	0.028	0.036	0.061	0.057	0.080	0.096	0.076	0.044	0.028	0.027		*0.05-0.2*	*0.001*	**0.025**
Iron	mg/L	0.5	0.2	**0.3**	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2		*0.3*	*0.1*	**0.064**
Copper	mg/L	0.003	ND	**0.001**	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.000	0.001	0.000	0.001	0.001	*1.3 (AL)*		*0.001*	**0.000**
Magnesium	mg/L	8.8	6.7	**7.8**	7.6	7.7	8.3	7.9	7.8	8.3	7.9	7.8	7.8	7.7	7.8	7.2			*0.1*	**0.29**
Calcium	mg/L	33.3	24.9	**26.9**	25.4	25.5	28.7	27.2	27.8	28.3	26.3	25.7	26.7	26.3	26.8	27.8			*0.1*	**1.1**
Sodium	mg/L	9.4	4.6	**5.4**	4.9	5.1	6.6	6.9	5.8	5.7	5.4	4.9	4.7	4.6	5.2	5.1		*20 (2)*	*0.1*	**0.73**
Potassium	mg/L	1.3	0.9	**1.0**	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.0			*0.1*	**0.07**
Manganese	mg/L	0.002	ND	**0.000**	ND	ND	0.000	0.000	0.000	ND	ND	ND	ND	ND	ND	ND		*0.05*	*0.001*	**0.000**
Lead	mg/L	ND	ND	**0.000**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.015 (AL)*		*0.001*	
Zinc	mg/L	0.022	ND	**0.001**	0.000	ND	ND	0.000	0.001	0.002	ND	ND	ND	0.000	ND	0.006		*5*	*0.001*	**0.00**
Silica	mg/L	2.9	1.1	**2.1**	2.4	AE	2.4	2.6	1.9	1.4	1.8	1.9	2.0	2.2	2.2	2.2			*0.4*	**0.3**
Sulfate	mg/L	36.0	20.1	**24.9**	25.3	23.9	28.1	31.1	24.7	24.3	22.7	22.6	23.5	23.7	23.8	25.1				**2.4**
Chloride	mg/L	15.0	7.5	**10.5**	9.4	8.6	12.5	12.4	11.1	10.1	10.4	9.9	10.1	9.9	10.7	10.6		*250*	*5*	**1.1**
Phosphorus	mg/L	0.73	0.35	**0.49**	0.48	0.49	0.52	0.46	0.50	0.51	0.39	0.44	0.43	0.56	0.47	0.57			*0.05*	**0.05**
Free Carbon Dioxide	mg/L	16.4	4.4	**8.7**	9.5	7.9	10.6	12.5	9.2	9.2	7.4	6.0	7.8	7.4	8.8	8.3				**1.7**
Total Hardness (3), (4), (5)	mg/L	166	90	**116**	99	119	118	126	132	145	138	102	102	104	104	104				**16**
Total Alkalinity (3)	mg/L	94	68	**79**	84	81	80	81	88	92	83	73	77	73	74	71				**7**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	94	68	**79**	83	80	80	80	88	92	82	72	77	72	74	70				**7**
Non-Carbonate Hardness (3)	mg/L	72	6	**36**	15	38	38	46	44	53	56	30	26	31	30	33				**12**
Chemical Oxygen Demand	mg/L	11.7	ND	**4.3**	3.6	2.5	10.9	5.3	AE	6.3	4.9	3.6	1.2	2.9	3.2	2.7			*2*	**2.6**
Dissolved Oxygen	mg/L	20.0	7.2	**10.6**	12.7	13.4	13.6	11.7	11.1	9.6	8.2	7.8	8.3	9.0	10.0	11.9				**2.1**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*1*		*0.1*	
Nitrate Nitrogen	mg/L	1.47	0.29	**0.41**	0.34	0.34	0.66	0.64	0.48	0.45	0.31	0.34	0.34	0.32	0.35	0.39	*10*	*10*	*0.1*	**0.12**
Fluoride	mg/L	0.86	0.10	**0.60**	0.62	0.69	0.61	0.64	0.69	0.70	0.57	0.73	0.64	0.64	0.43	0.30	*4*		*0.5*	**0.12**
pH		7.52	7.03	**7.27**	7.25	7.31	7.19	7.11	7.29	7.31	7.36	7.38	7.31	7.32	7.24	7.24	*6.5-8.5*	*6.5-8.5*		**0.07**
Specific Conductance @ 25 °C.	µmhos	297	161	**204**	210	209	180	221	179	210	211	203	209	217	211	190				**14**
Temperature	°C	23.4	2.3	**13.7**	5.4	5.7	5.5	8.8	15.0	17.9	22.9	23.2	29.0	17.8	11.5	8.7				**8.0**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter (ppm)	(4) By Titration
AL: Action Level	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
RL: Reporting Limit	(6) Reported results are below the low calibration standard but above the instrument detection limit.
< : Less than	NA = Not available
AE: Analytical Error	ND = Not detected above the reporting limit
IN: Invalid Sample	

Maximum	Minimum	Average	
9.6	5.2	6.7	GPG

Modified: 03/05/2024, 17:26

Chemist II: Patrick Williford


GLWA
Great Lakes Water Authority
LEGEND 2019
WATER PLANT
BOOSTER STATION
BOOSTER STATION / STORAGE
GLWA EXISTING
OTHERS EXISTING
Last Updated: 02/11/2019 - Patrick Williford
LAKE HURON
MIXTURE OF LAKE HURON & NORTHEAST
NORTHEAST
SPRINGWELLS High
SPRINGWELLS Intermediate
SOUTHWEST
MIXTURE SPRINGWELLS Intermediate & SOUTHWEST
WATER WORKS PARK
Lake Huron Plant
Northeast Water Plant
SPRINGWELLS WATER PLANT
Southwest Plant
Water Works Park
DETROIT
LAKE ST. CLAIR
LAKE ERIE
CANADA
NORTH
MONTROSE
VIENNA
THETFORD
FOREST
MARATHON
DEERFIELD
NORTH BRANCH
BURNSIDE
MAPLE VALLEY
SPEAKER
FLUSHING
MT. MORRIS
GENESEE
RICHFIELD
OREGON
MAYFIELD
ARCADIA
GOODLAND
LYNN
BROCKWAY
GREENWOOD
GRANT
BURTCHVILLE
CLAYTON
FLINT
BURTON
DAVISON
ELBA
LAPEER
ATTICA
IMLAY
MUSSEY
EMMETT
KENOCKEE
CLYDE
FORT GRATIOT
Imlay Station
GAINES
MUNDY
GRAND BLANC
ATLAS
HADLEY
METAMORA
DRYDEN
ALMONT
BERLIN
RILEY
WALES
KIMBALL
PORT HURON
ARGENTINE
FENTON
HOLLY
GROVELAND
BRANDON
OXFORD
ADDISON
Bruce
ARMADA
RICHMOND
COLUMBUS
ST. CLAIR
DEERFIELD
TYRONE
ROSE
SPRINGFIELD
INDEPENDENCE
ORION
OAKLAND
WASHINGTON
RAY
LENOX
CASCO
CHINA
AUBURN HILLS
Orion Station
OCEOLA
HARTLAND
HIGHLAND
WHITE LAKE
WATERFORD
PONTIAC
ROCHESTER HILLS
SHELBY
MACOMB
CHESTERFIELD
IRA
COTTRELLVILLE
CLAY
PROP. RESERVOIR
Adams Station
GENOA
BRIGHTON
MILFORD
COMMERCE
WEST BLOOMFIELD
BLOOMFIELD
TROY
STERLING HEIGHTS
CLINTON
HARRISON
Franklin Station
WIXOM
NOVI
FARMINGTON HILLS
ROYAL OAK TWP.
WARREN
Roseville
St. Clair Shores
HAMBURG
GREEN OAK
LYON
SOUTHFIELD
Farmington Station
Newburgh Station
NORTHVILLE
LIVONIA
Northeast Station
Highland Park
Hamtramck
Grosse Pointe Shores
WEBSTER
NORTHFIELD
SALEM
PLYMOUTH
Schoolcraft Station
Joy Station
Westland
Garden City
Dearborn Heights
Ford Station
ANN ARBOR
SCIO
SUPERIOR
CANTON
DEARBORN
Inkster
Wayne
Michigan Ave. Station
Zug Island
Ypsilanti Station
Wick Station
Allen Park
Lincoln Park
Ecorse
Wyandotte
LODI
PITTSFIELD
YPSILANTI
VAN BUREN
ROMULUS
TAYLOR
Southgate
Riverview
BROWNSTOWN
Trenton
Woodhaven
Grosse Ile
SALINE
YORK
AUGUSTA
SUMPTER
HURON
Flat Rock
Gibraltar
MACON
MILAN
LONDON
EXETER
ASH
South Rockwood
Rockwood
BERLIN
Newport
RIDGEWAY
DUNDEE
RAISINVILLE
FRENCHTOWN
DEERFIELD
MONROE
MONROE-TOWN
BLISSFIELD
SUMMERFIELD
IDA
LA SALLE
MICHIGAN
OHIO
WASHTENAW COUNTY
WAYNE COUNTY
MONROE COUNTY
OAKLAND COUNTY
MACOMB COUNTY
LAPEER COUNTY
GENESEE COUNTY
ST. CLAIR COUNTY
LIVINGSTON COUNTY