



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

GLWA Water Treatment Plants - Mineral Reports

Sample Dates: 12/13/2016 12/13/2016 12/13/2016 12/13/2016 12/13/2016 12/13/2016 12/13/2016 12/13/2016
 Lake Huron Southwest Belle Isle Water Works Park Northeast Springwells

Parameter	Formula	Units	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.40	0.08	7.50	0.04	9.90	0.06	0.08	0.02	0.3/95% (1)		
Total Solids		mg/L	122	140	142	129	147	132	136	152		500	10
Total Dissolved Solids		mg/L	90	97	96	91	102	94	96	92		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050	0.079	< 0.050	0.132	0.054	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.050	< 0.050	0.229	< 0.050	0.230	< 0.050	< 0.050	< 0.050		0.3	0.005
Copper	Cu	mg/L	AE	AE	AE	AE	AE	AE	AE	AE	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	9.16	9.32	9.08	9.06	8.53	10.42	9.44	7.86			0.5
Calcium	Ca	mg/L	76.9	64.3	78.7	98.5	77.7	71.1	27.1	80.9			0.1
Sodium	Na	mg/L	5.03	4.43	5.27	5.02	5.47	5.10	4.71	4.81		20 (2)	0.1
Potassium	K	mg/L	1.08	1.04	1.05	1.06	1.20	1.08	1.04	1.05			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	0.004	< 0.002	0.007	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.2	1.4	1.2	1.1	1.1	1.4	1.0	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.2	21.0	17.6	26.7	18.5	22.1	26.9	26.7		250	
Chloride	Cl ⁻	mg/L	7.5	8.0	7.5	9.0	7.5	8.5	8.5	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.40	< 0.05	0.42	< 0.05	0.33	0.45	0.65			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.7	4.2	1.9	6.1	1.5	5.0	6.8	6.6			
Total Hardness (3), (4), (5)		mg/L	100	102	100	110	102	108	106	108			
Total Alkalinity (3)		mg/L	92	80	90	80	80	80	76	72			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	92	80	90	80	80	80	76	72			
Non-Carbonate Hardness (3)		mg/L	8	22	10	30	22	28	30	36			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0	< 2.0	2.4	2.0	2.0	6.0	< 2.0			2
Dissolved Oxygen		mg/L	11.8	11.6	15.0	12.5	13.6	14.6	14.2	14.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.23	0.24	0.24	0.24	0.27	0.25	0.21	0.22	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.55	0.09	0.45	0.09	0.57	0.44	0.44	4.0	2.0	0.5
pH			8.04	7.58	7.98	7.42	8.02	7.50	7.35	7.34	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	198	200	218	226	222	183	224	225			
Temperature		°C	11.1	12.5	3.2	3.4	11.1	9.8	6.1	5.0			

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardness in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 03/07/2017
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 03/07/2017

Great Lakes Water Authority



WATER OPERATING SERVICES
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Water Works Park Water Treatment Plant Mineral Report

Sample Date: 12/13/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	9.90	0.06	0.3/95% (1)		
Total Solids		mg/L	147	132		500	10
Total Dissolved Solids		mg/L	102	94		500	10
Aluminum	Al	mg/L	0.132	0.054		0.05-0.2	0.005
Iron	Fe	mg/L	0.230	< 0.050		0.3	0.005
Copper	Cu	mg/L	AE	AE	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	8.53	10.42			0.5
Calcium	Ca	mg/L	77.7	71.1			0.1
Sodium	Na	mg/L	5.47	5.10		20 (2)	0.1
Potassium	K	mg/L	1.20	1.08			0.1
Manganese	Mn	mg/L	0.007	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.1	1.4			0.4
Sulfate	SO ₄ ²⁻	mg/L	18.5	22.1		250	
Chloride	Cl ⁻	mg/L	7.5	8.5		250	5
Phosphorus	P	mg/L	< 0.05	0.33			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.5	5.0			
Total Hardness (3), (4), (5)		mg/L	102	108			
Total Alkalinity (3)		mg/L	80	80			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	80			
Non-Carbonate Hardness (3)		mg/L	22	28			
Chemical Oxygen Demand		mg/L	2.0	2.0			2
Dissolved Oxygen		mg/L	13.6	14.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.27	0.25	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.57	4.0	2.0	0.5
pH			8.02	7.50	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	222	183			
Temperature		°C	11.1	9.8			

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardness in Grains per Gallon 6.26 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

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Lake Huron Water Treatment Plant Mineral Report

Sample Date: 12/13/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.40	0.08	0.3/95% (1)		
Total Solids		mg/L	122	140		500	10
Total Dissolved Solids		mg/L	90	97		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.050	< 0.050		0.3	0.005
Copper	Cu	mg/L	AE	AE	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	9.16	9.32			0.5
Calcium	Ca	mg/L	76.9	64.3			0.1
Sodium	Na	mg/L	5.03	4.43		20 (2)	0.1
Potassium	K	mg/L	1.08	1.04			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.2	1.4			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.2	21.0		250	
Chloride	Cl ⁻	mg/L	7.5	8.0		250	5
Phosphorus	P	mg/L	< 0.05	0.40			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.7	4.2			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	92	80			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	92	80			
Non-Carbonate Hardness (3)		mg/L	8	22			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	11.8	11.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.23	0.24	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.55	4.0	2.0	0.5
pH			8.04	7.58	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	198	200			
Temperature		°C	11.1	12.5			

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardness in Grains per Gallon 5.92 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 03/07/2017
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 03/07/2017

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Southwest Water Treatment Plant Mineral Report

Sample Date: 12/13/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	7.50	0.04	0.3/95% (1)		
Total Solids		mg/L	142	129		500	10
Total Dissolved Solids		mg/L	96	91		500	10
Aluminum	Al	mg/L	0.079	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.229	< 0.050		0.3	0.005
Copper	Cu	mg/L	AE	AE	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	9.08	9.06			0.5
Calcium	Ca	mg/L	78.7	98.5			0.1
Sodium	Na	mg/L	5.27	5.02		20 (2)	0.1
Potassium	K	mg/L	1.05	1.06			0.1
Manganese	Mn	mg/L	0.004	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.2	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.6	26.7		250	
Chloride	Cl ⁻	mg/L	7.5	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.42			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.9	6.1			
Total Hardness (3), (4), (5)		mg/L	100	110			
Total Alkalinity (3)		mg/L	90	80			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	90	80			
Non-Carbonate Hardness (3)		mg/L	10	30			
Chemical Oxygen Demand		mg/L	< 2.0	2.4			2
Dissolved Oxygen		mg/L	15.0	12.5			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.24	0.24	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.45	4.0	2.0	0.5
pH			7.98	7.42	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	226			
Temperature		°C	3.2	3.4			

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardness in Grains per Gallon 6.38 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 03/07/2017
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 03/07/2017

Great Lakes Water Authority



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Northeast Water Treatment Plant Mineral Report

Sample Date: 12/13/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	9.90	0.08	0.3/95% (1)		
Total Solids		mg/L	147	136		500	10
Total Dissolved Solids		mg/L	102	96		500	10
Aluminum	Al	mg/L	0.132	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.230	< 0.050		0.3	0.005
Copper	Cu	mg/L	AE	AE	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	8.53	9.44			0.5
Calcium	Ca	mg/L	77.7	27.1			0.1
Sodium	Na	mg/L	5.47	4.71		20 (2)	0.1
Potassium	K	mg/L	1.20	1.04			0.1
Manganese	Mn	mg/L	0.007	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.1	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	18.5	26.9		250	
Chloride	Cl ⁻	mg/L	7.5	8.5		250	5
Phosphorus	P	mg/L	< 0.05	0.45			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.5	6.8			
Total Hardness (3), (4), (5)		mg/L	102	106			
Total Alkalinity (3)		mg/L	80	76			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	76			
Non-Carbonate Hardness (3)		mg/L	22	30			
Chemical Oxygen Demand		mg/L	2.0	6.0			2
Dissolved Oxygen		mg/L	13.6	14.2			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.27	0.21	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.44	4.0	2.0	0.5
pH			8.02	7.35	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	222	224			
Temperature		°C	11.1	6.1			

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardness in Grains per Gallon 6.15 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 03/07/2017
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 03/07/2017

Great Lakes Water Authority



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Springwells Water Treatment Plant Mineral Report

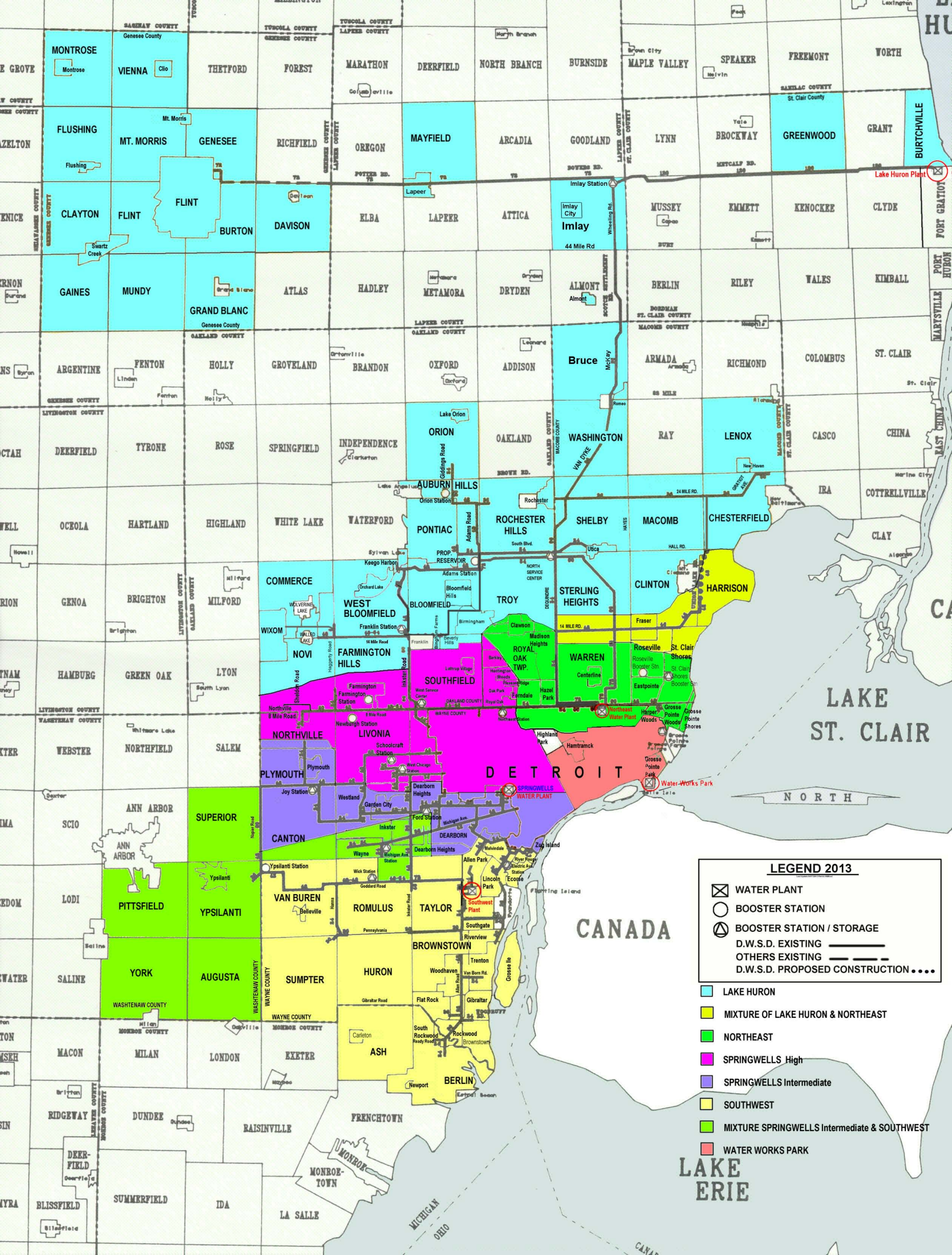
Sample Date: 12/13/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	9.90	0.02	0.3/95% (1)		
Total Solids		mg/L	147	152		500	10
Total Dissolved Solids		mg/L	102	92		500	10
Aluminum	Al	mg/L	0.132	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.230	< 0.050		0.3	0.005
Copper	Cu	mg/L	AE	AE	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	8.53	7.86			0.5
Calcium	Ca	mg/L	77.7	80.9			0.1
Sodium	Na	mg/L	5.47	4.81		20 (2)	0.1
Potassium	K	mg/L	1.20	1.05			0.1
Manganese	Mn	mg/L	0.007	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.1	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	18.5	26.7		250	
Chloride	Cl ⁻	mg/L	7.5	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.65			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.5	6.6			
Total Hardness (3), (4), (5)		mg/L	102	108			
Total Alkalinity (3)		mg/L	80	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	72			
Non-Carbonate Hardness (3)		mg/L	22	36			
Chemical Oxygen Demand		mg/L	2.0	< 2.0			2
Dissolved Oxygen		mg/L	13.6	14.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.27	0.22	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.44	4.0	2.0	0.5
pH			8.02	7.34	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	222	225			
Temperature		°C	11.1	5.0			

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardness in Grains per Gallon 6.26 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 03/07/2017
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Great Lakes Water Authority



LEGEND 2013

- ☒ WATER PLANT
- BOOSTER STATION
- ⊕ BOOSTER STATION / STORAGE
- D.W.S.D. EXISTING
- - - OTHERS EXISTING
- ⋯ D.W.S.D. PROPOSED CONSTRUCTION

- ☐ LAKE HURON
- ☐ MIXTURE OF LAKE HURON & NORTHEAST
- ☐ NORTHEAST
- ☐ SPRINGWELLS High
- ☐ SPRINGWELLS Intermediate
- ☐ SOUTHWEST
- ☐ MIXTURE SPRINGWELLS Intermediate & SOUTHWEST
- ☐ WATER WORKS PARK

LAKE ERIE

NORTH

CANADA

MICHIGAN
OHIO