



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

Lake Huron Water Treatment Plant Mineral Report

Sample Date: 05/10/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.45	0.05	0.3/95% (1)		
Total Solids		mg/L	143	144		500	10
Total Dissolved Solids		mg/L	137	140		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	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.44	10.53			0.5
Calcium	Ca	mg/L	22.9	21.1			0.1
Sodium	Na	mg/L	4.80	4.66		20 (2)	0.1
Potassium	K	mg/L	0.86	0.83			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	1.0	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	15.8	17.9		250	
Chloride	Cl ⁻	mg/L	8.5	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.36			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.7	6.9			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	80	74			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	74			
Non-Carbonate Hardness (3)		mg/L	20	28			
Chemical Oxygen Demand		mg/L	3.6	5.6			2
Dissolved Oxygen		mg/L	11.8	12.0			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.34	0.34	10		0.1
Fluoride	F ⁻	mg/L	0.07	0.50	4.0	2.0	0.5
pH			7.38	7.33	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	310	306			
Temperature		°C	11.4	10.8			

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 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: 07/01/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 07/01/2016

Great Lakes Water Authority



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Southwest Water Treatment Plant Mineral Report

Sample Date: 05/10/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	5.80	0.06	0.3/95% (1)		
Total Solids		mg/L	155	160		500	10
Total Dissolved Solids		mg/L	153	144		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.152	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.014	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.23	8.54			0.5
Calcium	Ca	mg/L	23.2	23.9			0.1
Sodium	Na	mg/L	4.94	5.19		20 (2)	0.1
Potassium	K	mg/L	0.94	0.98			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	0.8	0.9			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	26.2		250	
Chloride	Cl ⁻	mg/L	9.0	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.33			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.2	9.9			
Total Hardness (3), (4), (5)		mg/L	106	104			
Total Alkalinity (3)		mg/L	82	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	82	72			
Non-Carbonate Hardness (3)		mg/L	24	32			
Chemical Oxygen Demand		mg/L	3.2	2.8			2
Dissolved Oxygen		mg/L	10.7	10.5			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.50	0.53	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.55	4.0	2.0	0.5
pH			7.42	7.16	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	328	308			
Temperature		°C	12.3	11.7			

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 6.03 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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Water Works Park Water Treatment Plant Mineral Report

Sample Date: 05/10/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.60	0.07	0.3/95% (1)		
Total Solids		mg/L	164	158		500	10
Total Dissolved Solids		mg/L	156	141		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.061	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.62	9.05			0.5
Calcium	Ca	mg/L	25.0	24.7			0.1
Sodium	Na	mg/L	5.00	5.40		20 (2)	0.1
Potassium	K	mg/L	0.90	0.90			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	0.9	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.9	19.9		250	
Chloride	Cl ⁻	mg/L	8.5	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.29			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.3	5.0			
Total Hardness (3), (4), (5)		mg/L	100	104			
Total Alkalinity (3)		mg/L	60	70			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	60	70			
Non-Carbonate Hardness (3)		mg/L	40	34			
Chemical Oxygen Demand		mg/L	6.0	4.8			2
Dissolved Oxygen		mg/L	10.6	11.9			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.59	0.49	10		0.1
Fluoride	F ⁻	mg/L	0.07	0.57	4.0	2.0	0.5
pH			7.35	7.45	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	279	321			
Temperature		°C	15.8	15.2			

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 6.03 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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Northeast Water Treatment Plant Mineral Report

Sample Date: 05/10/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.60	0.07	0.3/95% (1)		
Total Solids		mg/L	164	160		500	10
Total Dissolved Solids		mg/L	156	155		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.061	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.62	10.70			0.5
Calcium	Ca	mg/L	25.0	25.0			0.1
Sodium	Na	mg/L	5.00	5.25		20 (2)	0.1
Potassium	K	mg/L	0.90	0.98			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	0.9	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.9	22.7		250	
Chloride	Cl ⁻	mg/L	8.5	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.3	4.0			
Total Hardness (3), (4), (5)		mg/L	100	104			
Total Alkalinity (3)		mg/L	60	74			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	60	74			
Non-Carbonate Hardness (3)		mg/L	40	30			
Chemical Oxygen Demand		mg/L	6.0	2.4			2
Dissolved Oxygen		mg/L	10.6	11.0			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.59	0.48	10		0.1
Fluoride	F ⁻	mg/L	0.07	0.49	4.0	2.0	0.5
pH			7.35	7.57	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	279	272			
Temperature		°C	15.8	12.4			

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 6.03 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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Springwells Water Treatment Plant Mineral Report

Sample Date: 05/10/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.60	0.19	0.3/95% (1)		
Total Solids		mg/L	164	159		500	10
Total Dissolved Solids		mg/L	156	149		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.061	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.62	8.49			0.5
Calcium	Ca	mg/L	25.0	23.6			0.1
Sodium	Na	mg/L	5.00	5.02		20 (2)	0.1
Potassium	K	mg/L	0.90	0.95			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	0.9	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.9	22.1		250	
Chloride	Cl ⁻	mg/L	8.5	12.0		250	5
Phosphorus	P	mg/L	< 0.05	0.52			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.3	6.6			
Total Hardness (3), (4), (5)		mg/L	100	100			
Total Alkalinity (3)		mg/L	60	76			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	60	76			
Non-Carbonate Hardness (3)		mg/L	40	24			
Chemical Oxygen Demand		mg/L	6.0	2.8			2
Dissolved Oxygen		mg/L	10.6	11.9			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.59	0.46	10		0.1
Fluoride	F ⁻	mg/L	0.07	0.50	4.0	2.0	0.5
pH			7.35	7.36	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	279	278			
Temperature		°C	15.8	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 5.80 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: 07/01/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 07/01/2016

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All GLWA Water Treatment Plant Mineral Reports

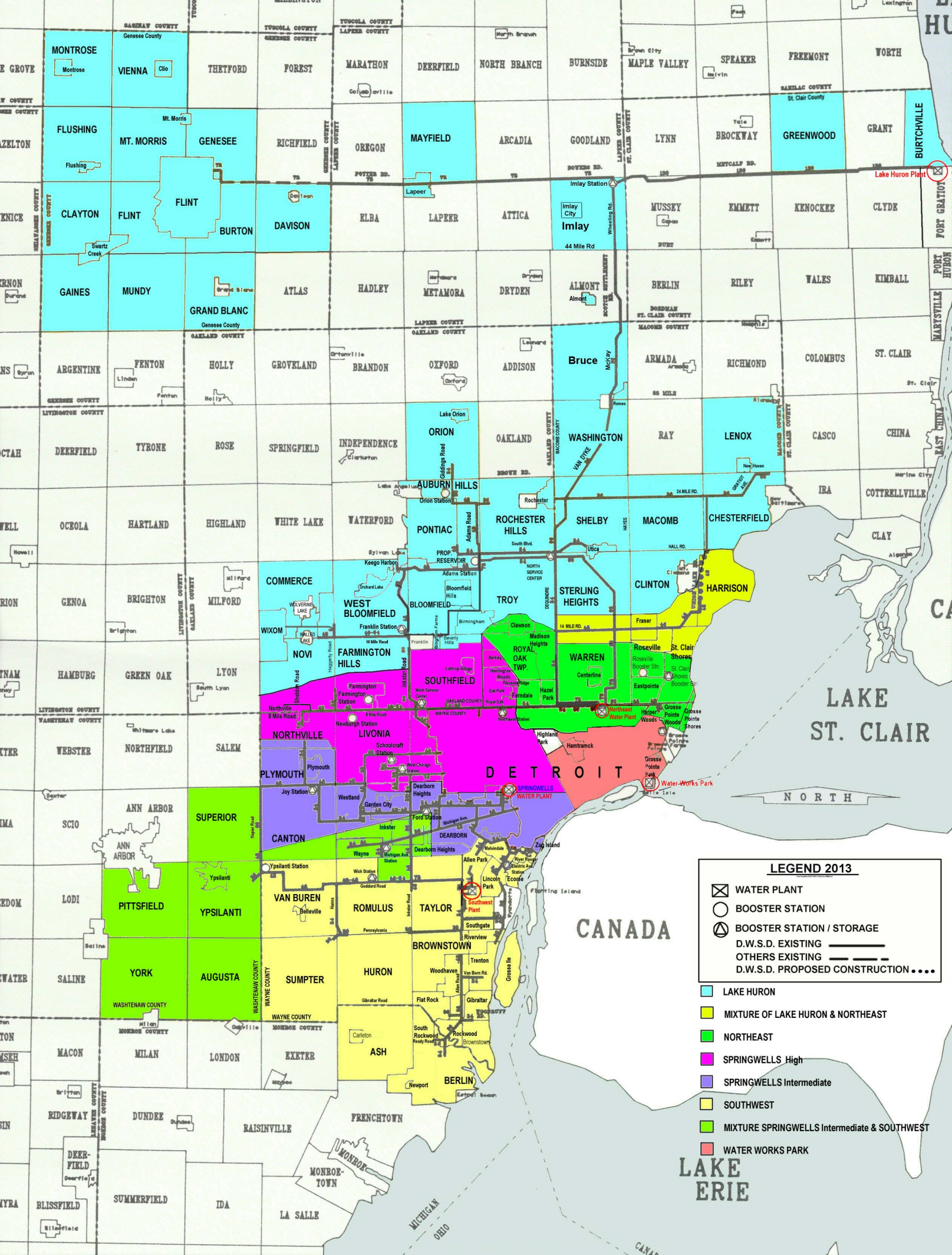
Sample Dates: 05/10/2016 05/10/2016 05/10/2016 05/10/2016 05/10/2016 05/10/2016 05/10/2016 05/10/2016

Parameter	Formula	Units	Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells	MCL	Sec.Std	MDL
			Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap			
Turbidity		NTU	0.45	0.05	5.80	0.06	2.60	0.07	0.07	0.19	0.3/95% (1)		
Total Solids		mg/L	143	144	155	160	164	158	160	159		500	10
Total Dissolved Solids		mg/L	137	140	153	144	156	141	155	149		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.050	< 0.050	0.152	< 0.050	0.061	< 0.050	< 0.050	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	0.014	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.44	10.53	8.23	8.54	8.62	9.05	10.70	8.49			0.5
Calcium	Ca	mg/L	22.9	21.1	23.2	23.9	25.0	24.7	25.0	23.6			0.1
Sodium	Na	mg/L	4.80	4.66	4.94	5.19	5.00	5.40	5.25	5.02		20 (2)	0.1
Potassium	K	mg/L	0.86	0.83	0.94	0.98	0.90	0.90	0.98	0.95			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 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	1.0	1.1	0.8	0.9	0.9	1.0	1.0	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	15.8	17.9	17.5	26.2	17.9	19.9	22.7	22.1		250	
Chloride	Cl ⁻	mg/L	8.5	9.5	9.0	10.5	8.5	10.5	10.5	12.0		250	5
Phosphorus	P	mg/L	< 0.05	0.36	< 0.05	0.33	< 0.05	0.29	0.35	0.52			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.7	6.9	6.2	9.9	5.3	5.0	4.0	6.6			
Total Hardness (3), (4), (5)		mg/L	100	102	106	104	100	104	104	100			
Total Alkalinity (3)		mg/L	80	74	82	72	60	70	74	76			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	74	82	72	60	70	74	76			
Non-Carbonate Hardness (3)		mg/L	20	28	24	32	40	34	30	24			
Chemical Oxygen Demand		mg/L	3.6	5.6	3.2	2.8	6.0	4.8	2.4	2.8			2
Dissolved Oxygen		mg/L	11.8	12.0	10.7	10.5	10.6	11.9	11.0	11.9			
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	0.34	0.34	0.50	0.53	0.59	0.49	0.48	0.46	10		0.1
Fluoride	F ⁻	mg/L	0.07	0.50	0.09	0.55	0.07	0.57	0.49	0.50	4.0	2.0	0.5
pH			7.38	7.33	7.42	7.16	7.35	7.45	7.57	7.36	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	310	306	328	308	279	321	272	278			
Temperature		°C	11.4	10.8	12.3	11.7	15.8	15.2	12.4	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 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: 07/01/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 07/01/2016

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