



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: 08/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.55	0.36	0.3/95% (1)		
Total Solids		mg/L	146	139		500	10
Total Dissolved Solids		mg/L	141	158		500	10
Aluminum	Al	mg/L	0.153	0.586		0.05-0.2	0.005
Iron	Fe	mg/L	0.067	0.085		0.3	0.005
Copper	Cu	mg/L	0.008	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	9.62	8.71			0.5
Calcium	Ca	mg/L	24.7	25.5			0.1
Sodium	Na	mg/L	4.10	4.53		20 (2)	0.1
Potassium	K	mg/L	0.82	0.82			0.1
Manganese	Mn	mg/L	0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	AE	AE	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.8	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	16.3	20.6		250	
Chloride	Cl ⁻	mg/L	8.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.39			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.1	2.1			
Total Hardness (3), (4), (5)		mg/L	99	102			
Total Alkalinity (3)		mg/L	81	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	81	72			
Non-Carbonate Hardness (3)		mg/L	18	30			
Chemical Oxygen Demand		mg/L	2.8	2.0			2
Dissolved Oxygen		mg/L	8.3	15.3			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.34	0.35	10		0.1
Fluoride	F ⁻	mg/L	0.08	0.68	4.0	2.0	0.5
pH			8.17	7.84	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	217	220			
Temperature		°C	25.6	25.1			

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 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: 11/02/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 11/02/2016

Great Lakes Water Authority



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Southwest Water Treatment Plant Mineral Report

Sample Date: 08/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	7.60	0.05	0.3/95% (1)		
Total Solids		mg/L	154	143		500	10
Total Dissolved Solids		mg/L	157	142		500	10
Aluminum	Al	mg/L	0.469	0.227		0.05-0.2	0.005
Iron	Fe	mg/L	0.296	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.015	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.56	9.21			0.5
Calcium	Ca	mg/L	29.7	25.5			0.1
Sodium	Na	mg/L	6.01	4.38		20 (2)	0.1
Potassium	K	mg/L	0.89	0.83			0.1
Manganese	Mn	mg/L	0.010	< 0.002		0.05	0.002
Lead	Pb	mg/L	AE	AE	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.7	0.9			0.4
Sulfate	SO ₄ ²⁻	mg/L	16.1	28.3		250	
Chloride	Cl ⁻	mg/L	9.0	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.34			0.05
Free Carbon Dioxide	CO ₂	mg/L	0.8	3.6			
Total Hardness (3), (4), (5)		mg/L	106	104			
Total Alkalinity (3)		mg/L	82	66			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	82	66			
Non-Carbonate Hardness (3)		mg/L	24	38			
Chemical Oxygen Demand		mg/L	3.6	5.2			2
Dissolved Oxygen		mg/L	8.6	8.3			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.21	0.22	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.57	4.0	2.0	0.5
pH			8.29	7.56	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	217	227			
Temperature		°C	24.2	25.2			

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.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 11/02/2016
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Water Works Park Water Treatment Plant Mineral Report

Sample Date: 08/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	3.50	0.09	0.3/95% (1)		
Total Solids		mg/L	136	150		500	10
Total Dissolved Solids		mg/L	148	170		500	10
Aluminum	Al	mg/L	0.147	0.205		0.05-0.2	0.005
Iron	Fe	mg/L	0.090	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.23	8.27			0.5
Calcium	Ca	mg/L	25.5	25.6			0.1
Sodium	Na	mg/L	4.53	4.31		20 (2)	0.1
Potassium	K	mg/L	0.82	0.81			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	AE	AE	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	18.6	23.9		250	
Chloride	Cl ⁻	mg/L	8.0	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.27			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.0	1.7			
Total Hardness (3), (4), (5)		mg/L	98	107			
Total Alkalinity (3)		mg/L	78	70			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	78	70			
Non-Carbonate Hardness (3)		mg/L	20	37			
Chemical Oxygen Demand		mg/L	4.8	3.2			2
Dissolved Oxygen		mg/L	13.7	15.4			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.26	0.27	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.63	4.0	2.0	0.5
pH			8.20	7.91	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	225	223			
Temperature		°C	24.4	23.8			

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 6.21 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 11/02/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 11/02/2016

Great Lakes Water Authority



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Northeast Water Treatment Plant Mineral Report

Sample Date: 08/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	3.50	0.06	0.3/95% (1)		
Total Solids		mg/L	136	154		500	10
Total Dissolved Solids		mg/L	148	128		500	10
Aluminum	Al	mg/L	0.147	0.169		0.05-0.2	0.005
Iron	Fe	mg/L	0.090	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.23	9.10			0.5
Calcium	Ca	mg/L	25.5	28.4			0.1
Sodium	Na	mg/L	4.53	4.39		20 (2)	0.1
Potassium	K	mg/L	0.82	0.83			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	AE	AE	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	18.6	22.9		250	
Chloride	Cl ⁻	mg/L	8.0	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.26			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.0	3.3			
Total Hardness (3), (4), (5)		mg/L	98	101			
Total Alkalinity (3)		mg/L	78	70			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	78	70			
Non-Carbonate Hardness (3)		mg/L	20	31			
Chemical Oxygen Demand		mg/L	4.8	6.0			2
Dissolved Oxygen		mg/L	13.7	14.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.26	0.27	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.56	4.0	2.0	0.5
pH			8.20	7.63	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	225	228			
Temperature		°C	24.4	26.1			

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 5.86 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 11/02/2016
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Springwells Water Treatment Plant Mineral Report

Sample Date: 08/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	3.50	0.05	0.3/95% (1)		
Total Solids		mg/L	136	148		500	10
Total Dissolved Solids		mg/L	148	123		500	10
Aluminum	Al	mg/L	0.147	0.247		0.05-0.2	0.005
Iron	Fe	mg/L	0.090	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.23	10.27			0.5
Calcium	Ca	mg/L	25.5	28.2			0.1
Sodium	Na	mg/L	4.53	4.68		20 (2)	0.1
Potassium	K	mg/L	0.82	0.86			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	AE	AE	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	0.03		5	0.1
Silica	SiO ₂	mg/L	0.8	0.8			0.4
Sulfate	SO ₄ ²⁻	mg/L	18.6	22.9		250	
Chloride	Cl ⁻	mg/L	8.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.48			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.0	3.0			
Total Hardness (3), (4), (5)		mg/L	98	101			
Total Alkalinity (3)		mg/L	78	71			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	78	71			
Non-Carbonate Hardness (3)		mg/L	20	30			
Chemical Oxygen Demand		mg/L	4.8	4.8			2
Dissolved Oxygen		mg/L	13.7	8.3			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.26	0.23	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.55	4.0	2.0	0.5
pH			8.20	7.67	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	225	222			
Temperature		°C	24.4	25.8			

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 5.86 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: 11/02/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 11/02/2016

Great Lakes Water Authority



All GLWA Water Treatment Plant Mineral Reports

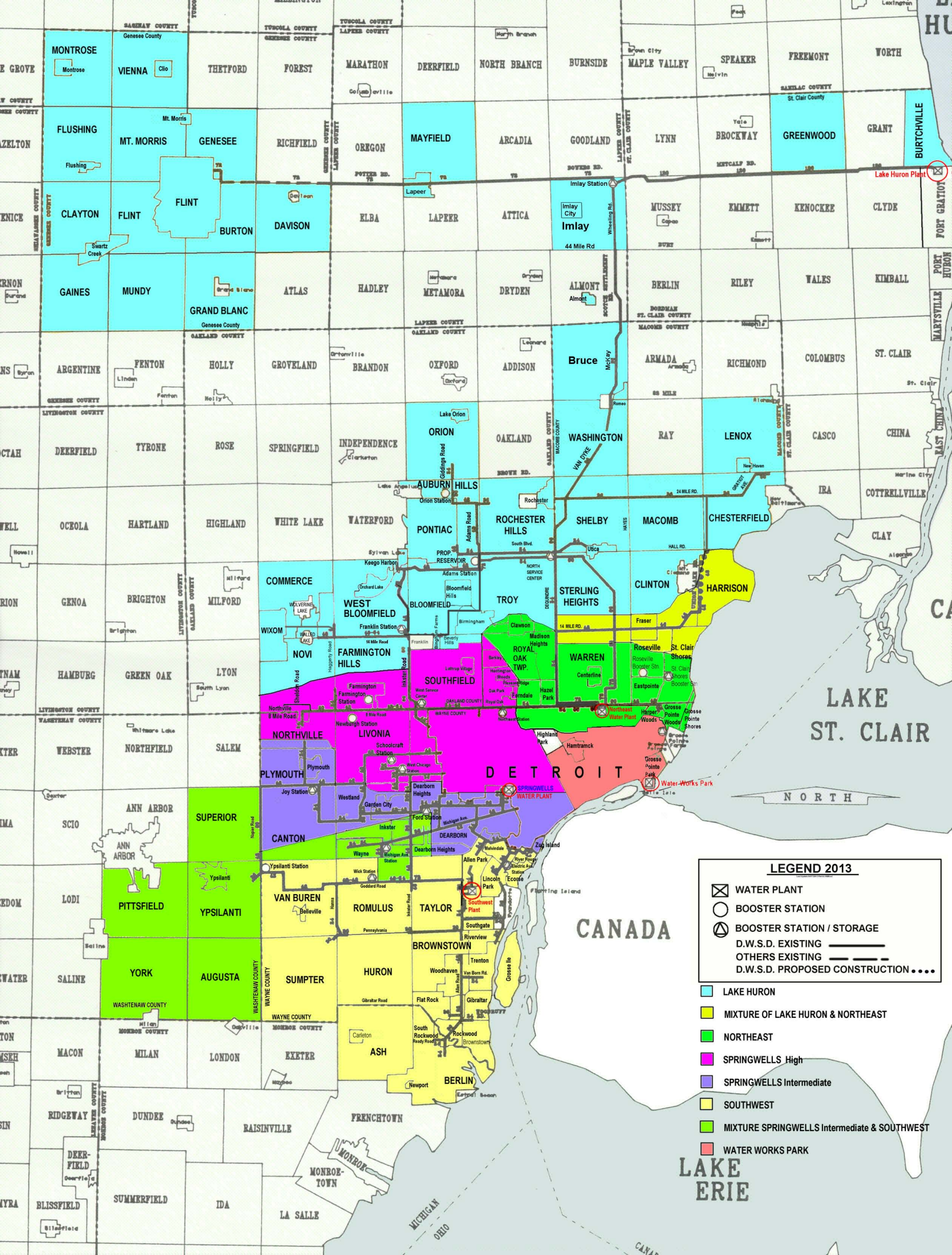
Sample Dates: 08/09/2016 08/09/2016 08/09/2016 08/09/2016 08/09/2016 08/09/2016 08/09/2016 08/09/2016

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	0.55	0.36	7.60	0.05	3.50	0.09	0.06	0.05	0.3/95% (1)		
Total Solids		mg/L	146	139	154	143	136	150	154	148		500	10
Total Dissolved Solids		mg/L	141	158	157	142	148	170	128	123		500	10
Aluminum	Al	mg/L	0.153	0.586	0.469	0.227	0.147	0.205	0.169	0.247		0.05-0.2	0.005
Iron	Fe	mg/L	0.067	0.085	0.296	< 0.050	0.090	< 0.050	< 0.050	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.008	< 0.005	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	9.62	8.71	11.56	9.21	11.23	8.27	9.10	10.27			0.5
Calcium	Ca	mg/L	24.7	25.5	29.7	25.5	25.5	25.6	28.4	28.2			0.1
Sodium	Na	mg/L	4.10	4.53	6.01	4.38	4.53	4.31	4.39	4.68		20 (2)	0.1
Potassium	K	mg/L	0.82	0.82	0.89	0.83	0.82	0.81	0.83	0.86			0.1
Manganese	Mn	mg/L	0.002	< 0.002	0.010	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	AE	AE	AE	AE	AE	AE	AE	AE	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.03		5	0.1
Silica	SiO ₂	mg/L	0.8	1.0	0.7	0.9	0.8	0.9	0.9	0.8			0.4
Sulfate	SO ₄ ²⁻	mg/L	16.3	20.6	16.1	28.3	18.6	23.9	22.9	22.9		250	
Chloride	Cl ⁻	mg/L	8.0	9.5	9.0	10.5	8.0	9.0	10.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.39	< 0.05	0.34	< 0.05	0.27	0.26	0.48			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.1	2.1	0.8	3.6	1.0	1.7	3.3	3.0			
Total Hardness (3), (4), (5)		mg/L	99	102	106	104	98	107	101	101			
Total Alkalinity (3)		mg/L	81	72	82	66	78	70	70	71			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	81	72	82	66	78	70	70	71			
Non-Carbonate Hardness (3)		mg/L	18	30	24	38	20	37	31	30			
Chemical Oxygen Demand		mg/L	2.8	2.0	3.6	5.2	4.8	3.2	6.0	4.8			2
Dissolved Oxygen		mg/L	8.3	15.3	8.6	8.3	13.7	15.4	14.8	8.3			
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	0.35	0.21	0.22	0.26	0.27	0.27	0.23	10		0.1
Fluoride	F ⁻	mg/L	0.08	0.68	0.09	0.57	0.09	0.63	0.56	0.55	4.0	2.0	0.5
pH			8.17	7.84	8.29	7.56	8.20	7.91	7.63	7.67	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	217	220	217	227	225	223	228	222			
Temperature		°C	25.6	25.1	24.2	25.2	24.4	23.8	26.1	25.8			

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 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: 11/02/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 11/02/2016

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**

NORTH

CANADA

MICHIGAN
OHIO