



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: 11/15/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.79	0.06	0.3/95% (1)		
Total Solids		mg/L	133	113		500	10
Total Dissolved Solids		mg/L	118	98		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	0.006	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	8.31	8.01			0.5
Calcium	Ca	mg/L	33.2	32.1			0.1
Sodium	Na	mg/L	5.18	5.47		20 (2)	0.1
Potassium	K	mg/L	0.83	0.81			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	1.5			0.4
Sulfate	SO ₄ ²⁻	mg/L	18.2	20.2		250	
Chloride	Cl ⁻	mg/L	7.0	7.5		250	5
Phosphorus	P	mg/L	< 0.05	0.38			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.6	3.2			
Total Hardness (3), (4), (5)		mg/L	106	100			
Total Alkalinity (3)		mg/L	82	78			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	82	78			
Non-Carbonate Hardness (3)		mg/L	24	22			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	9.7	9.9			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.46	0.36	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.60	4.0	2.0	0.5
pH			8.01	7.69	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	184			
Temperature		°C	16.6	17.7			

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 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: 03/07/2017
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 03/07/2017

Great Lakes Water Authority



WATER QUALITY DEPARTMENT
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Southwest Water Treatment Plant Mineral Report

Sample Date: 11/15/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	14.00	0.04	0.3/95% (1)		
Total Solids		mg/L	174	146		500	10
Total Dissolved Solids		mg/L	78	115		500	10
Aluminum	Al	mg/L	0.193	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.267	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.011	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	10.17	8.72			0.5
Calcium	Ca	mg/L	40.7	34.9			0.1
Sodium	Na	mg/L	5.27	5.72		20 (2)	0.1
Potassium	K	mg/L	0.87	0.86			0.1
Manganese	Mn	mg/L	0.014	< 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	1.5			0.4
Sulfate	SO ₄ ²⁻	mg/L	24.3	17.5		250	
Chloride	Cl ⁻	mg/L	7.0	8.0		250	5
Phosphorus	P	mg/L	< 0.05	0.31			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.8	3.2			
Total Hardness (3), (4), (5)		mg/L	102	108			
Total Alkalinity (3)		mg/L	82	78			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	82	78			
Non-Carbonate Hardness (3)		mg/L	20	30			
Chemical Oxygen Demand		mg/L	6.4	< 2.0			2
Dissolved Oxygen		mg/L	10.7	10.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.32	0.30	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.41	4.0	2.0	0.5
pH			7.96	7.68	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	226	231			
Temperature		°C	10.4	10.5			

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 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
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 03/07/2017

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Water Works Park Water Treatment Plant Mineral Report

Sample Date: 11/15/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	4.90	0.05	0.3/95% (1)		
Total Solids		mg/L	165	145		500	10
Total Dissolved Solids		mg/L	121	129		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.103	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.013	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	10.32	8.35			0.5
Calcium	Ca	mg/L	41.3	33.4			0.1
Sodium	Na	mg/L	5.46	5.62		20 (2)	0.1
Potassium	K	mg/L	0.89	0.89			0.1
Manganese	Mn	mg/L	0.003	< 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	17.6	24.8		250	
Chloride	Cl ⁻	mg/L	7.0	7.5		250	5
Phosphorus	P	mg/L	< 0.05	0.33			0.05
Free Carbon Dioxide	CO ₂	mg/L	0.9	2.1			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	76	70			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	76	70			
Non-Carbonate Hardness (3)		mg/L	24	32			
Chemical Oxygen Demand		mg/L	6.8	< 2.0			2
Dissolved Oxygen		mg/L	10.4	10.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.44	0.44	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.51	4.0	2.0	0.5
pH			8.21	7.83	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	228	207			
Temperature		°C	15.8	15.6			

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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Northeast Water Treatment Plant Mineral Report

Sample Date: 11/15/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	4.90	0.06	0.3/95% (1)		
Total Solids		mg/L	165	135		500	10
Total Dissolved Solids		mg/L	121	133		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.103	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.013	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	10.32	8.54			0.5
Calcium	Ca	mg/L	41.3	34.2			0.1
Sodium	Na	mg/L	5.46	4.75		20 (2)	0.1
Potassium	K	mg/L	0.89	0.82			0.1
Manganese	Mn	mg/L	0.003	< 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	17.6	26.7		250	
Chloride	Cl ⁻	mg/L	7.0	8.5		250	5
Phosphorus	P	mg/L	< 0.05	0.57			0.05
Free Carbon Dioxide	CO ₂	mg/L	0.9	5.3			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	76	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	76	72			
Non-Carbonate Hardness (3)		mg/L	24	30			
Chemical Oxygen Demand		mg/L	6.8	3.6			2
Dissolved Oxygen		mg/L	10.4	10.7			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.44	0.42	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.46	4.0	2.0	0.5
pH			8.21	7.43	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	228	225			
Temperature		°C	15.8	11.9			

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.

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Springwells Water Treatment Plant Mineral Report

Sample Date: 11/15/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	4.90	0.16	0.3/95% (1)		
Total Solids		mg/L	165	161		500	10
Total Dissolved Solids		mg/L	121	125		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.103	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.013	< 0.005	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	10.32	8.73			0.5
Calcium	Ca	mg/L	41.3	34.9			0.1
Sodium	Na	mg/L	5.46	4.84		20 (2)	0.1
Potassium	K	mg/L	0.89	0.80			0.1
Manganese	Mn	mg/L	0.003	< 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	1.8			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.6	26.6		250	
Chloride	Cl ⁻	mg/L	7.0	8.0		250	5
Phosphorus	P	mg/L	< 0.05	0.57			0.05
Free Carbon Dioxide	CO ₂	mg/L	0.9	2.5			
Total Hardness (3), (4), (5)		mg/L	100	108			
Total Alkalinity (3)		mg/L	76	68			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	76	68			
Non-Carbonate Hardness (3)		mg/L	24	40			
Chemical Oxygen Demand		mg/L	6.8	< 2.0			2
Dissolved Oxygen		mg/L	10.4	11.7			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.44	0.42	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.46	4.0	2.0	0.5
pH			8.21	7.74	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	228	231			
Temperature		°C	15.8	11.0			

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 detection limit.
IV: Invalid Sample	

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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All GLWA Water Treatment Plant Mineral Reports

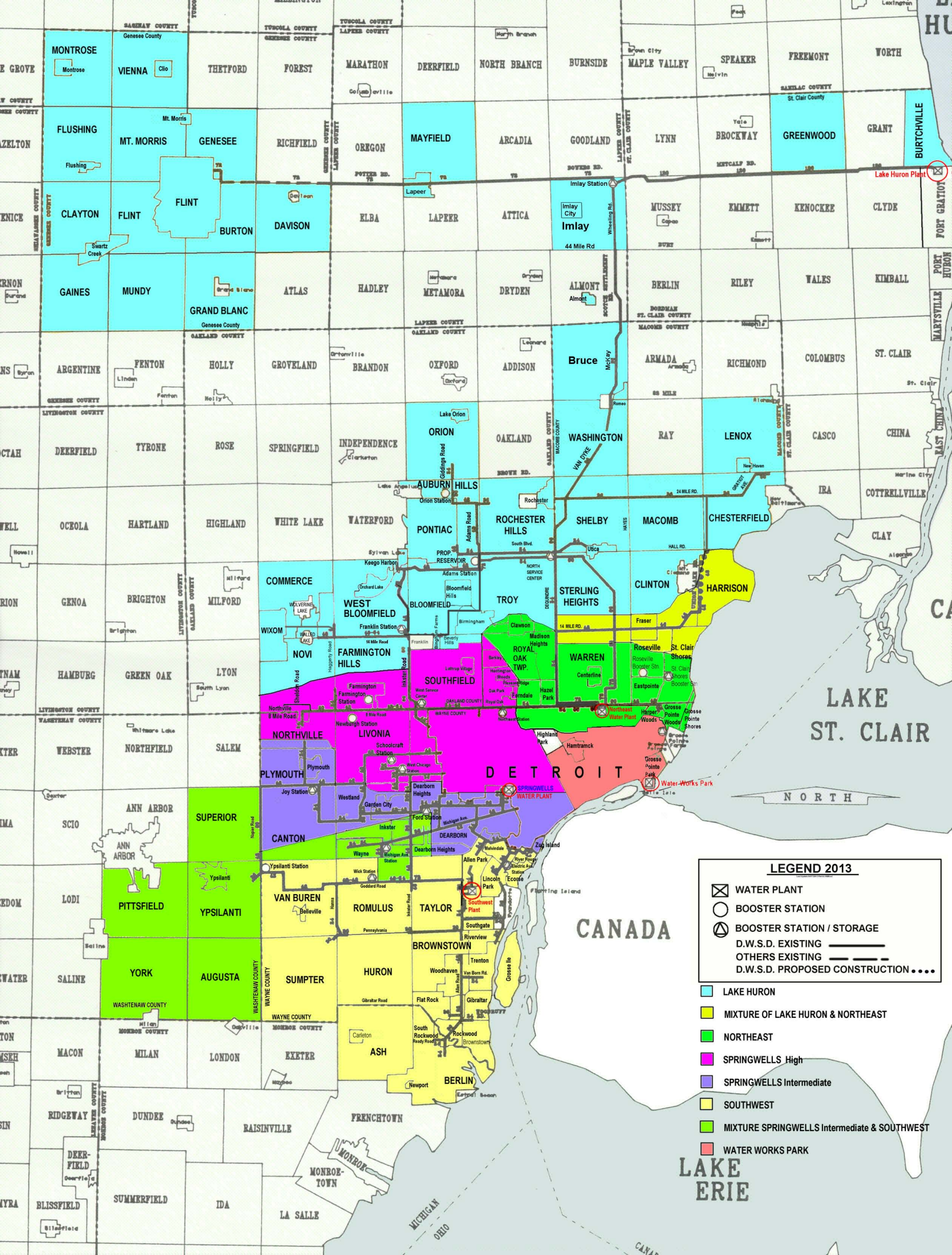
Sample Dates: 11/15/2016 11/15/2016 11/15/2016 11/15/2016 11/15/2016 11/15/2016 11/15/2016 11/15/2016

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	Tap			
Turbidity		NTU	0.79	0.06	14.00	0.04	4.90	0.05	0.06	0.16	0.3/95% (1)			
Total Solids		mg/L	133	113	174	146	165	145	135	161		500	10	
Total Dissolved Solids		mg/L	118	98	78	115	121	129	133	125		500	10	
Aluminum	Al	mg/L	< 0.050	< 0.050	0.193	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		0.05-0.2	0.005	
Iron	Fe	mg/L	< 0.050	< 0.050	0.267	< 0.050	0.103	< 0.050	< 0.050	< 0.050		0.3	0.005	
Copper	Cu	mg/L	0.006	< 0.005	0.011	< 0.005	0.013	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.002	
Magnesium	Mg	mg/L	8.31	8.01	10.17	8.72	10.32	8.35	8.54	8.73			0.5	
Calcium	Ca	mg/L	33.2	32.1	40.7	34.9	41.3	33.4	34.2	34.9			0.1	
Sodium	Na	mg/L	5.18	5.47	5.27	5.72	5.46	5.62	4.75	4.84		20 (2)	0.1	
Potassium	K	mg/L	0.83	0.81	0.87	0.86	0.89	0.89	0.82	0.80			0.1	
Manganese	Mn	mg/L	< 0.002	< 0.002	0.014	< 0.002	0.003	< 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	1.5	1.2	1.5	1.2	1.4	1.4	1.8			0.4	
Sulfate	SO ₄ ²⁻	mg/L	18.2	20.2	24.3	17.5	17.6	24.8	26.7	26.6		250		
Chloride	Cl ⁻	mg/L	7.0	7.5	7.0	8.0	7.0	7.5	8.5	8.0		250	5	
Phosphorus	P	mg/L	< 0.05	0.38	< 0.05	0.31	< 0.05	0.33	0.57	0.57			0.05	
Free Carbon Dioxide	CO ₂	mg/L	1.6	3.2	1.8	3.2	0.9	2.1	5.3	2.5				
Total Hardness (3), (4), (5)		mg/L	106	100	102	108	100	102	102	108				
Total Alkalinity (3)		mg/L	82	78	82	78	76	70	72	68				
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0				
Bi-Carbonate Alkalinity (3)		mg/L	82	78	82	78	76	70	72	68				
Non-Carbonate Hardness (3)		mg/L	24	22	20	30	24	32	30	40				
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0	6.4	< 2.0	6.8	< 2.0	3.6	< 2.0				2
Dissolved Oxygen		mg/L	9.7	9.9	10.7	10.8	10.4	10.6	10.7	11.7				
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	0.46	0.36	0.32	0.30	0.44	0.44	0.42	0.42	10		0.1	
Fluoride	F ⁻	mg/L	0.09	0.60	0.10	0.41	0.10	0.51	0.46	0.46	4.0	2.0	0.5	
pH			8.01	7.69	7.96	7.68	8.21	7.83	7.43	7.74	6.5-8.5	6.5-8.5		
Specific Conductance @ 25 °C.		micromhos	218	184	226	231	228	207	225	231				
Temperature		°C	16.6	17.7	10.4	10.5	15.8	15.6	11.9	11.0				

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



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