



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:		01/16/2018		01/16/2018		01/16/2018		01/16/2018		01/16/2018		01/16/2018		01/16/2018		MCL	Sec.Std	MDL
Parameter	Formula	Units	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap				
Turbidity		NTU	1.50	0.05	2.70	0.03	1.90	0.07	0.10	0.05	0.3/95% (1)							
Total Solids		mg/L	108	113	125	127	123	127	123	137							500	10
Total Dissolved Solids		mg/L	130	118	114	123	117	122	131	126							500	10
Aluminum	Al	mg/L	0.138	0.103	0.169	0.078	0.260	0.117	0.169	0.066							0.05-0.2	0.005
Iron	Fe	mg/L	0.030	< 0.005	0.068	< 0.005	0.080	< 0.005	< 0.005	0.022							0.3	0.005
Copper	Cu	mg/L	0.013	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)						1.0	0.002
Magnesium	Mg	mg/L	7.78	8.30	8.65	8.90	7.98	8.35	8.98	8.93								0.5
Calcium	Ca	mg/L	25.9	26.4	26.7	27.8	26.9	27.2	27.8	27.5								0.1
Sodium	Na	mg/L	4.69	4.93	5.21	5.40	5.55	5.13	5.68	5.70							20 (2)	0.1
Potassium	K	mg/L	0.87	0.88	0.90	0.90	1.06	0.95	0.90	0.92								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)							0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1							5	0.1
Silica	SiO ₂	mg/L	0.9	1.1	0.9	1.1	1.1	1.1	0.8	0.9								0.4
Sulfate	SO ₄ ²⁻	mg/L	16.8	21.5	17.8	25.5	17.2	22.7	24.0	24.9							250	
Chloride	Cl ⁻	mg/L	7.9	8.9	7.9	9.4	8.4	9.9	9.9	9.9							250	5
Phosphorus	P	mg/L	< 0.05	0.39	< 0.05	0.34	< 0.05	0.36	0.36	0.37								0.05
Free Carbon Dioxide	CO ₂	mg/L	1.0	5.7	1.6	7.8	1.4	7.6	6.9	7.0								
Total Hardness (3), (4), (5)		mg/L	96	104	106	104	102	106	106	102								
Total Alkalinity (3)		mg/L	82	72	86	74	86	74	76	80								
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0								
Bi-Carbonate Alkalinity (3)		mg/L	81	72	85	74	85	74	76	80								
Non-Carbonate Hardness (3)		mg/L	14	32	20	30	16	32	30	22								
Chemical Oxygen Demand		mg/L	2.9	< 2	2.9	2.9	3.3	3.3	2.5	2.5								2
Dissolved Oxygen		mg/L	15.0	15.6	14.5	14.8	15.2	16.8	14.7	15.2								
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	0.30	0.29	0.30	0.30	0.29	0.27	0.28	0.30	10							0.1
Fluoride	F ⁻	mg/L	0.08	0.75	0.08	0.61	0.07	0.60	0.39	0.35	4.0						2.0	0.5
pH			8.20	7.40	8.04	7.28	8.08	7.29	7.34	7.36							6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	228	231	240	230	237	239	239								
Temperature		°C	0.0	9.2	1.5	1.7	0.1	4.0	1.1	2.0								

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) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	

Reporting Analyst: Korey Raupach
 Reviewed By: Patrick Williford

Chemist-I
 Management Professional - Ops.

Initials: **K.R.**
 Initials: **P.W.**

Date: 02/28/2018
 Date: 03/13/2018

Great Lakes Water Authority



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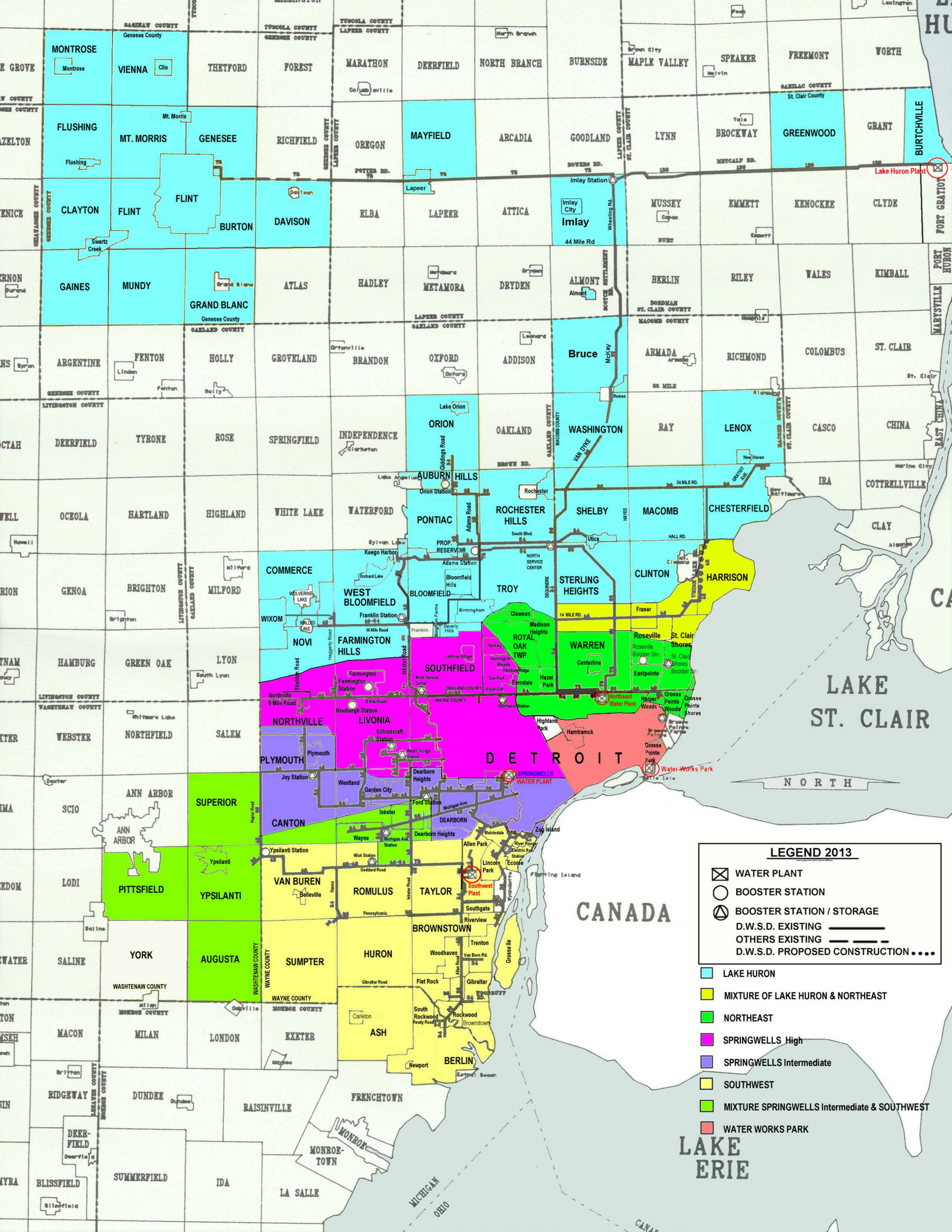
Sample Dates: 02/13/2018 02/13/2018 02/13/2018 02/13/2018 02/13/2018 02/13/2018 02/13/2018 02/13/2018

Parameter	Formula	Units	Lake Huron		Southwest		Belle Isle		Water Works Park		Northeast		Springwells		MCL	Sec.Std	MDL
			Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap			
Turbidity		NTU	0.52	0.06	2.40	0.04	3.70	0.06	0.07	0.09	0.3/95% (1)						
Total Solids		mg/L	127	135	155	161	131	140	141	139					500	10	
Total Dissolved Solids		mg/L	120	127	155	158	137	137	142	136					500	10	
Aluminum	Al	mg/L	0.080	0.105	0.172	0.103	0.190	0.093	0.103	0.079					0.05-0.2	0.005	
Iron	Fe	mg/L	0.010	< 0.005	0.061	< 0.005	0.055	< 0.005	0.005	0.014					0.3	0.005	
Copper	Cu	mg/L	0.007	< 0.005	0.008	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)			1.0	0.002		
Magnesium	Mg	mg/L	7.75	7.90	8.15	8.35	8.10	7.88	7.88	7.90						0.5	
Calcium	Ca	mg/L	29.0	28.9	32.5	34.0	30.0	30.4	29.6	29.7						0.1	
Sodium	Na	mg/L	5.34	5.36	8.64	9.72	6.94	7.35	6.83	6.93				20 (2)	0.1		
Potassium	K	mg/L	0.96	0.95	1.27	1.31	1.22	1.01	0.98	0.99						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)				0.001		
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				5	0.1		
Silica	SiO ₂	mg/L	2.5	2.8	2.7	2.9	2.4	2.6	2.6	2.6					0.4		
Sulfate	SO ₄ ²⁻	mg/L	16.8	20.1	19.1	27.2	17.1	22.0	24.8	21.5				250			
Chloride	Cl ⁻	mg/L	7.4	8.4	12.9	15.3	9.9	11.4	11.4	11.4				250	5		
Phosphorus	P	mg/L	< 0.05	0.40	< 0.05	0.33	< 0.05	0.40	0.35	0.37					0.05		
Free Carbon Dioxide	CO ₂	mg/L	1.0	5.7	2.1	12.1	1.7	7.4	7.2	7.3							
Total Hardness (3), (4), (5)		mg/L	104	100	114	116	106	104	106	104							
Total Alkalinity (3)		mg/L	82	72	88	78	88	74	74	78							
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0							
Bi-Carbonate Alkalinity (3)		mg/L	81	72	87	78	87	74	74	78							
Non-Carbonate Hardness (3)		mg/L	22	28	26	38	18	30	32	26							
Chemical Oxygen Demand		mg/L	4.9	2.5	3.3	2.5	4.1	2.1	2.5	3.3						2	
Dissolved Oxygen		mg/L	13.0	13.5	12.9	13.1	13.0	14.0	13.5	13.4							
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	0.27	0.25	1.01	1.00	0.29	0.31	0.28	0.28				10	0.1		
Fluoride	F ⁻	mg/L	0.08	0.77	0.09	0.73	0.08	0.63	0.58	0.61				4.0	2.0	0.5	
pH			8.20	7.40	7.91	7.11	8.00	7.30	7.31	7.33				6.5-8.5			
Specific Conductance @ 25 °C.		micromhos	190	196	134	242	207	209	212	212							
Temperature		°C	0.0	7.8	2.1	1.6	0.1	4.0	6.2	2.5							

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
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< : Less than	(5) Hardness in Grains per Gallon = 0.058 x (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting Analyst: Khan & Levoska Chemist Initials: **K.R.** Date: 06/25/2018
 Reviewed By: Patrick Williford Management Professional - Ops. Initials: **P.W.** Date: 06/29/2018

Great Lakes Water Authority

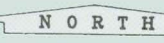


LEGEND 2013

- ☒ 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



MICHIGAN OHIO

CANADA

LAKE ST. CLAIR

DETROIT

MONTRÖSE

VIENNA

THETFORD

FOREST

MARATHON

DEERFIELD

NORTH BRANCH

BURNSIDE

MAPLE VALLEY

SPEAKER

FREEMONT

WORTH

BURCHVILLE

FLUSHING

MT. MORRIS

GENESEE

RICHFIELD

OREGON

MAYFIELD

ARCADIA

GOODLAND

LYNN

BROCKWAY

GREENWOOD

GRANT

CLYDE

PORT GRANT

CLAYTON

FLINT

FLINT

BURTON

DAVISON

ELBA

LAPEER

ATTICA

IMLAY

MUSSEY

EMMETT

KENOCKEE

CLYDE

PORT GRANT

GAINES

MUNDY

GRAND BLANC

ATLAS

HADLEY

METAMORA

DRYDEN

ALMONT

BERLIN

RILEY

WALES

KIMBALL

ST. CLAIR

PORT GRANT

ARGENTINE

FENTON

HOLLY

GROVELAND

BRANDON

OXFORD

ADDISON

BRUCE

ARMADA

RICHMOND

COLOMBUS

ST. CLAIR

ST. CLAIR

PORT GRANT

DEERFIELD

TYBONE

ROSE

SPRINGFIELD

INDEPENDENCE

OAKLAND

WASHINGTON

RAY

LENOX

CASCO

CHINA

ST. CLAIR

ST. CLAIR

PORT GRANT

OCOLA

HARTLAND

HIGHLAND

WHITE LAKE

WATERFORD

PONTIAC

ROCHESTER HILLS

SHELBY

MACOMB

CHESTERFIELD

CLAY

CLAY

CLAY

CLAY

GENOA

BRIGHTON

MILFORD

COMMERCE

WEST BLOOMFIELD

BLOOMFIELD

TROY

STERLING HEIGHTS

CLINTON

HARRISON

ST. CLAIR

ST. CLAIR

ST. CLAIR

ST. CLAIR

HAMBURG

GREEN OAK

LYON

NOVI

FARMINGTON HILLS

SOUTHFIELD

ROYAL OAK TWP.

WARREN

ST. CLAIR

ST. CLAIR

ST. CLAIR

ST. CLAIR

ST. CLAIR

ST. CLAIR

WEBSTER

NORTHFIELD

SALEM

NORTHVILLE

LIVONIA

DEARBORN

DEARBORN

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DEARBORN

DEARBORN

DEARBORN

SCIO

ANN ARBOR

ANN ARBOR

SUPERIOR

CANTON

PLYMOUTH

PLYMOUTH

PLYMOUTH

PLYMOUTH

PLYMOUTH

PLYMOUTH

PLYMOUTH

PLYMOUTH

PLYMOUTH

LODI

PITTSFIELD

YPSILANTI

YPSILANTI

VAN BUREN

ROMULUS

TAYLOR

TAYLOR

TAYLOR

TAYLOR

TAYLOR

TAYLOR

TAYLOR

TAYLOR

SALINE

YORK

AUGUSTA

SUMPTER

HURON

HURON

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HURON

HURON

MACON

MILAN

LONDON

EXETER

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SUMMERFIELD

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