

*CONCEPTUAL SITE MODEL
FORMER WURTSMITH AIR FORCE BASE &
OSCODA AREA*

- Historic PFAS Investigations
- Geology and Hydrology
- PFAS Detections in Groundwater and Surface Water
- Criteria Exceedances in Groundwater and Surface Water
- Current Projects

HISTORIC PFAS INVESTIGATIONS

2010 - 2011

2012-2013

2014-2015

2016-2017

2018-2019



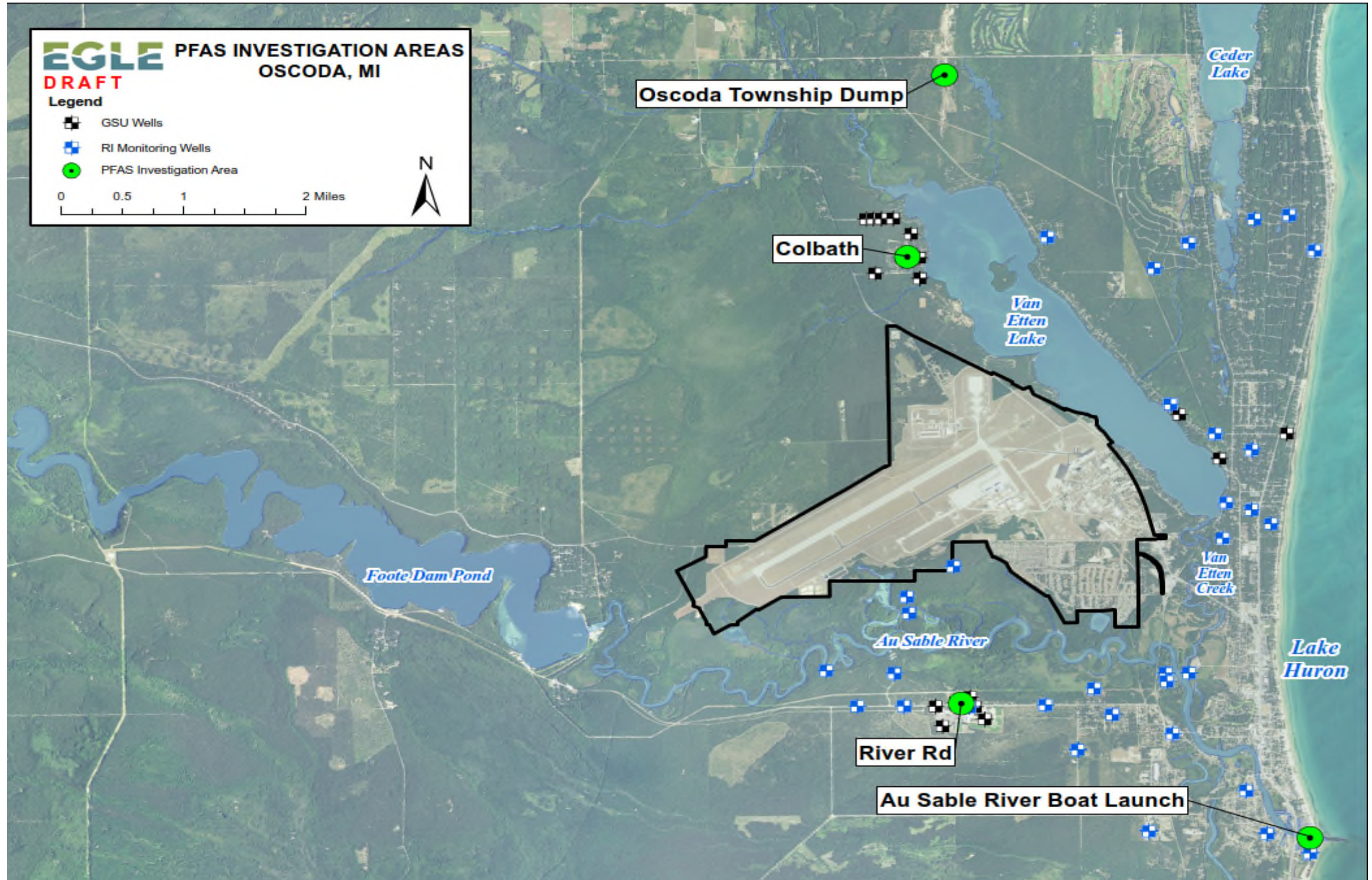
EGLE collects soil, groundwater, surface water, and fish samples

USAF base-wide PFAS sampling

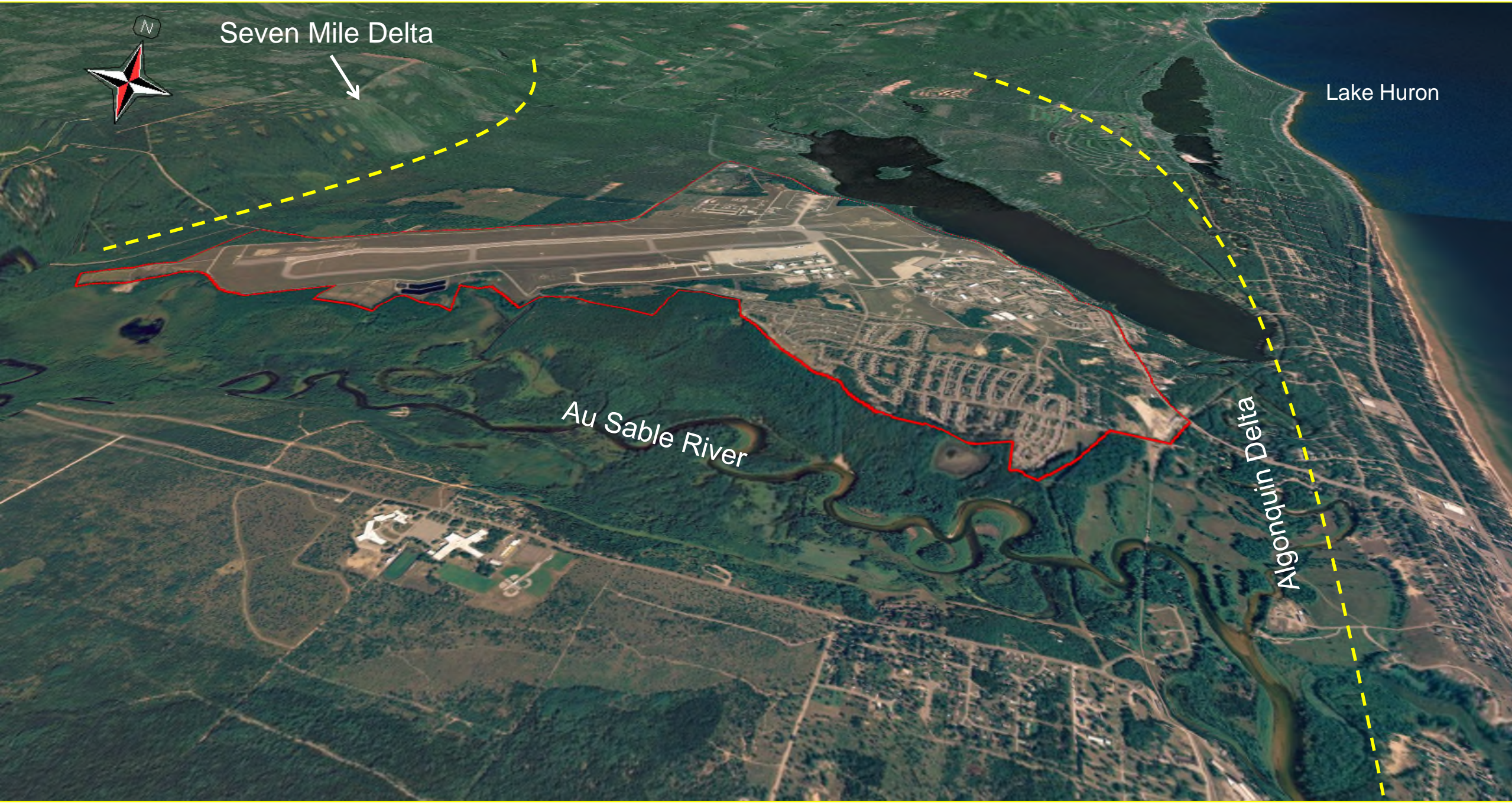
USAF completes Focus Feasibility Study and installs the FT-02 P&T System

Preliminary Assessment (PA) Site Investigation (SI)

Expanded Site Investigation (ESI)
USAF installs the Central Treatment Plant for PFAS



GEOLOGY AND HYDROLOGY

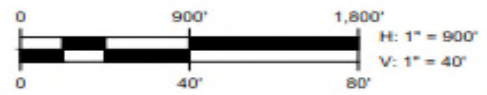
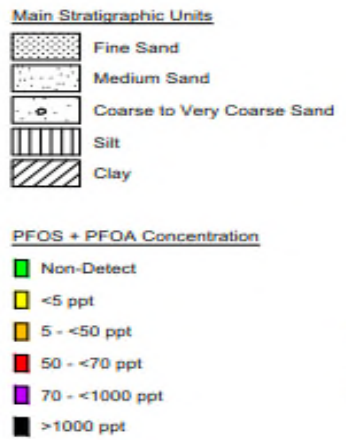
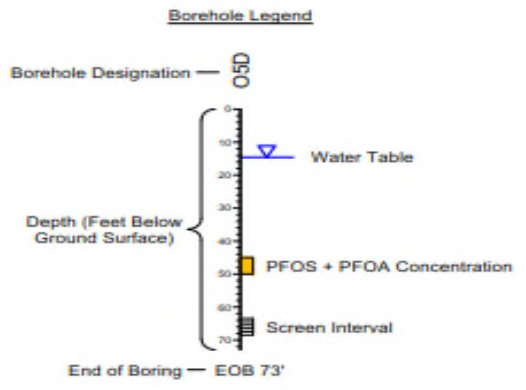
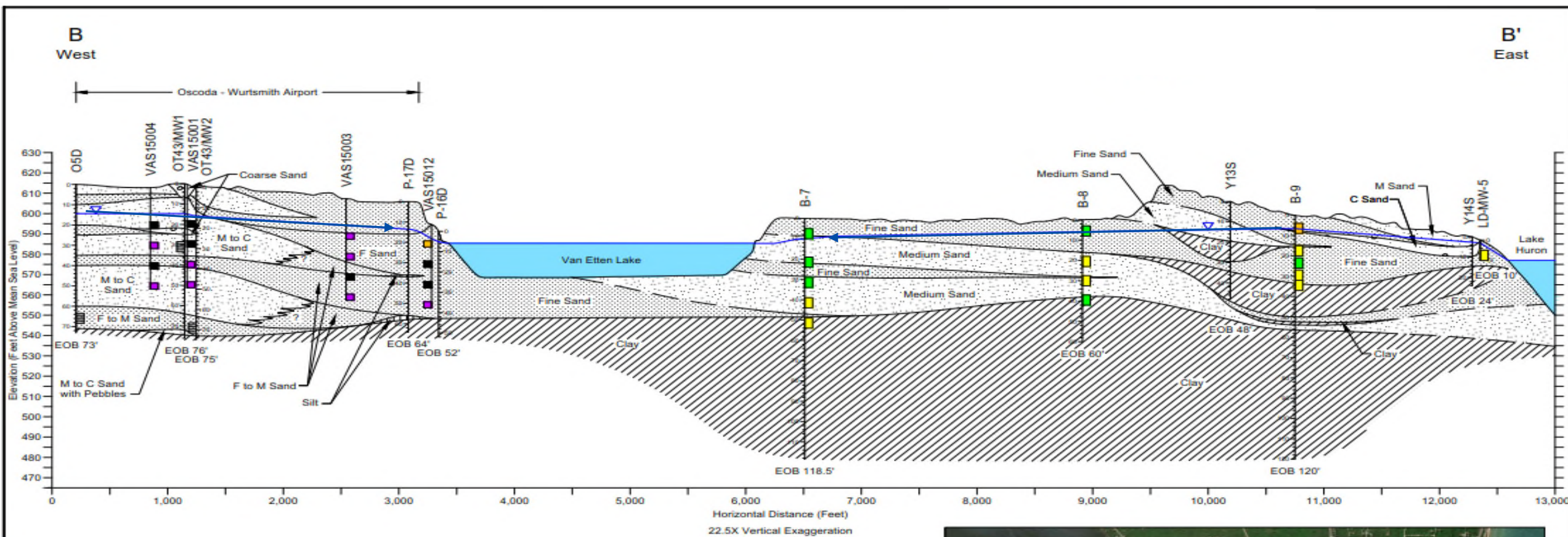


Seven Mile Delta

Lake Huron

Au Sable River

Algonquin Delta

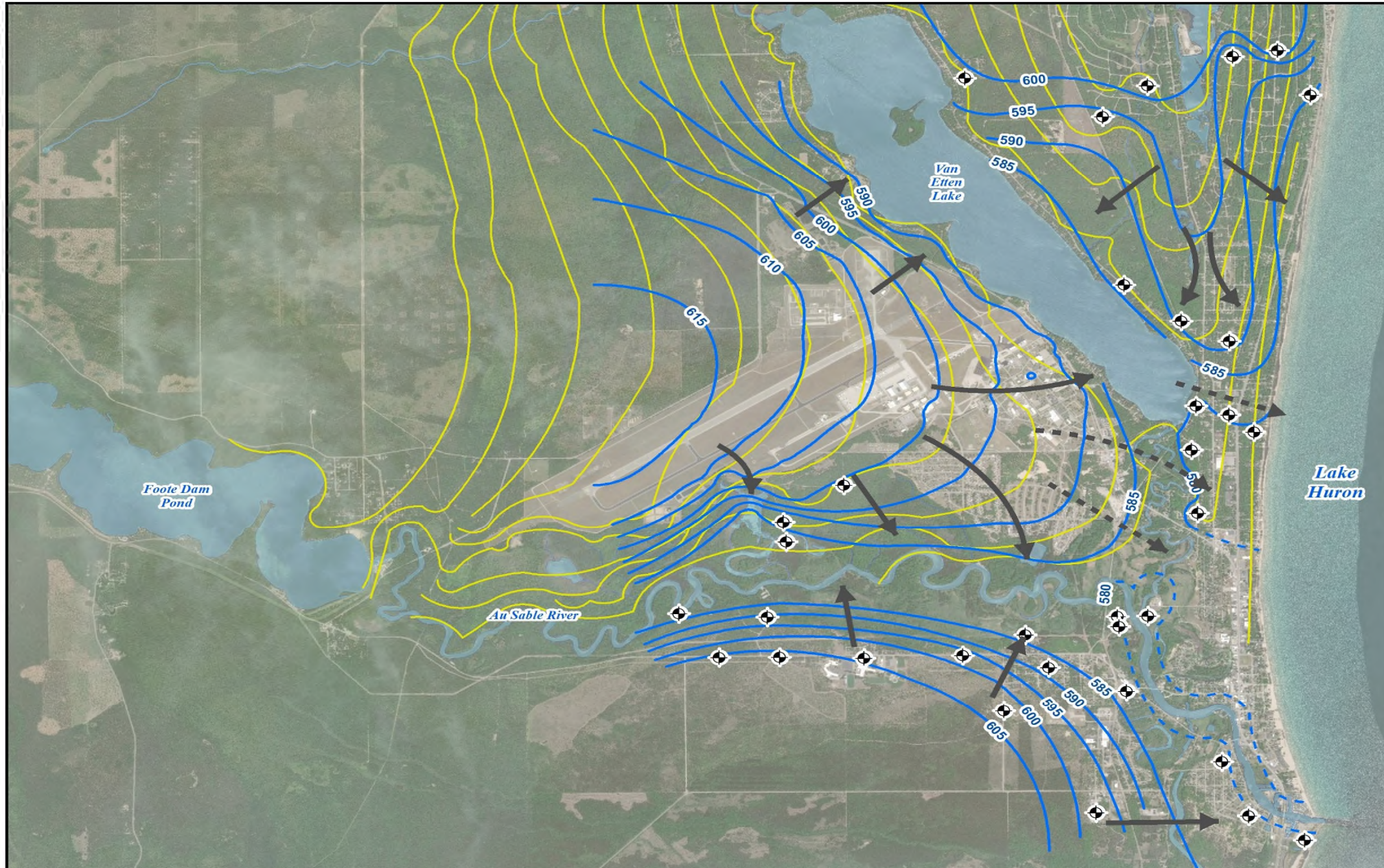




1/8/2020

Legend

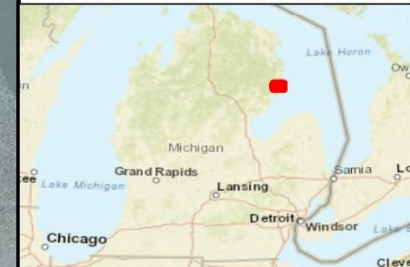
- RI Monitoring Wells
- Groundwater Contour
- Inferred Groundwater Contour
- USGS Contour
- Groundwater Flow Direction

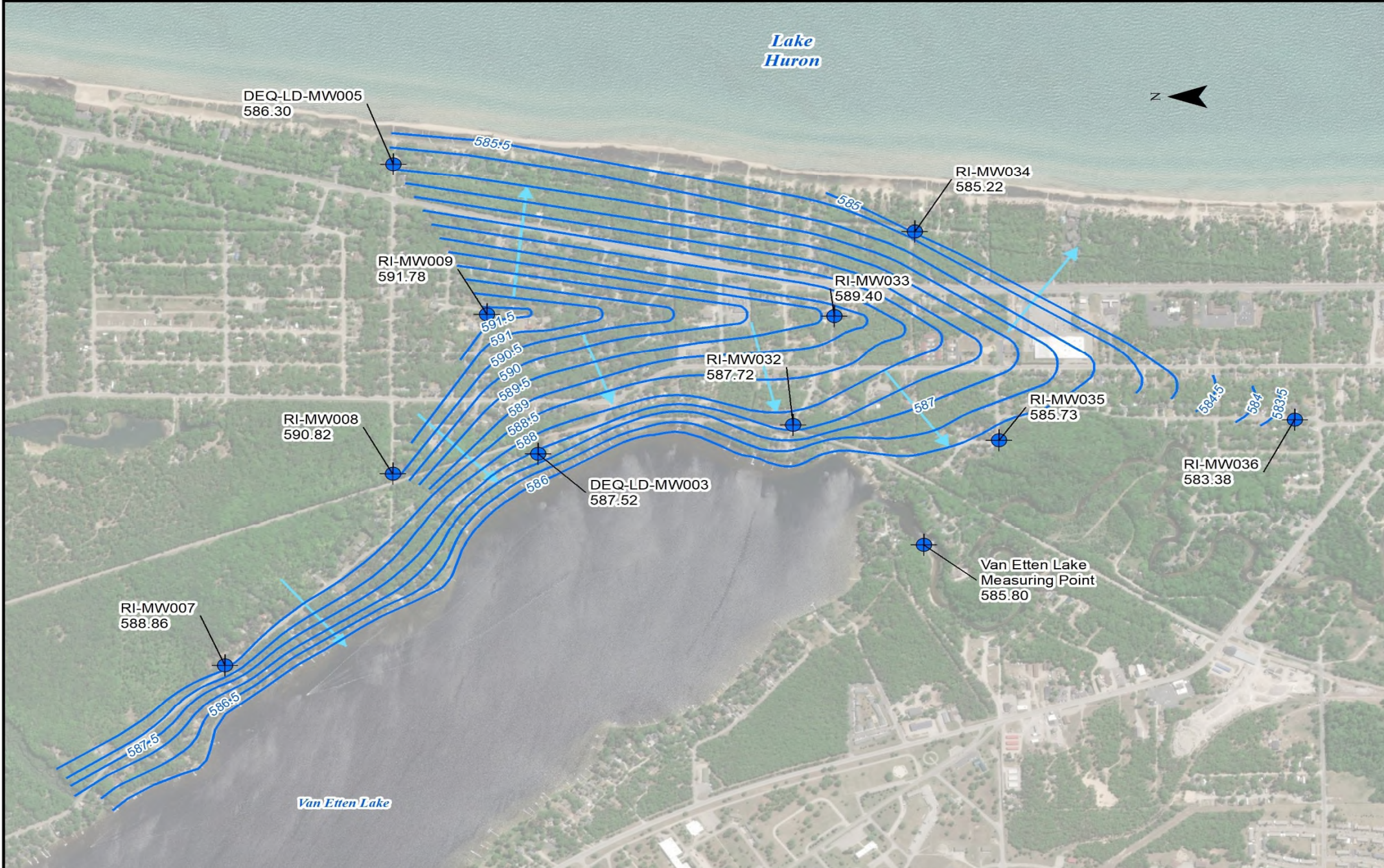


COMPOSITE
POTENTIOMETRIC
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN

0 3,400 6,800
Feet



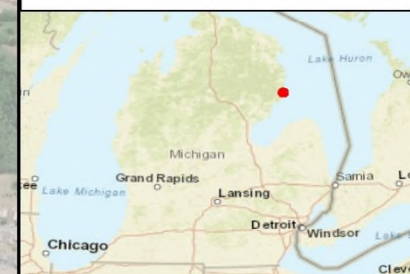


Legend

- Groundwater Elevation Monitoring Points
- Groundwater Elevation Contours
- Groundwater Flow Direction

DECEMBER 12, 2018
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN

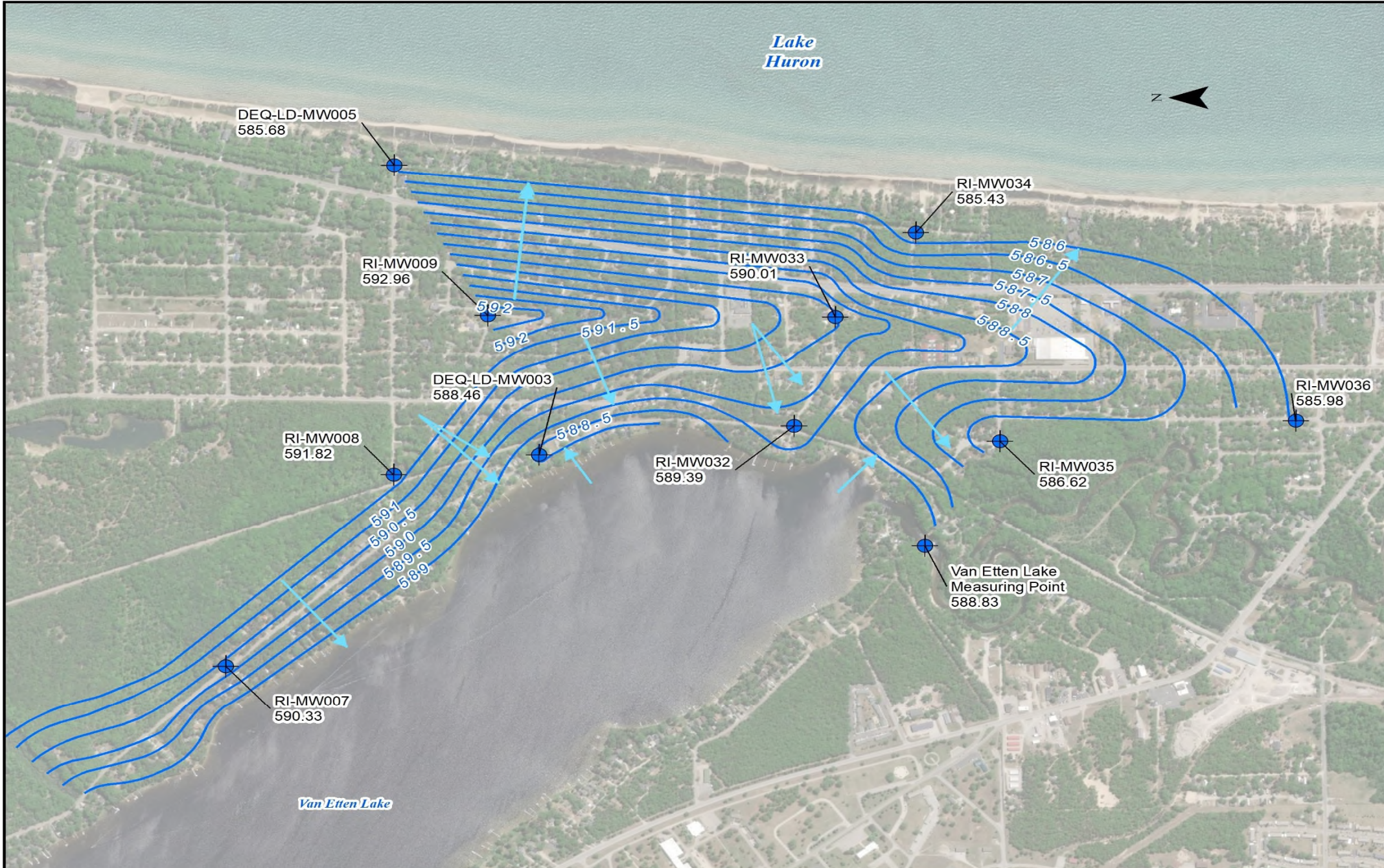




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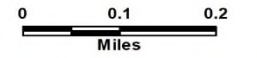
Legend

- Groundwater Elevation Monitoring Points
- Groundwater Elevation Contours
- Groundwater Flow Direction



JULY 17, 2019
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN





1/8/2020

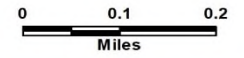


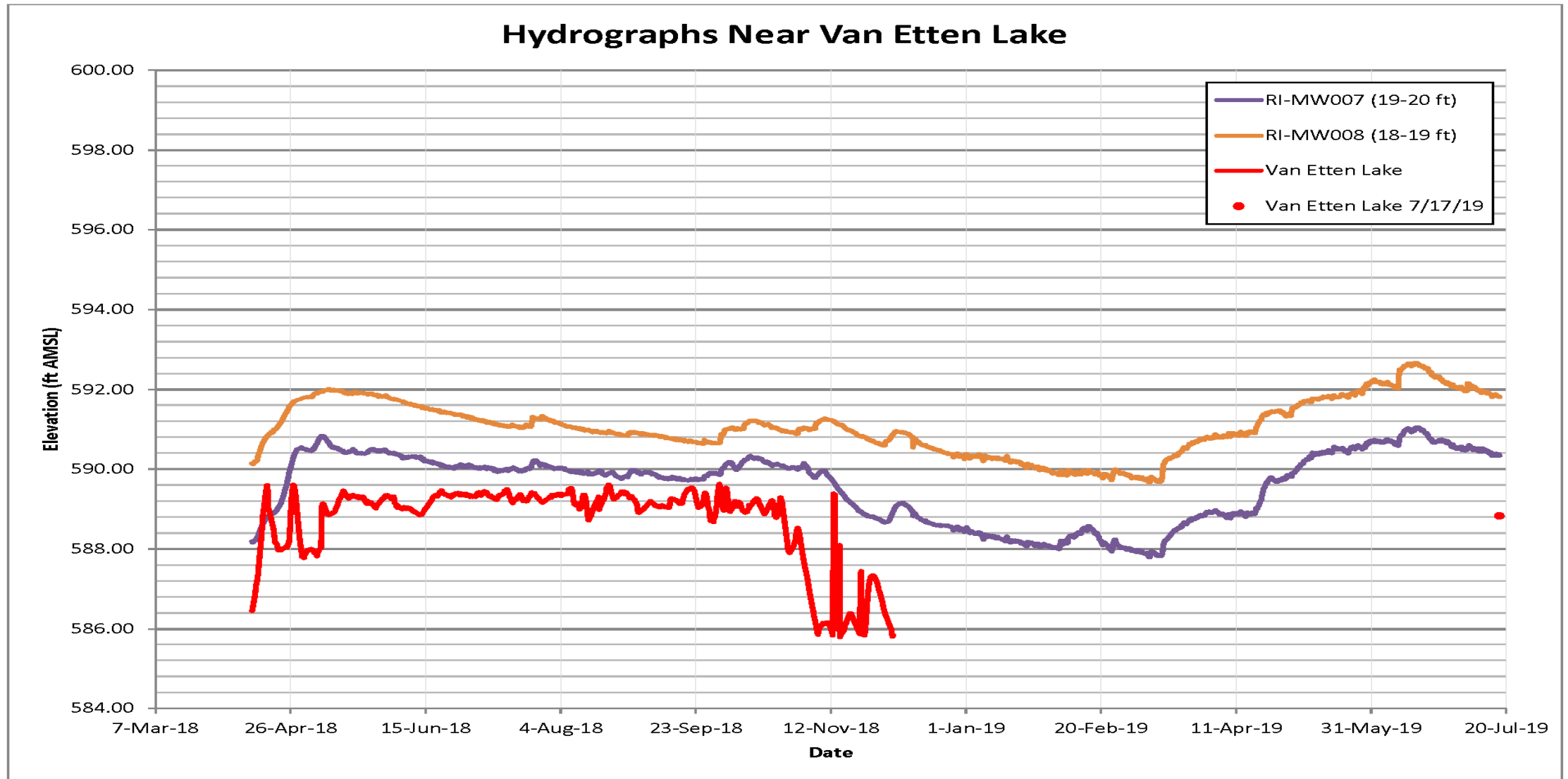
Legend

- Groundwater Elevation Monitoring Points
- Groundwater Elevation Contours
- Groundwater Flow Direction

JULY 17, 2019
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN



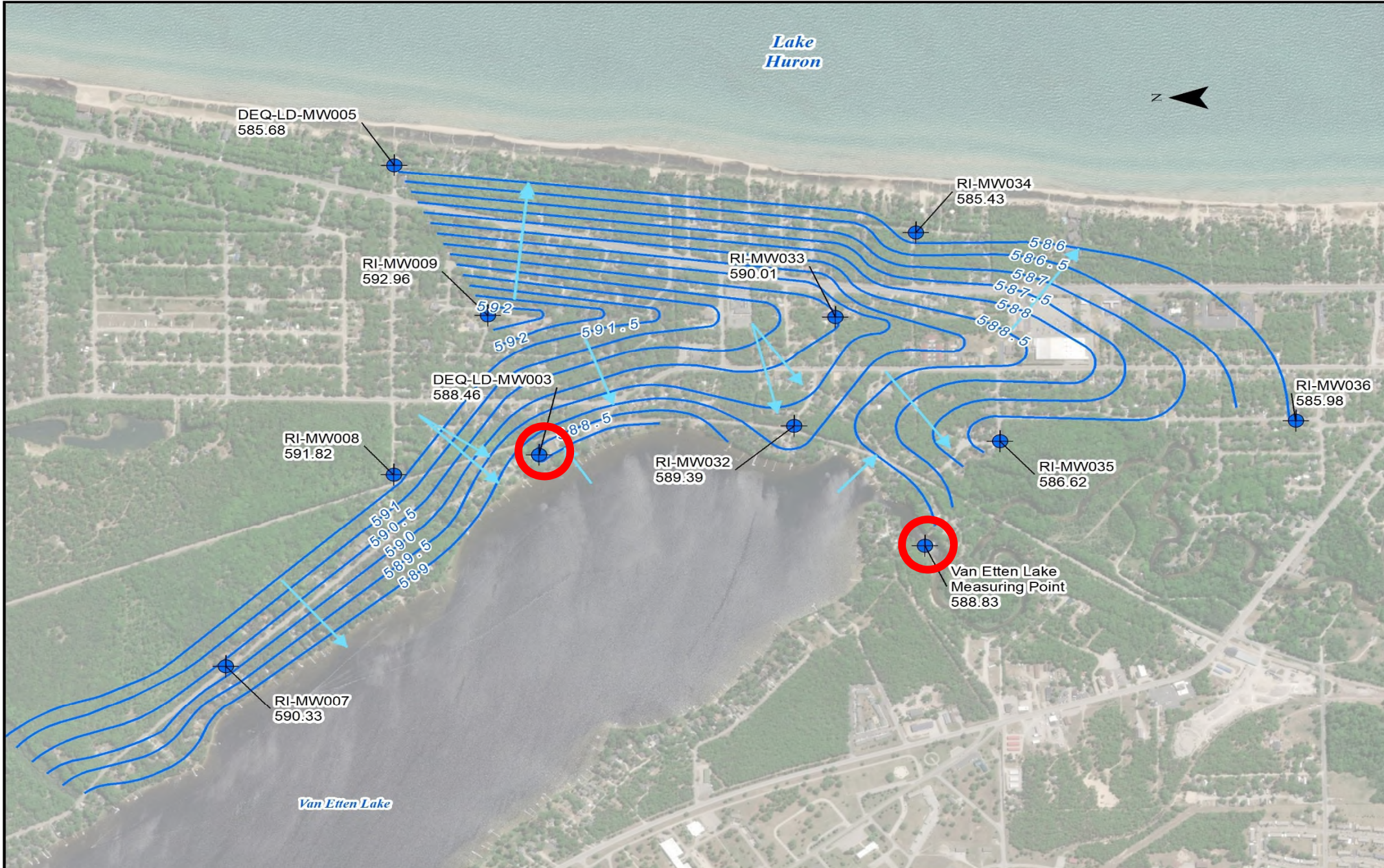




1/8/2020

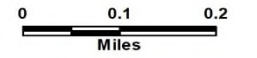
Legend

- Groundwater Elevation Monitoring Points
- Groundwater Elevation Contours
- Groundwater Flow Direction

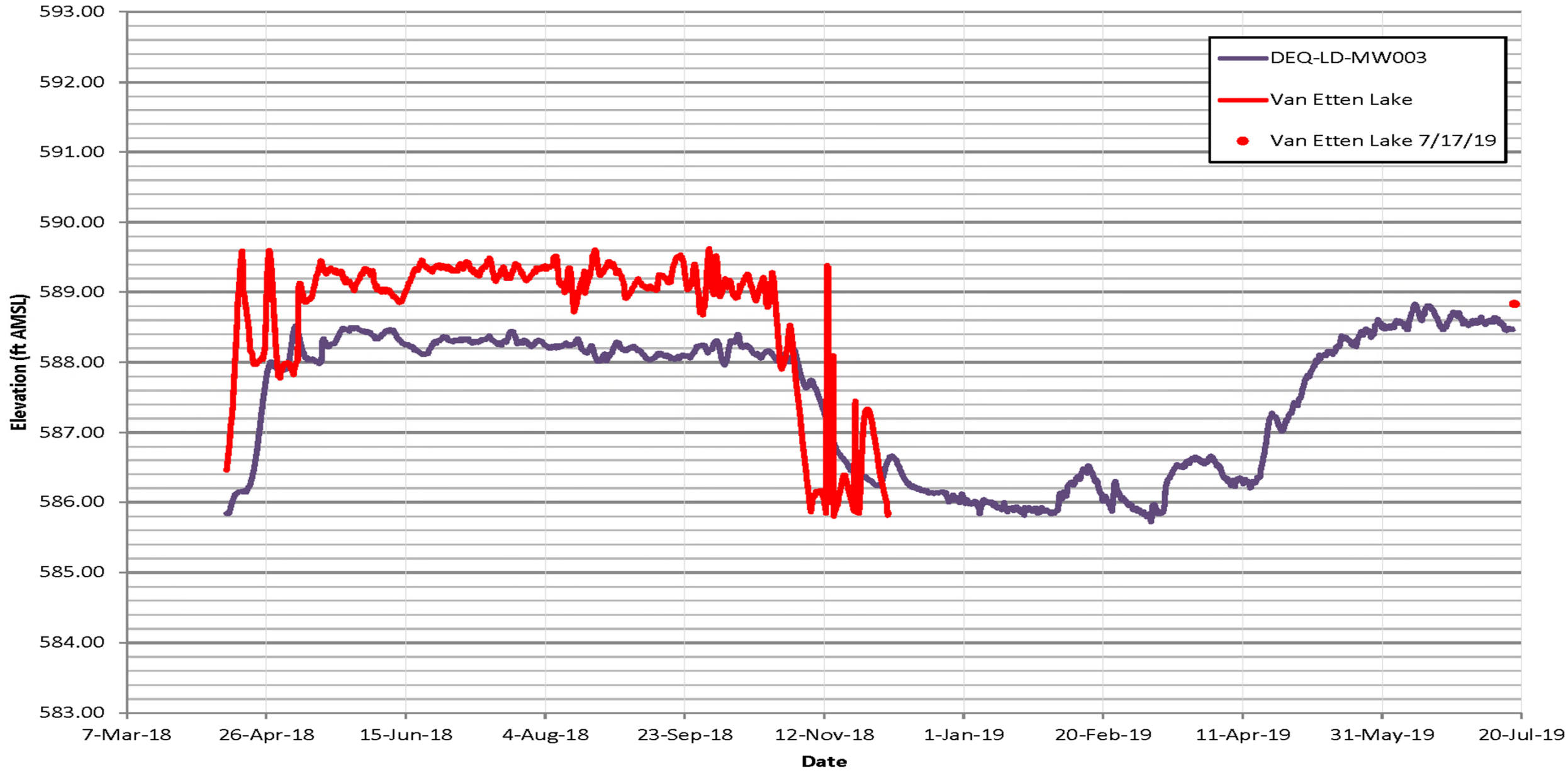


JULY 17, 2019
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN



Hydrographs Near Van Etten Lake

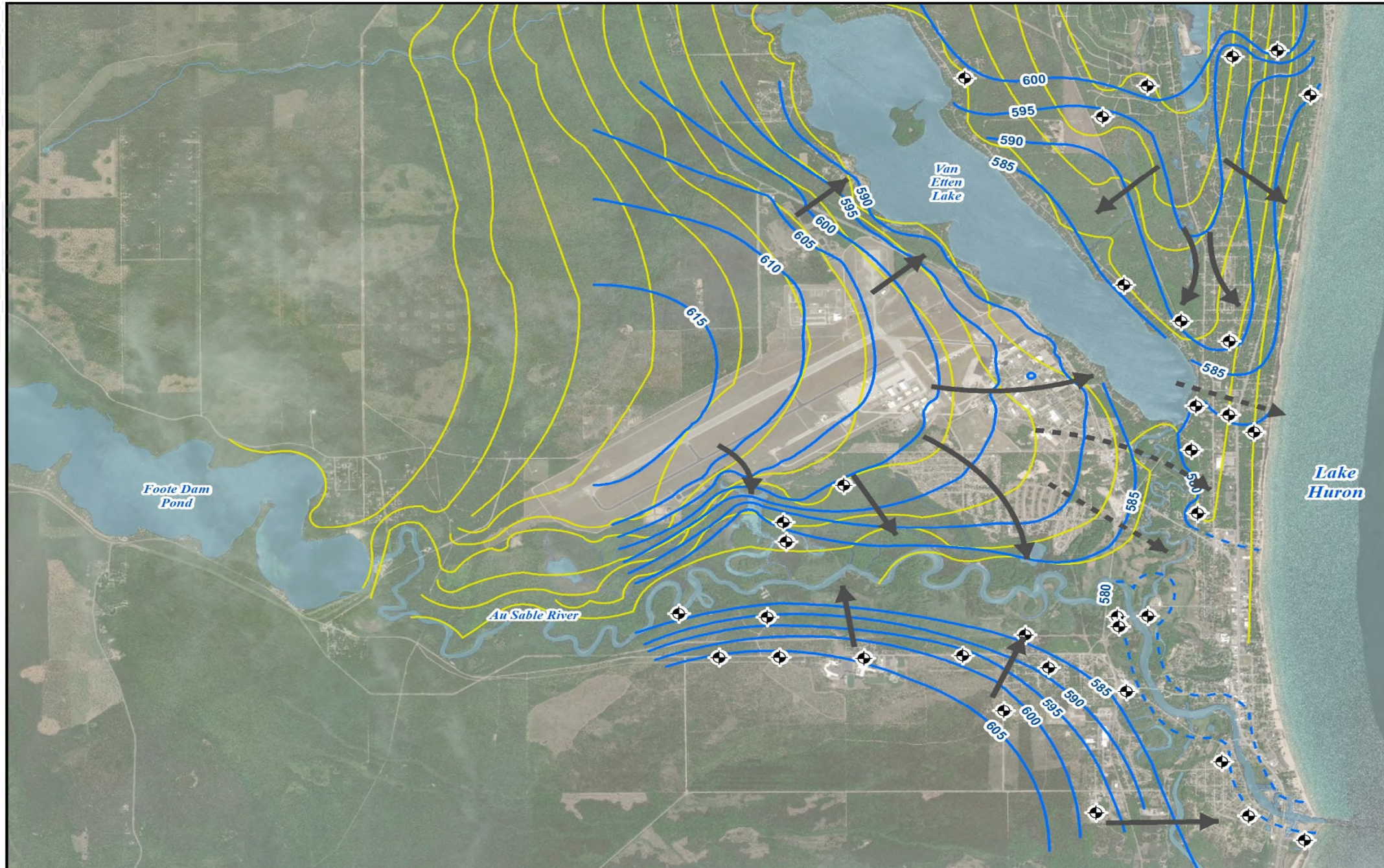




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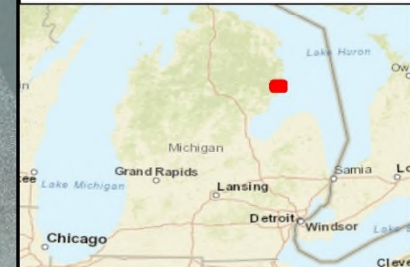
- RI Monitoring Wells
- Groundwater Contour
- Inferred Groundwater Contour
- USGS Contour
- Groundwater Flow Direction



COMPOSITE
POTENTIOMETRIC
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN

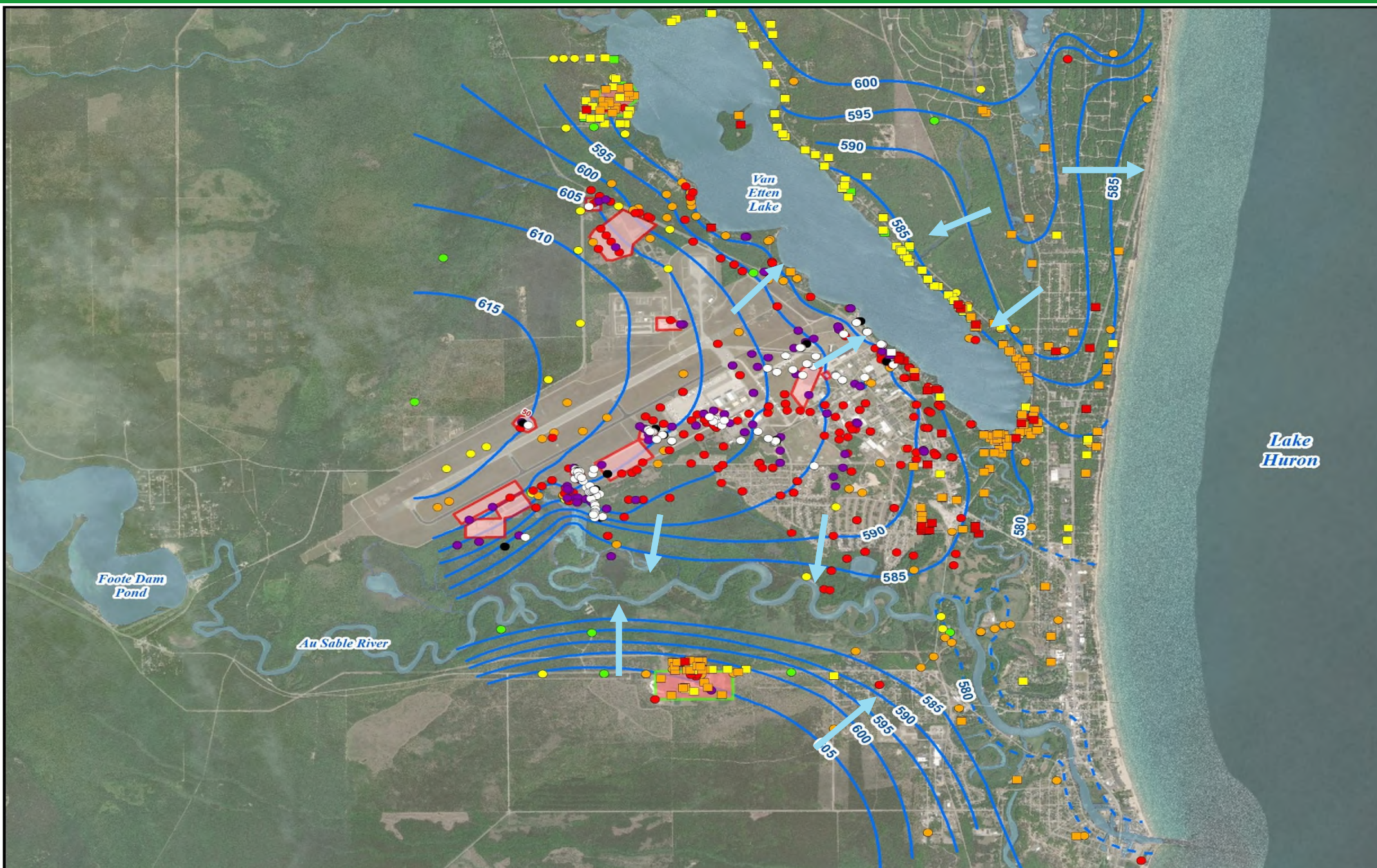
0 3,400 6,800
Feet



*PFAS DETECTIONS IN GROUNDWATER
AND SURFACE WATER*



1/8/2020



Total PFAS (ppt)

Residential Wells

- Green square: Non-Detect
- Yellow square: <10
- Orange square: 10 - <70
- Red square: 70 - <1,000
- Purple square: 1,000 - <5,000
- Black square: 5,000 - <10,000
- White square: >10,000

Groundwater Samples

- Green circle: Non-Detect
- Yellow circle: <10
- Orange circle: 10 - <70
- Red circle: 70 - <1,000
- Purple circle: 1,000 - <5,000
- Black circle: 5,000 - <10,000
- White circle: >10,000

— Groundwater Contour
- - - Inferred Groundwater Contour

PFAS Sources

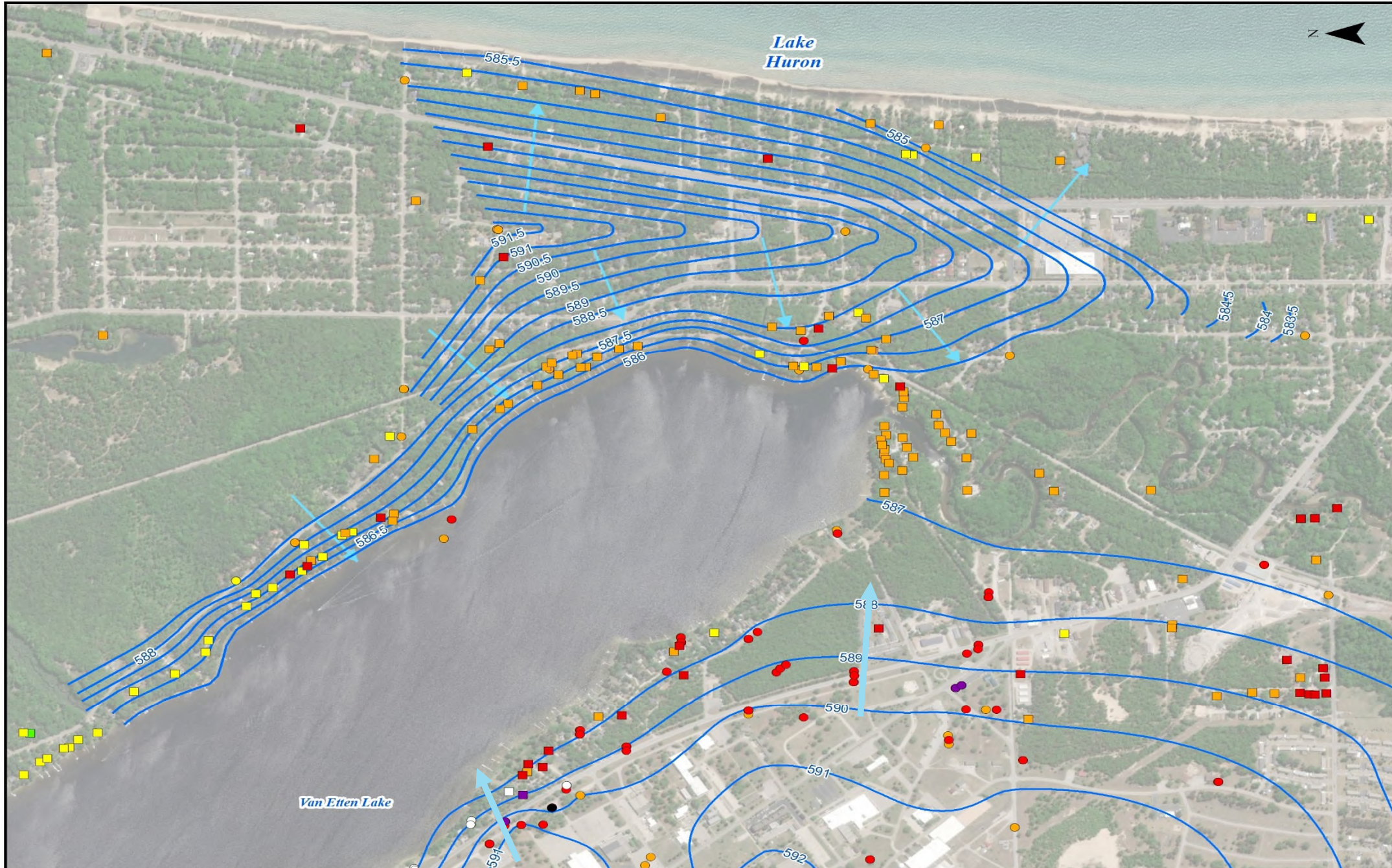
- Red outline: On-Site Source
- Pink outline: Off-Site Source

GROUNDWATER AND RESIDENTIAL SAMPLING RESULTS TOTAL PFAS

**FORMER WURTSMITH AIR FORCE BASE & OSCODA AREA
IOSCO COUNTY, MICHIGAN**

0 3,300 6,600
Feet



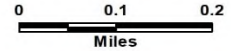


1/8/2020

- Legend**
- Residential Wells**
- Non-Detect
 - <10
 - 10 - <70
 - 70 - <1,000
 - 1,000 - <5,000
 - 5,000 - <10,000
 - >10,000
- Groundwater Samples**
- Non-Detect
 - <10
 - 10 - <70
 - 70 - <1,000
 - 1,000 - <5,000
 - 5,000 - <10,000
 - >10,000
- Groundwater Elevation Contours
- Groundwater Flow Direction

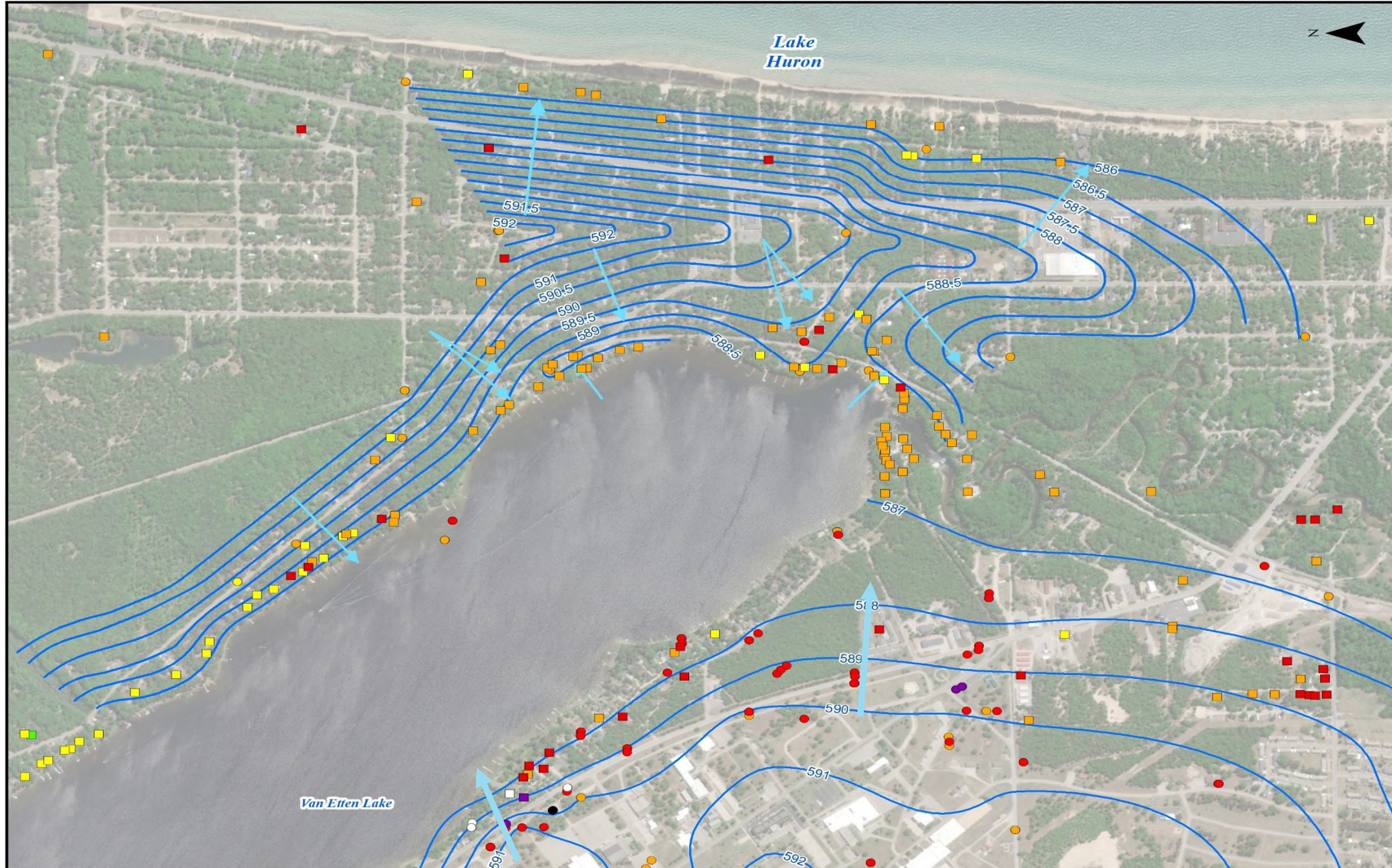
DECEMBER 12, 2018
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN





1/8/2020



Legend

Residential Wells

- Green square: Non-Detect
- Yellow square: <10
- Orange square: 10 - <70
- Red square: 70 - <1,000
- Purple square: 1,000 - <5,000
- Black square: 5,000 - <10,000
- White square: >10,000

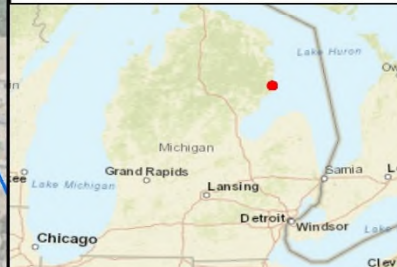
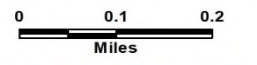
Groundwater Samples

- Green circle: Non-Detect
- Yellow circle: <10
- Orange circle: 10 - <70
- Red circle: 70 - <1,000
- Purple circle: 1,000 - <5,000
- Black circle: 5,000 - <10,000
- White circle: >10,000

- Blue line: Groundwater Elevation Contours
- Light blue arrow: Groundwater Flow Direction

JULY 17, 2019
GROUNDWATER
CONTOURS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCO COUNTY,
MICHIGAN





1/8/2020

Legend

Surface Water Sample Total PFAS (ppt)

- Non-Detect
- <12
- 12 - <50
- 50 - <100
- 100 - <1,000
- 1,000 - <2,500
- >2,500

— Groundwater Contours

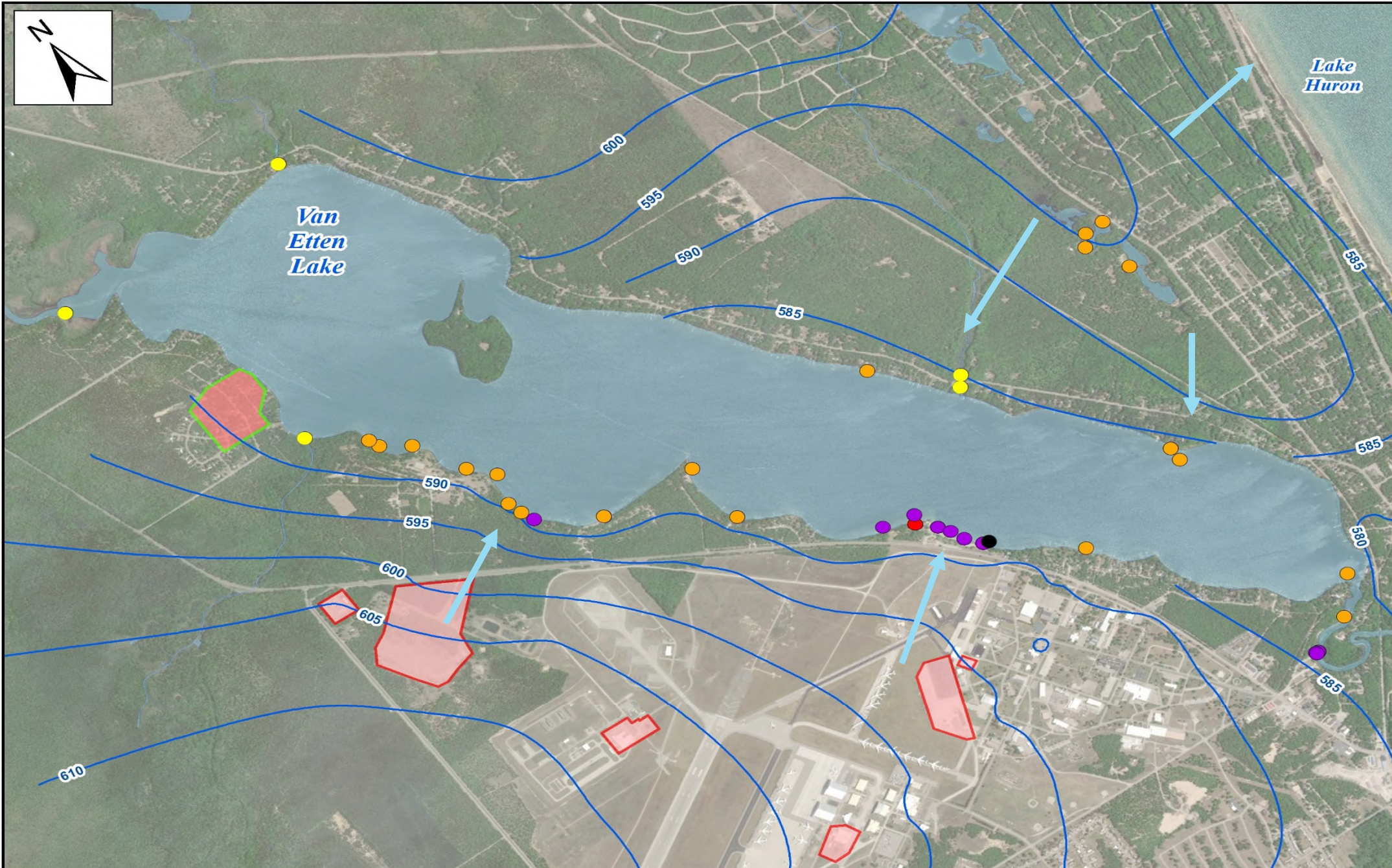
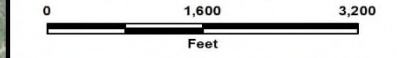
PFAS Sources

- On-Site Source
- Off-Site Source

*Samples collected between 2012-2018, Highest concentration shown

VAN ETTEN LAKE SURFACE WATER TOTAL PFAS SAMPLING RESULTS

FORMER WURTSMITH AIR FORCE BASE & OSCODA AREA
IOSCO COUNTY, MICHIGAN





1/8/2020

Legend

Surface Water Sample

Total PFAS (ppt)

- Non-Detect
- <12
- 12 - <50
- 50 - <100
- 100 - <1,000
- 1,000 - <2,500
- >2,500

- Groundwater Contour
- Inferred Groundwater Contour

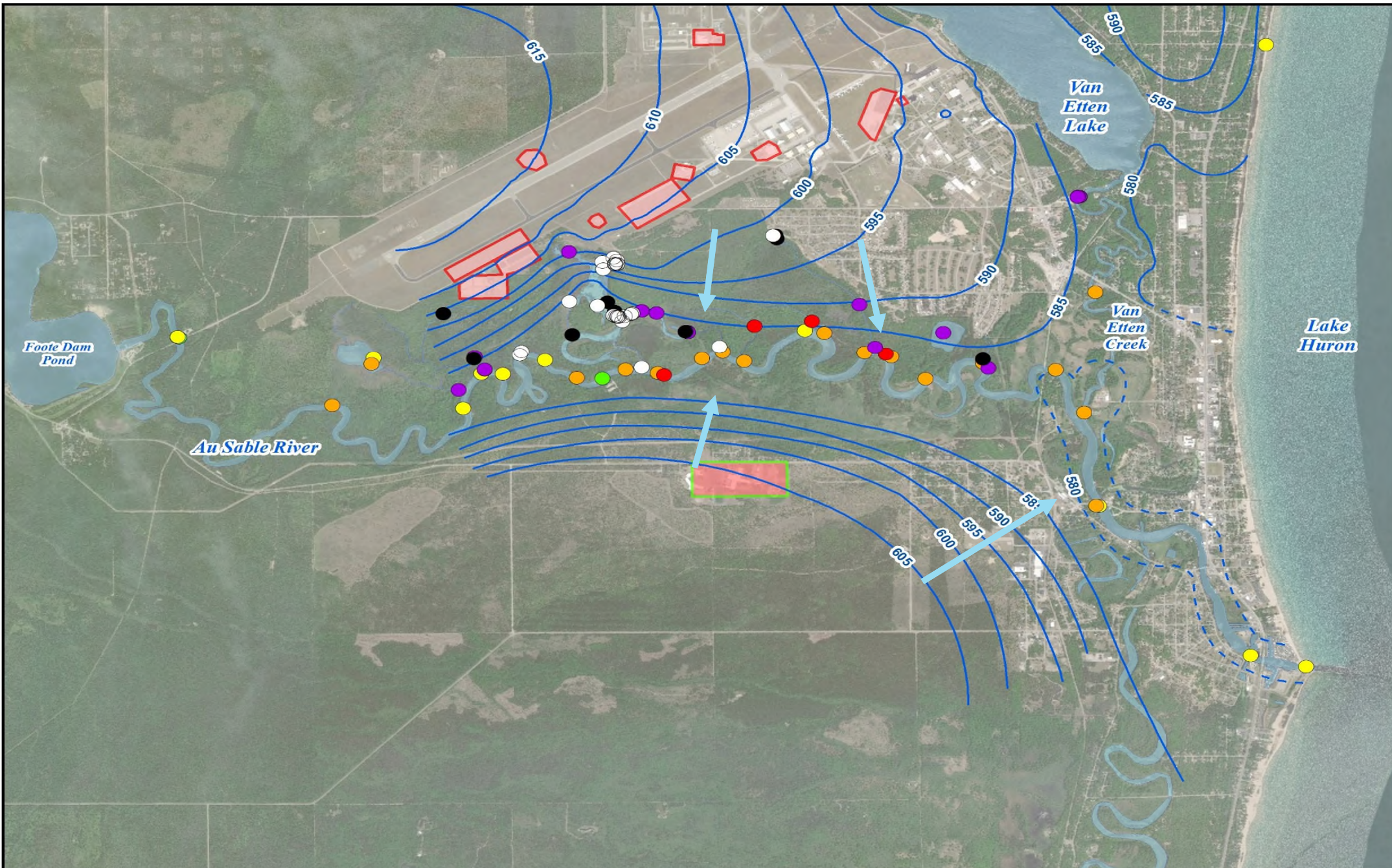
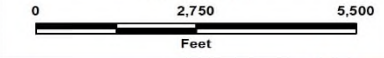
PFAS Sources

- On-Site Source
- Off-Site Source

*Samples collected between 2012-2018, Highest concentration shown

AU SABLE RIVER & CLARK'S MARSH SURFACE WATER TOTAL PFAS SAMPLING RESULTS

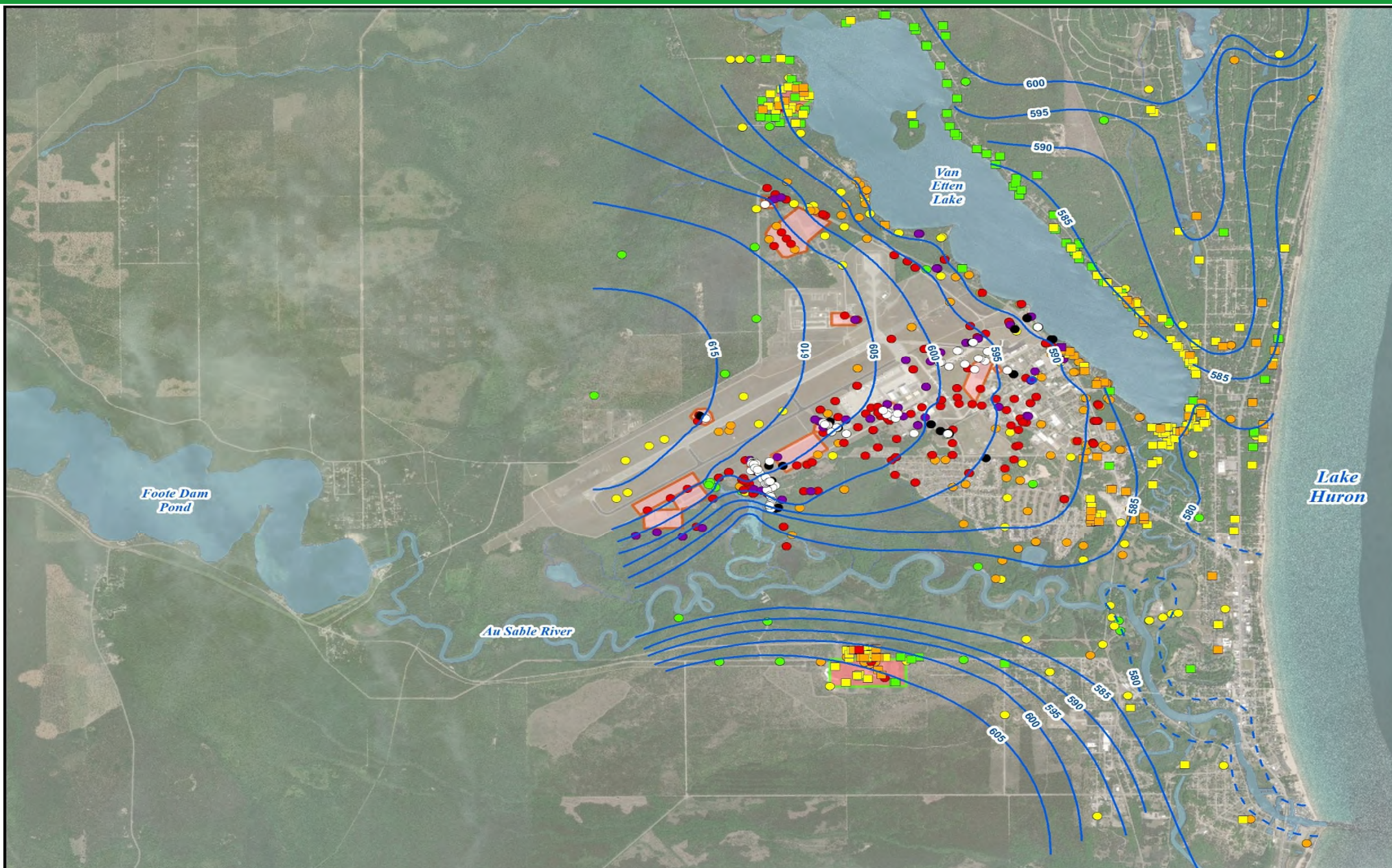
FORMER WURTSMITH AIR FORCE BASE & OSCODA AREA IOSCO COUNTY, MICHIGAN



CRITERIA EXCEEDANCES IN
GROUNDWATER AND SURFACE WATER



1/8/2020



PFOA + PFOS (ppt)

Residential Wells

- Non-Detect
- <10
- 10 - <70
- 70 - <1,000
- 1,000 - <5,000
- 5,000 - <10,000
- >10,000

Groundwater Samples

- Non-Detect
- <10
- 10 - <70
- 70 - <1,000
- 1,000 - <5,000
- 5,000 - <10,000
- >10,000

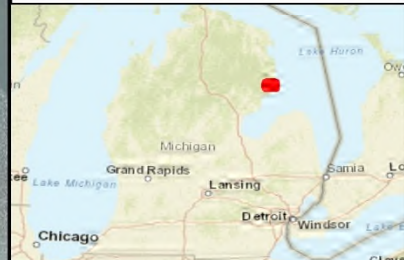
— Groundwater Contour
- - - Inferred Groundwater Contour

PFAS Sources

- On-Site Source
- Off-Site Source

GROUNDWATER & RESIDENTIAL SAMPLING RESULTS PFOA + PFOS

FORMER WURTSMITH AIR FORCE BASE & OSCODA AREA
OSCODA COUNTY, MICHIGAN





1/8/2020

Legend

Surface Water Sample PFOS (ppt)

- Non-Detect
- <12
- 12 - <50
- 50 - <100
- 100 - <1,000
- 1,000 - <2,500
- >2,500

— Groundwater Contours

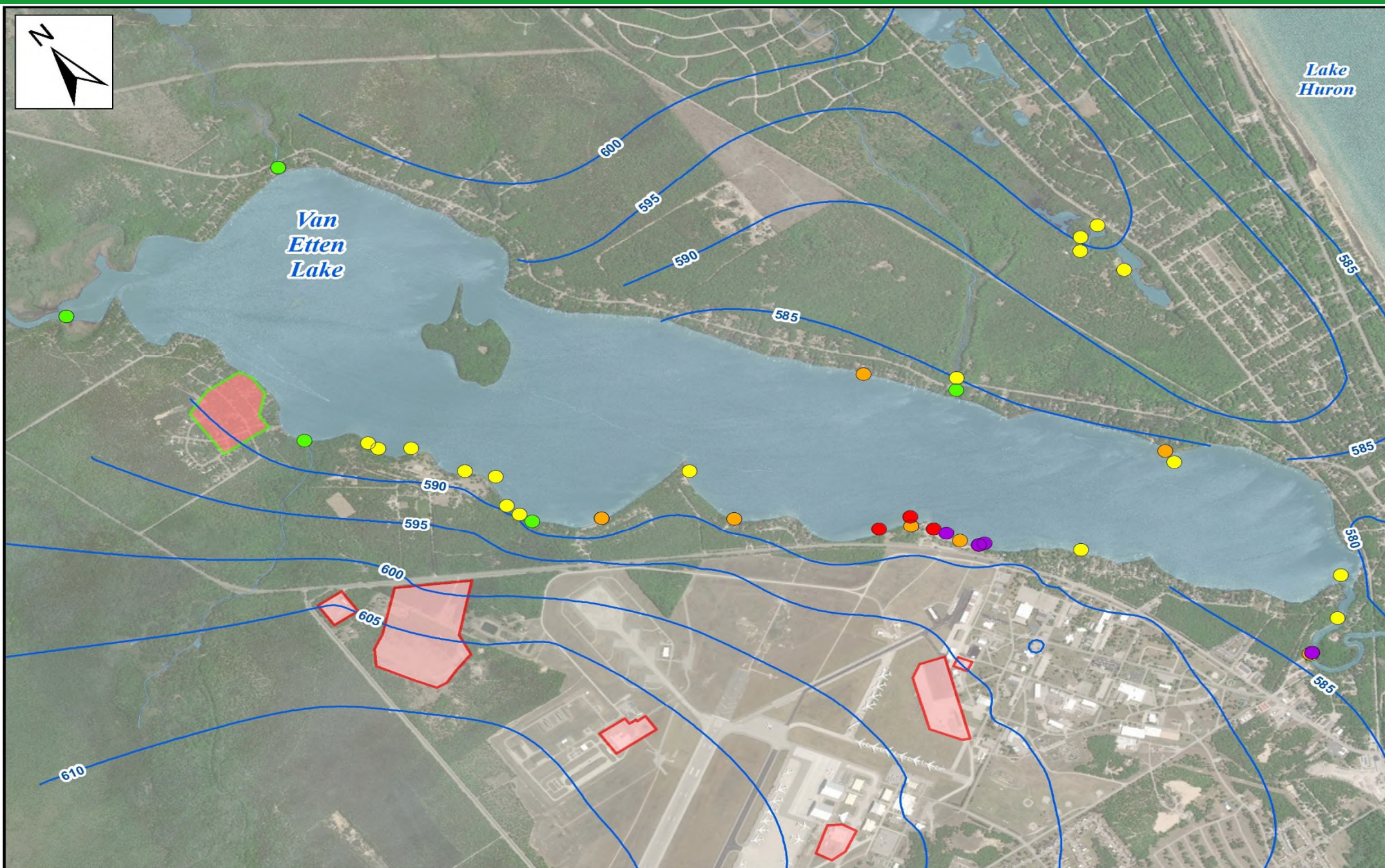
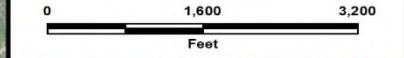
PFAS Sources

- On-Site Source
- Off-Site Source

*Samples collected between 2012-2018, Highest concentration shown

VAN ETTEN LAKE SURFACE WATER PFOS SAMPLING RESULTS

FORMER WURTSMITH AIR FORCE BASE & OSCODA AREA
OSCO COUNTY, MICHIGAN





1/8/2020

Legend

Surface Water Sample

PFOS (ppt)

- Non-Detect
- <12
- 12 - <50
- 50 - <100
- 100 - <1,000
- 1,000 - <2,500
- >2,500

- Groundwater Contour
- Inferred Groundwater Contour

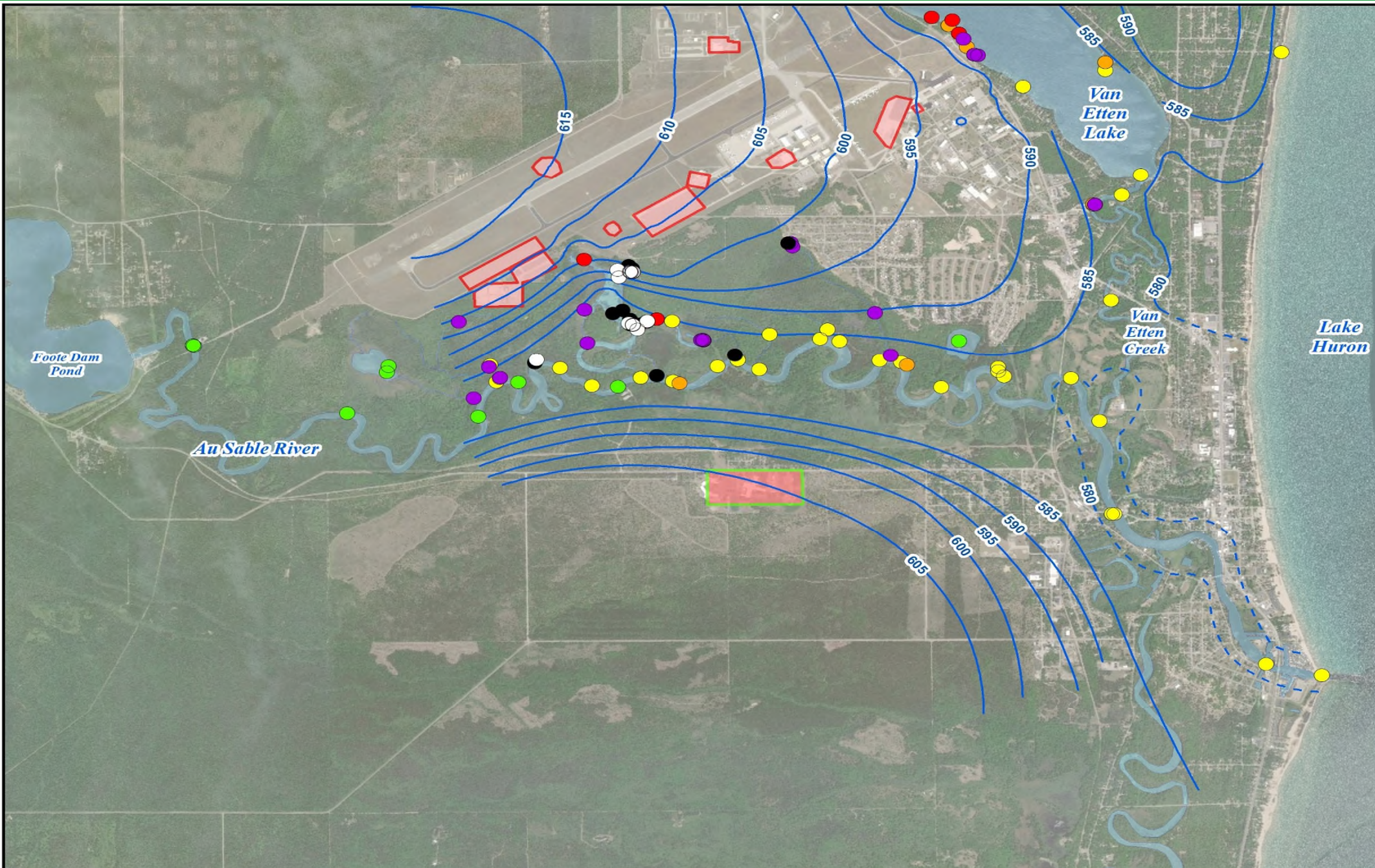
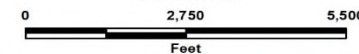
PFAS Sources

- On-Site Source
- Off-Site Source

*Samples collected between 2012-2018, Highest concentration shown

AU SABLE RIVER
& CLARK'S MARSH
SURFACE WATER
PFOS
SAMPLING RESULTS

FORMER WURTSMITH
AIR FORCE BASE &
OSCODA AREA
IOSCODA COUNTY,
MICHIGAN



CURRENT PFAS INVESTIGATIONS

- **EGLE Superfund**

- Oversight of Air Force Base activities

- **EGLE Saginaw Bay District**

- GSU Groundwater Monitoring Well Sampling
- Au Sable River Boat Launch Investigation



12/13/2019

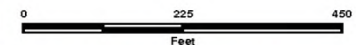
Legend

- Vertical Aquifer Sample Location
- Wurtsmith RI Monitoring Well
- Surface Water Sample

bgs - below ground surface
 ND - non-detect
 ppt - part per trillion
 VAS - vertical aquifer sample
 *Yellow highlight indicates exceedance of EGLE Part 201 criteria (PFOA + PFOS > 70 ppt)

OCTOBER 2019 VAS, MONITORING WELL, AND SURFACE WATER ANALYTICAL RESULTS

AU SABLE TOWNSHIP
 IOSCO COUNTY,
 MICHIGAN



VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B006	4 - 8	7.1	35.2
	14 - 18	10.1	42.4
	24 - 28	27.5	147.3

Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW029	2.5 - 7.5	32.1	90.8
	12.5 - 13.5	2.1	14.7
	24 - 25	ND	ND
	31 - 32	ND	ND

VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B007	5 - 9	133.1	256.2
	15 - 19	ND	7.1
	25 - 29	ND	ND

VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B008	4 - 8	37.2	80.9
	14 - 18	ND	ND
	24 - 28	ND	ND
	35 - 37	ND	ND

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-SW005	1.7	3.8

VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B004	5 - 9	ND	3
	15 - 19	ND	1.5
	25 - 29	ND	2.2
	33 - 35	ND	1.5

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-SW004	8.6	20.8

VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B003	3 - 7	8.1	17
	13 - 17	ND	5.6
	23 - 27	ND	8.1
	29.5 - 33.5	ND	7.6

Well ID	Status
RI-MW031	under water

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-SW001	12.9	34.2

VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B002	5 - 9	20.3	72.6
	15 - 19	11.2	25.5
	25 - 29	3.1	19.2
	34.5 - 37.5	ND	8.5

VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B005	5 - 9	ND	9.4
	15 - 19	ND	10
	25 - 29	ND	4.2
	32 - 34	ND	5.7

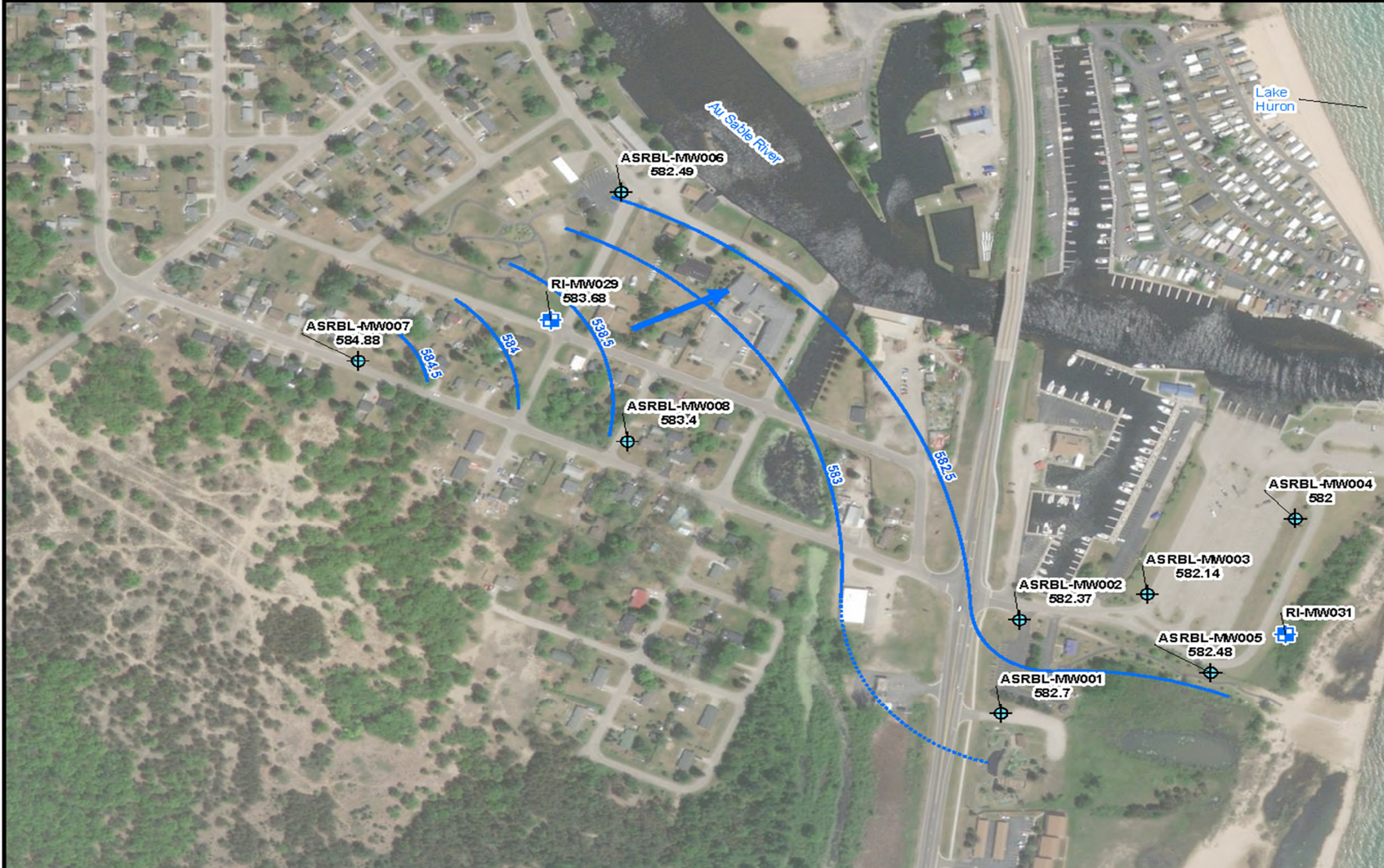
VAS Boring	Sample Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-B001	5 - 9	5.3	19.1
	15 - 19	3.2	16.5
	25 - 29	ND	3.8
	34.5 - 38.5	ND	ND

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-SW002	8	25

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
ASRBL-SW003	9.5	34.1



12/4/2019



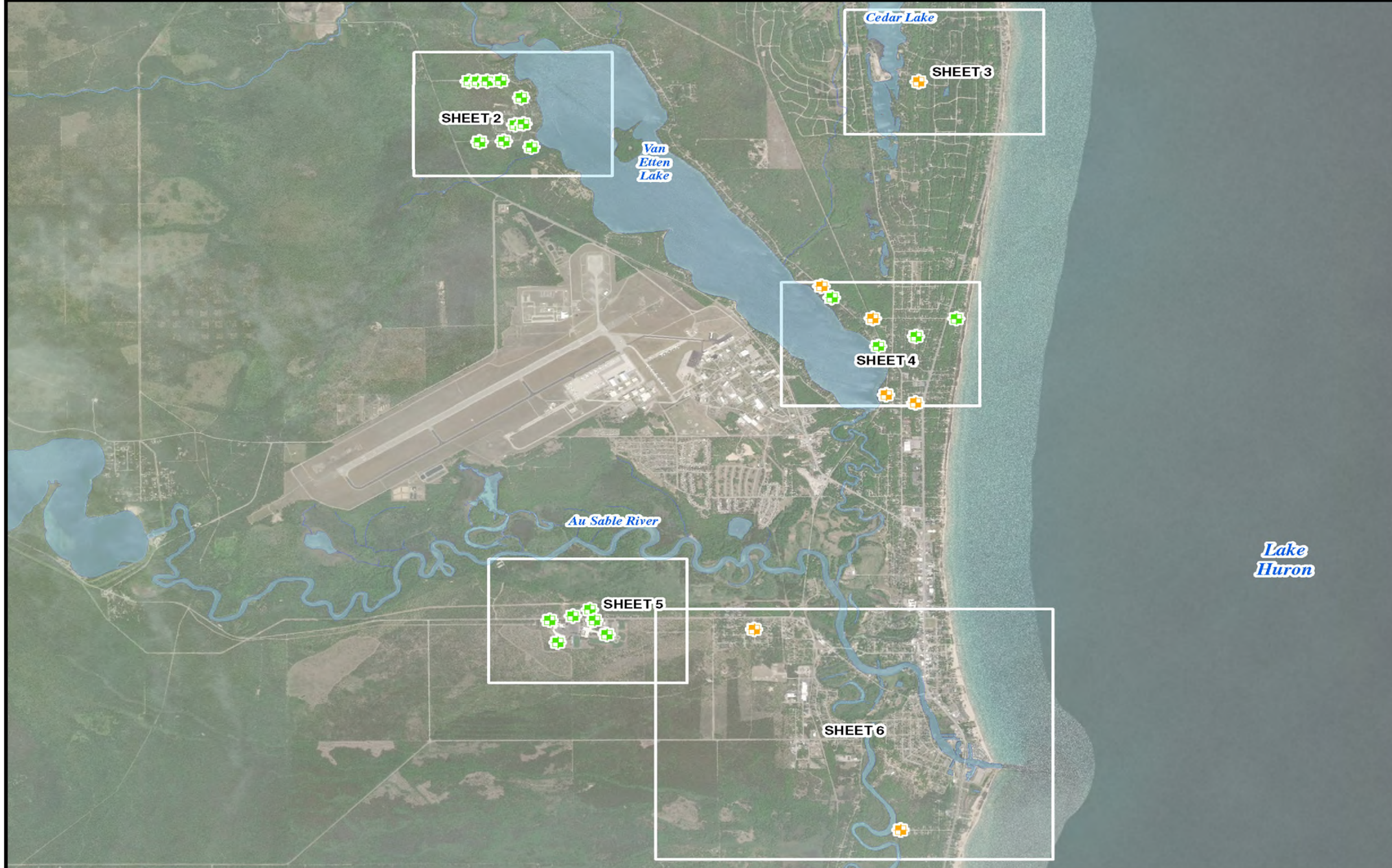
Legend

- Temporary Monitoring Wells
- Wurtsmith RI Monitoring Wells
- Groundwater Elevation Contours (ft AMSL)
- Inferred Groundwater Elevation Contours (ft AMSL)
- Estimated Groundwater Flow Direction

GROUNDWATER ELEVATION CONTOURS
 NOVEMBER 8, 2019

AU SABLE TOWNSHIP
 IOSCO COUNTY,
 MICHIGAN





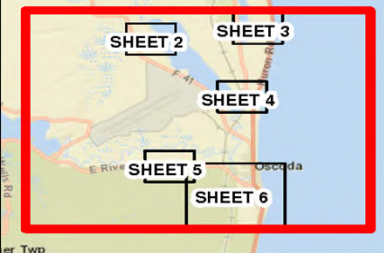
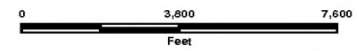
12/4/2019

Legend

- GSU Monitoring Well
- Wurtsmith Remedial Investigation Monitoring Well

GSU QUARTER 1
GROUNDWATER SAMPLING
OCTOBER 2019
SHEET 1 OF 6

FORMER WURTSMITH
AIR FORCE BASE
IOSCO COUNTY,
MICHIGAN





12/13/2019

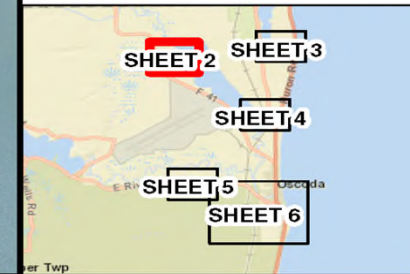
Legend

- + GSU Monitoring Well
- + Wurtsmith Remedial Investigation Monitoring Well
- ND - non-detect
- * No Label = Well not sampled in October 2019



GSU QUARTER 1
GROUNDWATER SAMPLING
OCTOBER 2019
SHEET 2 OF 6

FORMER WURTSMITH
AIR FORCE BASE
IOSCO COUNTY,
MICHIGAN





12/13/2019

Legend

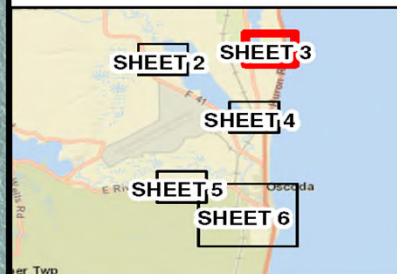
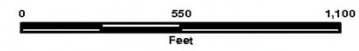
- GSU Monitoring Well
- Wurtsmith Remedial Investigation Monitoring Well
- ND - non-detect
- * No Label = Well not sampled in October 2019



Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW003	2 - 7	12.5	49.4

GSU QUARTER 1
GROUNDWATER SAMPLING
OCTOBER 2019
SHEET 3 OF 6

FORMER WURTSMITH
AIR FORCE BASE
IOSCO COUNTY,
MICHIGAN

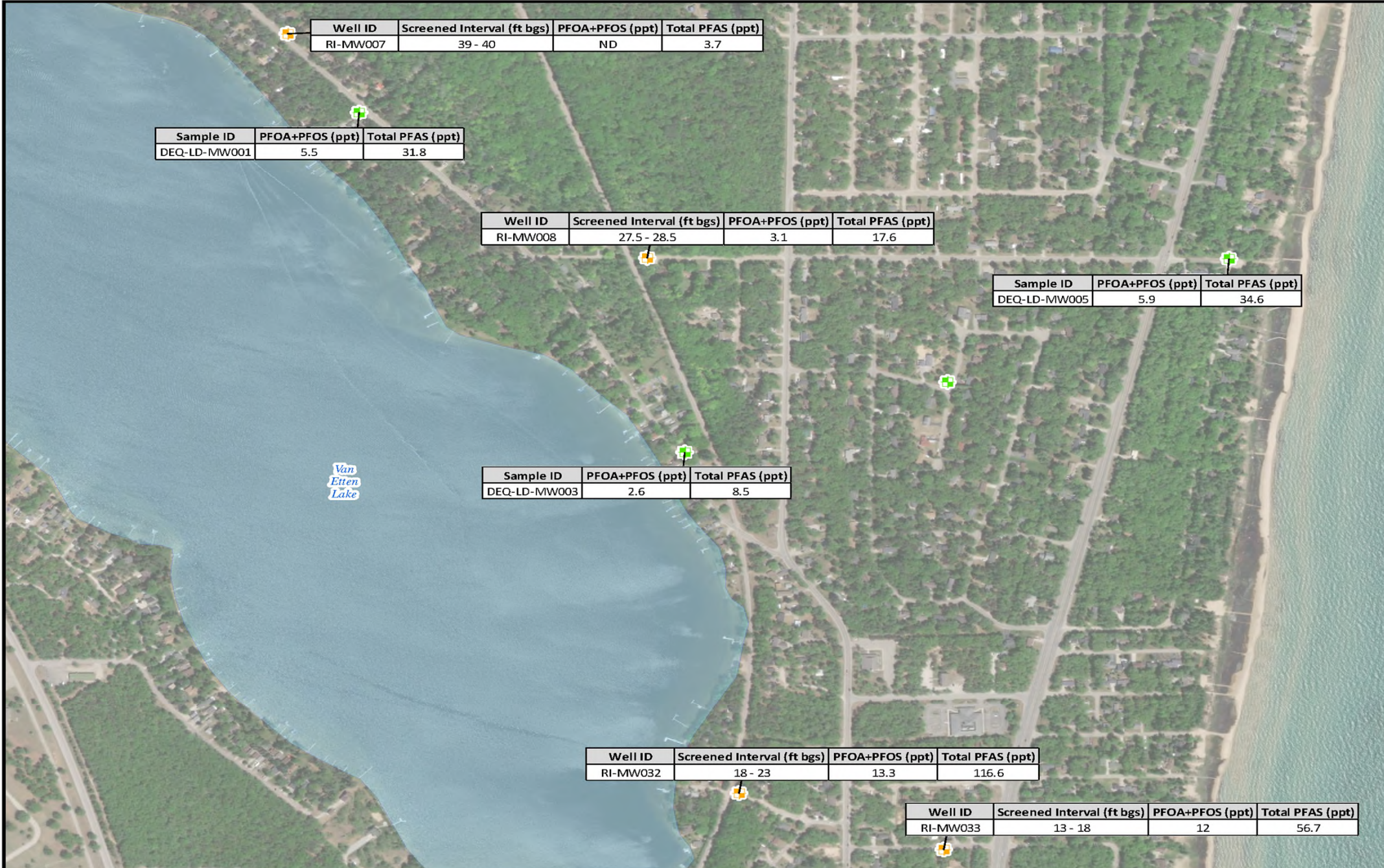




12/13/2019

Legend

- GSU Monitoring Well
- Wurtsmith Remedial Investigation Monitoring Well
- ND - non-detect
- * No Label = Well not sampled in October 2019



Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW007	39 - 40	ND	3.7

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
DEQ-LD-MW001	5.5	31.8

Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW008	27.5 - 28.5	3.1	17.6

Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
DEQ-LD-MW005	5.9	34.6

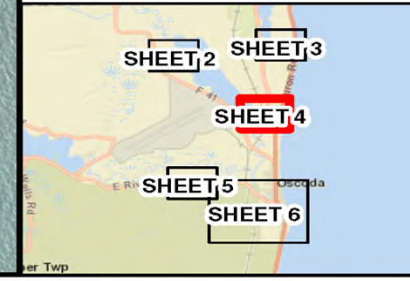
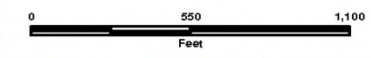
Sample ID	PFOA+PFOS (ppt)	Total PFAS (ppt)
DEQ-LD-MW003	2.6	8.5

Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW032	18 - 23	13.3	116.6

Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW033	13 - 18	12	56.7

GSU QUARTER 1
GROUNDWATER SAMPLING
OCTOBER 2019
SHEET 4 OF 6

FORMER WURTSMITH
AIR FORCE BASE
IOSCO COUNTY,
MICHIGAN





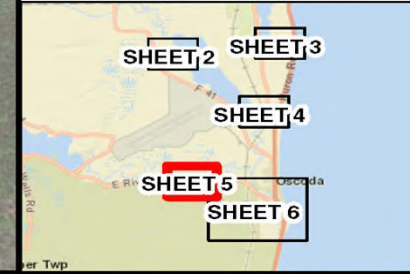
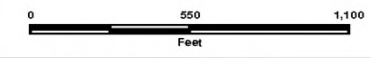
12/13/2019

Legend

- GSU Monitoring Well
- Wurtsmith Remedial Investigation Monitoring Well
- ND - non-detect
- * No Label = Well not sampled in October 2019

GSU QUARTER 1
GROUNDWATER SAMPLING
OCTOBER 2019
SHEET 5 OF 6

FORMER WURTSMITH
AIR FORCE BASE
IOSCO COUNTY,
MICHIGAN





12/13/2019

Legend

- GSU Monitoring Well
- Wurtsmith Remedial Investigation Monitoring Well
- ND - non-detect
- * No Label = Well not sampled in October 2019

Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW024	17 - 18	2.3	10.4
	26 - 27	1.7	20.6

Well ID	Screened Interval (ft bgs)	PFOA+PFOS (ppt)	Total PFAS (ppt)
RI-MW030	24 - 25	ND	ND

GSU QUARTER 1
GROUNDWATER SAMPLING
OCTOBER 2019
SHEET 6 OF 6

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