AECOM
1555 N. RiverCenter Drive
Suite 214
Milwaukee, WI 53212

T: +1-414-944-6080
aecom.com

March 18, 2020

Mr. Tauren Beggs
Hydrogeologist
Wisconsin Department of Natural Resources
2984 Shawano Avenue
Green Bay WI 54313-6727

**Revised Emerging Contaminant Work Plan Update #1**
**Former Town of Newton Gravel Pit**
**BRRTS No. 02-3-000268**
**AECOM Project No. 60135471(82518)**

Dear Mr. Beggs,

AECOM Technical Services, Inc. (AECOM), on the behalf of the City of Manitowoc (City), is pleased to submit this emerging contaminant work plan update to investigate per- and polyfluoroalkyl substances (PFAS) related to the Former Town of Newton Gravel Pit site, 3130 Hecker Road, Manitowoc Wisconsin.

Presented below is a project update along with a revised work plan for continued groundwater (monitoring wells and potable wells) and surface water monitoring.

**Project Update**

Presented below is a chronological outline of the completed PFAS planning and sampling activities along with a summary of regulatory correspondence and a discussion of the current regulatory framework.

Initial Limited Groundwater Assessment

An initial limited groundwater assessment led by the Wisconsin Department of Natural Resources (WDNR) was conducted during July 2018[1]. Seven monitoring wells were sampled (i.e. WT-01, WP-06R, WT-26, PZ-26A, WT-31, PZ-31A, and WT-34). Groundwater samples were analyzed for PFAS compounds using the Modified EPA Method 537, isotope dilution method, for the Michigan 24 compound list. PFAS compounds were identified in all but one (PZ-31A) of the seven wells sampled.

Only the sample from one well (WT-01), exceeded the U.S. Environmental Protection Agency's (EPA's) published Health Advisory Level (HAL) for PFAS compounds, Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) (i.e. 70 nanograms per liter (ng/l)).

Samples from three wells (WT-01, WP-06R, and WT-31), exceeded the Wisconsin Department of Health Services (WDHS) groundwater standard recommendation for the PFOA and PFOS Enforcement Standard (ES) value of 20 ng/l.

[1] *Limited Groundwater Assessment for Emerging Contaminants*, Former Town of Newton Gravel Pit, 3130 Heck Road, Manitowoc, Wisconsin. AECOM, October 22, 2018.

Additional On-site Groundwater Monitoring and Potable Well Sampling

On October 24, 2018, AECOM provided the WDNR with an initial *Emerging Contaminant Monitoring Work Plan and Project Status Update*[2]. In accordance with the work plan, AECOM completed additional on-site PFAS groundwater monitoring and potable well sampling along Hecker Road.

The additional on-site groundwater monitoring focused on sampling the balance of the on-site water table wells and the groundwater treatment pond, 10 locations total, including the following:

- WT-02A
- WT-03
- WP-07R
- WT-27
- WT-28
- WT-29
- WT-30
- WT-32
- WT-33
- Treatment Pond Staff Gage, SG-P

Samples were analyzed using the Modified EPA Method 537, isotope dilution method, for the Michigan 24 compound list. The results from this sampling effort were presented in the *Northern Source Area Sampling, 2018 VOC annual Groundwater Monitoring, and Initial Emerging Contaminant Groundwater Investigation Report*[3]. PFAS compounds were identified in all nine of the sampled water table monitoring wells. Samples from two wells (WT-02A and WT-28) exceeded the EPA HAL and samples from six wells (WT-02A, WT-28, along with WT-03, WT-29, WT-32, and WT-33) exceeded the WDHS groundwater ES recommendation value. Additionally, PFAS compounds were identified in the sample collected from the groundwater treatment pond.

The PFAS potable well sampling along Hecker Road was conducted in parallel with the volatile organic compound (VOC) sampling schedule as presented in the *Five Year Potable Well Monitoring Work Plan*[4].

Four potable wells along Hecker Road were sampled, as follows:

- 3327 Hecker Road
- 3461(3417) Hecker Road
- 3702 Hecker Road
- 3320 Hecker Road

The samples collected from the potable wells were also analyzed using the Modified EPA Method 537, isotope dilution method, for the Michigan 24 compound list. Sampling results were presented in the *October 2018 VOC Semi-Annual Potable Well Monitoring Letter Report and Initiation of Per-and Polyfluoroalkyl Substances (PFAS) Monitoring*[5] report. PFAS compounds were identified in samples collected at two locations (3327 Hecker Road and 3461(3417) Hecker Road), at levels below both the EPA HAL and the WDHS groundwater ES recommendation value.

Site Investigation Summary

The following summarizes the PFAS site investigation work to date:

- Sixteen water table wells and piezometers out of 27 on-site wells have been sampled. Results indicate EPA HAL and WDHS groundwater ES recommendation value exceedances. The on-site groundwater investigation activities are not complete; 11 piezometers have not been sampled.

[2] *Emerging Contaminant Monitoring Work Plan and Project Status Update,* Former Town of Newton Gravel Pit, AECOM October 24, 2018
[3] *Northern Source Area Sampling, 2018 VOC annual Groundwater Monitoring, and Initial Emerging Contaminant Groundwater Investigation Report,* Former Town of Newton Gravel Pit, 3130 Hecker Road, Manitowoc, Wisconsin, AECOM dated June 5, 2019
[4] *Five Year Potable Well Monitoring Work Plan*, Former Town of Newton Gravel Pit, 3130 Hecker Road, Manitowoc, Wisconsin. AECOM, May 8, 2017.
[5] *October 2018 VOC Semi-Annual Potable Well Monitoring Letter Report and Initiation of Per-and Polyfluoroalkyl Substances (PFAS) Monitoring,* Former Town of Newton Gravel Pit, AECOM, February 18, 2019

- The on-site groundwater treatment pond has been sampled.
- Four potable wells along Hecker Road have been sampled. Results indicate no WDHS groundwater ES recommendation value exceedances.

WDNR Communication/Correspondence

In addition to the completed PFAS activities noted above, the City has been in frequent communication with the WDNR concerning future PFAS site investigation activities. During a Project Team Meeting on July 9, 2019, the group discussed multiple aspects of the PFAS work including the status of regulations, communications with homeowners, recommended responses when PFAS is identified, how to limit exposure, etc. As a follow-up to the meeting, the WDNR provided a PFAS "Compilation of Information" email on August 7, 2019.

On October 25, 2019, as part of a continuing email thread, the WDNR sent an email titled "RE: Former Newton Pit – Expanded Potable Well Sampling WP – PFAS" to the Project Team. The email identified the need to submit an updated PFAS site investigation work plan and identified a requested broad scope of work.

During a Project Team Meeting on December 10, 2019, PFAS discussions clarified and refined the WDNR's requested scope of work. In general terms, the scope of work included:

- Continued on-site and off-site groundwater monitoring.
- Surface water sampling of Silver Creek.
- Continued potable well sampling.

On January 31, 2020, an *Emerging Contaminant Work Plan Update #1*[6] was submitted to the WDNR. The updated work plan proposed on-site groundwater monitoring and on-site surface water sampling. During a Project Team Meeting on February 14, 2020, and in follow-up correspondence[7] the WDNR requested additional actions for the investigation of PFAS compounds. This Revised Work Plan Update #1 is provided in response to the WDNR's requests to:

- Sample groundwater in existing on-site and off-site monitoring wells that have not previously been sampled for PFAS.
- Sample surface water at multiple locations in Silver Creek from the gravel pit to downstream eastward of the Thunder Ridge Road/Blackhawk Court area.
- Sample off-site potable wells east, southeast, and northeast of the gravel pit.
- Utilize the 36 analyte PFAS list for at least an initial round of sampling.
- Provide a preliminary framework for additional sampling if warranted based on the interpretation of data collected.
- Provide an alternative water management plan per WAC § NR716.17(1).

PFAS Regulatory Framework

As an emerging class of contaminants, the EPA has not determined a Maximum Contaminant Level (MCL) for PFAS under the Safe Drinking Water Act. There is no foreseeable date for when the EPA may promulgate PFAS MCLs.

There are currently no applicable Wisconsin Administrative Code Chapter NR 140 ESs or Preventative Action Limits (PALs) for PFAS in groundwater. As noted during the WDNR's PFAS Technical Advisory Group meeting on

[6] *Emerging Contaminant Work Plan Update #1*, Former Town of Newton Gravel Pit, AECOM, January 31, 2020.
[7] Response to Emerging Contaminant Work Plan Update #1, WDNR, February 17, 2020.

December 13, 2019, the NR 809 rulemaking process for two PFAS compounds, PFOA and PFOS, is underway with an anticipated promulgation date of summer 2022.

The WDHS recommended groundwater ES standard for PFOA and PFOS, individually or combined, is 20 ng/l. The recommended PAL for PFOA and PFOS, individually or combined, is 2 ng/l.

**Revised Work Plan Update #1**

This work plan update is provided in general accordance with the requirements of the Wisconsin Administrative Code Chapter NR 700 rule series with the understanding that multiple work plans for the project are currently in place and approved by the WDNR. Therefore, this work plan update is intended to be reviewed in conjunction with the existing plans.

There are potential cross contamination issues associated with PFAS sampling due to the presence of these compounds in many commercial products. Therefore, AECOM PFAS-certified sampling teams will conduct the PFAS sampling events. AECOM certification requires attending an internal PFAS sampling training course and reviewing the AECOM PFAS Sampling Guidance document designed to make AECOM samplers aware of the products known to have tested positive for PFAS compounds, as well as identifying PFAS-free products that are appropriate to use in the sampling environment.

Potable Well Sampling

The proposed potable well sampling locations, schedule, and sampling methods are presented as follows. An additional sampling "step-out" plan, and proposed response action levels are also presented.

*Locations and Schedule*

The proposed potable well sampling will be completed in two phases. The first phase will complete sampling of potable wells along Hecker Road during the VOC *Five Year Potable Well Monitoring Work Plan* sampling event scheduled for May 2020. The second phase will step-out to conduct sampling along CTH CR.

There is a total of 13 potable wells located along Hecker Road (see Figure 1) that have historically been monitored for VOCs. Four of these locations were sampled for PFAS during the October 2018 VOC semi-annual and initial PFAS potable well monitoring event:

- 3327 Hecker Road
- 3461(3417) Hecker Road
- 3702 Hecker Road
- 3320 Hecker Road

The balance of nine potable well locations along Hecker Road will be sampled for PFAS during the May 2020 monitoring event (i.e. the first phase of the sampling):

- 3114 Hecker Road
- 3121 Hecker Road
- 3303 Hecker Road
- 3515 Hecker Road
- 3518 Hecker Road
- 3609 Hecker Road
- 3625 Hecker Road
- 3627 Hecker Road
- 3720 Hecker Road

*Methods*

Potable well sampling for PFAS will include the following protocols:

Testing Laboratory:

Vista Analytical Laboratory, El Dorado Hills, CA.
Wisconsin Laboratory Certification No.: pending.

Laboratory Analysis:

Modified EPA Method 537 (isotope dilution method), State of Wisconsin list of 36 analytes.

Sampling:

Where applicable, PFAS sampling will be conducted first, before volatile organic compound (VOC) sampling. This is to provide a separation of time and distance between the PFAS sampling and the VOC sampling, which is collected in 40-ml glass vials with a Teflon septum (the Teflon septa is a possible source for PFAS).

Samples will be obtained from a sample port/valve prior to treatment equipment and at a location as close to the well as possible. This is typically a sample port/valve located next to the system pressure tank, or it may be the nearest cold-water hose bib. The system will be purged for at least 10 minutes immediately prior to sampling.

The water samples will be collected in laboratory-supplied 250ml HDPE bottles without preservative. The sample bottles, once filled, will be stored on ice in insulated coolers. The coolers will be shipped via FEDEX to the analytical laboratory for chemical analysis within the holding times specified by the analytical method (14 days). The samples will be transferred to the laboratory under standard chain of custody control.

Quality Control:

Duplicate Sample: No field dups will be obtained.

Field Blanks:

The Method 537 sampling protocol, which require field blanks at each sampling location, will be modified as follows:

Since sampling will occur within individual homeowner residences, no field blanks will be collected during the sampling event.

Equipment Blanks:

There will be no field sampling equipment used. Therefore, no equipment blanks will be obtained.

Laboratory Quality Control:

The test lab will provide a Level 2 data package. Due to the use of the isotope dilution method, Matrix Spike/Spike Duplication (MS/MSD) analysis will not be requested.

Data Validation:

AECOM will provide a data validation review using procedures described in the National Functional Guidelines for High Resolution Superfund Method Data Review (EPA, April 2016), as appropriate.

Reporting:

AECOM will present the PFAS sampling results in a potable well monitoring letter report. The report will also include historical PFAS potable well sampling results.

*Step-out Plan*

The second phase of sampling, or step-out plan, will include potable well sampling along CTH CR. The rationale for scheduling the PFAS sampling along CTH CR as a separate event include:

- Initial PFAS monitoring of potable wells along Hecker Road indicate results that are either no-detect or less than the proposed ES standard[8]. It is anticipated that sampling the additional nine potable wells along Hecker Road will better define the extent of PFAS impacts and allow correlation to historical VOC impacts. These data will help refine the approach for additional sampling along CTH CR.
- In accordance with the WDNR- approved VOC *Five Year Potable Well Monitoring Work Plan*, there is extensive sampling scheduled along CTH CR during the October 2020 VOC sampling event. PFAS sampling can be efficiently conducted at the same time.
- It is possible that PFAS may be useful as a 'tracer' compound to differentiate between VOC impacts along Viebahn Street to the north and in the Thunder Ridge Road area to the south. In this way, the PFAS results may help to delineate separate possible VOC sources. Therefore, before PFAS monitoring is conducted along CTH CR, interpretation of the sampling data along Hecker Road along with additional planning to evaluate PFAS as a tracer compound should be completed.

The need for additional iterative phases of PFAS potable well sampling beyond what is proposed in this work plan will be evaluated pending the results from the proposed sampling and future discussions with the WDNR.

*Response Actions (alternative water management plan)*

Although there are no promulgated MCL or ES standards for PFAS, the following response actions will be implemented upon the City's receipt of the PFAS potable well monitoring laboratory results:

For potable well locations with reported PFOA and/or PFOS concentrations at or above the proposed ES standard:

- The well owner, or occupant as applicable, will be notified of the sampling results by phone call or in-person visit, as soon as reasonably possible. In accordance with NR 716.14, the City will provide written notice of the results to the well owner, or occupant as applicable, and the WDNR within 10 days of receiving the results.
- Bottled water will be provided to the homeowner, or occupant as applicable, as soon as reasonably possible.
- A confirmation sample will be scheduled as soon as reasonably possible.
- Planning will begin for providing a new drinking water source. This may entail a short-term solution (i.e. continued bottled water supply or the construction of a point of entry treatment (POET) system) and a longer-term solution such as a replacement potable well or the provision of City water.

For potable well locations with reported PFOA and/or PFOS concentrations below the proposed ES standard:

- In accordance with NR 716.14, the City will provide written notice of the results to the well owner, or occupant as applicable, and the WDNR within 10 days of receiving the results.
- The City will inform the well owner, or occupant as applicable, of the opportunity for self-purchase of bottled water and direct them to contact WDHS and WDNR for additional options based on their test results.
- Confirmation sampling will not be scheduled. Additional sampling may be conducted as outlined in a future PFAS potable well monitoring plan.

[8] *October 2018 VOC Semi-Annual Potable Well Monitoring Letter Report and Initiation of Per-and Polyfluoroalkyl Substances (PFAS) Monitoring,* Former Town of Newton Gravel Pit, AECOM, February 18, 2019.

- The City will inform the well owner, or occupant as applicable, of the opportunity for self-purchase of a new drinking water source and direct them to contact WDHS and WDNR for additional options based on their test results.

Groundwater Monitoring Well Sampling

The proposed monitoring well sampling locations, schedule, and sampling methods are presented as follows. An additional sampling "step-out" plan, and proposed response action levels are also presented.

*Locations and Schedule*

The proposed monitoring well sampling expands the PFAS groundwater sampling to include all existing on-site and off-site monitoring wells that have not been previously sampled. This includes a total of 37 wells (see Figure 2) to be sampled in conjunction with the May 2020 potable well sampling event:

On-site monitoring wells:

- PZ-01
- PZ-03
- PZ-26B
- PZ-26C
- PZ-30
- PZ-30A
- PZ-31
- PZ-32
- PZ-32A
- PZ-33
- PZ-33A

Off-site monitoring wells:

- WT-05
- PZ-05A
- PZ-05B
- WT-11
- WT-12
- PZ-12
- WT-15
- PZ-15A
- PZ-15B
- WT-16
- PZ-16
- PZ-16A
- PZ-16B
- PZ-16C
- WT-20
- WT-21
- WT-22
- WT-23
- WT-24
- PZ-24A
- PZ-24B
- PZ-24C
- ST-25
- PZ-25A
- PZ-25B
- PZ-25

*Methods*

Groundwater sampling for PFAS will include the following protocols:

Testing Laboratory:
Vista Analytical Laboratory, El Dorado Hills, CA.
Wisconsin Laboratory Certification No.: pending.

Laboratory Analysis:
Modified EPA Method 537 (isotope dilution method), State of Wisconsin list of 36 analytes.

Sampling:

Groundwater samples will be obtained using PFAS free equipment and low-flow sampling procedures. To determine stabilized readings during well purging AECOM will measure field parameters, such as oxygen reduction potential (ORP), dissolved oxygen (DO), conductivity, temperature, and pH, during the sampling event.

The water samples will be collected in laboratory-supplied 250ml HDPE bottles without preservative. The sample bottles, once filled, will be stored on ice in insulated coolers. The coolers will be shipped via FEDEX to the analytical laboratory for chemical analysis within the holding times specified by the analytical method (14 days). The samples will be transferred to the laboratory under standard chain of custody control.

Quality Control:

Duplicate Sample: No field dups will be obtained.

Field Blanks:

The Method 537 sampling protocol, which require field blanks at each sampling location, will be modified as follows:

A single field blank will be collected adjacent to a current sampling location, for each day during the sampling event. Field blanks will be collected by pouring laboratory-certified PFAS-free water into a laboratory-provided sampling container and shipping the sample to the laboratory with the field samples.

Equipment Blanks:

One equipment blank representative of the sampling procedures and equipment will be collected.

Laboratory Quality Control:

The test lab will provide a Level 2 data package. Due to the use of the isotope dilution method, Matrix Spike/Spike Duplication (MS/MSD) analysis will not be requested.

Data Validation:

AECOM will provide a data validation review using procedures described in the National Functional Guidelines for High Resolution Superfund Method Data Review (EPA, April 2016), as appropriate.

Reporting:

AECOM will present the PFAS sampling results in a dedicated groundwater monitoring letter report. The report will also include historical PFAS groundwater sampling results.

*Step-out Plan*

Although there are no promulgated groundwater standards for PFAS, the evaluation of the groundwater results will consider the WDHS recommended groundwater ES (20 ng/l) and PAL (2 ng/l) standards for PFOA and PFOS, individually or combined.

Where PFOA and PFOS results exceed the proposed ES standard, a step-out plan specifically applicable to additional on-site groundwater monitoring will be developed to delineate impacts. Where results are at or below the PAL standard, no additional delineation is anticipated.

The need for additional, stepped-out, groundwater monitoring to delineate PFAS groundwater impacts downgradient from the Newton Pit site, beyond the existing off-site monitoring well network and the scheduled potable well sampling locations, will be evaluated pending the results from the proposed sampling and future discussions with the WDNR.

*Response Actions*

There are no groundwater response actions proposed at this time.

Surface Water Sampling

The proposed surface water sampling locations, schedule, and sampling methods are presented as follows. An additional sampling "step-out" plan, and proposed response action levels are also presented.

*Locations and Schedule*

The 2018 and 2019 VOC surface water sampling events for Silver Creek showed a lack of VOC impacts to the stream. These results were not typical for the site conditions. Typically, there is a well prescribed, low concentration discharge of VOCs to Silver Creek. The lack of observed VOC impacts may have been due to the high-water stream flows witnessed both years, creating a "losing stream" condition where creek water was recharging groundwater. The high stream flow may also have diluted VOC groundwater discharges to the creek, thereby contributing to the overall lack of VOC detects.

As we enter the spring of 2020, high-water flows in Silver Creek have already been documented. It is anticipated that high stream flows may impact PFAS surface water sampling results, as follows:

- Groundwater discharges to the creek may be limited during high-flow and the associated "losing stream" conditions.
- High stream flows may dilute groundwater flows into the creek.
- High stream flows are more likely to carry contaminants of concern from possible upstream sources.
- High stream flows, and their associated high sediment loads, will create an extra step during laboratory sample preparation and possibly introduce variability into the analytical results. During sample preparation the laboratory will need to remove particulates from the water, by centrifuging (in an effort to protect the analytical equipment). The removal of particulates may also remove contaminants of concern that may be absorbed onto the particles, providing a low bias to the sample results.

For these reasons, the preferred surface water sampling schedule is during a low flow period, when stream flows are clear and stream base-flow includes groundwater discharge. These conditions may occur during summer dry periods and into the fall season. Therefore, surface water sampling of Silver Creek is proposed to occur during the first reasonable low flow/dry period during 2020.

The proposed PFAS surface water sampling in Silver Creek will be completed within the boundaries of the site property and downstream for a distance of approximately two miles. This includes a total of eight sample locations shown on Figure 3 as follows:

- SW-A, the northern gravel pit property line.
- SW-B, adjacent to the northeast gravel pit property line.
- SW-C, upstream of the bridge on the gravel pit property.
- SW-D, near the southern gravel pit property line, adjacent to VOC sampling staff gauge SG-1.
- SW-E, Hecker Road upstream of the right-of-way (ROW) bridge.
- SW-F, upstream of the snowmobile bridge by I-43 (west side of I-43).
- SW-G, CTH CR upstream of the ROW bridge.
- SW-H, 26th Street upstream of the ROW bridge.

*Methods*

Surface water sampling for PFAS will include the following protocols:

Testing Laboratory:
Vista Analytical Laboratory, El Dorado Hills, CA.
Wisconsin Laboratory Certification No.: pending.

Laboratory Analysis:
Modified EPA Method 537 (isotope dilution method), State of Wisconsin list of 36 analytes.

Sampling:

Sampling will be initiated at the furthermost down-stream location and progress up-stream. At each location, samples will be obtained from an undisturbed mid-stream flowing channel of water. Due to the reported properties of PFAS compounds, that indicate they like to exist at the air/water interface, grab samples will include the air/water interface.

The grab samples will be obtained using laboratory-supplied 250ml HDPE bottles without preservative. The sample bottles, once filled, will be stored on ice in insulated coolers. The coolers will be shipped via FEDEX to the analytical laboratory for chemical analysis within the holding times specified by the analytical method (14 days). The samples will be transferred to the laboratory under standard chain of custody control. Additional field data, specific to the Newton Pit site, will be collected to understand the local interaction between Silver Creek and groundwater as part of the local flow system. At the time of surface water sampling, a round of groundwater elevation readings will be obtained from the monitoring well network associated with the Newton Pit. Along with the groundwater elevation readings, surface water elevation readings will be collected from the Silver Creek and treatment pond staff gauges, SG-C and SG-P respectively. Mapping of the groundwater and surface water elevations will provide an interpretation of groundwater flow and whether Silver Creek is a losing or a gaining stream at the time of sampling.

Quality Control:

Duplicate Sample: No field dups will be obtained.

Field Blanks:

The Method 537 sampling protocol, which require field blanks at each sampling location, will be modified as follows:

A single field blank will be collected adjacent to a current sampling location, for each day during the sampling event. Field blanks will be collected by pouring laboratory-certified PFAS-free water into a laboratory-provided sampling container and shipping the sample to the laboratory with the field samples.

Equipment Blanks:

One equipment blank representative of the sampling procedures and equipment will be collected, if necessary.

Laboratory Quality Control:

The test lab will provide a Level 2 data package. Due to the use of the isotope dilution method, Matrix Spike/Spike Duplication (MS/MSD) analysis will not be requested.

Data Validation:

AECOM will provide a data validation review using procedures described in the National Functional Guidelines for High Resolution Superfund Method Data Review (EPA, April 2016), as appropriate.

Reporting:

The surface water PFAS sampling analytical results will be presented in a dedicated letter report.

*Step-out Plan*

Planning for stepped-out sampling along Silver Creek will initially be based on two considerations, 1) the levels of PFAS found in the creek, and 2) understanding the potential interaction between surface water and groundwater.

There are currently no proposed nor promulgated Wisconsin surface water standards for PFAS. Consequently, initial surface water PFAS laboratory analytical results will not have standards for comparison.

Understanding the potential interaction between surface water and groundwater will be considered in conjunction with the site conceptual model and will include a review of:

- groundwater and surface water elevation data obtained during the sampling event
- groundwater and surface water analytical results
- local Quaternary geology
- locations/depths of potable wells along Silver Creek
- the existence/location of other possible receptors along Silver Creek

Therefore, the need for additional, stepped-out, surface water monitoring will be evaluated pending the results from the proposed sampling and future discussions with the WDNR.

*Response Actions*

There are no surface water response actions proposed at this time.

**CLOSING**

The potential need for additional PFAS sampling of groundwater in potable wells and monitoring wells, or surface waters, beyond what is proposed in this work plan, will be evaluated pending the results from the proposed sampling and future discussions with the WDNR.

Unless otherwise notified by the WDNR, the City intends to proceed with the activities proposed in this Work Plan Update. If you have any questions, please contact Dave Henderson at 414.944.6190 or dave.henderson@aecom.com.

Yours sincerely,

AECOM Technical Services, Inc.

D. S. Henderson

David Henderson, P.E.
Project Manager

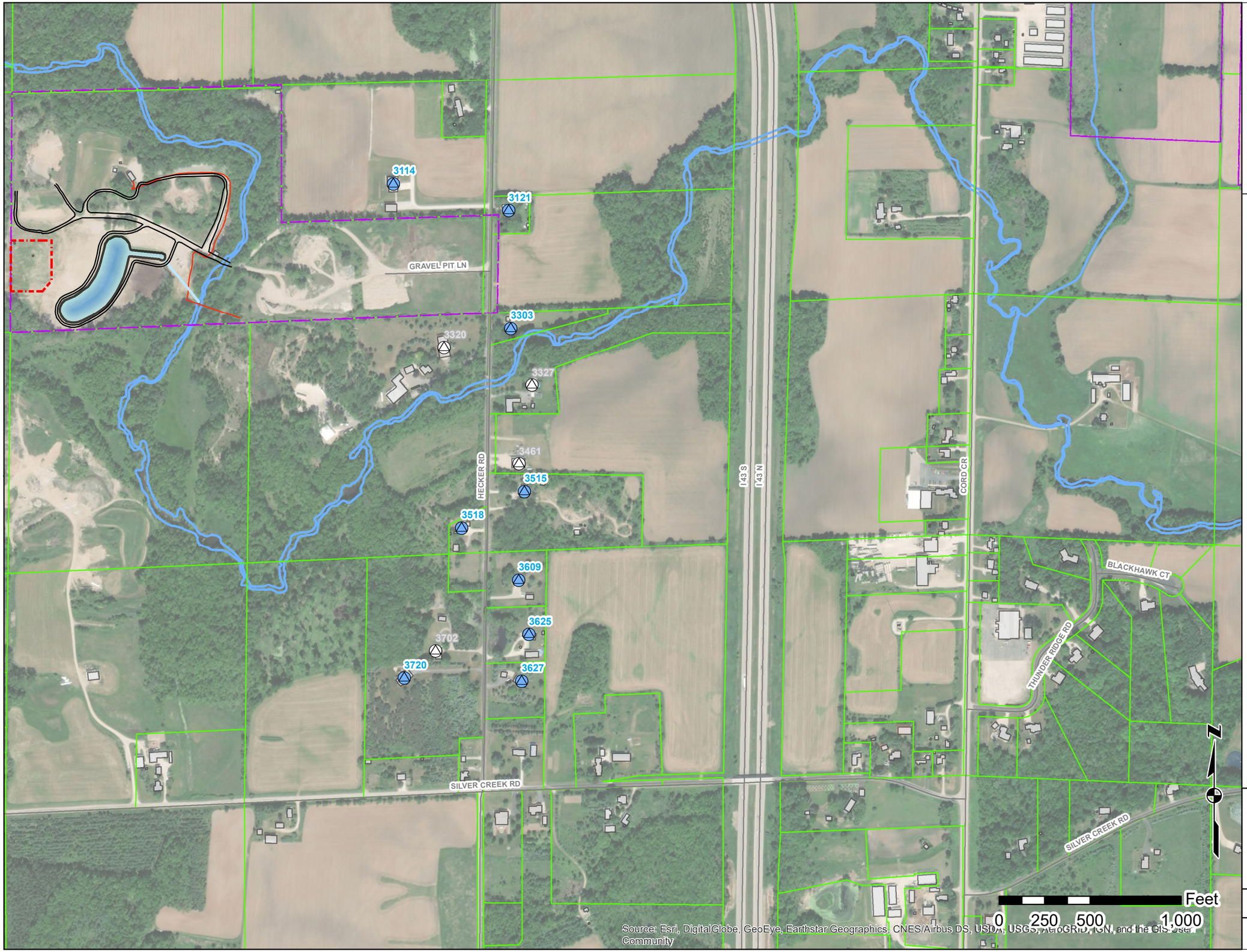
Attachments:
Figure 1 Proposed PFAS Potable Well Sample Locations
Figure 2 Proposed PFAS Monitoring Well Sample Locations
Figure 3 Proposed PFAS Surface Water Sample Locations

Cc: Kathleen M. McDaniel, City Attorney, City of Manitowoc
Dan Koski, Director of Public Infrastructure, City of Manitowoc

Project Management Initials: BM Creator: MLB Checked: Approved: ANSI B 11" x 17"

# FIGURE 1
# PROPOSED PFAS POTABLE WELL SAMPLE LOCATIONS

Former Newton Gravel Pit
Manitowoc, Wisconsin




## Legend

- Previously Sampled Private Wells
- Proposed Private Well To Be Sampled For PFAS
- Gravel Pit Roads
- Approximate Pond Location
- Approximate Outfall Pipe Location
- Engineered Cap Area
- Electric Line
- Civil Divisions
- Parcels
- Streams
- Building Footprints

Notes:
1. Horizontal Coordinates = NAD83 Manitowoc County Coordinates.

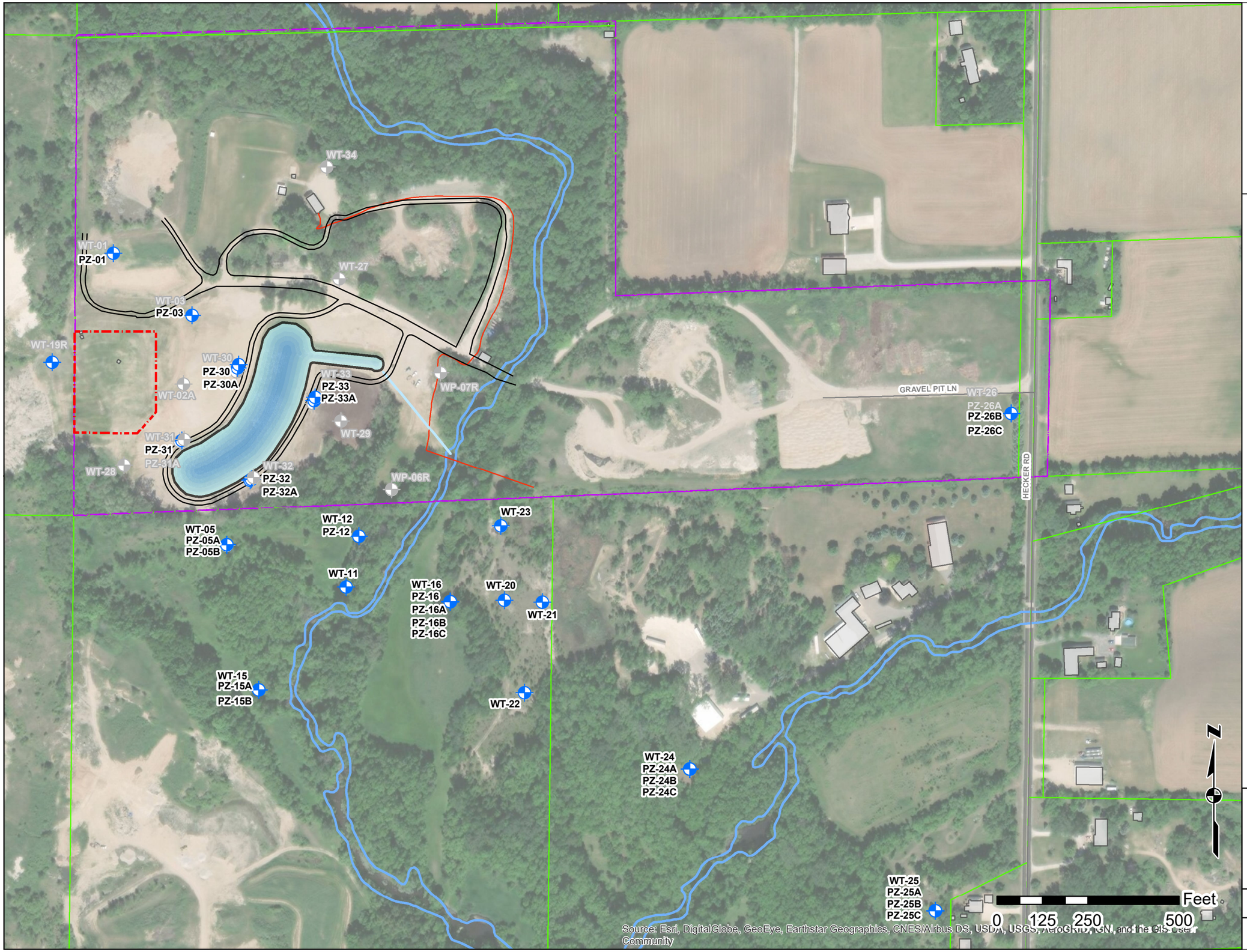

AECOM
1555 N. RiverCenter Drive, Suite 214
Milwaukee, Wi 53212
PH: 414-944-6080
www.aecom.com


| DRAWN BY: RW | DATE: 3/11/2020 |
|---|---|

**Project No.: 60135471**

C:\data\Projects\NewtonGPI\MXD\Fig1_PrivateHomesSampleLoc_PFASWP.mxd

Project Management Initials: BM Creator: MLB Checked: Approved: ANSI B 11" x 17"




# FIGURE 2
# PROPOSED PFAS MONITORING WELL SAMPLE LOCATIONS

Former Newton Gravel Pit
Manitowoc, Wisconsin

**Legend**

- Proposed Well To Be Sampled For PFAS
- Wells Previously Sampled
- Gravel Pit Roads
- Approximate Pond Location
- Approximate Outfall Pipe Location
- Engineered Cap Area
- Electric Line
- Civil Divisions
- Parcels
- Streams
- Building Footprints

Notes:
1. Horizontal Coordinates = NAD83 Manitowoc County Coordinates.

AECOM
1555 N. RiverCenter Drive, Suite 214
Milwaukee, Wi 53212
PH: 414-944-6080
www.aecom.com

DRAWN BY: RW | DATE: 3/11/2020

**Project No.: 60135471**

C:\data\Projects\NewtonGPM\MXD\Fig2_ProposedMWSampleLoc_PFASWP.mxd

Project Management Initials: BM Creator: MLB Checked: Approved: ANSI B 11" x 17"

# FIGURE 3
# PROPOSED PFAS SURFACE WATER SAMPLE LOCATIONS

Former Newton Gravel Pit
Manitowoc, Wisconsin

## Legend

- Proposed Staff Gauge To Be Sampled
- Staff Gauge Not Proposed For PFAS Sampling
- Gravel Pit Roads
- Approximate Pond Location
- Approximate Outfall Pipe Location
- Electric Line
- Civil Divisions
- Parcels
- Streams
- Building Footprints

Notes:
1. Horizontal Coordinates = NAD83 Manitowoc County Coordinates.


AECOM
1555 N. RiverCenter Drive, Suite 214
Milwaukee, Wi 53212
PH: 414-944-6080
www.aecom.com


DRAWN BY: RW | DATE: 3/15/2020

**Project No.: 60135471**

Feet
0 400 800 1,600

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

C:\data\Projects\NewtonGP\MXD\Fig3_ProposedswSampleLoc_PFASWP.mxd