Weihemuller, Wendy - DNR

From: HINMAN, MICHAEL T GS-12 USAF ANG 115 CES/Architect <michael.hinman.4@us.af.mil>
Sent: Thursday, October 14, 2021 9:18 AM
To: Ales, Stephen M -DNR
Cc: Dunlap, Mike J - DMA; PLENDL, MEGHAN M Lt Col USAF ANG 115 CES/CE
Subject: MMP ~ B400
Attachments: MMP Package ~ B400.pdf; B400 Sampling Report 14 May 2021.pdf

Steve,

For your review and subsequent approval.

MICHAEL T. HINMAN, GS-12, WI ANG
Architect, 115th Civil Engineering Squadron
Cell: 608.287.4566
michael.hinman.4@us.af.mil

Materials Management Plan

Wisconsin Air National Guard
Air Fighter Wing Facility
F-35 Bed Down - W50S9F20F0002
XGFG182006
XGFG182009
XGFG192006
XGFG182017
XGFG192002
XGFG192005
XGFG182018

Truax Field
Madison, Wisconsin

Prepared for:

FRANKFURT-SHORT-BRUZA
ASSOCIATES, P.C. (FSB)
5801 Broadway Extension, Suite 500
Oklahoma City, OK 73118

May 14, 2021

Materials Management Plan
Wisconsin Air National Guard
Air Fighter Wing Facility
F-35 Bed Down - W50S9F20F0002
XGFG182006
XGFG182009
XGFG192006
XGFG182017
XGFG192002
XGFG192005
XGFG182018

Truax Field
Madison, Wisconsin

This report prepared by:

Jeffrey C. Steiner, PG, PH, CPG
Senior Hydrogeologist

This report reviewed by:

Thomas Gaieck, PG
Hydrogeologist

AYRES

5201 E. Terrace Drive, Suite 200
Madison, WI 53718
608.443.1200 • Fax: 608.299.2184
www.AyresAssociates.com

Ayres Project No. 51-0467.00
File: \\ayres_active\51\md\00-51-0467 wiang_bed down project\additional truax sites project\materials management plan\final report\materials management plan - 6 additional sites (051421).docx

Contents

Page No.

List of Figures

List of Tables

List of Appendices

Introduction

Frankfurt-Short-Bruza Associates, P.C. (FSB) was retained by the Wisconsin Air National Guard (WIANG) to upgrade their installation to accommodate the F-35A aircraft including the construction of ALERT parking garages and munitions maintenance and inspection facility, repair of existing structures, and installation of a new perimeter fence. The six separate project sites and perimeter fence associated with F35: Bed Down project include:

01 - XGFG182017 – Munitions Maintenance and Inspection Facility

02 - XGFG182009 – F35 Alter B400 AMXS Building

03 - XGFG182006 – Alert GOV Parking shelters

04 - XGFG192002 – F35 Repair B401 AGE Building

05 - XGFG182018 - F35 Repair B1207

06 - XGFG192005 – F35 Repair B511 HAZMART

07 - XGFG192006 – Perimeter Fence

Ayres Associates partnered with FSB on the project to provide environmental services including assessment of soil and groundwater for previously documented volatile organic compounds (VOC) and per-and polyfluorinated alkyl substances (PFAS). These compounds were detected during previous environmental investigations conducted at the site. The presence of VOC compounds in soil and groundwater is associated with the use and storage of petroleum and other hazardous substances at the installation. The PFAS contamination detected at the site is attributed to the storage and use of firefighting foams at Hangar 414 and other nearby buildings or firefighting equipment testing areas at the base.

The Wisconsin Department of Natural Resources (WDNR) required confirmation of VOC and PFAS concentrations in soil and groundwater at the site and submittal of a Materials Management Plan (MMP) based upon the results of this assessment. In addition to the subsurface investigation and preparation of a materials management plan, a survey of building materials was conducted so that potential asbestos, lead-bearing paint, and other potentially hazardous materials are identified for proper removal prior to demolition or renovation. Therefore, the scope of work performed included evaluation and analysis of existing environmental data, soil sampling in the unsaturated zone, installation of temporary monitoring wells, collection of soil, groundwater, asbestos, and lead paint samples, and laboratory analysis of the environmental samples. Proposed sample locations include areas of known or suspected impacts based on historical information obtained from the WDNR Bureau of Remediation and Redevelopment Tracking System (BBRTS) on the Web and the “Draft Report, FY 16 Phase I Regional Site Inspections for Perfluorinated Compounds (March 2018), prepared by Amex Foster Wheeler under contract to the WIANG.

A Site Characterization Investigation was conducted at the six sites and perimeter fence area in October 2020. The primary objectives of the investigation were to:

- Define the local geology including the origin, texture, thickness, and distribution of the unconsolidated deposits
- Determine the local hydrogeologic conditions including depth to groundwater
- Confirm the type and distribution of contaminants of concern in the soil and groundwater at these sites
- Evaluate potential contaminant pathways and the potential for migration in soil and groundwater
- Use data collected during this assessment and assessments completed by others to prepare a materials management plan to manage potentially impacted environmental media during construction.

A Site Characterization Investigation report titled: *Site Characterization Report, Wisconsin Air National Guard, Air Fighter Wing Facility, F-35 Bed Down – W50 S9F20F0002, Truax Field, Madison Wisconsin* (Ayres 2020) was submitted separately. Environmental management activities related to site development are the subjects of this report.

Property and Contact Information

Project Title and Purpose

F-35 Bed down Project – W50S9F20F0002
WDNR BRRTS #02-13-585319

Key Title and Purpose

Property	Wisconsin Air National Guard
Owner:	3200 Pierstorff Street Madison, WI 53704
Contact:	Michael J. Dunlap, Lt Col.
Email:	michael.dunlap@us.af.mil
Phone:	608.245.4342

Engineer Information

Frankfurt-Short-Bruza Associates, P.C. (FSB)
5801 Broadway Extension, Suite 500
Oklahoma City, OK 73118

Contact:	Gene O. Brown, Principal, Director of Federal Programs
Email:	gbrown@fsb-ae.com
Phone:	405.840.2931

Consultant Information

Ayres Associates Inc
5201 E. Terrace Drive, Suite 200
Madison, WI 53718

Contact:	Jeffrey Steiner, PG, PH, CPG Senior Hydrogeologist
Email:	steinerj@ayresassociates.com
Phone:	608.443.1259

Regulatory Information

Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Contact:	Steven L. Martin, PG South Central Region Team Supervisor
Email:	stevenl.martin@wisconsin.gov
Phone:	608.293-0112

Project Description and Proposed Development

Frankfurt-Short-Bruza Associates, P.C. (FSB) was retained by the Wisconsin Air National Guard (WIANG) to upgrade the WIANG installation to accommodate the F-35A aircraft including the construction of ALERT parking garages and munitions maintenance and inspection facility, repair of existing structures, and installation of a new perimeter fence. Activities outlined in this document provide direction on materials management during construction and redevelopment at the site. Several phases of site investigation conducted on these properties provided data regarding residual contamination on the development site. Details of investigation activities are addressed in several reports prepared by Ayres Associates and others.

A map of the proposed facilities slated for demolition, reconstruction, or upgrades at 3200 Pierstorff Street (BRRTS #02-13-585319), is shown in Figure 2. The project will consist of the removal and replacement of the existing structures, removal of old utility lines, installation of new utilities, and areas of removal and replacement of bituminous pavement will be included at the new or existing facilities. Construction involving on-site soil management and capping will be conducted across the entire site to prevent direct human contact with contaminated soil and fill material. An engineered cap, in the form of buildings, tarmac, parking lots, and clean imported soil will be constructed on the property. Excavation for footings, site grading, removal of old utilities, and installation of new utilities will result in potentially contaminated materials being moved from their existing location and relocated to other areas of the project site or taken off-site for disposal. Materials relocated on-site, if any, will be placed in designated areas and capped with buildings, tarmac, clean soil, roads, and parking lots.

Background

Site Location and Description

The project site is located in the Northeast ¼ of the Northwest ¼ of Section 29, Township 8 North, Range 10 East, Dane County, Wisconsin. The site (herein referred to as site or property) is located at Truax Field, 3200 Pierstorff Street, Madison, Wisconsin (Figure 1).

With the recent announcement that the base will be transitioning to F-35A aircraft, several buildings and engineering appurtenances will require replacement or retrofitting to accommodate the new mission.

Site History and Background

The history of the site was obtained from environmental reports obtained from the WDNR BRRTS on the Web and from the “Draft Report, FY 16 Phase 1 Regional Site Inspections for Perfluorinated Compounds (March 2018), prepared by Amec Foster Wheeler under contract to the WIANG.

The WIANG installation at Truax Field was originally constructed in 1942 as an Army base. The base was deactivated as an active military base in 1968 when it became occupied by the WIANG. Since 1942, fighter/attack aircraft have been housed at Truax Field. Over the years, the installation has used and stored petroleum and other hazardous materials.

The Department of Defense has conducted environmental investigations at military bases across the county as part of the Installation Restoration Program, the WIANG base at Truax Field was one of the facilities included in the program. According to the WDDNR BRRTS, environmental activities have been conducted on the site since 1990 when a preliminary facility investigation indicated soil and groundwater in the proximity of Hangar 414 was impacted by petroleum. A subsequent investigation conducted by Dames and Moore defined an area of soil and groundwater contamination that resulted in excavation and disposal of petroleum-contaminated soil and operation of a soil vapor extraction system (SVE). The site was closed by the WDNR in 2012 with residual soil and groundwater contamination.

A Perfluorinated Compound Preliminary Assessment Site Visit was conducted on the base by BB&E, Inc. in 2015. The purpose of the visit was to identify sites with potential perfluorinated compound releases associated with Aqueous Film Forming Foam (AFFF) use and storage. The results of the assessment are documented in the "Final Perfluorinated Compounds Preliminary Assessment Site Visit Report (December 2015) prepared by BB&E, Inc. Findings of the report concluded that Hangar 414 was equipped with a fire suppression system supplied with AFFF and that a site investigation of soil and groundwater was recommended.

A Phase 1 Regional Site Inspection for Perfluorinated Compounds was conducted at the base by Amec Foster Wheeler in 2017. This work included subsurface investigation of soil and groundwater for perfluorinated compounds based upon the recommendations of the 2015 BB&E Site Visit Report. Three soil boring were advanced at the Hangar 414 site for collection of six soil samples. Soil samples were collected from the 0.5'-1' interval and just above the water table at a depth of 4.5' to 5.5'. One temporary well was also installed for collection of one groundwater sample. Results of soil sample analysis indicated detectable perfluorinated compound concentrations, however, none of the compounds detected in soil exceeded regulatory levels. Groundwater analysis detected six perfluorinated compounds with two compounds exceeding the EPA Drinking Water Health Advisory.

Ayres Associates performed a site characterization assessment at the site in October 2020 at the direction of WDNR to confirm the presence of VOC and PFAS concentrations in soil and groundwater at the site. Per-and Polyfluorinated Alkyl Substances (PFAS) were detected in 29 of the 34 soil samples submitted for PFAS analysis. Trace concentrations of perfluorooctanesulfonic acid (PFOS) were detected in 28 of the soil samples analyzed while perfluorooctanoic acid (PFOA) was detected in 7 of the soil samples analyzed. None of these constituents exceeded their respective regulatory standards in soil samples analyzed during this assessment. Results of lab analysis show none of the soil samples analyzed had detectable levels of VOC.

Detectable concentrations of PFAS compounds were found in each of the nine groundwater samples analyzed. Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) concentrations exceeded the NR 140 Wisconsin Administrative Code enforcement standard of 0.02 µg/L, as well as the USEPA Health Advisory of 0.07 µg/L in samples collected from 6 wells and 9 wells, respectively.

Laboratory results indicate detectable concentrations of VOC constituents in samples collected from four of the nine monitoring wells. Most of the petroleum and chlorinated hydrocarbon (VOC) constituents detected were found in samples collected from wells 01-AA-MW-2, 01-AA-MW-3, and 01-AA-MW-4 where olfactory observations during well development indicated the likely presence of hydrocarbons. Concentrations of 1,2-dichloroethane, benzene, and bromodichloromethane exceeded their respective NR 140 Wisconsin Administrative Code enforcement standards (ES) in a sample from well 01-AA-MW-3. Bromodichloromethane also exceeded the ES in a sample from well 01-AA-MW-4. The constituents 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,2-dichloropropane, benzene, bromodichloromethane, and naphthalene exceeded their respective NR 140 Wis. Adm. Code preventive action limits (PAL) in samples from one or more monitoring well.

Results of the site characterization are summarized in the following sections of this report.

Contaminants of Concern and Exposure Routes

Environmental concerns regarding the site are related to the known VOC contamination discovered during environmental activities conducted in the 1990s by Dames and Moore and others. The BRRTS site related to this contamination is closed with inclusion on the GIS registry indicating residual soil and groundwater contamination. More recent site investigations conducted on the site by Amec Foster and Wheeler and Ayres Associates detected perfluorinated compound concentrations in soil and groundwater at the site.

The primary contaminants of concern in soil include per-and polyfluorinated alkyl substances (PFAS). PFAS were detected in each of the 10 soil samples submitted for analysis. Per-and Polyfluorinated Alkyl Substances (PFAS) were detected in 29 of the 34 soil samples submitted for PFAS analysis. Trace concentrations of perfluorooctanesulfonic acid (PFOS) were detected in 28 of the soil samples analyzed. Trace concentrations of perfluorooctanoic acid (PFOA) were detected in 7 of the soil samples analyzed. Neither of these constituents exceeded their respective direct contact residual contaminant level (RCL) outlined in NR 720 Wisconsin Administrative Code in soil samples analyzed during this assessment. Wisconsin currently does not have protection of groundwater soil standards established for these constituents. However, PFOS and PFOA detections in soil exceed the calculated protection of groundwater Regional Screening Levels (RSL) using the EPA calculator. Soil impacts are depicted in Figure 3.

Detectable concentrations PFAS compounds were found in each of the nine groundwater samples analyzed. Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) concentrations exceeded the NR 140 Wisconsin Administrative Code enforcement standard of 0.02 µg/L, as well as the USEPA Health Advisory of 0.07 µg/L in samples collected from 6 wells and 9 wells, respectively.

Detectable concentrations of VOC constituents were found in groundwater samples collected from four of the nine monitoring wells. Most of the petroleum and chlorinated hydrocarbon (VOC) constituents detected were found in samples collected from wells 01-AA-MW-2, 01-AA-MW-3, and 01-AA-MW-4 where olfactory observations during well development indicated the likely presence of hydrocarbons. Concentrations of 1,2-dichloroethane, benzene, and bromodichloromethane exceeded their respective NR 140 Wisconsin Administrative Code enforcement standards (ES) in a sample from well 01-AA-MW-3. Bromodichloromethane also exceeded the ES in a sample from well 01-AA-MW-4. The constituents 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,2-dichloropropane, benzene, bromodichloromethane, and naphthalene exceeded their respective NR 140 Wis. Adm. Code preventive action limits (PAL) in samples from one or more monitoring well. Groundwater impacts are depicted in Figure 4 and Figure 5.

Based on the location and nature of the contaminants identified above and considering the anticipated future use for the site and planned excavation work, the *construction worker* has been identified as the most appropriate potential human receptor. The potential sources of contamination present at the site are primarily PFAS and VOC-impacted subsurface soils and groundwater. The potential routes of exposure include:

- Ingestion and dermal contact with PFAS and VOC impacted soils and groundwater
- Inhalation of VOCs in indoor air if contaminated sub-slab vapors are migrating into buildings
- Potential transport mechanisms at the site include:
- Wind and atmospheric dispersion
- Leaching of contaminants to groundwater and transport/migration via groundwater
- Partitioning of VOCs from soil to indoor air

Potential exposure during the remedial work will be managed with a Health and Safety Plan (HASP) and Community Air Monitoring Plan designed to protect site workers and the public. Potential future exposure to residual contamination and vapor transport, if any, will be mitigated using institutional and engineering controls.

Regional Geology and Hydrogeology

Geology

Evaluation of the site geology is based on existing published regional information[1], and site-specific data collected from borings advanced in the project area. Subsurface information collected during previous assessment activities conducted on the site indicates that the unconsolidated sediments consist primarily of between 3 and 7 feet of clay and silty clay underlain by fine to medium-grained sand to a depth of at least 18 feet below ground surface (bgs).

Regional information indicates that surficial unconsolidated deposits consist of glacial ground moraine and lake plain sediments consisting of stratified layers of sand, silt, and clay. Information obtained by the author of this report from a site investigation performed in 1992 for the City of Madison at the Truax Landfill located southwest of the project site indicates a deep, pre-glacial bedrock valley runs beneath the Truax Regional airport and project site. The unconsolidated deposits in the bedrock valley beneath the site area are estimated to be over 300 feet thick. The uppermost bedrock unit beneath the site is the Cambrian age Mount Simon Sandstone.

Hydrogeology

Groundwater is found within the unconsolidated glacial deposits and underlying sandstone bedrock. These aquifers are the source of domestic, municipal, and industrial water supplies in the Madison area and Dane County. The bedrock aquifer is the principal source of municipal water in Dane County. The City of Madison uses wells completed in the Mount Simon sandstone for its municipal water supply. Truax Field is supplied water from the City of Madison distribution system.

Depth to groundwater is less than ten feet below ground surface. Previous investigations at the site indicate that shallow groundwater has been interpreted to flow south-southeast.

Site Geology and Hydrogeology

Site Stratigraphy

Subsurface conditions were evaluated based on information collected from twenty five (25) soil borings advanced to a maximum depth of 15 feet below ground surface (bgs) during this assessment. Boring depths were terminated at 10 feet bgs instead of 15 feet bgs as indicated in the work plan due to shallow groundwater, except for boring A-MW-2. Boring AA-MW-2 was advanced to 15 feet bgs to obtain additional hydrogeologic information at depth in case dewatering is required. Each of the five soil borings advanced was used for the installation of monitoring wells (AA-MW-1 through AA-MW-5). Locations of the borings and monitoring wells are shown in Figure 2. Geologic cross-section A-A' is shown in Figure 6.

Subsurface information collected during this assessment indicates the unconsolidated sediments at the site consist of natural fill materials and stratified layers of ground moraine and lake plain deposits to the depth of exploration at 15 feet. The unconsolidated sediments are presented as two hydrostratigraphic units on cross-sections A-A' based on similar hydrologic characteristics such as grain size and permeability. The top unit consists of finer-grained silty sand, clayey sand, silt, and low plasticity clay

[1] Clayton, Lee and Attig, J.W. 1997. "Pleistocene Geologic Map of Dane County, Wisconsin, WGNHS Bulletin 95, Plate 1.

deposits of low to medium permeability. The lower unit consists of fine to coarse-grained, poorly graded sand and gravel materials of medium to high permeability.

Bedrock was not encountered during this assessment. Depth to bedrock in the site area is estimated to be over 300 below ground surface.

Groundwater Flow Conditions

Groundwater Levels

Groundwater level and elevation data were obtained from the monitoring wells on October 7 and October 8, 2020. Water level data collected on October 8th indicate that depth to water ranged from 5.16 feet below the top of well casing in well 01-AA-MW-3 to 8.38 feet in well 04-AA-MW-9. Water levels were 0.03 to 0.58 feet (0.36 to 6.9 inches) lower in each of the five wells measured on October 7, 2020. The water table was encountered at or slightly above the interface of the two hydrostratigraphic units (i.e., clay/sand unit interface).

Groundwater Flow

Water level data obtained from the temporary monitoring wells on October 8, 2020, were used to construct a water table contour map (Figure 7). Groundwater flow in the shallow unconsolidated deposits was generally northwest across the site during the October 2020 sampling event at an average horizontal hydraulic gradient of 0.001. The groundwater flow direction and gradient are consistent with results for the site characterization performed at the nearby hangar 414 building site in June 2020.

Vertical Gradients

Differences in hydraulic head can occur between different geologic units. The difference in hydraulic head is caused by steep hydraulic gradients induced by heavy groundwater pumping, large topographic relief, or by differences in hydraulic conductivity. Vertical gradients can induce or prevent contaminant migration in and between aquifers depending on the magnitude and direction of the gradient.

Vertical gradients could not be calculated as no well nests were installed during this assessment.

Hydraulic Conductivity Testing

Hydraulic conductivity (slug) tests were not performed on the nine temporary monitoring wells installed at the site during this assessment. However, slug tests were performed on four of the monitoring wells installed at the nearby Hangar 414 site during the June 2020 assessment performed by Ayres Associates. Those results are included in this report as the tests were performed on wells screened in the same geologic materials as the wells installed for this assessment.

The tests were performed by inserting a solid cylinder (slug) into the well and allowing the water level to equilibrate. The slug was then rapidly removed from the well to cause an instantaneous drop in water level (rising head test), then measuring the return of the water level to its static condition. Water level data were recorded with an automated pressure transducer and data logger system. Slug test data were evaluated using Aqtesolv v. 4.5 graphical analysis and reporting software. The slug tests were analyzed using the methods of Bouwer and Rice (1976) for unconfined aquifers.[2]

---

[2] Bouwer, H. and R.C. Rice, A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells, *Water Resources Research*, Vol.12, No.3, 1976, pp.423-428

Hydraulic conductivity values (recovery test only) calculated for the four temporary monitoring wells tested in June 2020 ranged from 2.4 x 10^{-2} cm/sec to 7.1 x 10^{-2} cm/sec. Each well was screened mostly or entirely within the coarse-grained sand and gravel layer beneath the site.

Groundwater Flow Velocity

Groundwater flow velocity was calculated for the water table aquifer at this site using the formula:

$V = ki/n_e$

Where:

V = horizontal groundwater flow velocity

k = hydraulic conductivity

i = hydraulic gradient

n_e = effective porosity

An average hydraulic conductivity value of 4.1 x 10^{-2} cm/sec was used in calculating groundwater flow velocity in the water-table aquifer. This value was obtained by calculating the arithmetic mean of hydraulic conductivity results for tests performed on water table wells at the site.

The hydraulic gradient (i) used to calculate horizontal groundwater flow velocity is based on water levels measured on October 8, 2020. An average horizontal gradient of 0.001 ft/ft was used to calculate groundwater flow in the upper unconsolidated aquifer.

The velocity of groundwater is also influenced by the porosity of the aquifer material. The effective porosity (n_e) is a measure of the amount of interconnecting pore space that is available in a given volume of material through which water can move. The average effective porosity of the unconsolidated material is assumed to be 30 percent.

Based on the values stated above, the average horizontal groundwater flow velocity in the unconsolidated water table aquifer across the subject site is approximately 0.39 feet/day or 142 feet/year.

Soil Quality Assessment

Soil samples were collected from the twenty-five soil probes advanced during the assessment and submitted to CT Laboratories in Baraboo, Wisconsin, for analysis. Selected samples were analyzed for VOC and PFAS; Vista Analytical was contracted by CT Labs to analyze for PFAS. The locations of the proposed borings and wells, and the depth of sampling, were prescribed by the WDNR and WIANG based upon previous site assessment findings completed by others as discussed in the WDNR-approved Sampling and Analysis Plan. Soil samples collected from nine of the probe locations at the six-building sites were generally selected for laboratory analysis from the 1-2-foot depth interval and the interval approximately one foot above the water table. Soil samples collected from the remaining 16 soil probe locations advanced along the perimeter fence were selected from the 0-2-foot depth interval. Within those prescribed intervals, the soil sample with the highest PID readings at each sampling location was selected for laboratory analysis. If no volatile organic contamination was identified above background during field screening, a sample from each sampling location was selected based on obvious discoloration or other visible signs of contamination. Soil samples were submitted to the laboratory and analyzed for PFAS and VOC using Vista's PFAS Isotope Dilution Method and EPA Method 8260C, respectively.

Field Observations and Screening Results

Headspace analysis was performed on each of the soil samples obtained from the probes. Headspace analysis is a screening tool used to qualitatively assess the degree of potential impacts to soil from volatile organic compounds. The headspace analysis was performed using a photoionization detector (PID) equipped with an 11.7 eV lamp in accordance with Ayres Associates' standard operating procedure #210.

Results of the headspace analysis do not indicate the potential presence of elevated levels of volatile organic constituents in the soil samples collected from above the water table in any of the probes advanced during this assessment. However, elevated PID readings of 322 and 1097 instrument units (IU) were recorded for soil samples collected at or below the water table from probe 01-AA-MW-1 at 5 feet and 8 feet below ground surface respectively, where a moderate to strong hydrocarbon odor was observed. A slight hydrocarbon odor was also noted in a soil sample collected below the water table in probe 01-AA-MW-4 with a corresponding PID reading of 5.6 IU.

Results of Soil Sample Laboratory Analysis

Thirty-four (34) soil samples collected from the soil probes advanced during this assessment were submitted for analysis. Samples were analyzed for VOCs and PFAS. VOCs were analyzed using EPA Method 8260C and PFAS was analyzed using Vista's PFAS Isotope Dilution Method. A summary of analyte detections and exceedances in soil are presented in Table 1. Soil analytical tables for individual sites are provided in Appendix A. The locations of analyte detections and exceedances in soil are shown in Figure 3.

Per-and Polyfluorinated Alkyl Substances (PFAS)

Per-and Polyfluorinated Alkyl Substances (PFAS) were detected in 29 of the 34 soil samples submitted for PFAS analysis. Trace concentrations of perfluorooctanesulfonic acid (PFOS) were detected in 28 of the soil samples analyzed and one equipment blank. Trace concentrations of perfluorooctanoic acid (PFOA) were detected in only 7 of the soil samples analyzed. The parameters PFOS and PFOA are the only two PFAS constituents that have established regulatory standards for soil in Wisconsin. Neither of these constituents exceeded their respective regulatory standards in any of the soil samples analyzed during this assessment. Wisconsin currently does not have protection of groundwater soil standards established for these constituents. However, PFOS and PFOA detections in soil exceed the calculated protection of groundwater Regional Screening Levels (RSL) using the EPA calculator.

Volatile Organic Compound Analysis (VOC)

Each of the 34 soil samples collected was analyzed for volatile organic compounds (VOC). All soil samples were collected from above the water table. Results of lab analysis show none of the soil samples analyzed had detectable levels of VOC; therefore, the results of VOC analysis were not tabulated.

Groundwater Quality Assessment

Groundwater samples were collected from each of the nine monitoring wells installed at the project site. The purpose of this sampling is to characterize the nature and extent of potential contamination at the site by determining the type, distribution, and concentration of chemical constituents present in the groundwater. The analytical data will also be used to evaluate potential treatment or disposal options for groundwater should dewatering be required during construction.

Ayres Associates collected one round of groundwater samples from the nine monitoring wells. Samples were collected from the wells on October 8, 2020, and submitted to CT Laboratories in Baraboo, Wisconsin for analysis of VOCs. Samples for PFAS analysis were submitted to Vista Analytical, a subcontractor of CT Labs. Each of the groundwater samples was analyzed for VOC and PFAS. VOCs were analyzed using EPA SW-846 Method 8260C and PFAS were analyzed using Vista's PFAS Isotope Dilution Method. A summary of analyte detections in groundwater samples is presented in Table 2 and Table 3. Groundwater analytical tables for individual sites are provided in Appendix B. The locations of analyte detections and exceedances in groundwater are shown in Figure 4 and Figure 5.

Per-and Polyfluorinated Alkyl Substances (PFAS)

Each of the nine groundwater samples collected was submitted for PFAS analysis. Detectable concentrations PFAS compounds were found in each of the nine groundwater samples analyzed and one equipment blank. (Note: trace concentrations of POFSA was the only parameter found in the equipment blank). Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) concentrations exceeded the NR 140 Wisconsin Administrative Code enforcement standard of 0.02 µg/L, as well as the USEPA Health Advisory of 0.07 µg/L in samples collected from 6 wells and 9 wells, respectively. The parameters PFOS and PFOA are the only two PFAS constituents that have established groundwater regulatory standards in Wisconsin.

Volatile Organic Compound Analysis (VOCs)

Groundwater samples collected from each of the nine temporary monitoring wells were analyzed for volatile organic compounds (VOC). Laboratory results indicate detectable concentrations of VOC constituents in samples collected from four of the nine monitoring wells. Most of the petroleum and chlorinated hydrocarbon (VOC) constituents detected were found in samples collected from wells 01-AA-MW-2, 01-AA-MW-3, and 01-AA-MW-4 where olfactory observations during well development indicated the likely presence of hydrocarbons. Concentrations of 1,2-dichloroethane, benzene, and bromodichloromethane exceeded their respective NR 140 Wisconsin Administrative Code enforcement standards (ES) in a sample from well 01-AA-MW-3. Bromodichloromethane also exceeded the ES in a sample from well 01-AA-MW-4. The constituents 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,2-dichloropropane, benzene, bromodichloromethane, and naphthalene exceeded their respective NR 140 Wis. Adm. Code preventive action limits (PAL) in samples from one or more monitoring well.

Field Parameters

Real-time data on temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity were collected from eight of the nine of the wells to complement the analytical data. These data were used to construct a "geochemical model" of conditions at the site to assist in the

interpretation and understanding of attenuation and or transformation processes that may be occurring, and the potential fate of the constituents of interest. Temperature, pH, specific conductance, turbidity, dissolved oxygen, and redox potential were obtained using an In-Situ®, Inc. AquaTROLL 600 multi-parameter water quality monitoring system. Simultaneous temperature, pH, specific conductance, turbidity, dissolved oxygen, and redox readings were taken continuously during pumping until readings stabilized.

The field parameter data are relatively consistent in each of the eight wells. The field data indicate near-neutral pH conditions in groundwater from wells MW-6, MW-7, and MW-9 while slightly lower pH readings were noted in groundwater from the other five wells. Specific conductivity is an indirect measure of the amount of dissolved solids in groundwater and is used as an indicator of water impacts. Specific conductivity measurements measured at the site were similar between wells and the range of values measured does not indicate significant impacts in groundwater. Turbidity levels were exceptionally low in samples from each well which is advantageous for obtaining accurate water quality analytical results by minimizing false positives and matrix interference effects.

Dissolved oxygen (DO) and oxidation-reduction (ORP) values in groundwater samples were lower than expected given the shallow depth to water, although the presence of lower permeability silt and clay materials above the water table in some areas may limit infiltration that could otherwise bring oxygenated water into the aquifer. The low DO and ORP values, apart from well MW-9, indicate reducing conditions within the aquifer that could be advantageous for the dechlorination of chlorinated hydrocarbons but would inhibit oxidation and natural attenuation of petroleum hydrocarbons. Little is currently known about the potential for natural attenuation of PFAS in the environment.

Building Materials Assessment

Six buildings associates with this Truax Field Air National Guard project are slated for demolition or renovation. Building material samples were collected from five of the six buildings to assess the presence of asbestos-containing materials (ACM) and lead-bearing paint (LBP). The Munitions and Inspection Facility (XGFG182017) was not assessed for asbestos and lead paint at the direction of Lt. Col. Meghan Plendl. The results of this sampling and analysis were submitted in separate reports.

Vapor Assessment

Vapor intrusion is the migration of volatile constituents from contaminated subsurface soil or groundwater into indoor air spaces of overlying buildings or underground routes such as buried utility lines and trenches. Most vapor intrusion occurs when gases or contaminants in the underlying soil, or contaminants at the water table, enter the unsaturated zone above the water table and migrate to the atmosphere, or into the air space of overlying structures or utility trenches. Less frequently, vapors can enter buildings with groundwater seepage into sumps or flooded basements where contaminants partition directly from the groundwater into indoor air.

No subsurface vapor sampling was proposed or performed during this assessment because existing data do not indicate the presence of hydrocarbons in soil or groundwater at concentrations of concern. However, a qualitative vapor assessment was performed to evaluate the potential for volatile constituents to migrate into buildings and utilities, or along utility trenches across or away from the site after hydrocarbons were detected in soil and groundwater at the site. Based on the results of this assessment, Ayres Associates concludes that residual hydrocarbon contamination in soil and groundwater is not of sufficient concentration to be a concern from vapor migration or intrusion in existing or future utilities and buildings. Also, the low organic content of the natural soils and fill material at the site will not likely promote the generation and migration of methane or other gases through the decomposition of organic matter.

Materials (Soil/Debris/Groundwater) Management Plan

This materials management plan applies to potential VOC or PFAS-impacted soil and groundwater, and other debris disturbed during construction of facilities associated with the F-35 Bed Down project at the Truax facility. The soil and debris material to be managed is considered non-hazardous solid waste. This plan summarizes information required under s. NR 718.12(2)(b) 1to 8, including responsible party information, the type and volume of impacted soil or groundwater to be managed, project location, consultant and contractor information, proposed schedule, results of analyses performed on the impacted soil and groundwater, a description of how the impacted soil and groundwater will be managed, and information to justify that relocation of impacted soils will meet requirements of s. NR 726.13{1)(b) 1 to 5.

Impacted Soil Management

PFAS-impacted soil is present throughout the project area with some areas containing greater contaminant concentrations than others. None of the soil sample results obtained from the recent assessment exceed the NR 720 Wisconsin Administrative Code direct contact standard for PFOS and PFOA, the only two compounds that currently have established soil standards in Wisconsin. However, fate and transport calculations performed to determine a soil to groundwater regional screening level (RSL) using the EPA RSL calculator indicate the concentrations in soil do exceed this conservative soil to groundwater (leaching) value, indicating a potential for the contaminants to leach to groundwater. Because groundwater beneath the site is known to be impacted by PFAS and PFOA above NR 140 Wis. Admn. Code groundwater standards, the WDNR may not allow excavated soils to be reused on-site. If WDNR does grant permission to relocate and reuse PFAS impacted soil on-site, they will require this material to be capped beneath the building, under other impervious surfaces (i.e., roads, parking areas, tarmac), or capped with up to 2-feet of clean imported soil and topsoil. Given the proposed construction finish grades and shallow depth to groundwater, there may not be sufficient space to reuse this soil on-site. Therefore, we anticipate that nearly all the soil excavated during construction will be managed and disposed of in an off-site Subtitle D municipal landfill.

Site development will necessarily require some modifications to existing site grades (elevations). However, based on current grading plans for the project, no significant quantities of clean soil or structural fill will be imported to raise base grade elevations for building construction.

Soil (and fill) at the site may include excess material from site grading, utility trenching for removing old utilities and installation of new utilities, soil removed during installation of poured concrete foundation walls and floor slabs, and removal and installation of asphalt and concrete tarmacs, aprons, sidewalks, and driveways. The locations and estimated quantities of soil spoil requiring removal and off-site disposal, and areas of clean imported soil for each of the sites, are described below and shown on site figures in Appendix C. Cut volumes provided below are based on preliminary design drawings provided by FSB. Actual volumes are contingent on final grading elevations, depth and length of utility trenching, and length and depth of foundation structures installed and will be determined by a contractor hired to perform the soil excavation and off-site disposal tasks.

01: XGFG182017 F-35 Munitions Maintenance & Inspection Facility

The planned building is to be approximately 2,500 square feet in size. The exterior walls for the building will consist of two cast-in-place concrete walls, with earth fill placed between the walls. The walls are planned to be supported on shallow foundations. Volume estimates for the foundation are based on 220 lineal feet, 5-foot deep by 4-feet wide. The design floor elevation is not established at this time but is assumed to be around elevation 856 feet.

An asphalt drive will be constructed on the southeast side of the building. The pavement section for the drive is planned as 4 inches of asphalt over 12 inches of aggregate base course. Based on preliminary design drawings provided by FSB, the estimated cut volume for this site is 1,435 cubic yards.

02: XGFG182009 F-35 Alter B400 Building

No subsurface work is planned for this facility.

03: XGFG182006 Alert GOV Parking Shelters

The project will consist of the removal and replacement of the existing asphalt pavement, demolition of three small structures, and construction of two (2) new garage structures. The foundations for the garage structures are unknown at this time but will be either supported on shallow foundations or a mat foundation with frost walls. The garage structure located on the north side of the GOV Building will be approximately 17 feet wide by 23 feet long, and the garage structure on the west side of the GOV Building will be approximately 23 feet wide by 27 feet long.

The pavement for the new drive and parking is planned to be asphalt cement concrete (ACC). It is our understanding that the pavement section will consist of 4 inches of ACC over 12 inches of aggregate. Based on preliminary design drawings provided by FSB, the estimated cut volume for this site is 1,232 cubic yards.

04: XGFG192002 F-35 Repair B401 AGE Shop

The project will consist of renovating the existing west wing/work bay of the Aerospace Ground Engineering Shop (Building 401). The footprint and roof structure of the existing one story, 20-foot-high ceiling, slab on grade building will remain. It is assumed that the floor slab for the new wing will be around the same elevation as the existing floor slab.

The project will also include reconfiguring the exterior drives. The pavement for the new drives is planned to be asphalt cement concrete (ACC). It is our understanding that the pavement section is planned as 4 inches of ACC over 12 inches of aggregate. Earthwork for the site will also include storm sewer replacement and a fire supply water line. Based on preliminary design drawings provided by FSB, the estimated cut volume for this site is 413 cubic yards.

05: XGFG182018 F-35: Repair B1207

The project will consist of electrical work, replacing concrete, replacing the loading dock, and adding a new sewer line. Based on preliminary design drawings provided by FSB, the estimated cut volume for this site is 87 cubic yards.

06: XGFG192005 F-35 B511 HAZMART

Minor earthwork will be performed at this site. The project includes sidewalk replacement, new pavers, and installation of a new fire suppression water line. Based on preliminary design drawings provided by FSB, the estimated cut volume for this site is 122 cubic yards.

07: XGFG192006 Perimeter Fence

A new perimeter fence will be installed around the east and south sides of the Truax facility. The work order provided by the client for the perimeter fence does not indicate the number of fence posts to be installed; however, we estimate 172 cubic yards of soil will be generated during fence construction assuming 3100 lineal feet of fence with 8-foot fence post spacing.

The general project approach and sequencing for the project is outlined below:

- Prepare design plans and specifications
- Prepare bid package and let for bid
- Select contractor and prepare contracts
- Prepare and submit dewatering permit if required
- Perform waste characterization, if necessary, and obtain permits
- Perform underground locate/clearance calls
- Abandon monitoring wells in development area, as necessary
- Mobilize equipment and personnel
- Perform demolition activities
- Excavate target soil and manage excavation water
- Transport and dispose of soil and debris at an off-site landfill
- Collect water entering the building foundations and utility trench excavations and transfer to a poly tank for storage and analysis, pending treatment and final disposal
- Backfill the excavation with clean fill and compact, as necessary for construction

Construction contractors will be responsible to implement and use best management practices to minimize tracking soil out of the project area in compliance with the site erosion control plan to be developed by the contractor as part of the design specifications.

Miscellaneous Construction Debris

Miscellaneous materials may be generated or found in conjunction with the overall construction project. Examples of such regulated materials would be demolition debris, wood, metal, underground tanks, utility lines, concrete foundations, and asphalt or concrete from the removal of parking areas, sidewalks, and runway aprons. These materials may be generated by individual sub-contractors or materials found within the excavated soil or fill material during construction. In general, the Contractor should load and transport miscellaneous materials for off-site disposal. These materials should be loaded and transported separately from the soil as some of these materials may require recycling.

Off-Site Transportation and Disposal (if required)

Off-site disposal of soil, concrete, bituminous material, or other contaminated materials is anticipated for this project. Any historic PFAS or VOC-impacted soil or fill excavated from the site that cannot be used on-site for construction will be transported and disposed of at Waste Management landfill located in Sun Prairie, Wisconsin, approximately 10 miles northeast of the site or other Subtitle D landfill selected by the contractor. Transportation and disposal of this material will likely require additional waste characterization.

Imported Fill Management

Imported construction materials such as sand and gravel for building and road construction will be temporality stockpiled on the development site’s existing asphalt parking. Additional material will be stockpiled for road and tarmac construction and utility trench backfill. The locations of the temporary stockpiles will be determined by the contractor selected for the project.

Contaminated soil, concrete, and debris are expected to be excavated and relocated in a continuous effort such that temporarily stockpiling this material will not be necessary. However, should it be

necessary to place excavated fill material in stockpiles, temporary stockpiles will be maintained in general accordance with s. NR 718.05 (3). Conditions for temporary stockpiles include:

- Placing the soil on an impervious base (e.g. concrete, asphalt, or plastic sheeting),
- Covering the soil when it is not being moved with a cover material sufficient to prevent infiltration of precipitation and inhibit volatilization of contaminants (e.g., plastic sheeting),
- Preventing surface water contact with the stockpiled soil using constructed berms, if necessary, to control surface water movement.

If stockpiles are maintained for longer than 15 days, requirements under s. NR 718.05(2) would also apply including stockpile inspections at least once every 30 days, immediately repairing or replacing any base, cover, anchoring, or berm materials, and notification to the WDNR if soil is stored for more than 90 days before final disposition.

The proposed soil handling and placement procedures meet environmental closure requirements of s. NR 726.13(b) and do not pose an unacceptable threat to public health, safety, welfare, or the environment. The site will be placed on the WDNR online Geographic Information System Registry (GIS Registry) for sites with residual soil and/or groundwater contamination and will have an approved cap maintenance plan which describes requirements for annual cap inspection and timely repair of any damaged/deteriorated areas.

The WNDR recently prepared a guidance document proposing a process to document soil, or other material, imported to a VPLE site. According to the draft guidance document (RR-041) the following factors will be considered when evaluating the imported fill:

- Past history of the property-where the soil and other filled materials are generated
- The volume of soil and other fill materials to be used
- Zoning restrictions on the planned end use of the receiving property
- Location on the receiving property where the material will be placed, including the locational criteria in Section NR718.12(1), Wis. Adm. Code; and
- Results of sampling and comparison with RCLs established in accordance with Chapter NR720, Wis. Adm. Code.

The borrow source has not been defined at this time. Only clean construction materials from a known, and properly vetted source, will be used and we do not anticipate analyzing the imported soil.

Locational Standards

Locational standards for the placement of relocated contaminated fill, if any, as outlined in ch. NR718.12(1)(c) consists of the following:

1. Within a floodplain.
2. Within 100 feet of any wetland or critical habitat area.
3. Within 300 feet of any navigable river, stream, lake, pond, or flowage.
4. Within 100 feet of any on-site water supply well or 300 feet of any off-site water supply well.
5. Within 3 feet of the high groundwater level.
6. At a depth greater than the depth of the original excavation from which the contaminated soil was removed.

7. Where the contaminated soil poses a threat to public health, safety, or welfare or the environment.

Areas of PFAS-impacted soil, and the area of potential soil relocation, maybe within three feet of high groundwater levels. Accordingly, consistent with ch. NR718.12(1)(d), we are requesting an exemption to the location criteria (# 5). Concentrations of PFAS from some of the soil samples collected at the site exceed soil to groundwater pathway RCLS calculated with the EPA RSL calculator, and groundwater monitoring indicates PFAS concentrations in groundwater above NR 140 Wis. Adm. Code standards. However, properly managed, the trace concentrations in soil do not represent a significant risk to human health or the environment.

In accordance with s. NR 718.12(1)(e)1, soil samples are required to be collected of relocated contaminated soil at a frequency of one sample per 100 cy of soil for the first 600 cy, followed by one sample for additional 300 cy quantities removed. Due to the extensive testing of the soil previously completed, the condition of this material has been well characterized and we request an exemption to the requirement for completing further chemical analysis.

Temporary Stockpiles

Imported construction materials such as sand and gravel for building, utility trenches, tarmac, runway aprons, and road construction will be temporality stockpiled on the development site's existing asphalt or concrete parking lot. The locations of the temporary stockpiles will be determined by the contractor selected for the project.

Contaminated soil from within the project limits is expected to be excavated and relocated or disposed of in a continuous effort such that temporarily stockpiling this material will not be necessary. However, should it be necessary to place excavated soil material in stockpiles, temporary stockpiles will be maintained in general accordance with s. NR 718.05 (3). Conditions for temporary stockpiles include:

- Placing the soil on an impervious base (e.g., concrete, asphalt, or plastic sheeting),
- Covering the soil when it is not being moved with a cover material sufficient to prevent infiltration of precipitation and inhibit volatilization of contaminants (e.g., plastic sheeting),
- Preventing surface water contact with the stockpiled soil using constructed berms, if necessary, to control surface water movement.

If stockpiles are maintained for longer than 15 days, requirements under s. NR 718.05(2) would also apply including stockpile inspections at least once every 30 days, immediately repairing or replacing any base, cover, anchoring, or berm materials, and notification to the WDNR if soil is stored for more than 90 days before final disposition.

During project construction activities, an Ayres Associates environmental professional will be on-site to monitor the soil being excavated and moved. Certain excavated materials may require additional characterization to evaluate appropriate handling, reuse, or disposal. Excavated materials will be monitored for the presence of:

- Potentially Hazardous Waste
- Buried objects including white goods, tires, railroad ties, drums, etc.
- Extensive areas of visible ash, coal, or cinder
- Detectable organic vapors as identified by photoionization detector (PID) screening
- Strong or unusual odors
- Unusual soil discoloration not previously noted

If any of the above are identified during excavation operations, excavation in this area will be suspended until the materials encountered are evaluated for proper management methods. Ayres personnel will evaluate unusual situations on a case-by-case basis to determine the appropriate alternative response required. In each situation, Ayres Associates personnel will assist the client or contractor with proper disposal or relocation of the regulated material.

The proposed soil handling and placement procedures meet environmental closure requirements of s. NR 726.13(b) and do not pose an unacceptable threat to public health, safety, welfare, or the environment. The site will be placed on the WDNR online Geographic Information System Registry (GIS Registry) for sites with residual soil and/or groundwater contamination. An approved cap maintenance plan will be prepared if required by WDNR, which describes requirements for annual cap inspection and timely repair of any damaged/deteriorated areas.

Asbestos

Five of the six facilities associated with this project were assessed for asbestos and lead-bearing paint in October 2020 and the results are presented in reports submitted separately. A certified asbestos company should abate RACM and non-friable ACM that is likely to become friable before starting demolition or renovation activities that are likely to disturb them. Similarly, ACM should be abated before recycling any attached substrates, such as wood, metal, glass, concrete, or other masonry materials. The selected asbestos company should be licensed to perform abatement work in the state of Wisconsin by the Wisconsin Department of Health Services (DHS). Before beginning any demolition or activities involving the disturbance of ACM, submit a "Notification of Demolition and Renovation and Application for Permit Exemption" form and applicable fees to the WDNR (Attachment E).

The quantities of RACM and non-friable ACM listed in the reports are visual estimates. Ayres recommends verifying these amounts before project design, bidding, budgeting, or submitting a notification of demolition activities to WDNR.

Any suspect ACM found during demolition that is not described in our reports should either be sampled by a certified asbestos inspector and analyzed; or assumed to contain asbestos. Manage confirmed and assumed ACM following all applicable federal, state, and local regulatory requirements. Several WDNR publications are available to guide building owners and operators through the proper handling and disposal procedures for ACM

Lead-Bearing Paint Materials

Lead-bearing paint was present on the masonry surfaces at some of the facilities tested. Masonry that is unpainted or coated with paint that is not lead-bearing (<0.5% by weight) may be used as fill, aggregate, or recycled under NR 500.08(2)(a). However, specific environmental performance, location, and operational requirements apply. Ayres recommends reviewing these requirements, which are listed in NR 504.04(3)(c) and NR 504.04(4)] before using unpainted masonry or masonry coated in non-lead-bearing paint as fill.

Groundwater and Storm Water Management

Groundwater dewatering is anticipated during construction at one or more of the sites given the existing and finish grade elevation of the land surface and the apparent high groundwater levels beneath the Truax facility. Groundwater levels in monitoring wells installed at the sites in October 2020 ranged from 5.16 feet to 8.38 feet below ground surface. Dewatering may be required during both foundation and utility excavation and construction. Design plans call for foundation walls to be placed at least 48-inches below finish grade and groundwater elevations should be at least two feet below the bottom of the excavation to stabilize soils. Excavation depths for water line installation may be as deep as 8-feet below ground surface or several feet below the water table.

Groundwater that is encountered during construction or utility excavations that reaches the land surface, or surface water encountered during storm events, must be properly managed. We anticipate that Madison Metropolitan Sewerage District (MMSD) will not allow the discharge of water impacted with PFAS to the sewerage system. The water will be collected and stored in on-site poly tanks or tankers and treated in an on-site treatment system using liquid activated carbon adsorption, ion exchange, or other methods deemed appropriate by the contractor prior to discharge to the sanitary sewer (with prior approval) or surface water. An alternative, depending on the volume of groundwater anticipated during dewatering, is to store the effluent from dewatering in frac tankers and transport the water to an off-site, out-of-state treatment facility capable of treating PFAS. Dewatering plans and permit requests from WDNR and the City of Madison for groundwater dewatering during utility and foundation construction will be required in advance of construction activities.

Continuing Obligations at Facility

Residual Soil Contamination

If contaminated soil managed under this soil management plan is excavated in the future, the property owner at the time of excavation will be responsible for the following:

- Determine if contamination is present
- Determine whether the material would be considered solid or hazardous waste
- Ensure that any storage, treatment, or disposal is in compliance with applicable statutes and rules

Contaminated soil may be managed in accordance with Wis. Admin. Code § NR 718, with prior DNR approval. In addition, all current and future property owners, and occupants of the property, and right-of-way holders need to be aware that excavation of the contaminated soil may pose a hazard and as a result, special precautions may need to be taken during excavation activities to prevent a health threat to humans. A historic fill exemption is required prior to construction of any structures overfill materials.

Depending on site-specific conditions, construction over contaminated soils or groundwater may also result in vapor migration of contaminants into enclosed structures or migration along underground utility lines. The potential for vapor intrusion and means of mitigation should be evaluated when planning any future redevelopment, and measures should be taken to ensure the continued protection of public health, safety, welfare, and the environment at the site.

Maintenance of a cover:

A soil cover/engineered barrier consisting of buildings, asphalt and concrete surfaces, and clean soil has been placed over the remaining contamination to eliminate direct contact with impacted soil and this cover must be maintained. Inspections will be required, and submittal of inspection reports may be required. Certain activities which would disturb the cover or barrier will be prohibited. If the cover is approved for industrial land use, notification of the DNR is required before changing to a non-industrial use, to determine if the cover will be protective for that use. An approved cap maintenance plan will be prepared if required by WDNR, which describes requirements for annual cap inspection and timely repair of any damaged/deteriorated areas. If the DNR requires changes to the maintenance plan, an updated maintenance plan must be provided at the completion of the soil disposal action.

Use of Industrial Land Use Soil Standards:

Industrial soil standards have been applied for the site receiving the contaminated materials. The DNR must be notified if the property land use will change from industrial use to non-industrial land

use. Additional investigation and remediation may be required prior to the change in land use to ensure the site conditions are protective for the planned land use.

Vapor: Future Actions to Address Vapor Intrusion:

While vapor intrusion does not currently exist, if a building is constructed on this property, or reconstructed, or if the use of a building is changed to a non-industrial use, vapor intrusion may be a concern. The DNR must be notified before construction of a building or changing the use of an existing building to non-industrial use. The use of vapor control technologies or an assessment of the potential for vapor intrusion will be required at that time.

Project Schedule

A preliminary construction project schedule, including design through construction, was developed by FSB for the individual sites:

02: XGFG182009 F-35 Alter B400 Building: 03/2022 – 03/2023

01: XGFG182017 F-35 Munitions Maintenance & Inspection Facility: 12/2021 – 09/2022

04: XGFG192002 F-35 Repair B401 AGE Shop: 12/2021 – 06/2022

06: XGFG192005 F-35 B511 HAZMART: 10/2021 – 07/2022

03: XGFG182006 Alert GOV Parking Shelters: 12/2021 – 09/2022

05: XGFG182018 F-35: Repair B1207: 08/2021 – 02/2022

Actual start and completion dates and milestones are contingent on regulatory review schedules, bidding, construction plan, and contract negotiations, permitting, adverse weather conditions, and the actual scope of work performed. Significant changes in review times or the scope of work outlined in this schedule or adverse weather conditions will necessarily affect the project schedule. A more detailed schedule specific to construction will be prepared and submitted when construction plans are finalized, project bidding is complete, and contractors have been selected.

Identification of Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA requires that remedial actions were undertaken pursuant to CERCLA comply with Federal and State applicable or relevant and appropriate standards or requirements (ARARs) where compliance is technically practicable. Non-CERCLA response actions do not necessarily require compliance with requirements beyond those contained in Wisconsin Administrative Codes and Statutes. While not legally binding, consideration will be given to statutes, regulations, ordinances, and guidance relating to this project including:

- Air, groundwater, surface water quality, and residual soil concentration standards
- Waste handling, storage, transfer, and disposal requirements
- Operating parameters
- Health and safety requirements
- Monitoring requirements

The identification of ARARs depends on the type of media, contaminants of concern, site-specific characteristics, and the technologies employed during remediation. ARARs are those cleanup standards or controls that are promulgated under state or federal law that specifically address a hazardous substance, pollutant or contaminant, action, location, or another situation at a site. A requirement may be "relevant" but may not be "appropriate" to apply for various reasons and, therefore, not well suited for the site. ARARs can be chemical-, action- or location-specific requirements.

The principal ARARs that apply to the development site include:

- Clean Air Act
- Clean Water Act
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
- Resource Conservation and Recovery Act (RCRA)
- Department of Transportation Rules for Hazardous Materials Transport
- Occupational Safety and Health Administration (OSHA)
- State of Wisconsin Statutes Chapter 30
- State of Wisconsin Environmental Protection – Wisconsin Administrative Code Chapter NR 100 rule series
- State of Wisconsin Pollutant Discharge Regulations (WPDES) – Wisconsin Administrative Code Chapter NR 200 rule series
- State of Wisconsin Water Quality Regulations – Wisconsin Administrative Code Chapter NR 300 rule series
- State of Wisconsin Air Pollution Control Regulations – Wisconsin Administrative Code Chapter NR 400 rule series
- State of Wisconsin Solid Waste Management Regulations – Wisconsin Administrative Code Chapter NR 500 rule series and Wisconsin Statute 289.43
- State of Wisconsin Hazardous Waste Management Rules – Wisconsin Administrative Code Chapter NR 600 rule series
- State of Wisconsin Investigation and Remediation of Environmental Contamination –
- Wisconsin Administrative Code Chapter NR 700 rule series

Permitting

Local permits, such as construction and right-of-way permits, dewatering permits, or waste disposal permits may be required by the State, City, or County and will be the responsibility of the contractor.

A generator's waste profile form obtained from the waste disposal facility must be completed prior to transportation and disposal of any material. The information is used by the disposal facility to determine if the waste can be treated, stored, or disposed of in a legal, safe, and environmentally sound manner. The client will receive notification of waste acceptance based on the information submitted.

The contractor will work with the Madison Metropolitan Sewerage District (MMSD) and the City of Madison Engineering Department to request permission or a permit to discharge contaminated or treated water to the sanitary system.

Cleanup Goals and Performance Objectives

Cleanup goals generally consist of either site-specific risk-based levels or regulated concentrations, such as federal maximum contaminant levels (MCLs) or state groundwater standards established for contaminants in groundwater. The risk-based remediation goals usually are calculated based on industrial and/or residential exposure scenarios and derived using standard contaminant partitioning and transport equations.

The Wisconsin Air National Guard's (owners) objective is to manage environmental media during construction in accordance with NR 726 Wisconsin Administrative Code for efforts expended during this redevelopment project. To obtain closure, it will be necessary to follow state regulatory requirements detailed in Wisconsin Administrative Codes. Contaminated soil should be restored in compliance with the requirements of ch. NR 720 and contaminated groundwater should be restored in compliance with the requirements of ch, NR 140. Sub-slab and indoor vapor concentrations will comply with Wisconsin and EPA Vapor Risk Screening Levels (VRSL) and indoor air Vapor Action Levels (VAL). Should additional environmental assessment be required, soil and groundwater samples collected and analyzed for risk analysis, evaluation of remedial alternatives, and compliance with state regulatory requirements will be analyzed in a fixed analytical laboratory using USEPA PFAS Isotope Dilution Method 537 and Method 8260 for VOC. Vapor samples will be analyzed using EPA Compendium Method TO-15.

The performance objectives established for soil management implemented at the site include:

1. Protect human health by eliminating exposure pathways for residual PFAS remaining in soils. Encapsulation residual PFAS and VOC will be achieved by constructing engineered barriers on the site.
2. Protect groundwater by encapsulation PFAS and VOC remaining in soils. Encapsulation of PFAS and VOC will limit the potential for mobilization of these constituents to groundwater.

Project Meetings

Meetings will be held to achieve a high degree of communication among members of the project team. These meetings will help to minimize errors and promote quality performance and site-safety during the system installation, mixing and injection, and monitoring phases of the project. Key project personnel attending these meetings, as appropriate, will include the Subcontractor's Field Operations and Site Health and Safety Managers, Ayres Associates project and field operations personnel, and representatives from WIANG, FSB, and their contractors.

Pre-construction Meeting

A pre-construction meeting will be held with the key project personnel to ensure that the entire team has a clear understanding of the project objectives, system design specifications, health, and safety issues, QAQC requirements, and work procedures. Site-specific requirements and work procedures will be reviewed with all parties. This meeting also will allow the key team members to meet and develop solutions to any potential problems known to the team prior to the initiation of installation activities.

Bi-Weekly Progress Meetings

A weekly progress meeting will be held with the key project members and other appropriate parties to discuss progress and planned activities. At a minimum, the key project personnel attending these meetings will include the subcontractor's field supervisor, construction personnel, and Ayres Associates project manager and technicians, if present.

Daily Meetings

The field team will meet daily, before work activities begin, to discuss, plan, and coordinate the work, health, and safety, and *QAQC* activities to be performed that day. These meetings will be documented in the project field notebook.

Problem Resolution Meetings

Special meetings will be held when and if a problem or work deficiency occurs or may occur that could impact safety, quality, cost, or the project schedule. All parties involved will attend to discuss the problem or deficiency, to review possible solutions, and implement a plan of action to resolve the problem or deficiency. The project manager or project engineer will document the meeting and provide notes to all meeting participants.

Quality Control Activities

Adherence to the design specifications and health and safety requirements and procedures will be required during the installation and operation of the remediation systems. The measures required to verify the quality of work performed and compliance with the specified project requirements include the inspection of materials, equipment, and workmanship before and during the performance of each task comprising the system installation and operation; and the resolution of all reported deficiencies and nonconformance issues.

Preparatory activities will include the following:

- Verifying that required submittals have been accepted by the WDNR project manager
- Ensuring that the field team has reviewed and discussed the work procedures that will be followed
- Reviewing procurement specifications, selecting suppliers, and tracking procurements
- Ensuring that materials and equipment are properly received, inspected, tested, inventoried, and stored

Progress monitoring activities will include the following:

- Checking work quality to ensure that contract requirements and design specifications are being met
- Verifying site activities are performed in a safe manner
- Checking that QA provisions are in place and that QC activities are being completed in compliance with QA requirements and procedures
- Checking that daily QC inspections are sufficiently rigorous to ensure continuing compliance with the QA program
- Checking that nonconformance issues are being recorded, tracked, and resolved
- Checking that QC reporting is accurate, timely, complete, and in compliance with QA requirements and procedures

Follow-up and completion activities will include:

- Resolution of nonconformance reports
- Resolution of outstanding discrepancies

Documentation

Construction Oversight/Documentation

Ayres Associates will make periodic visits to the site at intervals appropriate to the various stages of construction as Engineer or Technical Environmental Professional (referred to hereafter as simply Engineer) deems necessary to observe as an experienced and qualified design professional the progress that has been made, and the quality of the various aspects of Contractor's executed Work as they relate to the NR 718 Soils Management Plan and other environmental documents submitted to the Wisconsin Department of Natural Resources (WDNR). Based on information obtained during such visits and observations, the engineer, for the benefit of the client, will determine, in general, if the Work is proceeding in accordance with the environmental document. The engineer will not be required to make exhaustive or continuous inspections on the site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for the client a greater degree of confidence that the completed Work will conform generally to the environmental documents. On the basis of such visits and observations, the engineer will keep the client informed of the progress of the Work and will endeavor to guard the client against defective Work.

Field Logbook/Tablet

Ayres Associates oversight personnel will maintain a field logbook or suitable electronic alternative such as a tablet. Entries into the logbook or tablet will be dated and initialed. In addition to other project requirements, the log will contain a diary of daily events and progress and a record of site meetings and visitors. The logbook also will contain any observations of unusual or previously unnoticed site conditions. QAQC activities that will be recorded in the logbook include inspections of materials, supplies, and equipment; inspections of work quality, notations of possible improvements to QAQC, health, and safety, or work quality procedures; and field data and information for which a recording form has not previously been prepared.

Data Forms

Field sample forms, bound project logbooks, or an electronic tablet will be utilized to document the "who, what, when, where, why, and how" of site sampling activities. The field sample forms will be completed in the field at the time of sampling. Each form will be submitted to the field manager at the end of each day. After the field manager has reviewed each record for completeness and legibility, it will be transmitted to the project manager.

Nonconformance Log

Ayres Associate's field operations manager will be responsible for preparing and updating a nonconformance log for those activities assigned to their organization. The log will remain on-site and will identify all nonconformance situations, the nature of the nonconformance, corrective actions necessary to resolve the nonconformance, and the status of the nonconformance.

Progress Reports

Ayres Associates field technician will be responsible for preparing daily progress reports for the project manager and the client. These reports will contain a summary of work completed during the day, verification that work performed meets contract and design requirements, reporting and updating significant nonconformance situations, projected work activities for the following week, and a comparison of the work completed with respect to the project schedule. These reports also will highlight any potential problems that could compromise safety, work quality, or project schedule.

NR 724 Construction Documentation Report

An NR 724 construction documentation report will be submitted by responsible party within 90 days after the date that construction is completed of the new building. The report will document that the completed final remedial action meets or exceeds the design criteria and the plans and specifications developed in accordance with the requirements of NR 724.15. The report will include the following information:

- The regulatory status of the facility.
- Maps, plan sheets, drawings, and cross-sections.
- A synopsis of the remedial or interim action and a certification that the design and construction were carried out in accordance with the plans and specifications.
- An explanation of any minor changes to the plans and why these were necessary for the project.
- Results of site monitoring conducted during construction.
- A brief description of the public health and environmental laws applicable to the contamination and the interim or remedial action selected, including the physical location where the environmental laws shall be complied with for all media of concern.
- A revised operations and maintenance plan in accordance with s. NR 724.13 (4), unless the cover letter indicates that there are no revisions to the operations and maintenance plan.

Notification and Correction Process

Any problems associated with materials, supplies, equipment, and service suppliers will be documented and corrective actions will be taken immediately. In those instances, where a potential for impact to safety or project success exists, the field technician or project engineer will immediately notify the project manager of nonconformance situations.

All nonconforming shipments, materials, supplies, equipment, or subcontractor services will be documented and reported to Ayres Associates project manager. Documentation will include the date of the inspection, the items inspected, the nature of the nonconformance, any immediate corrective actions taken, and the name of the person performing the inspection. Ayres Associates field technician or project engineer will immediately contact Ayres Associates' project manager of any nonconformance situations that could possibly impact safety, quality, or the success of the project.

Ayres Associates field technicians or project engineer will maintain a log of all nonconformance reports and will document corrective actions through final resolution. Resolved nonconformance reports will be so indicated on the log with a description of the corrective actions and final resolution. Nonconformance resolution will be documented and communicated to all parties.

Ayres Associates field technicians will provide the project manager with a weekly update of this nonconformance log. Nonconforming materials, supplies, and equipment will be immediately tagged as being "out of conformance" and repaired, calibrated, or removed from the site as soon as reasonably possible. The client will be notified immediately if the nature of the nonconformance involves a health and safety violation or threatens safety or project success.

References

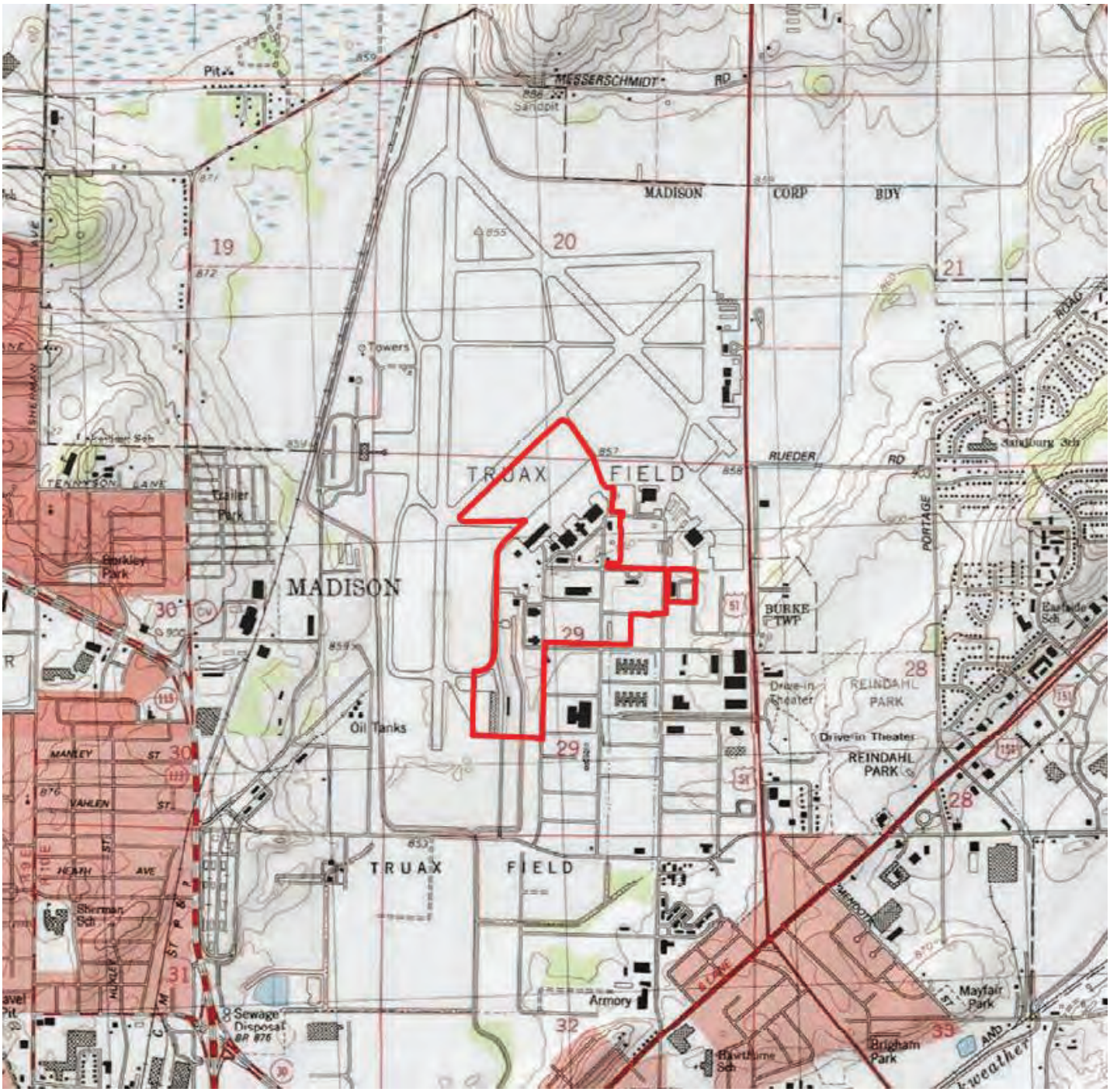
Bouwer, H. and R.C. Rice, A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells, *Water Resources Research*, Vol.12, No.3, 1976, pp.423-428

Amec Foster Wheeler, “Draft Report, FY 16 Phase 1 Regional Site Inspections for Perfluorinated Compounds” (March 2018)

BB&E Inc., “Final Perfluorinated Compounds Preliminary Assessment Site Visit Report” (December 2015)

Clayton, Lee and Attig, J.W. 1997. “Pleistocene Geologic Map of Dane County, Wisconsin, WGNHS Bulletin 95, Plate 1.

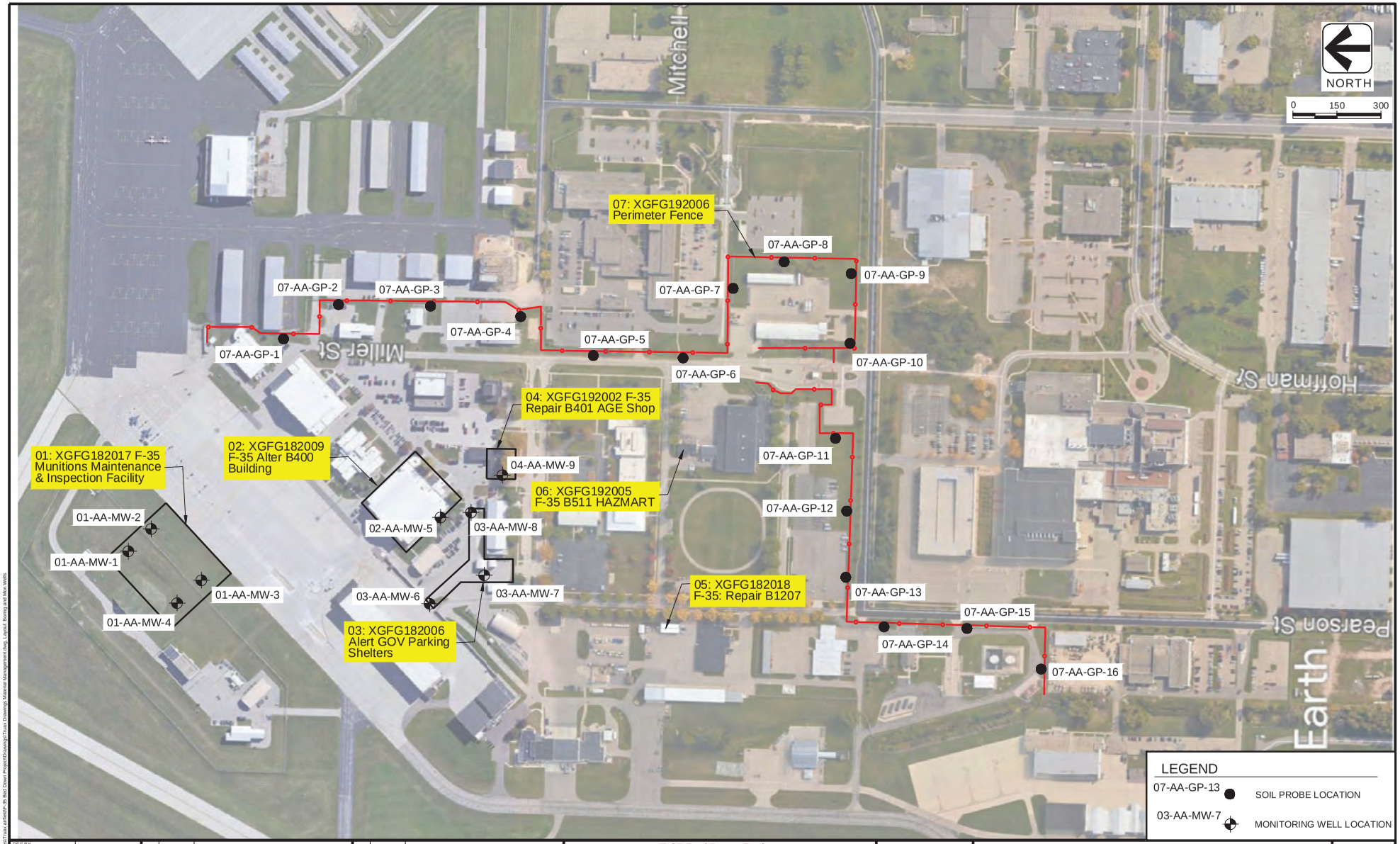
Figures



Source: Amec Foster Wheeler, March 2019

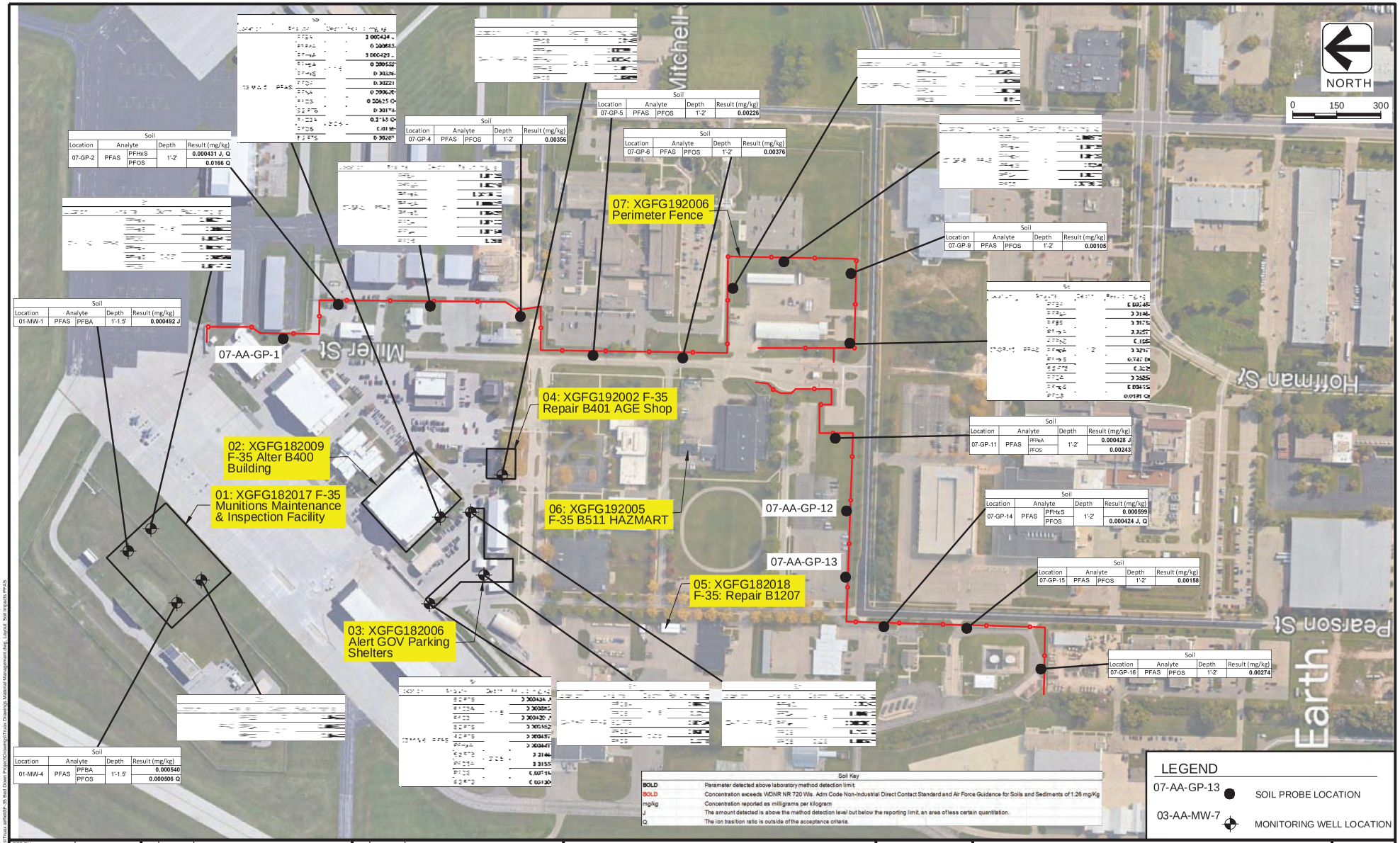
Figure 1 – Location Map
Materials Management Plan
F35 Bed Down Project
Truax Field, Madison, Wisconsin
May 2021 51-0467.10

AYRES ENVIRONMENTAL



DES BY J. STEINER						F-35 Bed Down Project Wisconsin Air National Guard - Truax Field Madison, Wisconsin	AYRES Eau Claire, WI 54701 715.834.3161	BORING AND MONITORING WELL LOCATIONS	SHEET NO. 2
DR BY T. SHUPERT	PROJ NO								
CHK BY J. STEINER	DATE MAY 2021	NO	DATE	REVISION	NO	DATE	REVISION		

AA-Standard.stb
5/10/2021
I:\ENTCAD\Ex...\Truax airfield\F-35 Bed Down Project\Drawing\Truax Drawings Materiel Management.dwg, Layout: Boring and Mon Wells



DES BY J. STEINER
DR BY T. SHUPERT
CHK BY J. STEINER
PROJ NO
DATE MAY 2021

NO	DATE	REVISION

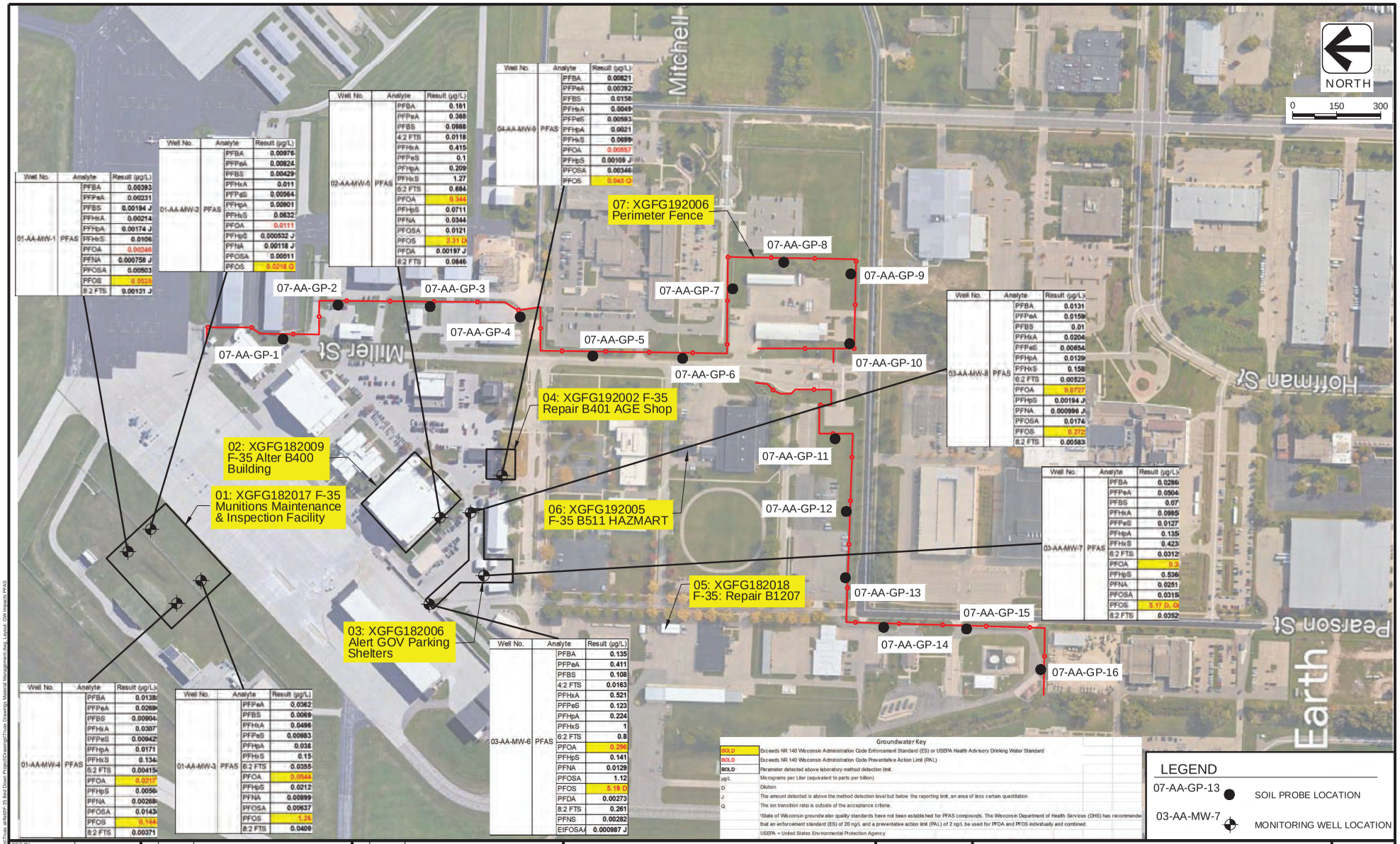
F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

SOIL IMPACTS - PFAS

SHEET NO. 3

AA-Standard.stb
5/10/2021
10:24:07 P:\Projects\Client\Truax Info\ArcMXD\F-35 Bed Down Project\Drawings\Truax Drawings Material Management\Data Layout\Soil Impacts PFAS



DES BY	J. STEINER
DR BY	T. SHUPERT
CHK BY	J. STEINER
PROJ NO	
DATE	DECEMBER 2020

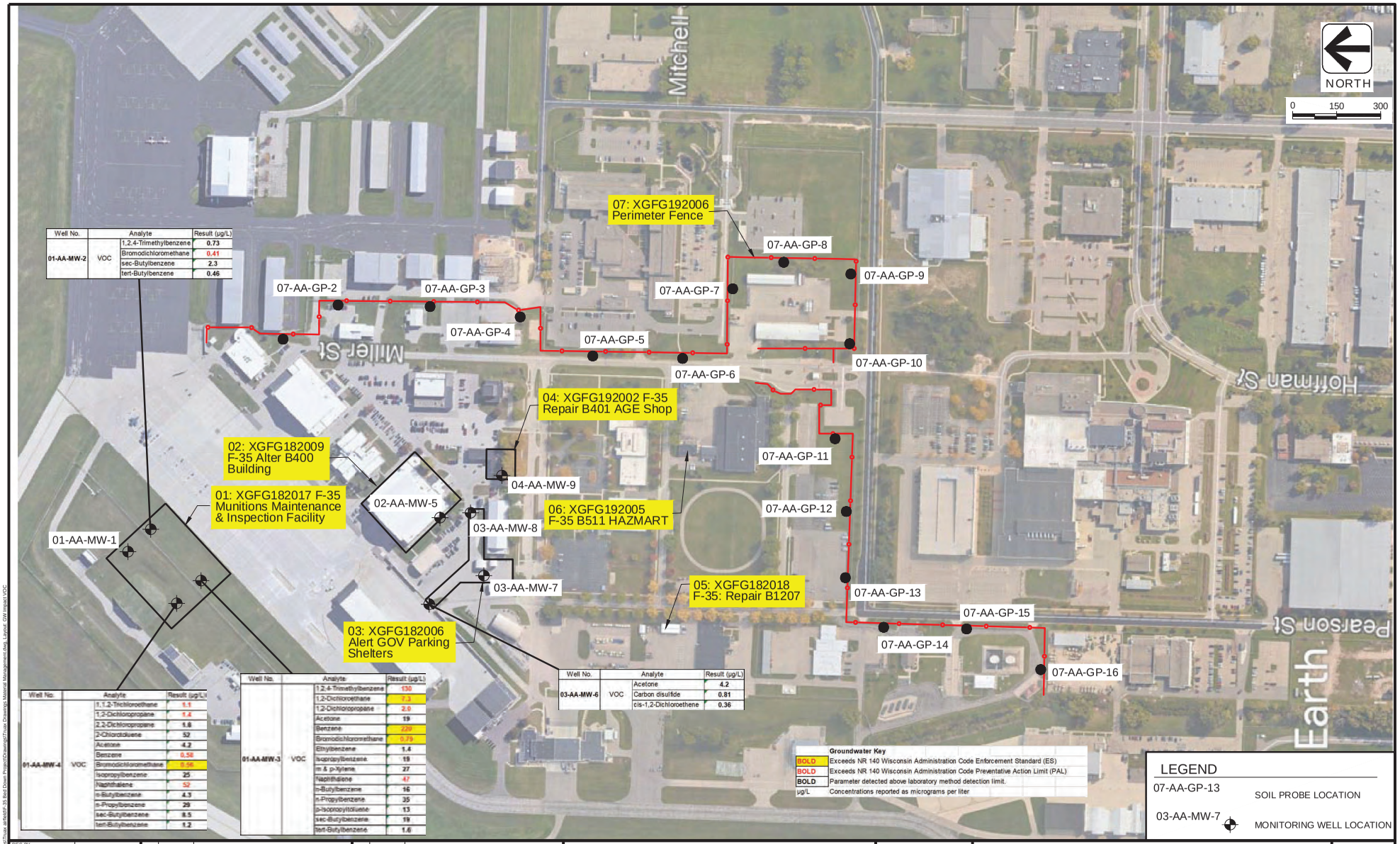
NO	DATE	REVISION
NO	DATE	REVISION

F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

GROUNDWATER IMPACTS - PFAS

SHEET NO. 4



Well No.	Analyte		Result (µg/L)
01-AA-MW-2	VOC	1,2,4-Trimethylbenzene	0.73
		Bromodichloromethane	0.41
		sec-Butylbenzene	2.3
		tert-Butylbenzene	0.46

Well No.	Analyte		Result (µg/L)
01-AA-MW-4	VOC	1,1,2-Trichloroethene	1.1
		1,2-Dichloropropane	1.4
		2,2-Dichloropropane	1.8
		2-Chlorotoluene	52
		Acetone	4.2
		Benzene	0.58
		Bromodichloromethane	0.56
		Isopropylbenzene	25
		Naphthalene	52
		n-Butylbenzene	4.3
		n-Propylbenzene	29
		sec-Butylbenzene	8.5
		tert-Butylbenzene	1.2

Well No.	Analyte		Result (µg/L)
01-AA-MW-3	VOC	1,2,4-Trimethylbenzene	130
		1,2-Dichloroethane	7.3
		1,2-Dichloropropane	2.0
		Acetone	19
		Benzene	220
		Bromodichloromethane	0.79
		Ethylbenzene	1.4
		Isopropylbenzene	19
		m & p-Xylene	27
		Naphthalene	47
		n-Butylbenzene	16
		n-Propylbenzene	35
		p-Isopropyltoluene	13
		sec-Butylbenzene	19
		tert-Butylbenzene	1.6

Well No.	Analyte		Result (µg/L)
03-AA-MW-6	VOC	Acetone	4.2
		Carbon disulfide	0.81
		cis-1,2-Dichloroethene	0.36

Groundwater Key	
BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES)
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Concentrations reported as micrograms per liter

DES BY J. STEINER
DR BY T. SHUPERT PROJ NO
CHK BY J. STEINER DATE MAY 2021

NO	DATE	REVISION

NO	DATE	REVISION

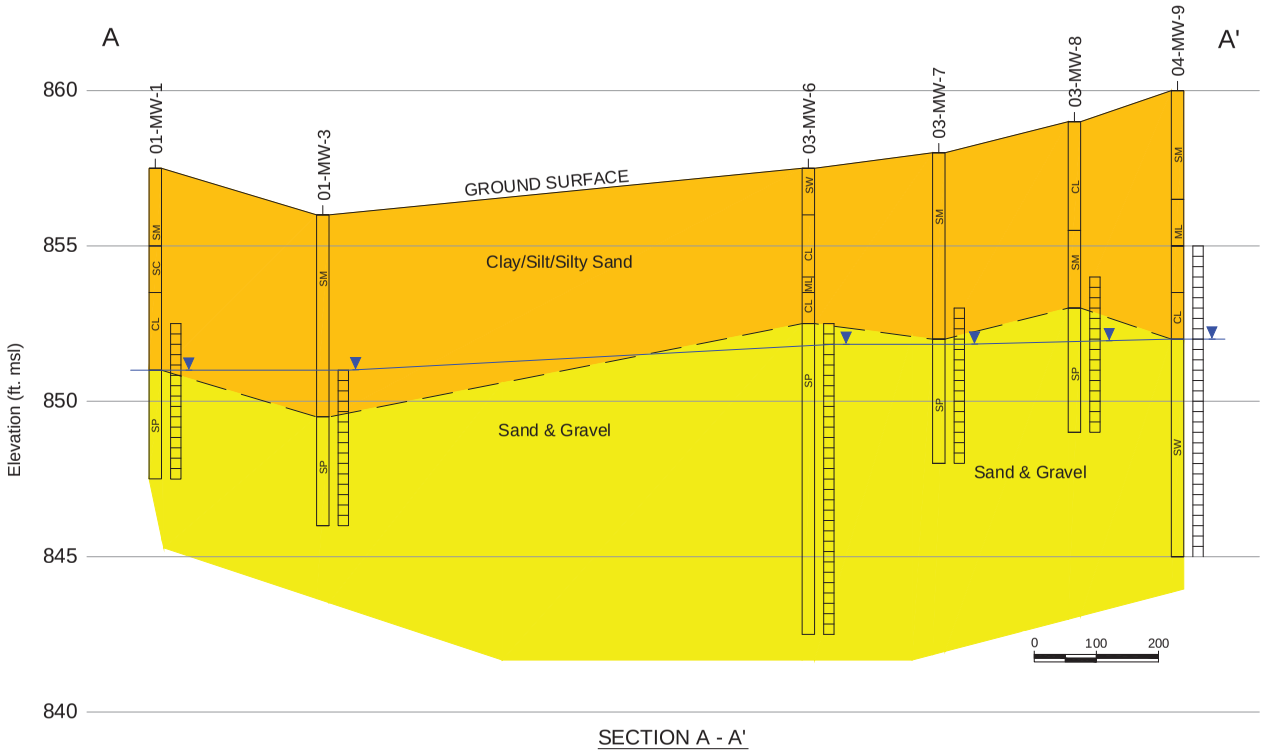
F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

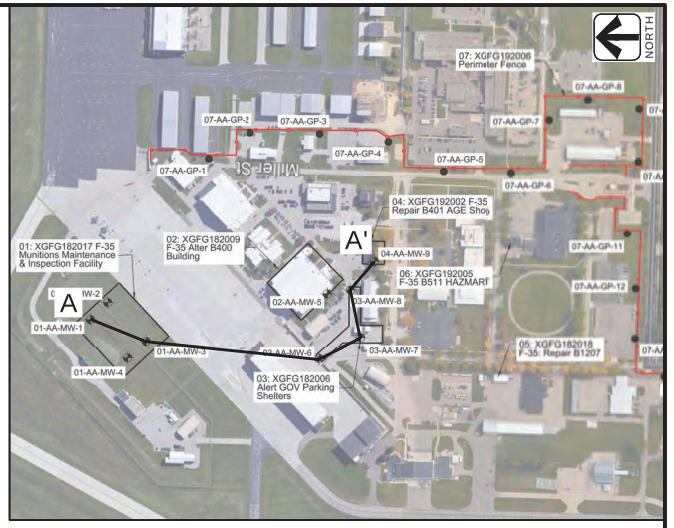
GROUNDWATER IMPACTS - VOC

SHEET NO. 5

AA-Standard.stb
5/10/2021
I:\ELC\Projects\...\Truax airfield\F-35 Bed Down Project\Drawings\Truax Drawings Material Management.dwg Layout: GW Impact VOC



SECTION A - A'



SECTION LOCATION
NTS

HYDROSTRATIGRAPHIC UNITS

- FINE-GRAINED CLAYEY SAND, SILTY SAND, SILT, AND CLAY DEPOSITS OF LOW PERMEABILITY
- FINE TO VERY COARSE-GRAINED, POORLY-GRADED SAND AND GRAVEL DEPOSITS OF MEDIUM TO HIGH PERMEABILITY

LEGEND

CL	INORGANIC CLAYS OF LOW PLASTICITY
ML	INORGANIC SILTS AND VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
SC	CLAYEY SANDS, SAND-CLAY MIXTURES
SM	SILTY SANDS, SAND-SILT MIXTURES
SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
▼	WATER LEVEL MEASURED IN WATER TABLE OBSERVATION WELL
	MONITORING WELL SCREEN INTERVAL

DES BY J. STEINER
DR BY T. SHUPERT
CHK BY J. STEINER
PROJ NO 51-0467.10
DATE MAY 2021

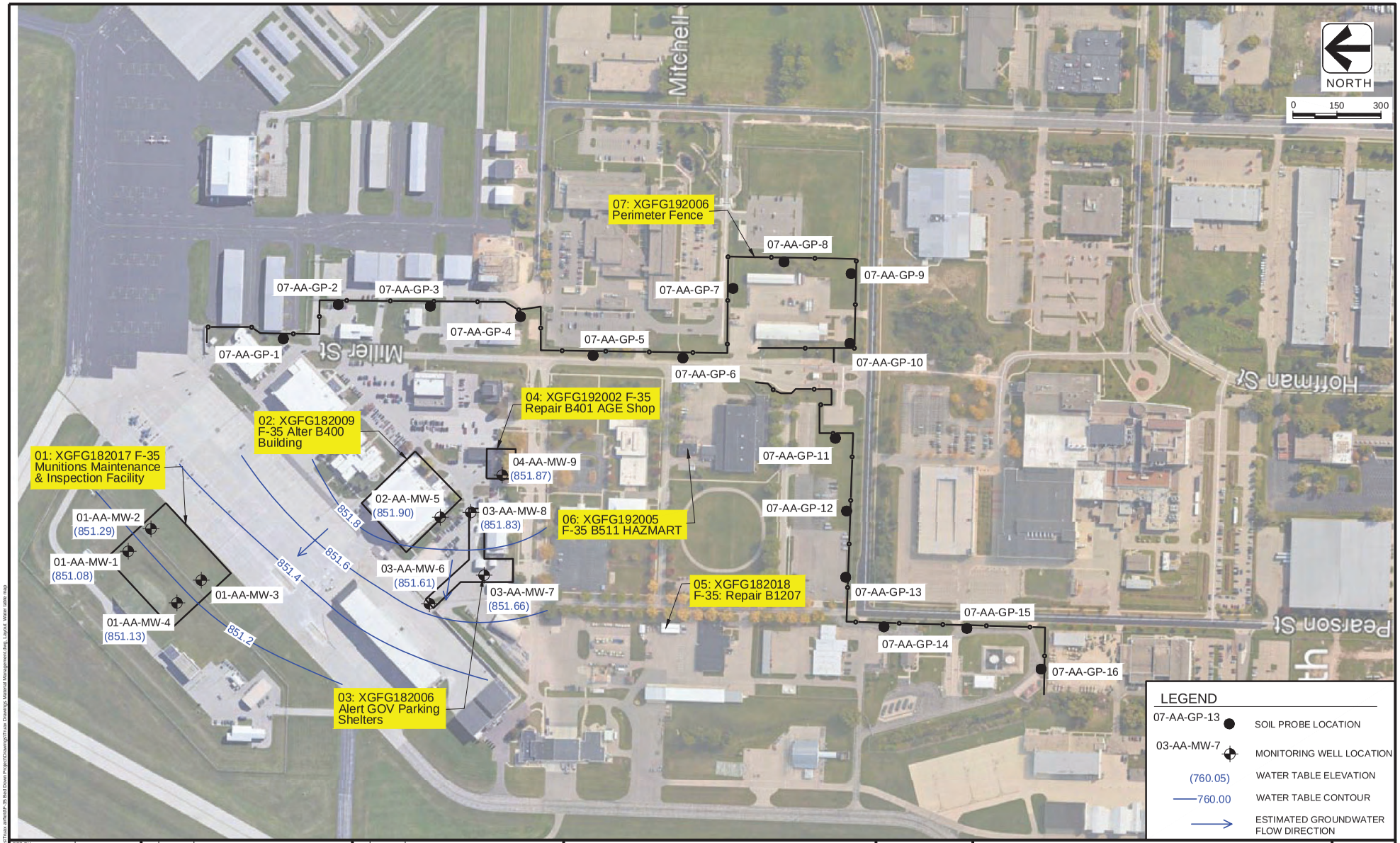
NO	DATE	REVISION

F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

Geologic Cross Section A - A'

SHEET NO. 6



DES BY J. STEINER							F-35 Bed Down Project Wisconsin Air National Guard - Truax Field Madison, Wisconsin	AYRES Eau Claire, WI 54701 715.834.3161	WATER TABLE CONTOUR MAP	SHEET NO. 7
DR BY T. SHUPERT	PROJ NO 51-0467.10									
CHK BY J. STEINER	DATE MAY 2021	NO	DATE	REVISION	NO	DATE	REVISION			

AA-Standard.stb
5/19/2021
I:\51-CAD\Ex...\Truax arnd\F-35 Bed Down Project\Drawings\Truax Drawings Missed Management.dwg, Layout: Water table map

Tables

Table 1
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		01-AA-MW-1 1'-1.5'	01-AA-MW-1 2'-2.5'	01-AA-MW-2 1'-1.5'	01-AA-MW-2 1'-1.5' D	01-AA-MW-2 2'-2.5'	01-AA-MW-3 1'-2'	01-AA-MW-3 2'-3'	01-AA-MW-4 1'-1.5'	Soil Standards			
Soil Type		SM	SM	SM	SM	SM	SM	SM	ML	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	82.8	78.4	69.9	84.9	77.2	89.7	89.9	76.9	Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)											
PFBA (Perfluorobutanoic acid)	375-22-4	**0.000492 J**	<0.000342	<0.000346	**0.000439 J**	<0.000339	<0.000338	<0.000338	**0.000540**	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000394	<0.000394	<0.000398	**0.000554**	<0.00039	<0.000389	<0.000389	<0.000386	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000301	<0.000301	<0.000304	<0.000293	<0.000298	<0.000297	<0.000297	<0.000295	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000356	<0.000356	<0.00036	<0.000347	<0.000353	<0.000352	<0.000352	<0.000349	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000214	<0.000214	**0.000311 J**	**0.000659**	**0.000393 J**	<0.000211	<0.000211	<0.00021	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000651	<0.000651	<0.000658	<0.000635	<0.000646	<0.000644	<0.000644	<0.000639	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00117	<0.00117	<0.00118	<0.00114	<0.00116	<0.00115	<0.00115	<0.00115	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000473	<0.000473	<0.000478	**0.000859**	<0.000469	<0.000468	<0.000468	<0.000464	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000336	<0.000336	<0.00034	<0.000328	<0.000334	<0.000333	<0.000333	<0.00033	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000386	<0.000386	**0.000632**	**0.000974**	**0.000586**	<0.000382	<0.000381	<0.000379	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000647	<0.000647	<0.000654	<0.000631	<0.000642	<0.00064	<0.00064	<0.000635	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000465	<0.000465	<0.00047	**0.000773**	<0.000461	<0.00046	**0.000527**	<0.000456	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.00073	<0.00073	<0.000738	<0.000712	<0.000724	<0.000722	<0.000722	<0.000716	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000309	<0.000309	<0.000312	<0.000301	<0.000306	<0.000305	<0.000305	<0.000303	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.000997	<0.000997	<0.00101	<0.000973	<0.000989	<0.000986	<0.000986	<0.000979	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	<0.000425	<0.000425	**0.00264 Q**	**0.00527 Q**	**0.00147 Q**	**0.00425**	**0.00443**	**0.000506 Q**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000366	<0.000366	<0.00037	<0.000357	<0.000363	<0.000362	<0.000362	<0.000359	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000447	<0.000447	<0.000452	<0.000436	<0.000443	<0.000442	<0.000442	<0.000439	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000714	<0.000714	<0.000722	<0.000697	<0.000708	<0.000706	<0.000706	<0.000701	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00114	<0.00114	<0.00115	<0.00111	<0.00113	<0.00113	<0.00112	<0.00112	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000728	<0.000728	<0.000736	<0.00071	<0.000722	<0.00072	<0.00072	<0.000715	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000681	<0.00068	<0.000688	<0.000664	<0.000675	<0.000673	<0.000673	<0.000668	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000255	<0.000255	<0.000258	<0.000249	<0.000253	<0.000252	<0.000252	<0.00025	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000683	<0.000682	<0.00069	<0.000666	<0.000677	<0.000675	<0.000675	<0.00067	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000714	<0.000714	<0.000722	<0.000697	<0.000708	<0.000706	<0.000706	<0.000701	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00101	<0.001	<0.00102	<0.000981	<0.000997	<0.000994	<0.000994	<0.000986	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.0004	<0.0004	<0.000404	<0.00039	<0.000396	<0.000395	<0.000395	<0.000392	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00572	<0.00572	<0.00578	<0.00558	<0.00567	<0.00565	<0.00565	<0.00561	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000398	<0.000398	<0.000402	<0.000388	<0.000394	<0.000393	<0.000393	<0.00039	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000594	<0.000593	<0.0006	<0.000579	<0.000589	<0.000587	<0.000587	<0.000582	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000261	<0.000261	<0.000264	<0.000255	<0.000259	<0.000258	<0.000258	<0.000256	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.0038	<0.0038	<0.00384	<0.00371	<0.00377	<0.00376	<0.00376	<0.00373	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000168	<0.000168	<0.00017	<0.000164	<0.000167	<0.000166	<0.000166	<0.000165	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000495	<0.000494	<0.0005	<0.000483	<0.000491	<0.000489	<0.000489	<0.000485	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00491	<0.00491	<0.00496	<0.00479	<0.00487	<0.00485	<0.00485	<0.00482	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00532	<0.00532	<0.00538	<0.00519	<0.00528	<0.00526	<0.00526	<0.00522	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].
[3]Unites States Environmental Protection Agency Regional Screening Levels (USEPA, 2017).

Table 1 (continued)
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		01-AA-MW-4 2'-2.5'	02-AA-MW-5 1'-1.5'	02-AA-MW-5 2'-2.5'	03-AA-MW-6 1'-1.5'	03-AA-MW-6 2'-2.5'	03-AA-MW-7 1'-1.5'	03-AA-MW-7 2'-2.5'	03-AA-MW-8 1'-1.5'	Soil Standards			
Soil Type		ML	SM	SM	SW	CL	SM	SM	CL	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	77.9	86.1	82.9	80.9	83.7	90.1	92.5	83.7				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)								Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	<0.000344	**0.000434 J**	<0.000334	<0.000342	<0.000339	<0.000346	<0.000334	<0.000341	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000396	**0.000883**	<0.000384	<0.000393	<0.00039	<0.000398	<0.000384	<0.000393	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000302	<0.000292	<0.000293	<0.0003	<0.000298	<0.000304	<0.000293	<0.0003	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000358	<0.000346	<0.000347	<0.000356	**0.000497**	<0.00036	<0.000347	<0.000355	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000215	**0.000420 J**	<0.000208	<0.000213	**0.000447**	<0.000216	<0.000208	<0.000649	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000654	<0.000632	<0.000635	<0.00065	<0.000644	<0.000657	<0.000635	<0.00116	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00117	<0.00113	<0.00114	<0.00117	<0.00116	<0.00118	<0.00114	<0.000472	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000475	**0.000552**	<0.000461	<0.000472	<0.000468	<0.000478	<0.000461	<0.000335	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000338	<0.000326	<0.000328	<0.000336	<0.000333	<0.00034	<0.000328	<0.000335	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000388	**0.00336**	<0.000376	<0.000385	<0.000382	<0.00039	<0.000376	**0.00243**	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.00065	<0.000628	**0.00174**	**0.00175**	**0.0146**	<0.000653	<0.000631	<0.000645	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000467	**0.00221**	<0.000453	<0.000464	<0.00046	<0.00047	<0.000453	**0.000613**	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000734	<0.000709	<0.000712	<0.000729	<0.000723	<0.000737	<0.000712	<0.000728	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.00031	**0.000620**	<0.000301	<0.000308	<0.000305	<0.000312	<0.000301	**0.000380 J**	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.001	<0.000968	**0.0163 Q**	**0.0196**	**0.0155**	**0.00631**	**0.00874**	<0.000994	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	<0.000427	**0.00625 Q**	**0.0159**	**0.0162**	**0.00714**	**0.0311**	**0.0375**	**0.0103 Q**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid	756426-58-1	<0.000368	<0.000355	<0.000357	<0.000366	<0.000362	<0.00037	<0.000357	<0.000365	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000449	<0.000434	<0.000436	<0.000447	<0.000443	<0.000452	<0.000436	<0.000446	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000718	<0.000693	**0.00287**	**0.00235**	**0.00130**	**0.00104**	<0.000696	<0.000712	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00114	<0.0011	<0.00111	<0.00114	<0.00113	<0.00115	<0.00111	<0.00113	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000732	<0.000707	<0.00071	<0.000727	<0.000721	<0.000735	<0.00071	<0.000726	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000684	<0.000661	<0.000664	<0.00068	<0.000674	<0.000687	<0.000664	<0.000679	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000256	<0.000248	<0.000249	<0.000255	<0.000253	<0.000258	<0.000249	<0.000255	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000686	<0.000663	<0.000666	<0.000682	<0.000676	<0.000689	<0.000665	<0.000681	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic	763051-92-9	<0.000718	<0.000693	<0.000696	<0.000713	<0.000707	<0.000721	<0.000696	<0.000712	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00101	<0.000976	<0.00098	<0.001	<0.000995	<0.00101	<0.00098	<0.001	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000402	<0.000388	<0.00039	<0.000399	<0.000396	<0.000404	<0.00039	<0.000399	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00575	<0.00555	<0.00557	<0.00571	<0.00566	<0.00577	<0.00557	<0.0057	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.0004	<0.000386	<0.000388	<0.000397	<0.000394	<0.000402	<0.000388	<0.000397	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000596	<0.000576	<0.000579	<0.000593	<0.000587	<0.000599	<0.000579	<0.000592	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000262	<0.000253	<0.000255	<0.000261	<0.000258	<0.000264	<0.000255	<0.00026	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00382	<0.00369	<0.0037	<0.00379	<0.00376	<0.00384	<0.0037	<0.00379	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000169	<0.000163	<0.000164	<0.000168	<0.000166	<0.00017	<0.000164	<0.000168	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000497	<0.00048	<0.000482	<0.000494	<0.00049	<0.000499	<0.000482	<0.000493	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00493	<0.00476	<0.00478	<0.0049	<0.00486	<0.00495	<0.00478	<0.00489	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00535	<0.00517	<0.00519	<0.00532	<0.00527	<0.00537	<0.00519	<0.00531	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.

[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

Table 1 (continued)
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		03-AA-MW-8 1'-1.5' D	03-AA-MW-8 2'-2.5'	04-AA-MW-9 1'-1.5'	04-AA-MW-9 3'-3.5'	04-AA-MW-9 3'-3.5' D	07-AA-GP-1 1'-2'	07-AA-GP-2 1'-2'	07-AA-GP-2 1'-2' D	Soil Standards			
Soil Type		CL	CL	SM	SM	SM	CL	ML/CL	ML/CL	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	81.5	90.9	89.8	92.9	90.6	83.2	79.7	79.1				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)								Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	<0.000332	<0.00034	<0.000344	<0.000342	<0.000347	<0.000343	<0.000341	<0.000347	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.000434 J**	<0.000391	<0.000395	**0.000399 J**	**0.00047 J**	<0.000395	<0.000393	<0.000399	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000291	<0.000299	<0.000302	<0.0003	<0.000305	<0.000302	<0.0003	<0.000305	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000345	<0.000353	<0.000358	<0.000355	<0.000361	<0.000357	<0.000355	<0.000361	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.000489**	<0.000212	<0.000215	**0.000342 J**	**0.000217 J**	<0.000214	<0.000213	<0.000216	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.00063	<0.000646	<0.000654	<0.000649	<0.00066	<0.000653	<0.000649	<0.000659	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00113	<0.00116	<0.00117	<0.00116	<0.00118	<0.00117	<0.00116	<0.00118	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000458	<0.000469	<0.000475	<0.000472	<0.000479	<0.000474	<0.000472	<0.000479	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000326	<0.000334	<0.000338	<0.000336	<0.000341	<0.000337	<0.000336	<0.000341	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.00676**	<0.000383	<0.000387	**0.00174**	**0.00277**	<0.000387	**0.000431 J, Q**	**0.000694 Q**	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000627	<0.000642	<0.00065	<0.000646	<0.000656	<0.000649	<0.000645	<0.000655	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.00185	<0.000462	<0.000467	<0.000464	**0.000585**	<0.000466	<0.000464	<0.000471	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000707	<0.000725	<0.000733	<0.000728	<0.00074	<0.000732	<0.000728	<0.00074	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000299	<0.000306	<0.00031	<0.000308	<0.000313	<0.00031	<0.000308	<0.000313	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.000966	<0.00099	<0.001	<0.000995	<0.00101	<0.001	<0.000995	<0.00101	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.00208**	**0.000581**	**0.0148**	**0.00809**	**0.00357 Q**	<0.000427	**0.0166 Q**	**0.0196 Q**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid	756426-58-1	<0.000355	<0.000363	<0.000368	<0.000365	<0.000371	<0.000367	<0.000365	<0.000371	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000433	<0.000444	<0.000449	<0.000446	<0.000453	<0.000448	<0.000446	**0.000560**	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000692	<0.000709	<0.000717	<0.000713	<0.000724	<0.000716	<0.000713	<0.000724	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.0011	<0.00113	<0.00114	<0.00114	<0.00115	<0.00114	<0.00113	<0.00115	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000705	<0.000723	<0.000731	<0.000726	<0.000738	<0.00073	<0.000726	<0.000738	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000659	<0.000676	<0.000683	<0.000679	<0.00069	<0.000683	<0.000679	<0.00069	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000247	<0.000253	<0.000256	<0.000255	<0.000259	<0.000256	<0.000255	<0.000259	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000661	<0.000678	<0.000685	<0.000681	<0.000692	<0.000685	<0.000681	**0.000788 J, Q**	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic	763051-92-9	<0.000692	<0.000709	<0.000717	<0.000713	<0.000724	<0.000716	<0.000713	<0.000724	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.000974	<0.000998	<0.00101	<0.001	<0.00102	<0.00101	<0.001	<0.00102	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000387	<0.000397	<0.000401	<0.000399	<0.000405	<0.000401	<0.000399	<0.000405	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00554	<0.00568	<0.00574	<0.00571	<0.0058	<0.00573	<0.0057	<0.00579	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000385	<0.000395	<0.000399	<0.000397	<0.000403	<0.000399	<0.000397	<0.000403	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000575	<0.000589	<0.000596	<0.000592	<0.000602	<0.000595	<0.000592	<0.000601	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000253	<0.000259	<0.000262	<0.000261	<0.000265	<0.000262	<0.000261	<0.000265	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00368	<0.00377	<0.00381	<0.00379	<0.00385	<0.00381	<0.00379	<0.00385	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000163	<0.000167	<0.000169	<0.000168	<0.00017	<0.000169	<0.000168	<0.00017	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000479	<0.000491	<0.000497	<0.000494	<0.000501	<0.000496	<0.000493	<0.000501	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00475	<0.00487	<0.00493	<0.0049	<0.00497	<0.00492	<0.0049	<0.00497	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00516	<0.00528	<0.00534	<0.00531	<0.0054	<0.00534	<0.00531	<0.00539	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.

[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

Table 1 (continued)
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		07-AA-GP-3 1'-2'	07-AA-GP-4 1'-2'	07-AA-GP-5 1'-2'	07-AA-GP-6 1'-2'	07-AA-GP-7 1'-2'	07-AA-GP-8 1'-2'	07-AA-GP-9 1'-2'	Soil Standards			
Soil Type		ML	CL	CL	CL	ML/CL	ML/SC	SW	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	82.4	84.8	81.2	83.6	86.4	80.5	96				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)							Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	**0.00125**	<0.000332	<0.000338	<0.000345	<0.000342	<0.000346	<0.00034	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.00216**	<0.000381	<0.000389	<0.000396	<0.000394	**0.000973**	<0.000391	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000293	<0.000291	<0.000297	<0.000303	<0.000301	<0.000304	<0.000298	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000346	<0.000345	<0.000352	<0.000359	<0.000356	<0.00036	<0.000353	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.00136 Q**	<0.000207	<0.000211	<0.000215	**0.000454 J**	**0.00109**	<0.000212	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000633	<0.00063	<0.000643	<0.000655	<0.000651	<0.000659	<0.000646	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00114	<0.00113	<0.00115	<0.00118	<0.00117	<0.00118	<0.00116	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.000635**	<0.000458	<0.000467	<0.000476	<0.000473	**0.00109**	<0.000469	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000327	<0.000326	<0.000332	<0.000339	<0.000336	<0.00034	<0.000334	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.00439**	<0.000374	<0.000381	<0.000388	**0.00396**	**0.0204**	<0.000383	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000629	<0.000627	<0.000639	<0.000651	<0.000647	<0.000655	<0.000642	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.00133**	<0.00045	<0.000459	<0.000468	**0.000700**	**0.00271**	<0.000461	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.00071	<0.000707	<0.000721	<0.000735	<0.00073	<0.000739	<0.000725	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	**0.00164**	<0.000299	<0.000305	<0.000311	<0.000308	<0.000312	<0.000306	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.00097	<0.000966	<0.000985	<0.001	<0.000997	<0.00101	<0.00099	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.269**	**0.00356**	**0.00226**	**0.00376**	**0.014**	**0.00796 Q**	**0.00105**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid	756426-58-1	<0.000356	<0.000354	<0.000362	<0.000368	<0.000366	<0.00037	<0.000363	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000435	<0.000433	<0.000442	<0.00045	<0.000447	<0.000452	<0.000444	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000695	<0.000692	<0.000705	<0.000719	<0.000714	<0.000723	<0.000709	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00111	<0.0011	<0.00112	<0.00115	<0.00114	<0.00115	<0.00113	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000708	<0.000705	<0.000719	<0.000733	<0.000728	<0.000737	<0.000723	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000662	<0.000659	<0.000672	<0.000685	<0.00068	<0.000689	<0.000676	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000248	<0.000247	<0.000252	<0.000257	<0.000255	<0.000258	<0.000253	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000664	<0.000661	<0.000674	<0.000687	<0.000682	<0.000691	<0.000678	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic a	763051-92-9	<0.000695	<0.000692	<0.000705	<0.000719	<0.000714	<0.000723	<0.000709	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.000978	<0.000973	<0.000993	<0.00101	<0.001	<0.00102	<0.000998	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000389	<0.000387	<0.000395	<0.000402	<0.000399	<0.000404	<0.000397	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00556	<0.00554	<0.00565	<0.00576	<0.00571	<0.00579	<0.00568	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000387	<0.000385	<0.000393	<0.0004	<0.000397	<0.000402	<0.000395	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000577	<0.000575	<0.000586	<0.000598	<0.000593	<0.000601	<0.000589	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000254	<0.000253	<0.000258	<0.000263	<0.000261	<0.000264	<0.000259	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.0037	<0.00368	<0.00375	<0.00382	<0.0038	<0.00384	<0.00377	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000164	<0.000163	<0.000166	<0.000169	<0.000168	<0.00017	<0.000167	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000481	<0.000479	<0.000489	<0.000498	<0.000494	<0.0005	<0.000491	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00477	<0.00475	<0.00485	<0.00494	<0.0049	<0.00496	<0.00487	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00518	<0.00515	<0.00526	<0.00536	<0.00532	<0.00538	<0.00528	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.
D	Dilution

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

Table 1 (continued)
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		07-AA-GP-10 1'-2'	07-AA-GP-11 1'-2'	07-AA-GP-12 1'-2'	07-AA-GP-13 1'-2'	07-AA-GP-14 1'-2'	07-AA-GP-15 1'-2'	07-AA-GP-16 1'-2'	Soil Standards			
Soil Type		GW/MH	GP/CL	ML/CH	ML/CL	SM	GC	CL	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2]	USEPA Regional Screening Level (RSL)[3]
Solids, Percent	CAS #	72.9	82.7	87.3	82.8	88.1	84.4	92.5				
Per-and Polyfluorinated Alkyl Substances (PFAS)		Analytical Result (mg/Kg)							Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		Residential Soil (mg/Kg)
Acronym / (Name)												
PFBA (Perfluorobutanoic acid)	375-22-4	**0.00248**	<0.000346	<0.000347	<0.000334	<0.000338	<0.000336	<0.000337	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.0146**	**0.000428 J**	<0.0004	<0.000384	<0.000389	<0.000387	<0.000387	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	**0.0178**	<0.000304	<0.000305	<0.000293	<0.000297	<0.000295	<0.000296	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.00036	<0.00036	<0.000362	<0.000348	<0.000352	<0.00035	<0.00035	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.0257**	<0.000216	<0.000217	<0.000209	<0.000211	<0.00021	<0.00021	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	**0.108**	<0.000658	<0.000661	<0.000635	<0.000643	<0.000639	<0.00064	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00118	<0.00118	<0.00119	<0.00114	<0.00115	<0.00115	<0.00115	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.0217**	<0.000478	<0.00048	<0.000461	<0.000467	<0.000464	<0.000465	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.00034	<0.00034	<0.000341	<0.000328	<0.000332	<0.00033	<0.000331	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.747 D**	<0.00039	<0.000392	<0.000377	**0.000599**	<0.000379	<0.000379	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	**0.302**	<0.000654	<0.000657	<0.000631	<0.000639	<0.000635	<0.000636	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.0525**	<0.00047	<0.000472	<0.000454	<0.000459	<0.000456	<0.000457	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	**0.00415**	<0.000738	<0.000741	<0.000712	<0.000721	<0.000717	<0.000718	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000312	<0.000312	<0.000313	<0.000301	<0.000305	<0.000303	<0.000304	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.00101	<0.00101	<0.00101	<0.000973	<0.000985	<0.000979	<0.000981	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.0191 Q**	**0.00243**	<0.000432	<0.000415	**0.000424 J, Q**	**0.00158**	**0.00274**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid	756426-58-1	<0.00037	<0.00037	<0.000372	<0.000357	<0.000362	<0.000359	<0.00036	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000452	<0.000452	<0.000454	<0.000436	<0.000442	<0.000439	<0.00044	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000723	<0.000722	<0.000725	<0.000697	<0.000706	<0.000701	<0.000702	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00115	<0.00115	<0.00115	<0.00111	<0.00112	<0.00112	<0.00112	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000737	<0.000736	<0.000739	<0.000711	<0.00072	<0.000715	<0.000716	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000689	<0.000688	<0.000691	<0.000664	<0.000673	<0.000668	<0.000669	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000258	<0.000258	<0.000259	<0.000249	<0.000252	<0.000251	<0.000251	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000691	<0.00069	<0.000693	<0.000666	<0.000675	<0.00067	<0.000671	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic a	763051-92-9	<0.000723	<0.000722	<0.000725	<0.000697	<0.000706	<0.000701	<0.000702	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00102	<0.00102	<0.00102	<0.000981	<0.000993	<0.000987	<0.000989	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000404	<0.000404	<0.000406	<0.00039	<0.000395	<0.000392	<0.000393	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00579	<0.00578	<0.0058	<0.00558	<0.00565	<0.00561	<0.00562	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000402	<0.000402	<0.000404	<0.000388	<0.000393	<0.00039	<0.000391	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000601	<0.0006	<0.000603	<0.000579	<0.000587	<0.000583	<0.000584	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000264	<0.000264	<0.000265	<0.000255	<0.000258	<0.000256	<0.000257	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00384	<0.00384	<0.00386	<0.00371	<0.00375	<0.00373	<0.00374	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.00017	<0.00017	<0.000171	<0.000164	<0.000166	<0.000165	<0.000165	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.0005	<0.0005	<0.000502	<0.000483	<0.000489	<0.000486	<0.000486	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00496	<0.00496	<0.00498	<0.00479	<0.00485	<0.00482	<0.00483	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00539	<0.00538	<0.0054	<0.00519	<0.00526	<0.00522	<0.00523	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.
D	Dilution

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

Table 2 - Summary of Groundwater Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/8/2020

Well Number	CAS #	01-AA-MW-1	01-AA-MW-2	01-AA-MW-3	01-AA-MW-4	02-AA-MW-5	02-AA-MW-5 Dup	03-AA-MW-6	03-AA-MW-7	03-AA-MW-8	04-AA-MW-9	MW-7 EB	Groundwater Standards	
													NR 140 Wis. Adm. Code (µg/L)[1]	USEPA Health Advisory Drinking Water (Surface Water or Groundwater) (µg/L)
Sampling Date		10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/7/2020	10/8/2020	ES	PAL
Acronym / (Name)		Analytical Result (µg/L)												
PFBA (Perfluorobutanoic acid)	375-22-4	**0.00393**	**0.00976**	<0.000368	**0.0138**	**0.161**	**0.144**	**0.135**	**0.0286**	**0.0131**	**0.00821**	<0.000367	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.00231**	**0.00824**	**0.0362**	**0.0269**	**0.368**	**0.369**	**0.411**	**0.0504**	**0.0159**	**0.00392**	<0.000645	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	**0.00194 J**	**0.00429**	**0.0069**	**0.00904**	**0.0988**	**0.0962**	**0.108**	**0.07**	**0.01**	**0.0158**	<0.000902	ns	ns
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000702	<0.000707	<0.000702	<0.000714	**0.0118**	**0.0117**	**0.0163**	<0.000688	<0.000719	<0.000719	<0.0007	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.00214**	**0.011**	**0.0496**	**0.0307**	**0.415**	**0.413**	**0.521**	**0.0985**	**0.0204**	**0.0049**	<0.0011	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.00122	**0.00564**	**0.00983**	**0.00942**	**0.1**	**0.0964**	**0.123**	**0.0127**	**0.00654**	**0.00593**	<0.00122	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00243	<0.00245	<0.00243	<0.00248	<0.00252	<0.00253	<0.00248	<0.00238	<0.00249	<0.00249	<0.00243	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.00174 J**	**0.00901**	**0.038**	**0.0171**	**0.209**	**0.201**	**0.224**	**0.135**	**0.0129**	**0.0021**	<0.000298	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000365	<0.000367	<0.000364	<0.000371	<0.000377	<0.000379	<0.000372	<0.000357	<0.000373	<0.000373	<0.000364	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.0106**	**0.0632**	**0.15**	**0.134**	**1.27**	**1.23**	**1**	**0.423**	**0.158**	**0.0699**	<0.000477	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.00101	<0.00102	**0.0355**	**0.00415**	**0.684**	**0.655**	**0.8**	**0.0312**	**0.00523**	<0.00103	<0.00101	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.00246**	**0.0111**	**0.0544**	**0.0217**	**0.344**	**0.334**	**0.296**	**0.3**	**0.0727**	**0.00557**	<0.000328	0.02	0.002	0.07
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000473	**0.000532 J**	**0.0212**	**0.0056**	**0.0711**	**0.0607**	**0.141**	**0.536**	**0.00194 J**	**0.00109 J**	<0.000472	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	**0.000758 J**	**0.00118 J**	**0.00899**	**0.00268**	**0.0344**	**0.0327**	**0.0129**	**0.0251**	**0.000996 J**	<0.000419	<0.000408	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	**0.00503**	**0.00511**	**0.00637**	**0.0143**	**0.0121**	**0.0097**	**1.12**	**0.0315**	**0.0174**	**0.00346**	**0.00104 J**	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.0535**	**0.0218 Q**	**1.26**	**0.144**	**2.31 D**	**2.55 D**	**5.19 D**	**5.17 D, Q**	**0.272**	**0.045 Q**	<0.000406	0.02	0.002	0.07
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000732	<0.000737	<0.000732	<0.000745	<0.000758	<0.00076	<0.000747	<0.000717	<0.00075	<0.00075	<0.00073	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000752	<0.000758	<0.000752	<0.000765	**0.00197 J**	**0.00169 J**	**0.00273**	<0.000737	<0.00077	<0.00077	<0.00075	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	**0.00131 J**	<0.00105	**0.0409**	**0.00371**	**0.0846**	**0.0856**	**0.261**	**0.0352**	**0.00583**	<0.00106	<0.00104	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00195	<0.00197	<0.00195	<0.00199	<0.00202	<0.00203	**0.00282**	<0.00191	<0.002	<0.002	<0.00195	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000833	<0.000839	<0.000833	<0.000848	<0.000863	<0.000865	<0.00085	<0.000816	<0.000853	<0.000853	<0.000831	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000692	<0.000697	<0.000692	<0.000704	<0.000716	<0.000718	**0.000987 J**	<0.000678	<0.000708	<0.000708	<0.00069	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.00053	<0.000534	<0.00053	<0.000539	<0.000549	<0.00055	<0.000541	<0.000519	<0.000543	<0.000543	<0.000529	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000621	<0.000626	<0.000621	<0.000632	<0.000643	<0.000645	<0.000633	<0.000608	<0.000636	<0.000636	<0.00062	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.00122	<0.00123	<0.00122	<0.00124	<0.00126	<0.00126	<0.00124	<0.00119	<0.00125	<0.00125	<0.00121	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00158	<0.00159	<0.00158	<0.00161	<0.00164	<0.00164	<0.00161	<0.00155	<0.00162	<0.00162	<0.00158	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.0004	<0.000403	<0.0004	<0.000407	<0.000414	<0.000415	<0.000408	<0.000392	<0.000409	<0.000409	<0.000399	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00193	<0.00195	<0.00193	<0.00197	<0.002	<0.00201	<0.00197	<0.00189	<0.00198	<0.00198	<0.00193	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000249	<0.000251	<0.000249	<0.000254	<0.000258	<0.000259	<0.000254	<0.000244	<0.000255	<0.000255	<0.000249	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.00211	<0.00212	<0.00211	<0.00214	<0.00218	<0.00219	<0.00215	<0.00206	<0.00216	<0.00216	<0.0021	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000381	<0.000384	<0.000381	<0.000388	<0.000395	<0.000396	<0.000389	<0.000373	<0.00039	<0.00039	<0.00038	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00258	<0.0026	<0.00258	<0.00262	<0.00267	<0.00268	<0.00263	<0.00253	<0.00264	<0.00264	<0.00257	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000148	<0.00015	<0.000148	<0.000151	<0.000154	<0.000154	<0.000151	<0.000145	<0.000152	<0.000152	<0.000148	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.0031	<0.00312	<0.0031	<0.00315	<0.00321	<0.00322	<0.00316	<0.00304	<0.00317	<0.00317	<0.00309	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00306	<0.00309	<0.00306	<0.00312	<0.00317	<0.00318	<0.00313	<0.003	<0.00314	<0.00314	<0.00306	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00477	<0.0048	<0.00477	<0.00485	<0.00494	<0.00495	<0.00486	<0.00467	<0.00488	<0.00488	<0.00475	ns	ns	ns

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES) or USEPA Health Advisory Drinking Water Standard
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Micrograms per Liter (equivalent to parts per billion)
ns	No standard established
D	Dilution
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion transition ratio is outside of the acceptance criteria.

[1]State of Wisconsin groundwater quality standards have not been established for PFAS compounds. The Wisconsin Department of Health Services (DHS) has recommended that an enforcement standard (ES) of 20 ng/L and a preventative action limit (PAL) of 2 ng/L be used for PFOA and PFOS individually and combined.

USEPA = United States Environmental Protection Agency

Table 3 - Summary of Groundwater Analytical Results - Volatile Organic Compounds (VOC)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/08/20

												Trip	Groundwater Standards	
Well Number		**01-AA-MW-1**	**01-AA-MW-2**	**01-AA-MW-3**	**01-AA-MW-3 DUP**	**01-AA-MW-4**	**02-AA-MW-5**	**03-AA-MW-6**	**03-AA-MW-7**	**03-AA-MW-8**	**04-AA-MW-9**	**Blank**	**NR 140 Wis. Adm. Code**	
Sampling Date	**CAS #**	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/7/2020	**ES**	**PAL**
Volatile Organic Compounds		**Analytical Result (µg/L)**											**(µg/L)**	
1,1,1,2-Tetrachloroethane	630-20-6	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	70	7
1,1,1-Trichloroethane	71-55-6	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	200	40
1,1,2,2-Tetrachloroethane	79-34-5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.2	0.02
1,1,2-Trichloroethane	79-00-5	<0.30	<0.30	<0.30	<0.30	**1.1**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	5	0.5
1,1-Dichloroethane	75-34-3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	850	85
1,1-Dichloroethene	75-35-4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	7	0.7
1,1-Dichloropropene	563-58-6	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
1,2,3-Trichlorobenzene	87-61-6	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	ns	ns
1,2,3-Trichloropropane	96-18-4	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	60	12
1,2,4-Trichlorobenzene	120-82-1	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	70	14
1,2,4-Trimethylbenzene	95-63-6	<0.29	**0.73**	**130**	**130**	<0.29 M	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	480	96
1,2-Dibromo-3-chloropropane	96-12-8	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.2	0.02
1,2-Dibromoethane	106-93-4	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0.05	0.005
1,2-Dichlorobenzene	95-50-1	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	600	60
1,2-Dichloroethane	107-06-2	<0.24	<0.24	**7.3**	**7.2**	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	5	0.5
1,2-Dichloropropane	78-87-5	<0.18	<0.18	**2.0**	**1.9**	**1.4**	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	5	0.5
1,3,5-Trimethylbenzene	108-67-8	<0.27	<0.27	<0.27	<0.27	<0.27 M	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	480	96
1,3-Dichlorobenzene	541-73-1	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	600	120
1,3-Dichloropropane	142-28-9	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	ns	ns
1,4-Dichlorobenzene	106-46-7	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	75	15
2,2-Dichloropropane	594-20-7	<0.30	<0.30	<0.30	<0.30	**1.8**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
2-Butanone	78-93-3	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	4,000	800
2-Chlorotoluene	95-49-8	<0.25	<0.25	<0.25	<0.25	**52 M**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	ns	ns
2-Hexanone	591-78-6	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	ns	ns
4-Chlorotoluene	106-43-4	<0.30	<0.30	<0.30	<0.30	<0.30 M	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
4-Methyl-2-pentanone	108-10-1	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	500	50
Acetone	67-64-1	<4.0	<4.0	**19**	**17**	**4.2**	<4.0	**4.2**	<4.0	<4.0	<4.0	<4.0	9,000	1,800
Benzene	71-43-2	<0.40	<0.40	**220**	**210**	**0.58**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	5	0.5
Bromobenzene	108-86-1	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Bromochloromethane	74-97-5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
Bromodichloromethane	75-27-4	<0.29	**0.41**	**0.79**	**0.82**	**0.56**	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	0.5	0.06
Bromoform	75-25-2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	4.4	0.44
Bromomethane	74-83-9	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	10	1
Carbon disulfide	75-15-0	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	**0.81**	<0.60	<0.60	<0.60	<0.60	1,000	200
Carbon tetrachloride	56-23-5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	5	0.5
Chlorobenzene	108-90-7	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
Chloroethane	75-00-3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	400	80
Chloroform	67-66-3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	6	0.6
Chloromethane	74-87-3	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	<0.60	30	3
cis-1,2-Dichloroethene	156-59-2	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**0.36**	<0.30	<0.30	<0.30	<0.30	70	7
cis-1,3-Dichloropropene	10061-01-5	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	0.4	0.04
Dibromochloromethane	124-48-1	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	60	6
Dibromomethane	74-95-3	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	ns	ns
Dichlorodifluoromethane	75-71-8	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	1,000	200
Diisopropyl ether	108-20-3	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Ethylbenzene	100-41-4	<0.30	<0.30	**1.4**	**1.3**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	700	140
Hexachlorobutadiene	87-68-3	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Isopropylbenzene	98-82-8	<0.30	<0.30	**19**	**19**	**25**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
m & p-Xylene	179601-23-1	<0.70	<0.70	**27**	**29**	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	2000	400
Methyl tert-butyl ether	1634-04-4	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	60	12
Methylene chloride	75-09-2	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	**0.91**	5	0.5
Naphthalene	91-20-3	<0.30	<0.30	**47**	**52**	**52**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	100	10
n-Butylbenzene	104-51-8	<0.29	<0.29	**16**	**16**	**4.3 M**	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	ns	ns
n-Propylbenzene	103-65-1	<0.30	<0.30	**35**	**36**	**29**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
o-Xylene	95-47-6	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	2000	400
p-Isopropyltoluene	99-87-6	<0.30	<0.30	**13**	**13**	<0.30 M	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
sec-Butylbenzene	135-98-8	<0.40	**2.3**	**19**	**19**	**8.5 M**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Styrene	100-42-5	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	100	10
tert-Butylbenzene	98-06-6	<0.40	**0.46**	**1.6**	**1.6**	**1.2 M**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Tetrachloroethene	127-18-4	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	5	0.5
Tetrahydrofuran	109-99-9	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	50	10
Toluene	108-88-3	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	800	160
trans-1,2-Dichloroethene	156-60-5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	100	20
trans-1,3-Dichloropropene	10061-02-6	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	0.4	0.04
Trichloroethene	79-01-6	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	5	0.5
Trichlorofluoromethane	75-69-4	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Vinyl acetate	108-05-4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	ns	ns
Vinyl chloride	75-01-4	<0.14	<0.14	<0.14	<0.14	<0.14 M	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	0.2	0.002

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES)
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Concentrations reported as micrograms per liter
--	Not analyzed
ns	No standard established
	USEPA = United States Environmental Protection Agency
M	Matrix spike and/or Matrix Spike Duplicate recovery outside acceptance limits

Appendix A
Summary of Soil Sample Laboratory Analytical Results by Site

F-35 Munitions Maintenance and Inspection Facility; Project Location 01
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		01-AA-MW-1 1'-1.5'	01-AA-MW-1 2'-2.5'	01-AA-MW-2 1'-1.5'	01-AA-MW-2 1'-1.5' D	01-AA-MW-2 2'-2.5'	01-AA-MW-3 1'-2'	01-AA-MW-3 2'-3'	01-AA-MW-4 1'-1.5'	01-AA-MW-4 2'-2.5'	Soil Standards			
Soil Type		SM	SM	SM	SM	SM	SM	SM	ML	ML	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	82.8	78.4	69.9	84.9	77.2	89.7	89.9	76.9	77.9				
Per-and Polyfluorinated Alkyl Substances (PFAS)		Analytical Result (mg/Kg)									Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
Acronym / (Name)														
PFBA (Perfluorobutanoic acid)	375-22-4	**0.000492 J**	<0.000342	<0.000346	**0.000439 J**	<0.000339	<0.000338	<0.000338	**0.000540**	<0.000344	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000394	<0.000394	<0.000398	**0.000554**	<0.00039	<0.000389	<0.000389	<0.000386	<0.000396	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000301	<0.000301	<0.000304	<0.000293	<0.000298	<0.000297	<0.000297	<0.000295	<0.000302	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000356	<0.000356	<0.00036	<0.000347	<0.000353	<0.000352	<0.000352	<0.000349	<0.000358	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000214	<0.000214	**0.000311 J**	**0.000659**	**0.000393 J**	<0.000211	<0.000211	<0.00021	<0.000215	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000651	<0.000651	<0.000658	<0.000635	<0.000646	<0.000644	<0.000644	<0.000639	<0.000654	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00117	<0.00117	<0.00118	<0.00114	<0.00116	<0.00115	<0.00115	<0.00115	<0.00117	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000473	<0.000473	<0.000478	**0.000859**	<0.000469	<0.000468	<0.000468	<0.000464	<0.000475	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000336	<0.000336	<0.00034	<0.000328	<0.000334	<0.000333	<0.000333	<0.00033	<0.000338	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000386	<0.000386	**0.000632**	**0.000974**	**0.000586**	<0.000382	<0.000381	<0.000379	<0.000388	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000647	<0.000647	<0.000654	<0.000631	<0.000642	<0.00064	<0.00064	<0.000635	<0.00065	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000465	<0.000465	<0.00047	**0.000773**	<0.000461	<0.00046	**0.000527**	<0.000456	<0.000467	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.00073	<0.00073	<0.000738	<0.000712	<0.000724	<0.000722	<0.000722	<0.000716	<0.000734	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000309	<0.000309	<0.000312	<0.000301	<0.000306	<0.000305	<0.000305	<0.000303	<0.00031	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.000997	<0.000997	<0.00101	<0.000973	<0.000989	<0.000986	<0.000986	<0.000979	<0.001	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	<0.000425	<0.000425	**0.00264 Q**	**0.00527 Q**	**0.00147 Q**	**0.00425**	**0.00443**	**0.000506 Q**	<0.000427	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000366	<0.000366	<0.00037	<0.000357	<0.000363	<0.000362	<0.000362	<0.000359	<0.000368	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000447	<0.000447	<0.000452	<0.000436	<0.000443	<0.000442	<0.000442	<0.000439	<0.000449	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000714	<0.000714	<0.000722	<0.000697	<0.000708	<0.000706	<0.000706	<0.000701	<0.000718	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00114	<0.00114	<0.00115	<0.00111	<0.00113	<0.00113	<0.00112	<0.00112	<0.00114	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000728	<0.000728	<0.000736	<0.00071	<0.000722	<0.00072	<0.00072	<0.000715	<0.000732	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000681	<0.00068	<0.000688	<0.000664	<0.000675	<0.000673	<0.000673	<0.000668	<0.000684	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000255	<0.000255	<0.000258	<0.000249	<0.000253	<0.000252	<0.000252	<0.00025	<0.000256	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000683	<0.000682	<0.00069	<0.000666	<0.000677	<0.000675	<0.000675	<0.00067	<0.000686	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000714	<0.000714	<0.000722	<0.000697	<0.000708	<0.000706	<0.000706	<0.000701	<0.000718	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00101	<0.001	<0.00102	<0.000981	<0.000997	<0.000994	<0.000994	<0.000986	<0.00101	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.0004	<0.0004	<0.000404	<0.00039	<0.000396	<0.000395	<0.000395	<0.000392	<0.000402	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00572	<0.00572	<0.00578	<0.00558	<0.00567	<0.00565	<0.00565	<0.00561	<0.00575	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000398	<0.000398	<0.000402	<0.000388	<0.000394	<0.000393	<0.000393	<0.00039	<0.0004	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000594	<0.000593	<0.0006	<0.000579	<0.000589	<0.000587	<0.000587	<0.000582	<0.000596	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000261	<0.000261	<0.000264	<0.000255	<0.000259	<0.000258	<0.000258	<0.000256	<0.000262	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.0038	<0.0038	<0.00384	<0.00371	<0.00377	<0.00376	<0.00376	<0.00373	<0.00382	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000168	<0.000168	<0.00017	<0.000164	<0.000167	<0.000166	<0.000166	<0.000165	<0.000169	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000495	<0.000494	<0.0005	<0.000483	<0.000491	<0.000489	<0.000489	<0.000485	<0.000497	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00491	<0.00491	<0.00496	<0.00479	<0.00487	<0.00485	<0.00485	<0.00482	<0.00493	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00532	<0.00532	<0.00538	<0.00519	<0.00528	<0.00526	<0.00526	<0.00522	<0.00535	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].
[3]Unites States Environmental Protection Agency Regional Screening Levels (USEPA, 2017).

F-35 Alter B400AMXS - Building; Project Location 02
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		02-AA-MW-5 1'-1.5'	02-AA-MW-5 2'-2.5'	Soil Standards			
Soil Type		SM	SM	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	86.1	82.9				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)	Analytical Result (mg/Kg)			Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	**0.000434 J**	<0.000334	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.000883**	<0.000384	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000292	<0.000293	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000346	<0.000347	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.000420 J**	<0.000208	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000632	<0.000635	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00113	<0.00114	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.000552**	<0.000461	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000326	<0.000328	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.00336**	<0.000376	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000628	**0.00174**	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.00221**	<0.000453	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000709	<0.000712	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	**0.000620**	<0.000301	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.000968	**0.0163 Q**	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.00625 Q**	**0.0159**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000355	<0.000357	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000434	<0.000436	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000693	**0.00287**	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.0011	<0.00111	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000707	<0.00071	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000661	<0.000664	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000248	<0.000249	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000663	<0.000666	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000693	<0.000696	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.000976	<0.00098	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000388	<0.00039	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00555	<0.00557	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000386	<0.000388	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000576	<0.000579	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000253	<0.000255	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00369	<0.0037	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000163	<0.000164	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.00048	<0.000482	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00476	<0.00478	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00517	<0.00519	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

Alert GOV Parking Shelters; Project Location 03
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		03-AA-MW-6 1'-1.5'	03-AA-MW-6 2'-2.5'	03-AA-MW-7 1'-1.5'	03-AA-MW-7 2'-2.5'	03-AA-MW-8 1'-1.5'	03-AA-MW-8 1'-1.5' D	03-AA-MW-8 2'-2.5'	Soil Standards			
Soil Type		SW	CL	SM	SM	CL	CL	CL	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	80.9	83.7	90.1	92.5	83.7	81.5	90.9				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)							Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	<0.000342	<0.000339	<0.000346	<0.000334	<0.000341	<0.000332	<0.00034	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000393	<0.00039	<0.000398	<0.000384	<0.000393	**0.000434 J**	<0.000391	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.0003	<0.000298	<0.000304	<0.000293	<0.0003	<0.000291	<0.000299	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000356	**0.000497**	<0.00036	<0.000347	<0.000355	<0.000345	<0.000353	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000213	**0.000447**	<0.000216	<0.000208	<0.000649	**0.000489**	<0.000212	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.00065	<0.000644	<0.000657	<0.000635	<0.00116	<0.00063	<0.000646	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00117	<0.00116	<0.00118	<0.00114	<0.000472	<0.00113	<0.00116	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000472	<0.000468	<0.000478	<0.000461	<0.000335	<0.000458	<0.000469	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000336	<0.000333	<0.00034	<0.000328	<0.000335	<0.000326	<0.000334	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000385	<0.000382	<0.00039	<0.000376	**0.00243**	**0.00676**	<0.000383	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	**0.00175**	**0.0146**	<0.000653	<0.000631	<0.000645	<0.000627	<0.000642	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000464	<0.00046	<0.00047	<0.000453	**0.000613**	<0.00185	<0.000462	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000729	<0.000723	<0.000737	<0.000712	<0.000728	<0.000707	<0.000725	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000308	<0.000305	<0.000312	<0.000301	**0.000380 J**	<0.000299	<0.000306	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	**0.0196**	**0.0155**	**0.00631**	**0.00874**	<0.000994	<0.000966	<0.00099	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.0162**	**0.00714**	**0.0311**	**0.0375**	**0.0103 Q**	**0.00208**	**0.000581**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000366	<0.000362	<0.00037	<0.000357	<0.000365	<0.000355	<0.000363	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000447	<0.000443	<0.000452	<0.000436	<0.000446	<0.000433	<0.000444	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	**0.00235**	**0.00130**	**0.00104**	<0.000696	<0.000712	<0.000692	<0.000709	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00114	<0.00113	<0.00115	<0.00111	<0.00113	<0.0011	<0.00113	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000727	<0.000721	<0.000735	<0.00071	<0.000726	<0.000705	<0.000723	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.00068	<0.000674	<0.000687	<0.000664	<0.000679	<0.000659	<0.000676	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000255	<0.000253	<0.000258	<0.000249	<0.000255	<0.000247	<0.000253	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000682	<0.000676	<0.000689	<0.000665	<0.000681	<0.000661	<0.000678	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000713	<0.000707	<0.000721	<0.000696	<0.000712	<0.000692	<0.000709	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.001	<0.000995	<0.00101	<0.00098	<0.001	<0.000974	<0.000998	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000399	<0.000396	<0.000404	<0.00039	<0.000399	<0.000387	<0.000397	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00571	<0.00566	<0.00577	<0.00557	<0.0057	<0.00554	<0.00568	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000397	<0.000394	<0.000402	<0.000388	<0.000397	<0.000385	<0.000395	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000593	<0.000587	<0.000599	<0.000579	<0.000592	<0.000575	<0.000589	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000261	<0.000258	<0.000264	<0.000255	<0.00026	<0.000253	<0.000259	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00379	<0.00376	<0.00384	<0.0037	<0.00379	<0.00368	<0.00377	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000168	<0.000166	<0.00017	<0.000164	<0.000168	<0.000163	<0.000167	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000494	<0.00049	<0.000499	<0.000482	<0.000493	<0.000479	<0.000491	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.0049	<0.00486	<0.00495	<0.00478	<0.00489	<0.00475	<0.00487	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00532	<0.00527	<0.00537	<0.00519	<0.00531	<0.00516	<0.00528	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.

[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

F-35 Repair B401 AGE Shop; Project Location 04
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		04-AA-MW-9 1'-1.5'	04-AA-MW-9 3'-3.5'	04-AA-MW-9 3'-3.5' D	Soil Standards			
Soil Type		SM	SM	SM	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	89.8	92.9	90.6				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)	Analytical Result (mg/Kg)				Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	<0.000344	<0.000342	<0.000347	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000395	**0.000399 J**	**0.00047 J**	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000302	<0.0003	<0.000305	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000358	<0.000355	<0.000361	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000215	**0.000342 J**	**0.000217 J**	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000654	<0.000649	<0.00066	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00117	<0.00116	<0.00118	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000475	<0.000472	<0.000479	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000338	<0.000336	<0.000341	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000387	**0.00174**	**0.00277**	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.00065	<0.000646	<0.000656	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000467	<0.000464	**0.000585**	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000733	<0.000728	<0.00074	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.00031	<0.000308	<0.000313	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.001	<0.000995	<0.00101	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.0148**	**0.00809**	**0.00357 Q**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000368	<0.000365	<0.000371	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000449	<0.000446	<0.000453	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000717	<0.000713	<0.000724	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00114	<0.00114	<0.00115	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000731	<0.000726	<0.000738	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000683	<0.000679	<0.00069	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000256	<0.000255	<0.000259	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000685	<0.000681	<0.000692	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000717	<0.000713	<0.000724	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00101	<0.001	<0.00102	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000401	<0.000399	<0.000405	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00574	<0.00571	<0.0058	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000399	<0.000397	<0.000403	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000596	<0.000592	<0.000602	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000262	<0.000261	<0.000265	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00381	<0.00379	<0.00385	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000169	<0.000168	<0.00017	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000497	<0.000494	<0.000501	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00493	<0.0049	<0.00497	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00534	<0.00531	<0.0054	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

F-35 Alter B400 AMXS - Perimeter Fence; Project Location 07
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		07-AA-GP-1 1'-2'	07-AA-GP-2 1'-2'	07-AA-GP-2 1'-2' D	07-AA-GP-3 1'-2'	07-AA-GP-4 1'-2'	07-AA-GP-5 1'-2'	07-AA-GP-6 1'-2'	07-AA-GP-7 1'-2'	07-AA-GP-8 1'-2'	Soil Standards			
Soil Type		CL	ML/CL	ML/CL	ML	CL	CL	CL	ML/CL	ML/SC	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	83.2	79.7	79.1	82.4	84.8	81.2	83.6	86.4	80.5				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)									Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	<0.000343	<0.000341	<0.000347	**0.00125**	<0.000332	<0.000338	<0.000345	<0.000342	<0.000346	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000395	<0.000393	<0.000399	**0.00216**	<0.000381	<0.000389	<0.000396	<0.000394	**0.000973**	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000302	<0.0003	<0.000305	<0.000293	<0.000291	<0.000297	<0.000303	<0.000301	<0.000304	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000357	<0.000355	<0.000361	<0.000346	<0.000345	<0.000352	<0.000359	<0.000356	<0.00036	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000214	<0.000213	<0.000216	**0.00136 Q**	<0.000207	<0.000211	<0.000215	**0.000454 J**	**0.00109**	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000653	<0.000649	<0.000659	<0.000633	<0.00063	<0.000643	<0.000655	<0.000651	<0.000659	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00117	<0.00116	<0.00118	<0.00114	<0.00113	<0.00115	<0.00118	<0.00117	<0.00118	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000474	<0.000472	<0.000479	**0.000635**	<0.000458	<0.000467	<0.000476	<0.000473	**0.00109**	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000337	<0.000336	<0.000341	<0.000327	<0.000326	<0.000332	<0.000339	<0.000336	<0.00034	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000387	**0.000431 J, Q**	**0.000694 Q**	**0.00439**	<0.000374	<0.000381	<0.000388	**0.00396**	**0.0204**	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000649	<0.000645	<0.000655	<0.000629	<0.000627	<0.000639	<0.000651	<0.000647	<0.000655	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000466	<0.000464	<0.000471	**0.00133**	<0.00045	<0.000459	<0.000468	**0.000700**	**0.00271**	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000732	<0.000728	<0.00074	<0.00071	<0.000707	<0.000721	<0.000735	<0.00073	<0.000739	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.00031	<0.000308	<0.000313	**0.00164**	<0.000299	<0.000305	<0.000311	<0.000308	<0.000312	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.001	<0.000995	<0.00101	<0.00097	<0.000966	<0.000985	<0.001	<0.000997	<0.00101	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	<0.000427	**0.0166 Q**	**0.0196 Q**	**0.269**	**0.00356**	**0.00226**	**0.00376**	**0.014**	**0.00796 Q**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000367	<0.000365	<0.000371	<0.000356	<0.000354	<0.000362	<0.000368	<0.000366	<0.00037	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000448	<0.000446	**0.000560**	<0.000435	<0.000433	<0.000442	<0.00045	<0.000447	<0.000452	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000716	<0.000713	<0.000724	<0.000695	<0.000692	<0.000705	<0.000719	<0.000714	<0.000723	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00114	<0.00113	<0.00115	<0.00111	<0.0011	<0.00112	<0.00115	<0.00114	<0.00115	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.00073	<0.000726	<0.000738	<0.000708	<0.000705	<0.000719	<0.000733	<0.000728	<0.000737	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000683	<0.000679	<0.00069	<0.000662	<0.000659	<0.000672	<0.000685	<0.00068	<0.000689	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000256	<0.000255	<0.000259	<0.000248	<0.000247	<0.000252	<0.000257	<0.000255	<0.000258	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000685	<0.000681	**0.000788 J, Q**	<0.000664	<0.000661	<0.000674	<0.000687	<0.000682	<0.000691	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000716	<0.000713	<0.000724	<0.000695	<0.000692	<0.000705	<0.000719	<0.000714	<0.000723	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00101	<0.001	<0.00102	<0.000978	<0.000973	<0.000993	<0.00101	<0.001	<0.00102	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000401	<0.000399	<0.000405	<0.000389	<0.000387	<0.000395	<0.000402	<0.000399	<0.000404	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00573	<0.0057	<0.00579	<0.00556	<0.00554	<0.00565	<0.00576	<0.00571	<0.00579	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000399	<0.000397	<0.000403	<0.000387	<0.000385	<0.000393	<0.0004	<0.000397	<0.000402	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000595	<0.000592	<0.000601	<0.000577	<0.000575	<0.000586	<0.000598	<0.000593	<0.000601	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000262	<0.000261	<0.000265	<0.000254	<0.000253	<0.000258	<0.000263	<0.000261	<0.000264	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00381	<0.00379	<0.00385	<0.0037	<0.00368	<0.00375	<0.00382	<0.0038	<0.00384	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000169	<0.000168	<0.00017	<0.000164	<0.000163	<0.000166	<0.000169	<0.000168	<0.00017	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000496	<0.000493	<0.000501	<0.000481	<0.000479	<0.000489	<0.000498	<0.000494	<0.0005	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00492	<0.0049	<0.00497	<0.00477	<0.00475	<0.00485	<0.00494	<0.0049	<0.00496	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00534	<0.00531	<0.00539	<0.00518	<0.00515	<0.00526	<0.00536	<0.00532	<0.00538	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.
[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

F-35 Alter B400 AMXS - Perimeter Fence; Project Location 07 (continued)
Summary of Soil Sample Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/7/2020 - 10/8/2020

Boring Number/Depth		07-AA-GP-9 1'-2'	07-AA-GP-10 1'-2'	07-AA-GP-11 1'-2'	07-AA-GP-12 1'-2'	07-AA-GP-13 1'-2'	07-AA-GP-14 1'-2'	07-AA-GP-15 1'-2'	07-AA-GP-16 1'-2'	Soil Standards			
Soil Type		SW	GW/MH	GP/CL	ML/CH	ML/CL	SM	GC	CL	WDNR NR 720 Wis. Adm. Code[1]		Air Force Guidance for Soils and Sediments[2] (mg/Kg)	USEPA Regional Screening Level (RSL)[3] Residential Soil (mg/Kg)
Solids, Percent	CAS #	96	72.9	82.7	87.3	82.8	88.1	84.4	92.5				
Per-and Polyfluorinated Alkyl Substances (PFAS) Acronym / (Name)		Analytical Result (mg/Kg)								Non-Industrial Direct Contact (mg/Kg)	Industrial Direct Contact (mg/Kg)		
PFBA (Perfluorobutanoic acid)	375-22-4	<0.00034	**0.00248**	<0.000346	<0.000347	<0.000334	<0.000338	<0.000336	<0.000337	ns	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	<0.000391	**0.0146**	**0.000428 J**	<0.0004	<0.000384	<0.000389	<0.000387	<0.000387	ns	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	<0.000298	**0.0178**	<0.000304	<0.000305	<0.000293	<0.000297	<0.000295	<0.000296	ns	ns	ns	1,300
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000353	<0.00036	<0.00036	<0.000362	<0.000348	<0.000352	<0.00035	<0.00035	ns	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	<0.000212	**0.0257**	<0.000216	<0.000217	<0.000209	<0.000211	<0.00021	<0.00021	ns	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.000646	**0.108**	<0.000658	<0.000661	<0.000635	<0.000643	<0.000639	<0.00064	ns	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00116	<0.00118	<0.00118	<0.00119	<0.00114	<0.00115	<0.00115	<0.00115	ns	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	<0.000469	**0.0217**	<0.000478	<0.00048	<0.000461	<0.000467	<0.000464	<0.000465	ns	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000334	<0.00034	<0.00034	<0.000341	<0.000328	<0.000332	<0.00033	<0.000331	ns	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	<0.000383	**0.747 D**	<0.00039	<0.000392	<0.000377	**0.000599**	<0.000379	<0.000379	ns	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.000642	**0.302**	<0.000654	<0.000657	<0.000631	<0.000639	<0.000635	<0.000636	ns	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	<0.000461	**0.0525**	<0.00047	<0.000472	<0.000454	<0.000459	<0.000456	<0.000457	1.26	16.4	1.26	ns
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000725	**0.00415**	<0.000738	<0.000741	<0.000712	<0.000721	<0.000717	<0.000718	ns	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000306	<0.000312	<0.000312	<0.000313	<0.000301	<0.000305	<0.000303	<0.000304	ns	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	<0.00099	<0.00101	<0.00101	<0.00101	<0.000973	<0.000985	<0.000979	<0.000981	ns	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.00105**	**0.0191 Q**	**0.00243**	<0.000432	<0.000415	**0.000424 J, Q**	**0.00158**	**0.00274**	1.26	16.4	1.26	ns
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000363	<0.00037	<0.00037	<0.000372	<0.000357	<0.000362	<0.000359	<0.00036	ns	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000444	<0.000452	<0.000452	<0.000454	<0.000436	<0.000442	<0.000439	<0.00044	ns	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.000709	<0.000723	<0.000722	<0.000725	<0.000697	<0.000706	<0.000701	<0.000702	ns	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00113	<0.00115	<0.00115	<0.00115	<0.00111	<0.00112	<0.00112	<0.00112	ns	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000723	<0.000737	<0.000736	<0.000739	<0.000711	<0.00072	<0.000715	<0.000716	ns	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000676	<0.000689	<0.000688	<0.000691	<0.000664	<0.000673	<0.000668	<0.000669	ns	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000253	<0.000258	<0.000258	<0.000259	<0.000249	<0.000252	<0.000251	<0.000251	ns	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000678	<0.000691	<0.00069	<0.000693	<0.000666	<0.000675	<0.00067	<0.000671	ns	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.000709	<0.000723	<0.000722	<0.000725	<0.000697	<0.000706	<0.000701	<0.000702	ns	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.000998	<0.00102	<0.00102	<0.00102	<0.000981	<0.000993	<0.000987	<0.000989	ns	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000397	<0.000404	<0.000404	<0.000406	<0.00039	<0.000395	<0.000392	<0.000393	ns	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00568	<0.00579	<0.00578	<0.0058	<0.00558	<0.00565	<0.00561	<0.00562	ns	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000395	<0.000402	<0.000402	<0.000404	<0.000388	<0.000393	<0.00039	<0.000391	ns	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.000589	<0.000601	<0.0006	<0.000603	<0.000579	<0.000587	<0.000583	<0.000584	ns	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000259	<0.000264	<0.000264	<0.000265	<0.000255	<0.000258	<0.000256	<0.000257	ns	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00377	<0.00384	<0.00384	<0.00386	<0.00371	<0.00375	<0.00373	<0.00374	ns	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000167	<0.00017	<0.00017	<0.000171	<0.000164	<0.000166	<0.000165	<0.000165	ns	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.000491	<0.0005	<0.0005	<0.000502	<0.000483	<0.000489	<0.000486	<0.000486	ns	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00487	<0.00496	<0.00496	<0.00498	<0.00479	<0.00485	<0.00482	<0.00483	ns	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00528	<0.00539	<0.00538	<0.0054	<0.00519	<0.00526	<0.00522	<0.00523	ns	ns	ns	ns

BOLD	Concentration exceeds WDNR NR 720 Wis. Adm Code Non-Industrial Direct Contact Standard and Air Force Guidance for Soils and Sediments
BOLD	Concentration detected above laboratory method detection limit
ns	No standard established.
<	Concentration less than laboratory method detection limit
Dup	Duplicate
mg/Kg	Milligrams per kilogram (equivalent to parts per million)
µg/Kg	µg/kg = Micrograms per Kilogram (equivalent to parts per billion)
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion trasition ratio is outside of the acceptance criteria.

[1]Wisconsin Department of Natural Resources NR 720 Wisconsin Administrative Code Residual Contaminant Levels (RCLs) for soil.

[2]Air Force Guidance screening levels calculated using the USEPA Regional Screening Level calculator [https://epa-prgs.ornl.gov/cgibin/chemicals/csl_search].

Appendix B
Summary of Groundwater Sample Laboratory Analytical Results by Site

F-35 Munitions Maintenance and Inspection Facility; Project Location 01
Summary of Groundwater Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/8/2020

Well Number	CAS #	01-AA-MW-1	01-AA-MW-2	01-AA-MW-3	01-AA-MW-4	Groundwater Standards		
						NR 140 Wis. Adm. Code (µg/L)[1]		USEPA Health Advisory
Sampling Date		10/8/2020	10/8/2020	10/8/2020	10/8/2020	ES	PAL	Drinking Water (Surface Water or Groundwater) (µg/L)
Acronym / (Name)		Analytical Result (µg/L)						
PFBA (Perfluorobutanoic acid)	375-22-4	**0.00393**	**0.00976**	<0.000368	**0.0138**	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.00231**	**0.00824**	**0.0362**	**0.0269**	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	**0.00194 J**	**0.00429**	**0.0069**	**0.00904**	ns	ns	ns
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000702	<0.000707	<0.000702	<0.000714	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.00214**	**0.011**	**0.0496**	**0.0307**	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	<0.00122	**0.00564**	**0.00983**	**0.00942**	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00243	<0.00245	<0.00243	<0.00248	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.00174 J**	**0.00901**	**0.038**	**0.0171**	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000365	<0.000367	<0.000364	<0.000371	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.0106**	**0.0632**	**0.15**	**0.134**	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.00101	<0.00102	**0.0355**	**0.00415**	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.00246**	**0.0111**	**0.0544**	**0.0217**	0.02	0.002	0.07
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	<0.000473	**0.000532 J**	**0.0212**	**0.0056**	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	**0.000758 J**	**0.00118 J**	**0.00899**	**0.00268**	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	**0.00503**	**0.00511**	**0.00637**	**0.0143**	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.0535**	**0.0218 Q**	**1.26**	**0.144**	0.02	0.002	0.07
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000732	<0.000737	<0.000732	<0.000745	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.000752	<0.000758	<0.000752	<0.000765	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	**0.00131 J**	<0.00105	**0.0409**	**0.00371**	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00195	<0.00197	<0.00195	<0.00199	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000833	<0.000839	<0.000833	<0.000848	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000692	<0.000697	<0.000692	<0.000704	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.00053	<0.000534	<0.00053	<0.000539	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000621	<0.000626	<0.000621	<0.000632	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.00122	<0.00123	<0.00122	<0.00124	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00158	<0.00159	<0.00158	<0.00161	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.0004	<0.000403	<0.0004	<0.000407	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00193	<0.00195	<0.00193	<0.00197	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000249	<0.000251	<0.000249	<0.000254	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.00211	<0.00212	<0.00211	<0.00214	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000381	<0.000384	<0.000381	<0.000388	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00258	<0.0026	<0.00258	<0.00262	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000148	<0.00015	<0.000148	<0.000151	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.0031	<0.00312	<0.0031	<0.00315	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00306	<0.00309	<0.00306	<0.00312	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00477	<0.0048	<0.00477	<0.00485	ns	ns	ns

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES) or USEPA Health Advisory Drinking Water Standard
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Micrograms per Liter (equivalent to parts per billion)
ns	No standard established
D	Dilution
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion transition ratio is outside of th acceptance criteria.

[1]State of Wisconsin groundwater quality standards have not been established for PFAS compounds. The Wisconsin Department of Health Services (DHS) has recommended that an enforcement standard (ES) of 20 ng/L and a preventative action limit (PAL) of 2 ng/L be used for PFOA and PFOS individually and combined.

USEPA = United States Environmental Protection Agency

F-35 Alter B400AMXS - Building; Project Location 02
Summary of Groundwater Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/8/2020

Well Number	CAS #	02-AA-MW-5	02-AA-MW-5 Dup	Groundwater Standards		
				NR 140 Wis. Adm. Code (µg/L)[1]		USEPA Health Advisory
Sampling Date		10/8/2020	10/8/2020	ES	PAL	Drinking Water (Surface Water or Groundwater) (µg/L)
Acronym / (Name)						
PFBA (Perfluorobutanoic acid)	375-22-4	**0.161**	**0.144**	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.368**	**0.369**	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	**0.0988**	**0.0962**	ns	ns	ns
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	**0.0118**	**0.0117**	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.415**	**0.413**	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	**0.1**	**0.0964**	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00252	<0.00253	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.209**	**0.201**	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000377	<0.000379	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**1.27**	**1.23**	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	**0.684**	**0.655**	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.344**	**0.334**	0.02	0.002	0.07
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	**0.0711**	**0.0607**	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	**0.0344**	**0.0327**	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	**0.0121**	**0.0097**	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**2.31 D**	**2.55 D**	0.02	0.002	0.07
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000758	<0.00076	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	**0.00197 J**	**0.00169 J**	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	**0.0846**	**0.0856**	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.00202	<0.00203	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000863	<0.000865	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000716	<0.000718	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000549	<0.00055	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000643	<0.000645	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.00126	<0.00126	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00164	<0.00164	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000414	<0.000415	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.002	<0.00201	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000258	<0.000259	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.00218	<0.00219	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000395	<0.000396	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00267	<0.00268	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000154	<0.000154	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.00321	<0.00322	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00317	<0.00318	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00494	<0.00495	ns	ns	ns

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES) or USEPA Health Advisory Drinking Water Standard
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Micrograms per Liter (equivalent to parts per billion)
ns	No standard established
D	Dilution
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion transition ratio is outside of th acceptance criteria.

[1]State of Wisconsin groundwater quality standards have not been established for PFAS compounds. The Wisconsin Department of Health Services (DHS) has recommended that an enforcement standard (ES) of 20 ng/L and a preventative action limit (PAL) of 2 ng/L be used for PFOA and PFOS individually and combined.

USEPA = United States Environmental Protection Agency

Alert GOV Parking Shelters; Project Location 03
Summary of Groundwater Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/8/2020

Well Number	CAS #	03-AA-MW-6	03-AA-MW-7	03-AA-MW-8	MW-7 EB	Groundwater Standards		
						NR 140 Wis. Adm. Code (µg/L)[1]		USEPA Health Advisory
Sampling Date		10/8/2020	10/8/2020	10/8/2020	10/8/2020	ES	PAL	Drinking Water (Surface Water or Groundwater) (µg/L)
Acronym / (Name)								
PFBA (Perfluorobutanoic acid)	375-22-4	**0.135**	**0.0286**	**0.0131**	<0.000367	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.411**	**0.0504**	**0.0159**	<0.000645	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	**0.108**	**0.07**	**0.01**	<0.000902	ns	ns	ns
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	**0.0163**	<0.000688	<0.000719	<0.0007	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.521**	**0.0985**	**0.0204**	<0.0011	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	**0.123**	**0.0127**	**0.00654**	<0.00122	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00248	<0.00238	<0.00249	<0.00243	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.224**	**0.135**	**0.0129**	<0.000298	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000372	<0.000357	<0.000373	<0.000364	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**1**	**0.423**	**0.158**	<0.000477	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	**0.8**	**0.0312**	**0.00523**	<0.00101	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.296**	**0.3**	**0.0727**	<0.000328	0.02	0.002	0.07
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	**0.141**	**0.536**	**0.00194 J**	<0.000472	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	**0.0129**	**0.0251**	**0.000996 J**	<0.000408	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	**1.12**	**0.0315**	**0.0174**	**0.00104 J**	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**5.19 D**	**5.17 D, Q**	**0.272**	<0.000406	0.02	0.002	0.07
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.000747	<0.000717	<0.00075	<0.00073	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	**0.00273**	<0.000737	<0.00077	<0.00075	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	**0.261**	**0.0352**	**0.00583**	<0.00104	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	**0.00282**	<0.00191	<0.002	<0.00195	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.00085	<0.000816	<0.000853	<0.000831	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	**0.000987 J**	<0.000678	<0.000708	<0.00069	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000541	<0.000519	<0.000543	<0.000529	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000633	<0.000608	<0.000636	<0.00062	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.00124	<0.00119	<0.00125	<0.00121	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00161	<0.00155	<0.00162	<0.00158	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000408	<0.000392	<0.000409	<0.000399	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00197	<0.00189	<0.00198	<0.00193	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000254	<0.000244	<0.000255	<0.000249	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.00215	<0.00206	<0.00216	<0.0021	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.000389	<0.000373	<0.00039	<0.00038	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00263	<0.00253	<0.00264	<0.00257	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000151	<0.000145	<0.000152	<0.000148	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.00316	<0.00304	<0.00317	<0.00309	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00313	<0.003	<0.00314	<0.00306	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00486	<0.00467	<0.00488	<0.00475	ns	ns	ns

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES) or USEPA Health Advisory Drinking Water Standard
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Micrograms per Liter (equivalent to parts per billion)
ns	No standard established
D	Dilution
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion transition ratio is outside of th acceptance criteria.

[1]State of Wisconsin groundwater quality standards have not been established for PFAS compounds. The Wisconsin Department of Health Services (DHS) has recommended that an enforcement standard (ES) of 20 ng/L and a preventative action limit (PAL) of 2 ng/L be used for PFOA and PFOS individually and combined.

USEPA = United States Environmental Protection Agency

F-35 Repair B401 AGE Shop; Project Location 04
Summary of Groundwater Analytical Results - Per-and Polyfluorinated Alkyl Substances (PFAS)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/8/2020

Well Number	CAS #	04-AA-MW-9	Groundwater Standards		
			NR 140 Wis. Adm. Code (µg/L)[1]		USEPA Health Advisory
Sampling Date		10/8/2020	ES	PAL	Drinking Water (Surface Water or Groundwater) (µg/L)
Acronym / (Name)					
PFBA (Perfluorobutanoic acid)	375-22-4	**0.00821**	ns	ns	ns
PFPeA (Perfluoropentanoic acid)	2706-90-3	**0.00392**	ns	ns	ns
PFBS (Perfluorobutanesulfonic acid)	375-73-5	**0.0158**	ns	ns	ns
4:2 FTS (4:2 Fluorotelomer sulfonic acid)	757124-72-4	<0.000719	ns	ns	ns
PFHxA (Perfluorohexanoic acid)	307-24-4	**0.0049**	ns	ns	ns
PFPeS (Perfluoropentanesulfonic acid)	2706-91-4	**0.00593**	ns	ns	ns
HFPO-DA (Hexafluoropropylene oxide dimer acid)	13252-13-6	<0.00249	ns	ns	ns
PFHpA (Perfluoroheptanoic acid)	375-85-9	**0.0021**	ns	ns	ns
ADONA (Ammonium 4,8 dioxa 3H perfluorononanoate)	919005-14-4	<0.000373	ns	ns	ns
PFHxS (Perfluorohexanesulfonic acid)	355-46-4	**0.0699**	ns	ns	ns
6:2 FTS (6:2 Fluorotelomer sulfonic acid)	27619-97-2	<0.00103	ns	ns	ns
PFOA (Perfluorooctanoic acid)	335-67-1	**0.00557**	0.02	0.002	0.07
PFHpS (Perfluoroheptanesulfonic acid)	375-92-8	**0.00109 J**	ns	ns	ns
PFNA (Perfluorononanoic acid)	375-95-1	<0.000419	ns	ns	ns
PFOSA (Perfluorooctane sulfonamide)	754-91-6	**0.00346**	ns	ns	ns
PFOS (Perfluorooctanesulfonic acid)	1763-23-1	**0.045 Q**	0.02	0.002	0.07
9Cl-PF3ONS (9 chlorohexadecafluoro 3 oxanonane 1 sulfonic acid)	756426-58-1	<0.00075	ns	ns	ns
PFDA (Perfluorodecanoic acid)	335-76-2	<0.00077	ns	ns	ns
8:2 FTS (8:2 Fluorotelomer sulfonic acid)	39108-34-4	<0.00106	ns	ns	ns
PFNS (Perfluorononanesulfonic acid)	68259-12-1	<0.002	ns	ns	ns
MeFOSAA (N Methyl perfluorooctane sulfonamidoacetic acid)	2355-31-9	<0.000853	ns	ns	ns
EtFOSAA (N Ethyl perfluorooctane sulfonamidoacetic acid)	2991-50-6	<0.000708	ns	ns	ns
PFUnA (Perfluoroundecanoic acid)	2058-94-8	<0.000543	ns	ns	ns
PFDS (Perfluorodecanesulfonic acid)	335-77-3	<0.000636	ns	ns	ns
11Cl-PF3OUdS (11 chloroeicosafluoro 3 oxaundecane 1 sulfonic acid)	763051-92-9	<0.00125	ns	ns	ns
10:2 FTS (10:2 Fluorotelomer sulfonic acid)	120226-60-0	<0.00162	ns	ns	ns
PFDoA (Perfluorododecanoic acid)	307-55-1	<0.000409	ns	ns	ns
MeFOSA (N Methyl perfluorooctane sulfonamide)	31506-32-8	<0.00198	ns	ns	ns
PFTrDA (Perfluorotridecanoic acid)	72629-94-8	<0.000255	ns	ns	ns
PFDoS (Perfluorododecanesulfonic acid)	79780-39-5	<0.00216	ns	ns	ns
PFTeDA (Perfluorotetradecanoic acid)	376-06-7	<0.00039	ns	ns	ns
EtFOSA (N Ethyl perfluorooctane sulfonamide)	4151-50-2	<0.00264	ns	ns	ns
PFHxDA (Perfluorohexadecanoic acid)	67905-19-5	<0.000152	ns	ns	ns
PFODA (Perfluorooctadecanoic acid)	16517-11-6	<0.00317	ns	ns	ns
MeFOSE (N Methyl perfluorooctane sulfonamidoethanol)	24448-09-7	<0.00314	ns	ns	ns
EtFOSE (N Ethyl perfluorooctane sulfonamidoethanol)	1691-99-2	<0.00488	ns	ns	ns

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES) or USEPA Health Advisory Drinking Water Standard
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Micrograms per Liter (equivalent to parts per billion)
ns	No standard established
D	Dilution
J	The amount detected is above the method detection level but below the reporting limit, an area of less certain quantitation.
Q	The ion transition ratio is outside of th acceptance criteria.

[1]State of Wisconsin groundwater quality standards have not been established for PFAS compounds. The Wisconsin Department of Health Services (DHS) has recommended that an enforcement standard (ES) of 20 ng/L and a preventative action limit (PAL) of 2 ng/L be used for PFOA and PFOS individually and combined.

USEPA = United States Environmental Protection Agency

F-35 Munitions Maintenance and Inspection Facility; Project Location 01
Summary of Groundwater Analytical Results - Volatile Organic Compounds (VOC)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/08/20

							Groundwater Standards	
Well Number		**01-AA-MW-1**	**01-AA-MW-2**	**01-AA-MW-3**	**01-AA-MW-3 DUP**	**01-AA-MW-4**	**NR 140 Wis. Adm. Code**	
Sampling Date	**CAS #**	10/8/2020	10/8/2020	10/8/2020	10/8/2020	10/8/2020	**ES**	**PAL**
Volatile Organic Compounds		**Analytical Results (µg/L)**					**(µg/L)**	
1,1,1,2-Tetrachloroethane	630-20-6	<0.40	<0.40	<0.40	<0.40	<0.40	70	7
1,1,1-Trichloroethane	71-55-6	<0.29	<0.29	<0.29	<0.29	<0.29	200	40
1,1,2,2-Tetrachloroethane	79-34-5	<0.30	<0.30	<0.30	<0.30	<0.30	0.2	0.02
1,1,2-Trichloroethane	79-00-5	<0.30	<0.30	<0.30	<0.30	**1.1**	5	0.5
1,1-Dichloroethane	75-34-3	<0.30	<0.30	<0.30	<0.30	<0.30	850	85
1,1-Dichloroethene	75-35-4	<0.40	<0.40	<0.40	<0.40	<0.40	7	0.7
1,1-Dichloropropene	563-58-6	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
1,2,3-Trichlorobenzene	87-61-6	<0.23	<0.23	<0.23	<0.23	<0.23	ns	ns
1,2,3-Trichloropropane	96-18-4	<0.30	<0.30	<0.30	<0.30	<0.30	60	12
1,2,4-Trichlorobenzene	120-82-1	<0.28	<0.28	<0.28	<0.28	<0.28	70	14
1,2,4-Trimethylbenzene	95-63-6	<0.29	**0.73**	**130**	**130**	<0.29 M	480	96
1,2-Dibromo-3-chloropropane	96-12-8	<0.25	<0.25	<0.25	<0.25	<0.25	0.2	0.02
1,2-Dibromoethane	106-93-4	<0.30	<0.30	<0.30	<0.30	<0.30	0.05	0.005
1,2-Dichlorobenzene	95-50-1	<0.30	<0.30	<0.30	<0.30	<0.30	600	60
1,2-Dichloroethane	107-06-2	<0.24	<0.24	**7.3**	**7.2**	<0.24	5	0.5
1,2-Dichloropropane	78-87-5	<0.18	<0.18	**2.0**	**1.9**	**1.4**	5	0.5
1,3,5-Trimethylbenzene	108-67-8	<0.27	<0.27	<0.27	<0.27	<0.27 M	480	96
1,3-Dichlorobenzene	541-73-1	<0.26	<0.26	<0.26	<0.26	<0.26	600	120
1,3-Dichloropropane	142-28-9	<0.17	<0.17	<0.17	<0.17	<0.17	ns	ns
1,4-Dichlorobenzene	106-46-7	<0.30	<0.30	<0.30	<0.30	<0.30	75	15
2,2-Dichloropropane	594-20-7	<0.30	<0.30	<0.30	<0.30	**1.8**	ns	ns
2-Butanone	78-93-3	<2.6	<2.6	<2.6	<2.6	<2.6	4,000	800
2-Chlorotoluene	95-49-8	<0.25	<0.25	<0.25	<0.25	**52 M**	ns	ns
2-Hexanone	591-78-6	<3.0	<3.0	<3.0	<3.0	<3.0	ns	ns
4-Chlorotoluene	106-43-4	<0.30	<0.30	<0.30	<0.30	<0.30 M	ns	ns
4-Methyl-2-pentanone	108-10-1	<2.2	<2.2	<2.2	<2.2	<2.2	500	50
Acetone	67-64-1	<4.0	<4.0	**19**	**17**	**4.2**	9,000	1,800
Benzene	71-43-2	<0.40	<0.40	**220**	**210**	**0.58**	5	0.5
Bromobenzene	108-86-1	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Bromochloromethane	74-97-5	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
Bromodichloromethane	75-27-4	<0.29	**0.41**	**0.79**	**0.82**	**0.56**	0.5	0.06
Bromoform	75-25-2	<0.40	<0.40	<0.40	<0.40	<0.40	4.4	0.44
Bromomethane	74-83-9	<0.90	<0.90	<0.90	<0.90	<0.90	10	1
Carbon disulfide	75-15-0	<0.60	<0.60	<0.60	<0.60	<0.60	1,000	200
Carbon tetrachloride	56-23-5	<0.30	<0.30	<0.30	<0.30	<0.30	5	0.5
Chlorobenzene	108-90-7	<0.30	<0.30	<0.30	<0.30	<0.30	ns	ns
Chloroethane	75-00-3	<0.50	<0.50	<0.50	<0.50	<0.50	400	80
Chloroform	67-66-3	<0.30	<0.30	<0.30	<0.30	<0.30	6	0.6
Chloromethane	74-87-3	<0.60	<0.60	<0.60	<0.60	<0.60	30	3
cis-1,2-Dichloroethene	156-59-2	<0.30	<0.30	<0.30	<0.30	<0.30	70	7
cis-1,3-Dichloropropene	10061-01-5	<0.16	<0.16	<0.16	<0.16	<0.16	0.4	0.04
Dibromochloromethane	124-48-1	<0.30	<0.30	<0.30	<0.30	<0.30	60	6
Dibromomethane	74-95-3	<0.22	<0.22	<0.22	<0.22	<0.22	ns	ns
Dichlorodifluoromethane	75-71-8	<0.40	<0.40	<0.40	<0.40	<0.40	1,000	200
Diisopropyl ether	108-20-3	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Ethylbenzene	100-41-4	<0.30	<0.30	**1.4**	**1.3**	<0.30	700	140
Hexachlorobutadiene	87-68-3	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Isopropylbenzene	98-82-8	<0.30	<0.30	**19**	**19**	**25**	ns	ns
m & p-Xylene	179601-23-1	<0.70	<0.70	**27**	**29**	<0.70	2000	400
Methyl tert-butyl ether	1634-04-4	<0.30	<0.30	<0.30	<0.30	<0.30	60	12
Methylene chloride	75-09-2	<0.40	<0.40	<0.40	<0.40	<0.40	5	0.5
Naphthalene	91-20-3	<0.30	<0.30	**47**	**52**	**52**	100	10
n-Butylbenzene	104-51-8	<0.29	<0.29	**16**	**16**	**4.3 M**	ns	ns
n-Propylbenzene	103-65-1	<0.30	<0.30	**35**	**36**	**29**	ns	ns
o-Xylene	95-47-6	<0.26	<0.26	<0.26	<0.26	<0.26	2000	400
p-Isopropyltoluene	99-87-6	<0.30	<0.30	**13**	**13**	<0.30 M	ns	ns
sec-Butylbenzene	135-98-8	<0.40	**2.3**	**19**	**19**	**8.5 M**	ns	ns
Styrene	100-42-5	<0.29	<0.29	<0.29	<0.29	<0.29	100	10
tert-Butylbenzene	98-06-6	<0.40	**0.46**	**1.6**	**1.6**	**1.2 M**	ns	ns
Tetrachloroethene	127-18-4	<0.27	<0.27	<0.27	<0.27	<0.27	5	0.5
Tetrahydrofuran	109-99-9	<3.0	<3.0	<3.0	<3.0	<3.0	50	10
Toluene	108-88-3	<0.21	<0.21	<0.21	<0.21	<0.21	800	160
trans-1,2-Dichloroethene	156-60-5	<0.30	<0.30	<0.30	<0.30	<0.30	100	20
trans-1,3-Dichloropropene	10061-02-6	<0.23	<0.23	<0.23	<0.23	<0.23	0.4	0.04
Trichloroethene	79-01-6	<0.30	<0.30	<0.30	<0.30	<0.30	5	0.5
Trichlorofluoromethane	75-69-4	<0.40	<0.40	<0.40	<0.40	<0.40	ns	ns
Vinyl acetate	108-05-4	<5.0	<5.0	<5.0	<5.0	<5.0	ns	ns
Vinyl chloride	75-01-4	<0.14	<0.14	<0.14	<0.14	<0.14 M	0.2	0.002

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES)
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Concentrations reported as micrograms per liter
--	Not analyzed
ns	No standard established
	USEPA = United States Environmental Protection Agency

F-35 Alter B400AMXS - Building; Project Location 02
Summary of Groundwater Analytical Results - Volatile Organic Compounds (VOC)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/08/20

			Groundwater Standards NR 140 Wis. Adm. Code	
Well Number		**02-AA-MW-5**		
Sampling Date	**CAS #**	10/8/2020	**ES**	**PAL**
Volatile Organic Compounds			**(µg/L)**	
1,1,1,2-Tetrachloroethane	630-20-6	<0.40	70	7
1,1,1-Trichloroethane	71-55-6	<0.29	200	40
1,1,2,2-Tetrachloroethane	79-34-5	<0.30	0.2	0.02
1,1,2-Trichloroethane	79-00-5	<0.30	5	0.5
1,1-Dichloroethane	75-34-3	<0.30	850	85
1,1-Dichloroethene	75-35-4	<0.40	7	0.7
1,1-Dichloropropene	563-58-6	<0.30	ns	ns
1,2,3-Trichlorobenzene	87-61-6	<0.23	ns	ns
1,2,3-Trichloropropane	96-18-4	<0.30	60	12
1,2,4-Trichlorobenzene	120-82-1	<0.28	70	14
1,2,4-Trimethylbenzene	95-63-6	<0.29	480	96
1,2-Dibromo-3-chloropropane	96-12-8	<0.25	0.2	0.02
1,2-Dibromoethane	106-93-4	<0.30	0.05	0.005
1,2-Dichlorobenzene	95-50-1	<0.30	600	60
1,2-Dichloroethane	107-06-2	<0.24	5	0.5
1,2-Dichloropropane	78-87-5	<0.18	5	0.5
1,3,5-Trimethylbenzene	108-67-8	<0.27	480	96
1,3-Dichlorobenzene	541-73-1	<0.26	600	120
1,3-Dichloropropane	142-28-9	<0.17	ns	ns
1,4-Dichlorobenzene	106-46-7	<0.30	75	15
2,2-Dichloropropane	594-20-7	<0.30	ns	ns
2-Butanone	78-93-3	<2.6	4,000	800
2-Chlorotoluene	95-49-8	<0.25	ns	ns
2-Hexanone	591-78-6	<3.0	ns	ns
4-Chlorotoluene	106-43-4	<0.30	ns	ns
4-Methyl-2-pentanone	108-10-1	<2.2	500	50
Acetone	67-64-1	<4.0	9,000	1,800
Benzene	71-43-2	<0.40	5	0.5
Bromobenzene	108-86-1	<0.40	ns	ns
Bromochloromethane	74-97-5	<0.30	ns	ns
Bromodichloromethane	75-27-4	<0.29	0.5	0.06
Bromoform	75-25-2	<0.40	4.4	0.44
Bromomethane	74-83-9	<0.90	10	1
Carbon disulfide	75-15-0	<0.60	1,000	200
Carbon tetrachloride	56-23-5	<0.30	5	0.5
Chlorobenzene	108-90-7	<0.30	ns	ns
Chloroethane	75-00-3	<0.50	400	80
Chloroform	67-66-3	<0.30	6	0.6
Chloromethane	74-87-3	<0.60	30	3
cis-1,2-Dichloroethene	156-59-2	<0.30	70	7
cis-1,3-Dichloropropene	10061-01-5	<0.16	0.4	0.04
Dibromochloromethane	124-48-1	<0.30	60	6
Dibromomethane	74-95-3	<0.22	ns	ns
Dichlorodifluoromethane	75-71-8	<0.40	1,000	200
Diisopropyl ether	108-20-3	<0.40	ns	ns
Ethylbenzene	100-41-4	<0.30	700	140
Hexachlorobutadiene	87-68-3	<0.40	ns	ns
Isopropylbenzene	98-82-8	<0.30	ns	ns
m & p-Xylene	179601-23-1	<0.70	2000	400
Methyl tert-butyl ether	1634-04-4	<0.30	60	12
Methylene chloride	75-09-2	<0.40	5	0.5
Naphthalene	91-20-3	<0.30	100	10
n-Butylbenzene	104-51-8	<0.29	ns	ns
n-Propylbenzene	103-65-1	<0.30	ns	ns
o-Xylene	95-47-6	<0.26	2000	400
p-Isopropyltoluene	99-87-6	<0.30	ns	ns
sec-Butylbenzene	135-98-8	<0.40	ns	ns
Styrene	100-42-5	<0.29	100	10
tert-Butylbenzene	98-06-6	<0.40	ns	ns
Tetrachloroethene	127-18-4	<0.27	5	0.5
Tetrahydrofuran	109-99-9	<3.0	50	10
Toluene	108-88-3	<0.21	800	160
trans-1,2-Dichloroethene	156-60-5	<0.30	100	20
trans-1,3-Dichloropropene	10061-02-6	<0.23	0.4	0.04
Trichloroethene	79-01-6	<0.30	5	0.5
Trichlorofluoromethane	75-69-4	<0.40	ns	ns
Vinyl acetate	108-05-4	<5.0	ns	ns
Vinyl chloride	75-01-4	<0.14	0.2	0.002

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES)
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Concentrations reported as micrograms per liter
--	Not analyzed
ns	No standard established
	USEPA = United States Environmental Protection Agency

Alert GOV Parking Shelters; Project Location 03
Summary of Groundwater Analytical Results - Volatile Organic Compounds (VOC)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/08/20

					Groundwater Standards	
Well Number		**03-AA-MW-6**	**03-AA-MW-7**	**03-AA-MW-8**	**NR 140 Wis. Adm. Code**	
Sampling Date	**CAS #**	10/8/2020	10/8/2020	10/8/2020	**ES**	**PAL**
Volatile Organic Compounds		**Analytical Results (µg/L)**			**(µg/L)**	
1,1,1,2-Tetrachloroethane	630-20-6	<0.40	<0.40	<0.40	70	7
1,1,1-Trichloroethane	71-55-6	<0.29	<0.29	<0.29	200	40
1,1,2,2-Tetrachloroethane	79-34-5	<0.30	<0.30	<0.30	0.2	0.02
1,1,2-Trichloroethane	79-00-5	<0.30	<0.30	<0.30	5	0.5
1,1-Dichloroethane	75-34-3	<0.30	<0.30	<0.30	850	85
1,1-Dichloroethene	75-35-4	<0.40	<0.40	<0.40	7	0.7
1,1-Dichloropropene	563-58-6	<0.30	<0.30	<0.30	ns	ns
1,2,3-Trichlorobenzene	87-61-6	<0.23	<0.23	<0.23	ns	ns
1,2,3-Trichloropropane	96-18-4	<0.30	<0.30	<0.30	60	12
1,2,4-Trichlorobenzene	120-82-1	<0.28	<0.28	<0.28	70	14
1,2,4-Trimethylbenzene	95-63-6	<0.29	<0.29	<0.29	480	96
1,2-Dibromo-3-chloropropane	96-12-8	<0.25	<0.25	<0.25	0.2	0.02
1,2-Dibromoethane	106-93-4	<0.30	<0.30	<0.30	0.05	0.005
1,2-Dichlorobenzene	95-50-1	<0.30	<0.30	<0.30	600	60
1,2-Dichloroethane	107-06-2	<0.24	<0.24	<0.24	5	0.5
1,2-Dichloropropane	78-87-5	<0.18	<0.18	<0.18	5	0.5
1,3,5-Trimethylbenzene	108-67-8	<0.27	<0.27	<0.27	480	96
1,3-Dichlorobenzene	541-73-1	<0.26	<0.26	<0.26	600	120
1,3-Dichloropropane	142-28-9	<0.17	<0.17	<0.17	ns	ns
1,4-Dichlorobenzene	106-46-7	<0.30	<0.30	<0.30	75	15
2,2-Dichloropropane	594-20-7	<0.30	<0.30	<0.30	ns	ns
2-Butanone	78-93-3	<2.6	<2.6	<2.6	4,000	800
2-Chlorotoluene	95-49-8	<0.25	<0.25	<0.25	ns	ns
2-Hexanone	591-78-6	<3.0	<3.0	<3.0	ns	ns
4-Chlorotoluene	106-43-4	<0.30	<0.30	<0.30	ns	ns
4-Methyl-2-pentanone	108-10-1	<2.2	<2.2	<2.2	500	50
Acetone	67-64-1	**4.2**	<4.0	<4.0	9,000	1,800
Benzene	71-43-2	<0.40	<0.40	<0.40	5	0.5
Bromobenzene	108-86-1	<0.40	<0.40	<0.40	ns	ns
Bromochloromethane	74-97-5	<0.30	<0.30	<0.30	ns	ns
Bromodichloromethane	75-27-4	<0.29	<0.29	<0.29	0.5	0.06
Bromoform	75-25-2	<0.40	<0.40	<0.40	4.4	0.44
Bromomethane	74-83-9	<0.90	<0.90	<0.90	10	1
Carbon disulfide	75-15-0	**0.81**	<0.60	<0.60	1,000	200
Carbon tetrachloride	56-23-5	<0.30	<0.30	<0.30	5	0.5
Chlorobenzene	108-90-7	<0.30	<0.30	<0.30	ns	ns
Chloroethane	75-00-3	<0.50	<0.50	<0.50	400	80
Chloroform	67-66-3	<0.30	<0.30	<0.30	6	0.6
Chloromethane	74-87-3	<0.60	<0.60	<0.60	30	3
cis-1,2-Dichloroethene	156-59-2	**0.36**	<0.30	<0.30	70	7
cis-1,3-Dichloropropene	10061-01-5	<0.16	<0.16	<0.16	0.4	0.04
Dibromochloromethane	124-48-1	<0.30	<0.30	<0.30	60	6
Dibromomethane	74-95-3	<0.22	<0.22	<0.22	ns	ns
Dichlorodifluoromethane	75-71-8	<0.40	<0.40	<0.40	1,000	200
Diisopropyl ether	108-20-3	<0.40	<0.40	<0.40	ns	ns
Ethylbenzene	100-41-4	<0.30	<0.30	<0.30	700	140
Hexachlorobutadiene	87-68-3	<0.40	<0.40	<0.40	ns	ns
Isopropylbenzene	98-82-8	<0.30	<0.30	<0.30	ns	ns
m & p-Xylene	179601-23-1	<0.70	<0.70	<0.70	2000	400
Methyl tert-butyl ether	1634-04-4	<0.30	<0.30	<0.30	60	12
Methylene chloride	75-09-2	<0.40	<0.40	<0.40	5	0.5
Naphthalene	91-20-3	<0.30	<0.30	<0.30	100	10
n-Butylbenzene	104-51-8	<0.29	<0.29	<0.29	ns	ns
n-Propylbenzene	103-65-1	<0.30	<0.30	<0.30	ns	ns
o-Xylene	95-47-6	<0.26	<0.26	<0.26	2000	400
p-Isopropyltoluene	99-87-6	<0.30	<0.30	<0.30	ns	ns
sec-Butylbenzene	135-98-8	<0.40	<0.40	<0.40	ns	ns
Styrene	100-42-5	<0.29	<0.29	<0.29	100	10
tert-Butylbenzene	98-06-6	<0.40	<0.40	<0.40	ns	ns
Tetrachloroethene	127-18-4	<0.27	<0.27	<0.27	5	0.5
Tetrahydrofuran	109-99-9	<3.0	<3.0	<3.0	50	10
Toluene	108-88-3	<0.21	<0.21	<0.21	800	160
trans-1,2-Dichloroethene	156-60-5	<0.30	<0.30	<0.30	100	20
trans-1,3-Dichloropropene	10061-02-6	<0.23	<0.23	<0.23	0.4	0.04
Trichloroethene	79-01-6	<0.30	<0.30	<0.30	5	0.5
Trichlorofluoromethane	75-69-4	<0.40	<0.40	<0.40	ns	ns
Vinyl acetate	108-05-4	<5.0	<5.0	<5.0	ns	ns
Vinyl chloride	75-01-4	<0.14	<0.14	<0.14	0.2	0.002

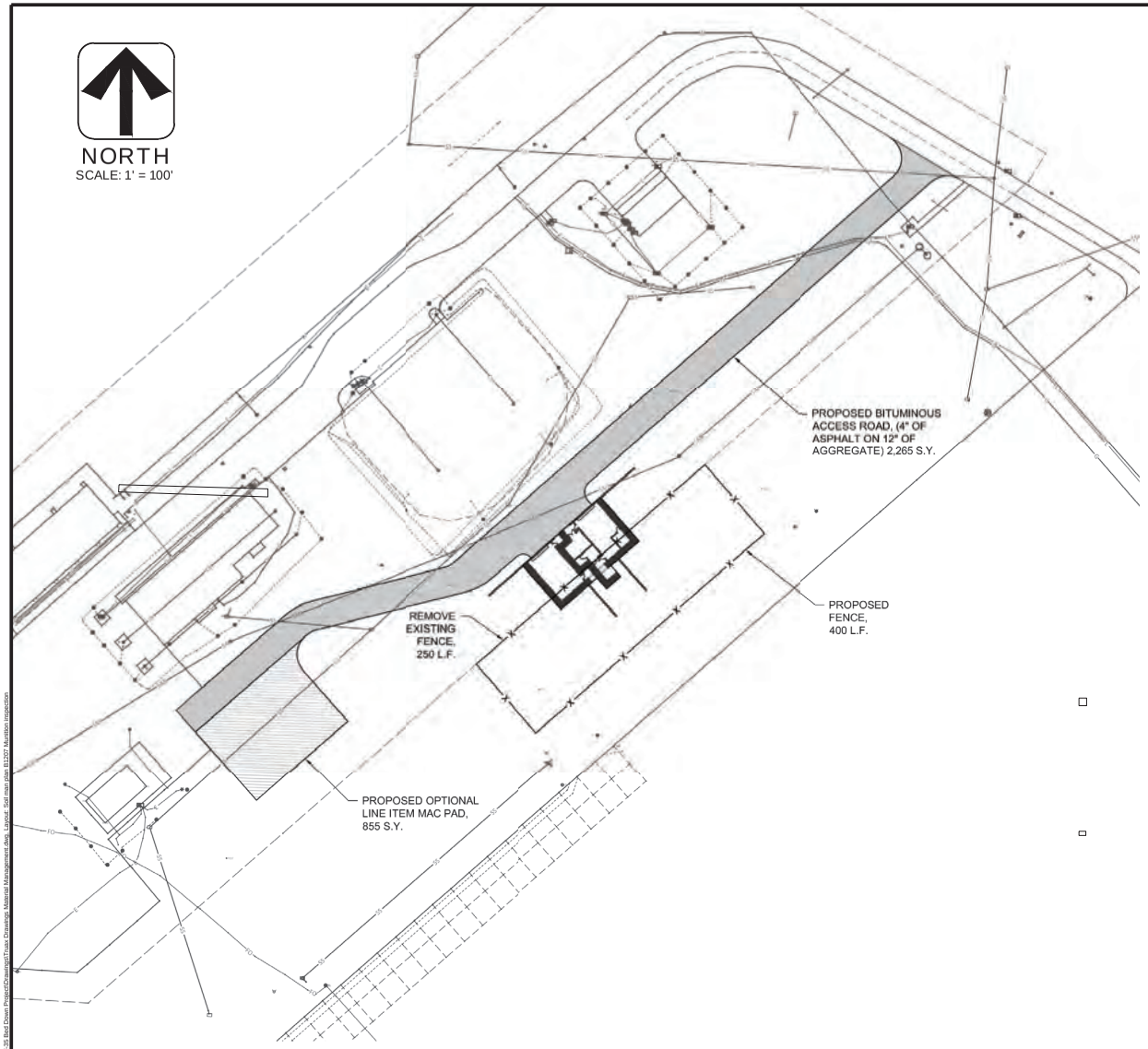
BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES)
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Concentrations reported as micrograms per liter
--	Not analyzed
ns	No standard established
	USEPA = United States Environmental Protection Agency

F-35 Repair B401 AGE Shop; Project Location 04
Summary of Groundwater Analytical Results - Volatile Organic Compounds (VOC)
Wisconsin Air National Guard - Truax Field - F35 Bed Down Project
10/08/20

			Trip	Groundwater Standards	
Well Number		**04-AA-MW-9**	**Blank**	**NR 140 Wis. Adm. Code**	
Sampling Date	**CAS #**	10/8/2020	10/8/2020	**ES**	**PAL**
Volatile Organic Compounds		**Analytical Results (µg/L)**		**(µg/L)**	
1,1,1,2-Tetrachloroethane	630-20-6	<0.40	<0.40	70	7
1,1,1-Trichloroethane	71-55-6	<0.29	<0.29	200	40
1,1,2,2-Tetrachloroethane	79-34-5	<0.30	<0.30	0.2	0.02
1,1,2-Trichloroethane	79-00-5	<0.30	<0.30	5	0.5
1,1-Dichloroethane	75-34-3	<0.30	<0.30	850	85
1,1-Dichloroethene	75-35-4	<0.40	<0.40	7	0.7
1,1-Dichloropropene	563-58-6	<0.30	<0.30	ns	ns
1,2,3-Trichlorobenzene	87-61-6	<0.23	<0.23	ns	ns
1,2,3-Trichloropropane	96-18-4	<0.30	<0.30	60	12
1,2,4-Trichlorobenzene	120-82-1	<0.28	<0.28	70	14
1,2,4-Trimethylbenzene	95-63-6	<0.29	<0.29	480	96
1,2-Dibromo-3-chloropropane	96-12-8	<0.25	<0.25	0.2	0.02
1,2-Dibromoethane	106-93-4	<0.30	<0.30	0.05	0.005
1,2-Dichlorobenzene	95-50-1	<0.30	<0.30	600	60
1,2-Dichloroethane	107-06-2	<0.24	<0.24	5	0.5
1,2-Dichloropropane	78-87-5	<0.18	<0.18	5	0.5
1,3,5-Trimethylbenzene	108-67-8	<0.27	<0.27	480	96
1,3-Dichlorobenzene	541-73-1	<0.26	<0.26	600	120
1,3-Dichloropropane	142-28-9	<0.17	<0.17	ns	ns
1,4-Dichlorobenzene	106-46-7	<0.30	<0.30	75	15
2,2-Dichloropropane	594-20-7	<0.30	<0.30	ns	ns
2-Butanone	78-93-3	<2.6	<2.6	4,000	800
2-Chlorotoluene	95-49-8	<0.25	<0.25	ns	ns
2-Hexanone	591-78-6	<3.0	<3.0	ns	ns
4-Chlorotoluene	106-43-4	<0.30	<0.30	ns	ns
4-Methyl-2-pentanone	108-10-1	<2.2	<2.2	500	50
Acetone	67-64-1	<4.0	<4.0	9,000	1,800
Benzene	71-43-2	<0.40	<0.40	5	0.5
Bromobenzene	108-86-1	<0.40	<0.40	ns	ns
Bromochloromethane	74-97-5	<0.30	<0.30	ns	ns
Bromodichloromethane	75-27-4	<0.29	<0.29	0.5	0.06
Bromoform	75-25-2	<0.40	<0.40	4.4	0.44
Bromomethane	74-83-9	<0.90	<0.90	10	1
Carbon disulfide	75-15-0	<0.60	<0.60	1,000	200
Carbon tetrachloride	56-23-5	<0.30	<0.30	5	0.5
Chlorobenzene	108-90-7	<0.30	<0.30	ns	ns
Chloroethane	75-00-3	<0.50	<0.50	400	80
Chloroform	67-66-3	<0.30	<0.30	6	0.6
Chloromethane	74-87-3	<0.60	<0.60	30	3
cis-1,2-Dichloroethene	156-59-2	<0.30	<0.30	70	7
cis-1,3-Dichloropropene	10061-01-5	<0.16	<0.16	0.4	0.04
Dibromochloromethane	124-48-1	<0.30	<0.30	60	6
Dibromomethane	74-95-3	<0.22	<0.22	ns	ns
Dichlorodifluoromethane	75-71-8	<0.40	<0.40	1,000	200
Diisopropyl ether	108-20-3	<0.40	<0.40	ns	ns
Ethylbenzene	100-41-4	<0.30	<0.30	700	140
Hexachlorobutadiene	87-68-3	<0.40	<0.40	ns	ns
Isopropylbenzene	98-82-8	<0.30	<0.30	ns	ns
m & p-Xylene	179601-23-1	<0.70	<0.70	2000	400
Methyl tert-butyl ether	1634-04-4	<0.30	<0.30	60	12
Methylene chloride	75-09-2	<0.40	**0.91**	5	0.5
Naphthalene	91-20-3	<0.30	<0.30	100	10
n-Butylbenzene	104-51-8	<0.29	<0.29	ns	ns
n-Propylbenzene	103-65-1	<0.30	<0.30	ns	ns
o-Xylene	95-47-6	<0.26	<0.26	2000	400
p-Isopropyltoluene	99-87-6	<0.30	<0.30	ns	ns
sec-Butylbenzene	135-98-8	<0.40	<0.40	ns	ns
Styrene	100-42-5	<0.29	<0.29	100	10
tert-Butylbenzene	98-06-6	<0.40	<0.40	ns	ns
Tetrachloroethene	127-18-4	<0.27	<0.27	5	0.5
Tetrahydrofuran	109-99-9	<3.0	<3.0	50	10
Toluene	108-88-3	<0.21	<0.21	800	160
trans-1,2-Dichloroethene	156-60-5	<0.30	<0.30	100	20
trans-1,3-Dichloropropene	10061-02-6	<0.23	<0.23	0.4	0.04
Trichloroethene	79-01-6	<0.30	<0.30	5	0.5
Trichlorofluoromethane	75-69-4	<0.40	<0.40	ns	ns
Vinyl acetate	108-05-4	<5.0	<5.0	ns	ns
Vinyl chloride	75-01-4	<0.14	<0.14	0.2	0.002

BOLD	Exceeds NR 140 Wisconsin Administration Code Enforcement Standard (ES)
BOLD	Exceeds NR 140 Wisconsin Administration Code Preventative Action Limit (PAL)
BOLD	Parameter detected above laboratory method detection limit.
µg/L	Concentrations reported as micrograms per liter
--	Not analyzed
ns	No standard established

Appendix C
Excavation and Fill Area Figures by Site

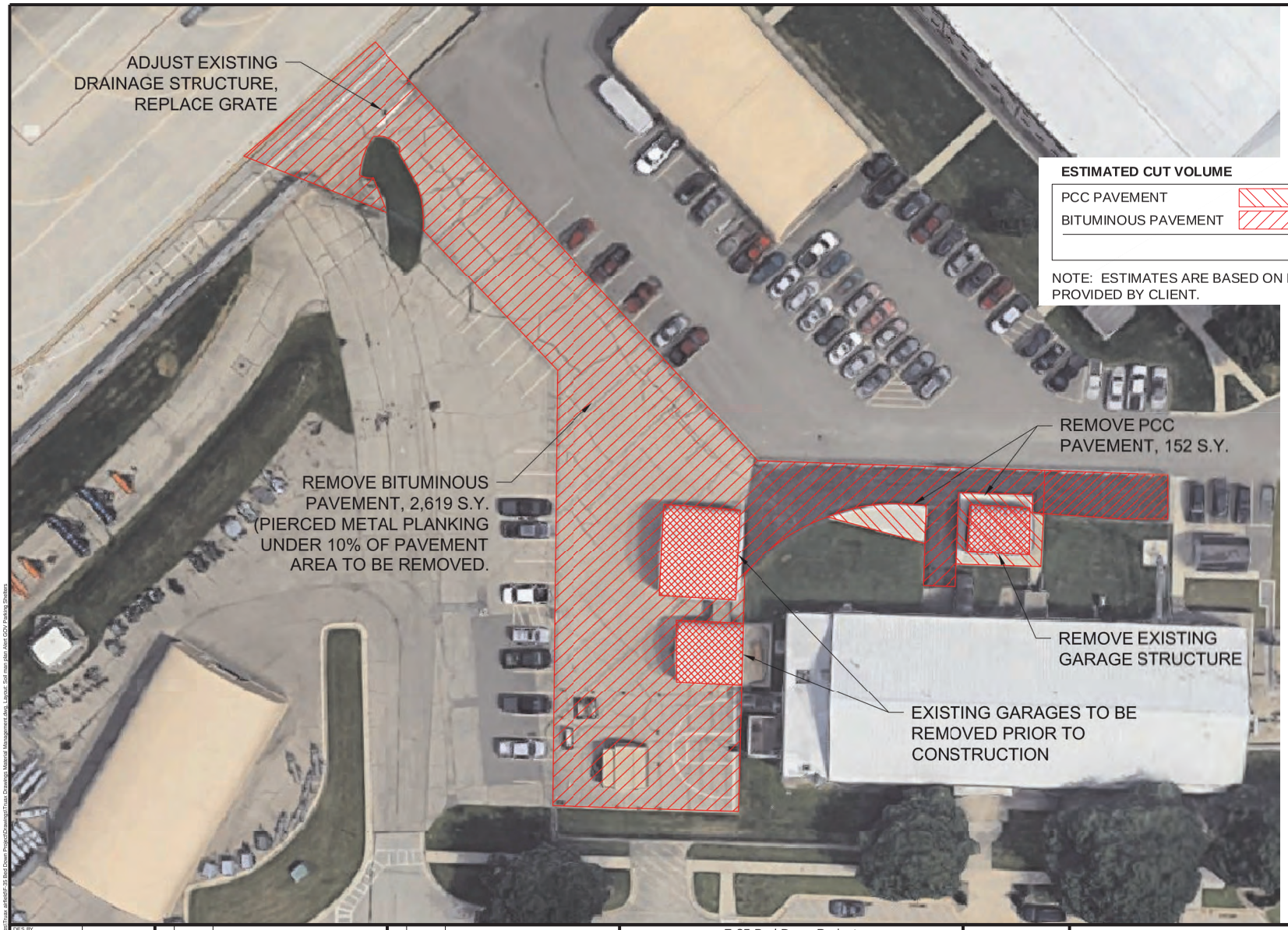


ESTIMATED CUT VOLUME

OPTIONAL PAD		855 sy x 0.5 yd = 428 cy
BITUMINOUS ROAD		2,265 sy x 0.44 yd = 1,007 cy
		TOTAL = 1,435 cy

NOTE: ESTIMATES ARE BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY CLIENT.

DES BY J. STEINER								F-35 Bed Down Project Wisconsin Air National Guard - Truax Field Madison, Wisconsin	AYRES Eau Claire, WI 54701 715.834.3161	EXCAVATION AND FILL AREAS 01: XGFG182017 F-35 Munitions Maintenance & Inspection Facility	SHEET NO. 1
DR BY T. SHUPERT	PROJ NO										
CHK BY J. STEINER	DATE MAY 2021	NO	DATE	REVISION	NO	DATE	REVISION				



NORTH

ESTIMATED CUT VOLUME

PCC PAVEMENT		0.44 yd x 152 syd = 78 cy
BITUMINOUS PAVEMENT		0.44 yd x 2,619 sy = 1164 cy
		TOTAL = 1,232 cy

NOTE: ESTIMATES ARE BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY CLIENT.

DES BY J. STEINER
DR BY T. SHUPERT
CHK BY J. STEINER
PROJ NO
DATE MAY 2021

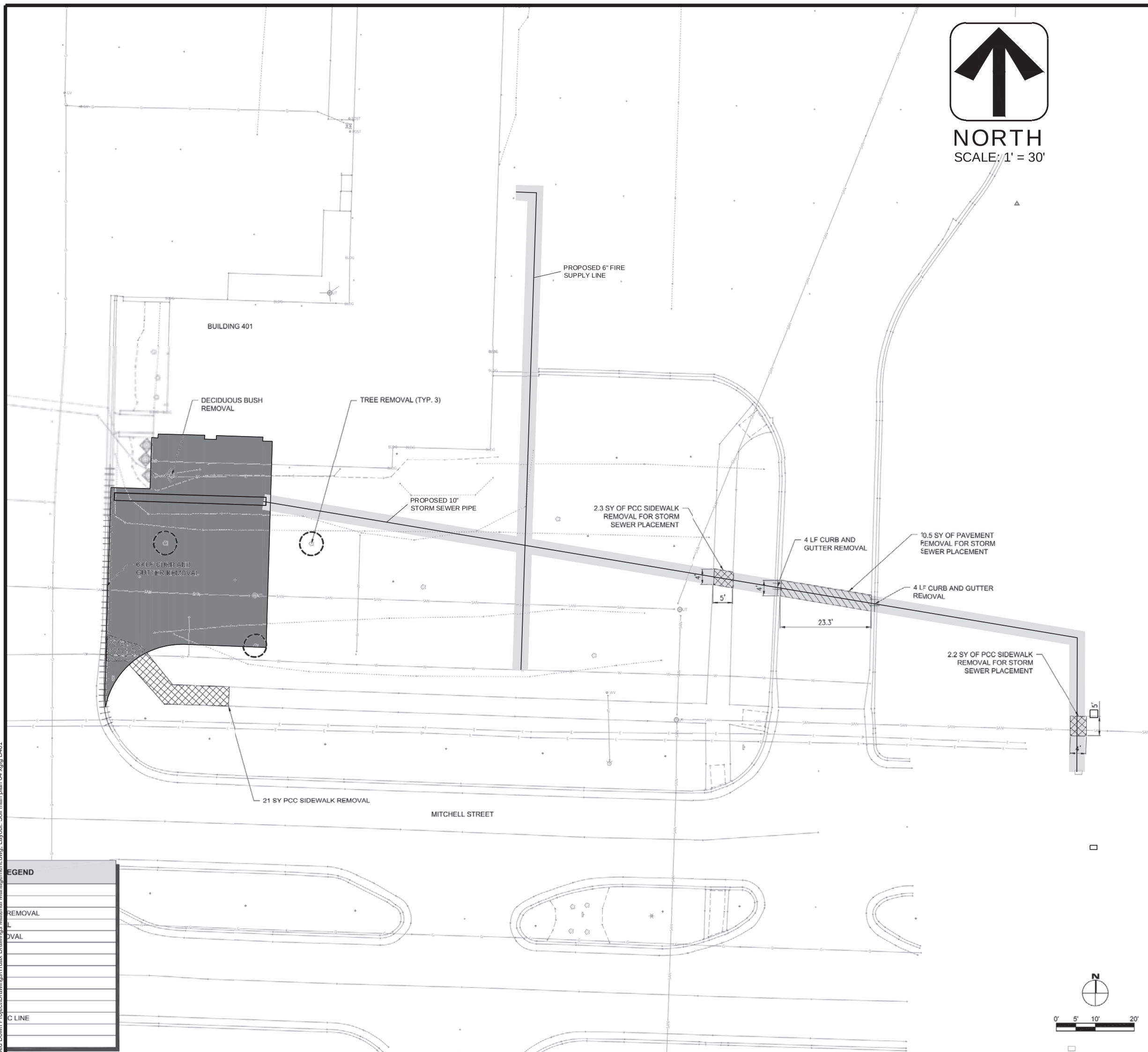
NO	DATE	REVISION

F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

EXCAVATION AND FILL AREAS
03: XGFG182006 Alert GOV Parking Shelters

SHEET NO. 1



ESTIMATED CUT VOLUME

SIDEWALK REMOVAL	137 sf x 1ft/ 27 cf/cy = 5 cy
SOIL REMOVAL	2169 sf x 1.5 ft/ 27 cf/cy = 121 cy
CURB & GUTTER	2 ft x 1.5 ft x 77 ft/ 27 cf/cy = 9 cy
PIPE PLACEMENT	4 ft x 5 ft x 375 ft/ 27 cf/cy = 278 cy
	TOTAL = 413 cy

NOTE: ESTIMATES ARE BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY CLIENT.

DES BY J. STEINER		NO	DATE	REVISION	
DR BY T. SHUPERT	PROJ NO	NO	DATE	REVISION	
CHK BY J. STEINER	DATE MAY 2021				

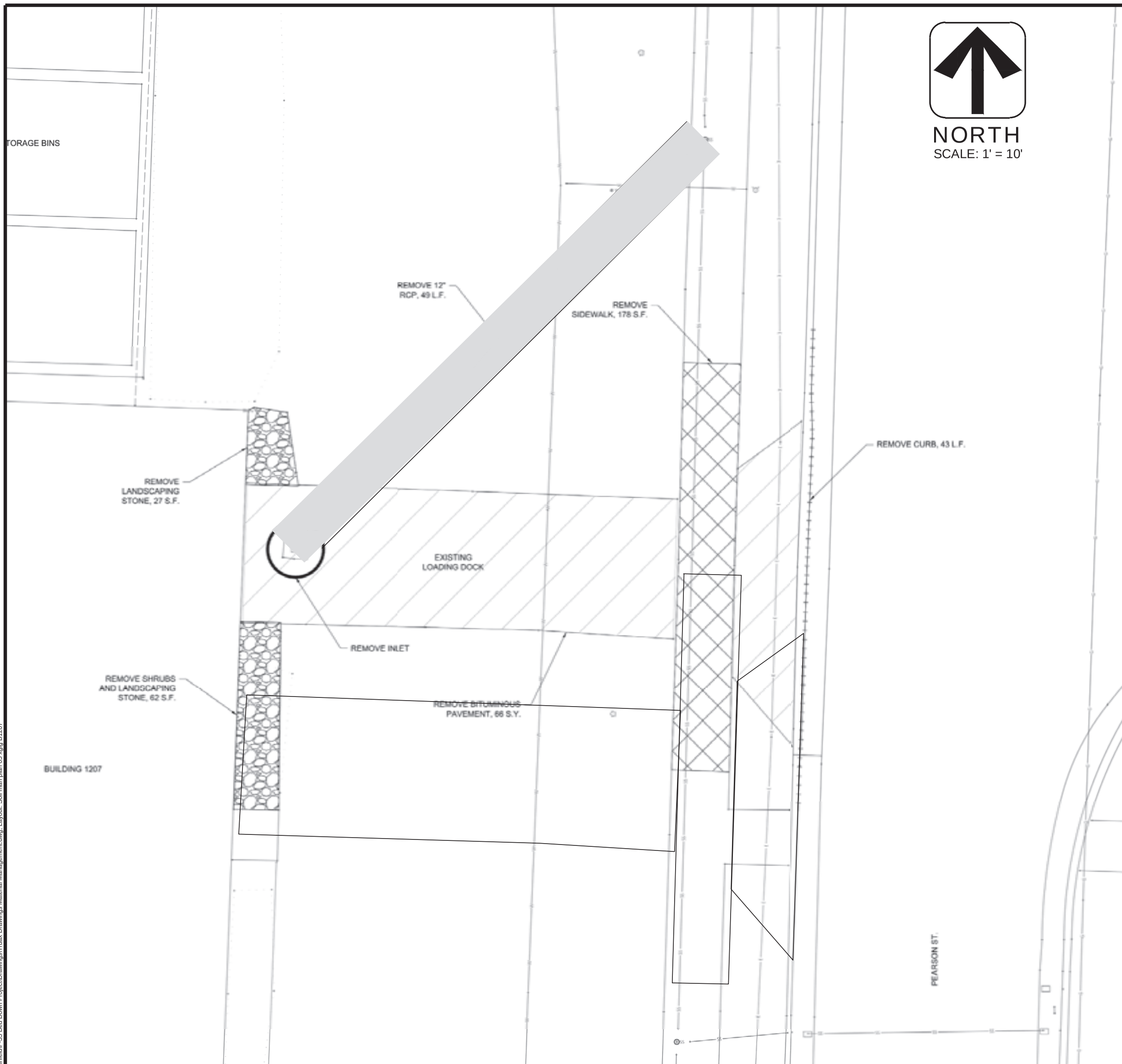
F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

EXCAVATION AND FILL AREAS
04: XGFG192002 F-35 REPAIR B401 AGE SHOP

SHEET NO. 1

I:\51\CAD\Env. sites\Truax airfield\F-35 Bed Down Project\Drawings\Truax Drawings Material Management.dwg, Layout: Soil man plan 04 xgfg B401
5/10/2021
AA-Standard.stb



ESTIMATED CUT VOLUME

LOADING DOCK CONC.	600 sf x 1.67 ft/ 27 cf/cy = 37 cy
SIDEWALK CONC.	180 sf x 1.67 ft/ 27 cf/cy = 11 cy
LANDSCAPING	89 sf x 1.5 ft/ 27 cf/cy = 5 cy
CURB & GUTTER	2 ft x 1.5 ft x 42 ft/ 27 cf/cy = 5 cy
PIPE REMOVAL	4 ft x 4 ft x 49 ft/ 27 cf/cy = 29 cy
	TOTAL = 87 cy

NOTE: ESTIMATES ARE BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY CLIENT.

DES BY J. STEINER		NO	DATE	REVISION	NO	DATE	REVISION
DR BY T. SHUPERT	PROJ NO						
CHK BY J. STEINER	DATE MAY 2021						

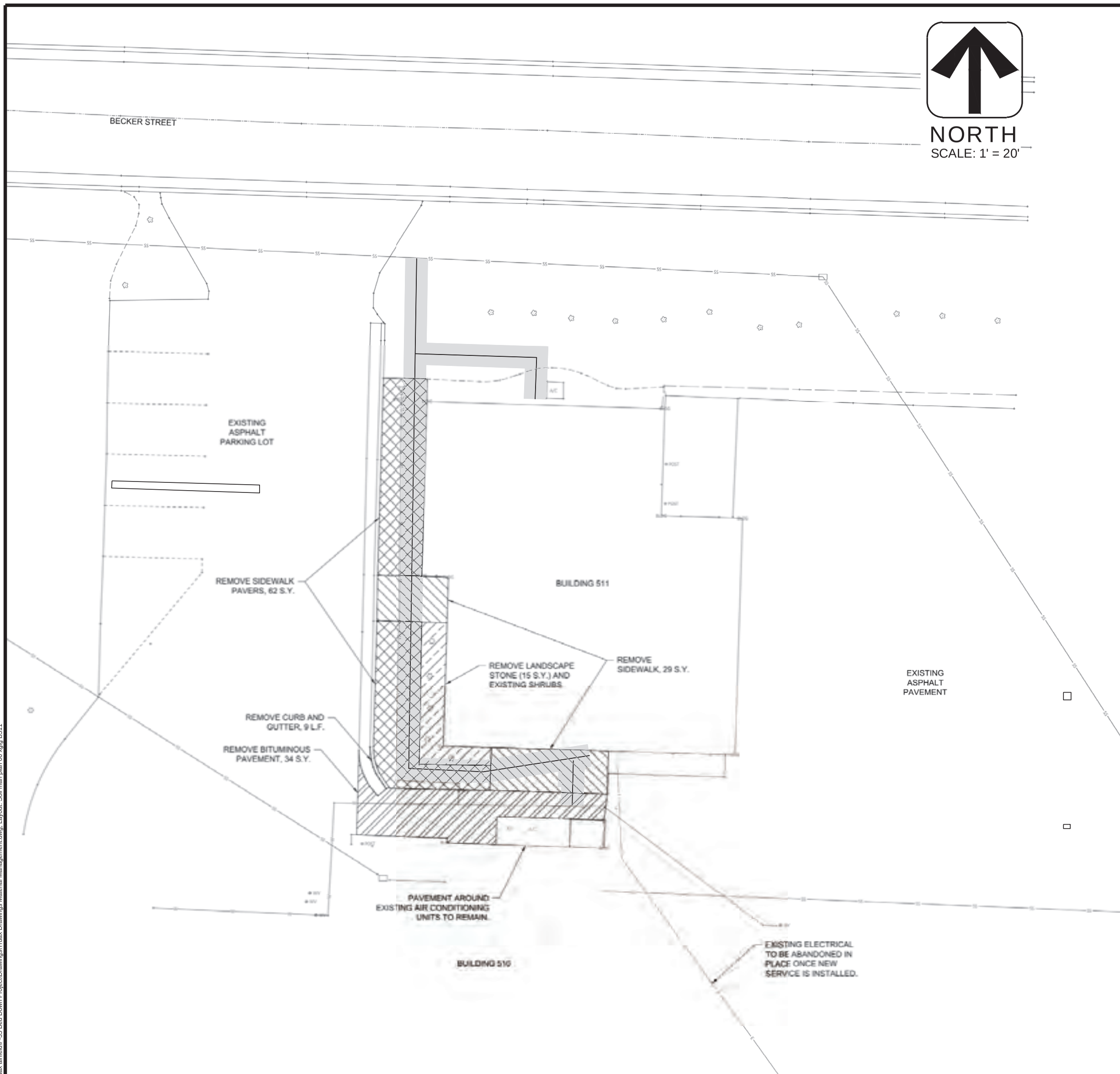
F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

EXCAVATION AND FILL AREAS
05: XGFG182018 F-35: REPAIR B 1207

SHEET NO. 1

AA-Standard.stb
5/10/2021
I:\51\CAD\Env. sites\Truax airfield\F-35 Bed Down Project\Drawings\Truax Drawings Material Management.dwg, Layout: Soil man plan 05 xgfg B1207



ESTIMATED CUT VOLUME

BITUMINOUS REMOVAL	34 sy x 0.33 yd = 11 cy
LANDSCAPE REMOVAL	15 sy x 0.33 yd = 5 cy
PAVERS REMOVAL	62 sy x 0.33 yd = 20 cy
SIDEWALK REMOVAL	29 sy x 0.33 yd = 9.5 cy
PIPE PLACEMENT	521 sf x 4 ft/ 27 cf/cy = 77 cy
	TOTAL = 122.5 cy

NOTE: ESTIMATES ARE BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY CLIENT.

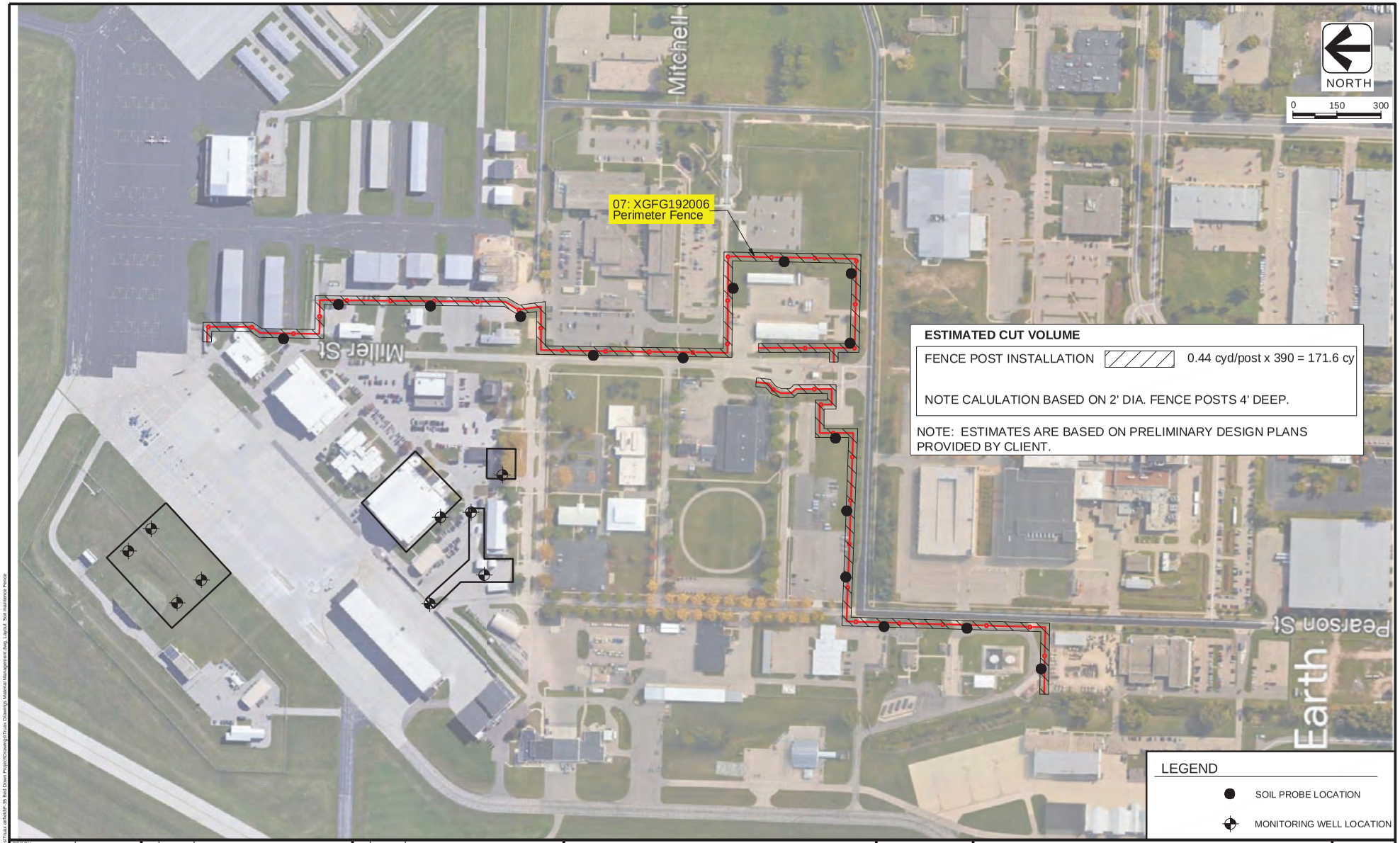
DES BY J. STEINER		NO	DATE	REVISION	
DR BY T. SHUPERT	PROJ NO	NO	DATE	REVISION	
CHK BY J. STEINER	DATE MAY 2021				

F-35 Bed Down Project
Wisconsin Air National Guard - Truax Field
Madison, Wisconsin

AYRES
Eau Claire, WI 54701
715.834.3161

EXCAVATION AND FILL AREAS
06: XGFG192005 F-35 B511 HAZMART

SHEET NO. 1



DES BY J. STEINER								F-35 Bed Down Project Wisconsin Air National Guard - Truax Field Madison, Wisconsin	AYRES Eau Claire, WI 54701 715.834.3161	EXCAVATION AND FILL AREAS 07: XGFG192006 Perimeter Fence	SHEET NO. 1
DR BY T. SHUPERT	PROJ NO										
CHK BY J. STEINER	DATE MAY 2021	NO	DATE	REVISION	NO	DATE	REVISION				

AA-Standard.stb
5/10/2021
I:\EAU CLAIRE\Projects\Truax airfield\F-35 Bed Down Project\Drawings\Truax Drawings Material Management.dwg, Layout: Soil resistance Fence

TAB G

GEOTECHNICAL REPORT

GEOTECHNICAL ENGINEERING REPORT

Air National Guard
B400 Hangar Slab on Grade Replacement
XGFG182009
Truax Field
Madison, Wisconsin

GESTRA Project No.: M20068-10
November 30, 2020

Prepared For:
Hanson Professional Services, Inc.
13801 Riverport Drive, Suite 100
Maryland Heights, MO 63043

GESTRA

Geotechnical Engineering Report

Air National Guard
B400 Hangar Slab on Grade Replacement
XGFG182009
Truax Field
Madison, Wisconsin

GESTRA Project No. M20068-10
November 30, 2020

Prepared For:

Hanson Professional Services, Inc.
277 W. Nationwide Blvd.
Columbus, OH 43215

Prepared By:

GESTRA Engineering, Inc.
2223 Industrial Drive
Monona, WI 53713
(608) 222-9406

Table of Contents

Geotechnical Engineering Report
Air National Guard
B400 Hangar Slab on Grade Replacement
XGFG182009
Truax Field
Madison, Wisconsin

1.0 INTRODUCTION

GESTRA Engineering, Inc. (GESTRA) was authorized by Hanson Professional Services, Inc. (Hanson) to complete a subsurface exploration and geotechnical engineering report for the Air National Guard (ANG) B400 Hangar Slab on Grade Replacement project located at Truax Field in Madison, Wisconsin. This report presents the results from the subsurface soil exploration and describes the field exploration, laboratory test results, and provides recommendations pertaining to the design and reconstruction of the slab on grade for the B400 Hangar Facility building.

The engineering recommendations and analysis contained within this report are based on the following project information which is a projection of GESTRA's understanding of the project. If for any reason the actual project information differs from what is reported below, GESTRA should be contacted so that we can review our recommendations in light of any new information.

1.1 PROJECT INFORMATION

The project will consist of the removal and replacement of the existing slab on grade for the B400 Hangar Facility building. It is our understanding that the existing slab for the Hangar Facility is being replaced, due to an anticipated increase in traffic volume from F-35 aircrafts.

The current slab is reported to consist of 7 inches of concrete overlying 8 inches of gravel per our discussion with Hanson. Based on discussion with Hanson the existing concrete and about 3 inches of the base course material will be removed and replaced with 10 inches of concrete. The remaining base course material will be re-used or replaced, where needed.

2.0 SCOPE OF WORK

GESTRA has performed the following services for the project:

- Contacted Diggers Hotline to locate public utilities at the site.
- Staked borehole location in the field using tape and stake methods. Elevation and coordinates of the boring location was not obtained as the grade inside the building will not be changing.
- Completed one (1) standard penetration test (SPT) soil boring to a depth of 11 feet. At the completion of drilling, the borehole was abandoned per WDNR requirements, and surface patched using bag mixed concrete.
- Performed laboratory soil testing to assign classification and engineering properties to the soils encountered. Laboratory testing included hand penetrometer, moisture and organic content, Atterberg limits, grain size analysis, modified Proctor, California Bearing Ratio

(CBR) test, pH and Miller Box resistivity. GESTRA subcontracted Testing Engineers International, Inc. to perform laboratory sulfate testing.

- Prepared this geotechnical engineering report presenting the results of the field and laboratory testing as well as providing the following recommendations:
    a. Slab on Grade: floor slab recommendations, soil parameters for the pavement design consisting of an estimated CBR value for design of concrete pavement, and subgrade modulus of soil reaction value for design of rigid pavement.

3.0 EXPLORATION RESULTS

3.1 SITE CONDITIONS

The existing building where our boring was performed is approximately 200-foot wide by 200-foot long with a couple of additions on the southeast side of the building. Based on our discussion with Hanson, the existing slab inside of the building consist of 7 inches of concrete over 8 inches of aggregate base material. Historical aerial photos indicate that the site was undeveloped in 1937 and by 1955, the existing Hangar Building was constructed.

3.2 PEDOLOGICAL INFORMATION

The USDA NRCS Web Soil Survey was used to research the pedologic mapping within the project limits. We have included the Web Soil Survey map in Appendix III of this report for your reference. Wacousta Silty Clay Loam was mapped within the project limits.

Wacousta series consists of very deep, very poorly drained soils formed in silty lacustrine sediments. These soils are in broad depressions and swales on till plains, moraines, and stream terraces. These soil types are considered common subgrade material, and have generally fair to poor strength characteristics.

3.3 SUBSURFACE SOIL PROFILE

Boring, B-8, performed for the B400 Hangar Facility Slab on Grade Replacement project was completed in conjunction with other borings for multiple different projects at Truax Air Field.

Boring B-8 was performed inside Building B400. The pavement structure at boring location B-8 consisted of 7 ½ inches of concrete over a sand with gravel layer that extended to approximately 1.5 feet below the top of slab elevation, which is consistent with the reported design section.

Fill was encountered directly below the slab section. The fill material consisted of silty sand with gravel and extended to a depth of 4.8 feet. The native soils consisted a 2.6-foot thick lean clay layer overlying very loose to medium dense sand. Moisture content of the clay layer tested was 21%.

Results of the field and laboratory tests and observations are depicted on the individual boring logs included in Appendix I. Soils were grouped together based on similar observed properties. The stratification lines were estimated by the reviewing engineer based on available data and experience. The actual in-situ changes between layers may differ slightly and may be more gradual than depicted on the boring logs. Subsurface and groundwater conditions can vary between borehole locations and in areas not explored.

It is important to note that the soil observations, fill depths and topsoil thickness estimates were made in small diameter boreholes. Therefore, it should be understood that thicker or thinner deposits of the individual strata are likely to be encountered within other portions of the project. Furthermore, the estimation of a strata thickness at a particular location can differ from person to person due to a sometimes indistinct transition between the soils encountered. Additionally, it must be recognized that in the absence of foreign substances and/or debris within the soil samples obtained, it is sometimes difficult to distinguish between natural soils and clean soil fill.

3.4 GROUNDWATER OBSERVATIONS

A groundwater observation was made during drilling operations. Groundwater was observed at a depth of 7.4 feet during drilling. An accurate water level reading could not be made at the completion of drilling due to collapsing soils.

Groundwater level fluctuations may occur with time and seasonal changes due to variations in precipitation, evaporation, surface water runoff and local dewatering. Perched water pockets and a higher water table may also be encountered during wet weather periods, particularly in more permeable silt and sand seams or granular fill material overlying less permeable clays. Installation and monitoring of an observation well would be required to assess true groundwater elevation.

3.5 LABORATORY TEST SUMMARY

GESTRA collected bulk samples from the auger cuttings from boring B-8. In addition, GESTRA collected bulk samples from the auger cuttings from B-4, which was performed for another adjacent project at Truax Field. Due to the similarity of the bulk samples from B-4 and B-8, the samples were combined to create a large enough composite sample to represent the generalized soil profile of the upper 5 feet of soil. Based on design pavement loads, a CBR test was performed using modified Proctor density (ASTM D1557). The details of laboratory results for the modified Proctor and CBR tests are provided in Appendix II. Following Table 3-1 summarizes the modified Proctor and CBR test results.

Table 3-1: Summarized Modified Proctor and CBR Test Results of Subgrade Materials

Sample Designation	Sample Location	Modified Proctor (ASTM D1557)		% CBR at 0.1 in penetration, 95% compaction
		Max. Dry Density (pcf)	% Optimum Moisture Content	
CBR-1	B-4 and B-8	142.0	5.9	31

Select samples of the subgrade soils were submitted for laboratory gradation testing. Table 3-2 provides a summary of the tests performed and associated USCS soil classification.

Table 3-2: Subgrade Soil Tests

Soil Sample	Sample Location	Grain Size Results (% passing)		Atterberg Limit Results (%)		Soil Type
		P4	P200	LL	PI	
CBR-1	B-4 and B-8	79.9	35.0	14	1	Silty Sand with Gravel

P4= Percent passing sieve #4; P200= Percent passing sieve #200

4.0 ANALYSIS AND RECOMMENDATIONS

4.1 SITE PREPARATION

We understand site preparation should start with removal of the existing concrete slab. Debris or other deleterious material, if encountered after slab removal should be removed. In addition, all unused utilities should be properly rerouted, removed or abandoned. Material removed from the project site should be disposed in accordance with all applicable federal, state, and local regulations. Soil should not be stockpiled near or adjacent to the excavations.

In the building slab on grade and pavement areas, after the initial site preparation described above, we recommend compacting the exposed material. Any areas of significant deflection during compaction may be disked, dried, and re-compacted if weather permits, or removed and replaced with engineered fill. After compaction is completed, we recommend the subgrade area should be proof rolled with a minimum 20-ton tandem axle duel wheel dump truck. A geotechnical engineer or their designated representative should be present during the proof roll in order to identify soft or unstable areas, if any, and subsequently recommend remediation procedures. Per FAA AC 150/5370-10H, Section 152-2.9, soft areas of subgrade that deflect more than 1-inch or show permanent deformation greater than 1-inch shall be remediated. Where subgrade remediation is needed, the type of remediation and the depth needed should be determined at the time of construction based on drainage, weather and soil conditions. The following options may be considered for subgrade soil correction.

Mechanical Stabilization: Areas of subgrade remediation could be reworked to correct the moisture content and recompacted in accordance with the project specification. If the underlying soil becomes soft and unstable due to presence of water and existing soil cannot be recompacted, localized soft areas may require bridging of the unstable weak soils to facilitate construction. Bridging can be accomplished with the use of thick layers of granular engineered fill. If open-graded aggregate layers are used for subgrade replacement, we recommend a geotextile fabric be placed to prevent migration of fine soil particles into the layer.

Geogrid: Removal and replacement or mechanical stabilization can include the placement of a geogrid material with an approved granular fill. Various options of geogrid strength and related thickness of granular fill are available, but the system selected should be designed by an experienced contractor or geogrid supplier based on the site soil conditions. By using a geogrid, the soil excavation and replacement depth can be reduced.

Removal and Replacement: Removal and replacement of the soft or unstable soils can be performed and replaced with similar suitable material that exists in the other areas of the subgrade or replaced with engineered fill. Based on FAA AC 150/5370-10H, Section P-152-2.5, the subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 100 percent of the maximum dry density for non-cohesive soils and for cohesive soils as determined by ASTM D1557. Non-cohesive soils in this specification defined as soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318. If an open graded clean stone is used as fill, a geotextile might be necessary to provide an adequate separation between the underlying subgrade and new fill and to prevent migration of the finer subgrade soils into the void space of the new fill. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

Site grading should direct runoff away from the planned building slab on grade and pavement areas, and should be maintained throughout construction so that the potential for softening of the subgrade soils is reduced. Equipment and working traffic should also be kept to a minimum on subgrade surfaces, especially during times of precipitation or following spring thaw. The contractor is responsible for maintaining completed earthwork areas. Consideration should be given to installing construction roads or utilizing the existing pavement for construction traffic to reduce disturbance to the subgrade soils.

Per FAA AC 150/5370-10H, Item 152-2.8, the fill materials shall be constructed in lifts as established in control strip per Item 152-2.7. However, the lift thickness should not be less than 6 inches nor more than 12 inches of compacted thickness. The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. Engineered fill placed within the building pad or in the pavement subgrade/base course should be compacted to a minimum of 95% of the modified Proctor dry density value. Structural soil fill should be placed a minimum of five feet beyond the edges of the new building and pavement areas, and an additional foot horizontally for each vertical foot of new fill to be placed to provide adequate lateral confinement. The inorganic site soils free of any construction debris that would be removed from excavations could be reused as structural fill; however, moisture conditioning of the material may be necessary.

The information presented in this report may be used to evaluate the site conditions for construction, but the contractor is responsible for determining site preparation means and methods required to complete the project. An aggressive construction schedule or construction during seasons with limited drying time may not allow for reconditioning of the subgrade and soil correction may require removal and replacement with imported granular fill or use of geogrid with granular fill.

4.2 FLOOR SLAB RECOMMENDATIONS

We recommend that a subgrade reaction modulus of 125 pounds per square inch per inch of deflection (pci) be used in the design of the floor slab at grade. The modulus value was assumed based on the native clay soils or similar engineered fill as the subgrade soil, assumes a 1-foot plate is used to determine the modulus, and should be adjusted for the size of the foundation and confinement effect. We recommend that the floor slabs be suitably reinforced and designed to be separate from the foundation system in order to allow for separate movements. It is recommended that the structural engineer specify the floor slab thickness, reinforcing, joint details and other

parameters. At a minimum, the floor slabs are recommended to be reinforced or the concrete contain an appropriate fiber mesh additive to help control shrinkage cracking.

We recommend the installation of a capillary moisture break directly below the slab. A typical capillary moisture break may consist of at least 6 inches of sand or gravel with a maximum particle size of 1-1/2 inch, containing 15-55% passing the number 4 sieve and no more than 12% passing the number 200 sieve (fines) and should follow the recommendations of ACI 302.1R-15, Chapter 6. The structural engineer, architect, or manufacturer of a floor covering should determine the need of a vapor barrier, specify the vapor barrier location and consider the concrete curing and the effects of moisture on future flooring materials or building end use. If a vapor retarder is used, we recommend it be placed in accordance with ACI 302.1 Section 3.2 and should meet the requirements of ASTM E1745. The vapor retarder should include proper sealing at penetrations, overlap at joints, and sealing at the interface of the wall and slab and may require an adequate cushion material to prevent damage.

4.3 PAVEMENT DESIGN

SOIL PARAMETERS FOR PAVEMENT DESIGN

From an evaluation of the subsurface conditions, FAA AC No.: 150/5320-6F, and FAA AC No.: 150/5370-10H, we recommend that the specific pavement design values outlined below be used in establishing the appropriate pavement section(s) for the project.

The parameters in Table 4-1 assume soil subgrade preparation has been performed as identified in this report and are based on Unified Soil Classification System (USCS) classification of silty sand (SM). Table 4-1 provides the recommended soil parameters for the design of the pavement section.

Table 4-1: Estimated Average Soil Parameters

Design Parameters [a]	
USCS Soils Classification	SM
Reduced Subgrade Strength for Flexible Pavement CBR value [b], (%)	4
Frost Group Index [c]	FG-3
Frost Penetration depth [d], (Inches)	60
Maximum Dry Density [e], (pcf)	142.0
Optimum Moisture Content [e], (%)	5.9
Poisson's Ratio [f]	0.35
Revised Modulus of Subgrade Reaction Based on Frost Group Index [b] (k) (pci)	25
Elastic Modulus of Subgrade for Rigid Pavement [h] (E), (psi)	6,000

a The values present in the Table are based on lab results from testing on similar soils.
b Based on FAA AC No.: 150/5320-6F, Chapter 3. Section 3.12.18.3, Table 3-5
c Based on FAA AC No.: 150/5320-6F, Chapter 2. Section 2.7.1, Table 2-2
d Based on Hammerpedia website, Wisconsin Frost Line (https://www.hammerpedia.com/wisconsin-frost-line/)
e Based on Proctor test ran on the auger cuttings collected from upper 5 feet of borings.
f Based on FAA AC No.: 150/5320-6F, Chapter 3. Section 3.12.11, Table 3-2
g Based on FAA AC No.: 150/5320-6F, Appendix A:Soil Characteristics Pertinent to Pavement Foundations
h Estimated using empirical formula per FAA AC No.: 150/5320-6F, Chapter 2. Section 2.5.3

FAA AC No: 150/5320-6F suggests subgrade stabilization may be necessary where the elastic modulus of subgrade is less than 7,500 psi (or CBR of 5%). The above elastic modulus of subgrade value is reduced due to seasonal frost (see discussion below). If subgrade stabilization is planned, FAA AC No: 150/5320-6F, Section 2.6.1 recommends subgrade stabilization by chemical, mechanical methods or replacement with suitable subgrade material.

DISCUSSION OF SEASONAL FROST

The airport is located in a seasonal frost area. The design of an airport pavement should address the adverse effects of seasonal frost. Per FAA AC No: 150/5320-6F, the design of pavement can be based on either of two approaches: Frost Protection or Reduced Subgrade Strength (RSS). The estimated soil parameters in Section 4.5 are presented to be used for RSS approach.

SUBSURFACE DRAINAGE

One of the important considerations in designing a high quality and durable pavement is providing adequate drainage. Drainage design for the proposed pavement section is out of GESTRA's scope for this project. Subsurface drainage is discussed in Appendix G of FAA AC No. 150/5320-5D Airport Drainage Design dated May 13, 2013. The effectiveness of subsurface drainage may be impacted by the site groundwater.

4.4 SOIL CORROSIVITY

GESTRA completed Miller Box resistivity and pH testing on samples collected from the upper 5 feet of borings B-4 and B-8. In addition, GESTRA subcontracted Testing Engineers International, Inc. to complete sulfate testing on a sample collected from B-8. Table 4-3 provides a summary of the test results, and detailed results are included in Appendix II.

Table 4-4: Summary of Laboratory Testing (Corrosivity)

Sample Number	Soil Type	Test	Test Method	Results
B-4, SS-2	Sand	Resistivity (Miller Box)	G187	19,763 Ω*cm
B-8, SS-2	Silty Sand, FILL			12,543 Ω*cm
B-8, SS-2	Silty Sand, FILL	pH	G51	8.6
B-8, SS-1	Silty Sand, FILL	Sulfate	C1580	< 0.1 percent by mass

Based on the results from the electrical resistivity testing and Table 2-3 in the FHWA NHI-09-087, the existing onsite soils are non-corrosive.

The sulfate content determined for the sample was compared to the values in Table 19.3.1.1 of ACI 318R. Based on this table, the soil samples test are categorized as "Exposure Class S0" and injurious sulfate attack is not a concern.

4.5 CONSTRUCTION CONSIDERATIONS

The detailed means and method of excavation and construction should be decided by the contractor and approved by the project design team. Based on the specific site information, geotechnical exploration results and requirements for the reconstruction of the slab, the following issues should be taken in consideration during construction.

Dewatering

Based on the soil boring performed, substantial water is not anticipated to be encountered during shallow excavation. If water is encountered during shallow excavation, we anticipate the appropriate number of temporary sump pits and pumps should be sufficient to remove anticipated volume of water in the excavation. The contractor should be prepared to control groundwater and surface water and prevent it from accumulating in excavations or otherwise affecting construction. If excavations are planned that will extend near the water level encountered in our boring, a formal dewatering plan should be developed before the start of construction.

Excavation Stability

Caving is a common issue for excavation side walls during construction, especially if fill material, granular soils, and/or water seepage are observed. An excavation plan should be developed and the length of excavation left open should be limited to prevent caving soil from covering the suitable bearing soils.

A temporary soil retention system may also be necessary in order to prevent caving or provide support of surrounding structures or utilities during construction. Providing recommendations or designing the retention system is out of the scope for GESTRA. The contractor must comply with the federal, state, local and updated OSHA regulations during excavation and in retention system design to ensure excavation safety and a retention system should consider the site groundwater in the design.

Occupational Safety and Health Act (OSHA) has instituted strict standards for temporary construction excavations. These standards are outlined in 29 CFR Part 1926 Subpart P. Excavations within unstable soil conditions or extending five feet or more in depth should be adequately sloped or braced according to these standards. Excavation safety is the responsibility of the contractor. Material stockpiles or heavy equipment should not be placed near the edge of the excavation slopes. The actual stable slope angle should be determined during construction and will depend upon the loading, soil, and groundwater conditions encountered.

Weather Implications

The subgrade soil might become unstable with exposure to adverse weather such as rain (surface run-off), snow and freezing temperatures. The unstable areas due to weather exposure may require an additional undercut or stabilization and the representative geotechnical engineer should assist with the determination of the depth of additional undercut or stabilization procedure based on observation of the field condition.

Soil Sensitivity

Soil at the construction site will be exposed to moisture and disturbance from construction traffic, construction equipment and human factors. Due to the disturbance, soil may become sensitive with contact of water. Contractor should try to lessen the exposure the soil at the construction site

may encounter to moisture and disturbances. Therefore, slab and pavements should be constructed immediately after the review of the representative geotechnical engineer.

Existing Fill

The depth and type of existing fill material may vary through the project site. Excavating, handling and disposing existing fill material may have special requirements. GESTRA has not evaluated the material or groundwater with respect to environmental considerations.

5.0 EXPLORATION AND TESTING PROCEDURES

5.1 LAYOUT AND ELEVATION PROCEDURES

One (1) soil boring was completed at the location shown on the attached Borehole Location Map in Appendix I. The location of the boring was selected by Hanson and located in the field by GESTRA. Elevation of the borehole was not obtained by GESTRA since the grade of the slab is not anticipated to change.

5.2 FIELD TESTING PROCEDURES

The borehole was drilled using a truck mounted drill rig. The borehole was initiated and advanced by using hollow stem augers. Samples were collected at 2-1/2-foot intervals to a depth of 11 feet. All representative soil samples were taken in general accordance with the "Standard Method for Penetration Test and Split-Barrel Sampling of Soils" (ASTM D1586). After each sampling, a soil sample was retained and placed in a jar and recorded for type, color, consistency, and moisture, sealed and then transported to the laboratory for further review and testing, if required. The specific drilling method used including the depth, rig type, and crew chief, are included on the boring log.

5.3 LABORATORY TESTING PROCEDURES

After completion of drilling operations, all of the retained soil samples were transported to GESTRA's laboratory and classified by a geotechnical engineer using the Unified Soil Classification System (USCS). A chart describing the classification system used is included in Appendix I. The engineer assigned laboratory testing suited to extract important index properties of the soil layers. Laboratory testing included hand penetrometer, moisture content, Atterberg limits, grain size analysis, modified Proctor, CBR, pH, resistivity using Miller box and sulfate. The methods used are presented on the individual lab forms.

STANDARD OF CARE

Our exploration was limited to evaluating subsurface soil and groundwater conditions pertaining to the proposed project. GESTRA did not perform any environmental, chemical, or hydrogeologic testing as these were not part of our work scope.

This report should be made available in its entirety to bidding contractors for information purposes. The soil borings and site sketch should not be detached from this report. Our report is not valid if used for purposes other than what is described in the report.

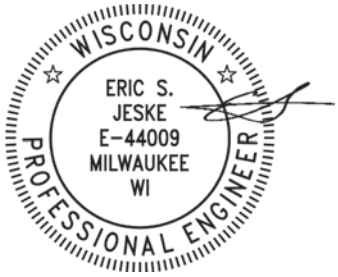
All OSHA regulations such as those regarding proper sloping and temporary shoring of excavations should be followed during the entire construction process.

GESTRA has presented our professional opinions in this report in the form of recommendations. Our opinions are based on our understanding of current project information and related accepted engineering practices at the time of this report. Other than this, no warranty is implied or intended.

Sincerely,

GESTRA Engineering, Inc.

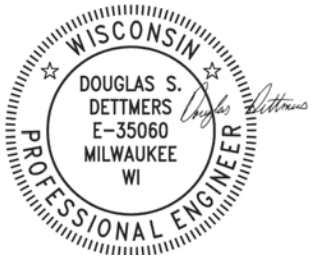
Report Prepared By:



Digitally signed by Eric Jeske
Date: 2020.12.01 09:06:09 -06'00'

Eric Jeske, P.E.
Staff Engineer

Report Reviewed By:

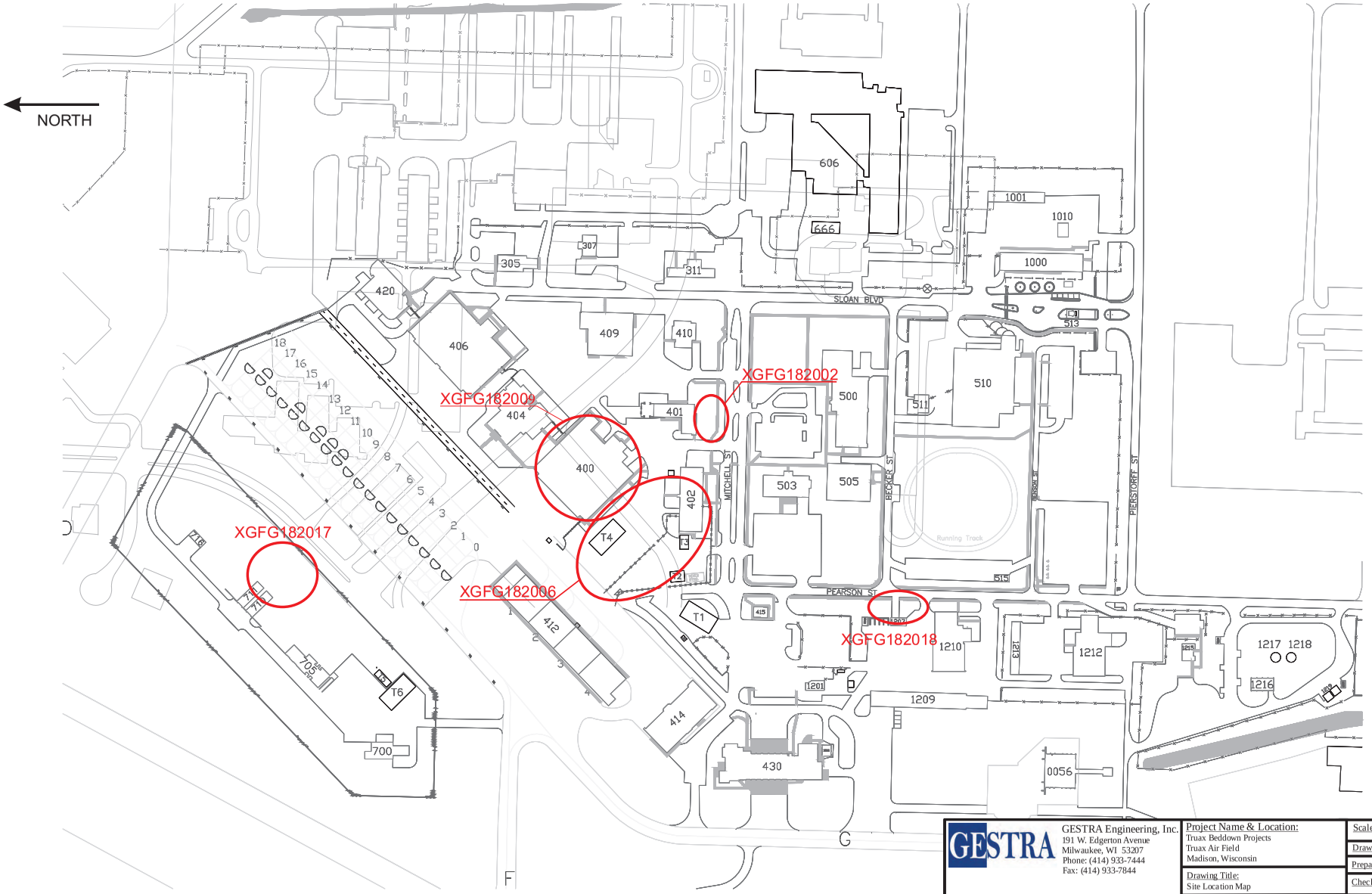


Digitally signed by Douglas Dettmers
Date: 2020.12.01 09:07:06 -06'00'

Douglas Dettmers, P.E.
Senior Engineer

APPENDIX I

SITE LOCATION MAP, BOREHOLE LOCATION MAP, TEST BORING LOGS, GENERAL NOTES AND SOILS CLASSIFICATION



GESTRA

GESTRA Engineering, Inc.
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444
Fax: (414) 933-7844

Project Name & Location:
Truax Beddown Projects
Truax Air Field
Madison, Wisconsin

Drawing Title:
Site Location Map

Project No.: M20064-10

Scale: Not to Scale

Drawing No.: 1 of 1

Prepared by: EJ

Checked by: DD

Date: October 23, 2020

= Approximate Borehole Location

Base map obtained from Dane County GIS website

GESTRA Engineering, Inc.
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444
Fax: (414) 933-7844

Project Name & Location:
Truax Beddown Projects
XGFG182009
Madison, Wisconsin

Drawing Title:
Borehole Location Map

Project No.: M20068-10

Scale: 1" = 80'

Drawing No.: 1 of 1

Prepared by: EJ

Checked by: DD

Date: October 23, 2020

SOIL BORING LOG

GESTRA Engineering Inc.
2223 Industrial Drive
Monona, WI 53713
Phone: 608-222-9406, Fax: 608-222-9408

PROJECT NAME: Truax Beddown Facility	DATE DRILLING STARTED: 10/14/2020	PAGE NUMBER: 1 of 1	
PROJECT LOCATION: Madison, WI	DATE DRILLING ENDED: 10/14/2020	BORING NUMBER: B-8	
BORING DRILLED BY: FIRM: Gestra; CREW CHIEF: S. Gonyer	FIELD LOG: K. Turner	NORTHING	PROJECT NUMBER: M20068-10
	LAB LOG / QC: E. Jeske	EASTING	DRILLING RIG: CME 75 (International)
			DRILLING METHOD: 3¼" HSA
			SURFACE ELEVATION: ft

Sample Number and Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft) / Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
					CONCRETE (7.5") 0.6								
SS-1	6	4 12 13	25		SAND, brown, moist, trace gravel and clay seams, trace small concrete pieces, (FILL) 1.5								
SS-2	16	5 12 13	25		SILTY SAND WITH GRAVEL, brown, moist, (FILL) 4.8								
SS-3	12	2 3 5	8	5	LEAN CLAY WITH SAND, greenish gray, moist, stiff 7.4	CL			1.50			21	
SS-4	14	4 6 9	15	▽	SAND, brown, wet, medium dense	SP							
SS-5	15	3 4 6	10	10	Color change to gray at 9.5' 11								
					End of Boring at 11.0 ft.								
				15									
				20									
				25									

WATER & CAVE-IN OBSERVATION DATA

▽	WATER ENCOUNTERED DURING DRILLING (ft): 7.4 ft.		CAVE DEPTH AT COMPLETION (ft): NMR	WET ☐ DRY ☐
▼	WATER LEVEL AT COMPLETION (ft): NMR	■	CAVE DEPTH AFTER 0 HOURS (ft): NMR	WET ☐ DRY ☐
▼	WATER LEVEL AFTER 0 HOURS (ft): NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS

SYMBOL	DEFINITION
HSA	Hollow Stem Auger
RWB	Rotary Wash Boring (Mud Drilling)
_FA	4", 6" or 10" Diameter Flight Auger
_HA	2", 4" or 6" Hand Auger
_DC	2 1/2" , 4" , 5" or 6" Steel Drive Casing
_RC	Size A, B, or N Rotary Casing
PD	Pipe Drill or Cleanout Tube
CS	Continuous Split Spoon Sampling
DM	Drill Mud
JW	Jetting Water
SS	2" O.D. Split Spoon Sample
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample
ST	3" Thin Walled Tube Sample (Shelby Tube)
3TP	3" Thin Walled Tube (Pitcher Sampler)
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)
W	Wash Sample
B	Bag Sample
P	Test Pit Sample
_Q	BQ, NQ, or PQ Wireline System
_X	AX, BX, or NX Double Tube Barrel
CR	Core Recovery – Percent
NSR	No Sample Recovered, classification based on action of drilling, equipment and/or material noted in drilling fluid or on sampling bit.
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.
▽	Water Level Symbol

TEST SYMBOLS

SYMBOL	DEFINITION
MC	Moisture Content - % of Dry Wt. – ASTM D 2216
OC	Organic Content - % of Dry Wt. – ASTM D 2974
DD	Dry Density – Pounds Per Cubic Foot
LL, PL	Liquid and Plastic Limit – ASTM D 4318
	Additional Insertions
Qu	Unconfined Comp. Strength-psf – ASTM D 2166
Qp	Penetrometer Reading – Tons/Square Foot
Ts	Torvane Reading – Tons/Square Foot
G	Specific Gravity – ASTM D 854
SL	Shrinkage Limits – ASTM D 427
OC	Organic Content – Combustion Method
SP	Swell Pressure - Tons/Square Foot
PS	Percent Swell
FS	Free Swell – Percent
pH	Hydrogen Ion Content. Meter Method
SC	Sulfate Content – Parts/ Million, same as mg/L
CC	Chloride Content - Parts/ Million, same as mg/L
C*	One Dimensional Consolidation – ASTM D 2453
Qc*	Triaxial Compression
D.S.*	Direct Shear – ASTM D 3080
K*	Coefficient of Permeability – cm/sec
D*	Dispersion test
DH*	Double Hydrometer – ASTM D 4221
MA*	Particle Size Analysis – ASTM D 422
R	Laboratory Receptivity, in ohm – cm – ASTM G 57
E*	Pressuremeter Deformation Modulus – TSF
PM*	Pressuremeter Test
VS*	Field Vane Shear – ASTM D 2573
IR*	Infiltrometer Test – ASTM D 3385
RQD	Rock Quality Designation – Percent

*See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY

DENSITY TERM	"N" VALUE
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

CONSISTENCY TERM	Unconfined Compressive Strength, (tsf)	"N" VALUE
Very Soft	<0.25	0-2
Soft	0.25 - 0.49	2-4
Medium Stiff	0.5 - 0.99	4-8
Stiff	1.0 - 1.99	8-16
Very Stiff	2.0 - 3.99	16-30
Hard	4.0+	Over 30

Standard "N" Penetration: Blows per Foot of a 140 Pound Hammer Falling 30 inches on a 2 inch OD Split Barrel Sampler

Lamination	Up to 1/2" thick stratum
Layer	1/2" to 6" thick stratum
Lens	1/2" to 6" discontinuous stratum
Varved	Alternating laminations
Dry	Powdery, no noticeable water
Moist	Below saturation
Wet	Saturated, above liquid limit
Water bearing	Pervious soil below water

RELATIVE GRAVEL PROPORTIONS

CONDITION	TERM	RANGE
Coarse Grained Soils	trace of gravel	2-14%
	with gravel	15-49%
Fine Grained Soils		
15-29% + No. 200	trace of gravel	2-14%
15-29% + No. 200	with gravel	15-29%
30% + No. 200	trace of gravel	2-14%
30% + No. 200	with gravel	15-24%
30% + No. 200	gravelly	25-49%

RELATIVE SIZES

Boulder	Over 12"
Cobble	3" - 12"
Gravel	
Coarse	3/4" - 3"
Fine	#4 – 3/4"
Sand	
Coarse	#4 - #10
Medium	#10 - #40
Fine	#40- #200
Silt & Clay	- # 200, Based on Plasticity

SOILS CLASSIFICATION FOR ENGINEERING PURPOSES

ASTM Designation: D 2487 - 83

(Based on Unified Soil Classification System)

SOIL ENGINEERING

		Criteria for Assigning GroupSymbols and Group Names Using Laboratory Tests [A]		Soil Classification[B] Group Symble	Group Name
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less Than 5% fines [C]	Cu≥ 4 and 1≤ Cc ≤3[E]	GW	Well graded gravel [F]
			Cu< 4 and/or 1> Cc >3[E]	GP	Poorly graded gravel [F]
		Gravels with Fines more than 12% fines [C]	Fines Classify as ML or MH	GM	Silty gravel [F.G.H.]
			Fines classify as CL or CH	GC	Clayey gravel [F.G.H.]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean sands Less than 5% fines [D]	Cu≥ 6 and 1≤ Cc ≤3[E]	SW	Well graded sand [I]
			Cu< 6 and/or 1> Cc >3[E]	SP	Poorly graded sand [I]
		Sands with Fines more than 12% fines [D]	Fines Classify as ML or MH	SM	Silty sand [G.H.I]
			Fines classify as CL or CH	SC	Clayey sand [G.H.I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	inorganic	PI >7 and plots on or above " A" line	CL	Lean clay [K.L.M]
			PI<4 or plots below " A " line	ML	Silt [K.L.M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K.L.M.N] Organic Silt [K.L.M.O]
	Silts and Clays Liquid Limit 50 or more	inorganic	PI plots on or above " A " line	CH	Fat clay [K.L.M]
			PI plots below " A " line	MH	Elastic silt [K.L.M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [K.L.M.P] Organic Silt [K.L.M.Q]
Highly organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat
Fibric Peat > 67% Fibers		Hemic Peat 33 % - 67 % Fibers		sapric	Peat < 33% Fibers

[A] Based on the material passing the 3-in (75- mm)sieve

[B] If field sample contained cobbles or boulders, or both. add with cobbles or boulders, or both to group name

[C] Gravels with 5 to 12 % fines require dual symbols:
GW - GM well-graded gravel with silt
GW - GC well-graded gravel with clay
GP - GM poorly-graded gravel with Silt
GP - GC poorly-graded gravel with clay

[D] Sands with 5 to 12 % fines require dual symbols:
SW -SM well-graded sand with silt
SW - SC well-graded sand with clay
SP - SM poorly-graded sand with Silt
SP - SC poorly-graded sand with clay

[E] $Cu = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name

[G] If fines classify as CL-ML, use dual symbol GC-GM. or SC-SM

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL_ML silty clay
If soil contains 15 to 29% plus No. 200, add, "with sand" or " with gravel", whichever is predominent

[L] If soil contains ≥ 30% plus No.200, predominantly sand, add "sandy" to the group name

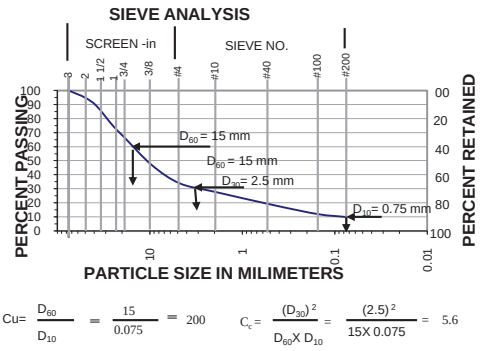
[M] If soil contains ≥ 30% plus No.200, predominantly gravel add "gravelly" to the group name

[N] PI ≥4 and plots on or above "A" Line

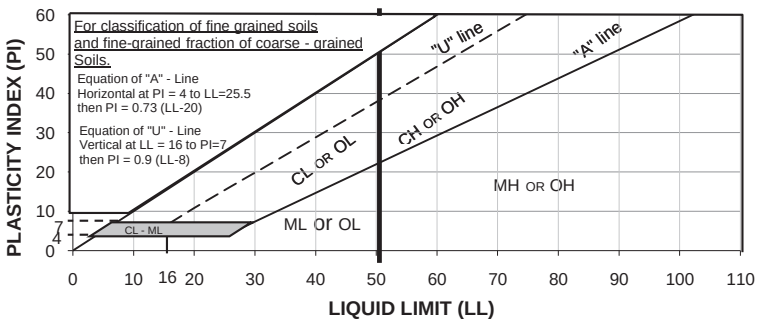
[O] PI < 4 or plots below "A" Line

[P] PI plots on or above "A" Line

[Q] PI plots below "A" Line



$Cu = \frac{D_{60}}{D_{10}} = \frac{15}{0.075} = 200$ $C_c = \frac{(D_{30})^2}{D_{60} X D_{10}} = \frac{(2.5)^2}{15X\,0.075} = 5.6$



APPENDIX II

LABORATORY TEST RESULTS

GESTRA Engineering
191 W. Edgerton Avenue
Milwaukee, WI 53207
Phone: (414) 933-7444
Fax: (414) 933-844

Laboratory Test Results of
CBR (California Bearing Ratio) of Laboratory-Compacted Soils

Project Name:	Truax Beddown Facility	Date:	Tuesday, October 27, 2020
Project Number:	M20068-10	Report To:	Hanson
Project Location:	Madison, WI		
ASTM Designation:	**D 1883**		

Sample Information

Boring number:	Combined B-4 and B-8
Description of Soil:	SILTY SAND WITH GRAVEL, brown
Strain Rate (in/min):	0.05
Method used for CBR sample preparation:	Modified
Condition of Sample:	Soaked
Surcharge Amount:	**40 lbs**
Desired percent compaction:	95%

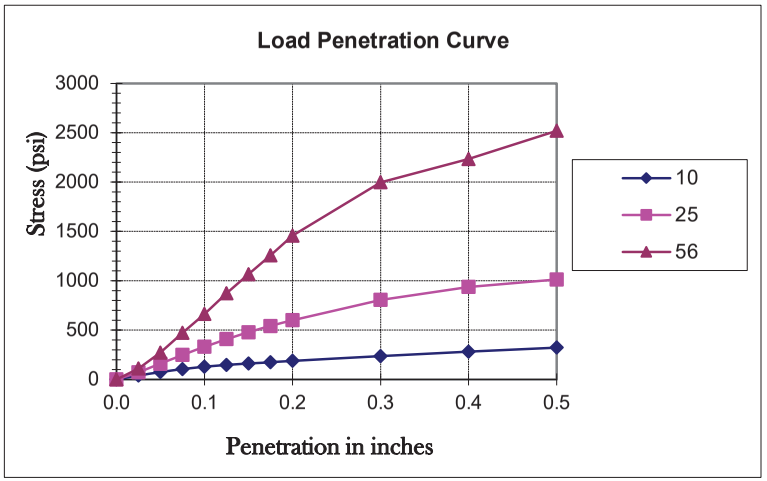
From Proctor Results

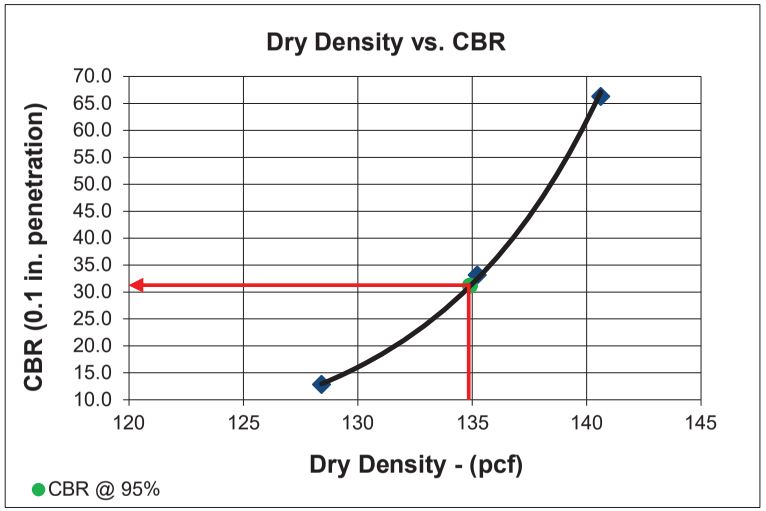
Optimum Moisture:	5.9%
Maximum Dry Density: (pcf)	142

Test Results

		Trial 1	Trial 2	Trial 3
	Number of blows / layer:	10	25	56
Moisture Content	Before Compaction	6.5	6.4	6.3
	Top 1" after soaking	10.1	9.3	7.5
	Average after soaking	9.2	8.8	7.6
	% swelling	**0.5**	**0.5**	**0.1**
Dry Density	Before soaking (pcf)	128	135	141
	After soaking (pcf)	129	135	141
	Percent Compaction	90.4%	95.2%	99.0%
CBR at 0.1 in. penetration		**12.84**	**33.14**	**66.28**
CBR at 0.2 in. penetration		**12.54**	**40.01**	**97.13**

CBR @ 95 %: 31





Performed by: T. Tran

Reviewed By: E. Jeske, PE
GESTRA Engineering, Inc.

GESTRA Engineering, Inc
2223 Industrial Drive
Monona, WI 53713
Phone: (608) 222-9406; Fax: (608) 222-9408

Laboratory Test Results of Proctor Sample

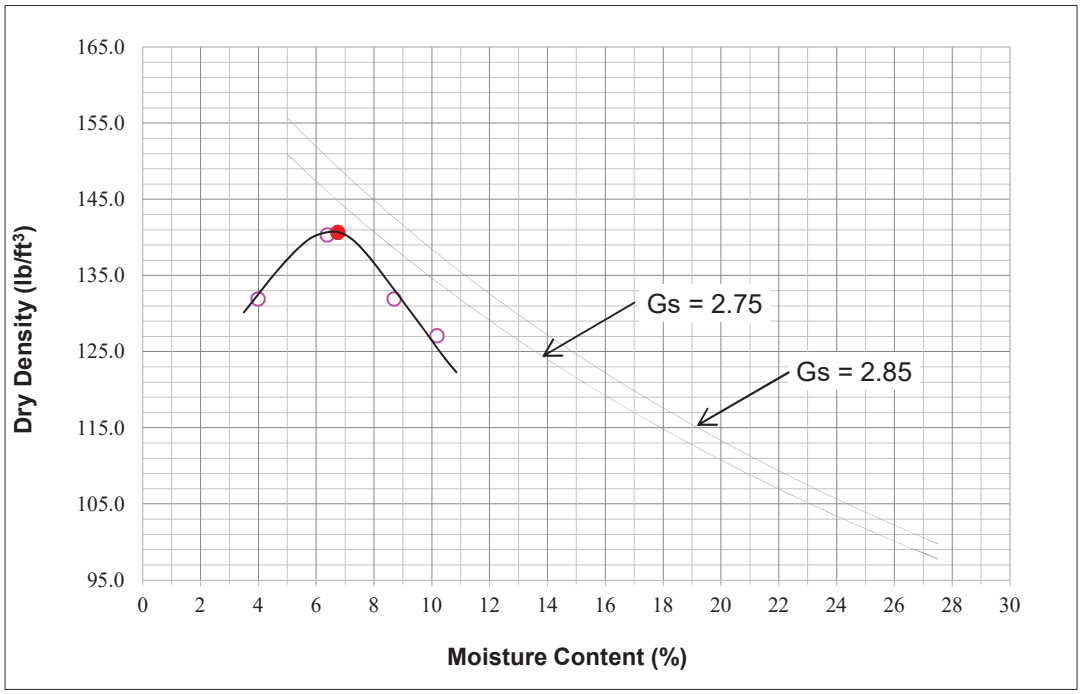
Project Name:	Truax Beddown Facility	Date:	October 24, 2020
Project Number:	M20068-10	Client:	Hanson
Projection Location:	Madison, WI		
ASTM Designation:	**D1557** Method: **B**	Rammer Type:	Manual

Sample Information

Type of Material	SILTY SAND WITH GRAVEL, brown
Sample Location	Combined B-4 and B-8
Sample Number	1
Sample Date	10/14/2020

OPTIMUM MOISTURE 6.8 **%**

UNCORRECTED			**CORRECTED**		
Maximum Density:	140.6	**lb/ft^3**	**Maximum Dry Density**	142.0	**lb/ft^3**
Oversize Gravel Content	14	**%**	**Original Gravel Content**	23	**%**
			Corrected Optimum Moisture	5.9	**%**



Notes: [1]The solid dot indicates uncorrected maximum density at test gravel content.
[2]Field density tests should be compared to the corrected maximum dry density, listed above, which uses insitu gravel content

Performed by: A.Hamberger

Reviewed By: T. Tran
GESTRA Engineering

GESTRA Engineering, Inc
2223 Industrial Drive
Monona, WI 53713
Phone: (608) 222-9406; Fax: (608) 222-9408

Laboratory Test Results of Atterberg Limits of Soil

Project Name:	Truax Beddown Facility	Date:	October 28, 2020
Project Number:	M20068-10	Client:	Hanson
Project Location:	Madison, WI		
ASTM Designation:	**D4318**		

Sample Information

Type of Sample	Bulk
Boring Number	Combined B-4 and B-8
Sample Number	1
Depth of Sample	Upper 5 feet

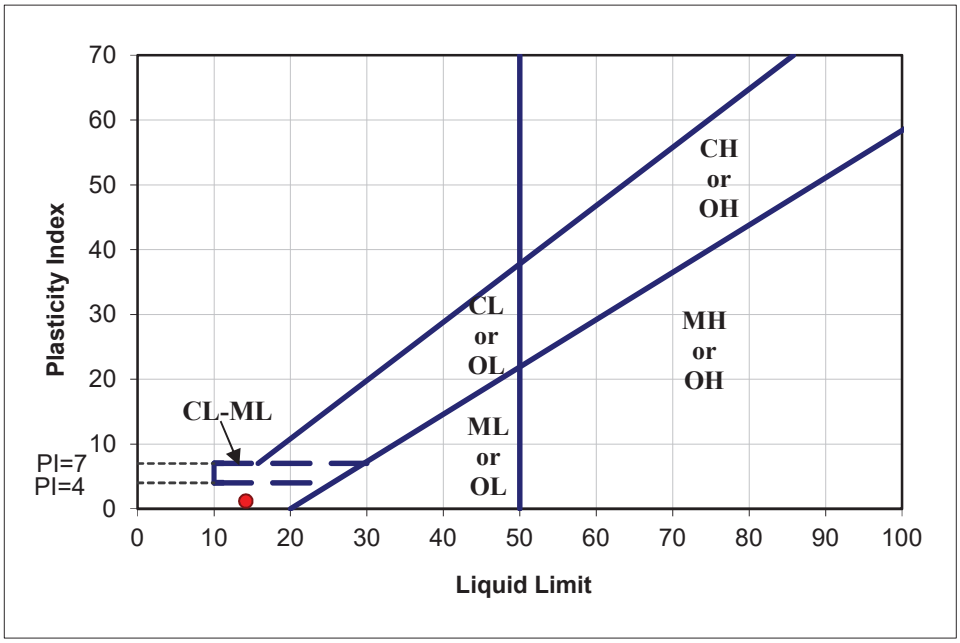
Determination of Liquid Limit

Cup Number	D24	D7	L12
Weight of Cup (g)	14.24	14.38	14.39
Weight of Wet Soil and Cup (g)	28.35	26.00	24.51
Weight of Dry Soil and Cup (g)	26.70	24.42	23.03
Moisture Content (%)	13.2	15.7	17.1
Blow Counts	28	20	15

Determination of Plastic Limit

Cup Number	L18	D8
Weight of Cup (g)	7.31	7.22
Weight of Wet Soil and Cup (g)	12.36	12.60
Weight of Dry Soil and Cup (g)	11.80	12.00
Moisture Content (%)	12.5	12.6

Compilation of Test Results



Liquid Limit	14
Plastic Limit	13
Plasticity Index	1
USCS Symbol	**ML**

Performed by: A. Hamberger

Reviewed By: E. Jeske, PE

GESTRA Engineering, Inc.

GESTRA Engineering, Inc
2223 Industrial Drive
Monona, WI 53713
Phone: (608) 222-9406, Fax (608) 222-9408

Laboratory Test Results of Mechanical Analysis of Soil or Aggregate

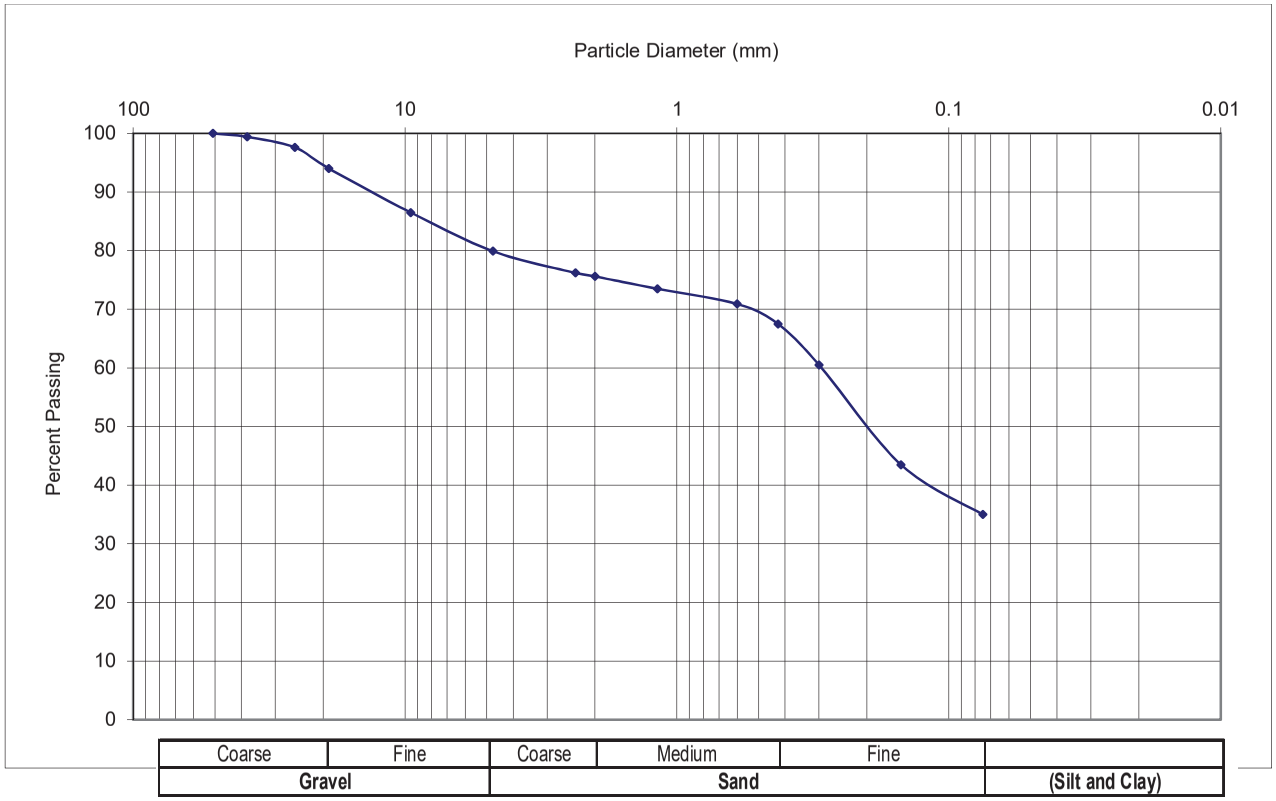
Project Name:	Truax Beddown Facility	Date:	October 29, 2020
Project Number:	M20068-10	Reported To:	Hanson
Project Location:	Madison, WI		
ASTM Designation:	**C136, D422**		

Sample Information

Type of Sample:	Bucket	Sample Number:	1
Boring Number:	Combined B-4 and B-8	Sample Depth:	Upper 5 feet

Mechanical Analysis Data

Sieve	Sieve Opening (mm)	Percent Passing (%)
2	50.8	100.0
1 1/2	38.1	99.4
1	25.4	97.6
3/4	19.05	94.0
3/8	9.525	86.5
#4	4.75	79.9
#8	2.36	76.2
#10	2	75.6
#16	1.18	73.5
#30	0.6	70.9
#40	0.425	67.5
#50	0.3	60.5
#100	0.15	43.5
#200	0.075	35.0



Remarks:

Gravel	20.1	%	Sand	44.9	%
Passing #200 Sieve (Silt & Clay)				35.0	%

Performed by: B. Bills

Reviewed by: E. Jeske, PE
GESTRA Engineering, Inc.

GESTRA Engineering, Inc
2223 Industrial Drive
Monona, WI 53713
Phone: (608) 222-9406; Fax: (608) 222-9408

Laboratory Test Results

Project Name:	Truax Beddown Facility	Date:	November 24, 2020
Project Number:	M20068-10	Report To:	Hanson
Project Location:	Madison, WI		

Laboratory Test Results of Resistivity of Soil (Miller Box)

ASTM Designation: G57

Boring Number	B-4	B-8
Sample Number	2	2
Moisture Content (%)		
Temperature of Sample (°F)	71.6	70.00
Temperature of Sample (°C)	22.00	21.11
Resistivty Value (Ω*cm)	17,000	11,000
Corrected Resistivty Value (Ω*cm)	19,763	12,543

Laboratory Test Results of pH of Soils

ASTM Designation: D4972-Method A "pH meter"

Boring Number	B-8
Sample Number	2
pH	8.6

Performed by: BJB

Reviewed By: E. Jeske, PE
GESTRA Engineering

PO Box 572455 / Salt Lake City UT 84157-2455 / USA
TEL +1 801 262 2448 · FAX +1 801 262 9870 · www.TEi-TS.com

GESTRA ENGINEERING INCORPORATED
191 WEST EDGERTON AVENUE
MILWAUKEE WI 53207-6020
USA

Analysis No.	TS-2009117
Report Date	03 November 2020
Date Sampled	26 October 2020
Date Received	30 October 2020
Where Sampled	Milwaukee, WI USA
Sampled By	Client

This is to attest that we have examined: Soil for Project Name: Truax Beddown Facility; Site Location: Madison, WI; Job Number: M20068-40

When examined to the applicable requirements of:

ASTM C 1580-15 "Standard Test Method for Water-Soluble Sulfate in Soil"

Results:

ASTM C 1580 - Sulfate (soluble)

Sample		Results		Detection Limit
		ppm (mg/kg)	%[1]	
B-8		942.	0.0942	10.
SS-1	Sand			

NOTE: [1]Percent by weight after drying.

END OF ANALYSIS

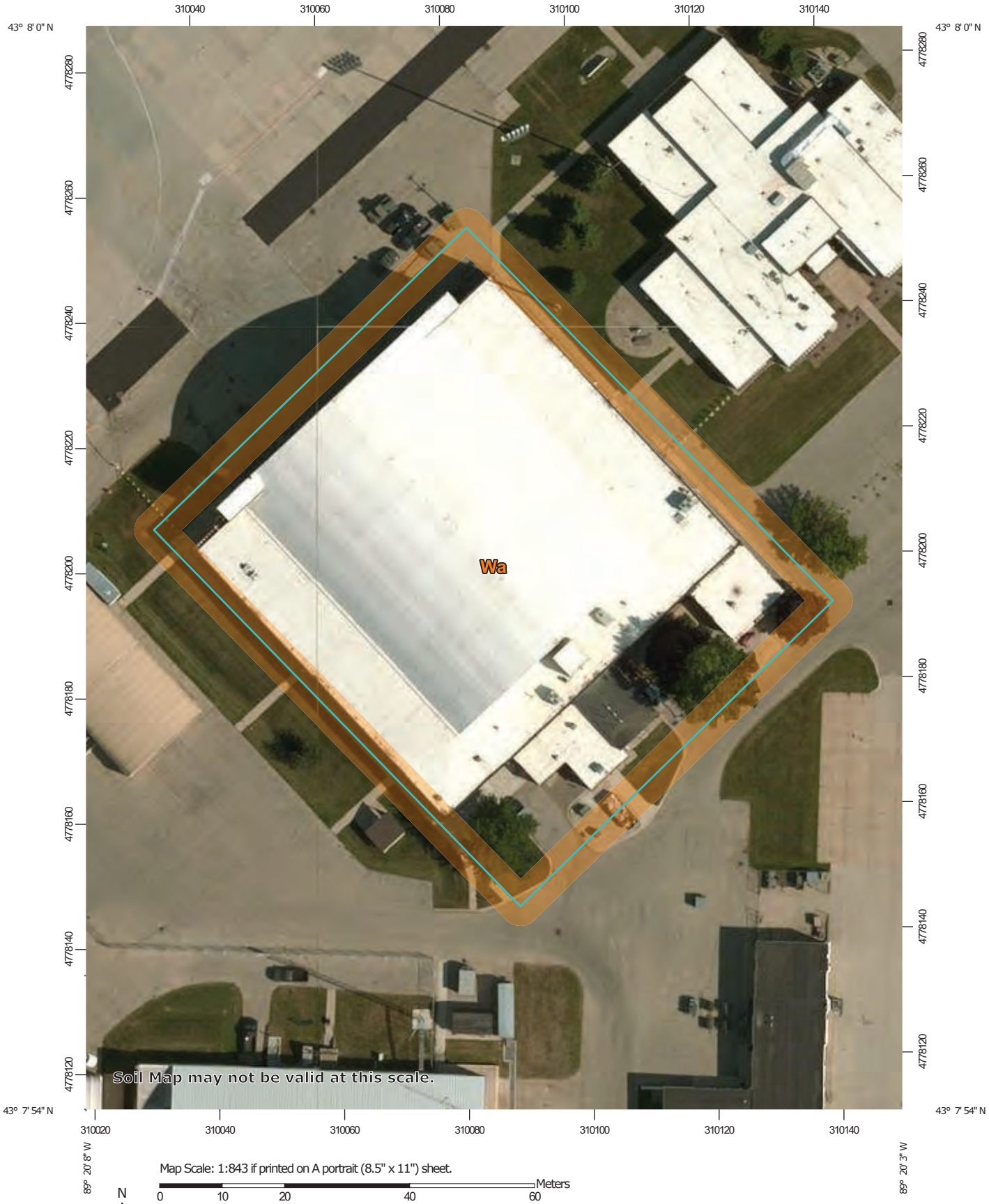
USEPA Laboratory ID UT00930

Merrill Gee P.E. – Engineer in Charge

APPENDIX III

WEB SOIL SURVEY

Soil Map—Dane County, Wisconsin



Map Scale: 1:843 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dane County, Wisconsin
Survey Area Data: Version 19, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 16, 2013—Aug 29, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Wa	Wacousta silty clay loam, 0 to 2 percent slopes	1.5	100.0%
Totals for Area of Interest		**1.5**	**100.0%**

WISCONSIN AIR NATIONAL GUARD
HEADQUARTERS 115TH FIGHTER WING (ACC) (ANG)
3110 MITCHELL STREET
MADISON WISCONSIN 53704-2529

13 October 2021

MEMORANDUM FOR WISCONSIN DEPARTMENT OF NATURAL RESOURCES

FROM: 115 CES/CC

SUBJECT: XGFG182009 F-35 Alter B400, Truax Field. Materials Management Plan Addendum – BRRTS #: 02-13-585319

1. Pursuant to the 21 July 2021 approved materials management plan, this serves as a project specific addendum for the subject project.

2. Attachment 1 details PFAS sampling results for the subject project. The single sample point within the sampling area contained PFAS compromised soil. For materials removed within the project site, materials will be managed as PFAS compromised soil. Materials removed within these boundaries (vertically and horizontally) will be managed in accordance with the 21 July 2021 letter, BRRTS #: 02-13-585319. The sample boundaries represent the entirety of the construction area.

3. If you have any additional questions, please feel free to contact me at 608-286-0010 or michael.dunlap@us.af.mil at any time. Thank you in advance for your review of this material management plan.

DUNLAP.MICHAEL.J.1138452693 Digitally signed by DUNLAP.MICHAEL.J.1138452693 Date: 2021.10.13 16:57:03 -05'00'

MICHAEL J. DUNLAP, Lt Col, WI ANG
Commander, 115th Civil Engineer Squadron
Base Civil Engineer, 115th Fighter Wing

Attachment:
1. B400 Sampling Report Results
2. B400 Sampling Plan

B400 Soil sampling results - PFAS

Site	Analyte	CAS Number	Conc. (ng/g)	MDL	RL	Qualifiers	WI RCL NI (ng/g)	EPA RSL (ng/g)
02-AA-MW-5 1'-1.5'	PFBA	375-22-4	0.434	0.332	0.480	J		
02-AA-MW-5 1'-1.5'	PFPeA	2706-90-3	**0.883**	0.382	0.480			
02-AA-MW-5 1'-1.5'	PFHxA	307-24-4	0.420	0.207	0.480	J		
02-AA-MW-5 1'-1.5'	PFHpA	375-85-9	**0.552**	0.459	0.480			
02-AA-MW-5 1'-1.5'	PFHxS	355-46-4	**3.36**	0.374	0.480			
02-AA-MW-5 1'-1.5'	PFOA	335-67-1	**2.21**	0.451	0.480		1260	1260
02-AA-MW-5 1'-1.5'	PFNA	375-95-1	**0.620**	0.300	0.480			
02-AA-MW-5 1'-1.5'	PFOS	1763-23-1	**6.25**	0.413	0.480	Q	1260	1260
02-AA-MW-5 2'-2.5'	6:2 FTS	27619-97-2	**1.74**	0.631	0.965			
02-AA-MW-5 2'-2.5'	PFOSA	754-91-6	**16.3**	0.972	1.45	Q		
02-AA-MW-5 2'-2.5'	PFOS	1763-23-1	**15.9**	0.415	0.482		1260	1260
02-AA-MW-5 2'-2.5'	8:2 FTS	39108-34-4	**2.87**	0.696	0.965			

WI RCL NI - Wisconsin DNR Residual Contaminant Level - non-industrial

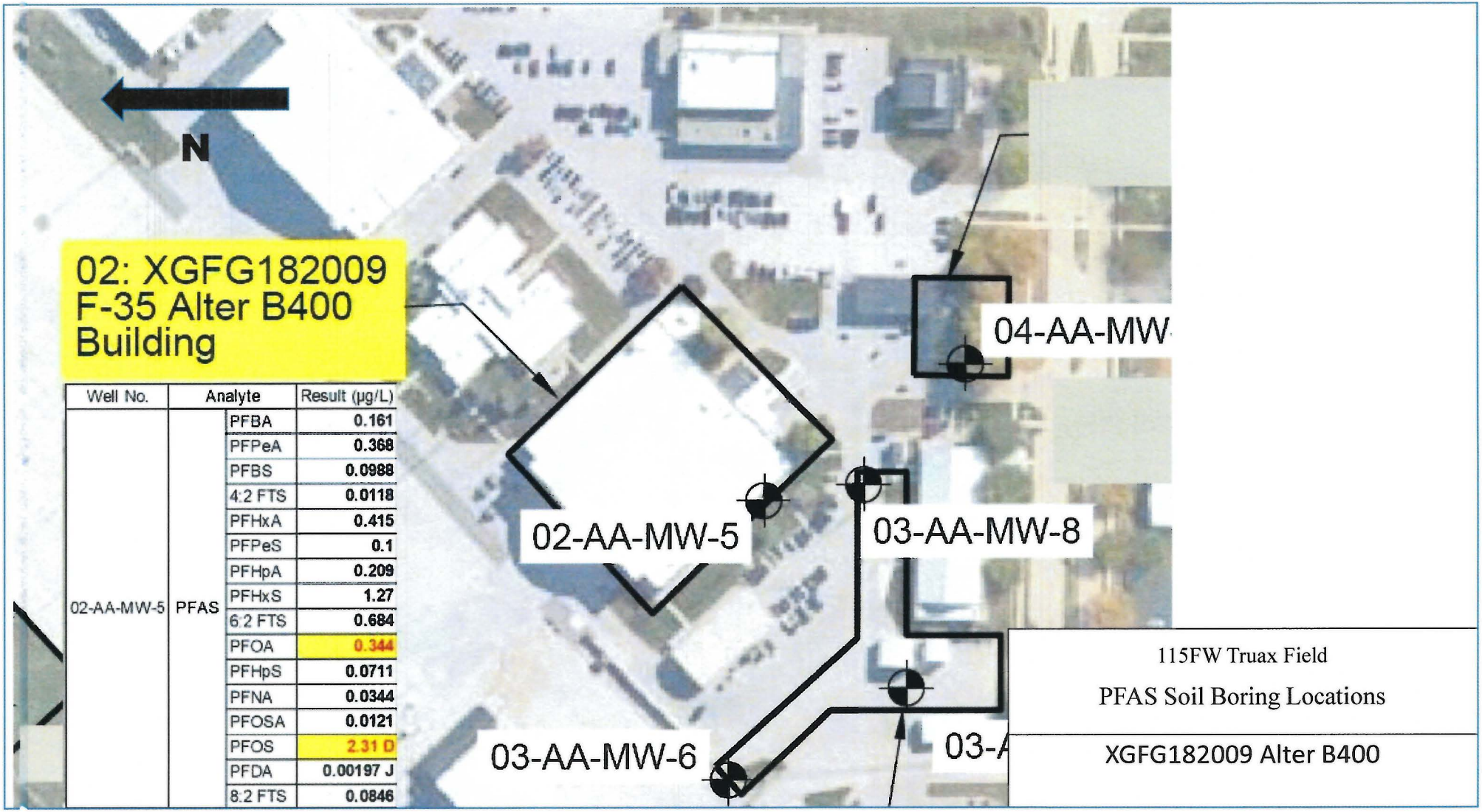
EPA RSL - US EPA Regional Screening Level (AF guidance for soils and sediments)

MDL = Method Detection Limit

RL = Reporting Limit

J = The amount detected is below the Reporting Limit/LOQ

Q = The ion transition ratio is outside of the acceptance criteria.



Well No.	Analyte		Result (µg/L)
02-AA-MW-5	PFAS	PFBA	0.161
		PFPeA	0.368
		PFBS	0.0988
		4:2 FTS	0.0118
		PFHxA	0.415
		PFPeS	0.1
		PFHpA	0.209
		PFHxS	1.27
		6:2 FTS	0.684
		PFOA	0.344
		PFHpS	0.0711
		PFNA	0.0344
		PFOSA	0.0121
		PFOS	2.31 D
		PFDA	0.00197 J
		8:2 FTS	0.0846

115FW Truax Field

PFAS Soil Boring Locations

XGFG182009 Alter B400