November 3, 2017

Mr. Jacob Hassan
Federal On-Scene Coordinator
U.S. Environmental Protection Agency Region 5
77 W. Jackson Street
Chicago, Illinois 60606

Subject: **Data Management Plan – Revision 2.3**
USS Lead Site
East Chicago, Lake County, Indiana
EPA Contract No. EP-S5-13-01
EPA TDD No. 0017-1704-005
Document Tracking No. (DTN): 1690A

Dear Mr. Hassan:

The Tetra Tech, Inc. Superfund Technical Assessment and Response Team (START) is submitting the Data Management Plan – Revision 2.3 to document data management processes and procedures for the USS Lead site in East Chicago, Lake County, Indiana. This revision addresses specific comments provided by EPA in preparation for limited distribution of the plan.

Please call me at (312) 201-7771 if you have any questions or comments regarding this submittal.

Sincerely,

Justin Button-Hutchens

Project Manager

DATA MANAGEMENT PLAN

USS LEAD SITE
EAST CHICAGO, LAKE COUNTY, INDIANA

Revision 2.3

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 5
Chicago, Illinois 60604

TDD#:	0017-1704-005	
EPA OSC:	Jacob Hassan	
SITE NAME:	USS Lead	
SITE LOCATION:	East Chicago, IN	
PLAN PREPARER:	Justin Button-Hutchens	
SIGNATURE/DATE:		November 3, 2017
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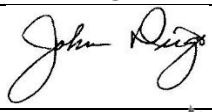
SIGNATURE/DATE:		November 3, 2017
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List of Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
COC	Chain of Custody
DBA	Database Administrator
ECHA	East Chicago Housing Authority
EDD	Electronic Data Deliverable
EPA	U.S. Environmental Protection Agency
ER	Emergency Response
ERRS	Emergency and Rapid Response Services
ERT	Environmental Response Team
GIS	Geographic Information Systems
GPS	Global positioning system
HUD	U.S. Department of Housing and Urban Development
ICS	Incident Command System
NPL	National Priorities List
OSC	On-Scene Coordinator
OU	Operating Unit
PII	Personally Identifiable Information
PDF	Portable document format file
QA	Quality Assurance
QC	Quality Control
SOP	Standard Operating Procedure
SQL	Structured Query Language
SSDMP	Site-Specific Data Management Plan
START	Superfund Technical Assessment and Response Team
TDD	Technical Direction Document
TWA	Time-Weighted Average
USS Lead	U.S. Smelter and Lead Refinery
VPN	Virtual Private Network
WCHC	West Calumet Housing Complex
WMA	Web-based Mapping Application
XRF	X-ray Fluorescence

1.0 Site Background / Overview

Tetra Tech, Inc. prepared this Site-Specific Data Management Plan (SSDMP) for the U.S. Smelter and Lead Refinery, Inc. (USS Lead) site under U. S. Environmental Protection Agency (EPA) Region 5 Superfund Technical Assessment and Response Team (START) contract No. EP-S5-13-01 Technical Direction Document (TDD) Nos. S05-0014-1608-007 and S05-0017-1704-005. This SSDMP identifies data management protocols and procedures for managing the environmental and situational awareness information collected during removal and remedial site activities at the USS Lead site. This plan includes documentation for the data collection and management tools used on the USS Lead site along with data work flows from collection to archival in approved systems.

The USS Lead site is located in East Chicago, Lake County, Indiana (see Figure 1 in Appendix A). A copper smelter, lead refinery, and secondary lead smelter operated on site from the 1920s until 1985. Smelting operations volatilized metals including lead and arsenic. Dust containing various metal constituents was deposited by wind on area soils during these operations. Blast furnace slag was stockpiled south of the plant building and spread once a year over an adjoining 21-acre wetland south of the site. The primary contaminants of concern are lead and arsenic, which are present in exposed soils and inside area residences, as revealed by soil and dust sampling.

EPA listed the USS Lead site on the National Priorities List (NPL) in 2009. Part of the former USS Lead facility — along with nearby commercial, municipal, and residential areas — make up the 79-acre site, which EPA has divided into two operating units (OUs). OU1 is bounded by East Chicago Avenue to the north, Parrish Avenue to the east, East 151st Street and the Soo Line Railroad to the south, and the Indiana Harbor Canal to the west. OU2 is bounded by Soo Line Railroads to the north and east and the Grand Calumet River to the south and west. EPA's removal and remedial site activities are limited to OU1.

OU1 is divided into three zones, as shown in Figure 2 in Appendix A. The Removal Program has addressed soil and indoor dust contamination in Zone 1, specifically at the West Calumet Housing Complex (WCHC), where mulch has been spread over all exposed soils. Indoor samples were collected in consenting occupied WCHC residences. These residences have been cleaned by EPA's Emergency and Rapid Response Services (ERRS) contractors independent of the indoor sampling results. The Removal Program has also collected residential dust samples and conducted indoor cleanings in a small subset of homes in Zones 2 and 3. The Remedial Program conducted outdoor soil sampling in Zones 2 and 3, which led to excavation of a small subset of properties in Zones 2 and 3 by both the Removal and Remedial Programs, with the intention of conducting additional excavations and indoor cleanings during the 2017 field season based on sampling results.

During the 2017 field season, the Removal Program excavated 103 residential yards, collected interior dust samples, and cleaned the interior in 56 percent of residences within Zone 2. The Removal Program also excavated six public areas in Zone 2, including public parks, railroad rights-of-way, and vacant lots. The Remedial Program excavated 120 residential yards within Zone 3. The Removal Program collected interior dust samples and cleaned the interior in 67 percent of residences within Zone 3.

EPA is working to address contamination at the USS Lead site in a Unified Command with the City of East Chicago, the East Chicago Housing Authority (ECHA), the State of Indiana, the Agency for Toxic

Substances and Disease Registry (ATSDR), and the U. S. Department of Housing and Urban Development (HUD).

2.0 Site-Specific Data Management Plan Objectives

The objective of this SSDMP is to provide a clear understanding of site-wide USS Lead data collection, management, reporting, and visualization practices. The documentation of these practices is for reproducibility by other contractors and to meet EPA's site documentation requirements. Procedures for sharing data between responding agencies and throughout the incident command system (ICS) and procedures for producing electronic and hard copy deliverables of specific data types are included in this plan. Finally, this plan is intended to promote consistent use and distribution of project data by internal and external parties.

3.0 Special Considerations Relating to the Site

All data captured on and relating to the USS Lead site are for internal use by the EPA. Data collected during site activities may contain personally identifiable information (PII) and thus should be secured and managed according to EPA standards. EPA On-Scene Coordinators (OSCs) or other EPA representatives will determine which agencies or individuals have access to data and which data will be released to the public. The data collection, management, and display processes outlined in this plan use secured systems that require pre-authorized access or the use of Virtual Private Network (VPN) software. For additional information or to gain access to the data, see the Standard Operating Procedures (SOPs) included in Appendix B and referenced in Section 5.3, below.

4.0 Site-Specific Data Management Plan Revision History

The table below describes the revision history of this SSDMP.

Table 1: SSDMP Revision History

SSDMP Version	Revision Date	Author	Description of Changes
1.0	9/1/2016	B. Cooper, L. Foster, C. Willits	Development of initial SSDMP
1.5	10/8/2016	B. Cooper, L. Foster, C. Willits	Minor revisions to initial SSDMP
2.0	3/31/2017	R. Kondreck, A. Kleist, L. Cannon, K. Brown	Overhaul of draft SSDMP to account for all data streams and SOPs describing how to process data
2.1	4/14/2017	R. Kondreck, A. Kleist, L. Cannon, K. Brown	Minor revisions to draft SSDMP Version 2.0
2.2	4/28/2017	R. Kondreck. A. Kleist, J. Button-Hutchens	Minor revisions to draft SSDMP Version 2.1
2.3	10/31/2017	R. Kondreck, J. Button-Hutchens	Minor revisions to draft SSDMP Version 2.2, revisions to SOP 81 and SOP 83.

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5.0 USS Lead Data Management Workflow

Data collected at the USS Lead site can be grouped into four data streams: (1) Real-Time Quantitative Data, (2) Continuous Real-Time Data, (3) Laboratory Data, and (4) Qualitative Data. These data streams are generated by EPA and its contractors using electronic and paper collection tools that are housed in databases and file management systems related to the site. Data collected during field operations and from monitoring and sampling devices undergo systematic quality control prior to release for viewing in geospatial and report products. The general USS Lead site workflows, including setup procedures, and detailed data stream workflows are defined in the subsections below.

5.1 Workflow Setup

General workflow set-up started by acquiring publicly available datasets such as parcel boundaries and addresses of the properties included in the USS Lead site. These data were acquired through the Indiana Geological Survey (IGS 2015) and the Indiana Department of Homeland Security (Indiana 2016) websites. Parcels were assigned random property identification numbers (0 to 1000 for Zone 1, 2000 to 2999 for Zone 2, and 3000 to 3999 for Zone 3) to protect PII. Parcels may also be referenced using property identification numbers that correlate to the house number and street that were developed and used prior to 2016 (4856 Melville or MELV4856). Parcel boundaries were modified as needed based on in-field observations (for example, combining multiple parcels into one property).

These resulting data assigned each property in Zones 1 through 3 a parcel boundary with an associated address and random or correlated property number assignment. These data were uploaded into ArcGIS Collector, ArcGIS Survey123, and into the Scribe Database, feeding the data streams described in the next section. ArcGIS Collector and ArcGIS Survey123 are digital data collection applications available for iOS or Android tablet computers and were used for field data collection. Scribe is a software tool developed by the EPA's Environmental Response Team (ERT) to assist in the process of managing environmental data (EPA 2017a). These data are accessed through a Scribe database that is distributed through Scribe.net subscription services.

5.2 General Workflow Overview

Data generated during field activities follow a common workflow: once collected and quality control (QC) checked, data are processed and loaded into Scribe, a site-specific structured query language (SQL) database. Data can be published on line from the local database, to Scribe.net and transferred to the Region 5 Emergency Response (ER) Cloud environment. Data are then further processed and loaded on the EPA GeoPlatform and made available for viewing in the USS Lead site Dashboard. The EPA Region 5 – USS Lead Dashboard is a web-based mapping application (WMA) housed on the EPA GeoPlatform. The USS Lead Dashboard visualizes the data generated from the four data streams detailed in Section 5.3 as feature services. Additionally, the USS Lead Dashboard contains historical imagery, and points, lines and areas feature services. Alternately, data can be collected, QC checked, and uploaded directly to a virtual storage server such as a MyCloud device. MyCloud is a data storage server that is accessible remotely via an on-line interface.

Deviations from this general workflow may include the development of on-site geographic information system (GIS) products, such as hard-copy maps and reports, for use during field activities. These data are back-loaded into the site-specific database on the ER Cloud as backup and for site documentation.

Figure 1 on the following page depicts the generalized workflow of the four data streams mentioned in Section 5.0. Each of the four data streams is further explained in the following section.

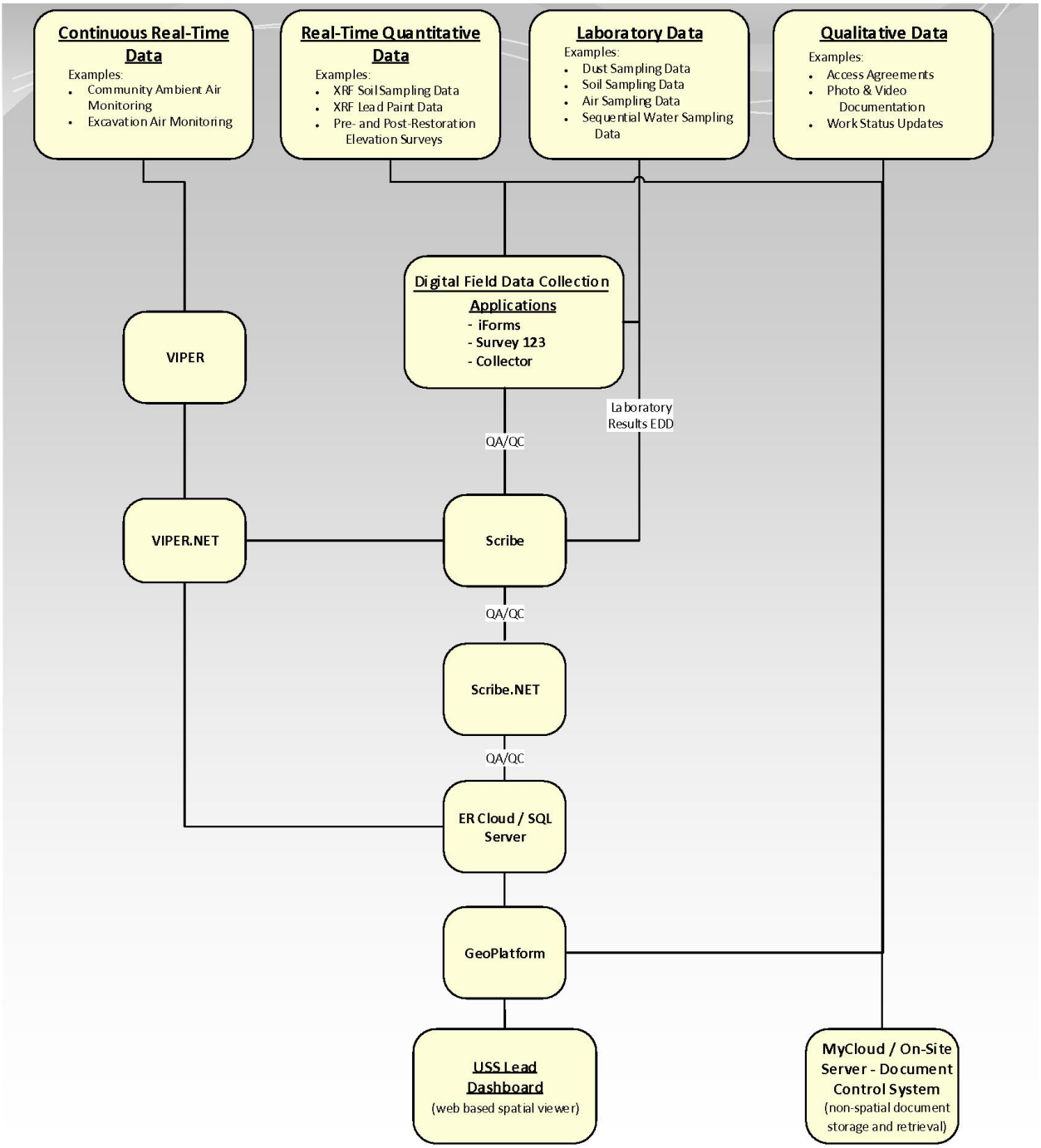


Figure 1: USS Lead Site General Workflow Diagram

Notes:
EDD Electronic data deliverable
QA/QC Quality assurance/quality control
XRF X-ray fluorescence

5.3 Data Streams by Activity

Each data stream for the USS Lead site follows a specific workflow detailing data management steps from data collection through QC checking, processing, and displaying the data. Data collected at the USS Lead site were grouped into data streams that followed a similar workflow. In total, four data streams were identified: (1) Real-Time Quantitative Data, (2) Continuous Real-Time Data, (3) Laboratory Data, and (4) Qualitative Data. Additional data streams may be added as the site progresses if new data do not fit into the present categories. A summary of the data streams is provided in Table 2, below.

Table 2: Summary of Data Streams by Activity

Data Stream	Description	Data
Real-Time Quantitative Data	Data generated on site using real-time screening or survey equipment that result in a chemical concentration or geographical location at one sample point.	-XRF Lead Paint Screening Data -XRF Soil Screening Data -Pre- and Post-Restoration Elevation Surveys -Final Excavation Elevations/Rootwad Mapping -Licensed Survey Data -RTK Survey Data -Pegasus Survey Data
Continuous Real-Time Data	Data generated on site using continuous, real-time air monitoring equipment and associated telemetry systems, resulting in a continuous stream of data that can be monitored in real time for concentrations of relevant air quality measures.	-VIPER Data from DustTrak
Laboratory Data	Data generated both on site and off site that result in a laboratory determination of a chemical concentration of a particular sample.	-Dust Sample Data -Soil Sample Data -Low-Flow Excavation Air Sample Data -High-Volume Ambient Air Sample Data -Sequential Water Sample Data
Qualitative Data	Data generated on site that are not numeric in nature.	-Photographic and Video Documentation -Indoor Documentation Form -Property Closeout Form -Interview Questionnaire

Note:
XRF – X-Ray fluorescence
RTK – Real-Time Kinematic

EPA and multiple contractors—including Tetra Tech, SulTRAC, CH2M, Environmental Restoration, and SRS—are responsible for generating data in one or more of the data streams described above. Data management procedures may vary resulting from contractor idiosyncrasies in generating data; however, the documentation below provides standards for how data should be collected and processed. Substantial deviations will be documented in contractor-specific SOPs and alternative workflows. Contractor-specific documentation will be added to future SSDMP revisions if necessary.

5.3.1 Real-Time Quantitative Data

The Real-Time Quantitative Data stream is defined as data generated on-site using real-time screening or survey equipment that results in a chemical concentration or a geographical location at one sample point. Qualitative or observational data may also be collected as part of this data stream. The general data flow for the Real-Time Quantitative Data stream is described below. Activities at USS Lead associated with this data stream include lead-based paint screening conducted using an X-ray fluorescence (XRF) analyzer, XRF soil screening, initial and final excavation elevations, various site surveys, and geographical mapping of root masses contained within excavation footprints. Specific procedures for collecting and processing data in this data stream are included in Tetra Tech site-specific SOPs found in Appendix B.

Collection of this type of data starts by entering information into a digital data collection application running on tablet computers. Each sampling team will be equipped with a tablet computer that will have access to the specific applications used at the USS Lead site. Activity-specific instructions on entering information into the application are included in Tetra Tech SOPs No. 080, "Collector for ArcGIS," and No. 081, "iForm and Survey123 Data Entry." The data are collected in the application, then synced with a corresponding on-line database and downloaded by the Field Data Manager for QC review. Procedures for downloading and QC reviewing the forms are outlined in Tetra Tech SOP No. 083, "Downloading Data from TetraForms and Survey123." After QC review, the data are sent to the Database Administrator (DBA) for import into Scribe. Once the data are in Scribe, the DBA uses the steps outlined in Tetra Tech SOP No. 085, "Scribe Database Management" to conduct an additional QC check. Finally, the database is published to Scribe.net, where it can be accessed by field teams using subscription services.

Data published to Scribe.net will be synced to an SQL server database in the ER Cloud environment using a web service. The SQL Server will then be used for GIS and reporting purposes. GIS software is connected to the SQL Server (typically SQL View), from which maps and GIS files can be created. Files can then be uploaded to the EPA GeoPlatform and used in the USS Lead Dashboard WMA according to steps described in Tetra Tech SOP No. 086, "Dashboard/GeoPlatform."

Table 3 describes the sampling activities, collection tools, form names, and contractors associated with the Real-Time Quantitative Data stream. The SOPs referenced above seek to standardize procedures for this data stream; however, the SOPs may not cover how all contractors collect their data. The forms created to standardize some data collection are documented in Table 3. Their names are subject to change because the forms are frequently revised. Current names and versions of the forms are listed below and can also be found in the associated collection tool.

Table 3: Summary of Real-Time Quantitative Data Stream

Activity	Collection Tool	Form Name	Data Generator
XRF Lead Paint	iForm	USS Lead – START Residential Inspection Sampling Form	Tetra Tech
XRF Soil Screening	iForm	XRF Screening (Excavation) and XRF QC Standard Form	Tetra Tech, CH2M
XRF Soil Screening	iForm	Residential Yards Soil Sampling Form	SulTRAC
Pre- and Post-Restoration Elevation Surveys	Leica Survey Equipment	Not applicable	Tetra Tech, CH2M

Activity	Collection Tool	Form Name	Data Generator
Final Excavation Elevations/Rootwad Mapping	Survey123	Excavation Tracking Form (Excavation Depth)	Tetra Tech, CH2M
Licensed Survey	Professional Survey	Not applicable	ERRS Subcontractor
RTK Survey	RTK	Not applicable	EPA
Pegasus Survey	Pegasus	Not applicable	EPA

Figure 2, on the following page depicts the step-by-step process for real-time quantitative data management.

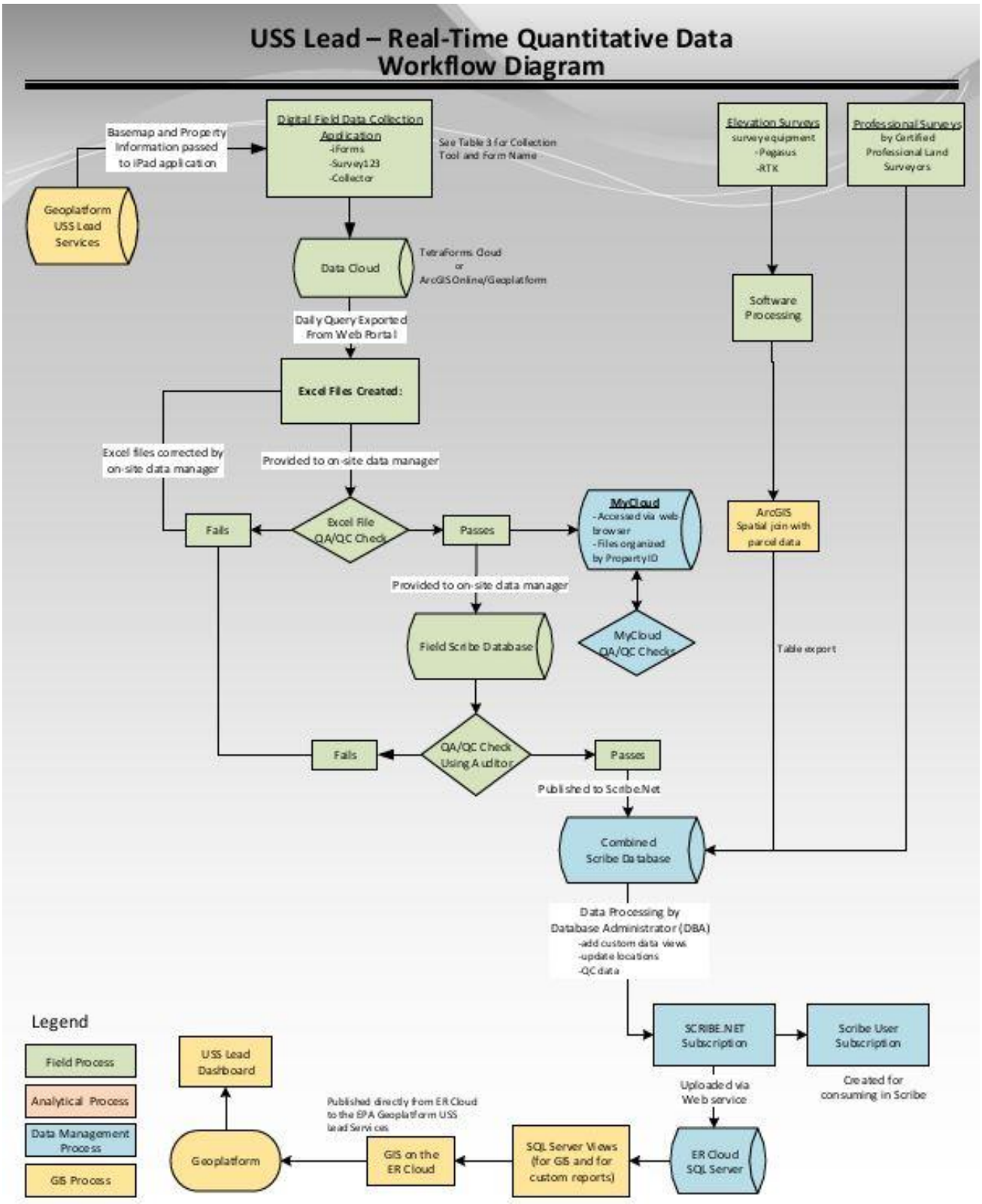


Figure 2: USS Lead Site Real-Time Quantitative Data Stream Flow Diagram

Notes:
QA/QC Quality assurance/quality control

5.3.2 Continuous Real-Time Data

The Continuous Real-Time Quantitative Data stream is defined as data generated on site using continuous, real-time air monitoring equipment and associated telemetry systems, resulting in a continuous stream of data that can be monitored in real time for concentrations of relevant air quality measures. Specific procedures for collection and processing of these data are included in Tetra Tech site-specific SOPs in Appendix B. At the USS Lead site, the activity associated with this data stream is community ambient air monitoring and excavation air monitoring.

Data are captured using a TSI DustTrak DRX 8553 (DustTrak) unit and transmitted using a VIPER deployment. VIPER is a wireless network-based communications system that enables real-time transmission of data from field sensors to local or remote computers (EPA 2017b). Monitoring equipment is deployed in multiple locations in and around the USS Lead site, where particulate monitoring and real-time weather data are collected and streamed to a local or virtual server. Instruments are outfitted with VIPER Lincs, coupled with Gateways, which stream data to the VIPER virtual server. From this virtual server, information is translated by a Meter App and sent on to the Survey Controller software. A "Run" is configured on the Survey Controller, where settings for data collection frequencies from each instrument and global positioning system (GPS) settings are established. Following the configuration of a Run, information being streamed via the VIPER system is stored in a database on the Survey Controller machine. Data is then published to VIPER.net via an internet connection and made available for online viewing in the VIPER Deployment Manager.

Once published to VIPER.net, data are also synced to an SQL Server in the ER Cloud where time-weighted averages (TWAs) can be calculated, and data are made available for use in reports and importing to GIS. GIS is used to process data transmitted via VIPER and make it available for viewing in the USS Lead Site Dashboard. Alternately, data can be downloaded directly off the DustTraks, and TWAs can be calculated using the steps outlined in Tetra Tech SOP No. 082, "Processing Direct-Download DustTrak Data." Regardless of the method, once calculated and QC checked, the TWAs imported into Scribe by the DBA.

Table 4 describes the monitoring activity, collection tool, and contractors generating data associated with the Continuous Real-Time Data stream. The SOPs outlined above seek to standardize procedures for this data stream; however the SOPs may not cover how all contractors collect and process their data. The forms created to standardize some data collection are documented in Table 4. The file name is not provided for the form because VIPER generates names for the files.

Table 4: Summary of Continuous Real-Time Quantitative Data Stream

Activity	Collection Tool	Form Name	Data Generator
Particulate Monitoring	DustTrak/VIPER	No form name – generated by DustTrak software or VIPER and exported as an Excel file for further assessment	Tetra Tech, SRS, CH2M

Figure 3 depicts the step-by-step process of air monitoring and weather data streaming via the VIPER system.

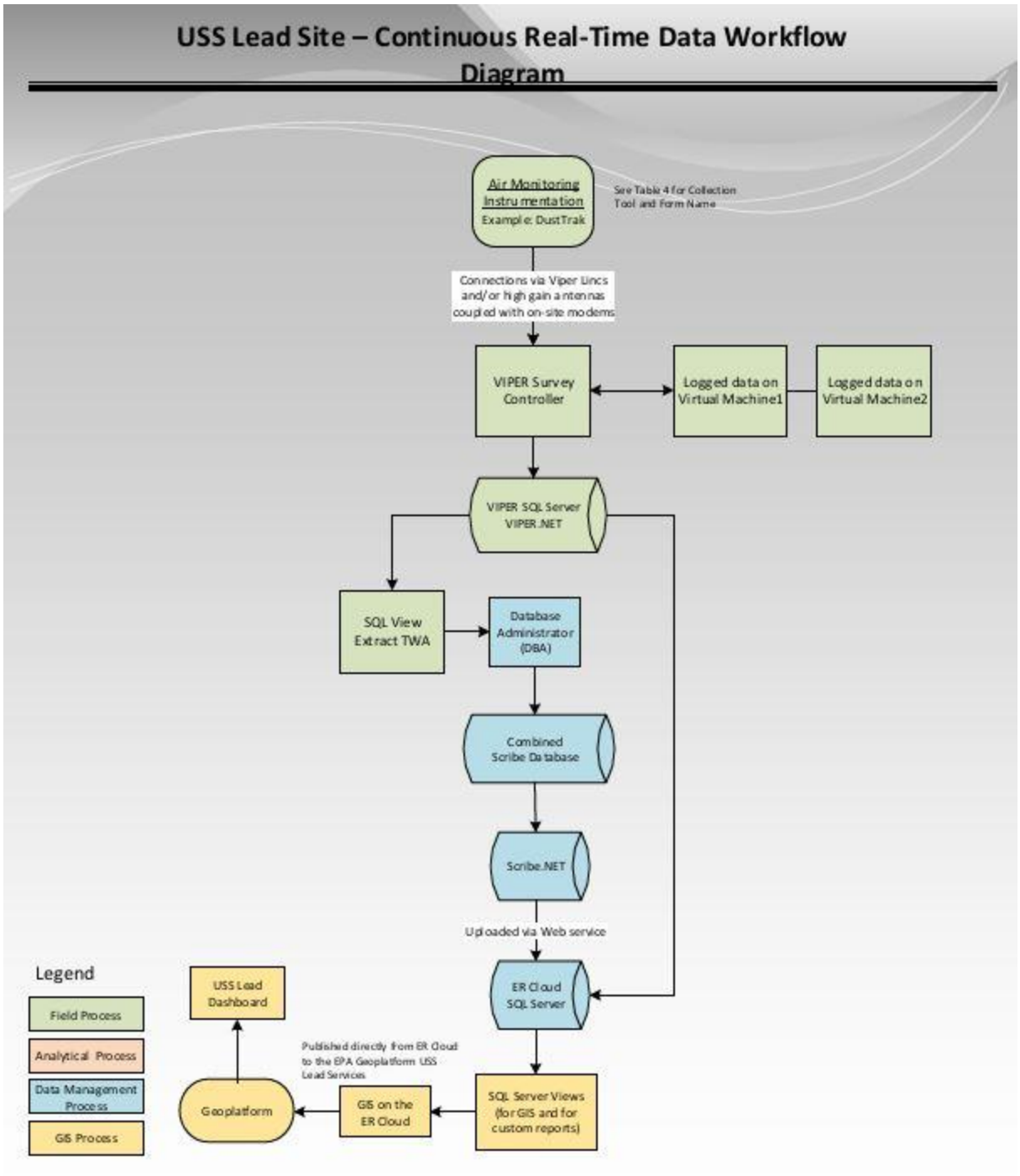


Figure 3: USS Lead Site Continuous Real-Time Data Stream Flow Diagram

Notes:
TWA Time-weighted average

5.3.3 Laboratory Data

The Laboratory Data stream is defined as data generated both on-site and off-site that results from a laboratory determination of a chemical concentration of a particular sample. Data generated on-site utilizes digital data capture technology to document sample characteristics. Qualitative or observational

data may also be collected as part of this data stream. Data generated off-site include reports generated by an accredited laboratory, which typically consists of analytical reports and electronic data deliverables (EDDs). EDDs are used to (1) determine a chemical concentration for the sample and (2) provide detailed QA/QC data to facilitate the validation of laboratory data. The activities at the USS Lead site associated with this data stream are indoor dust sampling, soil sampling, high-volume ambient air sampling, low-flow excavation air sampling, and sequential water sampling. Specific procedures on how to process data for each activity are described in detail in Tetra Tech's site-specific SOPs, included in Appendix B.

This data stream follows a similar workflow as the Real-Time Quantitative Data Stream described in Section 5.3.1 in that the data collection begins in the field with a digital data collection application. The field teams will be equipped with tablet computers to access specific data collection forms. When new samples are collected, the field team will enter the associated details into the application using steps outlined in either Tetra Tech SOP No. 080, "Collector for ArcGIS," or No. 081, "iForm and Survey123 Data Entry," and then sync the data into an on-line interface. The Field Data Manager will then download the data and perform a QC check according to Tetra Tech SOP No. 083, "Downloading Data from Tetra Forms and Survey123." The Field Data Manager can then import the data into the Scribe Field Database and generate a chain of custody (COC). Instructions for importing data to a Scribe Field Database and generating a COC can be found in Tetra Tech SOP No. 084, "Scribe Field Database." Once a COC is created, the data are sent to the DBA, where a QA/QC check is performed, and the results are published to Scribe.net, according to steps outlined in Tetra Tech SOP No. 085, "Scribe Database Management."

When an EDD is received from the laboratory, preliminary data will be sent to the DBA to be imported into the Scribe Analytical Database. Final (Level IV) data will be imported the same way but must first be validated by a START chemist. Once the EDDs are imported, the DBA will run a QA/QC check of Scribe to ensure that samples included in the EDDs match ones imported from the digital data collection application. Finally, the database is published to Scribe.net.

Table 5 describes the sampling activities, collection tools, form names, and contractors generating data associated with the Laboratory Data stream. The SOPs outlined above seek to standardize procedures for this data stream; however, the SOPs may not cover how all contractors collect or how all laboratories report their data. The forms created to standardize some data collection are documented in Table 5. The file names are subject to change and can be found in the associated digital data collection application.

Table 5: Summary of Laboratory Data Stream

Activity	Collection Tool	Form Name	Data Generator
Dust Sampling	iForm/ Logbook	USS Lead – START Residential Inspection Sampling Form/Logbook	Tetra Tech
Soil Sampling	iForm	Residential Yards Soil Sampling Form	SulTRAC
Low-Flow Excavation Air Sampling	iForm	USS Lead – START Personal Air Sampling (Monitoring) Form	Tetra Tech
High-Volume Ambient Air Sampling	iForm/ Logbook	USS Lead – START Ambient Air Sampling Short Form (no calculations)/Logbook	Tetra Tech
Sequential Water Samples	iForm	USS Lead – SRS Sequential Sampling Form	SRS
		USS Lead – START Sequential Sampling Form	Tetra Tech

Figure 4 below depicts the step-by-step process for laboratory data management.

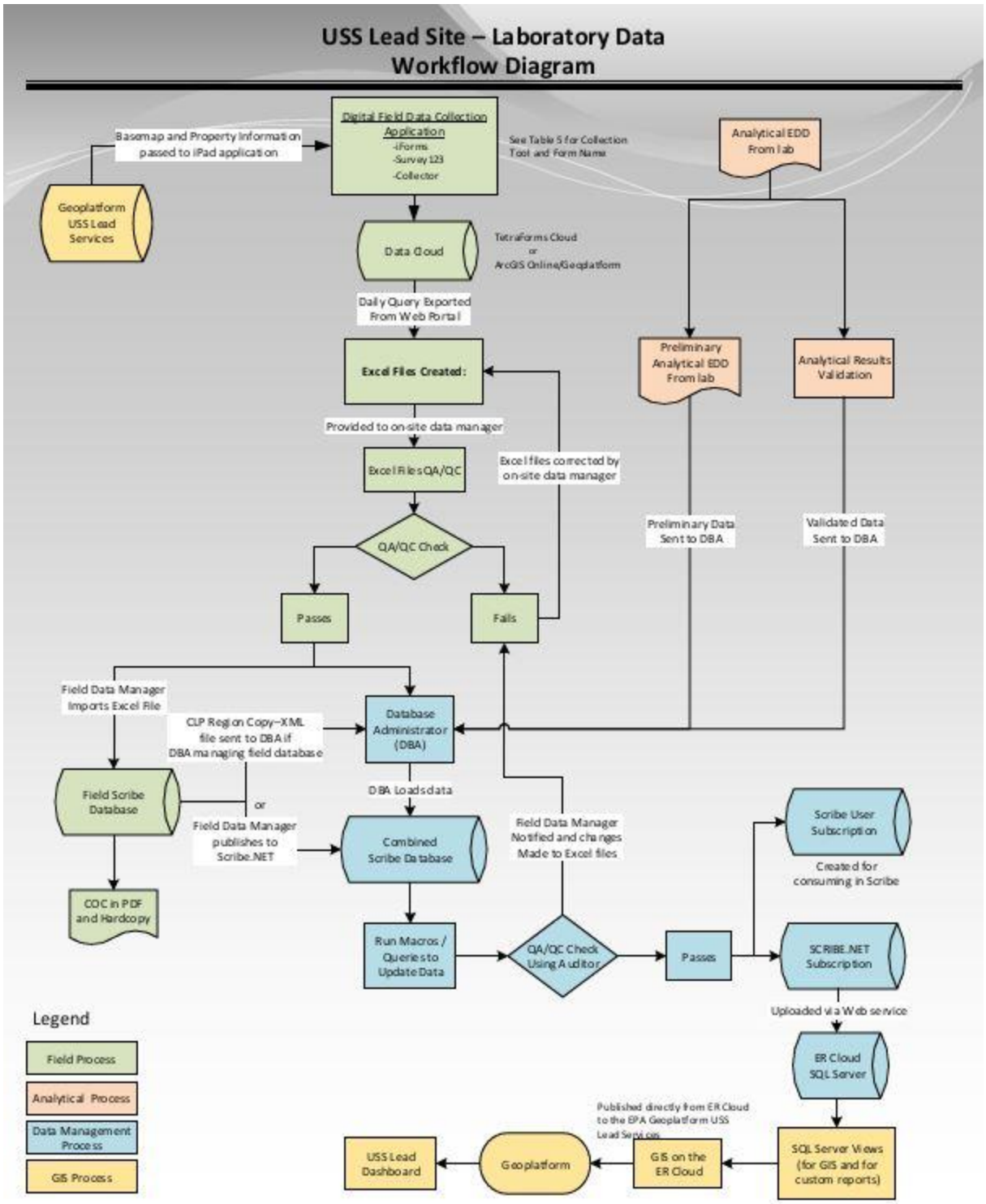


Figure 4: USS Lead Site Laboratory Data Stream Flow Diagram

5.3.4 Qualitative Data

The Qualitative Data stream is defined as data generated on-site that are not numerical. The data in this stream take the form of pictures, videos, portable document format (PDF) files, and qualitative characteristics associated with specific samples or properties as collected in digital data collection

applications. Collection and processing of data collected as part of this data stream are described in the site-specific SOPs referenced below. The activities associated with this data stream at the USS Lead site include resident interviews, and pre- and post-cleaning documentation.

Data in this stream can be collected in the digital data collection applications according to Tetra Tech SOP No. 081, "iForm and Survey123 Data Entry," and No. 80, "Collector for ArcGIS," then exported and uploaded to either MyCloud or the EPA GeoPlatform. Pictures and videos are captured in the field using cameras and camcorders, then downloaded locally and uploaded to the MyCloud. Field data sheets are scanned as PDF files and loaded to the MyCloud. Specific instructions on uploading data to the MyCloud can be found in Tetra Tech SOP No. 087, "Uploading Data to MyCloud," and procedures for loading or inputting qualitative Collector data onto the EPA GeoPlatform can be found in Tetra Tech SOP No. 086, "Dashboard/GeoPlatform."

Table 6 describes the activities, collection tools, form names, and contractors generating data associated with the Qualitative Data stream. The SOPs provided above seek to standardize procedures for this data stream; however, the SOPs may not cover how all contractors collected their data. The forms created to standardize some data collection are documented in Table 6. The file names are subject to change and can be found in the iForm application.

Table 6: Summary of Qualitative Data Stream

Activity	Collection Tool	Form Name	Data Generator
Interview Questionnaire	iForm	USS Lead – Interview Questionnaire	EPA
Property Closeout	Field Data Sheet	Property Closeout Form	Environmental Restoration (ER)
Indoor Documentation	Field Data Sheet/ Camera/Camcorder	USS Lead Indoor Documentation	Tetra Tech
Pre- and Post-Excavation Documentation	Field Data Sheet/ Camera/Camcorder	Indoor Documentation Checklist	ER

Figure 5, on the following page, depicts the step-by-step process of qualitative data management.

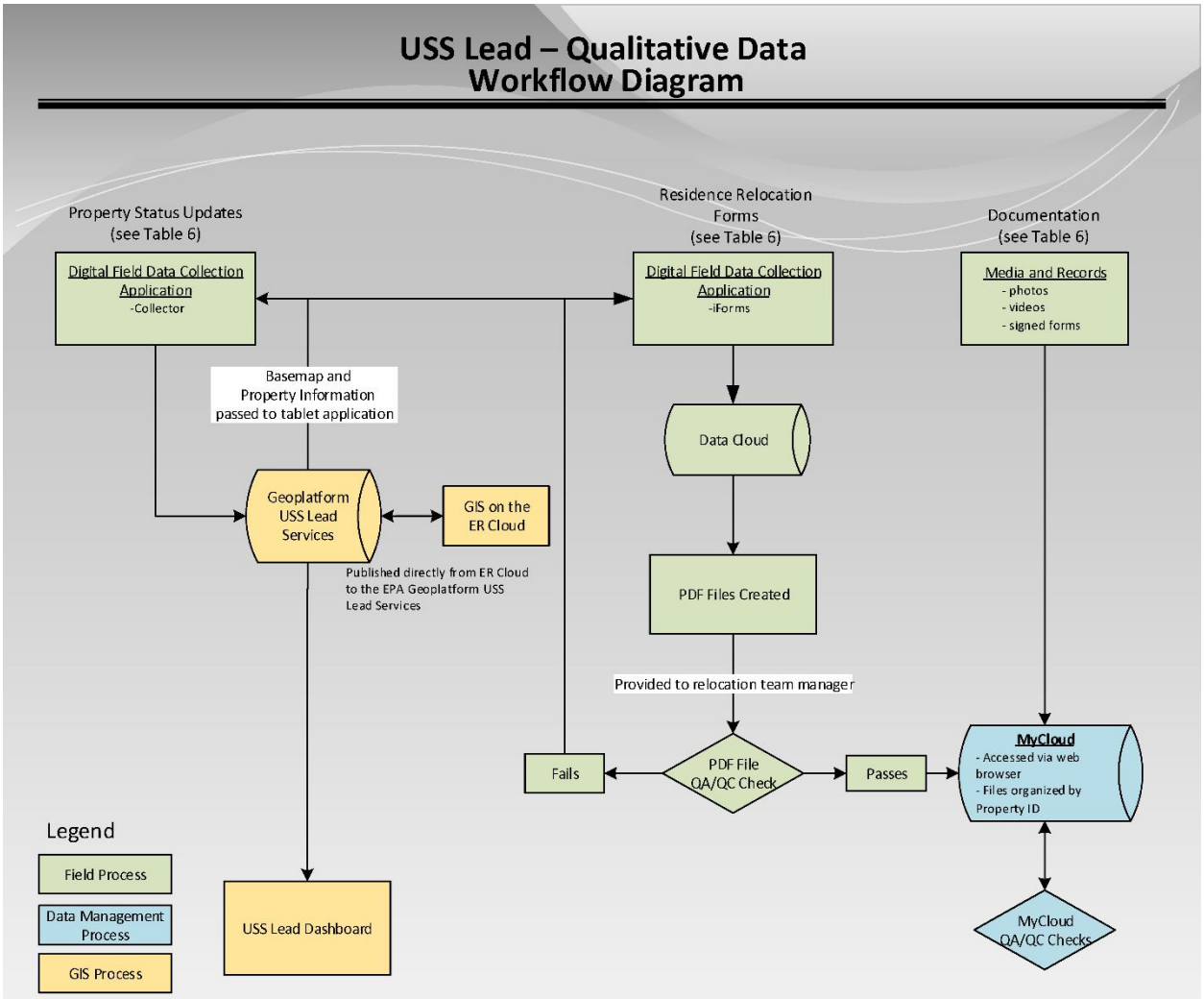


Figure 5: USS Lead Site Qualitative Data Stream Flow Diagram

6.0 Data Access and Distribution

The following subsections summarize access instructions and distribution methods for the data generated at the USS Lead site. The data are made up of three types: tabular data, qualitative data, and geospatial data. Tabular data are housed within Scribe databases and distributed with Scribe.net, qualitative data are stored on the MyCloud, and geospatial data are housed within the ER Cloud and distributed via the EPA Region 5 – USS Lead Dashboard on the EPA GeoPlatform.

6.1 Tabular Data Access and Overview

Tabular data consists of field data generated using a digital data collection application and laboratory analytical data. At the USS Lead site, Scribe captures sampling, observational, monitoring field data, and analytical laboratory data. The field data collected and imported to Scribe include results for high volume ambient air, low-flow personal air, sequential water, excavation survey data, indoor dust, and soil

samples. Observational data including property information, sampling locations, analyses, samplers, instrument, and remarks are associated with each of these field data inputs.

The field monitoring data collected through digital data collection applications are residential lead-based paint testing using an XRF analyzer, screening for arsenic and lead in soil using XRF analyzer, and collection of pre-excavation and confirmation of excavation depth GPS points. The analytical data provided from EDDs are preliminary and validated laboratory results from sampling events. All Scribe data are published to Scribe.net and accessed through Scribe.net subscription services. Users who need to access specific published Scribe projects are provided with a secure user account and password that will allow Scribe data to be downloaded for use in proprietary database applications such as Scribe software and SQL Server database on the ER Cloud. ERT Software Support controls setting up user accounts and subscription identifications with passwords.

The field air monitoring data collected through Survey Controller and VIPER Deployment Manager are particulate concentrations. The data provided from VIPER Deployment Manager are published to VIPER.NET and accessed through VIPER.NET subscription services. Users who need to access specific published VIPER projects are provided with a secure user account and password that will allow VIPER data to be downloaded for use in proprietary database applications such as Scribe software and SQL Server database on the ER Cloud. ERT Software Support controls setting up user accounts and subscription identifications with passwords.

All field data collected and stored on Scribe.NET and VIPER.NET can be accessed by the SQL Server database. The SQL Server database uses the subscription services of other databases, such as Scribe.NET and VIPER.NET, to received pushed data. Once the data are received, the SQL Server is used to manipulate the data as needed, and to convert the data into formats that can be consumed by different applications. For example, the SQL Server is used to perform an automated calculation of time-weighted averages on air monitoring data collected via VIPER and pushed to the SQL Server via VIPER.NET. Once these time-weighted averages are calculated, the SQL Server is used to convert the data into a format that can be consumed by the EPA Geoplatform, and pushed to the EPA Geoplatform to be presented in interactive web mapping applications.

For specific access instructions for the USS Lead Scribe database, see Tetra Tech SOP No. 085, "Scribe Database Management."

Application	Database/Project	Username[1]	Comment
Scribe	Removal#2979	R05 USS Lead	Tetra Tech - Dust, Air, XRF, Survey, and Water
Scribe	Remedial SulTRAC Field #2993	R05 USSLEAD_Sul	SulTRAC - Soil
Scribe	Remedial SRS Field #3030	R05 USSLead_SRSField	SRS – Air and Water
Scribe	Remedial Analytical #3000	N/A	N/A
Scribe	Remedial Combined #3024	USS Lead-SULTRAC COMBINED	Combines Projects #2993, #3000, and #3030
Scribe	Remedial Combined #3024	USS Lead Sultrac Combined	SulTRAC/SRS – Air, Soil, and Water
Scribe.NET	Scribe.NET Subscription	R05 ERCloud	Web service that pushes data housed on Scribe.NET to SQL Server
VIPER	VIPER5	viper_admin	X

Application	Database/Project	Username[1]	Comment
VIPER.NET	VIPER.NET Subscription	R05ERCloud	Web service that pushes data housed on VIPER.NET to SQL Server
SQL Server	SCRIBE5	Scribe_admin	Login for SQL users, provides access to all SQL databases
SQL Server	SCRIBE5	viewer_scribe5	Login for SQL users, provides access to all SQL databases
SQL Server	VIPER5	viper_admin	Login for SQL users, provides access to VIPER.NET databases
SQL Server	VIPER5	viewer_viper5	Login for SQL users, provides access to VIPER.NET databases
SQL Server	Multiple	viewer_R5	Login for SQL users, provides access to all SQL databases
SQL Server	iForm5	iform5_user	Login for SQL users, allows access to iForms databases
SQL Server	iForm5	viewer_iform5	Login for SQL users, allows access to iForm databases

[1] Password may be provided on request

N/A – Not Available

6.2 Qualitative Data Access and Overview

Qualitative data consists of field data generated that are not quantitative. The files are stored and can be accessed via a MyCloud device. At the USS Lead site, field data stored on the MyCloud include documentation photographs, videos, interview questionnaires, indoor documentation inventories, and property closeout forms. The MyCloud device can either be installed at the USS Lead field office, EPA's Regional office (77 W. Jackson Street, Chicago, Illinois), or the EPA Region 5 Warehouse (600a Joliet Road, Willowbrook, Illinois), and the files on the device are accessible from anywhere with Internet access. Users can access these files by logging-in to MyCloud using the steps outlined in Tetra Tech SOP No. 087, "Uploading Data to MyCloud."

Application[1]	Storage Location	Comments
MyCloud	Willowbrook/ EPA East Chicago Field Office	Tetra Tech
MyCloud	ERRS East Chicago Field Office	ERRS

[1] To access the MyCloud the user must be on the same internet connection as the MyCloud.

6.3 Geospatial Data Access and Overview

Geospatial data consists of Scribe.net SQL Server Views, feature/map services, and VIPER layers created by VIPER Deployment Manager. The data are accessed through EPA Region 5 – USS Lead Dashboard housed on the EPA GeoPlatform.

Users who need to access the USS Lead Dashboard must log into the EPA GeoPlatform with either an EPA Enterprise account or ArcGIS Online account. Within the EPA GeoPlatform, users will be invited to the Region 5 (R5) – USS Lead Group (INTERNAL) group.

Specific access instructions are provided in Tetra Tech SOP No. 086, "Dashboard/GeoPlatform," and Appendix B contains specific details on processing Scribe data so it can be displayed the USS Lead Dashboard.

Application	Database/Project	Views
Dashboard (http://rrt5.org)	USS Lead Internal Viewer and USS Lead Partner Viewer	Residential Dust Sampling Results Relocation Property Status (Internal Only) Lead-based Paint XRF Results Air Sampling and Monitoring Soil Sampling Results Soil Sampling Status Yard Excavation Status Sequential Water Sampling Results & Status (Internal Only) Elevation Surveys (Internal Only) Compare Analysis Gallery Historic Aerial Imagery Relocation Forms and Property Documentation (Internal Only) Help Guide (Draft)
Dashboard (http://rrt5.org)	USS Lead Public Viewer	Residential Soil and Dust Sampling Results Historic Aerial Imagery Compare Analysis of Historic Aerial Imagery

7.0 Data Security Considerations

Data collected on site includes PII. PII is information that can be used to identify, contact, or locate a single person or identify an individual in context. PII collected on site includes names, ages, phone numbers, and address of both adults and minors. The table below details PII data collected at the USS Lead site and how this information is being protected.

Table 7: USS Lead Site Data Security Measures

Data	Where Data are Collected/Available	How Data are Protected
Names (First and Last name of adults and/or minors at households) Ages (Ages of adults and/or minors at households) Phone Numbers (Contact information of households) Address (Location information of households)	Mobile Data Collection on tablet computers	Password protected tablet computers with automatic screen lock. Password protected data collection applications with ability to remotely wipe device if lost or stolen.
	Mobile Data Collection using ArcGIS Collector application	Password protected tablet computers with automatic screen lock. Password protected ArcGIS Collector application.
	On-site Server and personal computers	Site office is protected by key card lock on front doors with a guard during 9:00 am to 5:00 pm for allowing entry to local residences.
	Scribe.net Subscriptions	Password protected Subscription service with log-in credentials provide by ERT.
	Region V – USS Lead Dashboard	Password protected log-in into EPA GeoPlatform. ER Cloud is housed on FedRAM certified servers.

8.0 References

Indiana Geological Survey (IGS). 2015. Indiana University. "IGSMap: Map Gallery." https://igs.indiana.edu/IGSMAP/MapGallery.cfm

State of Indiana (Indiana). 2016. "Indiana Department of Homeland Security." http://www.in.gov/dhs/

U.S. Environmental Protection Agency (EPA). 2017a. "Scribe." https://response.epa.gov/site/site_profile.aspx?site_id=ScribeGIS

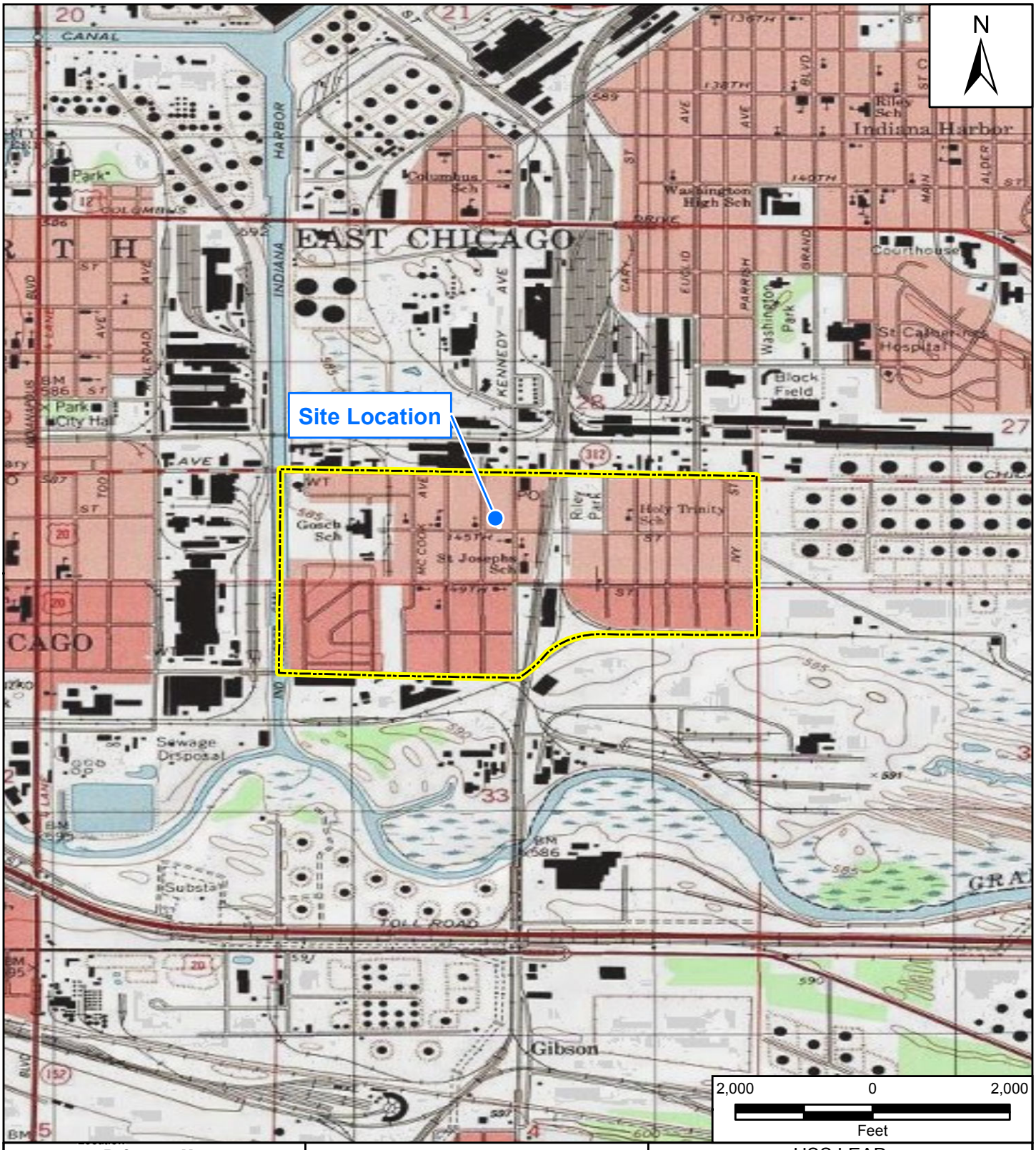
EPA. 2017b. "Viper Wireless Monitoring System." https://response.epa.gov/site/site_profile.aspx?site_id=5033

Appendix A

Site Figures

1 Site Location Map

2 Site Layout Map



Reference Map

Legend

Approximate Site Boundary

Source: USGS 7.5-Minute Topographic Quadrangle Map: Gary, IN 1991

USS LEAD
4920 Larkspur Street
East Chicago, Lake County, Indiana

Figure 1
Site Location Map

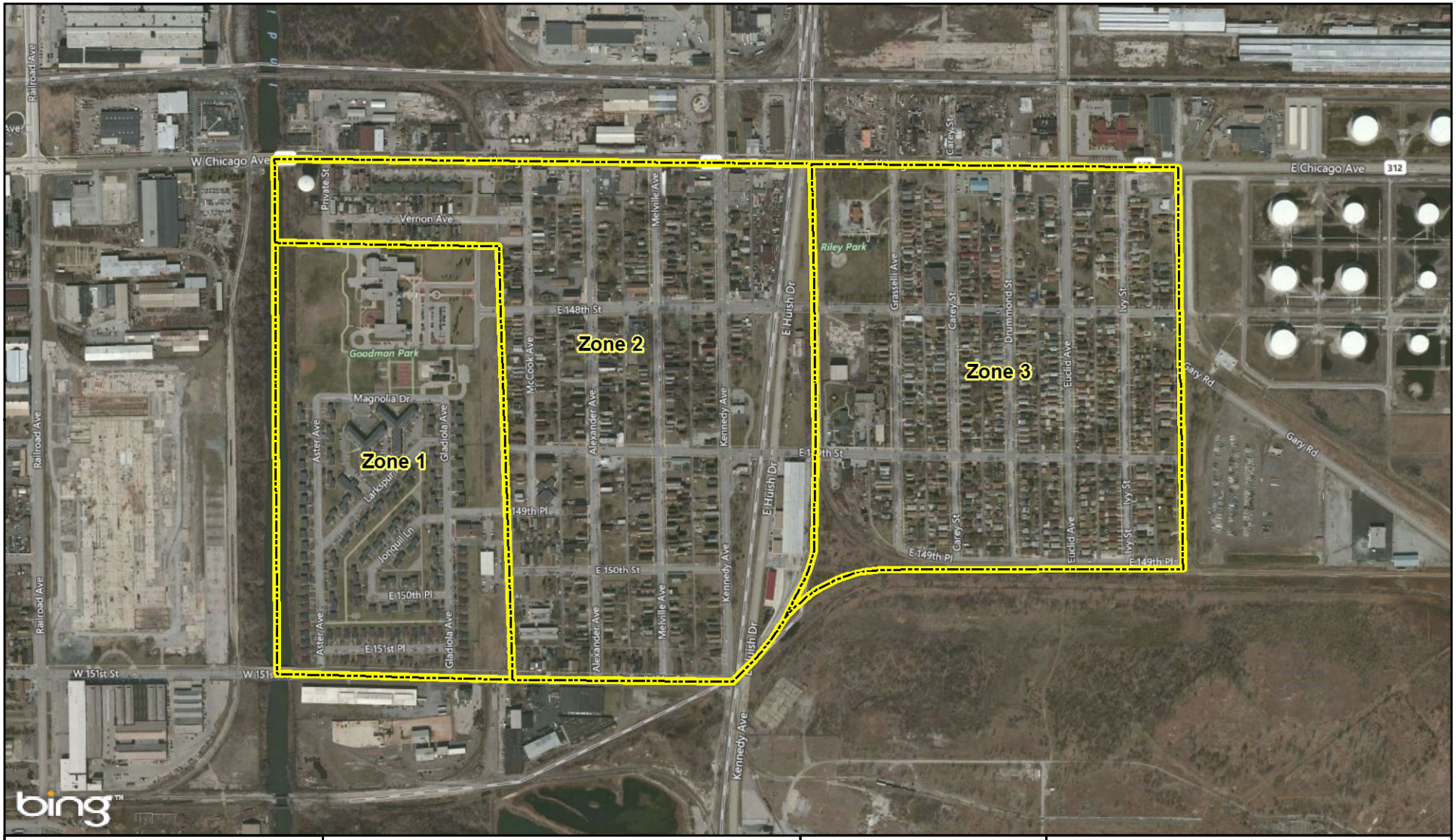
TETRA TECH

Prepared For: EPA | Prepared By: Tetra Tech, Inc.

File Path: C:\temp\USS_Lead\GIS\mxd\2016-09\Fig1-SiteLocation.mxd

Date Saved: 9/6/2016 | EPA Contract No.: EP-S5-13-01 | TDD No.: S05-0014-1608-007

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree



Reference Map

Legend

Zone Boundary

Source: Bing Maps Hybrid, 2013

N

500 0 500

Feet

USS LEAD
4920 Larkspur Street
East Chicago, Lake County, Indiana

Figure 2
Site Layout Map

TETRA TECH

Prepared For: EPA

Prepared By: Tetra Tech Inc.

File Path: C:\temp\USS_Lead\GIS\mxd\2016-09\Fig2-SiteLayout.mxd

Date Saved: 9/6/2016

EPA Contract No.: EP-S5-13-01

TDD No.: S05-0014-1608-007

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Appendix B

Tetra Tech Site-Specific Standard Operating Procedures

SOP No. 080, Collector for ArcGIS

SOP No. 081, iForm and Survey123 Data Entry

SOP No. 082, Processing Direct-Download DustTrak Data

SOP No. 083, Downloading Data from Tetra Forms and Survey123

SOP No. 084, Scribe Field Database

SOP No. 085, Scribe Database Management

SOP No. 086, Dashboard/GeoPlatform

SOP No. 087, Uploading Data to MyCloud

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Collector for ArcGIS

SOP NO. 080

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

Quality Assurance Approved

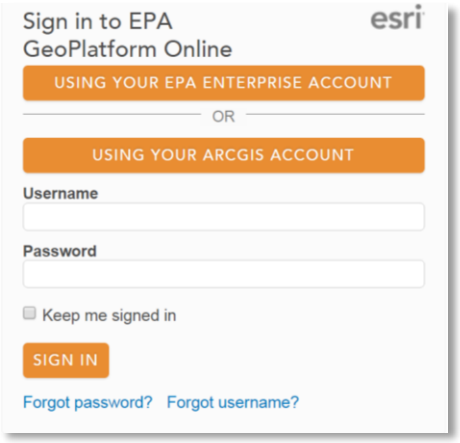
Date

Contents

This Standard Operating Procedure (SOP) is intended to provide the necessary steps for accessing and navigating the U.S. Environmental Protection Agency (EPA) GeoPlatform for use with the Collector for ArcGIS Application. Before using the Collector application for the first time, the user must sign into the EPA GeoPlatform with the ArcGIS Online Account provided by EPA via the user's computer. The directions found in Part I below will guide the user through the process. In addition, please make sure that the steps outlined in SOP 081: iForms Data Entry are completed before beginning the steps in Part II below.

Part I – EPA GeoPlatform

1. Using your computer's web browser, navigate to the following web address:
    - https://epa.maps.arcgis.com/home/signin.html
2. Non-EPA users should sign into the GeoPlatform by clicking "USING YOUR ARCGIS ACCOUNT" and enter your credentials.

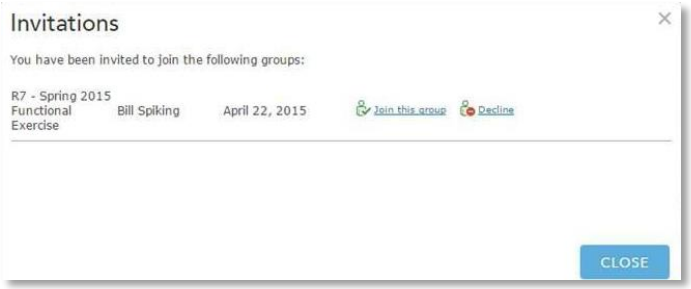


3. Once signed in, your web browser should look similar to the image below.

4. From the GeoPlatform homepage, click on the "GROUPS" menu item.

5. Click on "INVITATIONS (1)."

6. Click "Join this group;" there may be more than one group to join



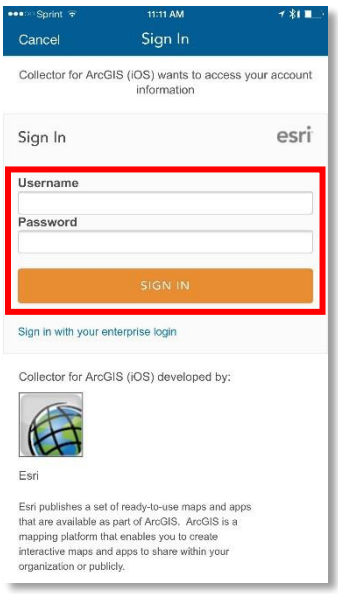
7. You now have access to the requested groups; field users should be invited to the group according to site activity.

Part II – Collector for ArcGIS

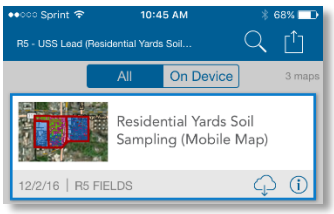
1. On your iPhone or iPad, tap the Collector App icon to open the App.

2. Tap "ArcGIS Online"

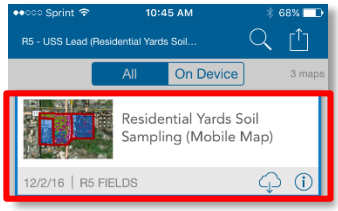
3. Enter user name and password (same as EPA GeoPlatform) and tap "SIGN IN."



4. Once your account credentials have been successfully verified, the user will have access to any Web Maps within your groups.



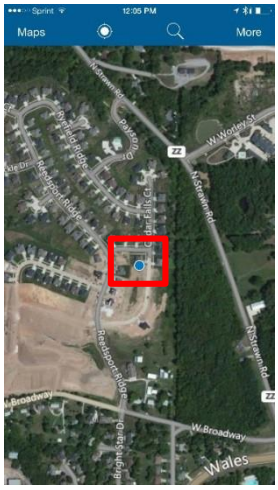
5. Tap any Web Map icon.



6. When the Web Map finishes loading, it will automatically zoom to your location overlaid on an aerial image. The small blue dot displayed on the Web Map is your approximate triangulated location. If the Web Map does not automatically zoom to your location, tap the "My Location" tool found in the menu above the map.

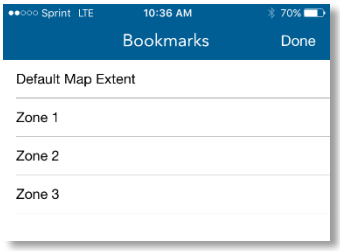
    - The locator icon ◌ indicates your location is not displayed on the map. Once My Location is turned on, the ◉ icon indicates your location on the map and is kept centered. As you move, the map moves on the screen to keep your location centered on the screen.

    - **Tip:** When you do not need to see your location on the map, turn off My Location. This action saves the battery by turning off not just the display of your location, but also the Global Positioning System (GPS). If you are collecting data, the GPS turns back on as needed to record collection locations.



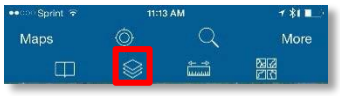
7. Tap "More" to display the additional tools that are available. If you're using an iPad, the additional tools will already be displayed without having to tap "More."

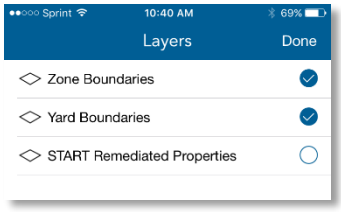
8. Tap the "Bookmarks" tool. This tool allows you to choose previously defined areas of interest.



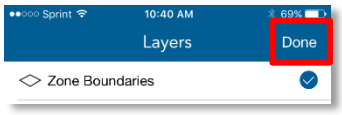
9. The Web Map will automatically pan to the default extent.

10. Tap the "Layers" tool from the additional tools menu.





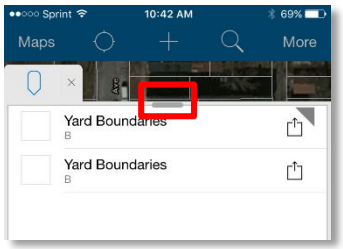
11. Tap the toggle ◯ to the right of turn off layer to add the layer to the map, and then click "Done." If you are using an iPad, "Done" will not display in the Layers window. To exit the Layers window from an iPad, just tap anywhere outside of the window.



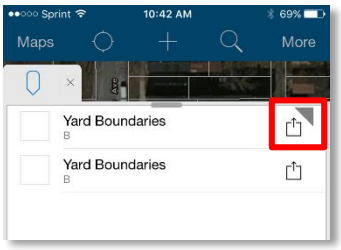
12. Using your fingers, zoom in to display the desired features on the map.

13. Using your index finger or stylus, tap a feature location to select it. The selected feature will be highlighted in light blue. The results of your selection will display below the map.

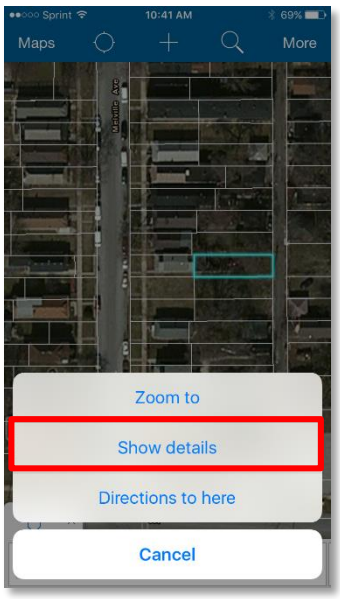
14. Tap the Pin icon ⬯ to expand the Results window. If features are stacked, expand the results window to cover the screen and select the proper feature. If you are using an iPad, the Results window will automatically expand when a feature is selected on the map.



15. Tap the Action icon to the right of the selected feature to display the Action window. If you're using an iPad, the Action icon is available only in the Details window.

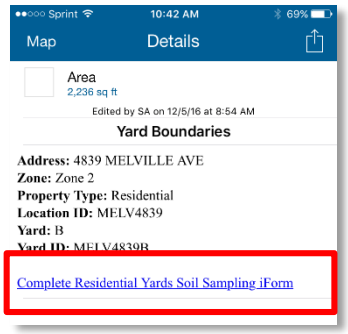


16. Tap "Show details" to see the attribute information for the feature selected. If you're using an iPad, the Details window will automatically expand when a feature is selected.

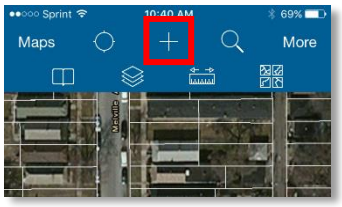


*Note – to complete the remaining steps, if an iForm is linked to the feature service, you must have installed the iForm App on your device and be logged into the tetraforms.iformbuilder.com server. See the iForm App SOP Guide for instructions.

17. In the Details window, also called the pop-up information, users can view the pre-populated feature attribute data. See the GeoPlatform SOP for information about the origin of attribute data.

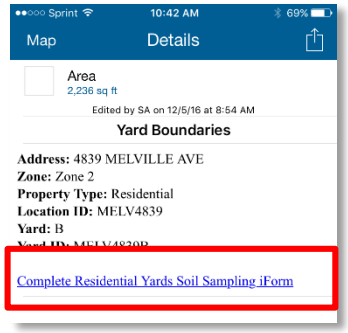


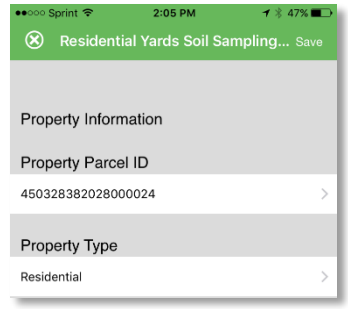
18. The Collect icon + adds features to a map. If you're using an iPad, the Collect icon is on the right side of window.



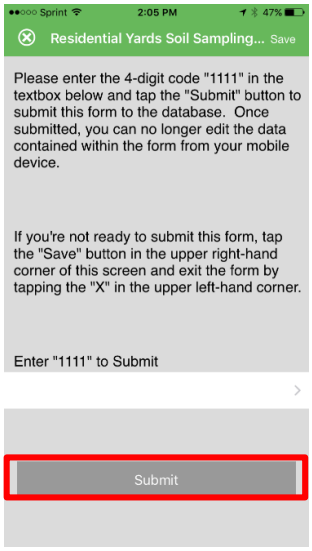
19. Currently, web maps are not set up to collect features in the field, as data collection is carried out through iForm App.

20. Click the iForm link to complete an iForm for that feature service. The iForm App will automatically launch and transfer any linked information to the iForm.

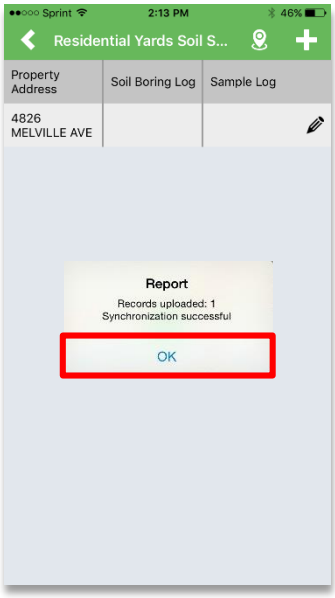




21. Complete the iForm as directed in SOP 081: iForms Data Entry and tap "Submit" at the end of the form.



22. Tap "OK" once the form has been successfully synchronized.



23. Double-click the Home button on your iPhone or iPad to navigate back to the Collector App.

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

iForm and Survey123 Data Entry

SOP NO. 081

REVISION NO. 1

Last Reviewed: November 3, 2017

November 3, 2017

Quality Assurance Approved

Date

Contents

This Standard Operating Procedure (SOP) is intended to provide the necessary steps for entering data into the iForm app and Survey123 app using an iPad. The iForm and Survey123 apps allow users to record field data digitally. From the apps, data can be uploaded to an on-line platform, downloaded, and imported into a database to track sample data and create chains of custody, and to track survey data related to excavation depth tracking. The types of field data that can be logged in the iForm app include indoor dust samples, X-ray fluorescence (XRF) screenings, low-flow air samples, high volume ambient air samples, sequential water samples, and soil samples. The types of field data that can be logged in the Survey123 app include pre-elevation surveys and excavation depth surveys.

Downloading iForm App

The first step to using the iForm app on your device is downloading it from the Apple Store.

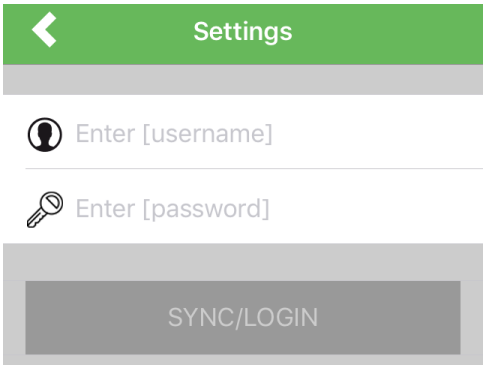
1. Go to the Apple Store app, search "iForms." The search results will resemble the image below.

2. Click "Get" on iForm by Zerion Software, and the iForm app will be downloaded to your device.

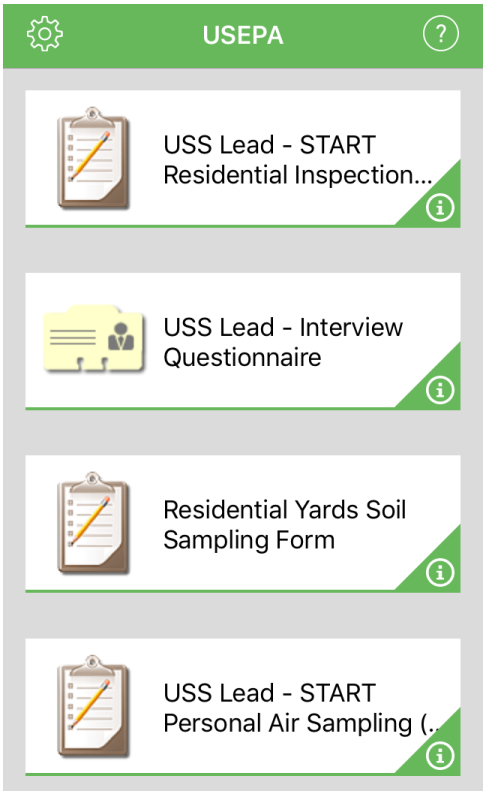
Signing In to iForms

The user must first log in to the system to access data entry forms in the iForm app.

1. Open the iForm app; the user will be directed to the settings tab where log-in information will be requested.
   1.1. Provide the project specific log-in credentials.
   1.2. Click "Sync/Login."



2. Once the user has successfully logged in, the home screen will show available forms for field data entry, as seen in the image below. This home screen allows the user to access all of the medium-specific sampling iForms. Data entry for each of these iForms will be discussed in detail in the following sections.

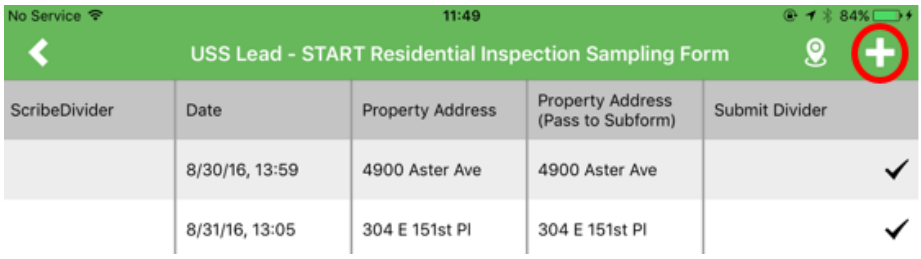


START Residential Inspection Sampling Form

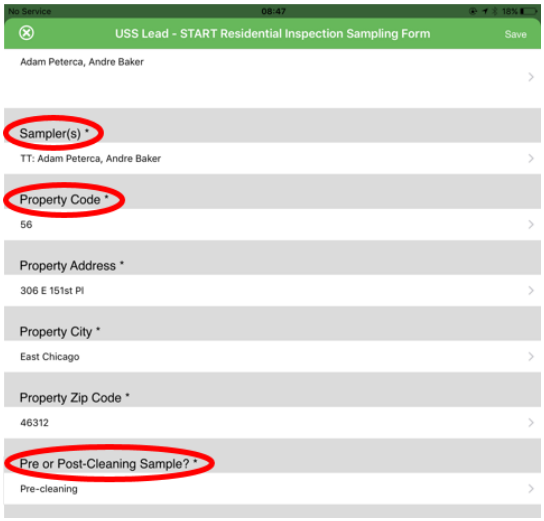
This form is to be used when the sampler enters a residence to collect dust samples or screen for lead-based paint using a handheld XRF analyzer.

1. Select the "USS Lead – START Residential Inspection" option depicted in the figure above.

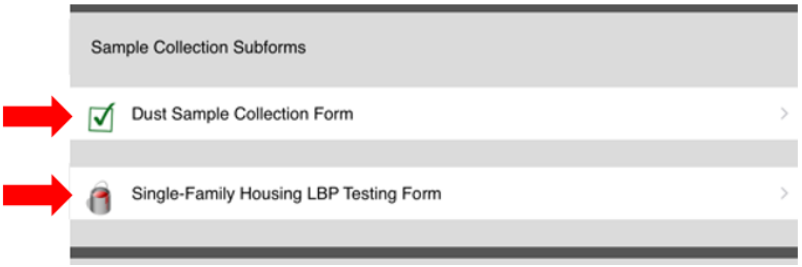
2. The subsequent page shows all of the START Residential Inspection Forms that have been completed on the device that is currently being used. Select the "+" symbol in the top-right corner of the subsequent screen to launch a new Residential Inspection Sampling Form (see image below).



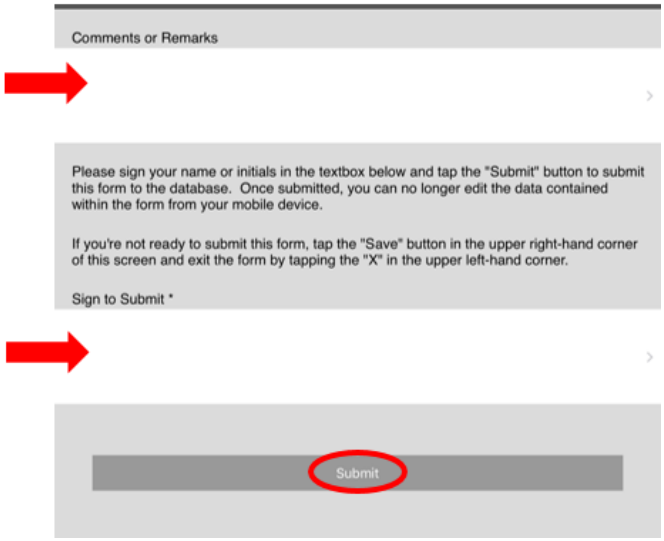
3. Enter the sample information, including Samplers, Property ID, and whether the sample is a pre- or post-cleaning sample. The property address and property city on this form will auto-populate once the property ID is entered (see image below).



4. At this point, the user will select either the Dust Sample Collection subform or the Lead-Based Paint Testing subform to input data for the samples being collected. These forms are launched by selecting the Sample Collection Subform as shown in the figure below. See "Dust – HEPA Vacuum Sampling" and "XRF – Lead-Based Paint Sampling" sections below for information on completing these forms.



5. Once the subforms have been completed, return to the parent form and scroll to the bottom of the form (see image below).
    3.1 Enter any comments pertaining to the samples under the "Comments or Remarks" section.
    3.2 Select the "Sign to Submit" area and provide a signature to submit the form.
    3.3 Click the "Submit" button.



Dust - HEPA Vacuum Sampling

1. From the "USS Lead – START Residential Inspection Sampling Form," select "Dust Sample Collection Form." The Date, Time, Sampler, Pre or Post-Cleaning Sample, and Property ID fields will already be populated by the information entered in the parent form. The Sample ID will be pre-populated with Property ID and Date, but will be incomplete until a sub-location is chosen.
2. Input the specific sample location information:
    a. Sub-location (Front Entrance, Bedroom, and so forth). Once a sub-location is selected, the Sample ID will update with the room code (For example, BR=Bedroom).
    b. Floor Type (Carpet, Tile, or other type).
3. Enter the number of the vacuum unit being used, sample start time, and the initial weight (grams, g) before the sample is collected.
4. At the completion of sampling, enter the sample stop time, total area sampled (square feet, ft^2), and the final weight (g). Confirm that the correct sample weight has been calculated.
5. Once the user has reviewed all data and confirmed their accuracy, click "Submit."
6. Repeat steps 1 through 5 for each additional dust sample to be completed.

XRF – Lead-Based Paint Sampling

1. From the "USS Lead – START Residential Inspection Sampling Form," select "Single-Family Housing LBP Testing Form." The Date, Time, and Sampler fields will already be populated by

the information entered in the parent form. The Sample ID will include Property ID and Date, but will be incomplete until the room equivalent and room component are chosen.

2. Complete the "XRF Model No" and "XRF Serial No" fields.
3. Input the specific sample location information:
    a. Floor (floor of the residence where the sample will be collected)
    b. Room Equivalent (Front Entrance, Bedroom West, Bedroom South, and so forth). Once a room equivalent is selected, the Sample ID will update with the room code (for example, BRS=Bedroom South).
    c. Room Component (The specific aspect being sampled within the room; for example, door, wall, or window molding). Once a room component is selected, the Sample ID will update with the room component code (For example, DR=Door).
    d. Component Direction (North, East, South, West, or Other).
4. Input the sample substrate information:
    a. Measurement Substrate (The material being sampled; for example, drywall or wood)
    b. Substrate Color (The color of the material being sampled)
5. Input the sample results information from the handheld XRF analyzer:
    a. XRF Measurement
    b. Confirm that the 3 SD is equal to 0.07, which is auto-populated.
    c. Confirm that the Sample Duration is equal to 15 seconds, which is auto-populated.
    d. Test number
6. Enter comments pertaining to the sample in the "Comments or Remarks."
7. If the sample tested positive on the XRF, select the "Photo of Test Location" option and take a photograph of the room component that tested positive.
8. Once the user has reviewed all data and confirmed its accuracy, click "Submit."
9. Repeat steps 1 through 5 for each additional lead based paint sample to be completed

Air – Excavation Gillian Pump Sampling

This form is to be used for low-flow air samples including both personal air monitoring and excavation air monitoring during removal activities.

1. From the iForm home screen, select "USS Lead – START Personal Air Sampling (Monitoring) Form."
2. The subsequent page shows all of the START Personal Air Sampling forms that have been completed on the device that is currently being used. Select the "+" symbol in the top-right corner of the subsequent screen to launch a new Personal Air Sampling form.
3. Enter initial information. Include the following fields: Event ID (whether personal air monitoring or excavation air monitoring), Samplers, Property Code, and Location Description (for example, located at rear entrance of residence).
4. Enter sample information:
    a. Sample Number (According to approved sample nomenclature; for example, USSL-2166-AA-RE-110916 where USSL=Site ID, 2166=Property Code, AA=Ambient Air, RE=Rear Entry, and 112816=Date)
    b. Sample Type (Field blank, field sample)

   c. Pump ID (Choose the pre-populated Pump ID in the drop-down menu that corresponds with the pump being used to collect the sample).
   d. Confirm that the analysis chosen is correct.
5. Enter the sample start time and the initial flow rate.
6. At the completion of sampling, enter the sample stop time, the final flow rate, and whether a pump fault occurred during sampling.
7. Confirm that the correct sample time, average flow rate, and sample volume have been calculated.
8. Enter any comments pertaining to the sample in the "Notes" section.
9. Once the user has reviewed all data and confirmed their accuracy, record signature, and click "Submit."

Air – High Volume Sampling

This form is to be used for High Volume perimeter air sampling during removal activities.

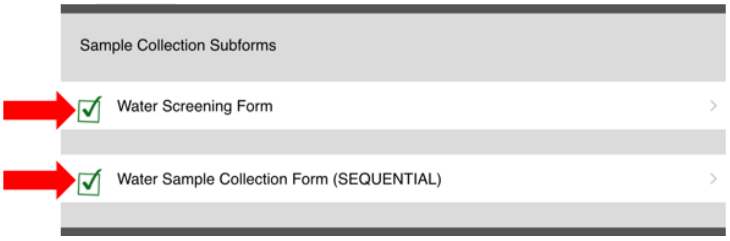
1. From the iForm home screen, select "USS Lead – START Ambient Air Sampling Short Form (no calculations)."
2. The subsequent page shows all of the START Ambient Air Sampling forms that have been completed on the device that is currently being used. Select the "+" symbol in the top-right corner of the subsequent screen to launch a new Ambient Air Sampling form.
3. Enter initial information. Include the following fields: Samplers and Property Code. (Once Property Code is entered, Property address, city, and Zip code will populate.)
4. All information pertaining to the calibration orifice is already completed; do not edit these fields.
5. Enter pump information:
   a. Choose the pre-populated VFC Serial in the drop-down menu that corresponds with the pump being used to collect the sample.
   b. Once the corresponding VFC Serial is chosen, the Pump Serial, Pump Model, and G-Factor will populate with known values.
6. Enter sample information:
   a. Sub location (Front Yard, Roof, or other)
   b. Confirm that Sample ID has populated correctly.
   c. Filter Number (This number can be found on the upper corner of the filter)
   d. Media (At USS Lead, use 8-inch by 10-inch Quartz filters)
   e. Confirm that Sample Type is Field Sample.
   f. Analytical Method (Unless directed otherwise, both "Pb/As by EQL-0512-202" and "TSP by mod. Method IO-3.1" should be selected)
7. Enter the sample start time and the lapse time indicator start time.
8. Confirm that pump calibration was completed successfully in accordance with Tetra Tech SOP 070: "High-Volume Ambient Air Sampling for Total Suspended Particulates and Lead Using Volumetric Flow Control."
9. At the completion of sampling, enter the sample stop time, the lapse time indicator stop time, the sampling stop date, and whether a pump fault occurred during sampling.
10. Confirm that the correct lapsed time has been calculated.

11. Once all sample data have been collected, the user must complete final flow calculations in accordance with Tetra Tech SOP 070: "High-Volume Ambient Air Sampling for Total Suspended Particulates and Lead Using Volumetric Flow Control"
12. Enter Calculated Flow Rate (cubic meters per minute, m^3/min) and Total Flow (cubic meters, m^3).
13. Enter any comments pertaining to the sample in the "Sample Remarks" section.
14. Once the user has reviewed all data and confirmed their accuracy, click "Submit."

Water – Sequential Water Sampling

This form is to be used for sequential water sampling during removal activities.

1. From the iForm home screen, select "USS Lead – START Sequential Sampling Form."
2. The subsequent page shows all of the START Sequential Sampling forms that have been completed on the device that is currently being used. Select the "+" symbol in the top-right corner of the subsequent screen to launch a new Sequential Sampling form.
3. Enter initial information. Include the following fields: Samplers, pre- or post-excavation sample, and Property Code (Once Property Code is entered Property address, city, Zip code, latitude, and longitude will populate).
4. Enter resident/property information:
    a. Resident/contact name
    b. Resident/contact phone number
    c. Property type (single family, duplex, apartment, or other)
    d. Approximate year built
    e. Water service line (Lead, Copper, Galvanized, PVC, other)
    f. Note any in-home water treatments used
    g. Owner name (if different than resident)
5. From this screen, the user will select either the Water Screening or the Water Sample Collection subform to input data for the samples being collected. These forms are launched by selecting the Sample Collection Subform as shown in the figure below. See "Water Sample Collection Form" and "Water Screening Form" sections below for information on completing these forms.



6. Once the subforms have been completed, return to the parent form and scroll to the bottom of the form (see image below).
    3.1 Enter any comments pertaining to the samples under the "Observations" section.
    3.2 Select the "Sign to Submit" area, and provide a signature to submit the form.
    3.3 Click the "Submit" button.

Water Sample Collection Form

1. From the "USS Lead – START Sequential Sampling Form," select "Water Sample Collection Form." The Date, Time, Sampler, and Location ID fields will already be populated by the information entered in the parent form. Update sample time if sampling does not begin right away.
2. Enter which round of sampling is occurring.
3. Enter the sample information:
    a. Input the filter information (if applicable).
    b. Enter the sample location to curb distance.
    c. Input the number of samples required (depending on distance of sample from the water main).
    d. Once sampling begins, record sample times:
        i. Start and preservation time for Total Phosphorus sample (DS001)
        ii. Start and preservation time for Total Alkalinity, Water Quality, and Anions sample (DS002)
        iii. Start and preservation time for Total Metals sample (DS003)
    e. Enter sample information:
        i. Floor that sample is taken
        ii. Location (kitchen sink, bathtub, or other location)
        iii. Stagnation time (hours)
        iv. Water meter reading (cubic feet, ft^3)
    f. Once the user has reviewed all data and confirmed their accuracy, click "Submit."

Water Screening Form

1. From the "USS Lead – START Sequential Sampling Form," select "Water Screening Form." The Date, Time, Sampler, and Location ID fields will already be populated by the information entered in the parent form. Update sample time if sampling does not begin right away.
    a. Enter sample information
        i. Floor (Floor of the residence where the sample will be collected)
        ii. Location (kitchen sink, bathtub, or other location)
        iii. Cold or Hot water
    b. Choose the parameter to be screened from the drop-down menu (Cl_2, pH, Temperature, and Conductivity). Once a parameter is chosen, the Instrument ID field above will autofill.
        iv. Once test is complete, record the measurement observed.
        v. Enter the units for the chosen parameter.
    c. Once the user has reviewed all data and confirmed their accuracy, click "Submit."
    d. Repeat steps a through d for each required screening parameter.

Soil – Residential Yards Sampling

This form is to be used for soil sampling during removal activities.

1. Enter property information. Include the following fields: Property Parcel ID, Property Type (Commercial, Residential, Right-of-Way [ROW], or School/Park/Church), Address, Latitude, Longitude, and Zone.
2. Enter the sample information, including Samplers, Property ID, Yard ID, and Yard Quadrant.
3. Enter the Soil Boring Log sub form:
    a. The Boring Time, Date, Sampler, and Property ID will already be populated.
    b. Input the Soil Borehole Number.
    c. Select Soil Borehole Location and click Refresh to update using the iPad's current global positioning system (GPS) location.
    d. Input interval Start and End Depths.
    e. Select the Soil Type, Soil Color, and Debris from their drop-down lists.
    f. Indicate whether this interval is the end of the soil boring.
        i. If the current interval is the end of the boring, proceed to the options below.
        ii. If the current interval is not the end of the boring, indicate "No" and continue entering interval information—beginning with step (d), above—until the final boring interval is reached.
    g. Choose a reason for Boring Termination from the dropdown menu.
    h. Fill in the End of Boring Depth.
    i. Click "Submit."
4. To enter soil sampling information, click "Sample Log" for the sample subform.
    a. Input the Sample Depth Interval, Sample Type, Sample, and Comments (if necessary).
    b. Click "Submit."
    c. Repeat step 4 for any additional samples.
5. Select "Photo Log" to capture site photos.
    a. Record the Sub Location where the photos is being taken: "B" for back yard, "F" for front yard, "G" for garden, "S" for side yard, and "QA"/"QB"/"QC"/"QD"/"QE" if front and back yard are being further divided into sections.
    b. Click "Capture Photo," and select to either "Take a picture with camera" or "Pick from photo library."
    c. Click "Photo Geolocation" and Refresh to update using the iPad's current GPS location.
    d. Input the direction in which the camera is facing.
    e. Add any additional comments.
    f. Click "Submit."
    g. Repeat step 5 for any additional photographs.
6. When all boring information has been collected, enter "1111" under the prompt "Enter '1111' to Submit," then click Submit.

XRF Quality Control (QC) Standard

This form is to be used for QC checks on the soil XRF analyzer.

1. From the iForm home screen, select "XRF QC Standard Form."
2. The subsequent page shows all of the XRF QC Standard forms that have been completed on the device that is currently being used. Select the "+" symbol in the top-right corner of the subsequent screen to launch a new XRF Standard QC form.

3. Enter initial information. Include the following fields: Activity (select the Zone where work is being completed). Once the Activity field is selected, the Instrument ID List, QC Standard Type, and Sample Number fields auto-populate.
4. Select the operator from the Operator Pick List
    a. If name does not appear in list, select Add New Name and type name.
5. Enter the XRF QC Standards Screening Form
    a. The XRF QC Screening Results subform will open. The QC Bullet will already be populated based on the information provided on the "XRF QC Standard Form."
    b. Use the XRF to screen the appropriate QC Standard Type.
    c. Enter the XRF instrument Sample ID number. This number will be located at the top of the XRF display after the screening is complete.
    d. Enter the lead screening value from the XRF in the Lead Screening Result section.
        i. If the lead screening value from the XRF is a non-detect, enter the non-detection value.
    e. Select the Lead Screening Result Qualifier
        i. Select the "=" sign if the value is detected
        ii. Select the "<" sign if the value is a non-detect
    f. Enter the arsenic screening value from the XRF in the Arsenic Screening Result section.
        i. If the arsenic screening value from the XRF is a non-detect, enter the non-detection value.
    g. Select the Arsenic Screening Result Qualifier
        i. Select the "=" sign if the value is detected
        ii. Select the "<" sign if the value is a non-detect
    h. Click Submit.
6. Enter any comments pertaining to the QC in the "Comments" section.
7. Once the user has reviewed all data and confirmed their accuracy, record signature, and click "Submit."

XRF Screening (Excavation)

This form is to be used for screening soil collected from bottom of excavation and/or in-situ with XRF analyzer.

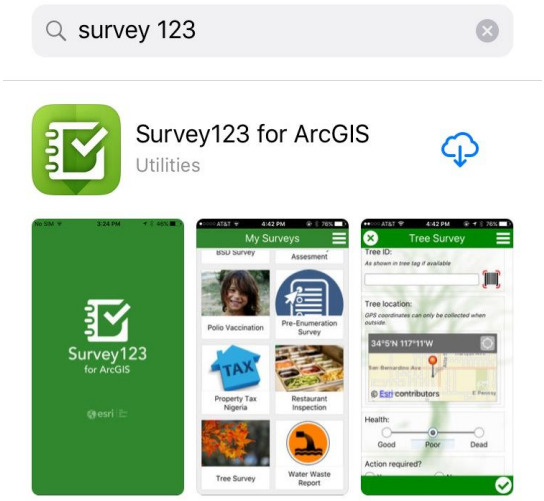
1. From the iForm home screen, select "XRF Screening (Excavation) Form."
2. The subsequent page shows all of the XRF Screening (Excavation) forms that have been completed on the device that is currently being used. Select the "+" symbol in the top-right corner of the subsequent screen to launch a new XRF Screening (Excavation) form.
3. Enter initial information. Include the following fields: Activity, Property Code with current Yard Quadrant (Once Property Code is entered, Property address, Yard ID, and Property ID will auto-populate), the Operator, and Excavation Depth (in inches). The Sample ID will auto-populate after all information listed above has been entered.
4. Select the sample collection method: composite, discrete, or grab.
5. Select the XRF Soil Screening sub form.

   a. The XRF Screening Results sub form will open. The Screening ID will already be populated based on the information provided on the "XRF Screening (Excavation) Form."
   b. Enter the XRF instrument Sample ID number. This number will be located at the top of the XRF display after the screening is complete.
   c. Enter the lead screening value from the XRF in the Lead Screening Result section.
      i. If the lead screening value from the XRF is a non-detect, enter the non-detection value.
   d. Select the Lead Screening Result Qualifier
      i. Select the "=" sign if the value is detected
      ii. Select the "<" sign if the value is a non-detect
   e. Enter the arsenic screening value from the XRF in the Arsenic Screening Result section.
      i. If the arsenic screening value from the XRF is a non-detect, enter the non-detection value.
   f. Select the Arsenic Screening Result Qualifier
      i. Select the "=" sign if the value is detected
      ii. Select the "<" sign if the value is a non-detect
   g. Click Submit.
   h. Repeat Steps b through g while screening different portions of the composite soil sample until five XRF Screening Results have been submitted.
   i. After five XRF Screening Results have been submitted, click "X" in the upper-left corner of the XRF Screening Results form to return to the XRF Screening (Excavation) Form.
6. After returning to the XRF Screening (Excavation) form, the median lead and arsenic values will be displayed.
7. Determine if the median values for both lead and arsenic are below the listed decision criteria. These values are project specific and need to be confirmed before the XRF Screening (Excavation) form can be used.
8. Select if further excavation is required
   a. If the median value exceeds the decision criteria for one or both of the contaminants, select yes.
   b. If the median value does not exceed the decision criteria for both contaminants, select no.
9. Select the moisture content of the sample. The options for moisture content are Wet, Moist, or Dry. A wet sample is one that is completely saturated. A moist sample is one that is fairly malleable and retains its form. A dry sample is one with little or no moisture.
   a. Note: Samples should be no more than a 20 percent moisture content for XRF screening.
10. If sample was wet (greater than 20 percent moisture), select if the sample was dried and select if the sample was sieved.
11. Select the soil description and primary color of the soil. Enter any comments pertaining to the sample in the "Comments" section.
12. Once the user has reviewed all data and confirmed their accuracy, record signature, and click "Submit."

Downloading Survey123 App

The first step to using the Survey123 app on your device is downloading it from the Apple Store.

1. Go to the Apple Store app, search "Survey123." The search results will resemble the image below.

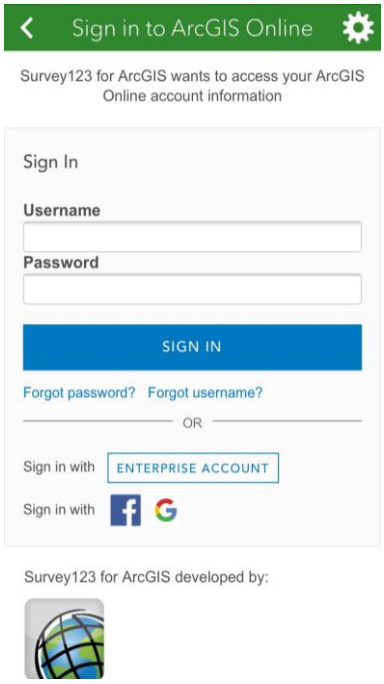


2. Click "Get" on Survey123 for ArcGIS, and the Survey123 app will be downloaded to your device.

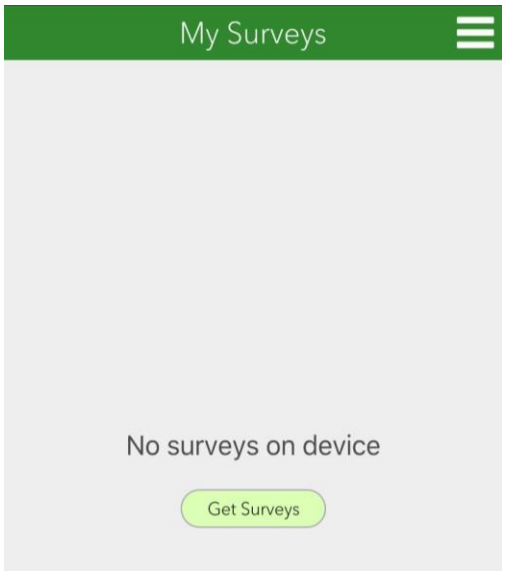
Signing In to Survey123

The user must first log-in to the system to access data entry forms in the Survey123 app.

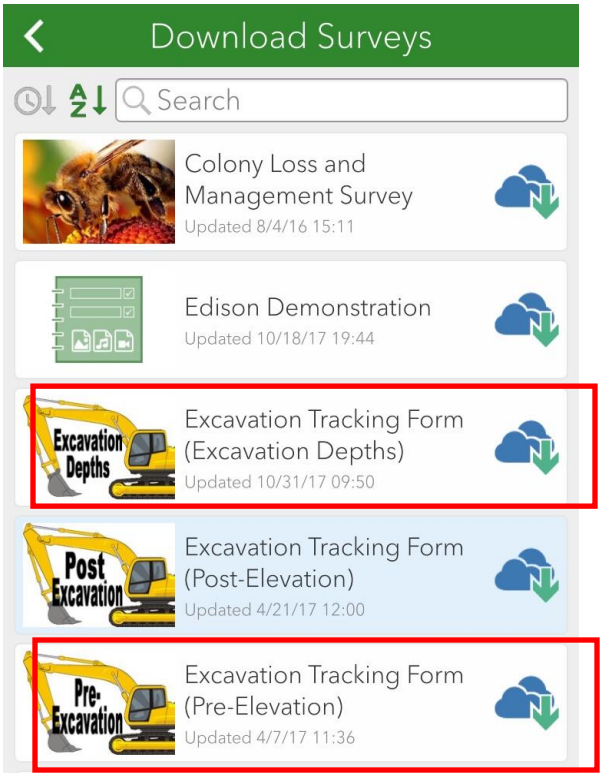
1. Open the Survey123 app; select the Sign In button. The user will be directed to the settings tab, where log-in information will be requested.
   a. Provide the necessary log-in credentials.
   b. Click "Sign In."



2. Once the user has successfully logged in, the home screen will show a button for Get Surveys, as seen below.



3. Click on Get Surveys, and download the surveys identified below.

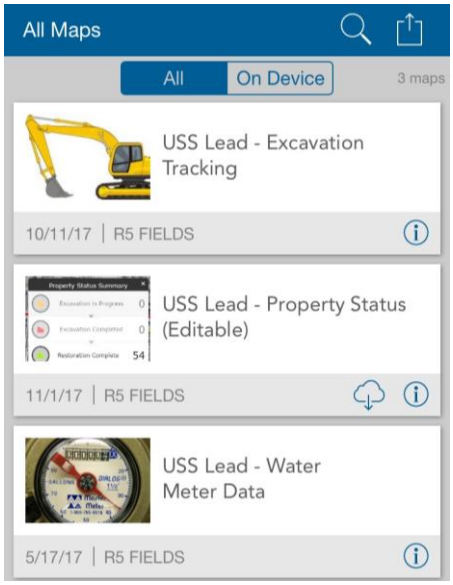


4. After they are downloaded, these forms are available for field data entry, as seen in the image below. Survey123 works collaboratively with the Collector App. Refer to SOP 80: Collector for ArcGIS for how to download and set up the Collector App.

Excavation Tracking Form (Pre-Elevation Survey)

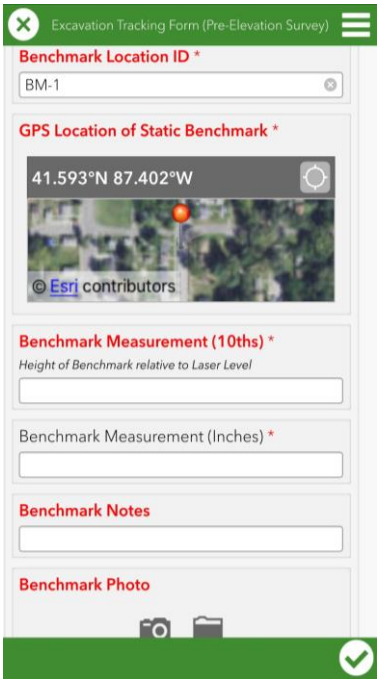
This form is used for recording the pre-elevation of a property before removal.

1. Using the Collector App, open the USS Lead – Excavation Tracking map.

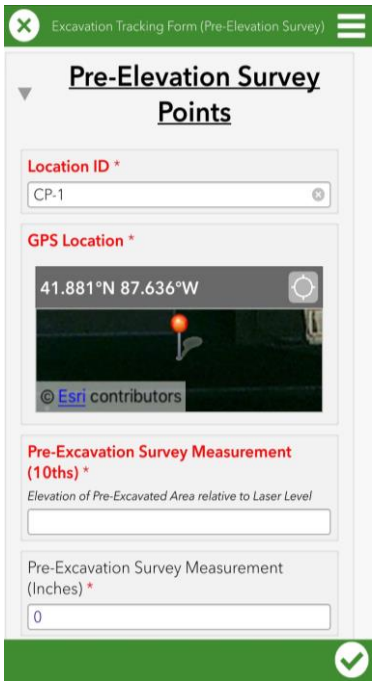


2. Select the area at the property that will be excavated. Click on the tab that appears after selecting the area that will be excavated.
3. Click on the Complete Pre-Elevation Survey. The Survey123 app will automatically launch and transfer any linked information to the Pre-Elevation Survey form.

4. On the Pre-Elevation Survey form, select the Sampler Name from the drop-down list. All other property information will have transferred from the Collector App.
5. Choose a static benchmark and label the Benchmark Location ID.
   a. A static benchmark is a point that will remain unaltered during excavation and can easily be referenced multiple times for additional measurements, such as a concrete staircase, a nearby fence post, or other similar static object.
6. After the Benchmark Location ID is created, retrieve the benchmark's GPS location by clicking the target in the upper right corner of the GPS Location of Static Benchmark.

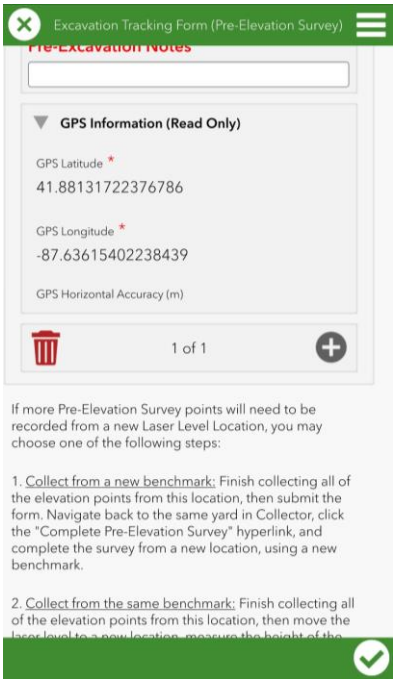


7. Enter the height of the benchmark relative to the laser level, and then take a photo of the benchmark. Select the Camera icon in the Benchmark Photo section to access the camera.
8. Choose a control point, and label the Location ID.
9. After the Location ID is created, retrieve the control point GPS location by clicking the target in the upper-right corner of the GPS Location.



10. Record the height of the control point relative to the laser level.

11. To collect another control point, select the "+" in the lower right corner. This + will open a new survey control point tab. Collect control points in 15-foot by 15-foot grids. Repeat Steps 8 through 11 until the pre-elevation of the yard is complete.

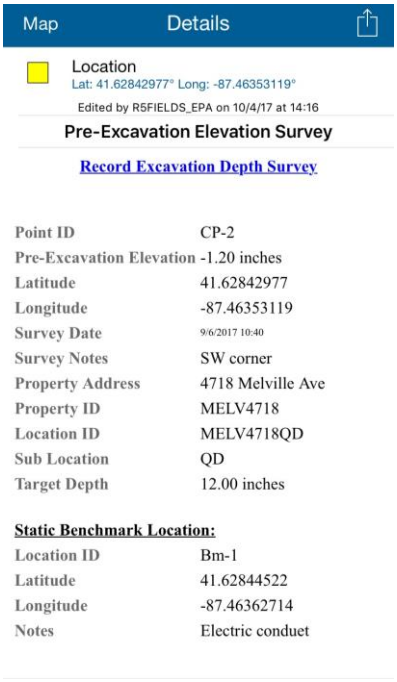


12. Once the user has reviewed all data and confirmed their accuracy, record signature, and click "Submit."

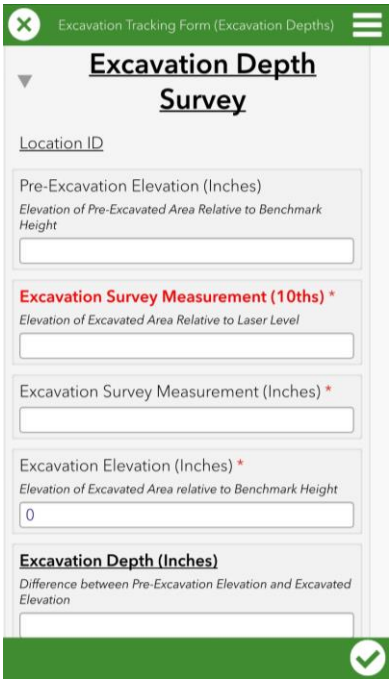
Excavation Tracking Form (Excavation Depths)

This form is used for recording the excavation depths of a property.

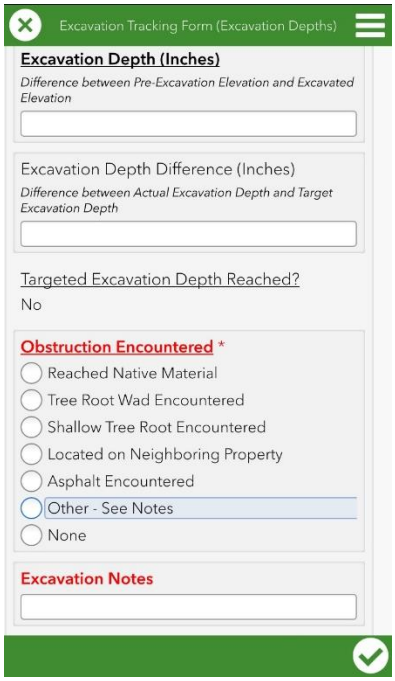
1. Using the Collector App, open the USS Lead – Excavation Tracking map.
2. Select the pre-elevation point at the property where excavation has been completed. Click on the tab that appears after selecting the pre-elevation point.
3. Click on the Record Excavation Depth Survey. The Survey123 app will automatically launch and transfer any linked information to the Excavation Depth Survey form.



4. On the Excavation Depth Survey form, select the Sampler Name. All other property information will have transferred from the Collector App.
5. Re-measure the height of the static benchmark that was chosen during the Pre-Elevation Survey.
6. Enter the height of the benchmark relative to the laser level.
7. Double-click on the “home” button and return to the Collector App. Using the Collector App for guidance, physically return to the exact location of the control point being measured.
8. Once you are standing at the location of the selected control point, double-click the “home” button and return to Survey123.
9. The pre-elevation survey information will auto-populate in the Location ID section.



10. Record the height of the control point relative to the laser level.
11. The excavation depth survey form calculates if the excavation has reached the targeted excavation depth.
    a. If the "Targeted Excavation Depth Reached?" section says no, and there are no obstructions, additional excavation is required to reach the target grade.
    b. If an obstruction prevents further excavation, select the description that most appropriately describes the obstruction



c. If excavation depth has been reached, select "none" in the Obstructions Encountered section.

12. Once the user has reviewed all data and confirmed their accuracy, record signature, and click "Submit."
13. Double-click the "Home" button, and return to Collector App. Repeat for each control point in the excavated area.

Troubleshooting

Problem	Possible Reason & Solution
Cannot see a specific form within the iForm/Survey123app.	• Try logging in with different credentials. • E-mail the project's geographic information system (GIS) specialist and request that the specific form be released to the username being used to login.
Accidentally submitted an incomplete iForm.	• iForms cannot be changed after they have been submitted. Try starting and resubmitting a new iForm after notifying project manager.

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Processing Direct-Download DustTrak Data

SOP NO. 082

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

Quality Assurance Approved

Date

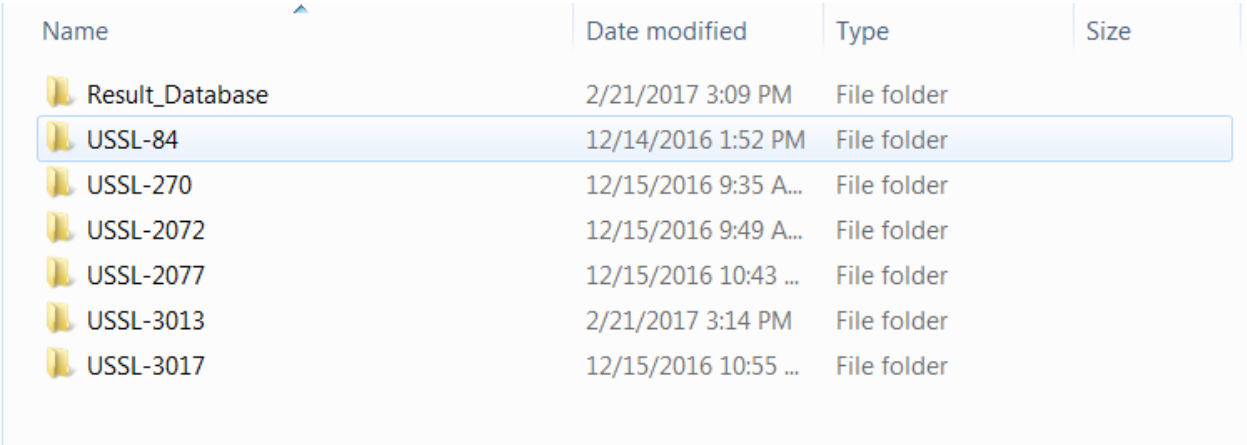
Contents

This Standard Operating Procedure (SOP) is intended to provide the necessary information and guidance for processing particulate matter (PM) monitoring data collected by a TSI DustTrak DRX 8533 unit (DustTrak). This SOP describes the methodology for processing and managing PM data downloaded directly from a DustTrak, with a final product consisting of calculated time-weighted averages (TWAs). This SOP describes the methodology for calculating both hourly and 24-hour TWAs. The methods described here can be adapted to calculate any TWA. This SOP assumes that data have successfully downloaded directly from a DustTrak unit and transferred to the computer used for the data processing.

Recommended File Management Structure

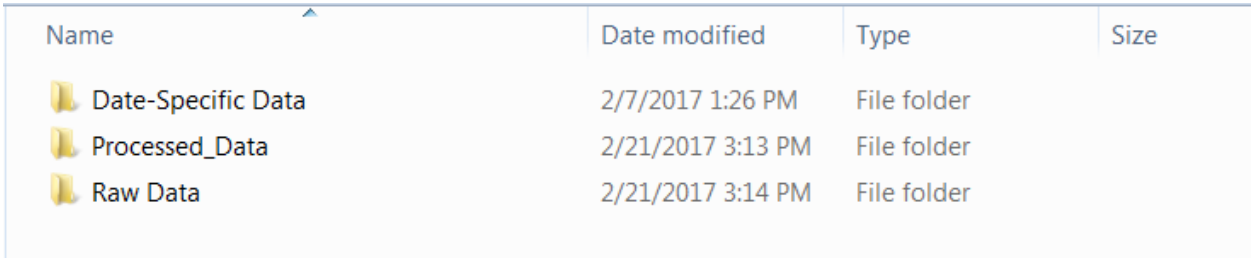
Before you begin data processing to calculate TWAs, it is recommended that the user establish a file management system, as there are several files generated during data processing. In addition, it is likely that multiple DustTraks will be deployed at various locations during project activities.

1. Establish a folder on a central server to house all DustTrak Data.



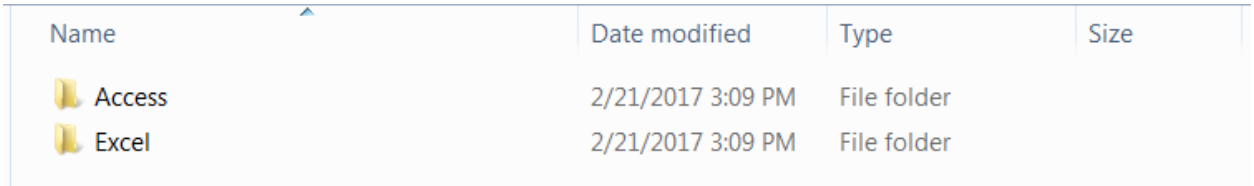
2. Establish a subfolder for each DustTrak location.

2.1. Within each location-specific folder, establish folders for "Raw Data," "Processed Data," and "Date-Specific Data."



3. Establish a subfolder for "Results Database."

3.1. Within the "Results Database" subfolder, establish folders for both Excel and Access databases. The files that should be saved in each of these folders will be discussed in the following sections.



DustTrak Direct-Download Data Contents

Data downloaded directly from the DustTrak are housed in an Excel comma separated value (.csv) file format. The file is typically named after the operating mode of the DustTrak, with a numeric differentiator. For example, if the DustTrak is being operated in "Manual" mode, files will be named "Manual_###.csv."

The .csv file contains all sensor readings collected from the relevant DustTrak run, as well as a set of summary and descriptive characteristics. The summary and descriptive characteristics are included at the top of the .csv file. The information included in these characteristics is described below. Information that is particularly useful for site-specific data processing is shown in **bold** text:

Characteristic	Description
Instrument Name	Describes the equipment used to collect PM data (DustTrak DRX)
Model Number	Defines the model DustTrak used to collect PM data
Serial Number	Serial number of DustTrak used to collect data. Important for determining the sampling location where data were collected
Firmware Version	Version of firmware used during data collection
Calibration Date	Most recent factory calibration date
Test Name	Name of test from DustTrak (should match .csv file name)
Test Start Time	Used to assign specific time to each reading in the data file
Test Start Date	Used to assign date to each reading in the data file
Test Length [D:H:S]	Length of test in days:hours:seconds
Test Interval [M:S]	Recording interval during test, typically 1 minute
PM1 Average [mg/m3]	Mean of all PM1 readings included in data file
PM1 Minimum [mg/m3]	Minimum of all PM1 readings included in data file
PM1 Maximum [mg/m3]	Maximum of all PM1 readings included in data file
PM1 TWA [mg/m3]	TWA of all PM1 readings included in the data file, calculated based on the entire test length
PM2.5 Average [mg/m3]	Mean of all PM2.5 readings included in data file
PM2.5 Minimum [mg/m3]	Minimum of all PM2.5 readings included in data file
PM2.5 Maximum [mg/m3]	Maximum of all PM2.5 readings included in data file
PM2.5 TWA [mg/m3]	TWA of all PM2.5 readings included in the data file, calculated based on the entire test length
PM4 Average [mg/m3]	Mean of all PM4 readings included in data file
PM4 Minimum [mg/m3]	Minimum of all PM4 readings included in data file
PM4 Maximum [mg/m3]	Maximum of all PM4 readings included in data file
PM4 TWA [mg/m3]	TWA of all PM4 readings included in the data file, calculated based on the entire test length
PM10 Average [mg/m3]	Mean of all PM10 readings included in data file

PM10 Minimum [mg/m3]	Minimum of all PM10 readings included in data file
PM10 Maximum [mg/m3]	Maximum of all PM10 readings included in data file
PM10 TWA [mg/m3]	TWA of all PM10 readings included in the data file, calculated based on the entire test length
TOTAL Average [mg/m3]	Mean of all Total PM readings included in data file
TOTAL Minimum [mg/m3]	Minimum of all Total PM readings included in data file
TOTAL Maximum [mg/m3]	Maximum of all Total PM readings included in data file
TOTAL TWA [mg/m3]	TWA of all Total PM readings included in the data file, calculated based on the entire test length
Photometric User Cal	Indication of current photometric calibration settings. A value of 1 indicates the unit is calibrated to Arizona Test Dust (factory default)
Size Correction User Cal	Indication of current size correction calibration settings. A value of 1 indicates the unit is calibrated to Arizona Test Dust (factory default)
Flow User Cal	Indication of current flow rate calibration. A value of 0 indicates the unit is set to the default flow rate of 3.0 liters per minute (L/min)
Errors	Reports any errors encountered during the test
Number of Samples	Total number of records in file (each record consists of a complete set of readings for each PM size category, as well as info on alarms and errors)

When you install a DustTrak, it is important to record the serial number of the DustTrak and the location of the DustTrak (typically a Property ID number) in a field logbook. When a file is downloaded directly from the DustTrak, it is automatically saved into a DustTrak-specific folder that utilizes the DustTrak serial number as the folder name. The serial number is also included in the summary characteristics in each raw data file, as described above. Maintaining a record correlating DustTrak serial numbers with sampling locations ensures that raw data files can be assigned to the correct sampling location.

In addition to the summary and descriptive characteristics outlined above, the data file also includes the results for each PM size category, reported sequentially based on the amount of time that has elapsed since the start of the run. An example of these data is provided below.

37	Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors
38	60	0.006	0.006	0.006	0.006	0.008		
39	120	0.004	0.004	0.004	0.004	0.004		
40	180	0.004	0.004	0.004	0.004	0.004		
41	240	0.004	0.004	0.004	0.004	0.004		
42	300	0.004	0.004	0.004	0.004	0.004		
43	360	0.004	0.004	0.004	0.004	0.004		
44	420	0.005	0.005	0.005	0.005	0.005		
45	480	0.004	0.004	0.004	0.004	0.004		
46	540	0.005	0.005	0.005	0.005	0.005		
47	600	0.004	0.004	0.004	0.004	0.004		

This unprocessed data file should be saved to file in a server location where all DustTrak data will be housed. If the file management structure recommended above is used, the file should be saved in the "Raw Data" folder within the appropriate location-based subfolder. It is important to maintain an

unprocessed version of the data file so that there is a version of the data that can act as an original copy if it is necessary to reprocess data or check the original data for errors and anomalies.

Determining Time and Date of Readings

The first step in calculating TWAs involves converting the elapsed time result provided in the DustTrak data file to the actual time that the reading was recorded. This process is accomplished using a simple calculation in Microsoft Excel. The resulting time of reading is then used to determine the date when the reading was made.

1. Open the file to be processed from the "Raw Data" folder.
2. Create a new column in the raw data portion of the file in column "I," named "Time Elapsed (days)." This column will be used to convert the "Elapsed Time [s]" column from seconds to days. This step is necessary because Excel uses days as its standard unit for time-based calculations.
   2.1. Populate the newly created "Time Elapsed (days)" column using the equation:
   "Time Elapsed (days)" = "Elapsed Time [s]"$\times \frac{1\ minute}{60\ seconds} \times \frac{1\ hour}{60\ minutes} \times \frac{1\ day}{24\ hours}$
3. Create a second new column in the raw data portion of the file in column "J," named "Time." This column will be used to calculate the exact time of each reading based on the "Test Start Time" provided in the summary characteristics, and the "Time Elapsed (days)" value calculated in Step 2.
   3.1. Populate the newly created "Time" column using the equation:
   "Time" = "Test Start Time" + "Time Elapsed (days)"
4. Create a third new column in the raw data portion of the file in column "K," named "Date." Populate the first row of raw data with the date listed as the "Test Start Date" in the summary characteristics portion of the data. Populate the rest of the "Date" column by using the calculated "Time" column to indicate when the date changes (when time changes from 23:XX:XX to 00:XX:XX, the date can be increased by one day). Take care if an attempt is made to automate the assignment of dates to readings, as there are typically an inconsistent number of readings per day.

   At this point in processing, the data should resemble the image below.

	A	B	C	D	E	F	G	H	I	J	K
37	Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors	Time Elapsed (days)	Time	Date
38	60	0.013	0.013	0.014	0.014	0.014			0.000694444	12:20:03	10/17/2016
39	120	0.014	0.015	0.015	0.015	0.016			0.001388889	12:21:03	10/17/2016
40	180	0.015	0.015	0.015	0.016	0.016			0.002083333	12:22:03	10/17/2016
41	240	0.014	0.014	0.014	0.015	0.016			0.002777778	12:23:03	10/17/2016
42	300	0.014	0.014	0.014	0.015	0.016			0.003472222	12:24:03	10/17/2016
43	360	0.013	0.014	0.014	0.014	0.014			0.004166667	12:25:03	10/17/2016
44	420	0.013	0.014	0.014	0.014	0.015			0.004861111	12:26:03	10/17/2016
45	480	0.014	0.015	0.015	0.016	0.016			0.005555556	12:27:03	10/17/2016
46	540	0.013	0.014	0.014	0.014	0.014			0.00625	12:28:03	10/17/2016
47	600	0.013	0.014	0.014	0.014	0.014			0.006944444	12:29:03	10/17/2016
48	660	0.013	0.014	0.014	0.014	0.015			0.007638889	12:30:03	10/17/2016
49	720	0.013	0.013	0.014	0.014	0.014			0.008333333	12:31:03	10/17/2016
50	780	0.013	0.014	0.014	0.014	0.015			0.009027778	12:32:03	10/17/2016

5. Save the time- and date-stamped file to the "Processed Data" subfolder, using a file naming convention that includes the sampling location and the dates, for example "USSL-3013-MMDDYY-MMDDYY."

Preparing Data for Entry in Results Database

Several steps are necessary to prepare the time- and date-stamped data for entry into the results database, including (1) isolating data into date-specific files to facilitate quality control (QC) checks; (2) performing preliminary calculations in support of time-weighted average determination; and (3) performing isolated date-specific TWA calculations that will be used later to QC check automated TWA calculations performed by a pivot table. Each of these steps is explained in greater detail below.

Isolate Data Based on Date

It is necessary to isolate data based on date to facilitate QC checks and future data review. For example, if the analytical results from a particular high-volume ambient air sampling session trigger the need to review PM monitoring data for the same time period, the isolation of date-specific data streamlines this review process. The steps for isolating data based on date are provided below.

1. Open the file to be processed from the "Processed Data" folder. The range of dates contained in each file should be apparent from the file name.

2. If this is the first time processing data to isolate a specific date, use the following steps.

2.1. Review the data to determine the first date that has 24-hour coverage, in other words, the first date when data are available for the time frame immediately after midnight (00:00:00 – 00:10:00), similar to the example provided below.

Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors	Time Elapsed (days)	Time	Date
29520	0.038	0.038	0.038	0.038	0.038			0.341666667	0:00:04	10/27/2016
29580	0.038	0.038	0.038	0.038	0.038			0.342361111	0:01:04	10/27/2016
29640	0.038	0.038	0.038	0.038	0.038			0.343055556	0:02:04	10/27/2016
29700	0.037	0.038	0.038	0.038	0.038			0.34375	0:03:04	10/27/2016
29760	0.037	0.037	0.037	0.037	0.037			0.344444444	0:04:04	10/27/2016
29820	0.037	0.037	0.037	0.037	0.037			0.345138889	0:05:04	10/27/2016
29880	0.037	0.037	0.037	0.037	0.038			0.345833333	0:06:04	10/27/2016
29940	0.036	0.037	0.037	0.037	0.037			0.346527778	0:07:04	10/27/2016
30000	0.036	0.037	0.037	0.037	0.037			0.347222222	0:08:04	10/27/2016
30060	0.036	0.037	0.037	0.037	0.037			0.347916667	0:09:04	10/27/2016
30120	0.036	0.036	0.036	0.036	0.036			0.348611111	0:10:04	10/27/2016
30180	0.036	0.036	0.036	0.036	0.036			0.349305556	0:11:04	10/27/2016
30240	0.036	0.036	0.036	0.036	0.036			0.35	0:12:04	10/27/2016

2.2. Select all data associated with the selected date and copy-paste it into a new, blank Excel workbook. Make sure to include the column headers.

2.3. Save the new workbook in the "Date-Specific Data" folder, using a naming convention that includes the sampling location and date, for example "USSL-3013-MMDDYY."

3. It is likely that data for subsequent dates may be split between multiple "Processed Data" files, depending on when the DustTrak runs were started and stopped. In this case, follow the steps below after the first date-specific data file has been created. If all the date-specific data are contained in one file, repeat steps 2.1-2.3, above.

3.1. Select all data available in the current "Processed Data" file for the date in question, and copy-paste the data to a blank workbook. Make sure to include column headers.

3.2. Open the subsequent "Processed Data" file based on the date range included in the file name. Review this file to determine whether the data in this file complete the 24-hour dataset for the date in question.

3.2.1. If the data in this second file complete the 24-hour dataset for the date in question, select and copy-paste these data into the Excel workbook housing the first portion of isolated date-specific data. Save this workbook in the "Date-Specific Data" folder, using a naming convention that includes the sampling location and date — for example, "USSL-3013-MMDDYY."

3.2.2. If the data in this second file do not complete the 24-hour dataset for the date in question, select the date-specific data that is present and copy-paste the data into the Excel workbook housing the first portion of isolated date-specific data. Proceed to review the other files in the "Processed Data" folder to determine whether any other files house data for the date in question.

3.2.2.1. If additional files containing data are identified in the "Processed Data" folder, copy-paste the data for the date in question into the Excel workbook housing isolated date-specific data. Review the resulting dataset to make sure that data have been pasted in sequential order according to time. Repeat this process until a dataset spanning 24-hours has been compiled. Save this workbook in the "Date-Specific Data" folder, using a naming convention that includes the sampling location and date, for example "USSL-3013-MMDDYY."

3.2.2.2. If a full set of data spanning the date in question cannot be found, delete the "Date-Specific Data" file for the date in question if it has been saved and proceed to the next date. It is not possible to calculate a daily TWA without a dataset that spans 24 hours. Do not delete any data from the "Processed Data" or "Raw Data" files. This incomplete dataset must still be included in a database of all PM monitoring readings.

NOTE: When data for a specific date are split between multiple files, it is because the DustTrak run was started and stopped during the date in question. This stopping and starting is typically the result of an intentional stoppage (for example, to perform a zero calibration or download data), but may also be the result of an unintentional stoppage (loss of power or equipment error). Relatively short lapses in data are expected to result from any intentional stoppage. When assembling a date-specific dataset from multiple "Processed Data" files, make sure to review the amount of time that elapsed between the stop of one run and beginning of the next run (the time difference between the last reading in one file and the first reading in the subsequent file). Time differences between these readings that are less than 1 hour are acceptable. Any lapses in data recording that are greater than 1 hour should be investigated to ensure that there is not an issue with operation of the DustTrak in question. For example, in the image below, the first "Processed Data" file for October 28, 2016, had a final reading at 7:16:04. The subsequent "Processed Data" file had an initial reading at 7:22:48. This time gap of approximately 6 minutes is acceptable and likely explained by the field team performing a zero calibration.

Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors	Time Elapsed (days)	Time	Date
141900	0.031	0.031	0.031	0.031	0.031			1.642361111	7:13:04	10/28/2016
141960	0.03	0.03	0.03	0.03	0.03			1.643055556	7:14:04	10/28/2016
142020	0.031	0.031	0.031	0.031	0.031			1.64375	7:15:04	10/28/2016
142080	0.031	0.031	0.031	0.031	0.031			1.644444444	7:16:04	10/28/2016
60	0.031	0.031	0.031	0.032	0.034			0.000694444	7:22:48	10/28/2016
120	0.033	0.034	0.034	0.034	0.034			0.001388889	7:23:48	10/28/2016
180	0.039	0.039	0.039	0.04	0.04			0.002083333	7:24:48	10/28/2016
240	0.042	0.043	0.043	0.043	0.044			0.002777778	7:25:48	10/28/2016

Performing Preliminary Calculations for TWA Determination

At this point, the Excel workbook containing a full dataset of date-specific data spanning 24 hours should be saved in the "Date Specific Data" folder. This file can now be used to perform preliminary calculations in support of calculating TWAs.

TWAs for a specific PM reading (for example, PM10) are calculated in four general steps, as described below.

1. Calculate the time difference between the time of the reading in question and the previous reading:

$$\text{Time Difference}_n = t_{PM10_n} - t_{PM10_{n-1}}$$

2. Multiply the reading in question by the time difference calculated in step 1, resulting in a time-weighted value:

$$\text{Time-Weighted PM10}_n = \text{PM10}_n \times \text{Time Difference}_n$$

3. Repeat steps 1 and 2 for all data points in the data set.
4. Calculate the desired TWA by dividing the sum of all time-weighted values by the sum of the time differences for the time frame in question. To calculate the 24-hour TWA, include all data in the date-specific data file:

$$\text{24-hour TWA PM10} = \frac{\sum Time\text{–}Weighted\ PM10}{\sum Time\ Difference}$$

The data processing procedure described in this SOP includes preliminary calculations of time difference and time-weighted values to facilitate QC checks and to simplify calculations in the compiled "Results Database," which contains a large amount of data. The steps for performing preliminary calculations of time difference and time-weighted values are provided below.

1. Open the file to be processed from the "Date-Specific Data" folder.
2. Create columns headers titled "Time Difference," "Product_PM10," "Product_PM2_5," "Product_PM1," and "Location," as shown below:

Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors	Time Elapsed (days)	Time	Date	Time Difference	Product_PM10	Product_PM2_5	Product_PM1	Location
115920	0.018	0.018	0.019	0.019	0.019			1.341666667	0:00:04	10/28/2016					USSL-3013

3. Populate the "Time Difference" column by calculating:

$$\text{Time Difference}_n = t_{PM10_n} - t_{PM10_{n-1}}$$

Note that the first row in the dataset will not be populated, as there is no previous time value to use for a time difference calculation.

4. Populate the "Product_PM10" column by calculating:

$$\text{Product\_PM10}_n = \text{PM10}_n \times \text{Time Difference}_n$$

Note that the first row in the dataset will not be populated, as there is no time difference to use in the calculation.

5. Populate the "Product_PM2_5" column by calculating:

$$\text{Product\_PM2\_5}_n = \text{PM2\_5}_n \times \text{Time Difference}_n$$

Note that the first row in the dataset will not be populated, as there is no time difference to use in the calculation.

6. Populate the "Product_PM1" column by calculating:

$$\text{Product\_PM1}_n = \text{PM1}_n \times \text{Time Difference}_n$$

Note that the first row in the dataset will not be populated, as there is no time difference to use in the calculation.

7. Populate the "Location" column by inserting the name of the monitoring location, using the naming convention "USSL-XXXX."
8. Save the populated date-specific file.

After completing these steps, the entire date-specific data set should be populated. An example is provided below:

Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors	Time Elapsed (days)	Time	Date	Time Difference	Product_PM10	Product_PM2_5	Product_PM1	Location
115920	0.018	0.018	0.019	0.019	0.019			1.341666667	0:00:04	10/28/2016					USSL-3013
115980	0.019	0.019	0.019	0.019	0.019			1.342361111	0:01:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116040	0.018	0.019	0.019	0.019	0.019			1.343055556	0:02:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	0.0000125	USSL-3013
116100	0.018	0.018	0.019	0.019	0.019			1.34375	0:03:04	10/28/2016	0.000694444	1.31944E-05	0.0000125	0.0000125	USSL-3013
116160	0.019	0.019	0.019	0.019	0.019			1.344444444	0:04:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116220	0.019	0.019	0.019	0.019	0.019			1.345138889	0:05:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116280	0.019	0.019	0.019	0.019	0.019			1.345833333	0:06:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116340	0.019	0.019	0.019	0.019	0.019			1.346527778	0:07:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116400	0.019	0.019	0.019	0.019	0.019			1.347222222	0:08:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116460	0.019	0.019	0.019	0.019	0.019			1.347916667	0:09:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116520	0.019	0.019	0.019	0.019	0.019			1.348611111	0:10:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	1.31944E-05	USSL-3013
116580	0.018	0.019	0.019	0.019	0.019			1.349305556	0:11:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	0.0000125	USSL-3013
116640	0.018	0.019	0.019	0.019	0.019			1.35	0:12:04	10/28/2016	0.000694444	1.31944E-05	1.31944E-05	0.0000125	USSL-3013
116700	0.018	0.018	0.018	0.019	0.019			1.350694444	0:13:04	10/28/2016	0.000694444	1.31944E-05	0.0000125	0.0000125	USSL-3013
116760	0.018	0.018	0.018	0.018	0.018			1.351388889	0:14:04	10/28/2016	0.000694444	0.0000125	0.0000125	0.0000125	USSL-3013
116820	0.018	0.018	0.018	0.018	0.018			1.352083333	0:15:04	10/28/2016	0.000694444	0.0000125	0.0000125	0.0000125	USSL-3013
116880	0.018	0.018	0.018	0.018	0.018			1.352777778	0:16:04	10/28/2016	0.000694444	0.0000125	0.0000125	0.0000125	USSL-3013
116940	0.018	0.018	0.018	0.018	0.018			1.353472222	0:17:04	10/28/2016	0.000694444	0.0000125	0.0000125	0.0000125	USSL-3013

Calculate Date-Specific 24-Hour TWA as QC Check

This step in the data processing methodology involves calculating 24-hour TWAs for each date-specific data file to use as a QC check against the pivot table used to automatically calculate TWAs in the "Results Database" file. Instructions for calculating 24-hour TWAs within each date-specific data file are provided below.

1. Open the date-specific data file to be processed from the "Date-Specific Data" folder.
2. Create a new worksheet within the date-specific data file.
3. Select the columns from the original worksheet containing the following data: "Time," "Date," "Time Difference," "Product_PM10," "Product_PM2_5," "Product_PM1" (Columns J through P). Copy and paste these columns into the newly created blank worksheet. An example of the contents of the new worksheet is provided below:

Time	Date	Time Difference	Product_PM10	Product_PM2_5	Product_PM1
00:00:25	10/26/2016				
00:01:25	10/26/2016	0.000694444	1.04167E-05	9.72222E-06	9.72222E-06
00:02:25	10/26/2016	0.000694444	1.04167E-05	9.72222E-06	9.72222E-06
00:03:25	10/26/2016	0.000694444	1.04167E-05	9.72222E-06	9.72222E-06
00:04:25	10/26/2016	0.000694444	1.04167E-05	9.72222E-06	9.72222E-06
00:05:25	10/26/2016	0.000694444	9.72222E-06	9.72222E-06	9.72222E-06
00:06:25	10/26/2016	0.000694444	9.72222E-06	9.72222E-06	9.72222E-06
00:07:25	10/26/2016	0.000694444	9.72222E-06	9.72222E-06	9.72222E-06

4. Create new columns titled "24Hr TWA PM10," "24Hr TWA PM2.5,"and "24Hr TWA PM1."
5. Calculate the 24-hour TWA for PM10 using the equation:

$$\text{24Hr TWA PM10} = \frac{\sum_{i=1}^{n} Product\_PM10}{\sum_{i=1}^{n} Time\ Difference}$$

Note that since data have been isolated to be date-specific, the 24-hour TWA can be calculated by using the summation of all data included in the date-specific data file.

6. Calculate the 24-hour TWA for PM2.5 using the equation:

$$\text{24Hr TWA PM2.5} = \frac{\sum_{i=1}^{n} Product\_PM2\_5}{\sum_{i=1}^{n} Time\ Difference}$$

7. Calculate the 24-hour TWA for PM1 using the equation:

$$\text{24Hr TWA PM1} = \frac{\sum_{i=1}^{n} Product\_PM1}{\sum_{i=1}^{n} Time\ Difference}$$

8. Save the date-specific data file. The 24-hour TWAs calculated during this portion of the data processing procedure will be used as a QC check for the TWAs calculated automatically by the pivot table included in the final "Results Database" file.

Populating the Results Database

After date-specific data have been processed and formatted as described above, the data are ready to be entered into the results database. This section walks through entering data in the results database, final processing of the data, and setting up and using a pivot table to automatically calculate 1-hour and 24-hour TWAs.

Entering Data in the Results Database

1. Create an Excel workbook to house the results database if one has not been created. Name the file "Result_Database_MMDDYY" and save it in the "Result Database" folder. Create two worksheets in the "Results Database" file. The first worksheet should be named "Database," and the second worksheet should be named "Pivot Table."

2. Open the date-specific data file that will be uploaded to the "Result Database" file.

3. Copy-paste all of the data from the date-specific data file into the "Database" worksheet within the "Result Database" file. Repeat as needed until all date-specific data that need to be added to the result database have been pasted into the "Database" worksheet.

4. Once all necessary data have been included in the "Result Database" file, create a new column to house a combined date-time value, which can be useful for future data analysis.

4.1. Create a column header titled "Date_Time" in column Q.

4.2. Populate the "Date_Time" column using the following formula in Excel:

"Date_Time" = "Date" + "Time"

4.3. Format the "Date_Time" column to display both time and date using a custom number format. If necessary, define a new custom number format with the following format:

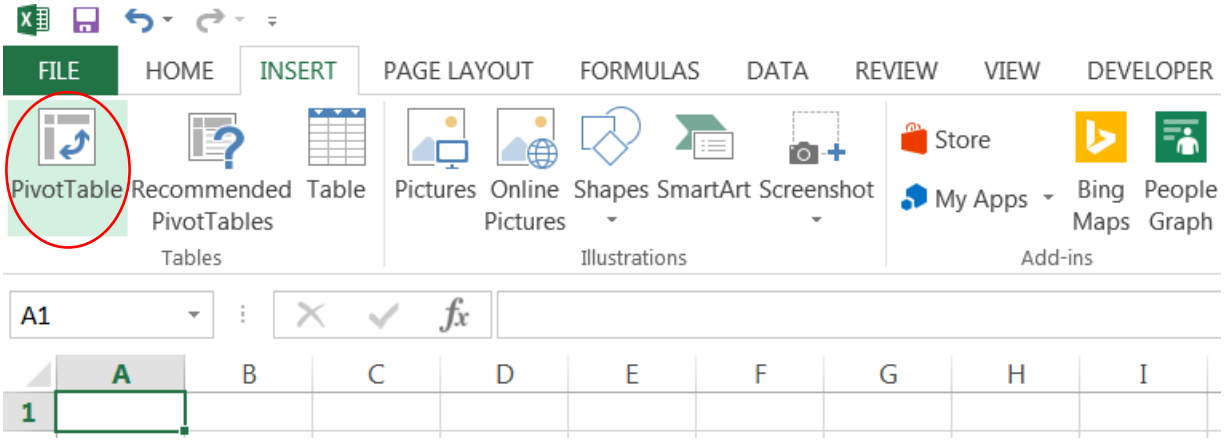
"mm/dd/yyy hh:mm:ss"

The result should appear as below:

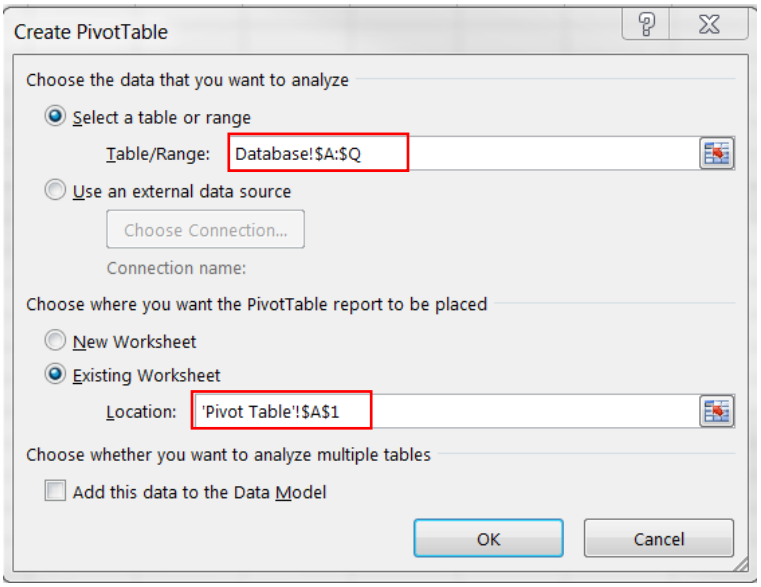
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Elapsed Time [s]	PM1 [mg/m3]	PM2.5 [mg/m3]	PM4 [mg/m3]	PM10 [mg/m3]	TOTAL [mg/m3]	Alarms	Errors	Time Elapsed (days)	Time	Date	Time Difference	Product_PM10	Product_PM2_5	Product_PM1	Location	Date_Time
45600	0.019	0.019	0.02	0.021	0.022			0.527777778	00:00:58	10/18/2016					USSL-2077	10/18/2016 00:00:58
45660	0.019	0.019	0.02	0.021	0.021			0.528472222	00:01:58	10/18/2016	0.000694444	1.45833E-05	1.31944E-05	1.31944E-05	USSL-2077	10/18/2016 00:01:58
45720	0.019	0.02	0.02	0.022	0.022			0.529166667	00:02:58	10/18/2016	0.000694444	1.52778E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:02:58
45780	0.019	0.02	0.02	0.021	0.021			0.529861111	00:03:58	10/18/2016	0.000694444	1.45833E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:03:58
45840	0.019	0.019	0.02	0.021	0.021			0.530555556	00:04:58	10/18/2016	0.000694444	1.45833E-05	1.31944E-05	1.31944E-05	USSL-2077	10/18/2016 00:04:58
45900	0.019	0.02	0.02	0.022	0.022			0.53125	00:05:58	10/18/2016	0.000694444	1.52778E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:05:58
45960	0.019	0.02	0.02	0.021	0.021			0.531944444	00:06:58	10/18/2016	0.000694444	1.45833E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:06:58
46020	0.019	0.02	0.02	0.022	0.022			0.532638889	00:07:58	10/18/2016	0.000694444	1.52778E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:07:58
46080	0.02	0.02	0.021	0.023	0.023			0.533333333	00:08:58	10/18/2016	0.000694444	1.59722E-05	1.38889E-05	1.38889E-05	USSL-2077	10/18/2016 00:08:58
46140	0.019	0.02	0.02	0.021	0.021			0.534027778	00:09:58	10/18/2016	0.000694444	1.45833E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:09:58
46200	0.019	0.02	0.02	0.021	0.022			0.534722222	00:10:58	10/18/2016	0.000694444	1.45833E-05	1.38889E-05	1.31944E-05	USSL-2077	10/18/2016 00:10:58

Creating the TWA Calculation Pivot Table

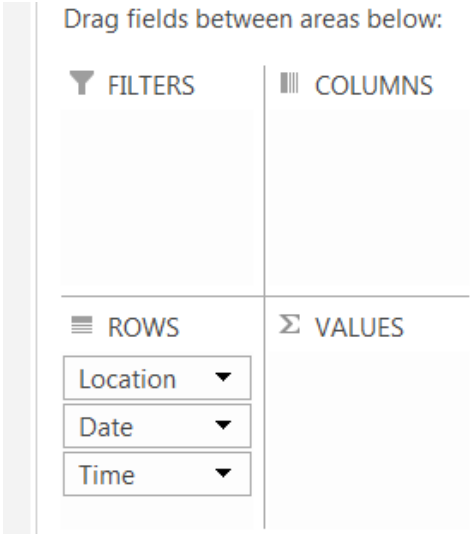
1. Open the "Pivot Table" worksheet within the "Result Database" file.
2. Navigate to the "Insert" tab and select "Pivot Table."



3. When prompted to choose the data to analyze, select all of the data in the "Database" worksheet by populating the "Table/Range" field with "Database!$A:$Q." This nomenclature directs the pivot table to analyze the entire column for data from columns A to Q. Using this nomenclature allows the user to add new data to the "Database" worksheet and update the pivot table without needing to redefine the data range. The "Create Pivot Table" prompt should be populated as below before selecting "OK."

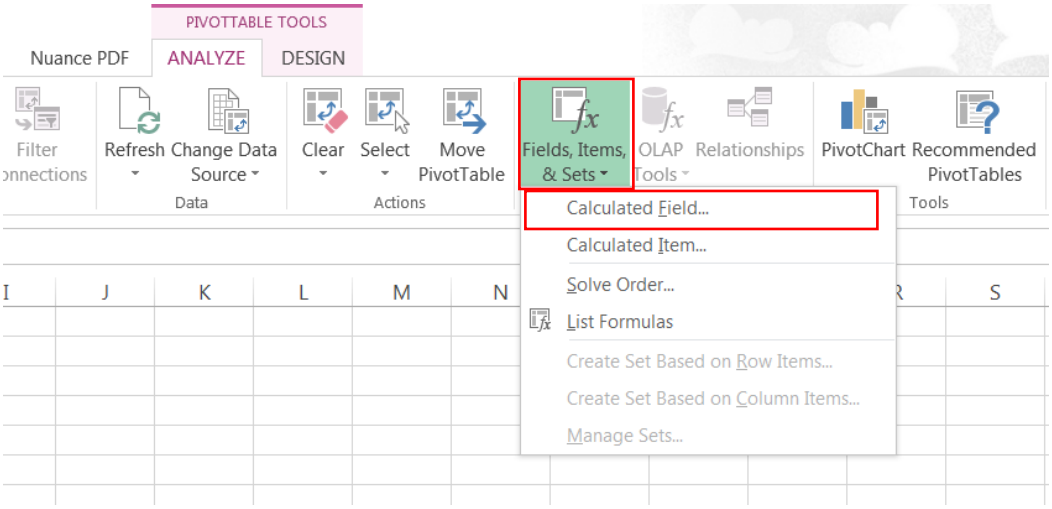


4. Populate the pivot table using the "Pivot Table Fields" area on the right of the screen
   - **4.1.** Drag "Location," "Date," and "Time" to the "Rows" section of the "Pivot Table Fields" area. The order that these entries are listed in the "Rows" section defines the order in which data are sorted. For most analyses, the most useful order involves sorting by location, then date, and then time.

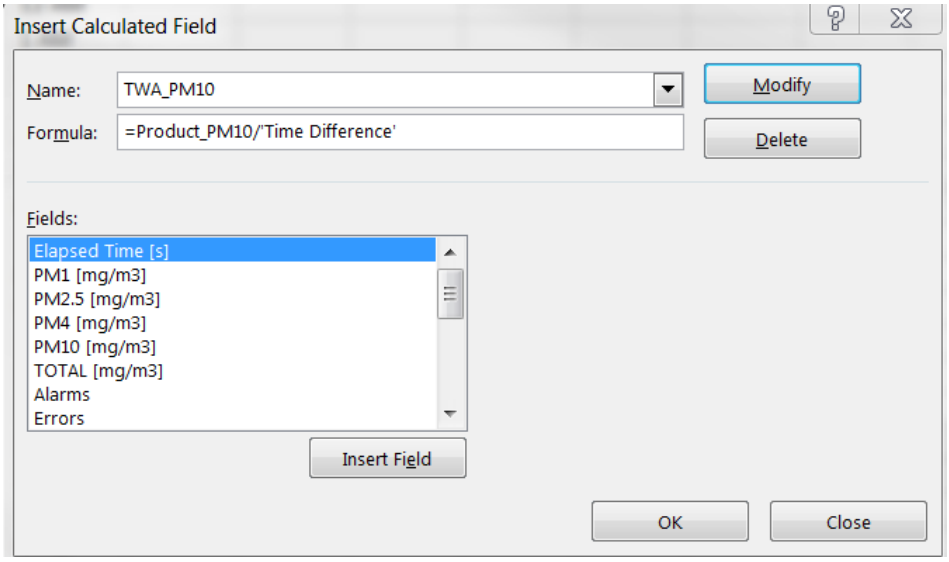


4.2. Calculate TWAs using the "Calculated Field" functionality of the pivot table.

4.2.1. Select the "Fields, Items, & Sets" menu from the "Analyze" Pivot Table Tools tab, and select "Calculated Field" from the drop-down menu.

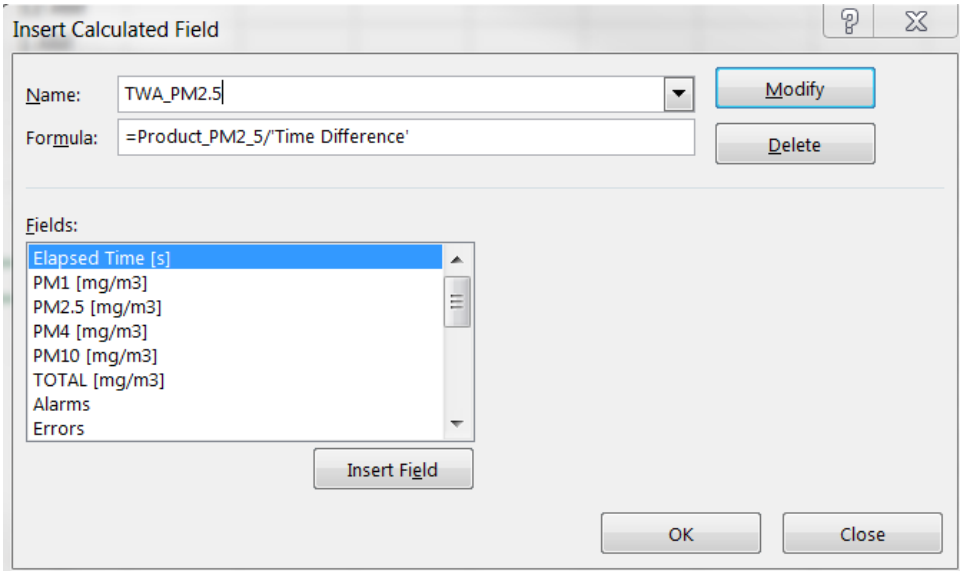


4.2.2. In the "Insert Calculated Field" prompt, enter the Name: "TWA_PM10," and the Formula: "=Product_PM10/'Time Difference.'" Fields can be selected and inserted into the formula in place of typing if desired.

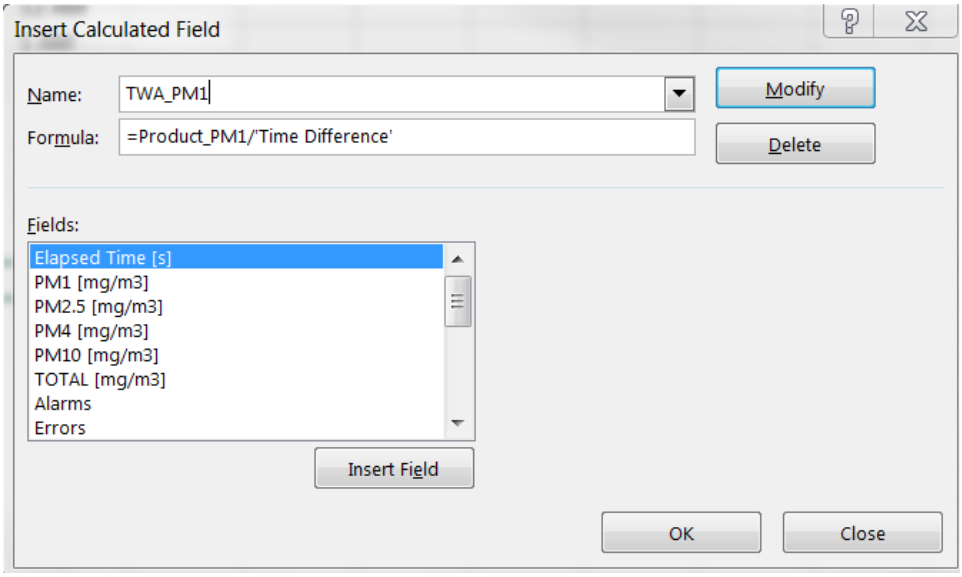


4.2.3. Repeat steps 4.2.1 and 4.2.2 to create calculated fields for TWA_PM2.5 and TWA_PM1, using the examples below as a guide:

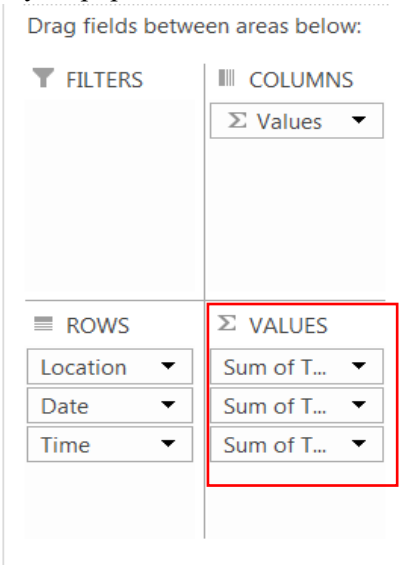
TWA_PM2.5:



TWA_PM1:

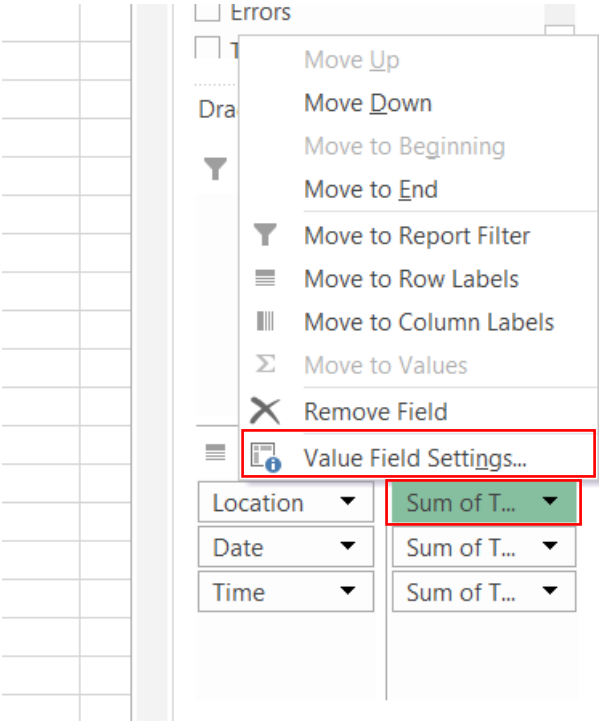


4.3. Drag the new "TWA_PM10," "TWA_PM2.5," and "TWA_PM1" fields to the "Values" portion of the "Pivot Table Fields" area. Once they have been moved to the "Values" area, the "Columns" area will automatically be populated with "Values."

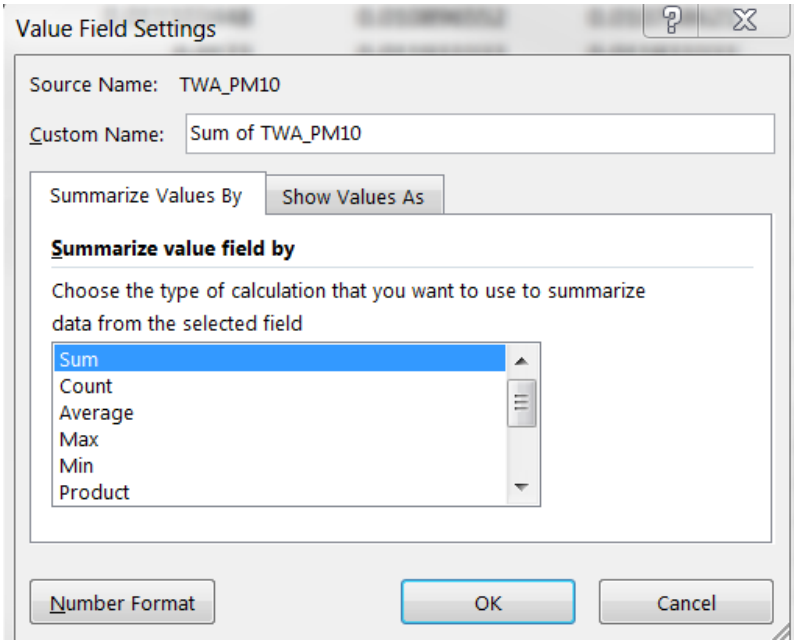


4.4. Make sure the "TWA_PM10," "TWA_PM2.5," and "TWA_PM1" calculated fields have "Value Field Settings" as "Sum of…" since the TWA calculation requires summations for calculation, as explained by the equation: TWA PM10 = $\frac{\sum_{i=1}^{n} Product\_PM10}{\sum_{i=1}^{n} Time\ Difference}$

4.4.1. If needed, adjust the "Value Field Settings" for each calculated field by clicking on the calculated field in the "Values" portion of the Pivot Table Fields area and selecting "Value Field Settings" from the drop-down menu.



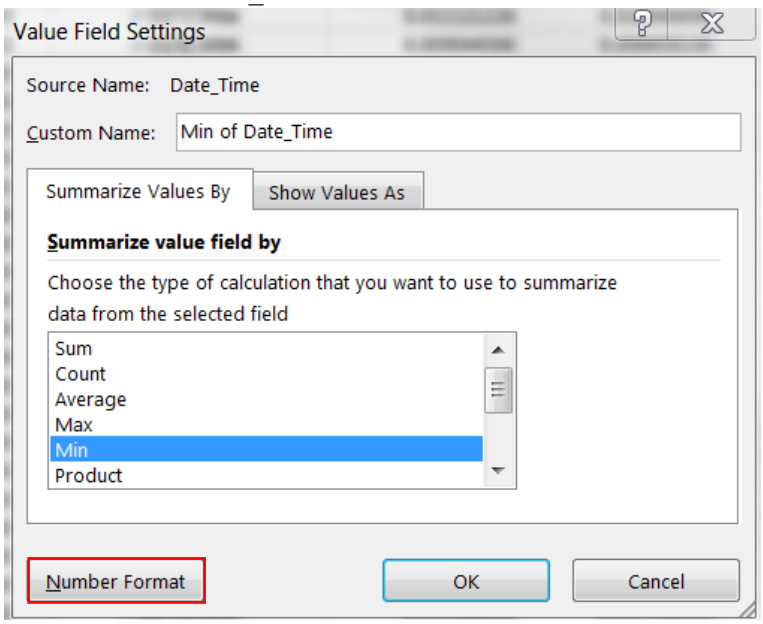
4.4.2. Make sure that the "Sum" option is selected. The Number Format can also be adjusted from this menu if desired.



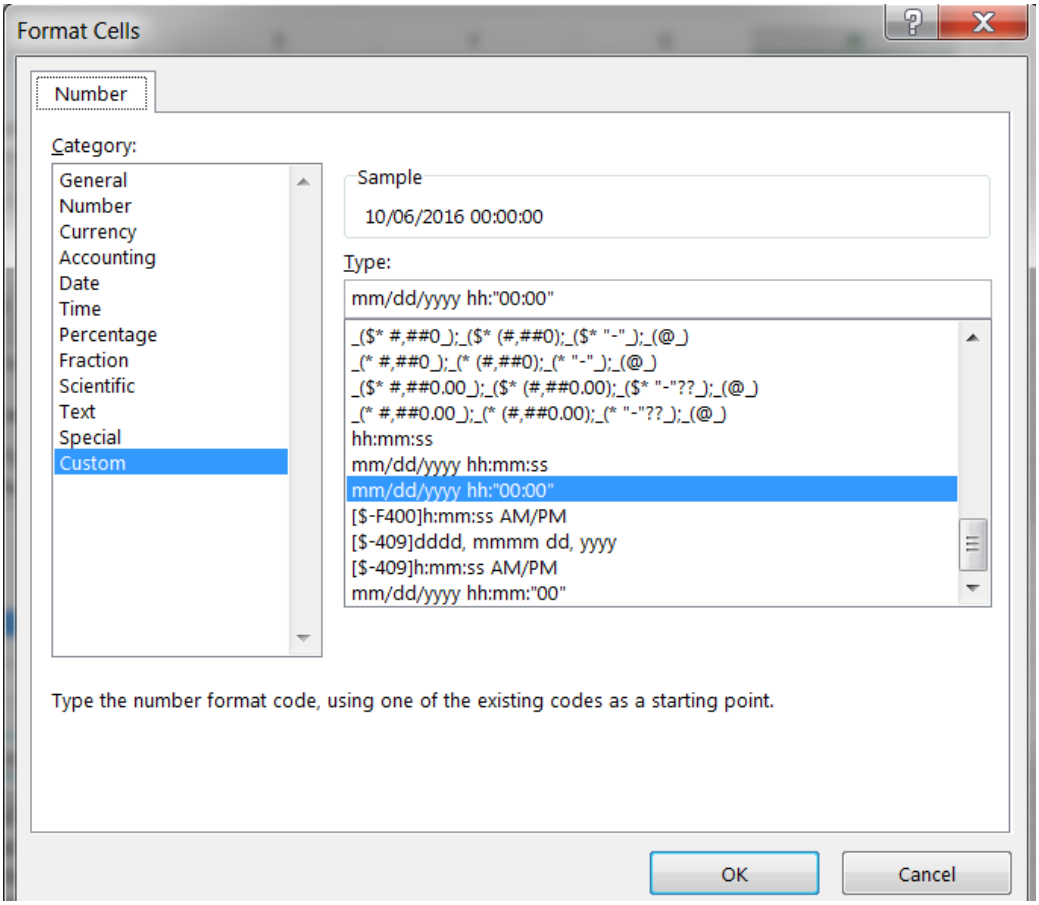
4.5. Add the combined "Date_Time" value to the pivot table by dragging the "Date_Time" field to the bottom of the "Values" section of the Pivot Table Fields area.

4.5.1. Use the "Value Field Settings" option to adjust the field settings to "Minimum of Date_Time." This option will report the earliest time that data were recorded in each pivot table category, such as time or date.

4.5.2. In the "Value Field Settings" dialogue box, select the "Number Format" button to adjust the display format for the "Time_Date" field.

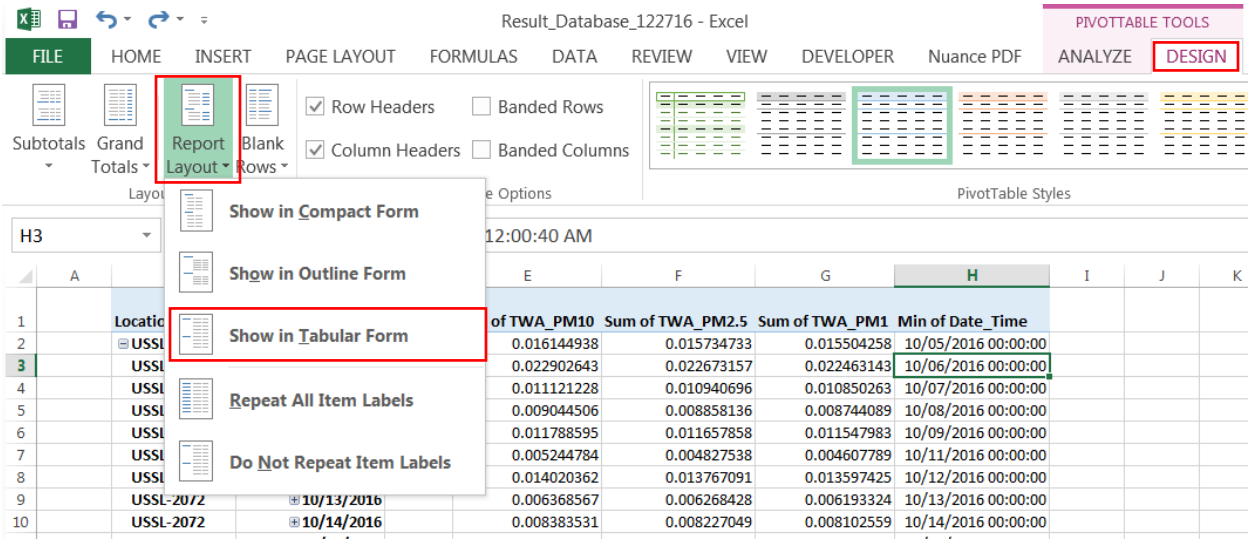


4.5.3. Select the "Custom" number format option, and in the text field type in the number format: "mm/dd/yyyy hh:"00:00." This format will provide a date-time stamp for each hourly TWA that displays the beginning of the collection period for the TWA. For example, if the first reading during the noon hour on October 15, 2016, was collected at 12:01:32, the "Date_Time" stamp will display "10/15/2016 12:00:00," making it easier to identify the time period that applies to the hourly TWA.



5. Format the populated pivot table. Formats can be tailored to user preference by adjusting the various options in the "Design" tab within Pivot Table Tools. For the generation of summary tables, it is recommended to use the "Tabular" report layout format.

5.1. To change the pivot table report format to "Tabular," Select the "Design" tab within Pivot Table Tools, then select "Report Layout," and finally select "Show in Tabular Form" from the drop-down menu.



6. The TWA calculation pivot table is now complete. Save the file to the "Result Database" folder using the naming convention "Result_Database_MMDDYY."

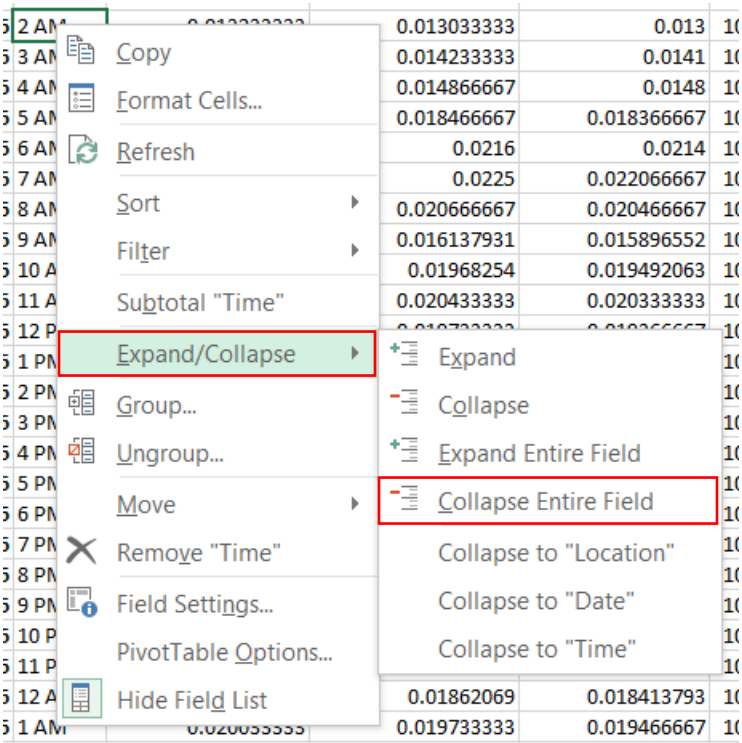
Using the TWA Calculation Pivot Table

As outlined in the preceding section, the TWA calculation pivot table is set up to automatically calculate both 24-hour and 1-hour TWAs based on the differentiation between date and time classes. This section will give a brief outline on how to manipulate the pivot table to display various combinations of TWAs.

1. Typically when the TWA calculation pivot table is created, it will be formatted so that all sample locations, all dates, and all times are displayed. This view provides a comprehensive accounting of 1-hour TWAs. The columns can be filtered using the drop-down arrows in the column headers to isolate particular sample locations, dates, or times.

Location	Date	Time	Sum of TWA_PM10	Sum of TWA_PM2.5	Sum of TWA_PM1	Min of Date_Time
USSL-2072	10/5/2016	12 AM	0.011103448	0.010896552	0.010758621	10/05/2016 00:00:00
USSL-2072	10/5/2016	1 AM	0.0123	0.011933333	0.011833333	10/05/2016 01:00:00
USSL-2072	10/5/2016	2 AM	0.013233333	0.013033333	0.013	10/05/2016 02:00:00
USSL-2072	10/5/2016	3 AM	0.0144	0.014233333	0.0141	10/05/2016 03:00:00
USSL-2072	10/5/2016	4 AM	0.015033333	0.014866667	0.0148	10/05/2016 04:00:00
USSL-2072	10/5/2016	5 AM	0.018666667	0.018466667	0.018366667	10/05/2016 05:00:00
USSL-2072	10/5/2016	6 AM	0.021733333	0.0216	0.0214	10/05/2016 06:00:00
USSL-2072	10/5/2016	7 AM	0.0227	0.0225	0.022066667	10/05/2016 07:00:00
USSL-2072	10/5/2016	8 AM	0.021066667	0.020666667	0.020466667	10/05/2016 08:00:00
USSL-2072	10/5/2016	9 AM	0.01637931	0.016137931	0.015896552	10/05/2016 09:00:00
USSL-2072	10/5/2016	10 AM	0.020301587	0.01968254	0.019492063	10/05/2016 10:00:00
USSL-2072	10/5/2016	11 AM	0.021233333	0.020433333	0.020333333	10/05/2016 11:00:00
USSL-2072	10/5/2016	12 PM	0.020366667	0.019733333	0.019366667	10/05/2016 12:00:00
USSL-2072	10/5/2016	1 PM	0.022633333	0.021466667	0.021033333	10/05/2016 13:00:00
USSL-2072	10/5/2016	2 PM	0.020995802	0.02027204	0.01991016	10/05/2016 14:00:00
USSL-2072	10/5/2016	3 PM	0.014066667	0.013633333	0.0134	10/05/2016 15:00:00
USSL-2072	10/5/2016	4 PM	0.010166667	0.009833333	0.0095	10/05/2016 16:00:00
USSL-2072	10/5/2016	5 PM	0.007466667	0.007066667	0.0069	10/05/2016 17:00:00
USSL-2072	10/5/2016	6 PM	0.007833333	0.007633333	0.0073	10/05/2016 18:00:00

2. To isolate 24-hour TWAs, right-click in the "Time" column, highlight "Expand/Collapse" from the drop-down menu, and select "Collapse Entire Field."



3. The resulting table collapses all 1-hour TWAs, and displays 24-hour TWAs. To display 1-hour TWAs again, follow the same process but select "Expand Entire Field."

Location	Date	Time	Sum of TWA_PM10	Sum of TWA_PM2.5	Sum of TWA_PM1	Min of Date_Time
USSL-2072	10/5/2016		0.016144938	0.015734733	0.015504258	10/05/2016 00:00:00
USSL-2072	10/6/2016		0.022902643	0.022673157	0.022463143	10/06/2016 00:00:00
USSL-2072	10/7/2016		0.011121228	0.010940696	0.010850263	10/07/2016 00:00:00
USSL-2072	10/8/2016		0.009044506	0.008858136	0.008744089	10/08/2016 00:00:00
USSL-2072	10/9/2016		0.011788595	0.011657858	0.011547983	10/09/2016 00:00:00
USSL-2072	10/11/2016		0.005244784	0.004827538	0.004607789	10/11/2016 00:00:00
USSL-2072	10/12/2016		0.014020362	0.013767091	0.013597425	10/12/2016 00:00:00
USSL-2072	10/13/2016		0.006368567	0.006268428	0.006193324	10/13/2016 00:00:00
USSL-2072	10/14/2016		0.008383531	0.008227049	0.008102559	10/14/2016 00:00:00
USSL-2072	10/15/2016		0.011872828	0.011769284	0.01166574	10/15/2016 00:00:00
USSL-2072	10/16/2016		0.017251564	0.017125782	0.016949965	10/16/2016 00:00:00
USSL-2072	10/17/2016		0.011801358	0.01132324	0.011109863	10/17/2016 00:00:00
USSL-2072	10/18/2016		0.012063238	0.011811675	0.011645587	10/18/2016 00:00:00
USSL-2072	10/19/2016		0.010336233	0.010185159	0.010019052	10/19/2016 00:00:00
USSL-2072	10/20/2016		0.004223767	0.004082696	0.004004864	10/20/2016 00:00:00

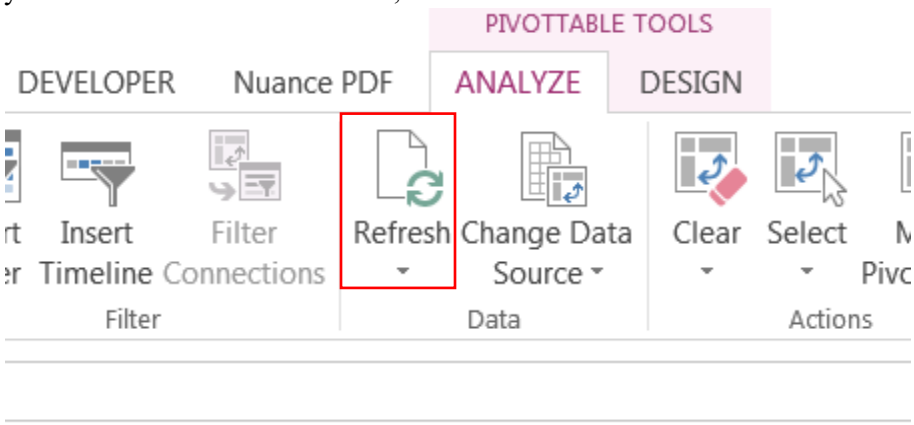
4. This table displaying 24-hour TWAs is useful for performing QC checks on the performance of the TWA pivot table to ensure that it is set up correctly. It is recommended that any time the result

database is updated with new data, at least 10 percent of the new 24-hour TWAs calculated by the pivot table are spot checked against the 24-hour TWAs calculated in each date-specific data file. Any anomalies between the two results should be recorded and investigated to where the mistake occurred.

Updating the TWA Calculation Pivot Table

Based on the ongoing nature of data collection for particulate matter monitoring, it is likely that the result database will be updated regularly and numerous times. This section provides brief instructions for updating the results database with new data.

1. Follow the process for inputting new data to the result database outlined in the "Entering Data in the Results Database" section, namely copy-pasting date-specific data into the "Database" worksheet, and populating the "Date_Time" field.
2. Select the "Pivot Table" worksheet to view the TWA calculation pivot table.
3. In the "Analyze" tab of the Pivot Table Tools, select "Refresh."



4. The pivot table will automatically be updated with the new data entered into the "Database" worksheet. Remember to perform a QC check on at least 10 percent of the 24-hour TWAs calculated for the new data by comparing pivot table results to the 24-hour TWAs calculated in the date-specific data files.
5. Save the result database as a new version in the "Result Database" folder, using file naming convention "Result_Database_MMDDYY."

Troubleshooting

Problem	Possible Reason & Solution
New data entered in the Results Database is not showing up in the TWA pivot table.	• Pivot table has not been refreshed, or is not referencing all data in the Results Database. Make sure to select "Refresh" in the Analyze Pivot Table Tools tab. • If selecting "Refresh" does not populate the pivot table with new data, make sure that the data source for the pivot table is correct by selecting "Change Data Source" Analyze Pivot Table Tools tab.

	The data range should include the entirety of columns A through Q.
The 24-hour TWA calculated by the pivot table does not match the 24-hour TWA calculated within the date-specific data file.	• Review the TWA calculated in the date-specific data file. Make sure that the data in the TWA calculation worksheet are the same as the data included in the results database. • If the data are the same, check the equation for calculating TWA in the date-specific data file. Make sure the equation is applied to the entire range of data, and is accurate.
The TWA pivot table is not displaying hourly TWAs.	• Right-click in the "Time" field, and select "Expand Entire Field."
The TWA pivot table is displaying hourly TWAs, but not 24-hour TWAs.	• Right-click in the "Time" field, and select "Collapse Entire Field."

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Downloading Data from Tetra Forms and Survey123

SOP NO. 083

REVISION NO. 1

Last Reviewed: November 3, 2017

November 3, 2017

Quality Assurance Approved

Date

Contents

This Standard Operating Procedure (SOP) is intended to provide the necessary steps for obtaining iForm data from the Tetra Forms Cloud and preparing the data to be loaded into a Scribe database. The Tetra Forms website enables users to access data collected in the field via the iForms app by downloading the data as an Excel file. Users can choose either the entire iForm data set or can select certain entries in the Tetra Forms Cloud interface before the data are downloaded. Once in Excel, the forms must be quality control checked and then saved according to a specific naming convention, based on the type of sample collected, before they are ready to be imported into Scribe.

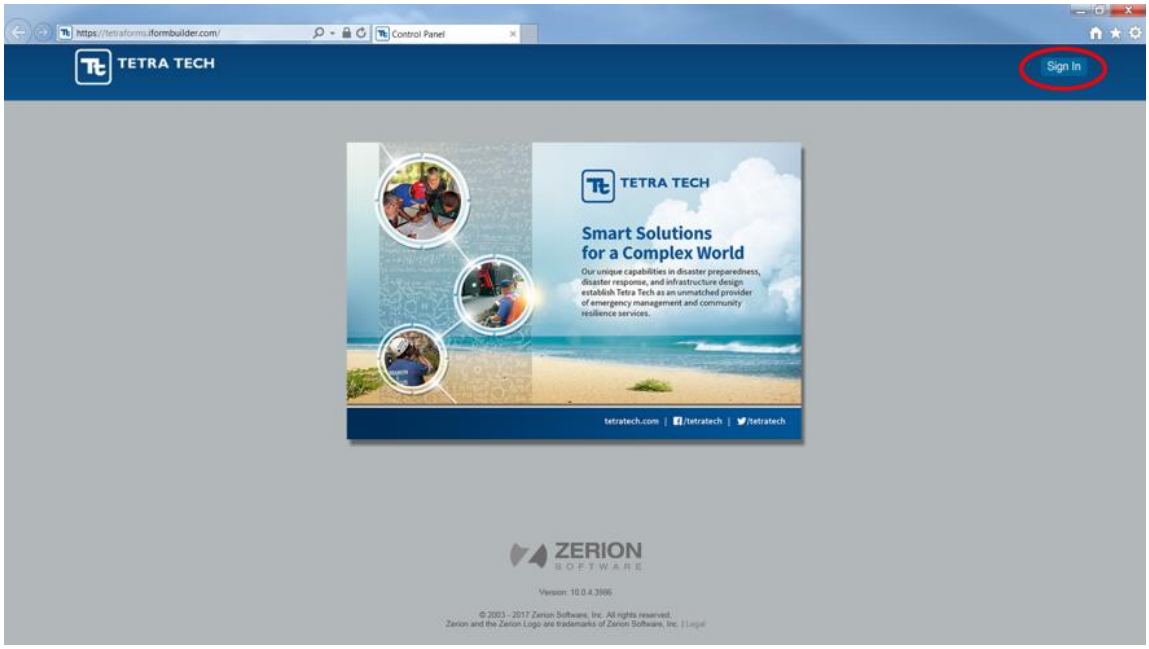
This SOP is also intended to provide the necessary steps for obtaining excavation elevation data collected in the field using a global positioning system (GPS) unit and a tablet computer and the ESRI Survey123 app. Data collected via the Survey123 app are uploaded to the Survey123 website, where they can be exported to an Excel file for quality control checks and eventual upload to Scribe.

Downloading Data from Tetra Forms

Signing In to Tetra Forms

The first step to accessing data collected in iForms is logging in to the Tetra Forms Cloud.

1. Go to https://tetraforms.iformbuilder.com/ to access the Tetra Forms home screen, shown in Exhibit 1. Tetra Forms will work in any browser.

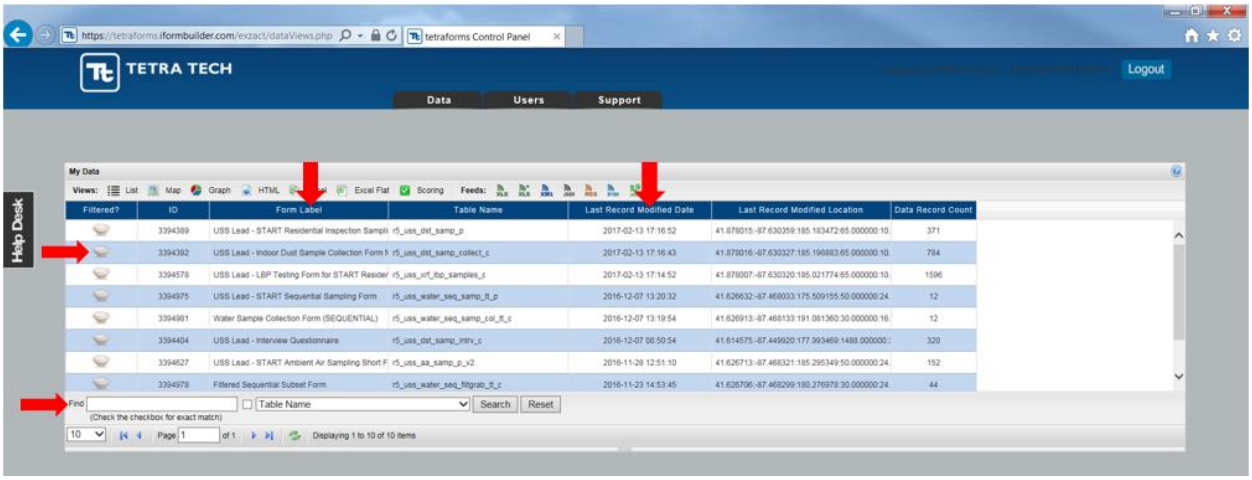


2. Click the "Sign In" button in the upper right corner of the screen.
- **2.1.** Provide the project specific log-in credentials.
- **2.2.** Click "Log In."

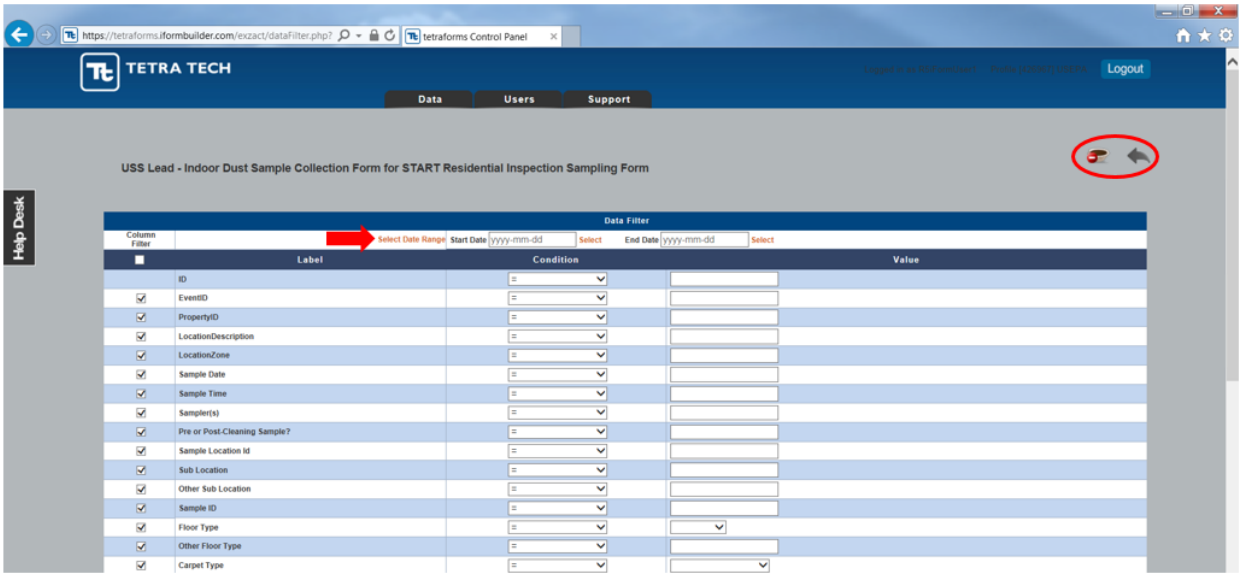
Filtering Data

Different sets of data can be filtered and selected in the Tetra Forms Cloud interface before the data are downloaded.

1. Using the names of the iForms listed under the heading "Form Label" (see below), search for the target data set.
   - **1.1.** iForms can also be found by using the "Find" box at the bottom of the page and entering either the Table Name, Form Name, or ID number as a search term.
   - **1.2.** The data set with the newest entries will appear at the top of the list. Older entries can be found farther down the list sorted by the "Last Record Modified Date" heading.
2. Once the data set is identified, click on the coffee filter icon , which will be in the same row and in the left-most column, under the heading "Filtered?" This icon will open the filter options.



3. On the subsequent screen, there will be check boxes with options to filter by EventID, PropertyID, Sample Date, Sampler(s), and other options (see below). Select a filter.
   - **3.1.** To filter the data using a range of dates, use the "Select Date Range" option in the ribbon above the list of filters and enter a date into the boxes. This filter can also accommodate open-ended ranges by leaving either the "Start Date" or the "End Date" boxes blank.
   - **3.2.** Alternately, if a filter other than date will be used, both date boxes could be left blank and a value can be entered into the box in the row of the chosen filter.
   - **3.3.** Scroll to the bottom of the screen and select "Set Filter."

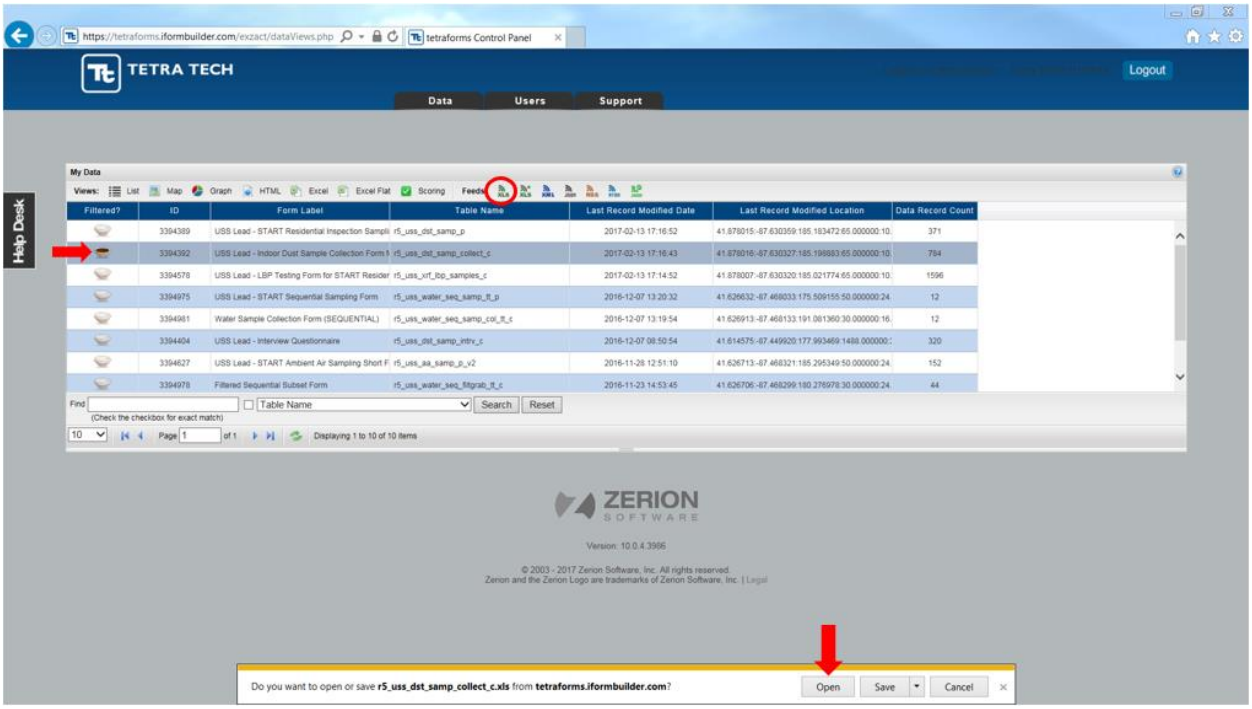


4. The next screen shows all of the iForm entries that satisfy the selected filter. To accept and begin downloading data, click the arrow in the upper right corner of the screen, or to go back and modify the filter, click the coffee filter icon next to the arrow and repeat step 3. (Both icons are circled in the image above.)

Exporting to XLS

To be imported into Scribe, iForm data must first be downloaded off the Tetra Forms Cloud in the form of an Excel file.

1. To download the newly filtered data, click on the row of the target data set from the list of all available iForms. The icon in the row of the filtered data will be brown. Once the row is selected, the entire row will darken (see below).
2. After selecting the row, click on the "XLS" icon from the ribbon above the list of data sets.



3. Open the new Excel file to begin the quality control review.

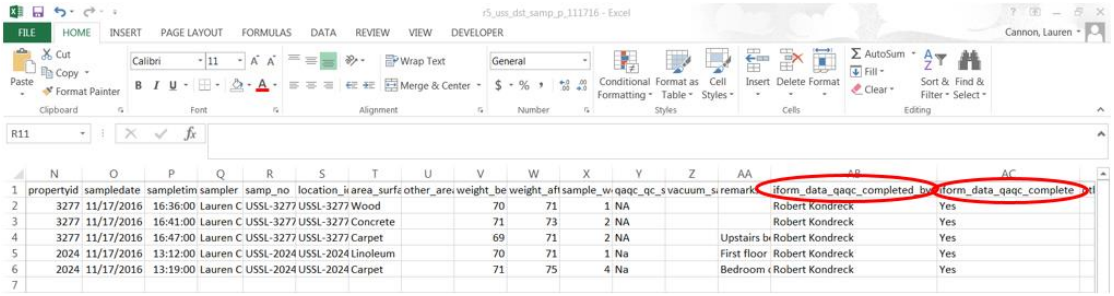
Quality Control Check

The user must perform a quality control (QC) check of iForm data to identify and correct any errors before the data are loaded into Scribe. The QC process is specific to the type of samples that were collected because the iForm format is different for each type of sample. Additionally, the way the files are saved also depends on the sample type. See table below for naming conventions.

Sample Type	iForm Name	File Name
Dust Samples	USS Lead – Indoor Dust Sample Collection Form for START Residential Inspection Sampling Form	Dust_Samples_MMDDYY
Ambient Air Samples	USS Lead – START Ambient Air Sampling Short Form	Air_Samples_MMDDYY
XRF Screening	USS Lead – LBP Testing Form for START Residential Inspection Sampling Form	XRF_Samples_MMDDYY
Low Flow Air Samples	USS Lead – START Personal Air Sampling (Monitoring) Form	LF_Samples_MMDDYY
Sequential Water Samples	USS Lead – START Sequential Sampling Form	Sequential_Form_MMDDYY
	Water Sample Collection Form (SEQUENTIAL)	Sequential_Sampling_Form_MMDDYY
	Water Screening Form	Water_Screening_Form_MMDDYY
	Filtered Sequential Subset Form	Filtered_Sequential_Form_MMDDYY
Soil Samples	Residential Yards Soil Sampling Form	Residential_Soil_Form_MMDDYY
	Sample Log	Soil_Sample_Log_MMDDYY
	Soil Boring Log	Soil_Boring_Log_MMDDYY
	Photo Log	Soil_Photo_Log_MMDDYY

Dust Samples

1. Check that the number of rows matches the number of samples collected for each location.
2. Compare the "PropertyID" field with the "LocationID" field. The number in each of these fields should be the same.
3. Check that the date in the "Samp_no" is the same as in the "Sampledate" field.
4. Compare "Samp_no" field with the "Sub_location" field. Check that BR is Bedroom, FE is front Entrance, RE is Rear Entrance, PA is Play Area, and so forth.
5. Compare "Area_Surface" field with "Carpet_Type" field. If "Area_Surface" shows "Carpet" then the "Carpet_Type" field must be filled, for example, Area Rug.
6. Location Zone must be filled out.
7. Fill out the "iform_data_qaqc_complete" field (see) with "Yes."
8. Fill out the "iform_data_qaqc_completed_by" field (see image below) with the last name of the person completing the QC check.
9. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.



	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1	propertyid	sampledate	sampletim	sampler	samp_no	location_i	area_surfa	other_area	weight_be	weight_aft	sample_w	qaqc_qc_s	vacuum_s	remark	iform_data_qaqc_completed_by	iform_data_qaqc_complete
2	3277	11/17/2016	16:36:00	Lauren C	USSL-3277	USSL-3277	Wood		70	71	1	NA			Robert Kondreck	Yes
3	3277	11/17/2016	16:41:00	Lauren C	USSL-3277	USSL-3277	Concrete		71	73	2	NA			Robert Kondreck	Yes
4	3277	11/17/2016	16:47:00	Lauren C	USSL-3277	USSL-3277	Carpet		69	71	2	NA		Upstairs be	Robert Kondreck	Yes
5	2024	11/17/2016	13:12:00	Lauren C	USSL-2024	USSL-2024	Linoleum		70	71	1	Na		First floor	Robert Kondreck	Yes
6	2024	11/17/2016	13:19:00	Lauren C	USSL-2024	USSL-2024	Carpet		71	75	4	Na		Bedroom (	Robert Kondreck	Yes
7																

Ambient Air Samples

1. Verify the "start_date" and the "stop_date" fields; be aware that the start_date must always be earlier than the stop_date.
2. "Total_time" field must always be the difference of "stop_count" minus "start_count" and in minutes.
3. Check the "pump_fault" field, take note of any entries that read "Yes."
4. If "media_items" field is listed as "NA," change it to "Unknown."
5. Verify that the "Analyses" field is filled out with the appropriate laboratory analytical methods.
6. Fill out the "iform_data_qaqc_complete" field with "Yes."
7. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
8. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

XRF Screenings

1. Verify that the "testnumber" field has the same information as the "test_number" field. Otherwise, change "test_number" entries to match "testnumber" entries.
2. Check that the "Room_Component" and "Meas Surface" categories correspond to one another.
3. Fill out the "iform_data_qaqc_complete" field with "Yes."
4. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
5. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Low Flow Air Samples

1. Check that the date in the "Samp_no" is the same as in the "Sampledate" field.
2. Compare "Samp_no" field with the "Sub_location" field. Check that RE, DW, and Blank in the "Samp_no" field correspond to Resident Entry, Downwind, and Field Blank.
3. Confirm or change the "eventid" field to be "Removal Excavation Air Monitoring."
4. Check the "pump_fault" field, take note of any entries that read "Yes."
5. Fill out the "iform_data_qaqc_complete" field with "Yes."
6. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
7. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

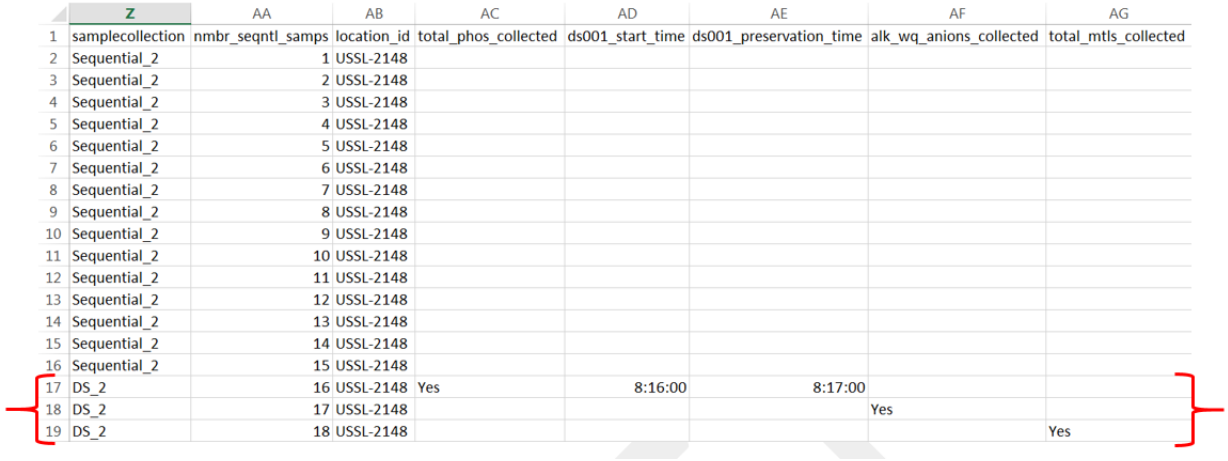
Sequential Water Samples

USS Lead – START Sequential Sampling Form:

1. Compare the "propertyid" and "location_id," making sure the fields contain the same number.
2. Confirm or change the "eventid" field to be "START Sequential Sampling."
3. The "pre_post_sample" field must be filled out.
4. Fill out the "iform_data_qaqc_complete" field with "Yes."
5. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
6. Once all of the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Water Sample Collection Form (SEQUENTIAL):

7. Confirm or change the "eventid" field to be "START Sequential Sampling."
8. The "pre_post_sample" and "smpl_loc_curb_dist_ft" fields must be filled out.
9. Fill out the "iform_data_qaqc_complete" field with "Yes."
10. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
11. Note the number in the "nmbr_seqntl_samps" field, and copy and insert the entire row until there are as many rows as indicated in this field.
12. Change the "nmbr_seqntl_samps" field so that each successive row contains a different number starting with 1 and counting up to the original number listed in the "nmbr_seqntl_samps" column.
13. For each of these new rows EXCEPT for the last 3, complete the following steps:
    - **13.1.** Change the "sample_no" column to the format "USSL-HHID-SXXX-MMDDYY." Replace HHID with the number in the "location_id" column for all rows. "MMDDYY" should be replaced in the format indicated with the date located in the "sampledate" column. The number that should replace "XXX" is in the "nmbr_seqntl_samps" column, including preceding zeroes as necessary. (This number will be different for all rows.)
    - **13.2.** Delete any entries in the following columns: "total_phos_collected," "ds001_start_time," "ds_001_preservation_time," "alk_wq_anions_collected," and "total_mtls_collected."
14. For the last 3 rows, complete the following steps (see image below):
    - **14.1.** Change the "samplecollection" field from "Sequential_N" to "DS_N."
    - **14.2.** Change the "sample_no" column to the format "USSL-HHID-DS00X-MMDDYY," inserting the location ID and date accordingly. For these 3 samples, X should be replaced by 1 in the first row, and increase by 1 in each of the next 2 rows.
    - **14.3.** In the first of these rows, delete any entries in the columns "alk_wq_anions_collected" or "total_mtls_collected."
    - **14.4.** In the second row, delete entries in the columns "total_phos_collected," "ds001_start_time," "ds001_preservation_time," and "total_mtls_collected."
    - **14.5.** In the final row, delete entries in the columns "total_phos_collected," "ds001_start_time," "ds001_preservation_time," and "alk_wq_anions_collected."



	Z	AA	AB	AC	AD	AE	AF	AG
1	samplecollection	nmbr_seqntl_samps	location_id	total_phos_collected	ds001_start_time	ds001_preservation_time	alk_wq_anions_collected	total_mtls_collected
2	Sequential_2	1	USSL-2148					
3	Sequential_2	2	USSL-2148					
4	Sequential_2	3	USSL-2148					
5	Sequential_2	4	USSL-2148					
6	Sequential_2	5	USSL-2148					
7	Sequential_2	6	USSL-2148					
8	Sequential_2	7	USSL-2148					
9	Sequential_2	8	USSL-2148					
10	Sequential_2	9	USSL-2148					
11	Sequential_2	10	USSL-2148					
12	Sequential_2	11	USSL-2148					
13	Sequential_2	12	USSL-2148					
14	Sequential_2	13	USSL-2148					
15	Sequential_2	14	USSL-2148					
16	Sequential_2	15	USSL-2148					
17	DS_2	16	USSL-2148	Yes	8:16:00	8:17:00		
18	DS_2	17	USSL-2148				Yes	
19	DS_2	18	USSL-2148					Yes

15. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Water Screening Form:

16. Confirm or change the "eventid" field to be "START Sequential Sampling."
17. Verify that the "sub_location" field is filled out.
18. Compare "mon_parameter" field with the "mon_meas_units" field. Check that "C," "SU," "mg/L," and "mg/L" in the "mon_meas_units" field correspond to "Temperature," "pH," "Cl2," and "Cl2 – Confirmation" in the "mon_parameter" field.
19. The row with "Cl2" in the "mon_parameter" field must contain zeroes in the "blank_reading_mgl" and "mon_measurement" fields.
20. The "pre_post_sample" field must be filled out.
21. Fill out the "iform_data_qaqc_complete" field with "Yes."
22. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
23. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Filtered Sequential Subset Form:

24. Confirm or change the "eventid" field to be "START Sequential Sampling."
25. The "pre_post_sample" field must be filled out.
26. The "floor_required," "sub_location," "smpl_loc_curb_dist_ft," and "watermeterreading" fields must be consistent across all samples from the same location.
27. Insert "USSL-" and the household ID number to the beginning of the "samp_no" field.
28. The "seq_subset_filter_size" should be 0.2 across all samples.
29. The "seq_subset_filter_material" should read "Polypropylene."
30. The "seq_subset_filtered_volume" should be 60 across all samples.
31. Check that each location has a separate row for the "filter_grab_id" entries "S00FB," "S009F," "S006F," and "S003F."
32. Fill out the "iform_data_qaqc_complete" field with "Yes."

33. Fill out the "iform_data_qaqc_completed_by" field with the last name of the person completing the QC check.
34. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Soil Samples

Sample Log:

1. The "propertytype," "propertyaddress," "sub_location," "samp_no," and "locationzone" fields must all be filled out.
2. The "location_id" and "yardid" fields may be left empty.
3. Once the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Residential Yards Soil Sampling Form:

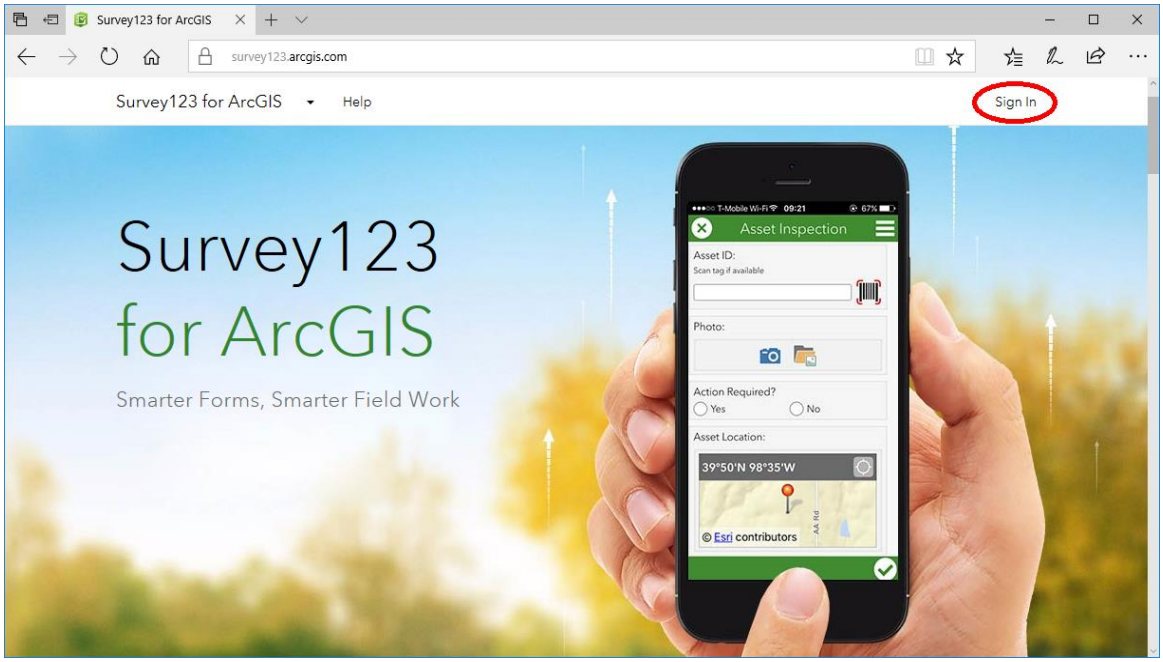
4. Each field should be populated except for "propertycomment," "sample_log," and "soil_boring_log" which may either be populated or remain empty.
5. Once the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)" according to the naming convention in the table above.

Downloading Data from Survey123 for ArcGIS

Signing into Survey123 for ArcGIS

The first step to accessing data collected in Survey123 is logging into the Survey123 Website.

1. Navigate to https://survey123.arcgis.com/ to access the Survey123 home screen, shown below. This webpage will work in any browser.

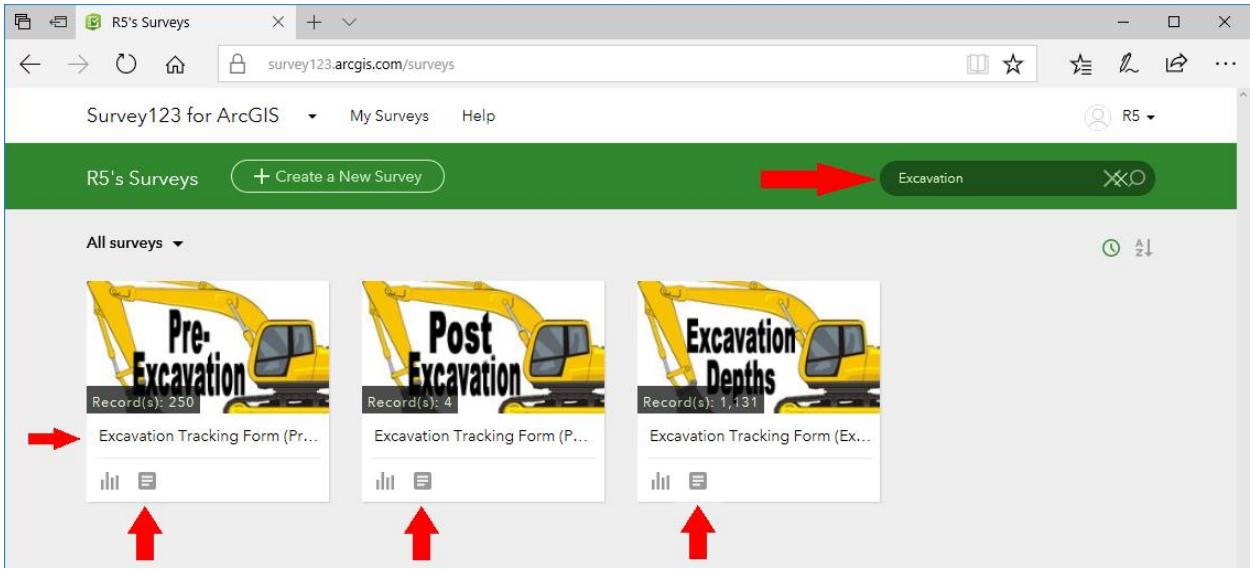


2. Click the "Sign In" button in the upper right corner of the screen.
   2.1. Provide the necessary log-in credentials.
   2.2. Click "Sign In."

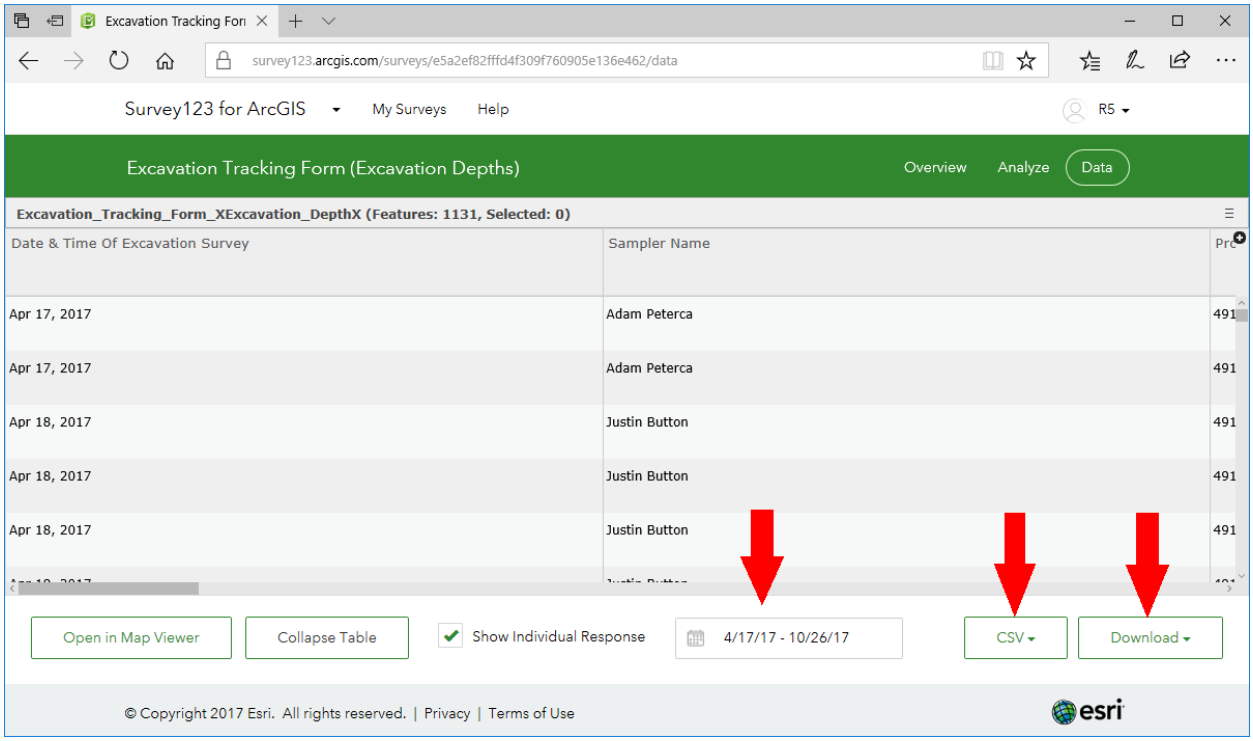
Exporting to CSV

To be imported into Scribe, Survey123 data must first be downloaded off the Survey123 webpage in the form of an Excel file.

1. Using the names of the surveys, search for the target data set.
   1.1. Surveys can also be found by using the "Search" box at the top right of the page.
2. Once the survey is identified, click on the datasheet icon , which will be just below the survey's name.



3. From this page, you can filter records by date. To filter the records, click on the date range box at the bottom of the page. The default date range will include all records.
   3.1. Specify a start and end date by typing them in the appropriate boxes, or by selecting them from the calendar.
4. Select the desired format for the download by clicking on the button labeled "CSV" located at the bottom-right of the page.
   4.1. Select "Excel"
5. To download the data, click on the Download button located in the bottom-right corner.
   5.1. Select whether to download all of the data, or to download only the filtered data.



6. To format the file for Scribe, open the new Excel file and copy all of the data.

6.1. Open the Scribe Column Header Excel file template.

6.2. Paste the data copied below the existing headers, with the first row of pasted data in Row-2).

6.2.1. Compare the headers in Row-2 with those in Row-1; they should look similar.

6.2.2. Compare the number of headers in Row-2 and in Row-1.

6.2.2.1. If Row-2 (the pasted data from the Survey123 export file) has more headers, then a new field was most likely added, and the Scribe Column Header template needs to be updated.

6.3. If the headers in Row-2 are similar to those in Row-1, and Row-2 has the same number of headers as Row-1, delete the column headers in Row-2. To delete them, right-click on row "2" and click Delete.

7. Save the reformatted Excel file and begin the quality control review.

Quality Control Check

The user must perform a QC check of Survey123 data to identify and correct any errors before the data are loaded into Scribe. Check that the "Excavation_Depth" field is greater than the "Target_Depth" field.

1. Check that the "Target_Reach" field says "Yes"
   - **1.1.** If field says "No," check the "Obstruction" field to make sure a reason has been provided to explain why the target excavation depth was not reached.
2. Fill out the "qaqc_complete" field with "Yes."
3. Fill out the "qaqc_completed_by" field with the last name of the person completing the QC check.
4. Once all the items above have been addressed and changed as necessary, save the file as a "CSV (Comma delimited)."

Troubleshooting

Problem	Possible Reason & Solution
Can't find a specific iForm in the Tetra Forms Cloud/Can't find a specific Survey123 Form	• Try typing in a search term in the "Find" box at the bottom of the page. • Not every user is granted access to all of the iForms. Log out and try logging back in using different credentials.
The data are not appearing after the filter is applied	• Try broadening the filter or download the data without a filter and remove extraneous data directly from the Excel file. • Confirm that the data were submitted in the iForms app and synced with the Tetra Forms Cloud.
The iForm data do not look the same as in the example	• Be sure the "XLS" download option was selected from the list of options. It is the first icon after "Feeds." Another option listed as "XLS" looks similar, but the icon has a plus sign in the upper left corner.
Cannot find the "iform_data_qaqc_complete" or "qaqc_complete" column	• Try expanding the width of all the columns. Some of the headings are longer than the automatically set width, so the titles are partially hidden. • The location of the columns will be different in each iForm; be sure to look carefully. • Make sure you have the correct version of the Scribe Column Headers – Excavation Tracking (Excavation Depths) template.
Some of the information in the iForm/Survey123 form looks incorrect	• If information on the iForm/Survey123 form looks out of place, check with the project manager or the sampling team to verify or correct this information.

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Scribe Field Database

SOP NO. 084

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

Quality Assurance Approved

Date

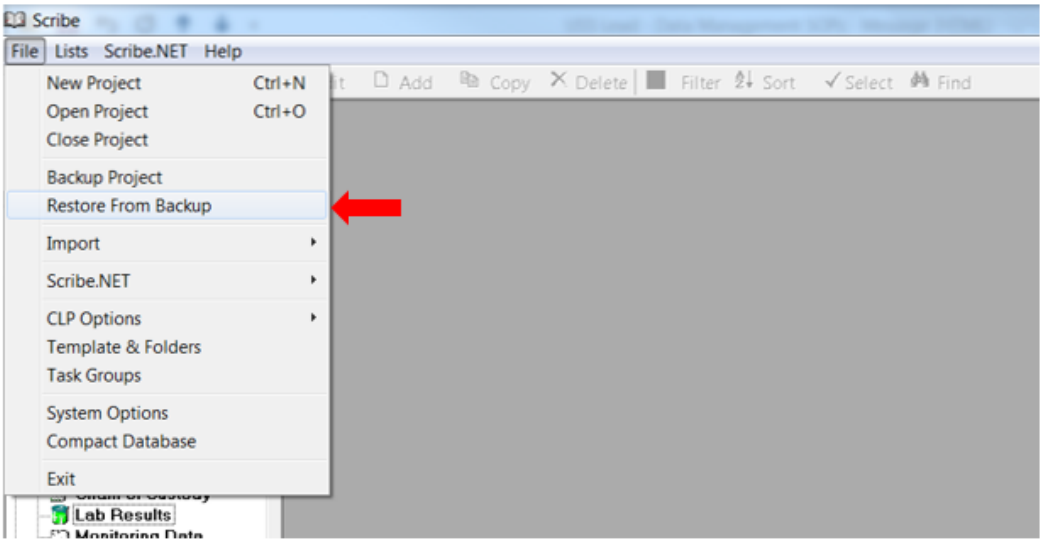
Contents

This Standard Operating Procedure (SOP) is intended to provide instructions for loading comma-separate value (CSV) files into a Scribe database, quality control (QC) checking the imported data, producing a chain of custody (COC) for field samples, and exporting the files necessary for the database manager to update the central project Scribe Database. Scribe is a database software that can store samples and related information including, but not limited to, location, date, sample medium, samplers, and laboratory results. Every record that is created in iForms must be loaded into a local version of the Scribe database to produce a COC, which must be included with samples being sent to laboratories for testing. Once the COC is created, it must be exported and sent to the database manager so that the master version of the Scribe database can be updated and published.

Importing Files into Scribe

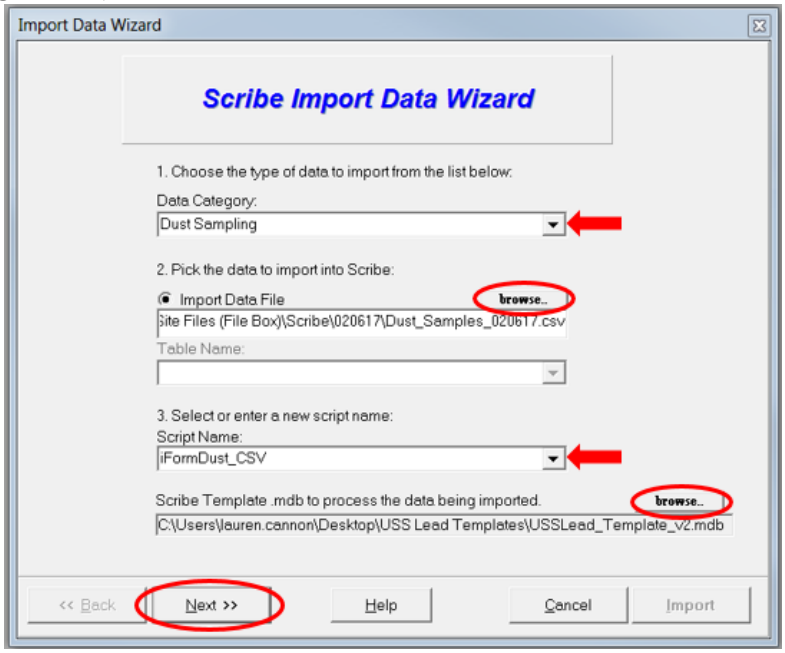
A clean, original version of the project's Scribe database must be used to import files. The database manager should provide this original backup file as well as upload templates that are used to process the data being imported. These files should be saved to an easily accessible location (for example, the user's desktop) where they will not be mistakenly be saved over with the database manager's published updates.

1. After opening Scribe, click on File→Restore From Backup (see image below).
   - **1.1.** Navigate to the location where the clean version of the database is saved and click "Open."
   - **1.2.** Select "Yes" in the next pop-up menu to load this project.
   - **1.3.** The menu that appears asks for a location to save the Scribe database after any local updates are made. Select a location and click "Save."
   - **1.4.** Select "Yes" to overwrite the existing project file.



2. With the original version now loaded, click File→Import→Custom Import.
   - **2.1.** Select "No" when prompted with the option to back up the project now, since a Backup version was just loaded.

2.2. The next window that appears asks for information related to the data you are importing. All three items must be addressed, and the proper importing template must be selected at the bottom of the list (see image below).



2.2.1. For item 1, select the type of samples associated with the data being uploaded from the drop-down menu. See the table in Section 2.2.3 for Data Categories.

2.2.2. Select "Browse" under item 2 and navigate to the location of the CSV file containing the iForm data. Be sure to change the file type from "Microsoft Access (*.mdb)" to "Text (tab delimited; csv)(*.txt;*.csv)." Select the correct file, then click "Open." The next field, "Table Name," may be left blank.

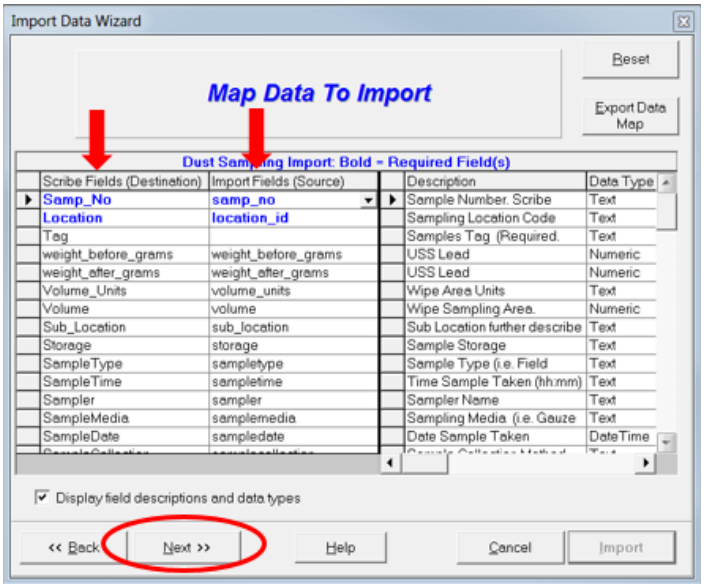
2.2.3. From the drop-down menu in item 3, select the script that corresponds with the data category selected in item 1. See the script naming conventions in the table below.

Sample Type	CSV File Name	Data Category	Script Name
Air	Air_Samples_MMDDYY	Air Sampling	iFormAir_CSV
	LF_Air_Samples_MMDDYY		iFormAir_LowFlow
Water	Sequential_Form_MMDDYY	Property Survey	Default
	Sequential_Sampling_Form_MMDDYY	Water Sampling	iForm_Sequential
	Filtered_Sequential_Form_MMDDYY		iForm_FilterGrab
	Water_Screening_Form_MMDDYY	Monitoring	iForm_Mon_Water
Dust	Dust_Samples_MMDDYY	Dust Sampling	iFormDust_CSV
XRF	XRF_Samples_MMDDYY	Monitoring	iForm_XRF
Soil	Residential_Soil_Form_MMDDYY	Soil/Sediment	Default
	Soil_Sample_Log_MMDDYY		

2.2.4. Select the other "Browse" button and navigate to the location to where the importing templates are saved. Select the correct template and click "Open."

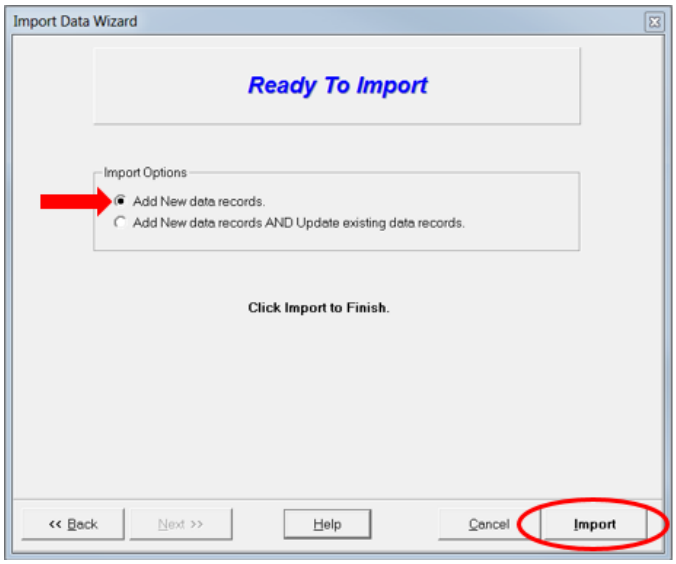
2.2.5. Once all the fields described above have been populated, select "Next."

2.2.6. The next page is titled "Map Data To Import." The two columns on the left are titled "Scribe Fields (Destination)" and "Import Fields (Source)" (see below). Scan through the rows of the table, checking that the contents of these two columns match each other. If there are no entries in the "Import Fields (Source)" column, select "Back" and make sure the correct template was selected. After checking the rows, click "Next."



2.2.7. The next page is titled "Data To Be Imported." Check each entry in the table and correct any errors, then click "Next."

2.2.8. On the "Ready To Import" page, select the "Add New data records" option, then click "Import" (see below).

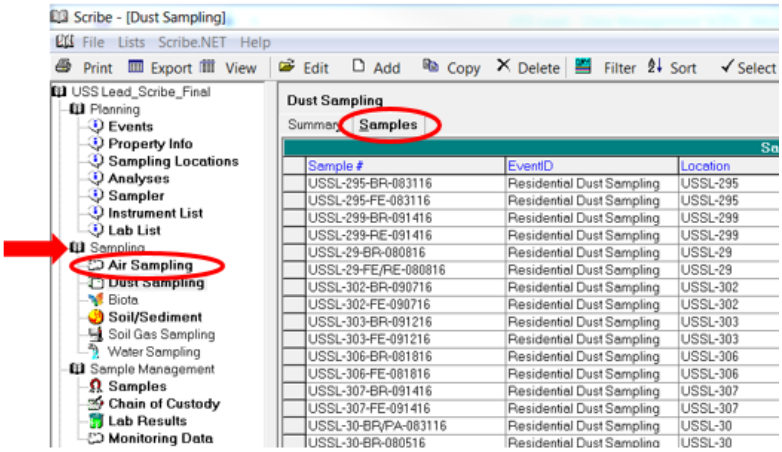


2.2.9. Click "No" when prompted to import more data.

Quality Control Checking Imported Data

After being imported, the data must be QC checked to ensure that any errors are identified and addressed as soon as possible.

1. After new data have been imported, select the relevant sample type from the navigation window on the left-hand side under the heading "Sampling" (see below). X-ray fluorescence (XRF) testing can be found under the "Sample Management" heading and the "Monitoring Data" subheading. Sequential water samples can be accessed under the same heading and the "Samples" subheading. When the proper subheading has been selected, select the "Samples" tab.



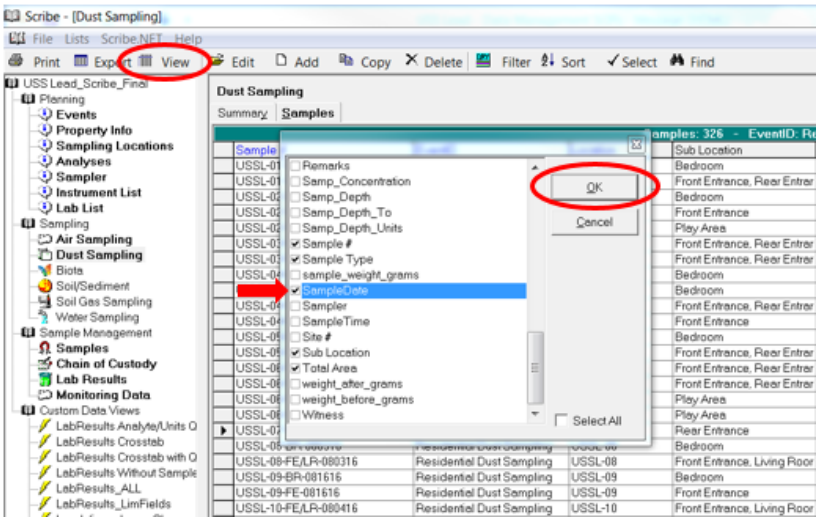
2. Once in the "Samples" tab, the data that have just been imported can be found via several methods.

2.1. If the Sample Number is known, it can be found by scrolling through the list of samples, which are sorted by "Sample #" in ascending order in the far-left column.

2.2. If only the sample date is known, it can be displayed and used to sort the samples.

2.2.1. Click on "View" from the ribbon at the top, then click "Select Columns."

2.2.2. In the window that appears, scroll to find "SampleDate." Check the box to the left of the text, then click "OK" (see below).



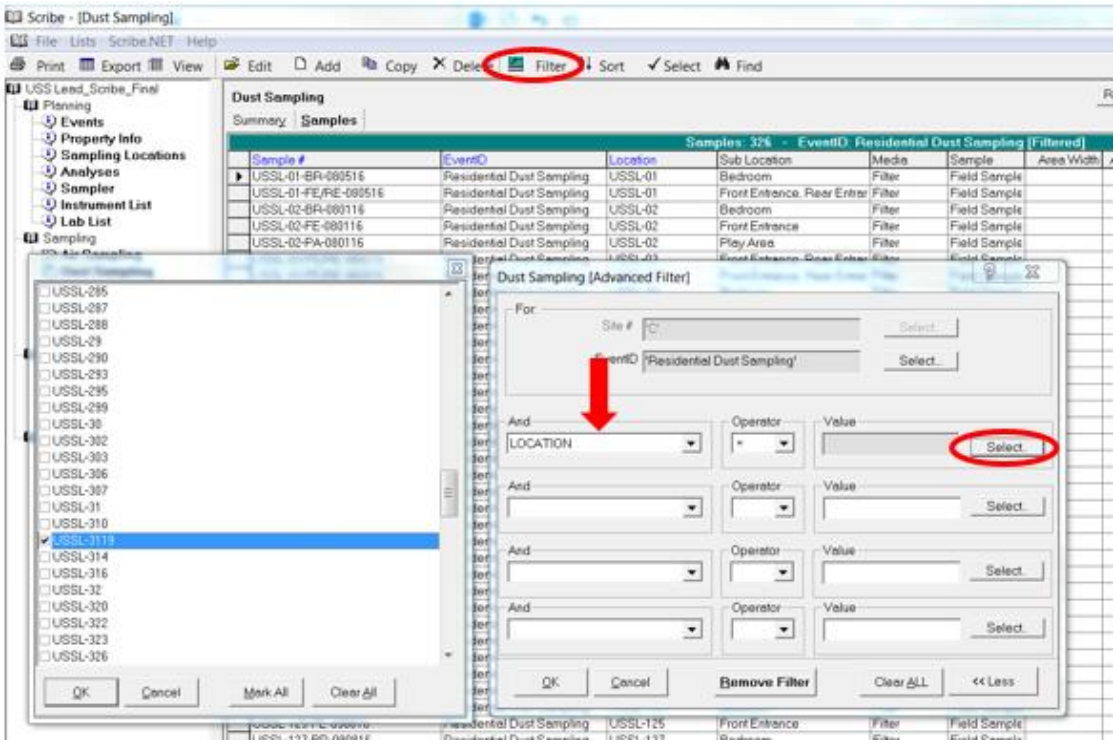
2.2.3. There will be a new column in the table labeled "SampleDate." The heading of this column can be right-clicked. From the menu that appears, "Sort Ascending" and "Sort Descending" options are available. Select one of these options and navigate to the Sample Date of the desired data.

2.3. If only the sample location is known or if differentiating between all the samples from one date becomes difficult, the samples can be filtered and displayed based on entries in a given column.

2.3.1. Click the "Filter" icon from the ribbon at the top of the screen.

2.3.2. In the window that appears, select a category that will be used to filter the samples from the drop-down menu in the left column of the first row. The "Operator" field in the center column will automatically populate.

2.3.3. Next, click "Select." In the window that appears (see below), check the box next to the number of the property where the samples were collected. Click "OK."



2.3.4. More filters can be added by following the same steps above on the subsequent rows. Once all desired filters are applied, click "OK."

2.3.5. The samples that meet the conditions of the filters are the only ones that will be displayed on the screen now.

3. Once the data have been filtered, all elements must be QC checked.

3.1. Since the data were QC checked after they were downloaded from the Tetra Forms Cloud and during the importing process, the QC check of the data within the database may be a general check for any anomalous dates, locations, and times. In particular, ensure consistency among samples from the same locations.

3.2. If any errors are identified, the data must be corrected in the original CSV file, saved, and then reimported following the procedures in the "Importing Data into Scribe" section above.

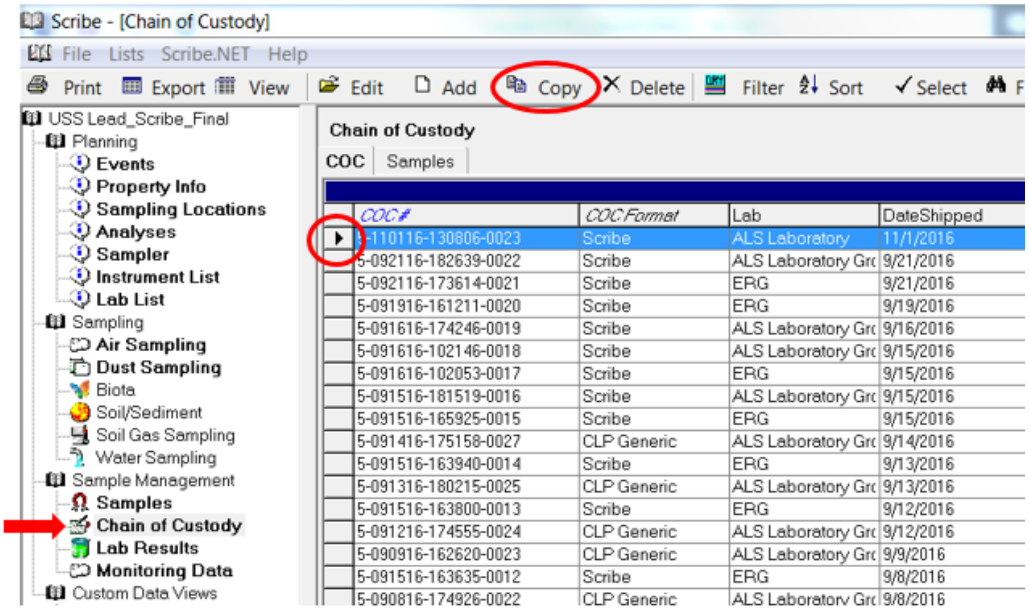
Producing a Chain of Custody

A COC must be included in the package of samples being sent into a laboratory for testing to track each sample and the corresponding laboratory results. To create a COC, the iForm data for all the samples being processed must be loaded into the Scribe database following the procedures above. Once the iForm data have been uploaded to Scribe successfully, use the following steps to generate a COC.

1. From the main interface, select "Chain of Custody" under the heading "Sample Management."

2. Highlight the top row by clicking on the box to the left of the row so that a black arrow appears (see below). The contents of this row do not matter because the entries will be replaced with the information specific to the COC we are creating.

3. Click the icon "Copy" from the ribbon at the top of the screen.



4. Scroll to the bottom of the list. The newly copied COC will be the last entry. Select this row, then right click and select "Edit" from the menu. A new screen will appear where information related to the project may be entered (see below).

4.1. Do not change the "COC #" field. The COC number is automatically generated by the software and should not be altered.

4.2. Change the "COC Format" field from "Scribe" to "CLP Generic."

4.3. Under "Contact Name" and "Contact Phone" include the project manager's information.

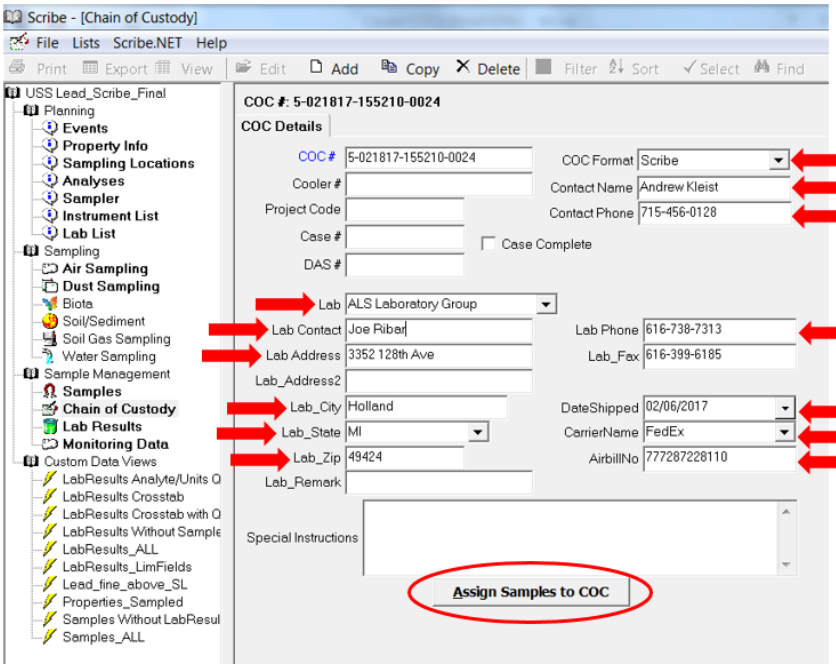
4.4. Next, input the contact information where the samples are being shipped. This information can either be entered by selecting the name of the laboratory from the drop-down menu next to the item "Lab" or by directly entering the laboratory's name, contact name, address, and phone number.

4.5. Change the "DateShipped" item to the date the samples are being shipped.

4.6. Enter a shipping carrier under the item "CarrierName."

4.7. Finally, input the air bill number under the item "AirBillNo," which can be found on the shipping label that is being used to ship the samples.

4.8. Click "Assign Samples to COC."



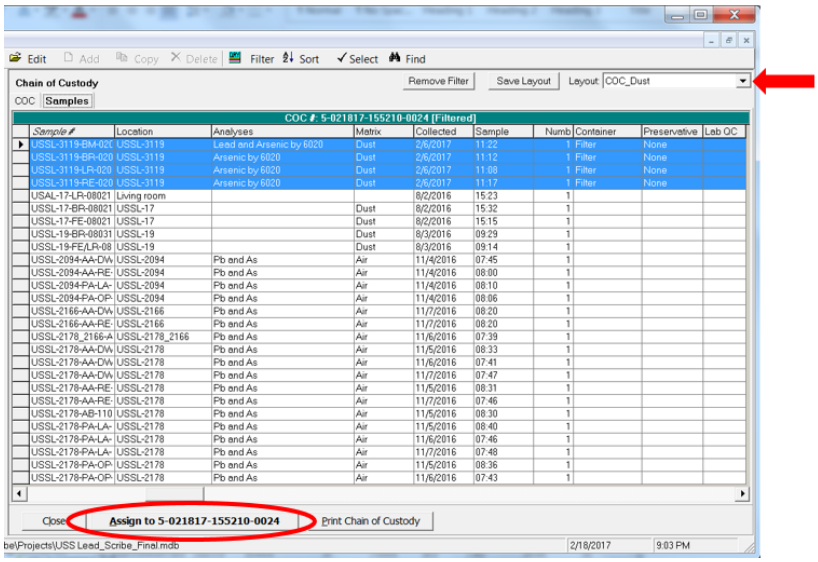
5. The next screen will be a list of the samples that have not yet been assigned to a COC.

5.1. Select the samples to be included on the COC. To select multiple samples, use the Ctrl key.

5.2. When the samples have been selected, click the center button at the bottom of the screen labeled "Assign to [COC #]" (see below).

5.3. On the window that appears, confirm the number of samples being added to the COC, and click "Yes" to continue, or "No" to return to the screen and reselect the samples.

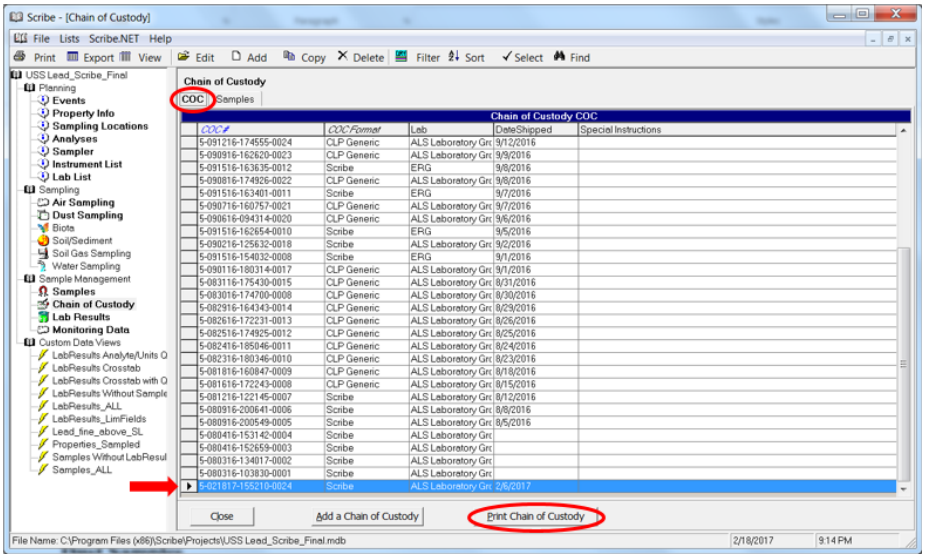
5.4. Before printing the COC, ensure that the "Layout" selection in the top-right corner of the screen corresponds to the type of samples being included on the COC. It can be changed by selecting a different layout from the drop-down menu. Note that each different sample type will require a different COC.



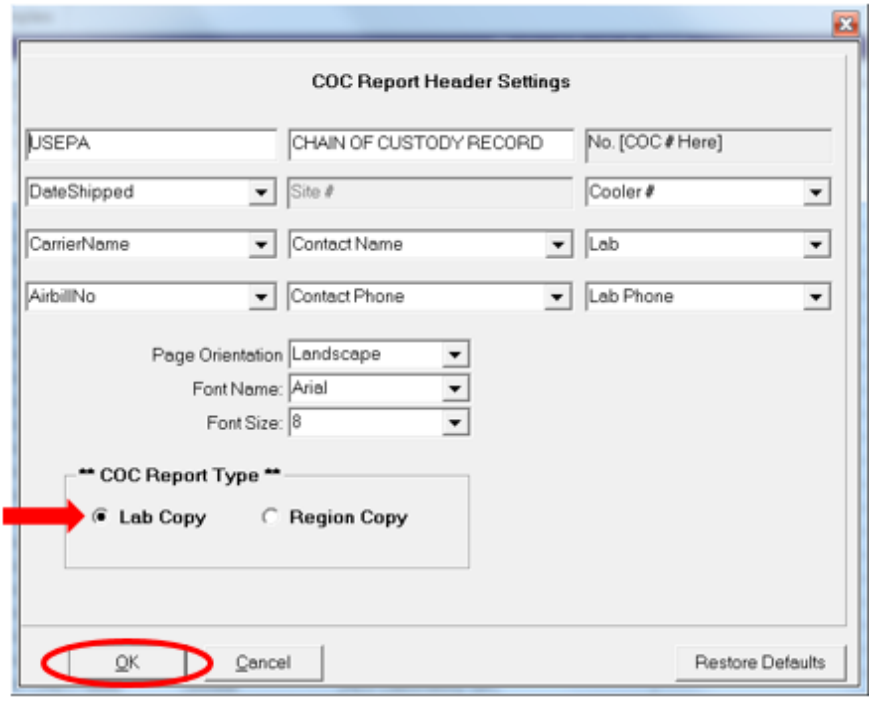
6. To print the COC, click the "COC" tab near the top of the page.

6.1. Browse by date and select the row of the newly created COC.

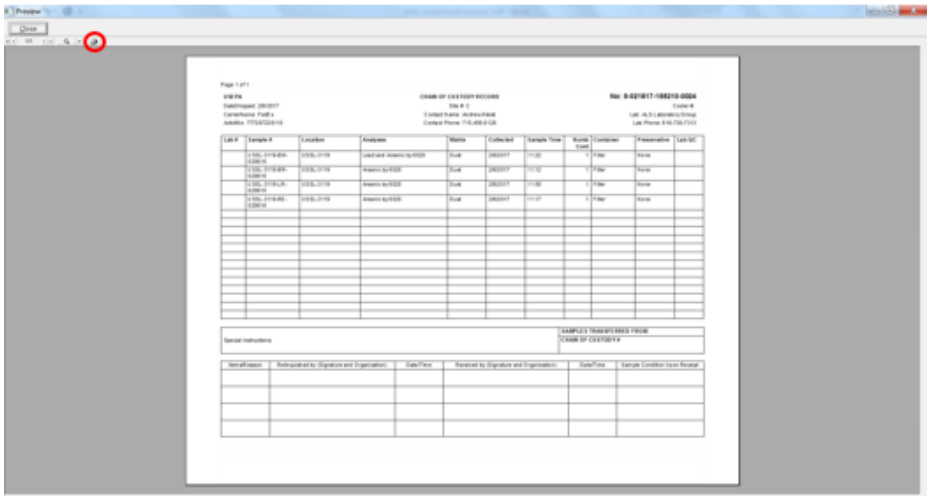
6.2. At the bottom of the screen, click the button on the right side labeled "Print Chain of Custody" (see below), then from the menu that appears, click "Preview."



6.3. In the next window, ensure that the "Lab Copy" option is selected, then click "OK" (see below).



7. A preview of the COC will appear. Ensure the information on the form is correct, then print a copy using the printer icon at the top of the screen (see below). Be sure to sign and date the form before packing it with the samples.

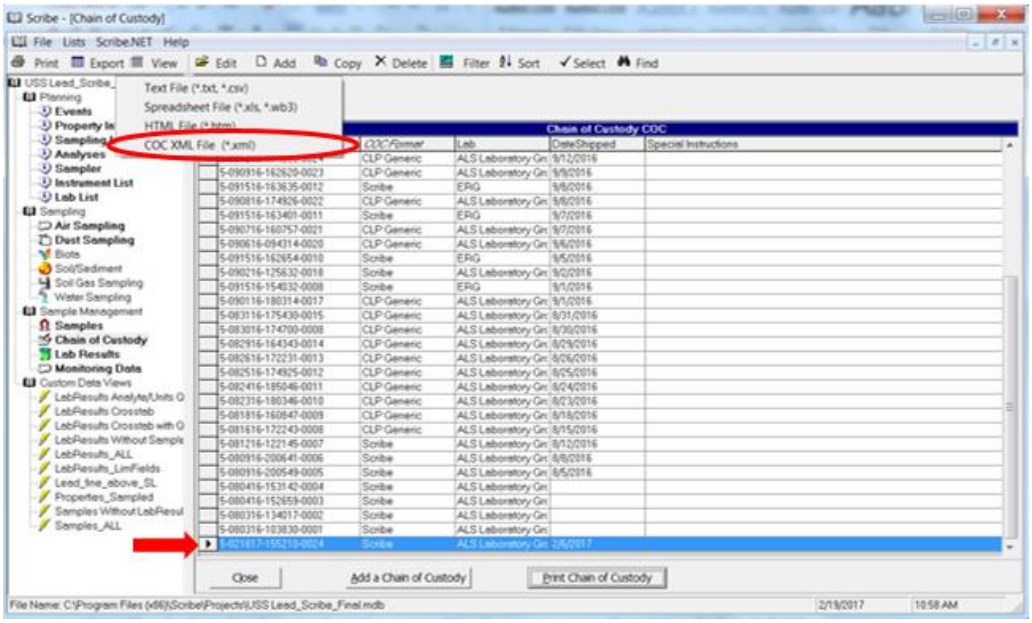


8. Once the COC is printed, export and save it as a PDF using the same printer icon. Be sure to save it to the appropriate project folder according to the type of sample and date (for example, Dust_COC_MMDDYY).
9. Close the preview window to return to the main Scribe interface.

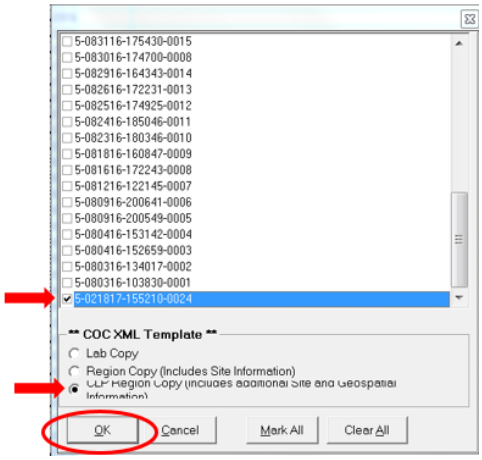
Exporting a Chain of Custody

While COCs can be created and printed by the field team using a local version of the Scribe database, the files used to create these COCs must be exported for the database manager to include in the central project database.

1. Within the "Chain of Custody" under the "COC" tab, be sure that the row of the newly created COC is selected.
   - **1.1.** Click the "Export" icon from the ribbon at the top of the screen.
   - **1.2.** From the drop-down menu that appears, click the "COC XML File (*.xml)" option (see below).



2. In the window that appears, check the box next to the COCs to be exported.
   - **2.1.** Ensure that the "CLP Region Copy (Includes additional Site and Geospatial Information)" option is selected (see below).
   - **2.2.** Select "OK."



3. Select a location and save the COC XML file according to the sample type and date — for example, "Air_Samples_MMDDYY."
4. A web browser containing the XML data will appear. This browser should be closed.

Sending Files to Database Manager

After iForm data have been imported, the necessary COCs created, and the XML files exported, certain files must be sent to the database manager so that the master version of the Scribe database can be updated.

1. For every sample, a different number and type of files must be sent to the database manager, as shown in the table below.

	File Type	
Type of Sample	**CSV File(s)**	**COC XML**
Dust Samples	Dust_Samples_MMDDYY	Yes
High Volume Air Samples	Air_Samples_MMDDYY	Yes
Low Flow Air Samples	LF_Air_Samples_MMDDYY	Yes
XRF Samples	XRF_Samples_MMDDYY	No
Sequential Water Samples	Sequential_Form_MMDDYY Sequential_Sampling_Form_MMDDYY Filtered_Sequential_Form_MMDDYY Water_Screening_Form_MMDDYY	No
Soil Samples	Residential_Soil_Form_MMDDYY Soil_Sample_Log_MMDDYY	Yes

2. Attach the necessary files and send to the database manager no later than the day after the samples are collected.

Troubleshooting

Problem	**Possible Reason & Solution**
Cannot find the CSV file.	• Confirm the file was saved to the folder in question. • Change the file type from "Microsoft Access (*.mdb)" to "Text (tab delimited; csv)(*.txt;*.csv)."
In the "Map Data To Import" screen, the "Scribe Fields" do not match the "Import Fields."	• This problem is likely because the incorrect template was selected. Click "Back" and select a different template. • Also be sure that the correct file was selected for importing. Different sample types have different fields, which could be causing a mismatch. • Ensure that the "Data Category" corresponds to the type of data being imported.
Cannot find the newly imported data.	• Try reimporting the CSV file. • If the data have been filtered, try removing the filters and sorting by sample location or sample number instead. • Be sure to search for the samples under the correct subheading. Dust samples cannot be found under the "Air Sampling" subheading. • Check that the correct Event ID has been chosen. Once the subheading has been selected, choose the "Summary" tab next to the "Samples" tab, and choose a different sampling event.
Cannot find ambient air/personal air samples.	• Ambient air and personal air samples are found under different Event IDs. Click on the "Summary" tab at the top of the page, select the correct ID, then click on the "Samples" tab.

Problem	**Possible Reason & Solution**
Cannot find water samples.	• Water samples are not stored under the Sampling→Water Sampling headings. Instead, click on the Sample Management→Samples category. • Try filtering the Samples by "Matrix." Water samples are categorized as "WP." Dust and air samples can also be found in this tab under a different filter.
Cannot find XRF screenings.	• XRF screenings are found under the "Monitoring Data" option under "Sample Management."
Missed adding a sample to the COC.	• Return to the "COC" tab and highlight the desired COC. Click on the "Samples" tab and select the missed sample. Click the "Assign to [COC#]" button at the bottom of the page.
Mistakenly added a sample to a COC.	• Right click on the sample and select "Edit" from the menu. The selected sample will be highlighted in the screen that appears. Delete the COC number from the top row so that the cell is blank. Return to the list of samples by clicking "Close" at the bottom of the screen. The sample will no longer be included on any COC.
Error messages pop up when trying to preview the COC.	• These errors are likely appearing because the COC is being created in a version of Scribe that is not compatible with the data being loaded. Try restoring the database from the clean, original backup version then recreating the COC. • Check that the "Layout" selected corresponds with the sample type. • Try reselecting "Print Chain of Custody," and check that the "Lab Copy" option is selected.
The COC form looks incorrect.	• Try closing the preview and navigating back to the "Samples" tab. Be sure that the "Layout" selected in the upper right corner matches the type of samples being included on the COC. If necessary, choose a different option from the drop down menu. • Close the preview and reselect "Print Chain of Custody," this time making sure that "Lab Copy" is the option selected. • From the list of COCs, select "Edit" and be sure that the "COC Format" option selected is "CLP Generic."

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Scribe Database Management

SOP NO. 085

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

Quality Assurance Approved

Date

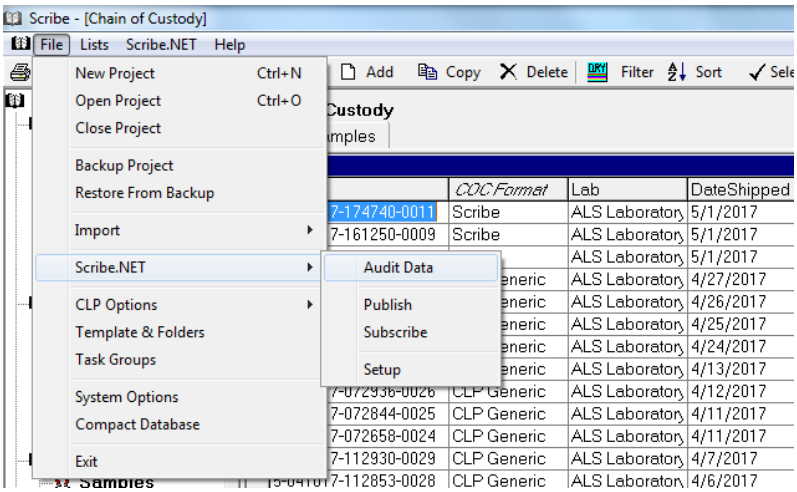
Contents

This Standard Operating Procedure (SOP) is intended to provide the necessary steps for performing quality assurance and quality control (QA/QC) for the Scribe database, publishing the database to Scribe.NET, and subscribing to an already published database. The QA/QC is necessary to ensure there are no issues when publishing the Scribe database to Scribe.NET. Publishing the Scribe database allows other users to subscribe to the project database, and have the most up to date version each day.

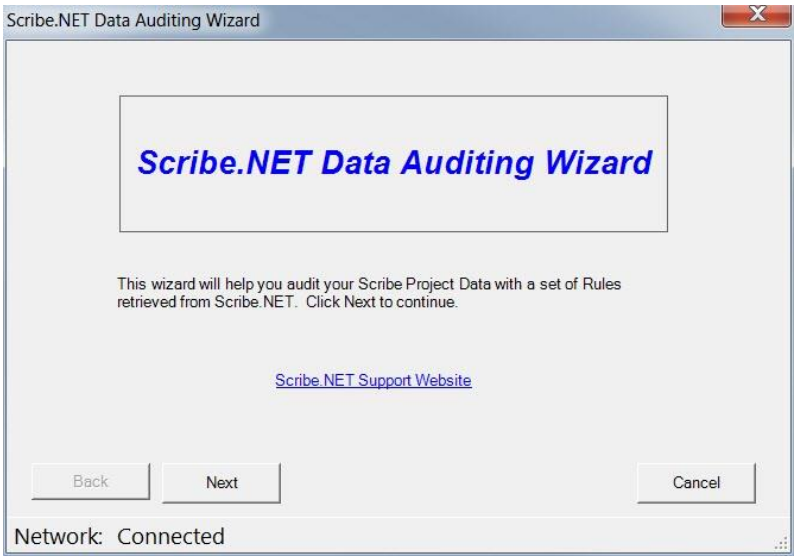
Scribe Database QA/QC

The Scribe.NET Data Auditing Wizard should be run before publishing the Scribe project to Scribe.NET To start the Auditing Wizard:

1. Click on File, then place the cursor on "Scribe.NET", then slide the cursor onto Audit Data. Click on Audit Data.



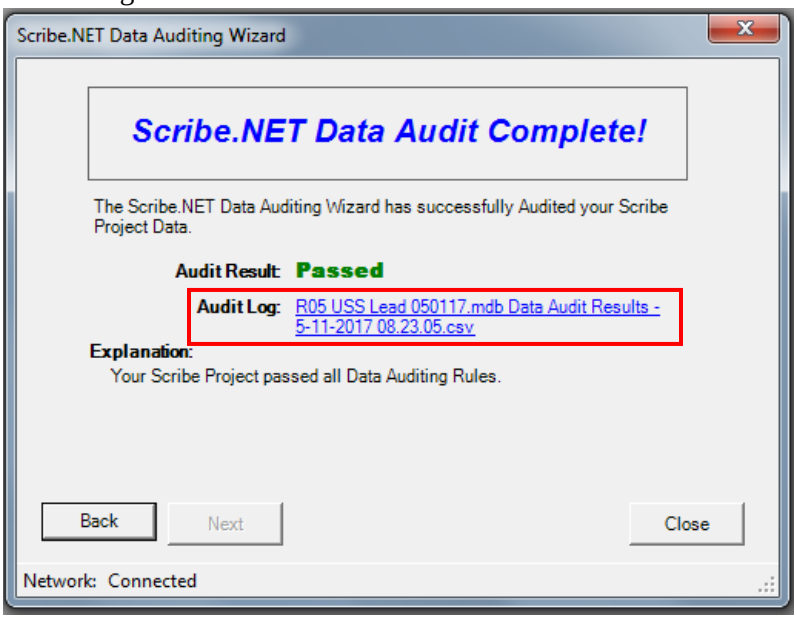
2. The Scibe.NET Data Auditing Wizard dialogue box appears. Click "Next."



3. Select the Data Auditing Rule Set to be run. For Zone 2 at USS Lead, 'R05 USS Lead' is chosen as the Data Auditing Rule Set. A database of the Auditing Rules for Zone 2 USS Lead can be provided to be used as an example upon request.

4. Ensure the appropriate groups are picked for the Scribe project. For example, the Remedial Analytical projects uses 'Monitoring' and 'Remedial_LabResults'.
5. Different groupings are checked for each Scribe project. In addition, the auditor rules would need to be modified to address any differences with new laboratory EDDs and/or field collection processes.
6. If the selected auditor rules find no issues with the Scribe Database, then the audit result will show "Passed".

7. If anything other than "Passed" is displayed, the auditor log needs to be opened to view the rule violations. The auditor log downloads as a .CSV file

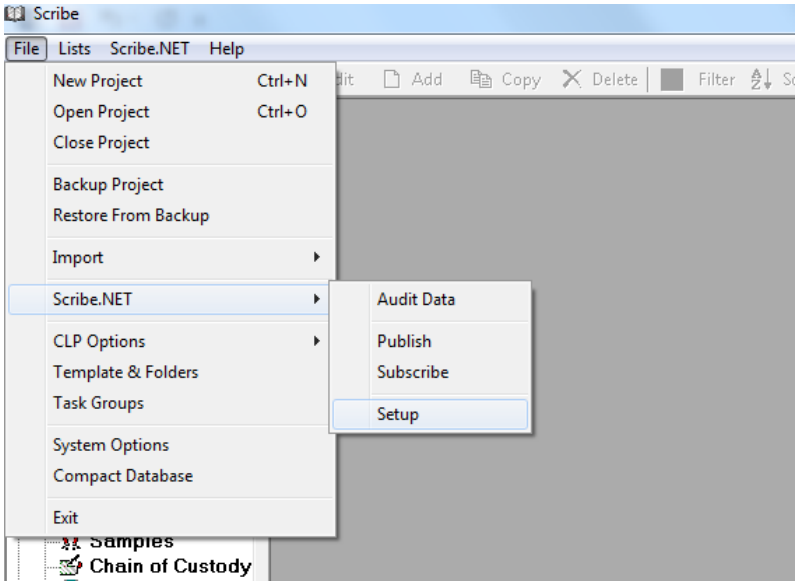


8. Address all of the rule violations, and rerun the Auditing Wizard to confirm all the rule violations have been addressed.

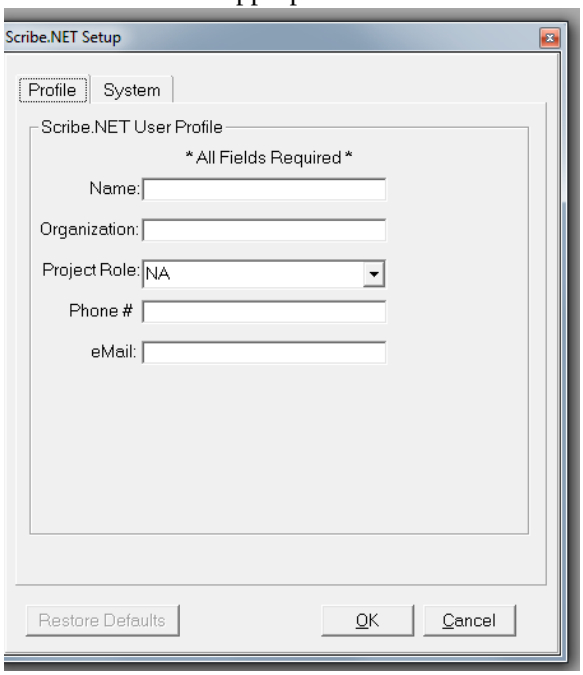
Scribe.NET Setup

After the Auditing Wizard is run, and (if any) errors have been fixed in the database, the database can be published to Scribe.NET. The first time you use Scribe.NET, you will be prompted for some basic user identification information. This data is only used to attach ownership of the project and to ensure data integrity of published project files and is not publicly displayed.

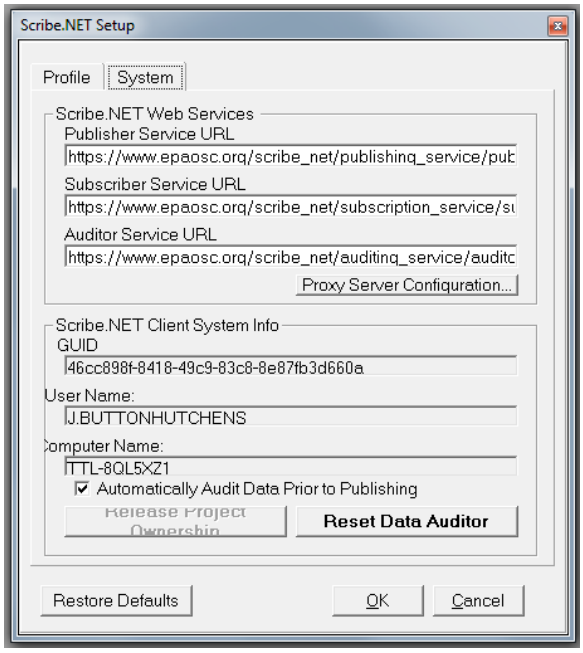
1. Click on File, then place the cursor on "Scribe.NET", then slide the cursor onto Setup. Click on Setup.



2. Fill in the fields on the Profile tab with the appropriate information. Then click OK.



3. The information on the System tab does not need to be modified unless instructed to do so by ERT.

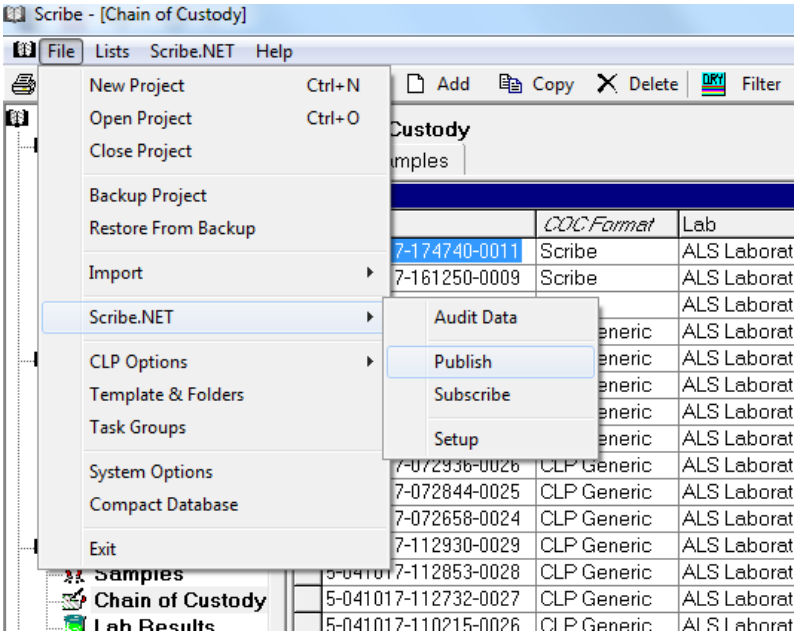


4. After the Profile information is completed, contact ERT to create a Project ID to allow the database to be published to Scribe.NET.

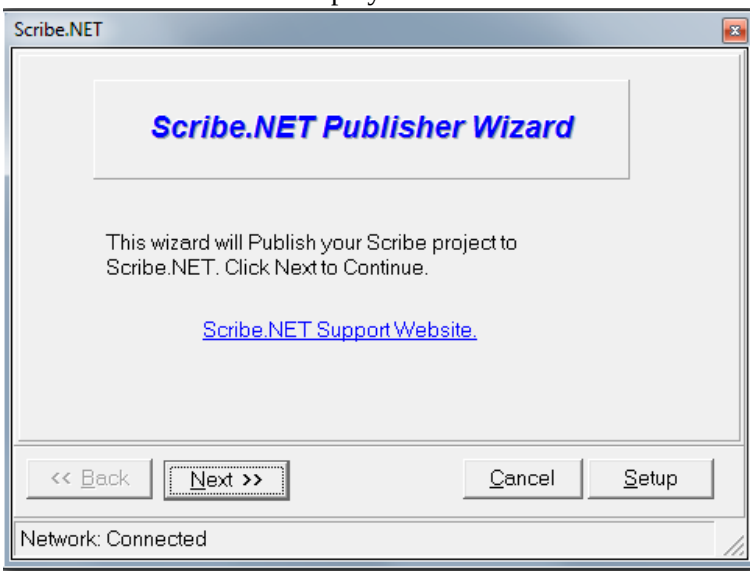
Publishing to Scribe.NET

Publishing a project(s) to Scribe.NET stores your project(s) on a web server with the intention of sharing your Scribe data with authorized subscribers via a subscription service. Future updates to the published project(s) will require subsequent publications of your updated project. Users who need to access specific published Scribe projects are provided with a secure user account and password that will allow Scribe data to be downloaded for consumption by proprietary database applications.

1. To publish a Scribe project click on File, then place the cursor on ‘Scribe.NET’ and slide the cursor onto Publish. Click Publish.



2. A Scribe.NET Publisher Wizard screen is displayed.



3. Click on the Next button and enter the individual Publisher ID and password provided by ERT.

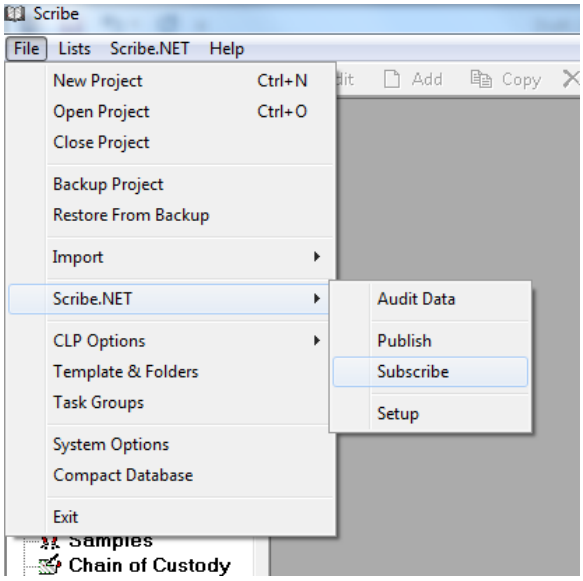
4. Click on the Publish button to publish your current project to Scribe.NET.
5. Once the project is published, contact ERT to create a subscription account. The subscription account will be used for others to access, or subscribe, to the most updated version of the project database.

Subscribe to a Project

Downloading a published project(s) on Scribe.NET requires a Subscription ID and a password. Individual subscriptions are configured to access the corresponding individual projects.

To download the project file from Scribe.NET:

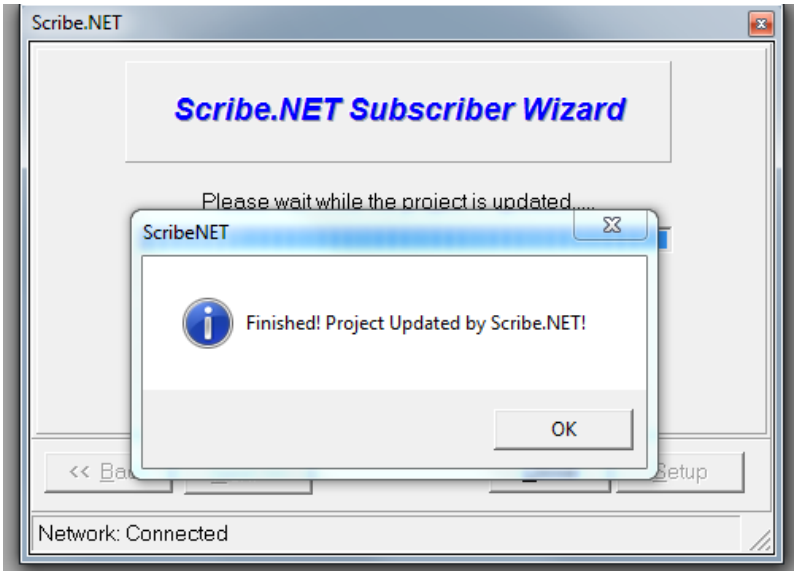
1. Click on File, then place the cursor on 'Scribe.NET' and slide the cursor onto Subscribe. Click on Subscribe.



2. A Scribe.NET Subscriber Wizard screen is displayed.

3. Click on the Next button and enter an individual Subscriber ID and password. Click on the Subscribe button to begin downloading all Scribe projects associated with the subscription.

4. If this is the first time subscribing to a project, you will be prompted to enter a filename for the download. Enter a filename and click on the Save button. Subsequent downloads from the same subscription will automatically update and replace the existing local project file with the data from the Scribe.NET subscription.
5. The download process begins. When the download is complete a status window appears. Click 'OK' to acknowledge the message.



6. The Scribe project that you downloaded will automatically load as your current Scribe project.

If subscription updates to a project is requested, a list of emails should be given to ERT so they can send out an email notifying when an update occurs to the database.

Troubleshooting

Problem	Possible Reason & Solution
Auditor keeps coming up as "Failed"	• A "Failed" audit doesn't necessarily mean the database is "not useable". Check the auditor rules, and be sure that the result of a failed rule means there is a problem in the database versus an acknowledgement of no data being input. • It could be due to a bad upload of recent data. Revert back to a backup of last working version of the database and re-attempt auditor.
Cannot Publish database to Scribe.NET	• There can only be one Publisher of the Scribe database. Make sure the same computer and login credentials are used. • Check that login credentials are correct
Cannot Subscribe to database	• Make sure the correct login information is entered

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Dashboard/GeoPlatform

SOP NO. 086

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

Quality Assurance Approved

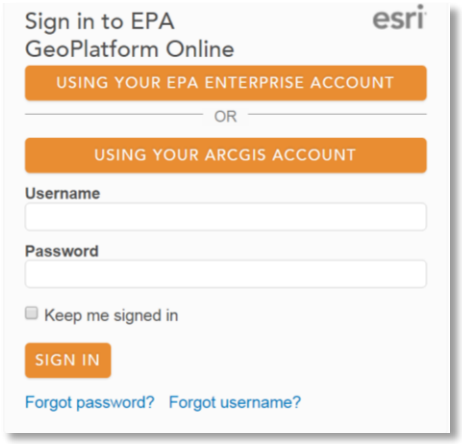
Date

Contents

This Standard Operating Procedure (SOP) is intended to provide the necessary steps for accessing and navigating the U.S. Environmental Protection Agency (EPA) GeoPlatform and the on-line applications for the USS Lead Site such as the Region V – USS Lead Dashboard (Internal or Partners), maps such as USS Lead Indoor Dust SAP Questionnaire, and feature layers. Before using the on-line tools, the user must sign into the EPA GeoPlatform with the ArcGIS Online Account provided by EPA and accept the invitation to the USS Lead group via the user's computer. Parts I and II below will guide the user through the process of accessing and navigating the EPA GeoPlatform and associated on-line applications for the USS Lead Site. Part III details the relationships between the components of the on-line applications.

Part I – EPA GeoPlatform

1. Using your computer's web browser, navigate to the following web address.
    - https://epa.maps.arcgis.com/home/signin.html
2. Non-EPA users, sign into the GeoPlatform by clicking "USING YOUR ARCGIS ACCOUNT" and enter your credentials.



3. Once signed in, your web browser should look similar to the image below.

4. From the GeoPlatform homepage, click on the "GROUPS" menu item.

5. Click on "INVITATIONS (1)".

6. Click "Join this group;" there may have more than one group to join.

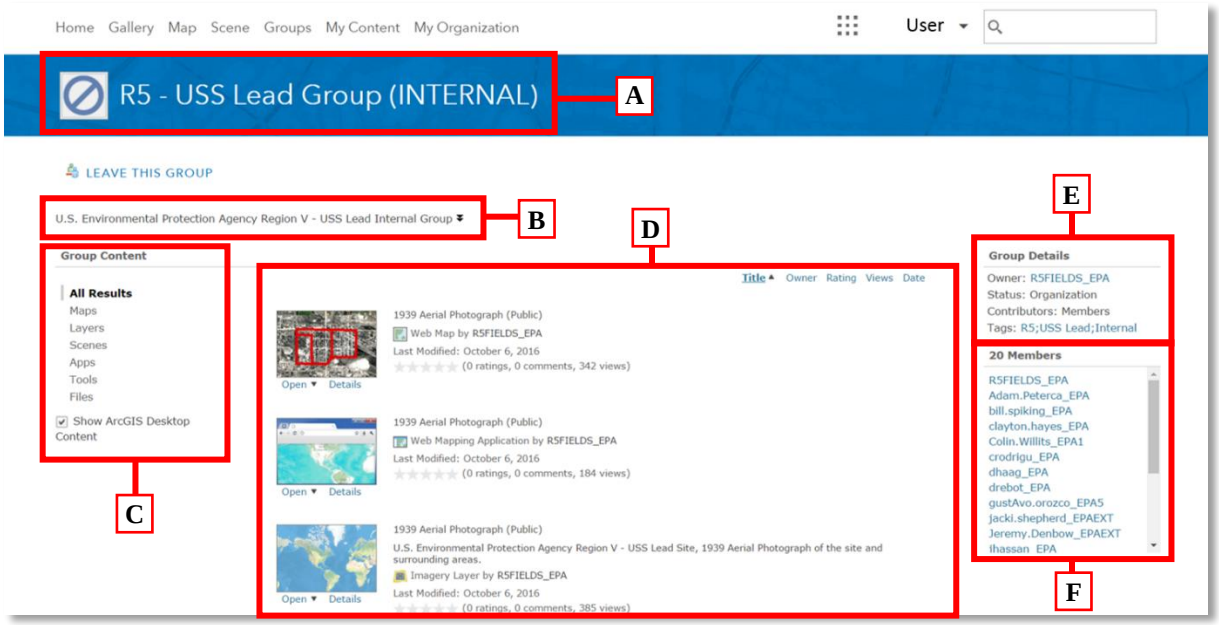
7. You now have access to the requested Groups. The groups below are just examples; you may not be or need to be invited to all groups. The main group is the "R5 – USS Lead Group (INTERNAL)," which displays all data for the site. All other groups for the site are either simplified or restricted versions of this group. For example, the "R5 – USS Lead (Dust Sampling)" group has access only to data and tools necessary for dust sampling. The purpose for multiple groups is to limit viewable resources for field collection or remove personal identifiable information for public applications.

8. Click the "Details" link to open the "R5 – USS Lead Group (INTERNAL)".

Part II – Region V – USS Lead Dashboard (INTERNAL)

1. Take note of the content within the Group page. The Web Maps contain *Feature Layers* overlaid on an aerial image. Normally, Web Maps will be accessed through a mobile device via ESRI Collector Application for field data collection; see SOP 080: Collector for ArcGIS. Operations Views allow Project and Data Managers to monitor, track, and assess daily operations through real-time feeds. Web Mapping Applications like the Region 5 – USS Lead Dashboard (INTERNAL) combine and display data from Web Maps and Operations Views.

Group Page Layout



A. Group Name – Name of current group

B. Group Description – Short description of group

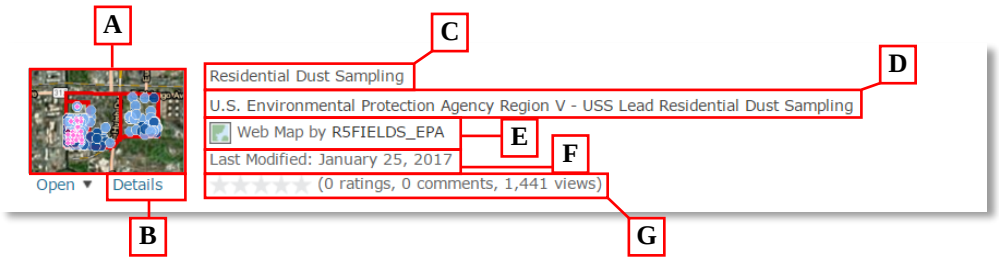
C. Group Content – Lists data types potentially found within group. Defaults to All Results; users can select Apps to sort data down to all applications within group.

D. Content Results – Lists results of option selected in Group Content.

E. Group Details – Lists additional detail of group such as owner, status, contributors, and tags.

F. Current Members – Lists current group members.

Item Layout



A. Item Thumbnail – Click thumbnail to open item or use the "Open" link.

B. Item Details Link – Click to navigate the details page of the item.

C. Item Title – Title of the item.

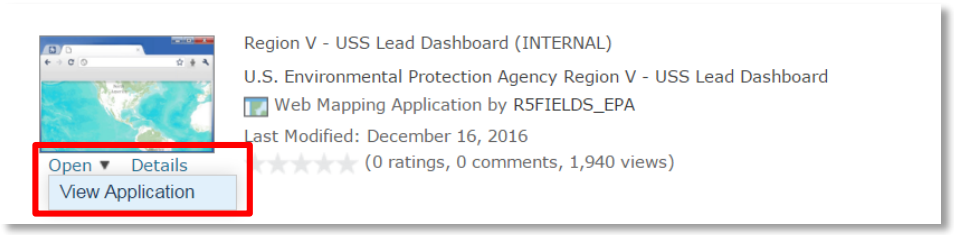
D. Item Description – Short description of the item.

E. Item Type – Type of GeoPlatform item such as Feature Layer, Web Mapping Application, or Web Map.

F. Last Modified Date – The last date the item was modified.

G. Item Ratings and Views – Star rating of item, number of ratings, comments, and views.

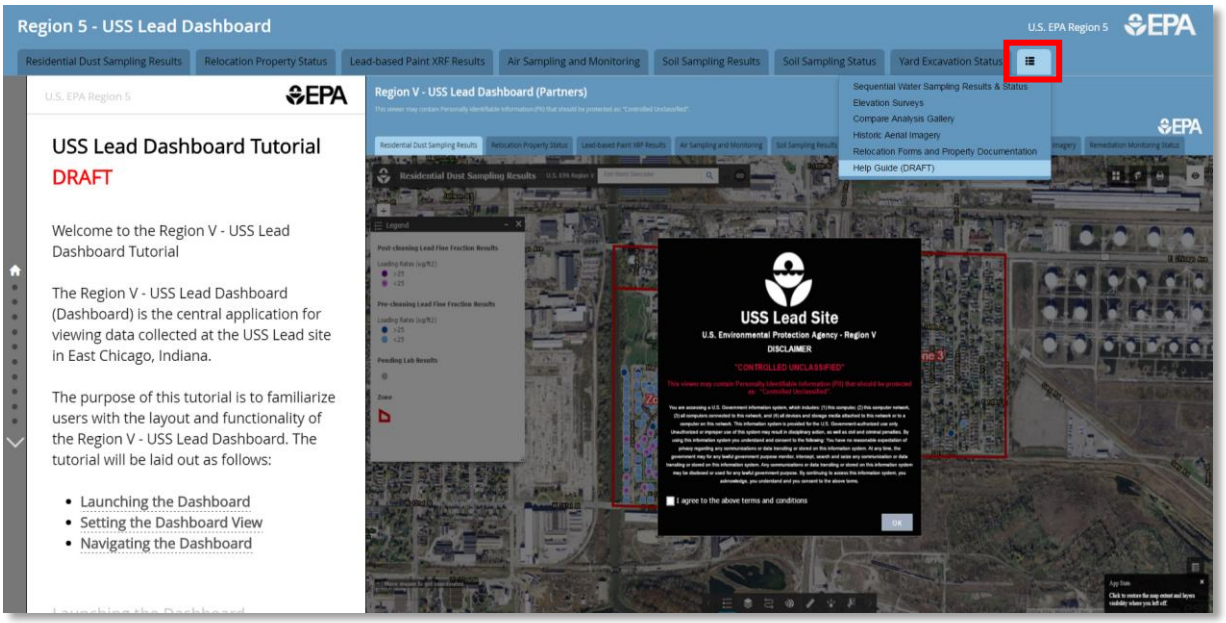
2. The main web application used by EPA and site contractors for the USS Lead Site is the Region V – USS Lead Dashboard (INTERNAL). If you are a first-time user, navigate to the application within content results and open the application by clicking the "Open" link and selecting "View Application."*



*Once a user has logged into the GeoPlatform and accepted the invitation to the R5 – USS Lead (INTERNAL) group, the user can use the following URL to launch the Region V – USS Lead Dashboard (INTERNAL). The user will have to enter his or her GeoPlatform credentials (as directed in step 2 from Part I – EPA GeoPlatform) before the application will open. Repeat steps to open other site applications.

https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=4d81fb0ff27447f1a6e5281ec5a957e1

3. The Region V – USS Lead Dashboard (INTERNAL) is a collection of Web Mapping Applications, Operations Views, Map Galleries, and Story Maps that visualize the data collected at the USS Lead Site. A tutorial (Help Guide) is built in to the Region V – USS Lead Dashboard (INTERNAL) that should be viewed before first use. The tutorial is located on the last tab of the Region V – USS Lead Dashboard (INTERNAL)*.

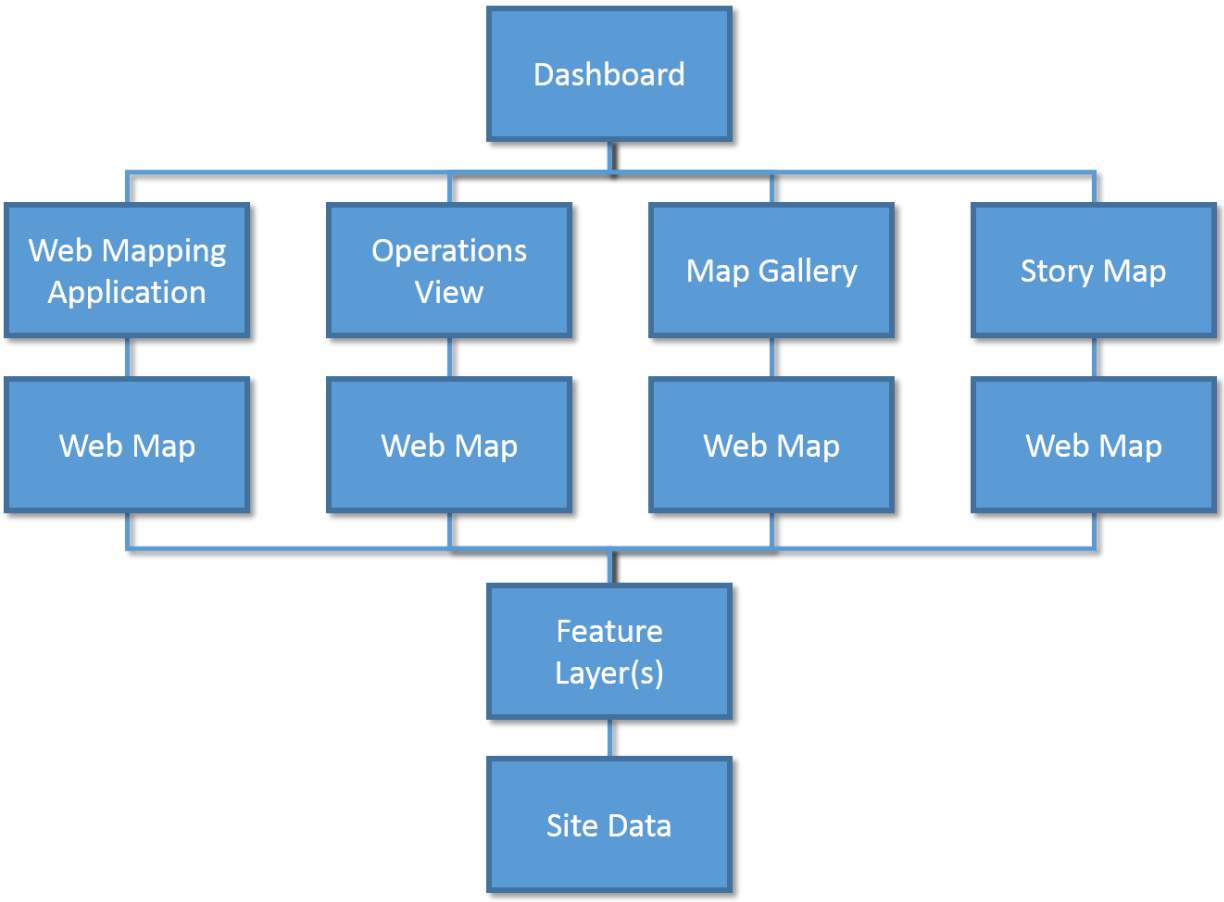


*Depending on zoom level of the internet browser, the last tab may be visible or may be contained in the additional tabs list, as outlined by the red box in the image above.

Part III – Data Relationships

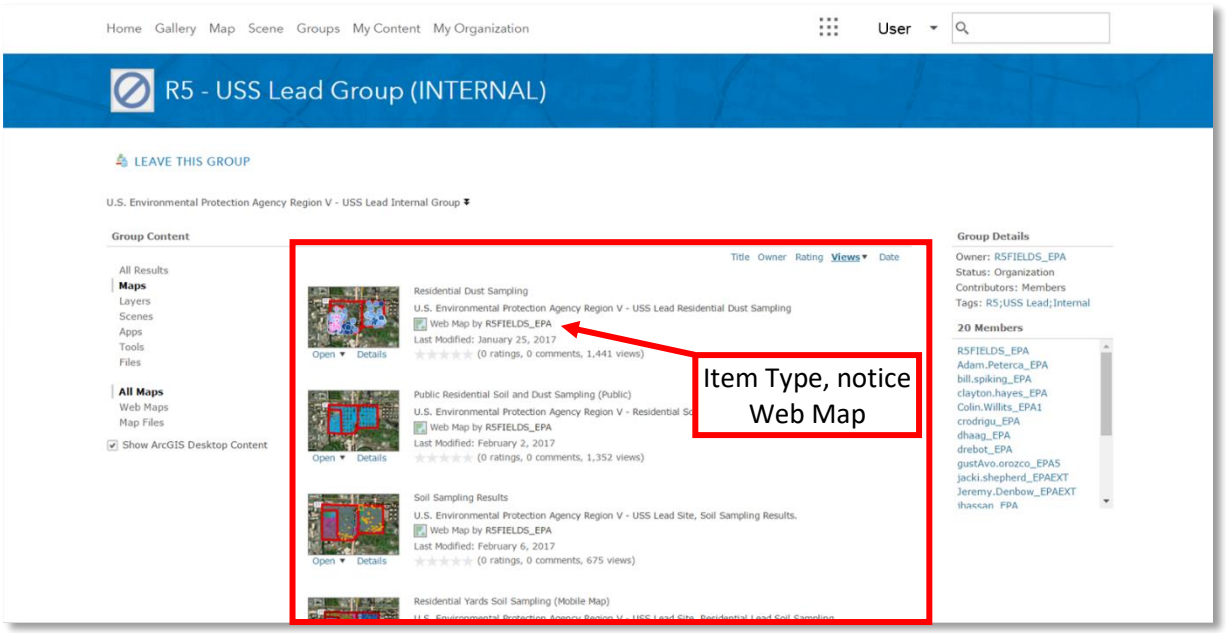
1. As stated in step 3 in Part II, the Region V – USS Lead Dashboard (INTERNAL) is a collection of Web Mapping Applications, Operations Views, Map Galleries, and Story Maps that visualize the data collected at the USS Lead Site. Part III will discuss the relationship between site applications and Web Maps, Web Maps and Feature Layers, Feature Layers, and Site Data.

Data Diagram



The Data Diagram displays the relationship of site data to a Dashboard or Web Mapping Application; either one can be an end use destination. The following sections further discuss these relationships using the Residential Dust Sampling Results tab in the Region V – USS Lead Dashboard (INTERNAL) as an example.

2. The first tab on the Region V – USS Lead Dashboard (INTERNAL) is a web mapping application (WAP) visualizing the residential dust sampling site data. The Residential Dust Sampling WAP is created from the Residential Dust Sampling Web Map. If changes to data visualization are needed, those changes are completed in the Web Map and not the WAP.

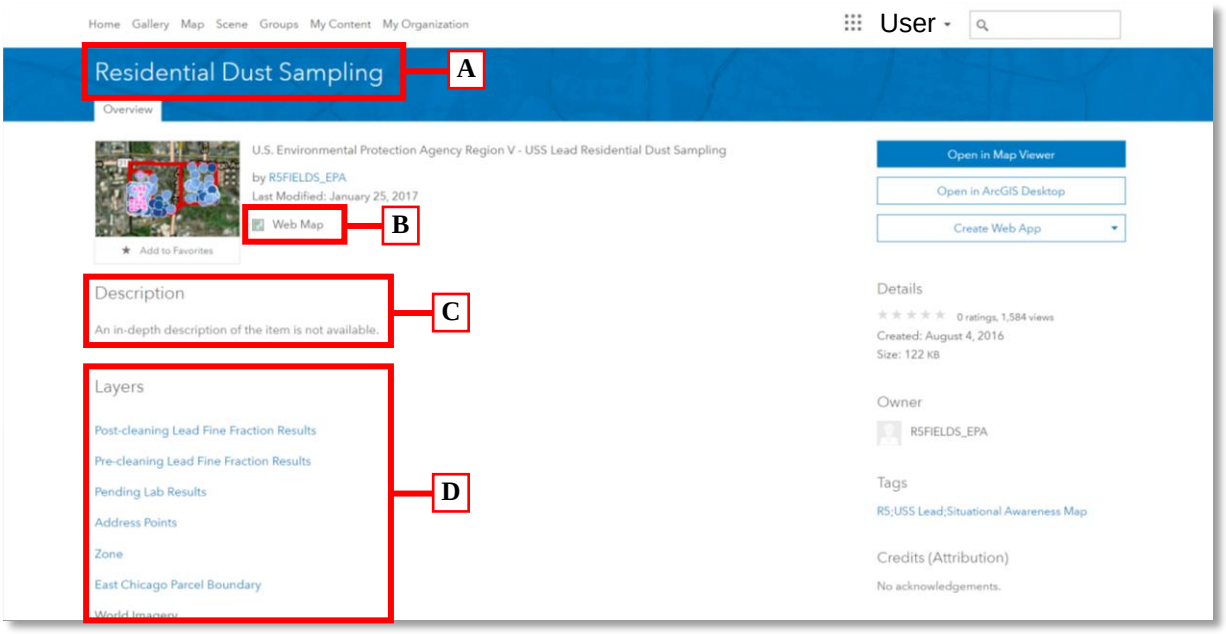


Notice below two web maps for residential dust sampling. The first, Residential Dust Sampling, is for the Region V – USS Lead Dashboard (INTERNAL), and the second, Public Residential Soil and Dust Sampling (Public), is for a public WAP. Again, the separation is to limit viewable data by field collection teams or remove sensitive data such as personnel identifiable information*.

*Web Maps are used by the Collector Application as well as used to build WAPs. Thus multiple Web Maps may be created for one type of site activity, such as residential dust sampling. One Web Map is used for field data collection for the residential dust sampling, another Web Map is used to build the WAP for the Region V – USS Lead Dashboard (INTERNAL), and another Web Map is used to build the Residential Soil and Dust Sampling Public Map.

3. The Residential Dust Sampling Web Map contains Feature Layers that are the visualization of dust sampling data. To view the Feature Layers within the Web Map click the "Details" link.

The details page for the Web Map will display all Feature Layers as well as other item information.



A. Item Title – Title of the item.

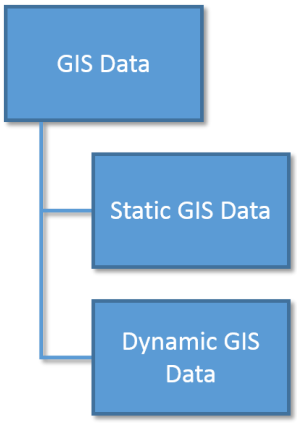
B. Item Type – Type of GeoPlatform item such as Feature Layer, Web Mapping Application, or Web Map.

C. Item Description – More in-depth description of item.

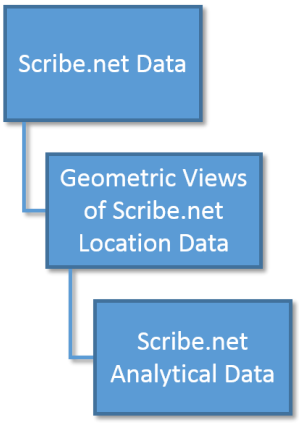
D. Layer List – Layers within item.

4. The Feature Layers within Residential Dust Sampling Web Map visualize the site data. The site data are either Geographic Information Systems (GIS) data or Scribe.net data.

GIS Data Diagram



Scribe.net Data Diagram



The GIS data are either static layers such as Zone Boundaries that the end user or field user uses but does not update, or dynamic layers such as Parcel Boundaries where a field user will update attribute data such as Property Status. Depending on the work flow, the attribute information can be changed in a WAP, Web Map or desktop application. Included in the static GIS data are identification (ID) data. These data were generated by EPA with the following conventions and should not be edited by field collection teams. (Sample IDs are generated in iForms.)

- Residential Dust Sampling and Lead Based Paint XRF Screening
  - Property IDs – Numeric 4 digit value
    - Zone 1: 0001 – 1000
    - Zone 2: 2000 – 2999
    - Zone 3: 3000 – 3999
    - Exception: WSJH
  - Sample Location IDs – USSL-Property ID, such as USSL-2419
- Residential Soil Sampling
  - Property Parcel IDs – Parcel ID from City of East Chicago Accessor's Office
  - Property IDs – First four letters of street name then first four digit of street number
    - For example, Address 405-09 E Chicago Ave – Property ID CHIC0405
  - Yard IDs – Property ID then Yard/Quadrant, for example, CHIC0405F
- Sequential Sampling (Water)
  - House IDs – Same as Residential Dust Sampling Property IDs
  - Property IDs – USSL-House IDs, such as USSL-3332

The Scribe.net data are geometric views of the published Scribe.net Subscription Location Table for USS Lead Site. These data are updated when the Scribe.net Subscription is updated. The data are either symbolized according to results with one symbol for below site action level and another for above site action level or simply by the location. The analytical data for sampling locations can either be displayed within the pop-up information for a single layer or housed in a separate table linked to the layer; see the tutorial within the Region V – USS Lead Dashboard (INTERNAL) form step 3 of Part II for more detail. All of the site data are housed on the Region V ER Cloud.

SOP APPROVAL FORM

START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING PROCEDURE

Uploading Data to MyCloud

SOP NO. 087

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

Quality Assurance Approved	Date

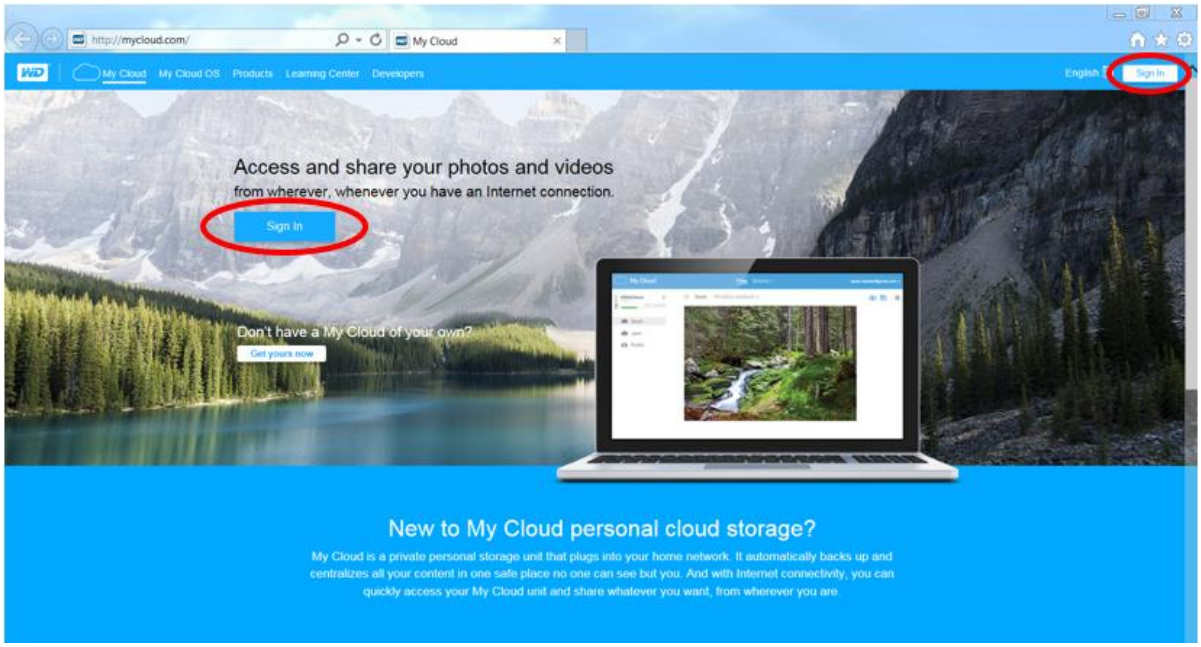
Contents

This Standard Operating Procedure (SOP) is intended to provide instructions for uploading documentation files to a MyCloud device. The device must be installed and configured online before uploading can begin. The files to be uploaded will be provided by the relocation documentation team and will include video files, picture files, and documentation forms. Once saved to MyCloud, files will be accessible to anyone with the proper login information.

Uploading Files to MyCloud

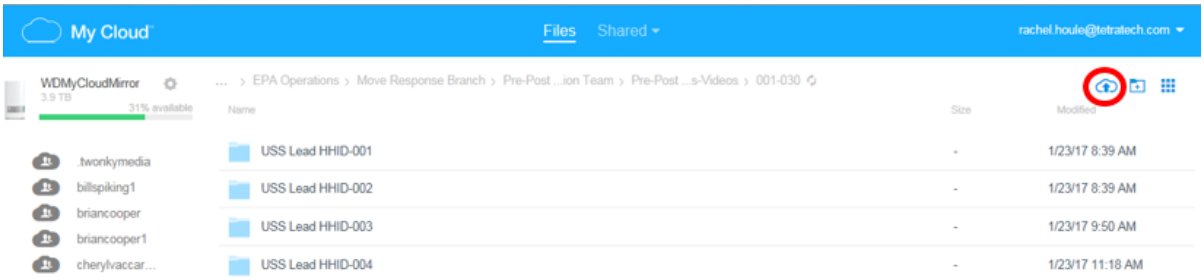
Documentation files are stored on a MyCloud device so that multiple parties can access files remotely. Once the MyCloud device is set up, the files can be accessed via an online interface from any computer with an internet connection using the proper login credentials.

1. Set up the MyCloud device according to the manufacturer's instructions.
2. Download the picture and video files off the respective cameras/memory cards.
   - **2.1.** Files should be saved into folders according to Property IDs.
   - **2.2.** Within each Property ID folder, there should be subfolders for pre-cleaning videos, pre-cleaning photos, post-cleaning videos, and post-cleaning photos.
3. Scan indoor documentation and property closeout forms and save according to Property ID and document type (for example, "327_Indoor Documentation Form" or "016_Property Closeout Form").
4. Open a web browser and navigate to https://files.mycloud.com to sign in.
5. Click on one of the "Sign In" buttons (both are circled in the image below).



6. Enter the username and password that were established when the MyCloud device was set up, then click "Sign in."
7. Navigate to the folder where the documentation files are stored. If a folder does not exist, create one.
8. There are two ways to upload files to this folder, outlined in steps 8.1 and 8.2, below.

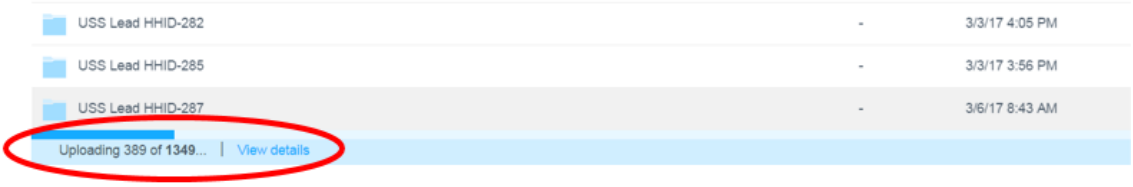
8.1. From the project's documentation subfolder click on the arrow icon in the upper right-hand corner of the screen (see image below).



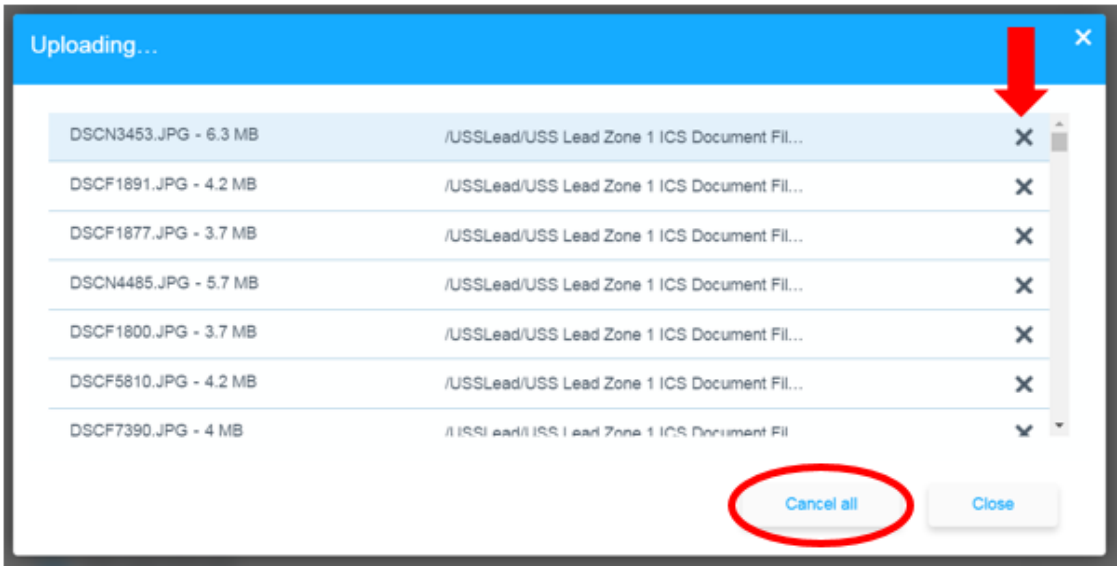
8.1.1. In the pop-up window that appears, navigate to the Property ID folder that contains the documentation files. Select the Property ID folder to be uploaded, then click "Open."

8.1.2. Individual files within a folder can also be selected if a Property ID folder already exists in the MyCloud online interface. To select individual files, first navigate to the specific subfolder where these files belong, click the arrow icon, and highlight each file to be uploaded before clicking "Open."

8.1.3. While the files are uploading, the user can see the progress on a bar at the bottom of the window (see image below).



8.1.4. Similarly, the progress can be viewed by clicking "View details" from this bar. The window that appears will show each individual file and its upload progress (see image below). Files will disappear as their upload is complete.



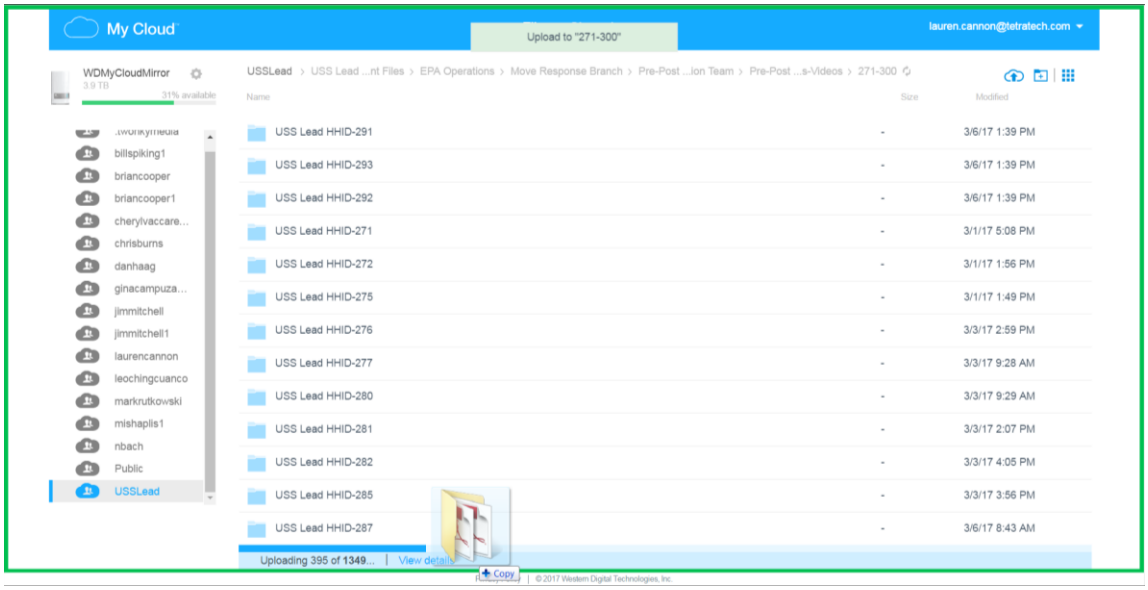
8.1.5. To cancel the upload of an individual file, select the "x" in its respective row. To cancel the entire upload, click the "Cancel all" button (shown in the image above).

8.1.6. When the upload has completed, a green bar will appear at the bottom of the window indicating that the files have successfully uploaded (see image below).

8.2. An alternate method for uploading files to MyCloud starts by navigating to the project's documentation folder.

8.2.1. In a finder window, navigate to where documentation files are kept locally.

8.2.2. Hold "Ctrl" and left click to select all the files to be uploaded. Files can be individual videos or pictures, folders containing all the documentation for a single Property ID, or folders containing only post-cleaning documentation files. Drag these files to the MyCloud page until a green box outlines the interface (as seen in the image below). Release to drop these files into this window.



8.2.3. The status of the upload can be checked as described in steps 8.1.3-8.1.5, above.

Quality Control Checking MyCloud Data

A quality control (QC) check should be performed on the data in MyCloud at the end of each day to account for each Property ID's documentation files.

1. In the MyCloud online interface, navigate to the documentation folder.
2. Check that each Property ID with documentation files from that day has its own folder.
   2.1. One-by-one, click on each folder and ensure that it has at least a pre-cleaning photos folder, pre-cleaning videos folder, and an indoor documentation form PDF.

2.2. Properties that have completed cleaning will also have a post-cleaning photos folder, post-cleaning videos folder, and a property closeout form PDF.

2.3. Click on each subfolder to check that there are pictures/videos in each subfolder.

3. If any documentation forms are missing, check with the documentation teams to confirm all were submitted.

4. If any photos or videos are missing, check that the data from all cameras/memory cards were downloaded.

Troubleshooting

Problem	**Possible Reason and Solution**
Cannot login to MyCloud online.	• Confirm or change the login credentials being used. • This error can occur if the MyCloud device is offline. Check that the device is properly plugged into both the power connection and the router. • Chrome is preferred, but other browsers are acceptable. Try logging in using a different web browser. • Ensure the computer's network is the same as the network connected to the MyCloud device. Only computers on the same wireless network as the MyCloud device will be able to access its files. • The MyCloud device has security settings that allows the administrator to allow or deny access to individual usernames. Ask the MyCloud administrator to grant access to the username being used. • Try going to www.mycloud.com/setup. Click "Get Started," then select the individual device's dashboard. Add the username(s) being used to login to grant access to the MyCloud. This step is especially necessary if the MyCloud is ever transferred and connected to a different network as a new MyCloud administrator must be established.
There are no files visible upon login.	• Click the gear icon in the upper left-hand corner of the screen and check that the MyCloud device is online. Try refreshing by clicking the refresh icon. • Ask the MyCloud administrator to grant access to the username being used. The MyCloud administrator can grant or deny users access to individual folders within the MyCloud. • If files still do not appear, the MyCloud device may have gone offline. Check the device's power and internet connections.
The upload has stopped.	• If the progress bar on the bottom has disappeared, check folders and individual subfolders to see if the upload is complete. • If the progress bar remains at the bottom, click "View details" and observe the progress of each individual file.

Problem	**Possible Reason and Solution**
	PDF and JPG files will take only seconds to upload, but large video files can take as long as 5 minutes each.
Cannot see all the files that were just uploaded.	• When viewing individual picture files, it can be easier to view them as a grid. Click the grid icon in the upper right-hand corner and the pictures will be displayed. • It is possible the upload failed. Try re-uploading the files that are missing.
Files cannot be uploaded.	• Check the status bar in the upper left-hand corner of the screen. Each MyCloud device has a certain capacity. If this capacity is approached or exceeded, an additional MyCloud device may need to be used. • Be sure the files being uploaded are in the locations specified. If the files were moved, navigate to their new location and reselect them to be uploaded.