TETRA TECH

August 1, 2018

Mr. Brian Cooper
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Subject: EPA Region 5 Data Management Plan Revision 3.0
EPA Contract No. EP-S5-13-01
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Dear Mr. Cooper:

The Tetra Tech, Inc. Superfund Technical Assessment and Response Team (START) is submitting the U.S. Environmental Protection Agency (EPA) Region 5 Data Management Plan – Revision 3.0 to document data management processes and procedures commonly implemented on emergency response and removal projects performed by the EPA Region 5 Removal Branch.

Please call me at (312) 201-7768 if you have any questions or comments regarding this submittal.

Sincerely,

Adam Peterca
Project Manager

EPA REGION 5
DATA MANAGEMENT PLAN

Revision 3.0

Prepared for

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

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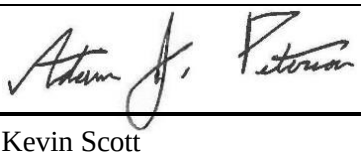
SIGNATURE/DATE:		August 1, 2018
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List of Abbreviations

App	Application – a software used on mobile devices
ASPECT	Airborne Spectral Photometric Environmental Collection Technology
CAP	Common Alerting Protocol
CLP	Contract Laboratory Program
COC	Chain of custody
COR	Contracting Officer's Representative
CSV	Comma separated value
DMP	Data Management Plan
EDD	Electronic data deliverable
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ER	Emergency response
ERT	Environmental Response Team
Esri	Environmental Systems Research Institute (international supplier GIS software and web-based mapping applications)
FedRAMP	Federal Risk and Authorization Management Program
FEMA	Federal Emergency Management Agency
FTP	File Transfer Protocol
GIS	Geographic Information System
GPS	Global Positioning System
HQ	Headquarters
ICS	Incident Command System
N/A	Not applicable
NRC	National Response Center
OSC	On-Scene Coordinator
PII	Personally identifiable information
PRP	Potentially responsible party

QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCMS	Removal Cost Management System
RCS	Remote communication standard
Recon	Reconnaissance
REOC	Regional Emergency Operations Center
SAP	Sampling and Analysis Plan
SEMS	Superfund Enterprise Management System
SOG	Standard operating guide
SOP	Standard operating procedure
SQL	Structured query language
START	Superfund Technical Assessment and Response Team
WMA	Web mapping application

1.0 GENERAL INFORMATION

This Data Management Plan (DMP) is intended for use with all projects performed by the U.S. Environmental Protection Agency (EPA) Region 5 Emergency Response and Removal Program that involve the collection, management, and/or reporting of environmental data. This document provides guidance for typical activities associated with both emergency response and removal actions to ensure that data are consistent and complete. The DMP includes data elements and valid values, data collection equipment, data management processes, data quality checks, and end-use products appropriate for supporting EPA On-Scene Coordinators (OSC).

The DMP is intended for use by the following personnel:

- OSC – Primary decision-maker responsible for determining response activities and clarifying information necessary to successfully manage the site
- Data Manager – Responsible for adherence to this DMP and the overall flow of data, as well as directing support personnel to ensure the accurate and complete collection, processing, storage, verification and reporting of site data. This role is generally filled by EPA contractor (Superfund Technical Assessment and Response Team [START]) personnel
- Field Personnel – Responsible for collecting and documenting general site information including sampling, monitoring, and field analytical data
- Geographic Information System (GIS) Personnel – Responsible for providing maps and GIS information – this role is generally filled by EPA contractor (START) personnel
- Environmental Response Team (ERT) – Responsible for providing support tools such as EPA's VIPER telemetry system and Scribe database system, and the EPA Region 5 ER Cloud.

The DMP includes the following:

- Main Document – General information on procedures required for adequate data capture and processing
- Appendix A – In-depth field guidance documents for Data Managers, and field team personnel
- Appendix B – Region 5 Data Elements and Valid Values
- Appendix C – Site-specific DMP Template

1.1 GENERAL DATA PRACTICES

Adherence to structured and well-defined data practices provides an important foundation for decision making in the field and data integrity during reporting. Regional DMPs ensure that collection and generation of data during the life cycle of a project are managed and maintained consistently. With general, consistent, and structured data practices, errors that may be introduced during field collection and processing of data are minimized. Site-specific DMPs, referencing the Region 5 DMP as guidance, provide concise, direct requirements for data collection and management at project sites and detail any deviations from Region 5 DMP best data management practices. An example of a site-specific DMP template is provided in Appendix C. Specific guidance on how to manage individual data streams is included in Section 3.0.

Best data management practices include use of specific data repositories or target databases. Some of these target databases are maintained by the EPA Emergency Response Team (ERT), such as Scribe and WebEOC®. Spatial data are managed in geodatabases approved by the EPA Region 5 Emergency Response and Removal Program for use within the Region 5 GIS environment, consisting of the Region 5 ER Cloud and EPA GeoPlatform. Data within ERT's databases are readily available to operations personnel (including federal representatives and contractors) via the standard reporting functions of those systems.

Except for the Removal Cost Management System (RCMS), ERT maintains web services for its data systems. These web services—as well as other web services provided by EPA's response partners (potentially responsible parties [PRP], state agencies, the Federal Emergency Management Agency [FEMA], etc.) — are consumed and viewed in various web-based mapping applications (WMA) and reports hosted using Region 5 GIS applications. Additional queries, reports, web services, and spatial data WMAs are developed and served from the Region 5 GIS environment, as directed by the OSC to support specific operational needs.

1.2 SPECIAL CONSIDERATIONS

The following are unique, site-specific requirements that should be considered prior to and during implementation of this DMP:

- This DMP is not all inclusive. Data processing and management for site data not included in this plan will be determined by the Data Manager and GIS personnel, and will be documented in a site-specific DMP.
- This DMP is not static. As new best practices, technologies, and tools are identified, they will be incorporated into this plan.
- Planning is required between the OSC and the Data Manager to identify data processing and management gaps, and to verify appropriateness of all data management efforts.
- All data captured are for internal use by EPA and designated contractors only. Data collected on EPA projects may contain personally identifiable information (PII) and thus should be secured and managed according to EPA standards. EPA OSCs, or other EPA representatives, will determine which agencies or individuals will have access to data. Data to be released to the public will be determined by the OSC in consultation with EPA Region 5 Superfund management and the Office of Public Affairs.
- This DMP is intended to be used with site-specific sampling and analysis plans, which will guide sample nomenclature, sample locations, sample collection standard operating procedures (SOP), and sample analyses.
- The Data Manager, working with field personnel, will determine monitoring and sampling nomenclature prior to field activities to ensure that all data collected are reported according to a consistent nomenclature scheme compatible with Scribe.

1.3 ROLES AND RESPONSIBILITIES

The primary data management responsibilities of the site OSC are to form the project-specific core data management team, establish data objectives, and ensure overall data management quality and completeness. The three primary members of the project-specific core data management team are the Data Manager, Database Administrator (DBA), and GIS Lead.

- The Data Manager is responsible for implementing data management tools in the field, coordinating data collection efforts, and ensuring quality assurance/quality control (QA/QC) of resulting data. The Data Manager is also responsible for determining the data needs for the site and establishing data workflow requirements.
- The Database Administrator is responsible for creating new databases, importing and exporting information to existing databases, conducting database queries and scripts, developing reports, and ensuring QA/QC procedures are followed on data manipulations.
- The GIS Lead is responsible for supporting the Data Manager through geospatial data management, geospatial data presentations and visualizations, software development and customization, and coordination with the Database Administrator.

Field personnel/data collectors are responsible for capturing field data as completely and accurately as possible. The site OSC and Data Manager will evaluate data management requirements for each project and resources and personnel will be assigned accordingly.

1.4 UPDATE SUMMARY

This DMP is a dynamic document meant to be updated continually as data and GIS management practices evolve and improve. The history of document revisions to this DMP will be presented below.

Table 1: Region 5 DMP Update History

Version	Revision Date	Author(s)	Description of Changes
0	March 2012	EPA Region 5	Initial setup of DMP
1.0	August 2014	EPA Region 5	Generic DMP for Region 5
2.0	November 2016	EPA Region 5; START Region 5	Update Region 5 DMP with new data collection and management tools and procedures and SSDMP template. Incorporation of revisions from EPA Use START Region 4 DMP as source document and incorporation of best practices format from EPA START Region 7 DMP.
3.0	August 2018	EPA Region 5; START Region 5	Update Region 5 DMP with new data collection and management tools. Incorporate updates based on recently developed site-specific data management plans

Notes:
DMP – Data management plan
START – Superfund Technical Assessment and Response Team
SSDMP – Site-specific data management plan

2.0 DATA MANAGEMENT PLAN OBJECTIVES

This regional DMP is intended to provide a clear understanding of standard methods for data collection, management, reporting, and visualization practices. The purpose of documenting these practices is for reproducibility by other contractors and to meet EPA's site documentation requirements. Specifically, this regional DMP has four primary objectives:

1) Standardize data management workflows.
2) Establish target databases and data repositories for long-term and secure storage of site data.
3) Provide recommended best data management practices for projects implemented under the Region 5 Emergency Response and Removal Program in Region 5.
4) Provide a basis and reference information for the creation of streamlined site-specific data management plans.

3.0 DATA MANAGEMENT WORKFLOWS

Data collected by the Region 5 Emergency Response and Removal Program can generally be grouped into seven data workflows: (1) Real-Time Continuous Data, (2) Real-Time Discrete Data, (3) Laboratory Data, (4) Processed Quantitative Data, (5) Processed Geospatial Data, (6) Media Data, and (7) Cost Data. Each of these data streams are routinely generated by EPA and its contractors during emergency response and removal activities. Each data workflow is defined by four major phases of the data lifecycle:

1) **Collection:** This phase of the data lifecycle focuses on the initial capture of relevant data. During this phase, efforts are focused on collecting accurate data in a manner that minimizes opportunities for human/user error, and that avoids the need for transcription or labor-intensive data handling.
2) **Transmission:** This phase of the data lifecycle involves passing data from its point of origin (during the collection phase) to an established data repository. A variety of methods and technologies can be used for data transmission, and the specific method used is determined by the type of data being transmitted.
3) **Storage:** This phase of the data lifecycle involves storing data in appropriate, secure repositories for long-term storage. The use of secure repositories is crucial to ensure data integrity. Data repositories are also selected for their ability to support advanced data analysis and visualization.
4) **Visualization/Analysis:** This phase of the data lifecycle focuses on interpreting data to aid in drawing meaningful conclusions that can support decision-making. Visualization/analysis tools frequently employed by the Region 5 Emergency Response and Removal Program include interactive web mapping applications, static map documents, data summary/analysis tables, and cost projections and estimates.

Maintaining data integrity and accuracy is the primary driver for all data management efforts. The Region 5 Emergency Response and Removal Program has developed a data management system that aims to limit the introduction of user error, transcription error, and intensive data handling. Each of the specific data management workflows described below define standard tools and methods for managing data. In addition, best data management practices are provided in Section 8.0. Adherence to these best data management practices further ensures data integrity and accuracy.

3.1 GENERAL WORKFLOW OVERVIEW

While data management practices should be tailored to site-specific conditions and objectives, a general data management workflow exists for Region 5 Emergency Response and Removal Program projects. This general data workflow is presented below. It includes many of the most common methods of data collection, transmission, and storage, and focuses on the use of EPA's GeoPlatform for data visualization. A summary of the most frequently used methods for data collection, transmission, storage, and visualization/analysis are provided below, followed by the General Data Workflow Diagram presented in **Figure 1**. This information is provided as a summary of data management practices, and should not be construed as a replacement for the more detailed discussions of specific data management workflows in the following sections.

Collection:

- **Survey 123:** Mobile application used in the field to capture tabular data and photographs. Tabular data typically includes both reconnaissance information (field notes) and sampling information.
- **Collector App:** Mobile application used in the field to collect and modify geospatial data and related attributes.
- **Instrumentation:** Equipment deployed in the field that typically collects some form of environmental or geospatial measurement. Includes air monitoring equipment, water quality meters, XRF analyzers, etc.
- **Logbooks:** Physical logbooks in which field notes are manually recorded.
- **Global Positioning System (GPS) Data:** GPS data can be collected via Survey123 and Collector apps by using an external GPS receiver. Handheld GPS units can also be used to collect geospatial data.
- **Analytical Data:** Analytical data is generated by laboratories, and provided to EPA in the form of electronic data deliverables (EDDs) and data packages. Analytical data is typically coupled with sampling data collected via Survey123/Collector apps or logbooks, and geospatial data.

Transmission:

- **VIPER Telemetry System:** The VIPER telemetry system transmits data via the cellular network using a system of LINCs and Gateways. Data is stored on the VIPER.net web server, and can be transmitted from VIPER.net to a structured query language (SQL) Server via a subscription service.
- **ProRAE Guardian Telemetry System:** The ProRAE Guardian system transmits data via a radio network to a local host computer. At sites where both ProRAE Guardian and VIPER systems are

deployed, the ProRAE Guardian system can be integrated into the VIPER system as a generic CAP stream.

- **Direct Upload to Web Server:** Both Survey123 and Collector apps allow data to be directly uploaded to web servers via a Wifi or cellular data connection. When a Survey123 form is submitted, it is uploaded both to the Survey123 web server and to the EPA GeoPlatform as a feature class. When a new data point or a change to an existing dataset is made with the Collector app and submitted, the feature class that was created or altered is automatically updated on the EPA GeoPlatform.
- **CSV:** Comma separated value (CSV) files are commonly used to store and transmit tabular data. Many monitoring instruments generate CSV files that can be downloaded via portable drive, and then transmitted via direct upload to a local computer and email or file transfer protocol services. CSV files can also be downloaded from many web servers to allow for the distribution of data, such as the Survey123 web server.
- **Email/FTP:** Email and FTP services are used to transmit datasets amongst project team members. Types of data transmitted via email and FTP services include CSV files containing tabular data collected via Survey123 or monitoring instruments, EDDs containing analytical data, PDF files including historical reports, scans of access agreements, scans of site logbooks, and deliverables, and media data including photographs and videos.

Storage:

- **Scribe/Scribe.net:** Scribe and Scribe.net are database services provided by EPA ERT to house environmental data. Scribe is a Microsoft Access-based database software, with a defined template designed to store common types of environmental data. This defined template can be customized on a site-specific basis to store various types and formats of tabular data. Scribe.net is a web server that ERT maintains to allow for the upload, secure storage, and service of subscriptions to Scribe databases. Scribe and Scribe.net act as target repositories for tabular data.
- **VIPER.net:** VIPER.net is a web server provided by EPA ERT that acts as a secure storage location for data transmitted via the VIPER telemetry system. Subscription services can be used to access data stored on VIPER.net, allowing the data to be polled by SQL Server and incorporated into Scribe databases.
- **File Geodatabase:** A file geodatabase is a collection of files in a folder that can store, query, and manage both spatial and nonspatial data. Project-specific file geodatabases are developed for each project, and act as a target repository for spatial datasets. The file geodatabases can be used to populate interactive mapping services on the GeoPlatform, and can also be used to generate static maps for inclusion in reports or instantaneous status updates.
- **Secure Local Server:** A secure local server typically refers to a server maintained by the START contractor with a defined file structure for the secure and organized storage of project files. This local server acts as the target repository for files that are not intended to be accessed or used frequently, including the unaltered, original versions of data downloaded from monitoring instruments.
- **RCMS:** RCMS functions as a Microsoft Access database. As such, the primary database file and a backup file should be maintained on a secure local server at all times.

Visualization/Analysis:

- **EPA GeoPlatform:** The EPA GeoPlatform is an ArcGIS Online platform designed to allow for interactive visualization of geospatial data. It is frequently used to present interactive web

mapping applications, story maps, and project management dashboards. While data can be hosted directly on the GeoPlatform, it is not typically used as a target repository for data.

- **Static Maps:** Environmental Systems Research Institute (Esri) ArcMap and ArcGIS Pro software are used to create static maps using data stored in file geodatabases. Static maps are included in reports and are frequently used to provide status updates to project stakeholders.
- **Data Summary Tables:** Analytical and monitoring data are often presented in data summary tables used to present summary statistics. When possible, automated scripts are used to generate summary tables to limit transcription and user errors. Data summary tables are included in reports and are frequently used to provide status updates to project stakeholders. The tables are a data analysis and presentation tool, and should not be used as a data repository.

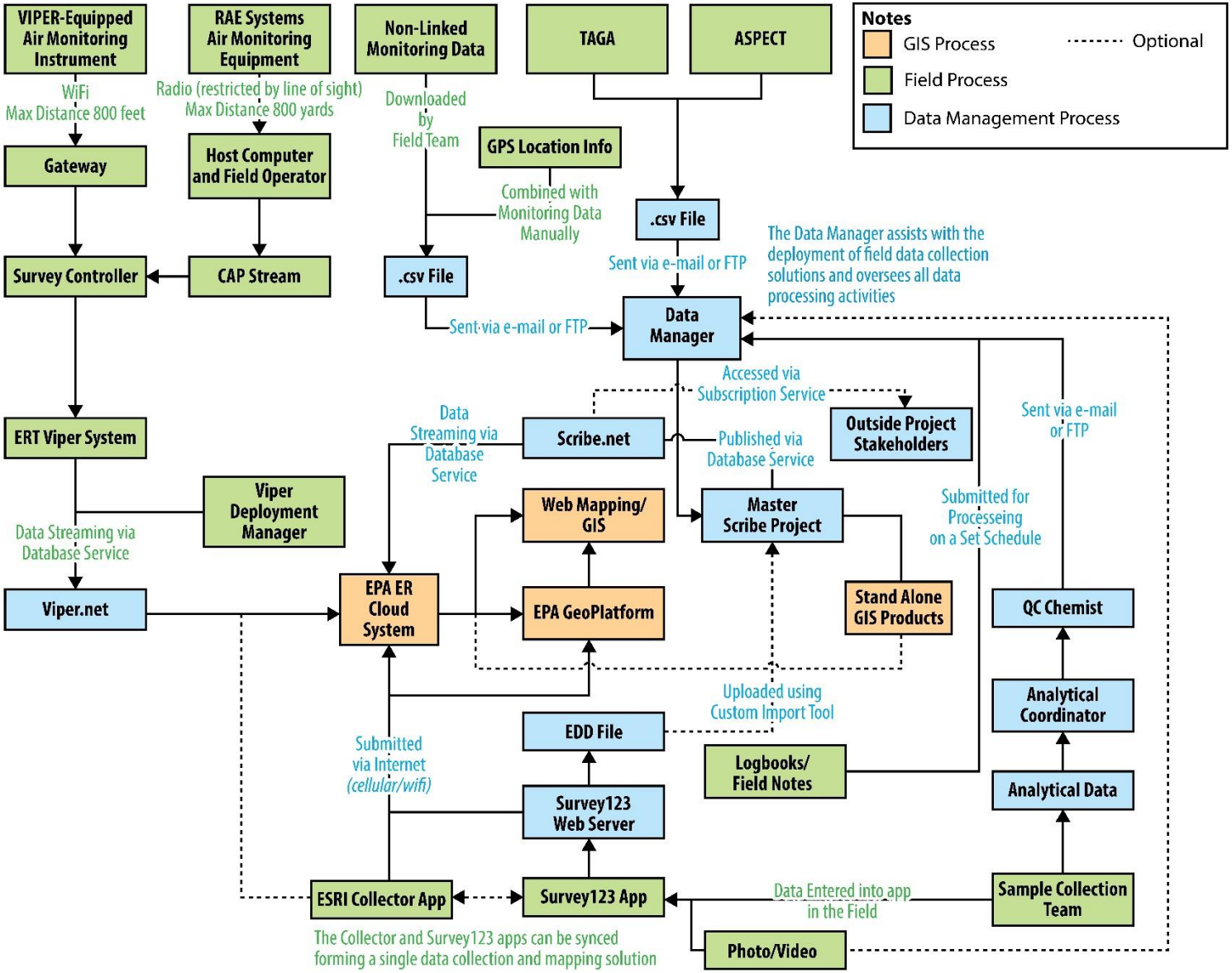


Figure 1: *General Data Workflow*

3.2 REAL-TIME CONTINUOUS DATA WORKFLOW

The Real-Time Continuous 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 quality measures. Specific procedures for collection and processing of these data are included in Region 5-specific standard operating guides (SOGs) provided in Appendix A. The SOGs referenced in this DMP seek to standardize procedures for this data stream; however, the SOGs may not include methods used by all contractors to collect their data.

VIPER

A VIPER deployment is one common method used for capturing and transmitting real-time continuous data. VIPER is a wireless network-based communications system that enables real-time transmission of data from field sensors to local or remote computers. Monitoring equipment is deployed in multiple locations in and around a site, where 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 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 project-specific calculations can be made, 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 project specific Dashboards.

Figure 2 depicts the step-by-step process of air monitoring and weather data streaming via the VIPER system.

ProRAE Guardian

ProRAE Guardian software collects, stores, and displays real-time data from remote monitors, specifically RAE Systems monitors. These monitors include: AreaRAEs, MultiRAE Pro, UltraRAE, etc.

The ProRAE Guardian network is a wireless network-based communications system that enables real-time transmission of data from field sensors to a local host computer. Monitoring equipment is deployed in multiple locations in and around a site, within a 1.5-mile radius, where data are collected and streamed to a local server. One ProRAE Guardian installation can capture real-time readings from up to 64 point-to-multipoint (PTM) (AreaRAE, etc.) monitors, and up to 450 remote communication standard (RCS) (Mesh-radio, such as MeshGuard) monitors. Instruments are outfitted with internal radios, RAELink 2, or RAELink 3 modems to communicate and stream data to the host computer. Data collection begins once settings within ProRAE Guardian are configured and the "Start" button is selected. Once the data collection begins, information being streamed via ProRAE Guardian is stored in a database on the ProRAE Guardian machine. Data can then be downloaded directly from the ProRAE Guardian database.

It is possible to port forward the data from ProRAE Guardian to the VIPER system. This is detailed in the EPA Environmental Response Team guidance document titled *VIPER – ProRAE Guardian Setup*, which can be downloaded from the EPA OSC Response website at: https://response.epa.gov/viper .

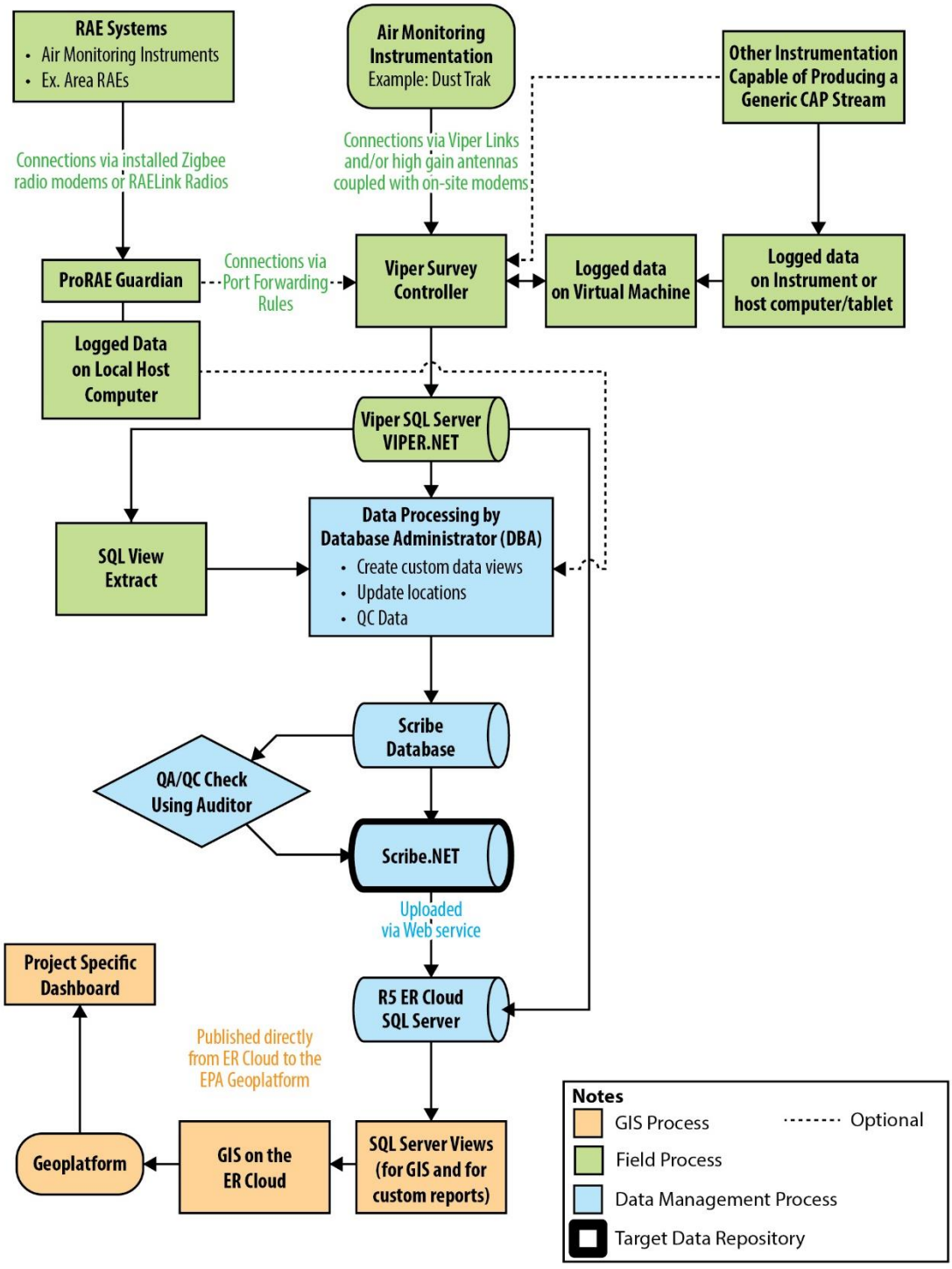


Figure 2: *Real-Time Continuous Data Workflow Diagram*

3.3 REAL-TIME DISCRETE DATA WORKFLOW

The Real-Time Discrete 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 Discrete Data stream is described below. Real-Time Discrete Data are typically associated with emergency response, assessment, and site reconnaissance work. Data include photographs, GPS waypoints, contact information, sampling and screening activities such as soil screening conducted using an X-ray fluorescence (XRF) analyzer, radiation surveys, multi-media sample collection, initial and final excavation elevations, and other site surveys. This data can be managed using a field collection device equipped with the Collector and/or Survey123 applications. Base map layers can be downloaded in Collector, allowing access to prepared maps and data collection at locations without internet coverage. If reconnaissance data are captured using devices not compatible with Region 5 data collection methods, or if no electronic device is available, data relevant to site reconnaissance may be entered manually in a field logbook or in a spreadsheet by use of a field laptop.

Specific procedures for collecting and processing data in this data stream are included in Region 5-specific SOGs found in Appendix A. The SOGs referenced seek to standardize procedures for this data stream; however, the SOGs may not include methods used by all contractors to collect their data. Region 5 is currently creating a compendium of standardized digital forms for data collection that will be available for use at all relevant sites.

Qualitative Data Collection

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 Region 5-specific SOGs referenced below.

Data in this stream can be collected using the digital data collection applications found in Region 5 SOG No. 001, "Survey123 Data Entry and Data Download," and SOG No. 002, "Collector for ArcGIS," then exported and uploaded to a secure external storage device (such as a MyCloud) or the EPA GeoPlatform. Pictures and videos are captured in the field using cameras and camcorders, then downloaded locally and uploaded to a secure external storage device. When physical field data sheets are used, the data sheets are scanned as PDF files and loaded to either an external storage device or the EPA GeoPlatform. Specific instructions and procedures for loading or inputting qualitative Collector data onto the EPA GeoPlatform can be found in Region 5 SOG No. 005, "Dashboard/GeoPlatform."

Figure 3, on the following page depicts the step-by-step process for real-time qualitative data management.

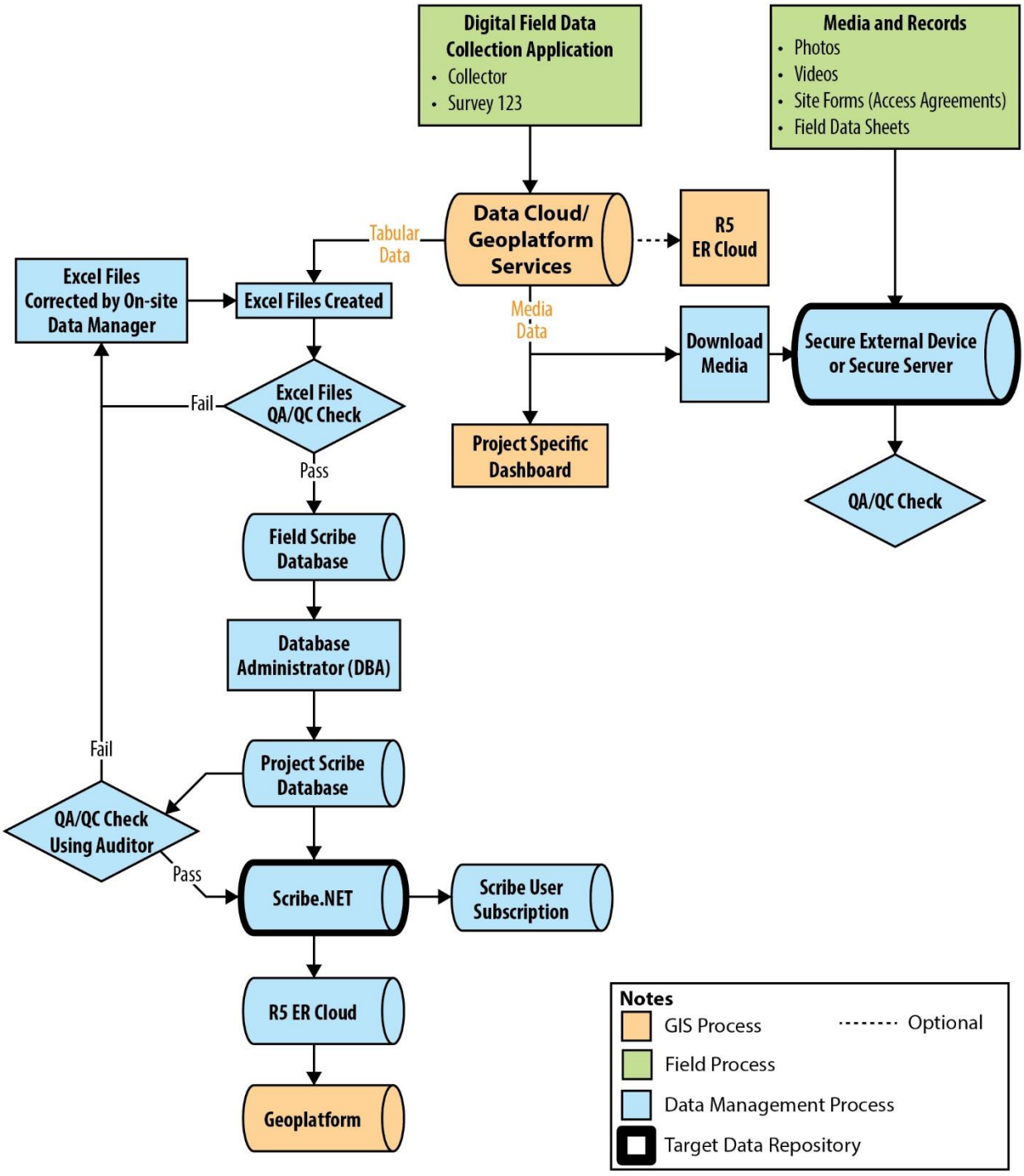


Figure 3: *Real-Time Discrete Qualitative Data Workflow Diagram*

Quantitative Data Collection

Collection of this type of data starts by entering information into a digital data collection application running on tablet computers. Sampling teams equipped with a tablet computer that will have access to the specific applications used to collect discrete data. Instructions on entering information into the application

are included in Region 5 SOG No. 002, "Collector for ArcGIS," and SOG No. 001, "Survey123 Data Entry and Data Download." 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 SOG No. 001, "Survey123 Data Entry and Data Download." 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 Region 5 SOG No. 004, "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 project specific dashboard web mapping application (WMA) according to steps described in SOG No. 005, "Dashboard/GeoPlatform."

Figure 4, on the following page depicts the step-by-step process for real-time quantitative data management.

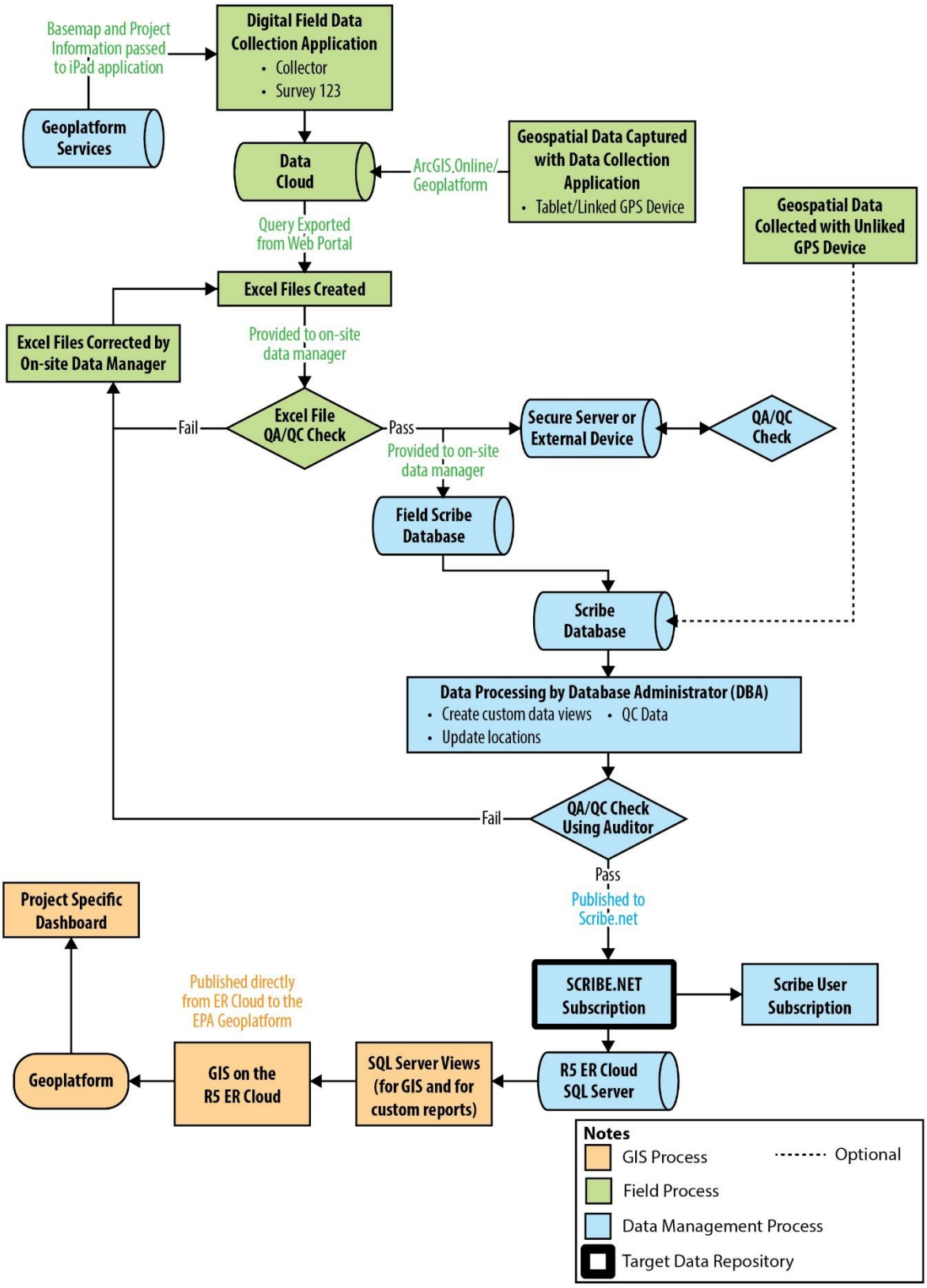


Figure 4: *Real-Time Discrete Quantitative Data Workflow Diagram*

3.4 LABORATORY DATA WORKFLOW

The Laboratory Data stream is defined as data generated off site that results from a laboratory determination of a chemical concentration or physical property of a particular sample. Data generated off site include reports by an accredited laboratory, which typically consist of analytical reports and electronic data deliverables (EDDs). EDDs are used to (1) provide a chemical concentration or physical property for the sample and (2) provide detailed QA/QC data to facilitate the validation of laboratory data.

There are typically three primary sources of laboratory data that must be managed during a project: (1) chain of custody (COC) records generated by the field team; (2) preliminary (unvalidated) laboratory data; and (3) validated laboratory data. It is important that all three of these data sources be captured and maintained throughout the lifecycle of the project, as they act as important legal documentation of sampling activities and can be highly useful for developing automated QC checks on project databases.

The target data repository for all three of these primary data sources is EPA's Scribe database software.

The first primary laboratory data source, COC records, are generated in the field at the point of sample collection. COCs can be generated in a variety of manners, including: (1) uploading Survey123 data to Scribe and using Scribe to generate digital COCs; (2) manually entering sampling data into Scribe and using Scribe to generate digital COCs; and (3) hand-writing sampling information on physical COCs. Region 5 recommends generating COCs using Scribe based on sample information that has been entered or uploaded to Scribe. Typically, the field team records sampling information in a Survey123 form, uploads the form to the Survey123 web server, and then downloads a CSV file containing relevant sampling information from the Survey123 web server (see Section 3.3). The field team performs a QC review of the sampling data contained in the CSV, and after confirming all information is accurate, uploads the data to the Field Scribe Database. The Field Scribe Database is then used to generate both physical COCs that are shipped with samples as a legal record of package contents, and a digital COC that is provided to the DBA to be added to the primary Project Scribe Database (see SOG 003, "Scribe Field Database"). Once the COC has been uploaded to the Project Scribe Database, it acts as a record of all samples that have been collected on the site and submitted for laboratory analysis. All COC records are maintained in the Project Scribe Database for the duration of the project.

The second primary laboratory data source (preliminary laboratory data) is provided by an off-site laboratory. Preliminary laboratory data typically consist of a preliminary analytical EDD, and a preliminary laboratory data package (typically a CLP Level II data package). Once the preliminary analytical EDD is received from the laboratory, it is provided to the DBA for upload to the Project Scribe Database. The DBA runs necessary upload scripts/data mappings to add the data contained in the preliminary analytical EDD to the Project Scribe Database. After the preliminary analytical data has been uploaded, the DBA runs QA/QC checks on the data using the Auditor tool contained in Scribe (see SOG 004, "Scribe Database Management"). Auditor rules are typically customized by the DBA on a project-specific basis, but at a minimum the Auditor rules should (1) ensure that new entries to the database are correctly formatted, and (2) compare preliminary EDD records to COC records to ensure that analytical results have been received for all samples contained in each COC record.

The third primary laboratory data source (final laboratory data) is provided by an off-site laboratory. Final laboratory data typically consist of a final analytical EDD, and a final laboratory data package (typically a CLP Level IV data package). The final laboratory data must undergo a data validation review by a qualified data reviewer prior to being uploaded to the Project Scribe Database. The data reviewer uses both the final analytical EDD and the final laboratory data package to perform data validation. During the data validation, the data reviewer updates the final analytical EDD with values for validated analytical results, and validated analytical data qualifiers. The data reviewer also generates a data validation report, which summarizes the findings, is included in the site report with the final analytical data, and can be uploaded to the project-specific response.EPA.gov website.

Once data validation has been completed, the final validated analytical EDD is provided to the DBA for upload to the Project Scribe Database. The DBA runs necessary upload scripts/data mappings to add the data contained in the final validated analytical EDD to the Project Scribe Database. After the final validated analytical data has been uploaded, the DBA runs QA/QC checks on the data using the Auditor tool contained in Scribe (see SOG 004, "Scribe Database Management").

The Region 5 Emergency Response and Removal Program recommends that all Project Scribe Databases be published to Scribe.net. Publishing a Project Scribe Database pushes the database to the Environmental Response Team (ERT) servers and creates a safe backup. Publishing the database to Scribe.net also allows for the use of Scribe.net's subscription services, which allow both web services and individual users to access published versions of the Project Scribe Database.

Figure 5 below presents a summary of the Laboratory Data Workflow typically implemented on Region 5 Emergency Response and Removal projects.

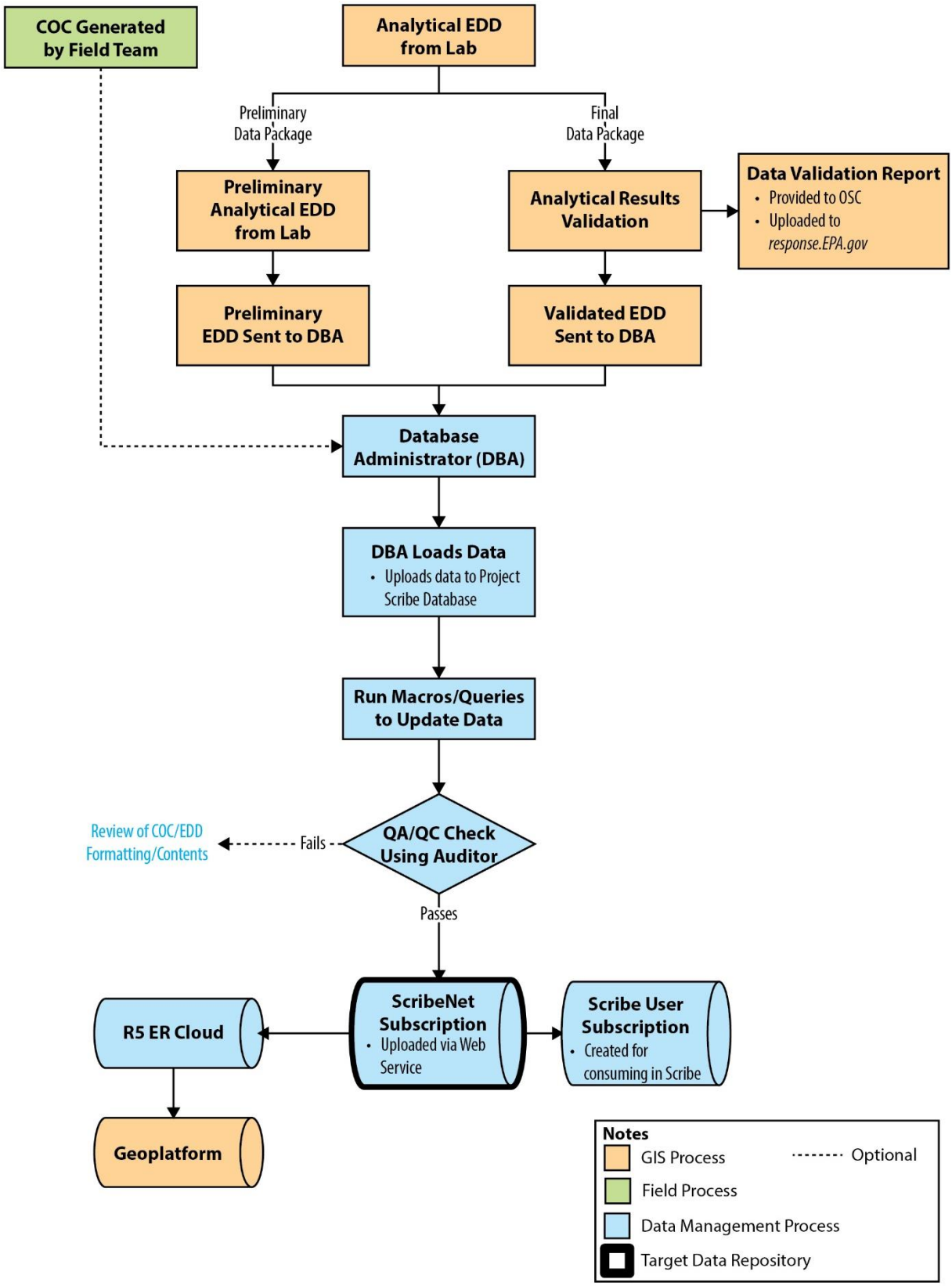


Figure 5: *Laboratory Data Workflow Diagram*

3.5 PROCESSED QUANTITATIVE DATA WORKFLOW

The Processed Quantitative Data stream consists of quantitative data that either (1) cannot be transmitted as a real-time data stream; or (2) acts as a backup dataset for a data stream that is transmitted in real-time. This data stream typically consists of instrument readings that are downloaded directly from instruments capable of datalogging, but then require some form of processing before they can be stored in an applicable data repository. For the purposes of the Region 5 Emergency Response and Removal Program, the Processed Quantitative Data Workflow typically consists of three types of data: (1) instrument readings downloaded directly from datalogging instruments; (2) datasets generated by EPA's Airborne Spectral Photometric Environmental Collection Technology (ASPECT); and (3) datasets generated by EPA ERT's Trace Atmosphere Gas Analyzer. Datalogging instruments are used more frequently than both ASPECT and TAGA in Region 5, but ASPECT and TAGA represent important emergency response capabilities, and are also included in this Regional DMP.

Data Downloaded from Datalogging Instruments

Data downloaded from datalogging instruments originates on site and is collected by the project field team. Most datalogging instruments allow the user to directly download data in either CSV or TXT file format. Once data has been downloaded from the instruments, a raw, unaltered version of the downloaded file should be saved and maintained. The raw files should also be sent to the project data manager. For instruments that can also have their data incorporated in a real-time data stream, the raw files should be maintained as a backup to real-time data. These backup files can be used in case of any issues with the real-time data workflow, and can also be used as a secondary QC check for data transmitted via real-time data streams.

For datalogging instruments that cannot have their data incorporated into a real-time data stream, the downloaded data act as the primary dataset for the instrument. In this scenario, once the data manager receives raw unaltered data files, a second copy of the raw files should be made. The original, unaltered data files should be maintained for the duration of the project as a backup dataset. The second copy of data files should be used to perform necessary data manipulations to incorporate the data into the target data repository, which is Scribe. Most instruments used during site work record data in instrument-specific formats. As a result, it is often necessary to manipulate the data file format to allow the data to be uploaded to the Project Scribe Database. When these manipulations are necessary, the project data manager should review (1) the format of the downloaded data files; (2) the format of the Project Scribe Database, with a focus on required fields and primary keys; and (3) the project-specific reporting requirements established in the sampling and analysis plan. After completing this review, the data manager should make the necessary changes to data formats so that the file can be successfully uploaded to the Project Scribe Database.

In some scenarios, this process of preparing data for upload to the Project Scribe Database can also require data reduction. For example, direct data downloads from air monitoring equipment often include a very large number of records, with readings often recorded in intervals as short as 1-second over long periods of time. To facilitate the storage of this data in the Project Scribe Database, data reduction may be necessary. This typically involves the calculation of time-weighted averages, or other forms of averages or central tendencies of the dataset. The specific form of data reduction performed must be

decided on a project-specific basis, and should be determined based on the project's sampling and analysis plan, and the specific scenarios that are being assessed.

Whenever possible, formatting and reducing data to facilitate data uploads to Scribe should be performed using automated data processing scripts. Once the data files have been correctly formatted (and reduced if necessary), they should be sent to the DBA for upload to the Project Scribe Database. It is important to maintain consistent formatting of all files sent to the DBA so that data upload scripts and field mappings can operate successfully. After the instrument data have been uploaded, the DBA runs QA/QC checks on the data using the Auditor tool contained in Scribe (see SOG 004, "Scribe Database Management").

The Region 5 Emergency Response and Removal Program recommends that all Project Scribe Databases be published to Scribe.net. Publishing a Project Scribe Database pushes the database to the Environmental Response Team (ERT) servers and creates a safe backup. Publishing the database to Scribe.net also allows for the use of Scribe.net's subscription services, which allow both web services and individual users to access published versions of the Project Scribe Database. This data management workflow is depicted in **Figure 6** below.

ASPECT and TAGA Data

Both ASPECT and TAGA generate CSV files in standard formats specific to each piece of equipment. The ASPECT and TAGA deployment teams are responsible for generating accurate datasets and transmitting them to the OSC. An unaltered version of the original file should be maintained for the duration of the project. A second version of the data file should be transmitted to the data manager for processing to allow upload to the Project Scribe Database. Similar to the process for preparing raw instrument data for Scribe upload, the data manager should review the format of the raw data files and the structure of the Project Scribe Database to determine the required formatting for transferring the data to Scribe. Whenever possible, data formatting should be performed using automated data processing scripts. Once the data files have been correctly formatted, they should be sent to the DBA for upload to the Project Scribe Database. The DBA then runs QA/QC checks on the data using the Auditor tool contained in Scribe (see SOG 004, "Scribe Database Management"). The Project Scribe Database can then be published to Scribe.net as described above. This data management workflow is depicted in **Figure 6** below.

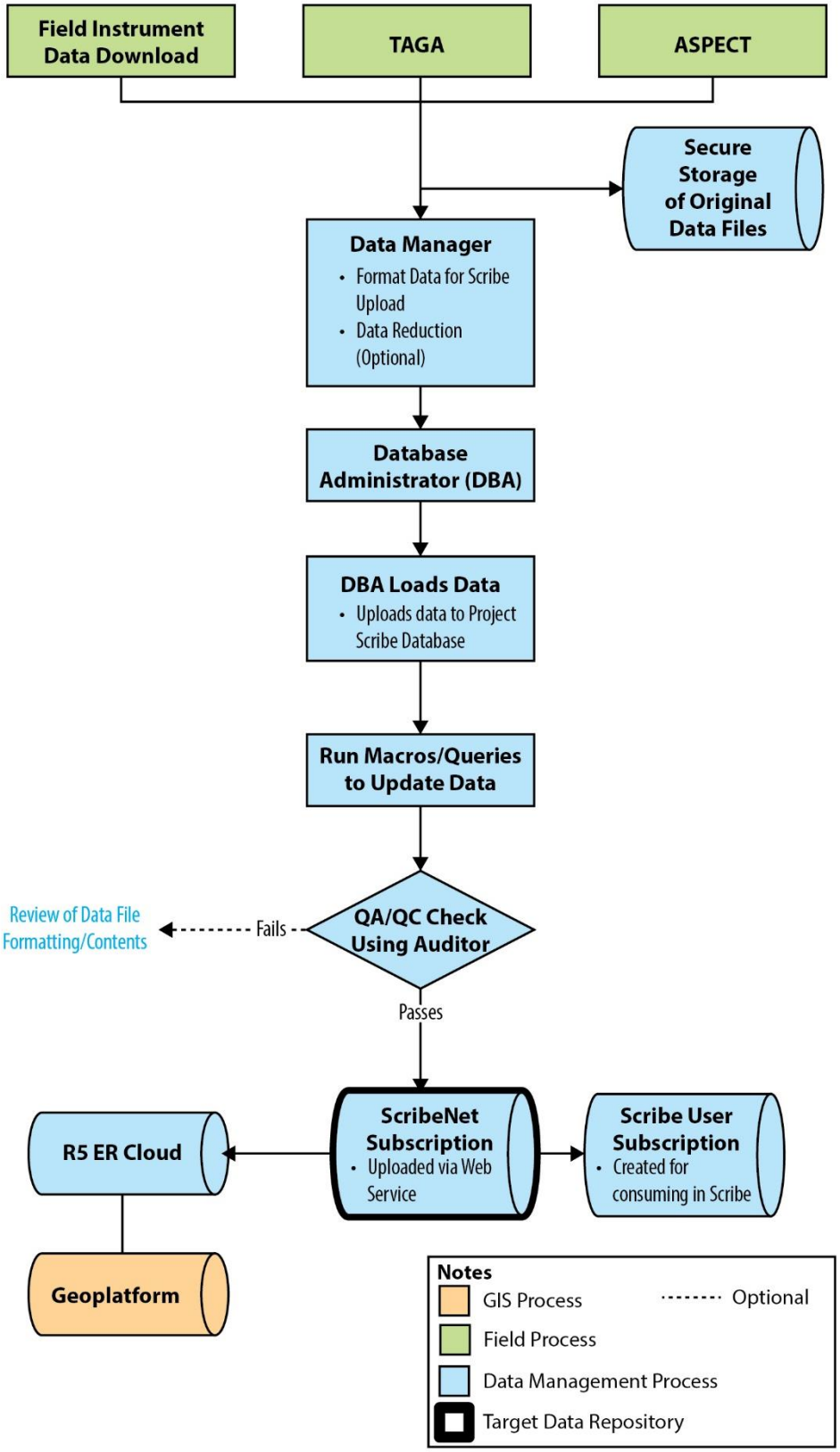


Figure 6: *Processed Quantitative Data Workflow Diagram*

3.6 PROCESSED GEOSPATIAL DATA WORKFLOW

The Processed Geospatial Data stream consists of geospatial data collected in the field, and typically consists of (1) data collected with a handheld GPS unit and (2) data collected with survey-grade surveying equipment. These data streams are collected in the field, and typically downloaded directly from the equipment. The data downloaded from the equipment typically requires some form of processing and reformatting before it can be included in the appropriate data repository. Geospatial data can also be captured via the Real-Time Discrete Data Workflow; this process is discussed in Section 3.3.

Handheld GPS Unit Data

The Handheld GPS Unit data stream initiates with the collection of geospatial location using a handheld GPS unit, typically with sub-meter accuracy. This type of equipment is used to record the XY location for key site features, such as sample locations. Handheld GPS units log data internally, which can then be downloaded to a computer by the field team. Depending on the type of GPS unit being utilized, data can typically be downloaded either in a geospatial shapefile format, or in proprietary file formats that are typically specific to the manufacturer of the GPS instrument. While the proprietary file formats require special handling for further use, they typically allow the user to maintain records of the quality and accuracy of each geospatial feature collected. The type of file format downloaded from the GPS unit should be determined by the Data Manager on a project-specific basis.

Once the geospatial files have been downloaded from the GPS unit, one original copy of the files should be maintained in a secure location, and a second copy of the files should be provided to the GIS Lead. This GIS Lead then processes the geospatial data to prepare it for further project use, and incorporation into a target data repository. If a proprietary file format is provided to the GIS Lead, software provided by the GPS manufacturer is typically used to convert the data into a more universal file format. When performing the process, the GIS Lead can select what quality and accuracy data to include in the file. If the geospatial data is intended to be associated with other non-spatial data (for example, location information for environmental samples that will also generate analytical data), the GIS Lead formats the geospatial data so that it can quickly and accurately be linked to the corresponding non-spatial data elements. This formatting typically involves formatting geospatial point data for upload to the Project Scribe Database.

Once geospatial point data has been correctly formatted, it is provided to the DBA for upload to the Project Scribe Database. If the geospatial point data represent sampling locations, the data can be uploaded as “Sample Location” data. Once the data has been uploaded to the Project Scribe Database, the DBA runs QA/QC checks using Auditor. The Region 5 Emergency Response and Removal Program recommends that all Project Scribe Databases be published to Scribe.net. Publishing a Project Scribe Database pushes the database to the Environmental Response Team (ERT) servers and creates a safe backup. Publishing the database to Scribe.net also allows for the use of Scribe.net’s subscription services, which allow both web services and individual users to access published versions of the Project Scribe Database. The inclusion of geospatial data for all sampling data in the Project Scribe Database allows the Scribe.net subscription service to be used to generate spatially enabled SQL Server views, which can be displayed on the EPA GeoPlatform (see Section 5.0).

Geospatial data that is not intended to be included in the Project Scribe Database, or data that cannot be incorporated into the Project Scribe Database, should be formatted according to project-specific protocols, and stored in a project file geodatabase. The project file geodatabase should be stored in a secure location, and used for generating static maps and data analysis. The project file geodatabase can also be stored on the R5 ER Cloud environment, and used to include non-Scribe data into web maps on the EPA GeoPlatform. The data management workflow for handheld GPS data is presented below in **Figure 7**.

Surveying Equipment Data

Surveying equipment is typically used when accurate measurements of elevation are required for a project. Accurate elevation measurements are most frequently needed to determine the elevation of site features, such as monitoring wells, and to create topographic models of sites. In both scenarios, data collected consist of X, Y, and Z (elevation) point measurements, as well as quality and accuracy information related to survey data collection. Data can typically be downloaded directly from surveying equipment to a portable thumb drive in a text file format. The files should then be downloaded by the field team. An original, unaltered version of the files should be saved in a secure location. A second copy of the files should be provided to the GIS Lead for processing.

Once the GIS Lead receives the downloaded text files, the files are processed into the appropriate format depending on project-specific considerations. The files should be formatted for upload to the Project Scribe Database. The exact procedures for processing survey data for upload to Scribe depend on the contents of the survey data. If specific sample locations were surveyed, the GIS Lead should ensure that survey data is correlated with the correct sample location/ID so that it can be related to sample results and COC records in Scribe. If a topographical survey was completed, the GIS Lead should collaborate with the DBA to ensure that survey data is formatted appropriately for upload to Scribe, typically into a custom table designed to house topographical survey data. Key considerations for uploading topographical survey data to Scribe include generating unique point IDs for each survey point, and determining the database table primary key. Once the data files have been processed for upload to the Project Scribe Database, one version of the files should be saved in the project file geodatabase. A second version of the files should be sent to the DBA for upload to the Project Scribe Database.

Once the data have been uploaded to the Project Scribe Database, the DBA runs QA/QC checks using Auditor. The Region 5 Emergency Response and Removal Program recommends that all Project Scribe Databases be published to Scribe.net. Publishing a Project Scribe Database pushes the database to the Environmental Response Team (ERT) servers and creates a safe backup. Publishing the database to Scribe.net also allows for the use of the Scribe.net subscription services for both web services and individual users to access published versions of the Project Scribe Database. Geospatial data included in the Project Scribe Database allows the Scribe.net subscription service to be used to generate spatially enabled SQL Server views, which can be displayed on the EPA GeoPlatform (see Section 5.0). The data management workflow for surveying data is presented below in **Figure 7**.

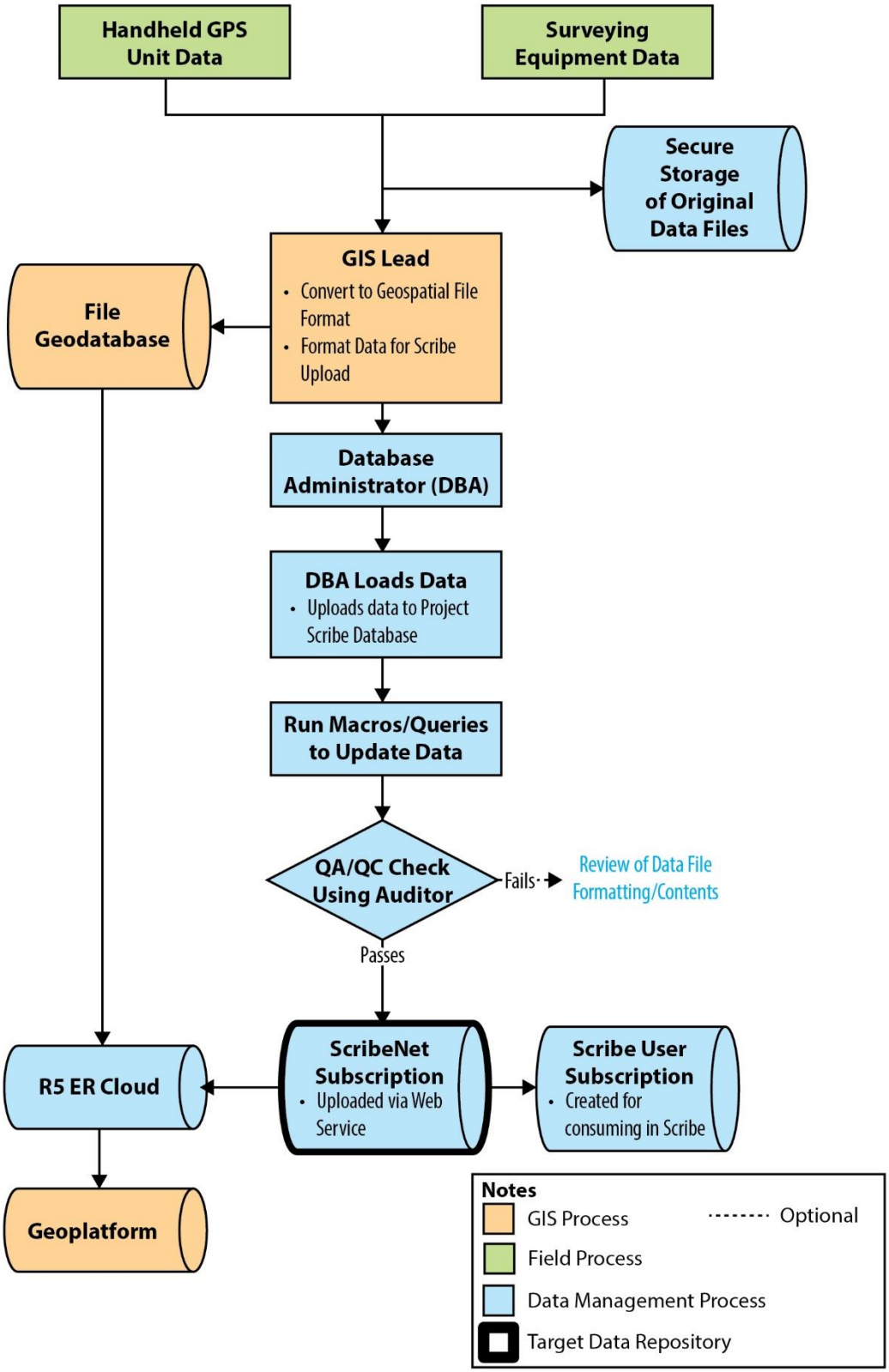


Figure 7: *Processed Geospatial Data Workflow Diagram*

3.7 MEDIA DATA WORKFLOW

The Media Data stream consists of non-tabular data such as photographs, videos, and portable document format (PDF) files. Media data are currently collected using a variety of methods. For example, photographs are collected using iPads, smartphones, and digital cameras. PDF files are often hand-written forms (such as access agreements) that are filled out in the field, then scanned into the digital record. Videos are often recorded using smartphones and digital cameras. Primary data workflows for media data include (1) photographs recorded using Survey123 or Collector and (2) manually managed media data.

Photographs recorded using the Survey123 or Collector mobile apps are automatically transferred to the GeoPlatform when forms are submitted. Photographs using Collector are embedded in the feature class dataset that is generated/updated when Collector forms are submitted. Photographs using Survey123 are hosted on the Survey123 web server, with links to the photos automatically populated in the feature class dataset created/updated when forms are submitted. The feature classes can be used to populate GeoPlatform web maps and web apps for data visualization, and photos can be downloaded from the GeoPlatform and Survey123 web server for long-term storage and backup.

Manually managed media data typically use the project response.EPA.gov website as a target data repository. Photographs, videos, PDF files, and other non-tabular data formats can be directly uploaded to response.EPA.gov websites for secure storage. Media data uploaded to response.EPA.gov websites are also typically stored on secure servers for routine access by the project team, allowing them to be incorporated into reports and other deliverables. When media data are saved to a secure local server, the data files should not be manipulated, and all metadata associated with the files should remain intact.

3.8 COST DATA WORKFLOW

When contractually required, the Cost Data stream reports site costs using the Removal Cost Management System (RCMS) program. RCMS is a cost accounting and reporting system used on removal sites to track costs and usage of personnel, equipment, subcontractors and purchases. Rate disks contain prepopulated Microsoft Access database tables utilized by RCMS that contain contract-specific costing information for the duration of the current Region 5 START contract, and include labor category rates and contract line item number (CLIN) equipment rates. Costs that are not included in the rate disk, such as laboratory analytical costs, are manually populated by the RCMS administrator. Information used for calculating daily costs, such as hours worked by employees, is manually populated by the RCMS administrator.

Reports (1900-55s) will be generated in accordance with contract requirements. The default report frequency for removal and response activities is weekly; report frequency may be adjusted based on project needs and may include daily, bi-weekly, or monthly reporting. The OSC will review and approve cost reports consistent with the roles and responsibilities of a Contracting Officer Representative (COR). The data management workflow for cost data is presented below in **Figure 8**.

For user guides on setting up and utilizing RCMS, visit https://response.epa.gov/rcmsdocuments.

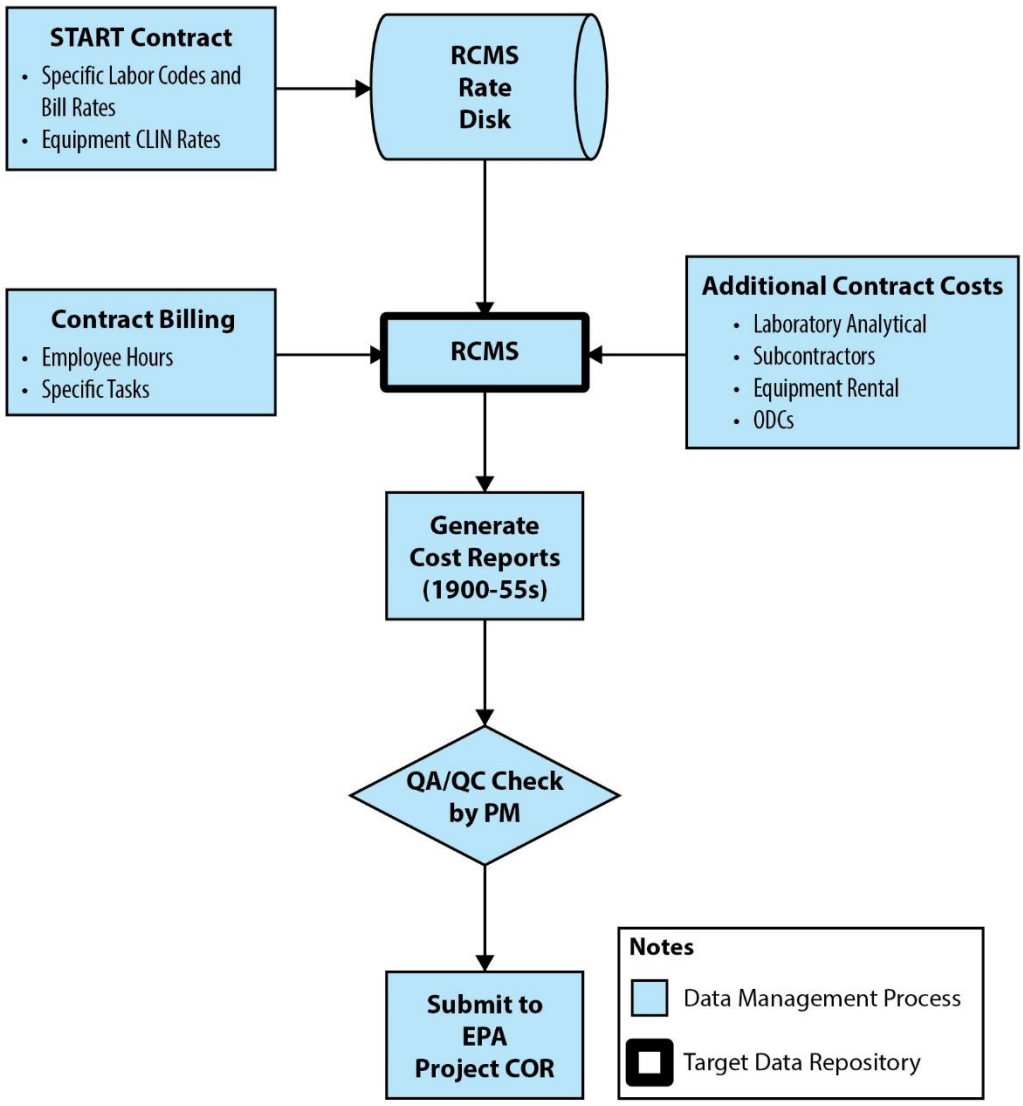


Figure 8: *Cost Data Workflow Diagram*

4.0 DATA STREAM SUMMARY

Data types, generally associated with the EPA Region 5 Emergency Response and Removal program, are presented below in **Table 2**. EPA Region 5 will apply data management methodologies that maximize data integrity.

Table 2: *Summary of Data Streams*

Data Stream	Data Type	Data Type Description	Collection Strategy	Processed Deliverable	Field Repository
Contacts	Contacts	Contact data for EPA, other federal agencies, state agencies, local responders, stakeholders	response.EPA.gov	OSC Phone Book (Regional)	response.EPA.gov
Deliverables	Documents	Documents related to the site	Various	Microsoft Office formats, PDF – All with associated metadata table which is also uploaded and maintained in response.EPA.gov	response.EPA.gov
	Photos	Photos or video related to the site	iPad, smartphone, digital camera	.jpeg, .tiff – All with associated metadata table which is also uploaded and maintained in response.EPA.gov	response.EPA.gov
Recon Data	Recon Documents and Photos	Documents and photos or videos related to a specific recon	Data collected by use of Survey123 and/or ArcGIS Collector App	Actual binaries are delivered to server, metadata delivered by Electronic Data Deliverable (EDD)	Geodatabase
	Recon Field Data	Other georeferenced data elements collected to support recon	Data collected by use of Survey123 and/or ArcGIS Collector App	EDD from Survey123	Geodatabase
Sampling and Monitoring	Sampling	Sample and location data	Data collected by use of Survey123 and/or ArcGIS Collector App	EDD from field collection device/Survey123	Scribe / Scribe.net
	Analytical	Laboratory or field results for samples	Lab EDD	Verified lab EDD	Scribe / Scribe.net
	Monitoring	Location and monitoring data	Data collected by use of field monitoring instruments, Survey123, and/or manual field entry	Comma Separated Value (.csv) or tabular file export from sampling/monitoring device, EDD from field collection device/ Survey123, and/or stream from VIPER	Scribe / Scribe.net / VIPER.net
Site Info	Site Info Data Service	Site information generated by EPA	response.EPA.gov Data Entry Screens	Final response.EPA.gov website for the project	response.EPA.gov
Spatial Data	Other Response Data	GIS services or layers from outside agencies or PRPs	N/A	Site-specific WMA	Geodatabase

Data Stream	Data Type	Data Type Description	Collection Strategy	Processed Deliverable	Field Repository
	Scribe Data Layers	Data layers generated from local Scribe databases or Scribe.net for use as REST Endpoint Services in the site-specific WMA, or for local mapping and reporting.	Scribe data entry with field collection device	Scribe data service	Scribe.net
	VIPER Data Layers	Data layers generated from VIPER.net for use as REST Endpoint Services in the site-specific WMA, or for reporting	VIPER Survey Controller	VIPER data service	VIPER.net
	GIS Operational Layers	Operational data layers provided as REST Endpoint Services, used in the site- specific WMA and Collector App as static layers	N/A	Site-specific WMA	Geodatabase
VIPER	VIPER Data Service	Location, time, and monitoring results from a VIPER-enabled field instrument	VIPER-enabled device	VIPER data service	VIPER.net

Notes:
EDD – Electronic data deliverable
ER – Emergency response
ERT – Environmental Response Team
FedRAMP – Federal Risk and Authorization Management Program
GIS – Geographic information system
N/A – Not applicable
PDF – Portable document format
PRP – Potentially responsible party
REST – Representational state transfer
OSC – On-scene coordinator
WMA – Web mapping application

5.0 DATA VISUALIZATION

The Region 5 Emergency Response and Removal program routinely uses data visualization technologies to support decision-making, and to aid in maintaining a common operating picture with numerous stakeholders. The most commonly used Region 5 data visualization tools focus on the use of geospatial data to create maps so that data can be viewed and evaluated in a spatial context. Region 5 routinely generates both static maps and interactive online mapping tools. Static maps are created using Esri GIS software and include Project File Geodatabases to populate maps with relevant data. Interactive online mapping tools require a more complex data management process, which is described in detail below.

5.1 EPA GEOPLATFORM AND R5 ER CLOUD

EPA GeoPlatform is a framework for coordinating geospatial activities, applications, and data across the agency. The GeoPlatform is built on the web service infrastructure of Esri's ArcGIS Online. Esri's ArcGIS online is a cloud-based environment that allows for the storage, creation, display, and management of web-based maps, applications, data, and geospatial information. For a more complete description of Esri's ArcGIS Online, refer to: https://www.esri.com/en-us/arcgis/products/arcgis-online/overview. The Region 5 Emergency Response and Removal program uses the GeoPlatform to enhance environmental decision-making by allowing users to create web maps, analyze and manage data, easily interact with field data, and rapidly collaborate with other GeoPlatform users. The GeoPlatform is a useful tool to provide near real-time data visualization and supports a common operating picture by allowing the EPA to control stakeholder access.

Several types of content can be stored and manipulated on GeoPlatform. While content can be directly hosted on the GeoPlatform, EPA has built out additional infrastructure for the secure hosting of data that can be served to the GeoPlatform via a variety of data streams. This secure hosting infrastructure is known as the Region 5 ER Cloud, and is administered by EPA ERT. Brief descriptions of the GeoPlatform content types most frequently used by the Region 5 Emergency Response and Removal program are provided below.

- **Web Map:** an interactive display of geographic information where users can customize the content and layers displayed within the map. To display a dynamic web map in an interactive environment, a Web Map must first be created. The Web Map provides a base web map where users can customize the content and layers available within the map. Web Maps also interact with the ArcGIS Collector app to allow field teams to edit/manage layers in the field, producing real-time updates to the Web Map.
- **Web App:** Allows users to further customize the interactive display of geographic information by tailoring the layout to the user's liking. Web Apps also allow users to add widgets to enhance the functionality of the map while also providing additional tools for data analysis. Users can completely customize the layout of how widgets and the base map are displayed, such as in the form of a Project Management Dashboard.
- **Feature Layer:** A grouping of similar geographic features. Feature layers can be created using a wide variety of tools and methods, but all function as a GIS layer that can be added to any Web Map or Web App. Feature layers hosted directly on the GeoPlatform or in Enterprise

geodatabases on the Region 5 ER Cloud can be manipulated by project members using GeoPlatform or mobile applications.

- **Map Image Layer:** A collection of map cartography based on vector data. Map image layers are typically hosted on the Region 5 ER Cloud for use on the GeoPlatform. Map image layers allow users to interact with the layer to observe relevant attributes and information, but does not allow users of GeoPlatform or mobile applications to modify the layer.
- **Form:** A published Survey123 Form that will have an associated hosted feature layer containing all data captured from the Survey123 Form.

The Region 5 ER Cloud allows for the consumption, management, and distribution of other data streams administered by EPA ERT, including Scribe.net and VIPER.net subscription services, and content hosted on response.EPA.gov web pages. These services, as well as other web services provided by EPA's response partners (PRPs, state agencies, FEMA, etc.), are consumed and viewed in web mapping applications (WMAs) and reports hosted on the Region 5 ER Cloud. Additional queries, reports, and web services are developed and served from the Region 5 ER Cloud environment, as directed by the OSC to support specific operational needs. A network diagram for the Region 5 ER Cloud is provided below in **Figure 9**, followed by an explanation of each key instance operating on the ER Cloud.

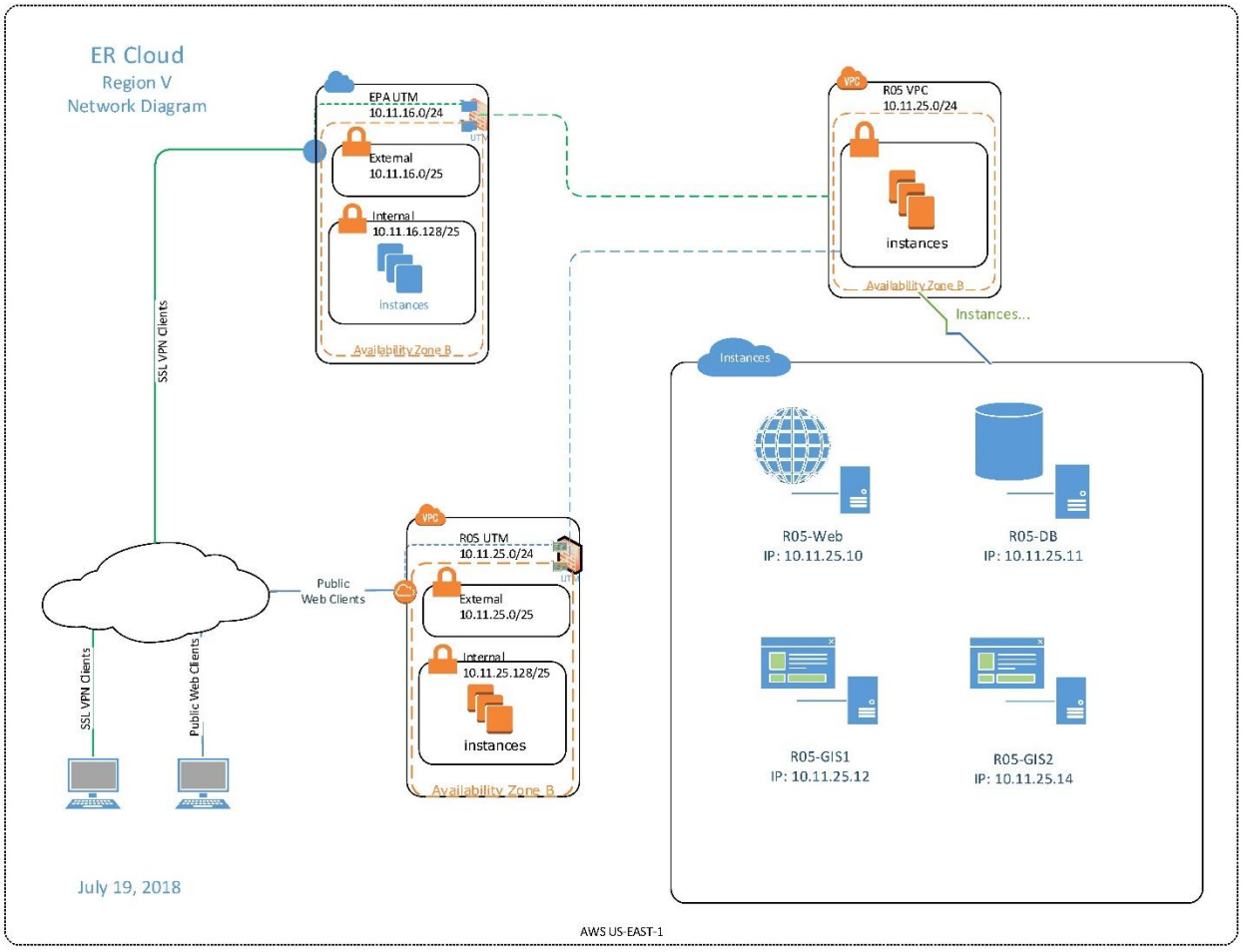


Figure 9: *Region 5 ER Cloud Network Diagram*

- **R05-Web:** Web server that houses web-based products developed for use on emergency response or removal/remedial sites.
- **R05-GIS1:** Server running Esri's ArcGIS for Server software. ArcGIS for Server powers the web-based GIS products developed and hosted in the ER Cloud System.
- **R05-GIS2:** Additional server running Esri's ArcGIS for Server software. ArcGIS for Server powers the web-based GIS products developed and hosted in the ER Cloud System.
- **R05-DB:** Houses the ArcGIS for Server application store, a set of files and folders containing data used in the web-based GIS products housed in the Region 5 ER Cloud system. This server also runs Microsoft SQL Server, which is used to house enterprise geodatabases; the Region 5 Scribe.net polling services; VIPER.net polling services; OData feeds from response.EPA.gov; and SQL Server Reporting Services (SSRS).

The exact data management process used to populate the GeoPlatform can vary on a project-specific basis, but general principles and workflows exist that are routinely implemented on Region 5 Emergency Response and Removal projects. Depending on the source of data to be displayed on the GeoPlatform the workflow will differ, but data will typically be hosted on the Region 5 ER Cloud while being displayed through the GeoPlatform.

If VIPER or Scribe datasets will be displayed on GeoPlatform, they are polled from VIPER.net or Scribe.net, and passed to a SQL Server database on the ER Cloud. From there, a DBA creates spatially enabled SQL Server views to be used by the GIS Lead to populate map documents. The data will then be published as a map service on the GIS server and the map service is consumed and displayed by the GeoPlatform.

Data collected through Survey123 or Collector apps are automatically hosted on the GeoPlatform as both forms and feature layers. The form and feature layers hosted on the GeoPlatform can only be edited by a user with the appropriate rights on the GeoPlatform, which can make it difficult for field teams to perform QC checks of their work. An alternative data workflow involves hosting Survey123 or Collector data in a SQL Server enterprise geodatabase. This data flow allows for the data hosted on the Region 5 ER Cloud to be edited through the GeoPlatform, while still being stored in the secure Region 5 ER Cloud environment. This workflow is recommended for Survey123 and Collector data that contains PII. The GIS Lead then uses the enterprise geodatabase to build map documents, which are displayed on the GeoPlatform as Map Services.

For other data types that cannot be captured by VIPER, Scribe, or mobile applications, the data will be consolidated in a file geodatabase, and then hosted on the ER Cloud. Examples of other data types include raster datasets and local parcel datasets. From there, the GIS Professional will use the geodatabase to create map documents, which will then be displayed on the GeoPlatform as a Map Service as previously described. These general workflows are depicted in **Figure 10** below.

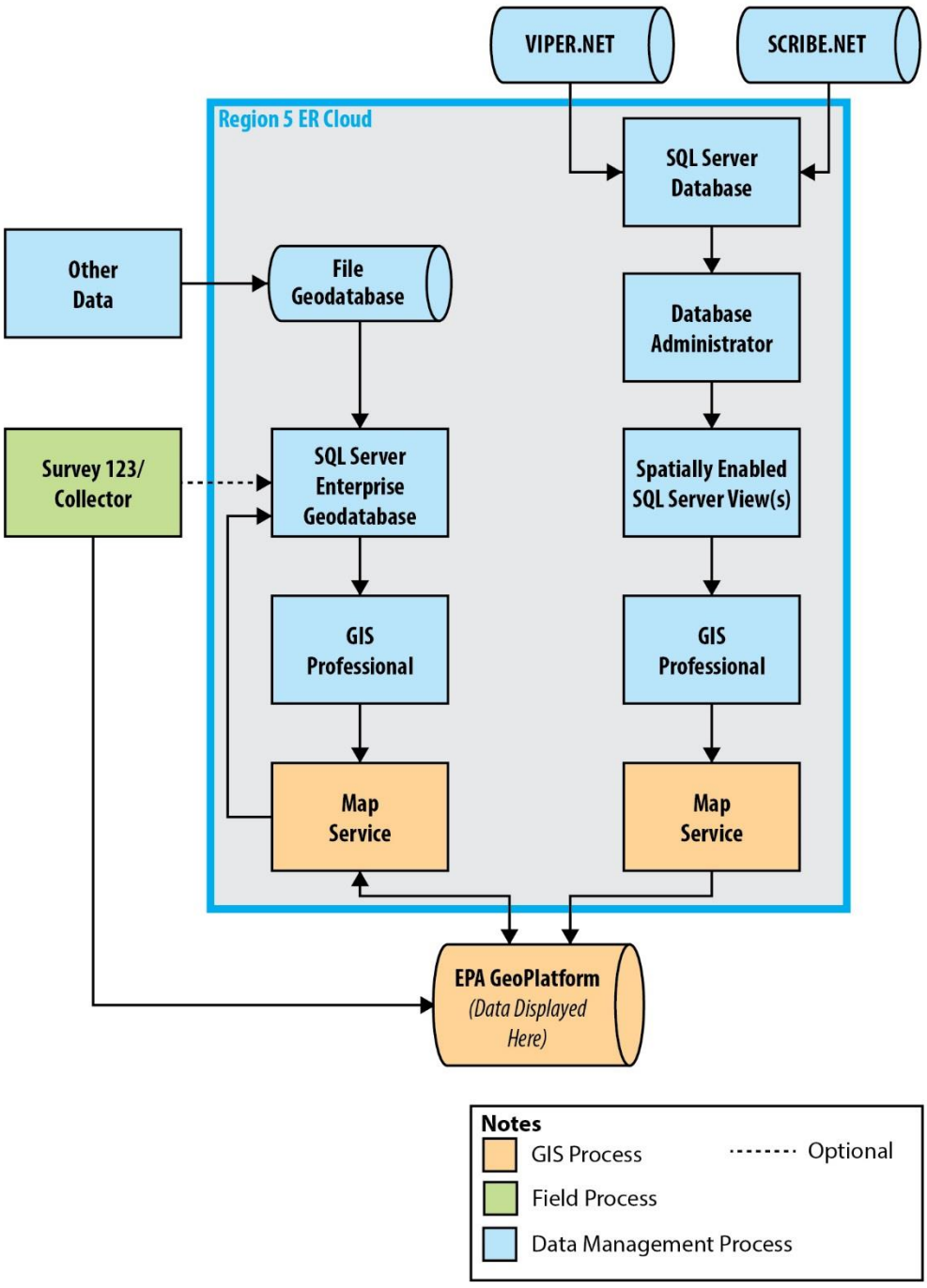


Figure 10: *GeoPlatform and ER Cloud Data Workflow Diagram*

5.2 SPECIAL CONSIDERATIONS

While the data management and visualization workflows described above entail the most commonly used approaches for displaying data on the GeoPlatform, several special considerations should be taken into account when determining a project's data visualization workflow. These special considerations are briefly described below.

- **Time-Critical Access to Data:** During emergency responses, there is often a need to streamline the means by which data is made available for review by key stakeholders. In this scenario, datasets can often be visualized more quickly by hosting them directly on the GeoPlatform, rather than on the ER Cloud. When rapid access to data is a high priority for a site, EPA data managers should be consulted to determine whether typical procedures should be bypassed to allow hosting of data directly on the GeoPlatform.
- **Data Containing Personally Identifiable Information (PII):** Data containing PII are routinely collected and managed during emergency response and removal activities. The security of PII is a top priority for all EPA projects. As a result, any datasets containing PII that will be visualized on the GeoPlatform should be hosted on the Region 5 ER Cloud to maximize data security.
- **Dataset File Size:** The Region 5 ER Cloud contains limited storage space, and is used as a data repository for multiple projects at any given time. As a result, it is important to consider the file size of datasets that will be hosted on the Region 5 ER Cloud. EPA data managers should be consulted to determine optimal hosting methods for large datasets, and data reduction methods should be used prior to hosting data on the Region 5 ER Cloud, where possible.

6.0 DATA SECURITY

Data collected by the Region 5 Emergency Response and Removal program requires secure storage and transmission. In particular, the Region 5 Emergency Response and Removal program often collects data containing 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 sites often includes names, ages, phone numbers, and addresses of both adults and minors. **Table 3** below details how data generated during Region 5 Emergency Response and Removal activities are protected, including data containing PII.

Table 3: *Data Security Measures*

Data Repository	Data Protection Measures
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.
Survey123 Web Server	Password-protected log-in to web server. Data housed on FedRAMP certified servers
Scribe.net Subscriptions	Password-protected subscription service with log-in credentials provided by ERT.
VIPER Survey Controller	Password-protected encrypted VPN connection to remote desktops with log-in credentials provided by ERT.
VIPER Deployment Manager	Password-protected web server with log-in credentials provided by ERT.
VIPER.net Subscriptions	Password-protected subscription service with log-in credentials provided by ERT.
START/EPA Personal Computers	Password-protected computers with automatic log out based on inactivity.
START Servers	Password-protected servers requiring office-based hardline connection or encrypted VPN connection.
R5 ER Cloud	Password-protected encrypted VPN connection to FedRAMP certified servers.
EPA GeoPlatform	Password-protected log-in. EPA GeoPlatform is hosted on FedRAMP certified servers.

Notes:
ER – Emergency response
ERT – Environmental Response Team
FedRAMP – Federal Risk and Authorization Management Program
R5 –EPA Region 5
START – Superfund Technical Assessment and Response Team
VPN – Virtual proxy network

7.0 DATA VERIFICATION

The Region 5 Emergency Response and Removal program's data flows have been designed to maximize both data quality and integrity. As a result, data streams incorporate the capture and preservation of original unaltered data, as well as thorough QC reviews to create a final dataset that has been reviewed to ensure its accuracy. Multiple QC checks for data verification are included in each major data workflow. A summary of these QC checks is provided in **Table 4** below.

Table 4: *Data Verification Summary*

Data Workflow	Data Integrity Assurance	QC Steps
Real-Time Continuous Data	Original datasets uploaded to VIPER.net cloud server in unaltered state, and can be accessed via VIPER Deployment web server at any point. Original unaltered equipment datalogging files downloaded and used for comparison.	**Field QC** 1. Field team reviews monitoring equipment data in real-time using Survey Controller for data transmitted via VIPER, and ProRAE Guardian software for data transmitted via ProRAE Guardian. **Post-Field QC** 1. Field team performs QC review of CSV files downloaded from VIPER Deployment Manager site or local computer running ProRAE Guardian in comparison with raw datalogging files from equipment. 1.1. If no changes to files downloaded from VIPER Deployment Manager, DBA runs SQL scripts to download data from VIPER.net cloud server and format correctly for inclusion into Project Scribe Database. If no changes to files saved to the local ProRAE Guardian computer, then files are sent to the Data Manager for formatting and reduction, and then uploaded to the Project Scribe Database 1.2. If discrepancies between unaltered data that was transmitted via telemetry and equipment raw data files, the equipment raw data files will be used. DBA runs automated upload scripts to verify data are formatted correctly for inclusion in Project Scribe Database. 2. DBA runs Auditor queries prior to publishing database to Scribe.net to verify correct formatting and use of valid values, as well as compliance with additional project specific data rules.
Real-Time Discrete Data	Original datasets uploaded to Survey123 webserver preserved on webserver in unaltered state; can be accessed at any point	**Field QC** 1. Field team reviews contents of Survey123/Collector forms prior to submitting 2. Field team performs QC review of CSV files downloaded from Survey123 web server prior to uploading to Scribe **Post-Field QC** 3. DBA runs automated upload scripts to verify data are formatted correctly for inclusion in Project Scribe Database 4. DBA runs Auditor queries prior to publishing database to Scribe.net to verify correct formatting and use of valid values, as well as compliance with additional project-specific data rules 5. GIS Lead reviews location of geospatial data to verify accuracy

Data Workflow	Data Integrity Assurance	QC Steps
Laboratory Data	COC records, preliminary data, and final validated data all included in Project Scribe Database. PDF laboratory reports with Level IV QC data maintained on secure server	**Post-Field QC** 1. Qualified data reviewer performs data validation based on Level IV data packages 2. Point location data for samples reviewed by GIS Lead to ensure accuracy 3. DBA runs automated upload scripts to verify data are formatted correctly for inclusion in Project Scribe Database 4. DBA runs Auditor queries prior to publishing database to Scribe.net to verify correct formatting and use of valid values, as well as compliance with additional project-specific data rules
Processed Quantitative Data	Original unaltered files maintained on secure server	**Post-Field QC** 1. Data Manager reviews content and format of data files 2. Automated data processing scripts eliminate human error and transcription error. Scripts designed to check for valid values and flag data files that contain any error records for more detailed review 3. DBA runs automated upload scripts to verify data are formatted correctly for inclusion in Project Scribe Database 4. DBA runs Auditor queries prior to publishing database to Scribe.net to verify correct formatting and use of valid values, as well as compliance with additional project-specific data rules
Processed Geospatial Data	Original unaltered files maintained on secure server	**Post-Field QC** 1. GIS Lead reviews format and content of data files 2. GIS Lead reviews location of geospatial data to verify accuracy 3. DBA runs automated upload scripts to verify geospatial point data are formatted correctly for inclusion in Project Scribe Database 4. DBA runs Auditor queries prior to publishing database to Scribe.net to verify correct formatting and use of valid values, as well as compliance with additional project-specific data rules
Media Data	Original unaltered files maintained on secure server with all metadata intact	**Post-Field QC** 1. Field team reviews photos uploaded to response.EPA.gov website to ensure captions and descriptions are accurate.
Cost Data	Original unaltered rate disk maintained on secure server Supplemental costing information maintained on secure server	**Post-Field QC** 1. Project manager produces 1900-55 report based on employee hours worked, received invoices, and other cost data. 2. Project manager reviews costing report and submits to EPA COR. 3. EPA COR reviews 1900-55 report. If any discrepancies, Project Manager makes cost adjustments on subsequent 1900-55 report that is delivered to EPA COR.

Notes:
COC – Chain of custody
COR – Contracting officer's representative
DBA – Database administrator
GIS – Geographic information system
PDF – Portable document format
QC – Quality control

8.0 DATA BEST MANAGEMENT PRACTICES

This section provides general guidance for each step in a project lifecycle and describes management methods for each data type. These items can be tailored for project-specific requirements. All changes should be reviewed by the project-specific core data management team to ensure consistency, and applicable changes should be documented in a site-specific DMP.

8.1 DATA PLANNING/PROJECT KICKOFF

Data planning should occur during the initial project kickoff meeting. Data discussions should occur prior to development of the Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) and before any data collection begins. Effective planning will lead to data collection consistent with the entire project scope.

Suggested topics for the data collection strategy discussion include:

- Data streams (geospatial, sampling data, photos, documents, etc.)
- Project-specific data elements and valid values
- Project-specific auditor queries
- Data collection tools and data flow
- Required data deliverables, including timeline and frequency.

After the data collection strategy has been determined, the project manager should immediately contact designated parties for all specialty equipment and data management needs. The Region 5 Emergency Response and Removal program is currently creating a project-specific data management plan template that will be used to automate this notification process, allowing data managers and specialized equipment managers to be immediately and automatically notified when their services will be needed.

8.2 DIGITAL DATA CAPTURE

Digital data capture, using Survey123 and Collector mobile apps, is the recommended process for emergency response and removal projects in Region 5. There are numerous benefits to using digital data capture methods, including:

- Standardized format for data collection and data outputs.
- Implementation of valid values, required elements, and other data quality measures from the initiation of data collection through storage in a Scribe database and visualization on the GeoPlatform. Form users can be required to fill out particular fields, provided with auto-formatted and auto-populated fields, and provided pre-populated pick lists. This standardization of data elements results in a “clean” database that can easily be queried and manipulated when necessary.
- Near real-time tracking of field data collection activities via secure synching of mobile apps with the GeoPlatform.

- Avoidance of intensive data handling, reformatting, and transcription limits opportunities for user error. Forms that are pre-designed for direct upload to Scribe minimize the effort needed to transition data from initial capture to permanent storage.

The Region 5 Emergency Response and Removal program is currently developing a standard library of Survey123 forms to include the most frequent types of data collection. Once this library of forms is completed, a new Region 5 Scribe project template will be created, allowing direct upload of all data captured via the forms to a Scribe database.

8.3 CONTACTS

A listing of all site contacts will be maintained by use of response.EPA.gov websites. The OSC will determine access privileges for each site contact. Site contacts will be updated as new contacts are added and will be revised when errors are identified.

8.4 DELIVERABLES

All documents developed or otherwise obtained to support field operations will be managed by use of response.EPA.gov websites. Documents may include, but are not limited to, sampling and analysis plans, health and safety plans, reports, and access agreements. Documents and associated metadata will be uploaded to the response.EPA.gov site. The OSC, in consultation with EPA Region 5 Superfund management and the Office of Public Affairs, will determine whether documents will be classified as public or private. In addition, data collected manually in a physical format (written field data sheets, field logbooks, etc.) should be scanned into PDF format and included in site deliverables.

8.5 SAMPLING DATA

Sample and associated locational data will be collected via Scribe-compatible Collector and Survey123 applications on a cellular-enabled iPad or smartphone, or an iPad connected to an external GPS device. All sampling and locational information will be entered into the appropriate form consistent with the site-specific data elements and valid values identified during project planning. In the absence of site-specific data elements or valid values, Region 5 defaults will be utilized.

If mobile data collection is not possible (e.g., greater GPS accuracy is required or electronic data capture is not available), alternate data collection strategies closely aligned with this DMP will be developed. Alternate strategies may include:

- Collecting sample and locational data by use of a GPS data dictionary with Scribe-consistent fields.
- Collecting sample and locational data by manual entries in a site logbook or on field sheets, ensuring all Scribe-required fields are documented.
- Manually entering data into Scribe.

Following data collection, field data will be processed to generate a Scribe-compatible file, which will be imported into a Scribe database. The resulting Scribe database will be reviewed by field personnel, and

errors will be corrected as required. The Data Manager or the DBA will then publish the Scribe database to Scribe.net.

8.6 MONITORING DATA

Whenever possible, monitoring equipment will utilize the VIPER telemetry system to transmit data wirelessly to a secure VIPER.net deployment for analysis and archiving. When using VIPER, the project team should regularly monitor data on the project's VIPER Deployment Manager. Any anomalies in the data observed on the Deployment Manager should immediately be investigated. The project team should also routinely download data directly from all instruments capable of performing datalogging. One copy of this direct download dataset should be maintained unaltered in the project file to act as a secure backup, and to ensure data integrity. A second copy of this direct download dataset should be used to verify the accuracy of data transmitted via VIPER. A wide range of techniques can be employed to verify data transmitted via VIPER, including:

- Spot-checks of individual monitoring values.
- Calculation and comparison of key summary statistics, such as time weighted averages, means, maximums, and minimums. When calculating summary statistics, the use of automated scripts is recommended to avoid user error.

Data transmitted via VIPER should be uploaded to Scribe and published to Scribe.net by the DBA. Depending on the size of the monitoring dataset, data reduction may be required. To reduce VIPER data, the DBA should poll the VIPER.net server to push data into a SQL Server database, and use automated scripts to perform data reduction.

If the ProRAE Guardian telemetry system is used to transmit data, the system should be linked to the VIPER telemetry system via port forwarding whenever possible. When this configuration is used, all data transmitted via the ProRAE Guardian system is captured on the VIPER.net server, which allows the data to be stored securely and accessed via subscriptions services for incorporation into Scribe, and eventual publication to Scribe.net. When the ProRAE Guardian system cannot be linked to the VIPER system, all data should be logged to the local computer running ProRAE Guardian. Logged data files should be sent to the Data Manager for reformatting and data reduction (if necessary). The formatted data files should then be uploaded to the Project Scribe Database, and published to Scribe.net.

When the VIPER telemetry system is not used to transmit data, data will be downloaded directly from monitoring instruments at the completion of each monitoring run. Original unaltered data files will be maintained on a secure server for the duration of the project. A second version of data files will be used for data processing and data reduction (if necessary). Automated scripts should be used to process monitoring data for upload to Scribe, and also for data reduction (as needed). Scripts should be created by an experienced developer with a strong understanding of monitoring instruments, data formats, and Scribe. This allows for the development of scripts that check for records of instrument error in data files, automatically flag files with anomalous data for more detailed review, and optimize data formatting for inclusion in Scribe. An experienced developer can also help guide data reduction approaches based on project-specific factors (for example, whether air monitoring is being performed for worker or community protection). Data downloaded directly from monitoring instruments should be uploaded to Scribe and published to Scribe.net by the DBA.

8.7 SPATIAL DATA

The preferred strategy for spatial data management is to gather a list of spatial data requirements and data collection methods during planning meetings. Potential spatial data may include:

- External GIS data layers / map services
- Points, lines, and areas (collected via GIS or other means)
- VIPER layers
- Scribe layers
- Photos posted at response.EPA.gov

The site-specific core data management team is also responsible for determining whether the project requires a site-specific WMA. If the project requires a site-specific WMA, the application will be created and delivered via the Region 5 GIS environment, with data used for the site-specific WMA residing on the Region 5 GIS environment, as described in Section 5.0. This WMA will be associated with a project-specific geodatabase (either file and/or enterprise) and project-specific ArcGIS map documents. If the project requires data for reporting only, spatial data and/or reporting data will be managed in accordance with Region 5 best management practices.

The GIS Lead will coordinate collection of spatial data with the site Data Manager and OSC, following guidelines established in the planning meeting, or as specified in the Regional DMP. Data collected in the field will be transferred to various ERT systems (e.g., Scribe, VIPER, response.EPA.gov), loaded into a Microsoft SQL Server database on the Region 5 ER Cloud, and/or hosted on the EPA GeoPlatform (Region 5 GIS environment). These data will then be displayed on the site-specific WMA.

The GIS Lead will coordinate with the OSC to determine whether to embed the site-specific WMA into the response.EPA.gov website for the project, and, if embedded, to decide the level of access. This process involves determining whether users viewing the site-specific WMA need only login via response.EPA.gov, or if additional login via the GeoPlatform is required. Finally, spatial data should be collected and managed through the Survey123 and Collector mobile apps, which allow EPA to capture and edit spatial data viewable within the site-specific WMA. Site sketches can be used as temporary data or permanently added to the project-specific geodatabase.

For cases where data are not housed on the Region 5 GIS environment, the GIS Lead will compile and submit data following approved contractual procedures to EPA Region 5 for archiving. The spatial data will include exports of Microsoft SQL Server-based data, such as VIPER and/or Scribe files. These exports will be included in the project-specific geodatabase. If the project does not include a WMA, the project file geodatabase will be zipped and delivered to EPA Region 5.

8.8 LABORATORY DATA

All laboratory procurement will include a request for a Scribe-compatible EDD. EDD templates may be provided to a laboratory contact to ensure production of high-quality EDDs.

Upon receipt, EDDs will be reviewed by appropriate personnel to ensure acceptable data have been provided by the laboratory. Following the QC check, the EDD will be imported into Scribe and published to Scribe.net. The Scribe dataset will be updated as necessary if data are validated. The Scribe fields labeled "Reportable Result," "QC Type," or "Remarks" may be available to differentiate between validated and non-validated data.

The Data Manager, in coordination with the site-specific core data management team, will distribute appropriate auditor queries. All data loaded to a Scribe database must pass these auditor queries during the upload process. The sampling team will review all data loaded to Scribe and correct errors as required.

8.9 COSTS

When contractually required, site costs will be reported using the RCMS program. Reports (1900-55s) will be generated in accordance with contract requirements. The default report frequency for removal and response activities is weekly; report frequency may be adjusted based on project needs and may include daily, bi-weekly, or monthly reporting. The OSC will review and approve cost reports consistent with the roles and responsibilities of a Contracting Officer Representative (COR).

8.10 MEDIA

Photos and videos obtained to support field operations generate files and metadata that must be managed. During photo capture, the ideal procedure for managing metadata involves use of the Collector and/or Survey123 apps. If the apps are not available, metadata may be entered manually in a field logbook or spreadsheet.

Images will be uploaded to the response.EPA.gov website. Photo metadata are captured via the Collector App, Survey123, or manually. The metadata information will be entered for each photo on response.EPA.gov. The OSC, in consultation with Region 5 Superfund management and the Office of Public Affairs, will determine whether photos will be classified as public or private, and will ensure all images considered as Superfund records are maintained in the Site File on the Superfund Enterprise Management System (SEMS).

8.11 HISTORICAL DOCUMENTATION

Historical documentation typically takes the form of historical reports, notes, and maps in PDF or physical format. Physical historical documentation should be scanned to PDF format. PDF files containing historical documentation should be uploaded to the response.EPA.gov website. The OSC, in consultation with Region 5 Superfund management and the Office of Public Affairs, will determine whether historical documentation will be classified as public or private, and will ensure all materials considered as Superfund records are maintained in the Site File on the Superfund Enterprise Management System (SEMS).

8.12 WEBEOC

WebEOC® is a web-based crisis management system designed to support the Incident Command System (ICS) for response management, in addition to providing a unique toolset for supporting daily operations in Regional Response Centers and the EPA headquarters (HQ) Emergency Operations Center (EOC). Implementation of the WebEOC® system is supported by ERT.

The Regional Emergency Operations Center (REOC) will receive calls through the National Response Center (NRC) or other sources. The phone duty officer will follow internal Region 5 procedures when receiving incident notifications from external sources and information regarding EPA response to these notifications. The phone duty officer will determine which notifications should be entered into WebEOC®, and when it is appropriate to close a notification.

9.0 USEFUL RESOURCES

Topic	Web Address
Scribe Database Management	https://response.epa.gov/site/site_profile.aspx?site_id=ScribeGIS
VIPER Wireless Monitoring System	https://response.epa.gov/site/site_profile.aspx?site_id=5033
VIPER Deployment Manager	https://viper.ert.org/
RCMS Cost System	https://response.epa.gov/rcmsdocuments
Esri ArcGIS Online System Overview	https://www.esri.com/en-us/arcgis/products/arcgis-online/overview
Region 5 Data Team	https://response.epa.gov/site/site_profile.aspx?site_id=11370

Appendix A:
Data Management Standard Operating Guides

SOG 001	Survey123 Data Entry and Data Download
SOG 002	Collector for ArcGIS
SOG 003	Scribe Field Database
SOG 004	Scribe Database Management
SOG 005	Dashboard/GeoPlatform

SOG APPROVAL FORM

REGION 5 START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING GUIDE

Survey123 Data Entry and Data Download

SOG NO. 001

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

	July 31, 2018
Quality Assurance Approved	Date

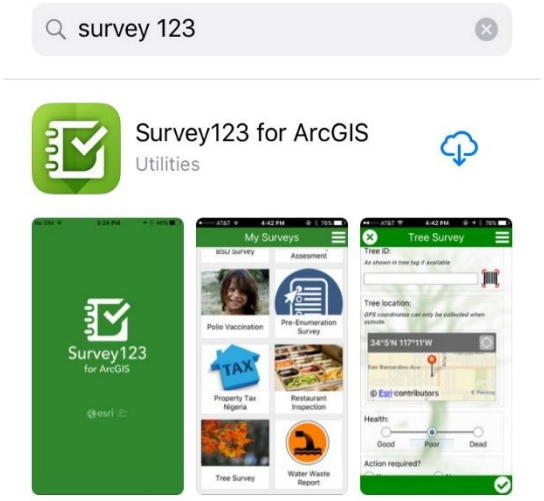
CONTENTS

This Standard Operating Guide (SOG) is intended to provide the necessary steps for entering data into the Survey123 app using a mobile device capable of supporting the Survey123 App. The Survey123 app allow users to record field data digitally. From this app, data can be uploaded to an on-line platform, downloaded, and imported into a database to track sample data and create chain of custody forms. The types of field data that can be logged in the Survey123 app include indoor dust samples, air monitoring instrumentations, radiation data, X-ray fluorescence (XRF) screenings, low-flow air samples, high volume ambient air samples, water samples, and soil samples. Additional types of field data that can be logged in the Survey123 app include pre-elevation surveys and excavation depth surveys. It is assumed that users of this SOG have read and understand the EPA Region 5 Data Management Plan, and are familiar with data management tools typically used in Region 5, such as Scribe and the EPA GeoPlatform. Images that are included in this SOG have been placed after a specific set of instructions, unless otherwise noted in the text. Red boxes and/or red arrows on the images are used to specify what portion of the image a user should be focusing on.

1.0 Downloading Survey123 App

The first step to using the Survey123 app on your device is downloading it from the device's App Store. For this SOG, the Apple Store is used as the example.

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



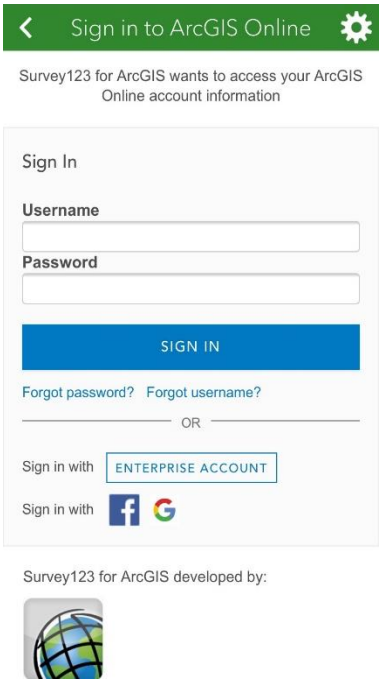
2. Click "Get" on Survey123 for ArcGIS, and the Survey123 app will be downloaded to your device.

2.0 Signing In to Survey123

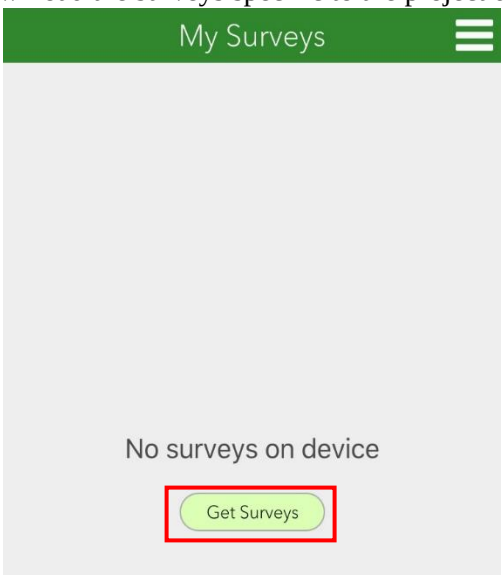
The user must first log-in to the system to access data entry forms in the Survey123 app.

1. Open the Survey123 app; There are two ways for signing into the Survey123 app.
   1.1. Select the "Get Surveys" button in the center of the screen. The user will be redirected to the sign in screen, where log-in information will be requested.
   1.2. Select the ☰ symbol in the right corner, and select the Sign In tab.
2. Provide the necessary log-in credentials. The sign in screen will resemble the image below. START personnel login credentials typically consist of the START personnel's Esri EPA account. In some instances, a site-specific account is created and utilized. If the START user does not have an account, contact the START Data Manager.

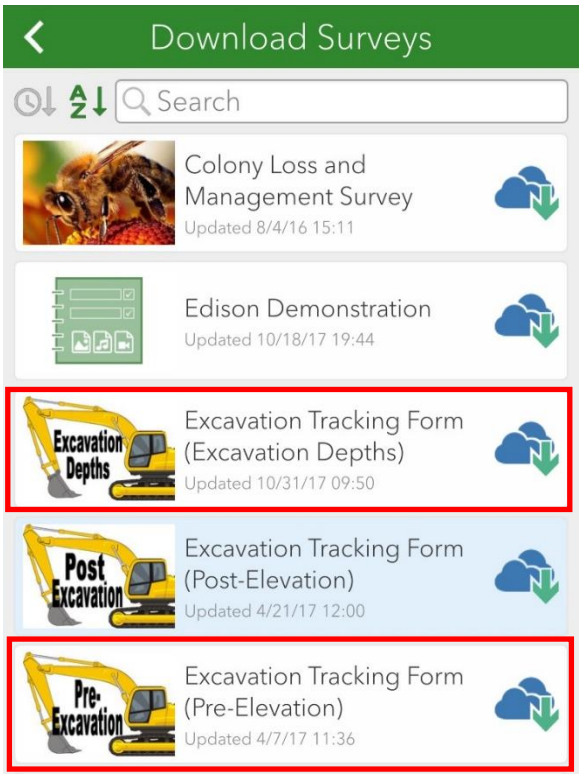
3. Click "Sign In."



4. Once the user has successfully logged in, the user will be redirected back to the My Surveys screen.
5. Click on Get Surveys, and download the surveys specific to the project data collection needs.



6. Forms can be found by scrolling through the list, or by searching for the form name in the search bar at the top of the screen. In this example, the forms with red borders were selected for download.
7. Download the forms by selecting the button to the right of the form name. A separate dialogue box appears showing the form download progress. Forms can only be downloaded one at a time, and provide a confirmation dialogue box pop up when the form has been downloaded.

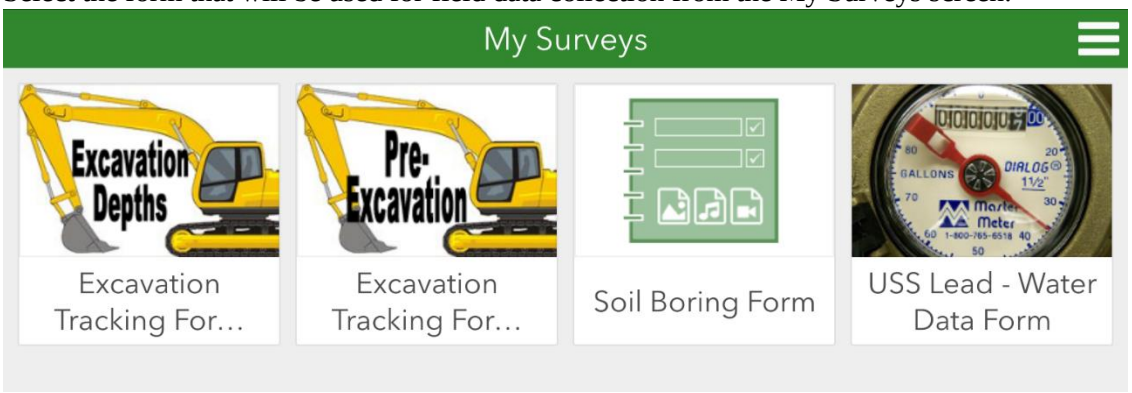


8. After the forms are downloaded, click the arrow in the upper left corner to return back to the My Surveys screen. The forms are then available for field data entry. Survey123 works collaboratively with the Collector App. Refer to SOG 002: Collector for ArcGIS for how to download and set up the Collector App.

3.0 Completing and Submitting Completed Survey123 Forms

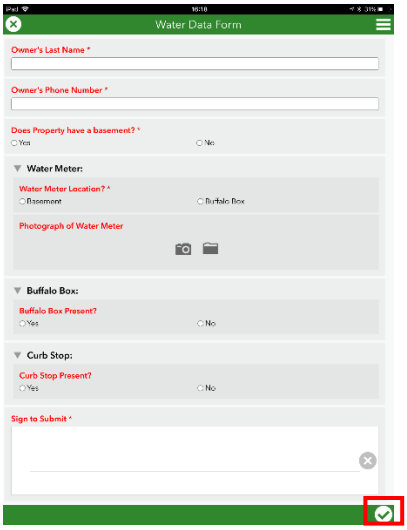
After the form is downloaded, it is ready for field data entry.

1. Select the form that will be used for field data collection from the My Surveys screen.



2. Input all required data. Required data is denoted with an asterisk.
3. After data is inputted into the form, review the form for completeness and accuracy.
4. Once the user has verified that all data has been entered accurately, the form can be submitted to the Survey123 web server. To submit the form, in the lower right corner, select the check mark

as shown in the image below. Some forms require a signature to be completed before the checkmark can be selected.



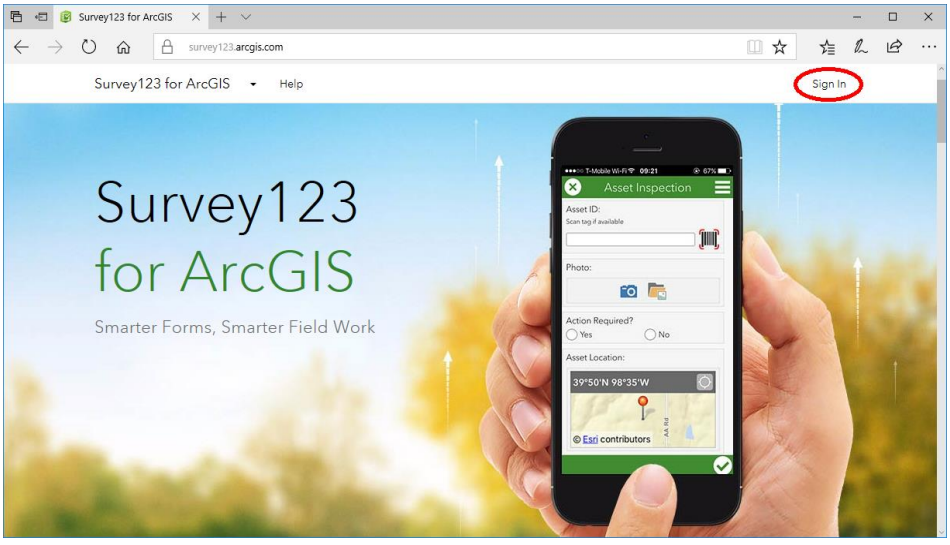
5. After the form is submitted, the form is sent to the Survey123 web server and displayed on the layers and web mapping applications that it is connected to, including being directly uploaded to the EPA GeoPlatform.

4.0 Downloading Data from Survey123 for ArcGIS

4.1 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.

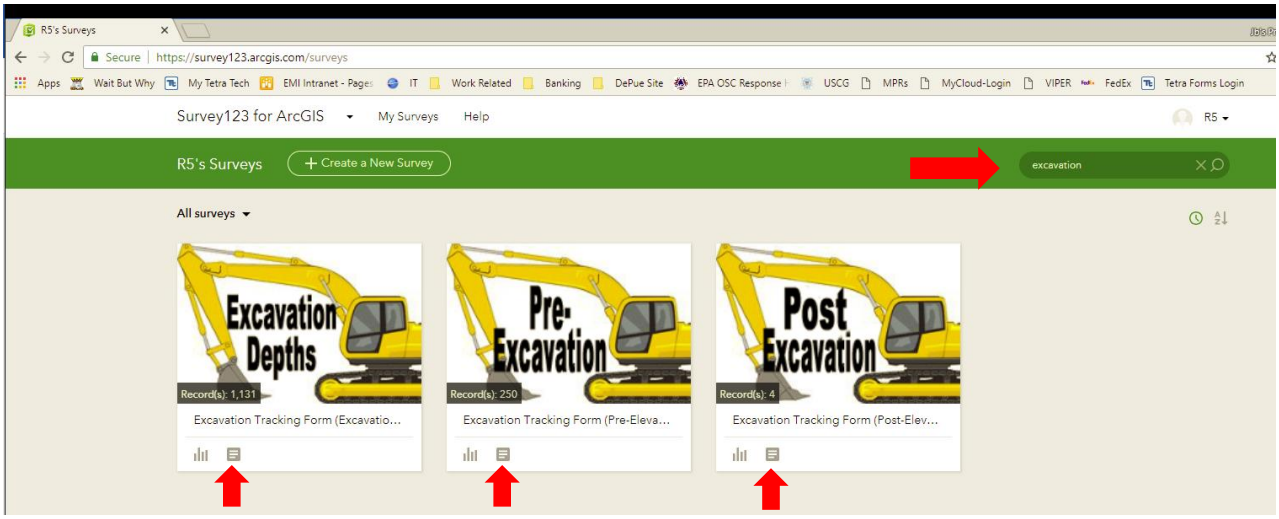


2. Click the "Sign In" button in the upper right corner of the screen.
   2.1. Provide the necessary log-in credentials.
   2.2. Click "Sign In."

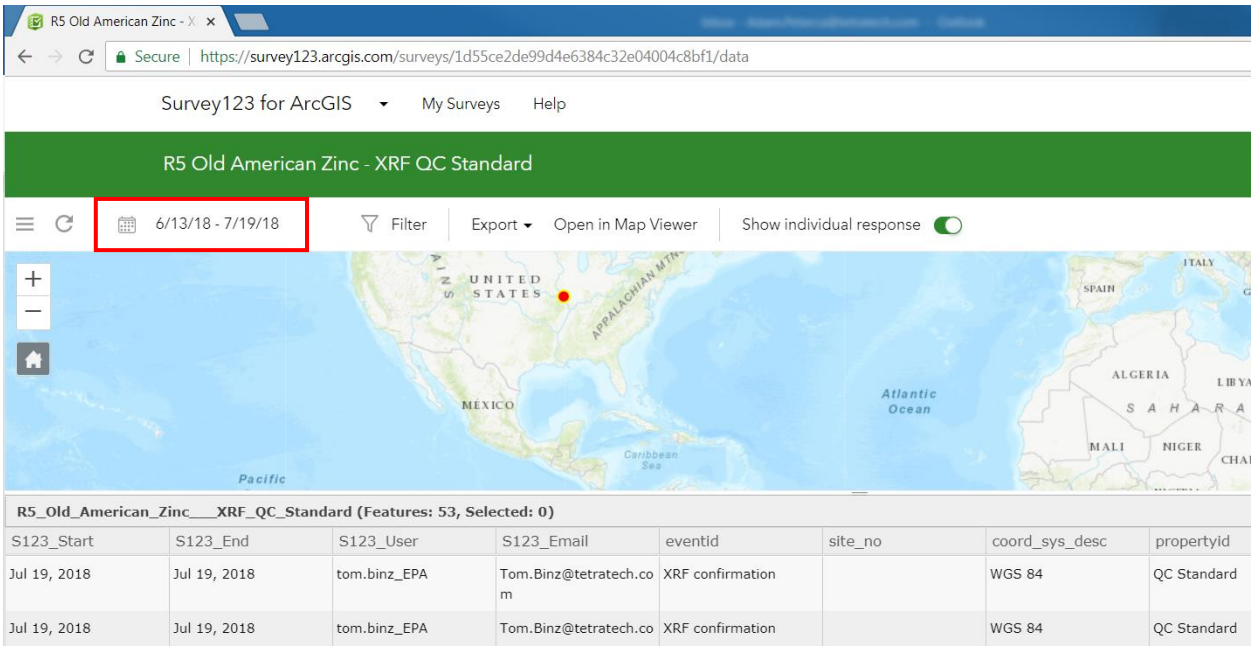
4.2 Exporting to CSV

To be imported into a Scribe database, Survey123 data must first be downloaded from the Survey123 web server in the form of a CSV file.

1. Surveys are listed based on how recently data has been uploaded. Scroll to the target data set based on the Survey Name.
   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.

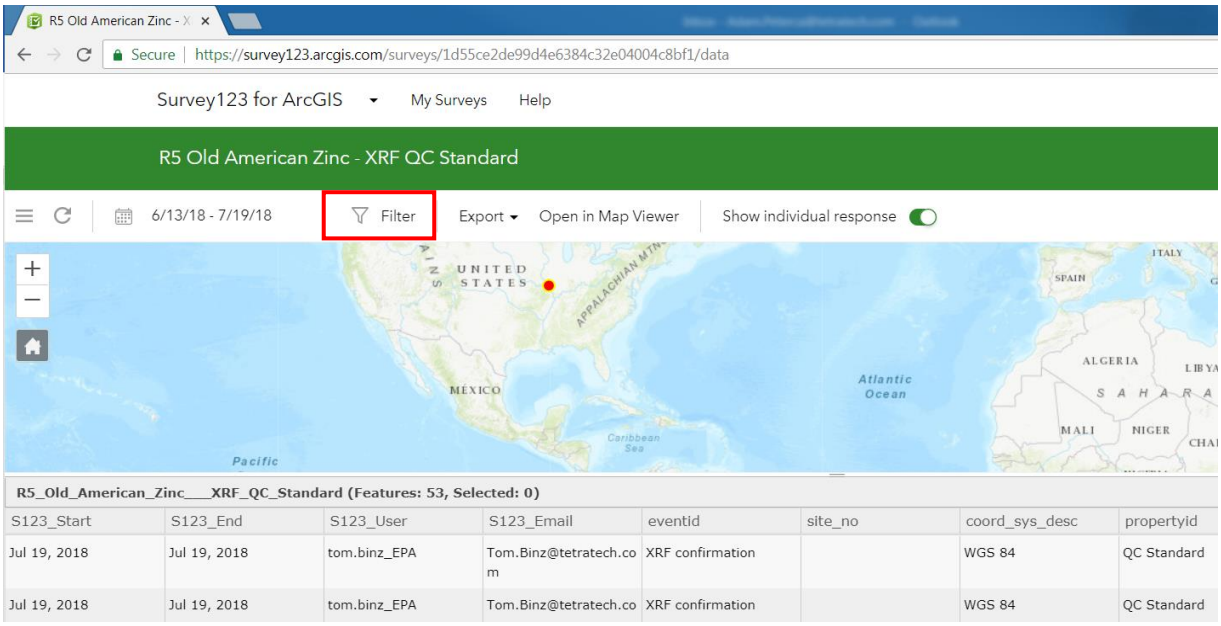


3. From this page, you can also filter records.
   3.1. To filter the records by date, click on the date range box at the top of the page. The default date range will include all records.
      3.1.1. Specify a start and end date by typing them in the appropriate boxes, or by selecting them from the calendar.



S123_Start	S123_End	S123_User	S123_Email	eventid	site_no	coord_sys_desc	propertyid
Jul 19, 2018	Jul 19, 2018	tom.binz_EPA	Tom.Binz@tetratech.com	XRF confirmation		WGS 84	QC Standard
Jul 19, 2018	Jul 19, 2018	tom.binz_EPA	Tom.Binz@tetratech.co	XRF confirmation		WGS 84	QC Standard

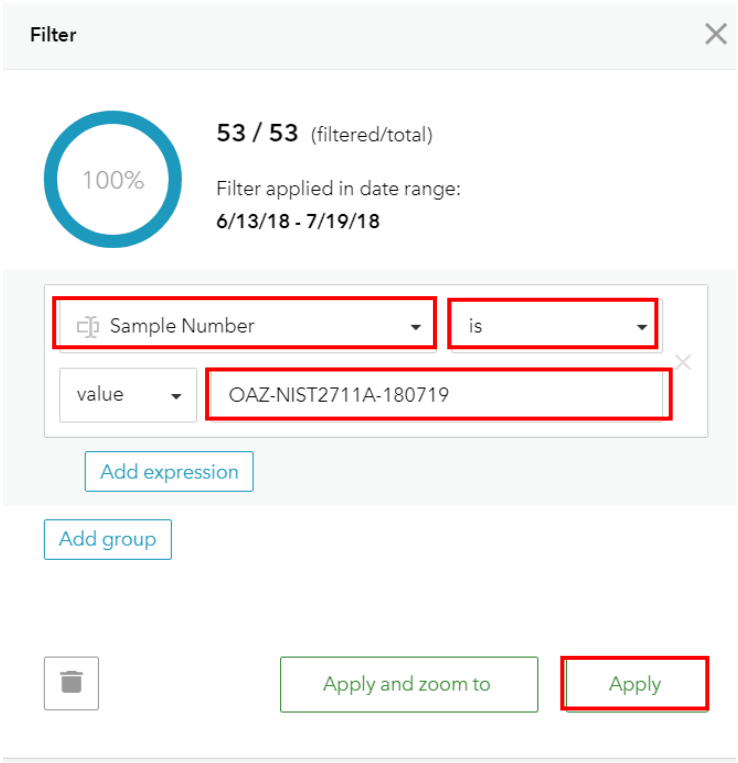
3.2. To filter the records by another attribute, click on the filter box at the top of the page. This will launch a filtering pop-up box.



S123_Start	S123_End	S123_User	S123_Email	eventid	site_no	coord_sys_desc	propertyid
Jul 19, 2018	Jul 19, 2018	tom.binz_EPA	Tom.Binz@tetratech.com	XRF confirmation		WGS 84	QC Standard
Jul 19, 2018	Jul 19, 2018	tom.binz_EPA	Tom.Binz@tetratech.co	XRF confirmation		WGS 84	QC Standard

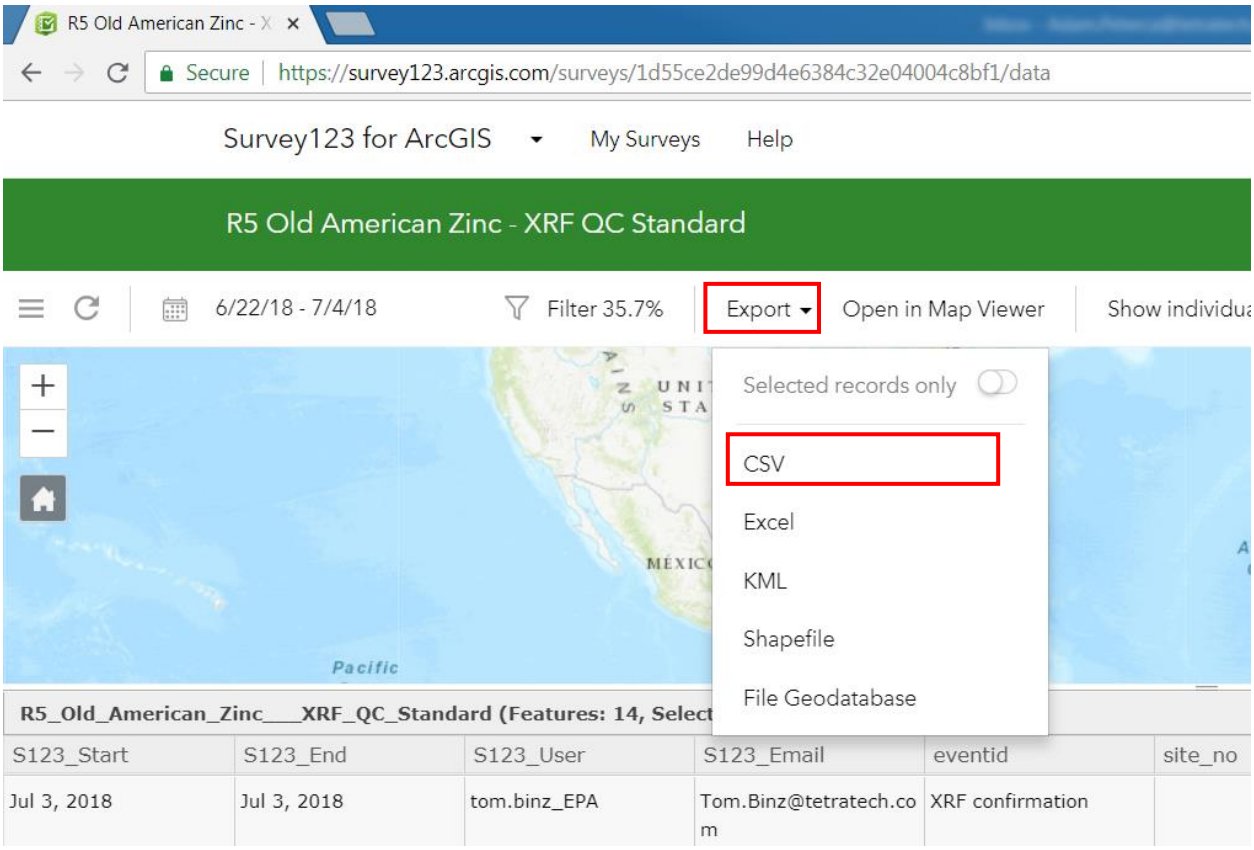
3.2.1. Specify the desired filtering criteria by selecting the attribute from the drop-down box, selecting the appropriate logical statement, and typing a value into the value box.

3.2.2. Click the "Apply" button to apply the filter.



4. Select the desired format for the download by clicking on the button labeled "Export" located at the top of the page.

4.1. Select "CSV". The records will automatically be downloaded after selecting the file format.



5. After successful download of the CSV file, the field team should perform a QC check before uploading to the Project Scribe Database.

4.3 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.

1. Check that the Survey123 data matches the type of samples that were collected
2. Check that the Survey123 sample data is correct for the samples collected
   - **2.1.** Check that the number of rows match the number of samples collected for each location
   - **2.2.** Check that the sample date is correct for each sample
   - **2.3.** Check that the sample location or property IDs are correct for each sample
   - **2.4.** Check that the sample nomenclature is correct for each sample
   - **2.5.** Verify all the sample-specific information is correct
3. Fill out the "qaqc_complete" field with "Yes."
4. Fill out the "qaqc_completed_by" field with the last name of the person completing the QC check.

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

Troubleshooting

Problem	Possible Reason & Solution
Cannot see a specific form within the 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.
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 Survey123 Forms. 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 Survey123 app and synced with the Survey123 Website.
The Survey123 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 "qaqc_complete" or "qaqc_complete_by" 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 Survey123 form; be sure to look carefully. • Make sure you have the correct version of the Scribe Column Headers template.
Some of the information in the Survey123 form looks incorrect	• If information on the Survey123 form looks out of place, check with the project manager or the sampling team to verify or correct this information.

SOG APPROVAL FORM

REGION 5 START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING GUIDE

Collector for ArcGIS

SOG NO. 002

REVISION NO. 0

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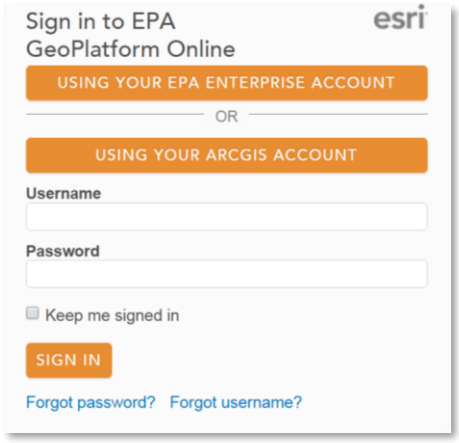
This Standard Operating Guide (SOG) is intended to provide the necessary steps for accessing and navigating the U.S. Environmental Protection Agency (EPA) GeoPlatform for use with the Collector for ArcGIS Application. Before using the Collector application for the first time, the user must sign into the EPA GeoPlatform with the ArcGIS Online Account provided by EPA via the user's computer. If a user does not have an ArcGIS Online Account, the user should request an account from the EPA ArcGIS Online Account Manager. The directions found in Part I below will guide the user through the process to access the EPA GeoPlatform. In addition, please make sure that the steps outlined in SOG 001: Survey123 Data Entry and Data Download are completed before beginning the steps in Part II below. It is assumed that users of this SOG have read and understand the EPA Region 5 Data Management Plan, and are familiar with data management tools typically used in Region 5, such as Scribe and the EPA GeoPlatform. Images that are included in this SOG have been placed after a specific set of instructions, unless otherwise noted in the text. Red boxes and/or red arrows on the images are used to specify what portion of the image a user should be focusing on.

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. EPA users should sign into the EPA GeoPlatform by clicking "USING YOUR EPA ENTERPRISE ACCOUNT" and enter your credentials. Non-EPA users should sign into the EPA GeoPlatform by clicking "USING YOUR ARCGIS ACCOUNT" and enter your credentials.

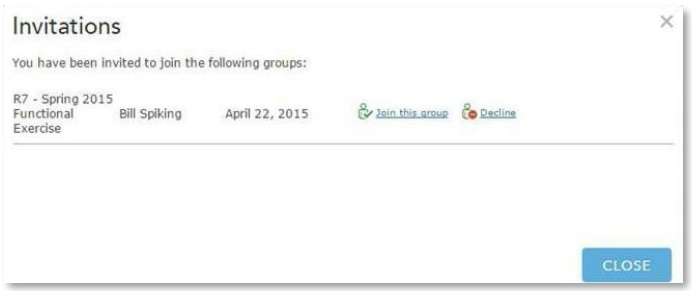


3. Once signed in, your web browser should look similar to the image below.

4. From the EPA GeoPlatform homepage, click on the "GROUPS" menu item. The "GROUPS" menu item is the most commonly used method to navigate to pages for an existing project. The other menu items are primarily used by web map developers.

5. If this is your first time accessing the project group, click on "INVITATIONS (1)." If you have already joined the project group, all groups that you are currently a member of will be listed on this page, and can be clicked to gain access.

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



7. You now have access to the selected groups; field users should be invited to the group according to site activity. Invitations can only be distributed by group members with the appropriate rights, which typically consists only of the project data management team.

R5 - USS Lead (Dust Sampling)

USS Lead - Dust Sampling

owned by R5FIELDS_EPA on August 1, 2016

R5 - USS Lead (Residential Yards Soil Sampling)

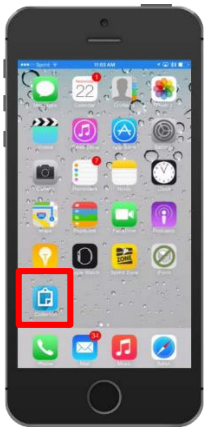
U.S. Environmental Protection Agency Region V - USS Lead Site, Residential Yards Soil Sampling.

owned by R5FIELDS_EPA on August 15, 2016

Part II – Collector for ArcGIS

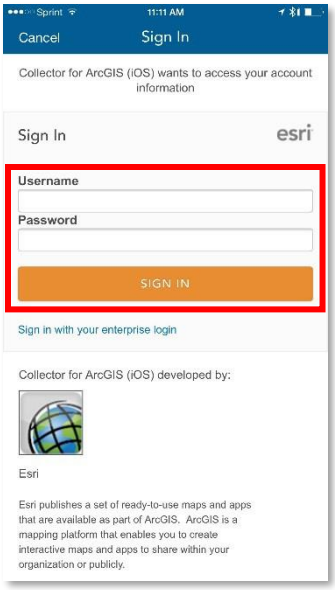
1. Download the Collector App from the App Store on your device. In this SOG, the Apple Store is used as the example.

2. On your smartphone or iPad, tap the Collector App icon to open the App.

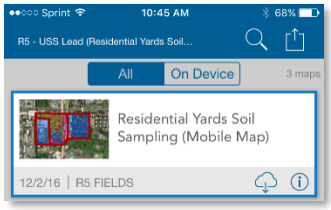


3. Tap "ArcGIS Online"

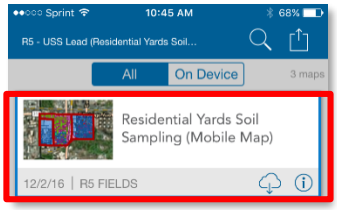
4. Enter user name and password (same as EPA GeoPlatform) and tap "SIGN IN."



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

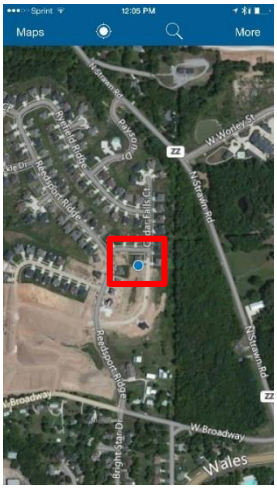


6. Tap the available Web Map icon.

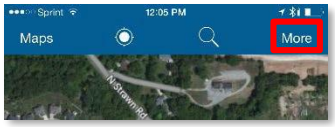


7. When the Web Map finishes loading, it will automatically zoom to your location overlaid on an aerial image. The small blue dot displayed on the Web Map is your approximate triangulated location. If the Web Map does not automatically zoom to your location, tap the "My Location" tool found in the menu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

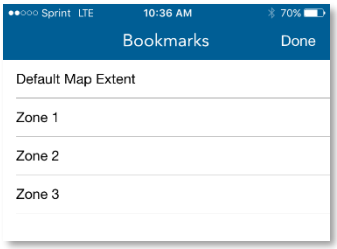
   - The locator icon ○ indicates your location is not displayed on the map. Once My Location is turned on, the ◉ icon indicates your location on the map and is kept centered. As you move, the map moves on the screen to keep your location centered on the screen.
   - **Tip:** When you do not need to see 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.



8. 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."

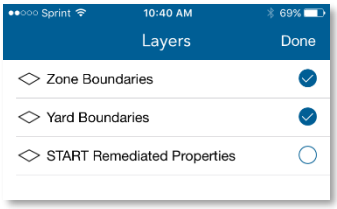


9. Tap the "Bookmarks" tool. This tool allows you to choose previously defined areas of interest.

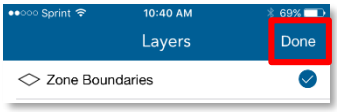


10. The Web Map will automatically pan to the default extent.

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



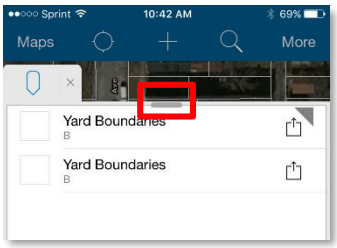
12. Tap the toggle ○ to the right of each unchecked layer to add the layer to the map, and then click "Done." If you are using an iPad, "Done" will not display in the Layers window. To exit the Layers window from an iPad, just tap anywhere outside of the window.



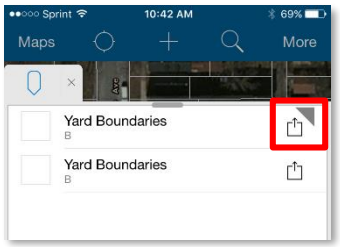
13. Using your fingers, zoom in to display the desired features on the map.

14. 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.

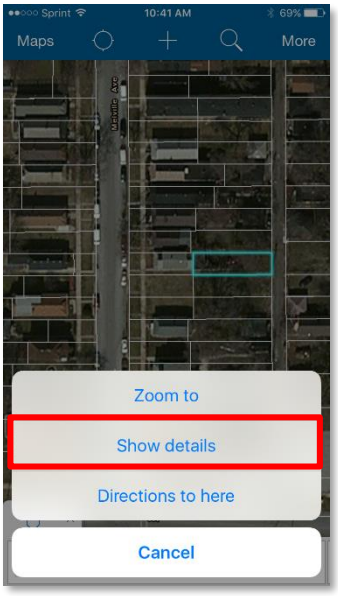
15. Tap the Pin icon ⬯ to expand the Results window. If features are stacked, expand the results window to cover the screen and select the proper feature. If you are using an iPad, the Results window will automatically expand when a feature is selected on the map.



16. 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.

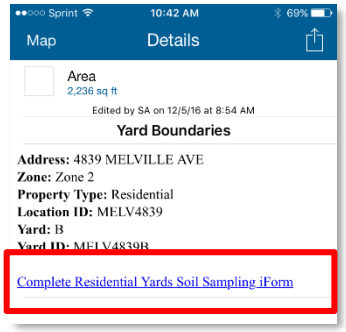


17. Tap "Show details" to see the attribute information for the feature selected. If you're using an iPad, the Details window will automatically expand when a feature is selected.

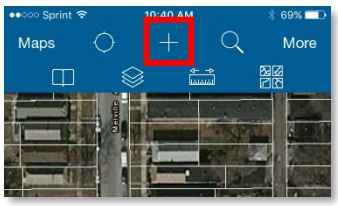


*Note – to complete the remaining steps, if a Survey123 form is linked to the feature service, you must have installed the Survey123 App on your device and be logged into the service. See the Survey123 App SOG 001 for instructions.

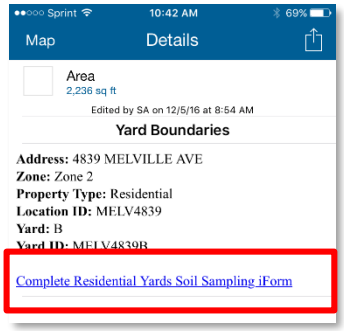
18. In the Details window, also called the pop-up information, users can view the pre-populated feature attribute data. See the GeoPlatform SOG 005 for information about the origin of attribute data.

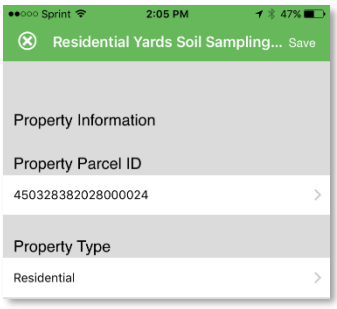


19. The Collect icon + adds features to a map. If you're using an iPad, the Collect icon is on the right side of window.

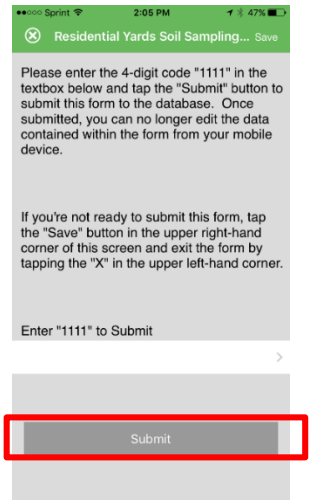


20. At sites that are using Survey123 as the primary feature collection application, click the Survey123 link to complete a Survey123 form for that feature service. The Survey123 App will automatically launch and transfer any linked information to the Survey123 form.

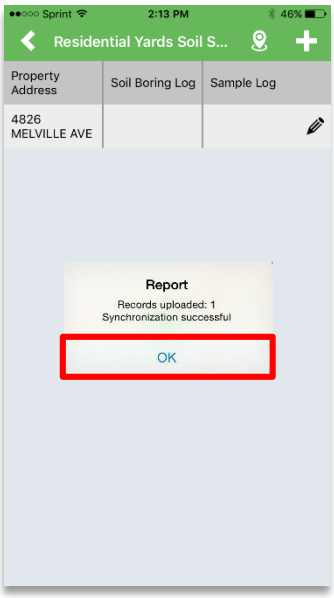




21. Complete the associated Survey123 form as directed in SOG 001: Survey123 Data Entry and Data Download, and tap "Submit" at the end of the form.



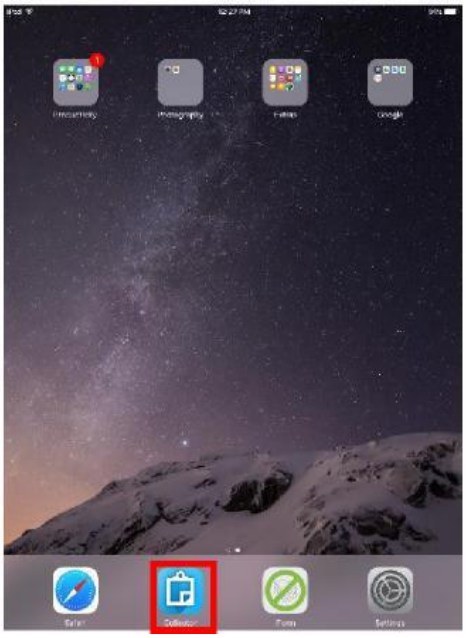
22. Tap "OK" once the form has been successfully synchronized.

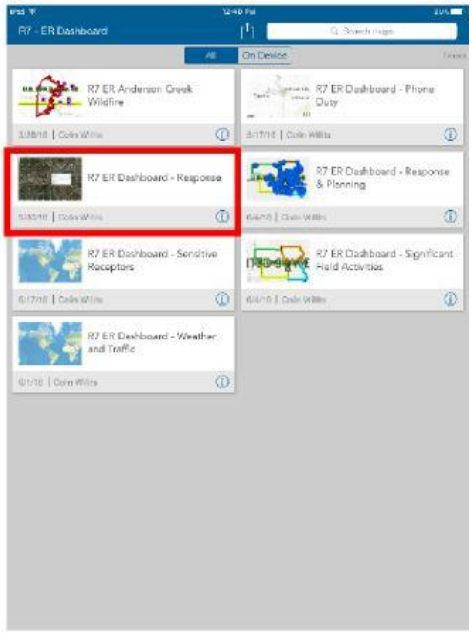


23. Double-click the Home button on your smartphone or iPad to navigate back to the Collector App.

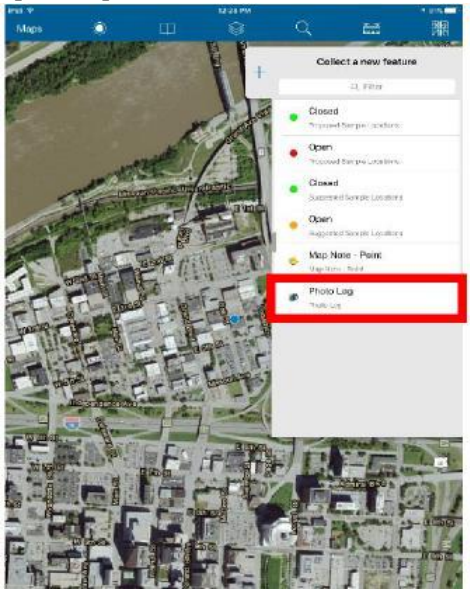
Part III – Collecting and Downloading Images from Collector App

1. Open Collector App and navigate to the Site Specific Map

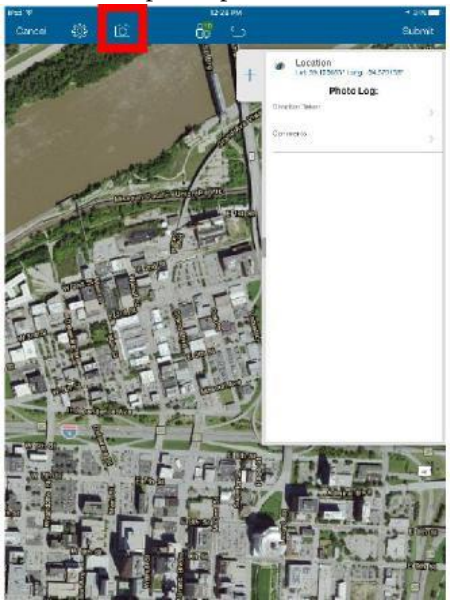


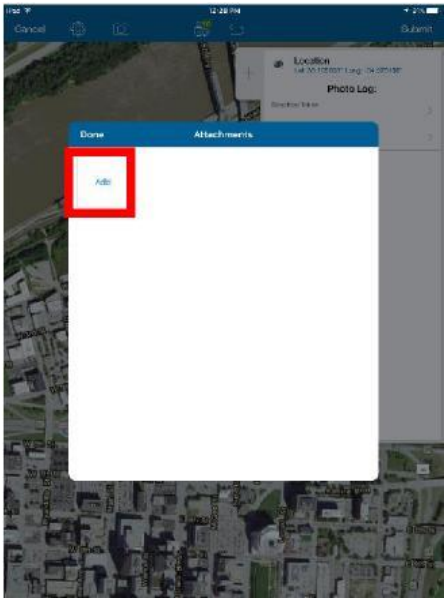


2. Collect a photo log point at current location or press and hold down on the screen to open a pop-up, then press the Action button and select "Collect Here".

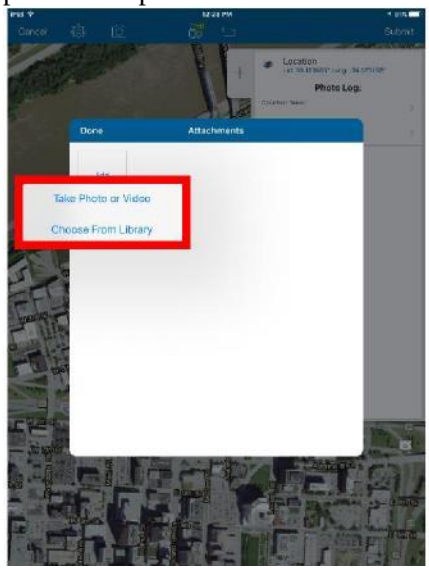


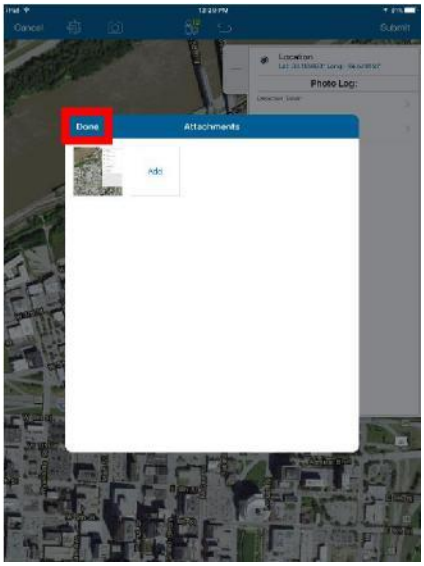
3. To collect a photo press the Photo button, then press the Add button.



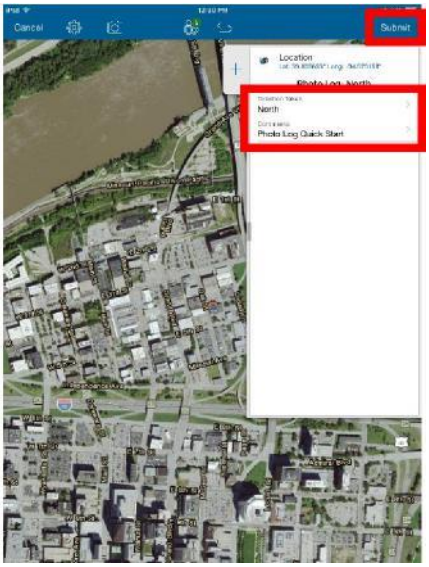


4. Either select the option to take a photo or choose from library, then repeat for any additional photos and press Done.

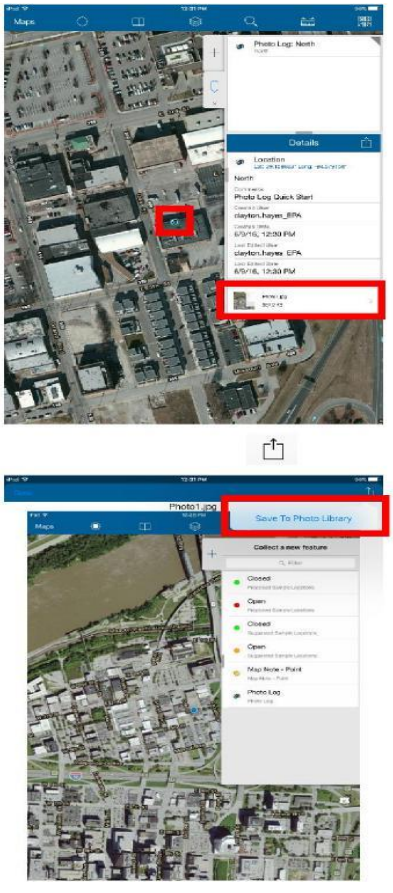




5. Update attribute information for direction and comments, then press Submit.



6. To download images, tap on the photo icon to display pop-up information. Scroll down to the photo attachment and tap on the attachment to display image.
7. Press the Action button to Save To Photo Library.
8. Download off the device and save to project folder.



SOG APPROVAL FORM

REGION 5 START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING GUIDE

Scribe Field Database

SOG NO. 003

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

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Quality Assurance Approved	Date

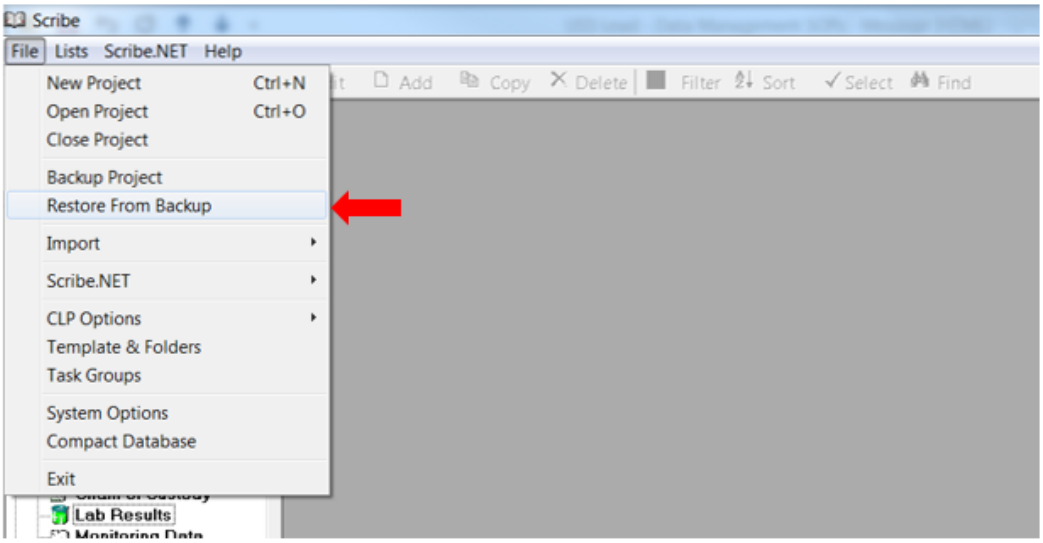
CONTENTS

This Standard Operating Guide (SOG) assumes that the user has basic knowledge of Scribe and has created the Scribe database for the project. For user guides on how to set up a Scribe Database, go to response.epa.gov/Scribe *to download ERT Scribe V3.10 Part 1: Quick Start Guide, ERT Scribe V3.10 Part 2: Field Use Basics, and ERT Scribe V3.10 Part 3: Management and Advanced Features. For details on how to set up an EPA Contract Laboratory Program (CLP) database, please refer to ERT User Manual for Scribe CLP Sampling V3.10. It is assumed that users of this SOG have read and understand the EPA Region 5 Data Management Plan, and are familiar with data management tools typically used in Region 5, such as Scribe and the EPA GeoPlatform. Images that are included in this SOG have been placed after a specific set of instructions, unless otherwise noted in the text. Red boxes and/or red arrows on the images are used to specify what portion of the image a reader should be focusing on. It is also assumed that the user has downloaded the necessary software for Scribe, and has it available for use on a computer. This SOG is intended to provide instructions for loading comma-separated value (CSV) files into a Scribe field database, quality control (QC) checking the imported data, producing a chain of custody (COC) record for field samples, and exporting the files necessary for the database administrator to update the central Project Scribe Database. Scribe is a database software that can store tabular data such as sample-related information including, but not limited to, location, date, sample medium, samplers, and laboratory results. When using digital data capture technology such as Esri's Survey123, every record that is created in Survey123 must be loaded into a local field version of the Scribe database to produce a COC form, 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 administrator so that the master version of the Scribe database can be updated and published.*

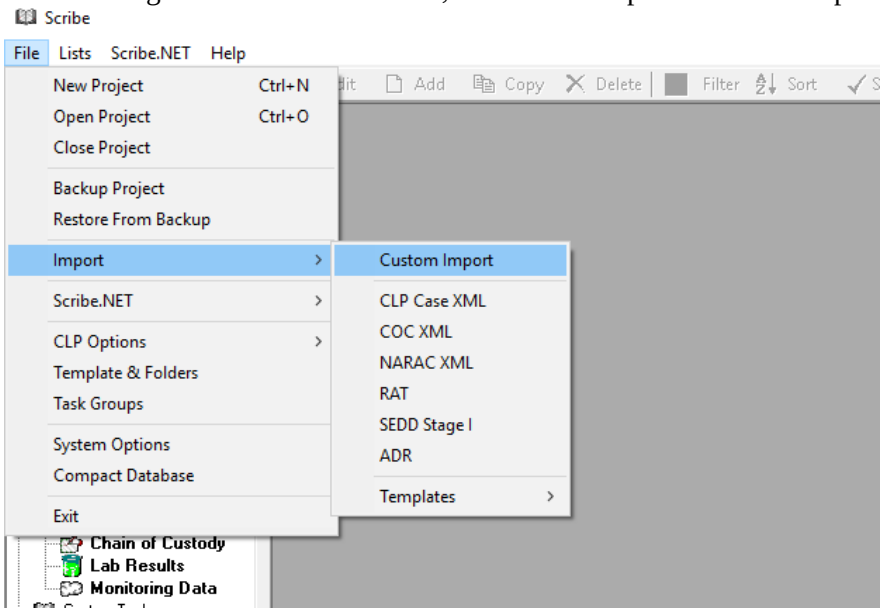
1.0 Importing Files into Scribe

A clean, original version of the project's Scribe database must be used to import files. The database administrator 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 computer) where they will not mistakenly replace the database administrator's published updates to the database.

1. Navigate to the  icon on your computer desktop. Open Scribe.
2. After opening Scribe, click on File→Restore From Backup (see image below).
   - **2.1.** Navigate to the folder location where the clean version of the database is saved and click "Open."
   - **2.2.** Select "Yes" in the next pop-up menu to load this project.
   - **2.3.** 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."
   - **2.4.** Select "Yes" to overwrite the existing project file.

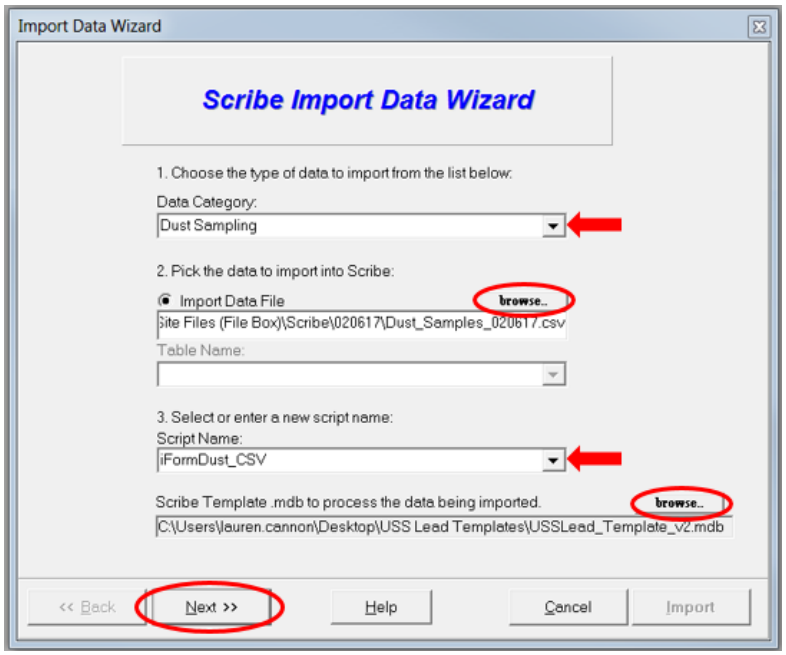


3. With the original version now loaded, click File→Import→Custom Import.



3.1. Select "No" when prompted with the option to back up the project now, since a Backup version was just loaded.

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



3.2.1. For item 1, select the data category associated with the data being uploaded from the drop-down menu.

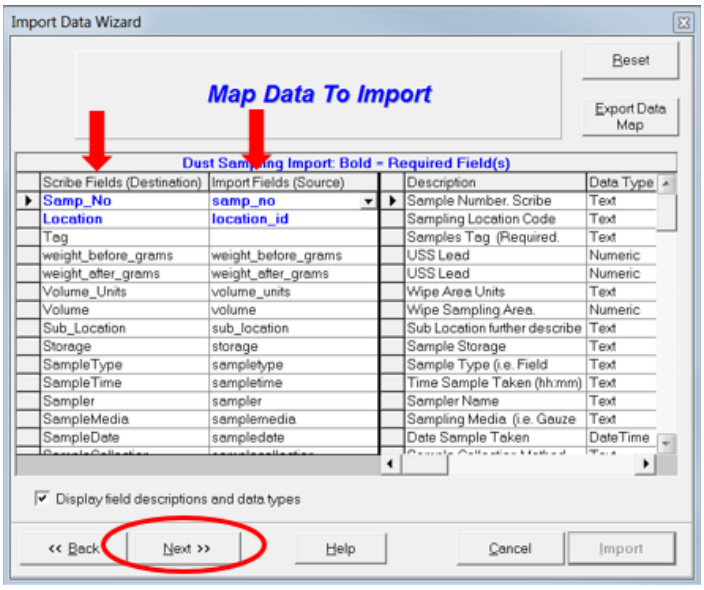
3.2.2. Select "Browse" under item 2 and navigate to the location of the CSV file containing the data to be uploaded (such as Survey123 data). If uploading a CSV or TXT file, be sure to change the file type from "Microsoft Access (*.mdb)" to "Text (tab delimited; csv)(*.txt;*.csv)." Select the correct file, then click "Open." The next field, "Table Name," may be left blank.

3.2.3. From the drop-down menu in item 3, select the script that corresponds with the data category selected in item 1. The script naming conventions should correspond to the associated sampling data. For example, if the user is uploading groundwater sampling data from Survey123, the script name should be named, "Survey123Groundwater_CSV"

3.2.4. Select the "Browse" button and navigate to the location to where the importing templates for the site are saved. Select the correct site template and click "Open."

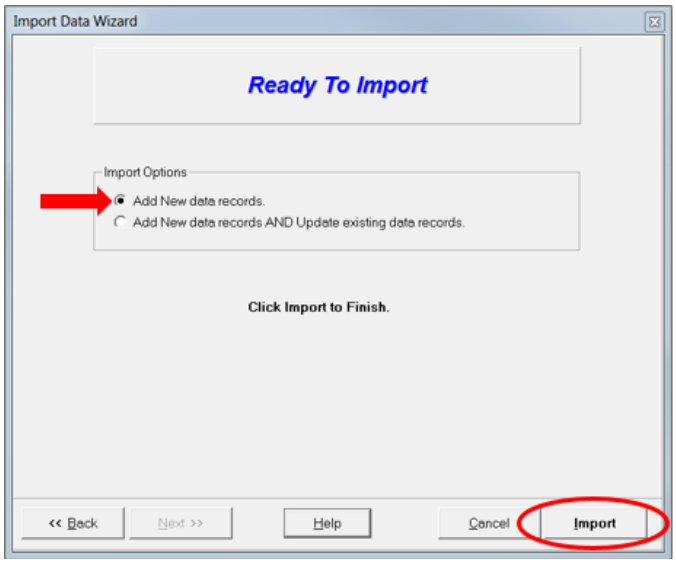
3.2.5. Once all the fields described above have been populated, select "Next."

3.2.6. The next dialogue box is titled "Map Data To Import" (see image below). The two columns on the left are titled "Scribe Fields (Destination)" and "Import Fields (Source)". 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."



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

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

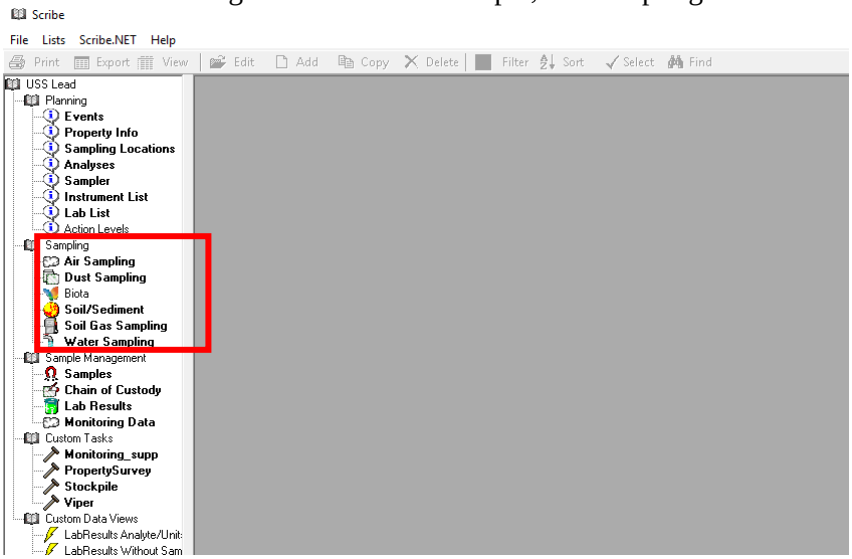


3.2.9. Click "No" when prompted to import more data.

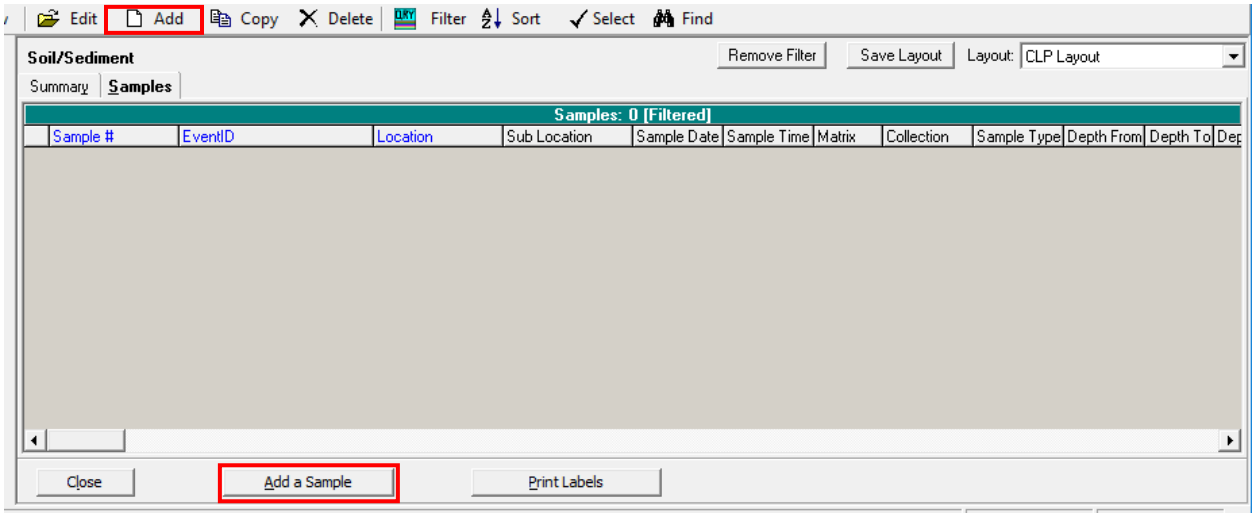
2.0 Adding CLP Samples

When adhering to EPA CLP standards, samples must be manually entered into the project specific Scribe Database. This section will detail how to add CLP samples to the database, and assumes the user has set up the necessary CLP Analyses, CLP/Tag Settings, and CLP Sample Number Generator. Information for Scribe CLP database set up can be found in the *ERT User Manual for Scribe CLP Sampling V3.10.*

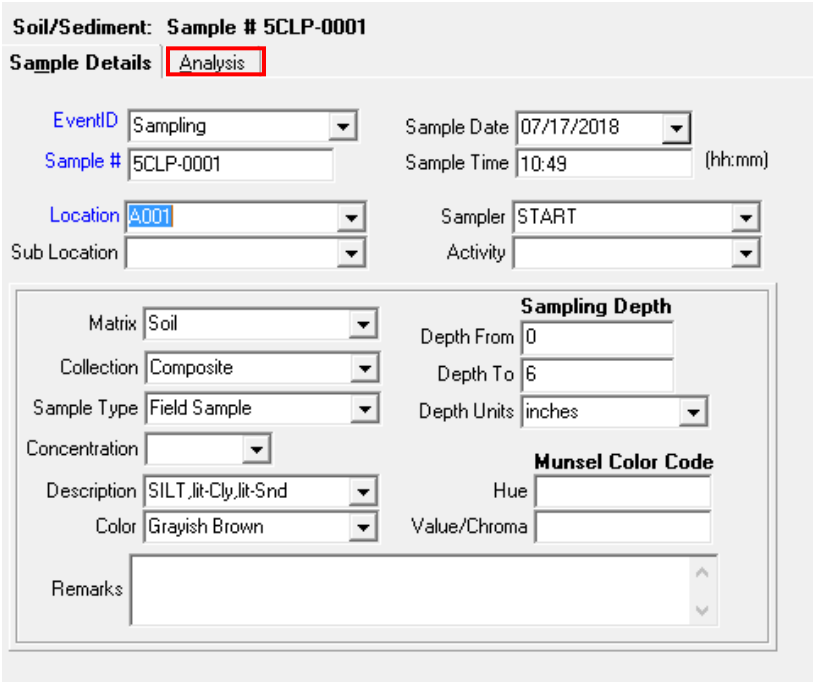
1. Depending on the type of sampling, select the appropriate sampling task under "Sampling" in the navigation pane as seen in the image below. In this example, soil sampling is selected.



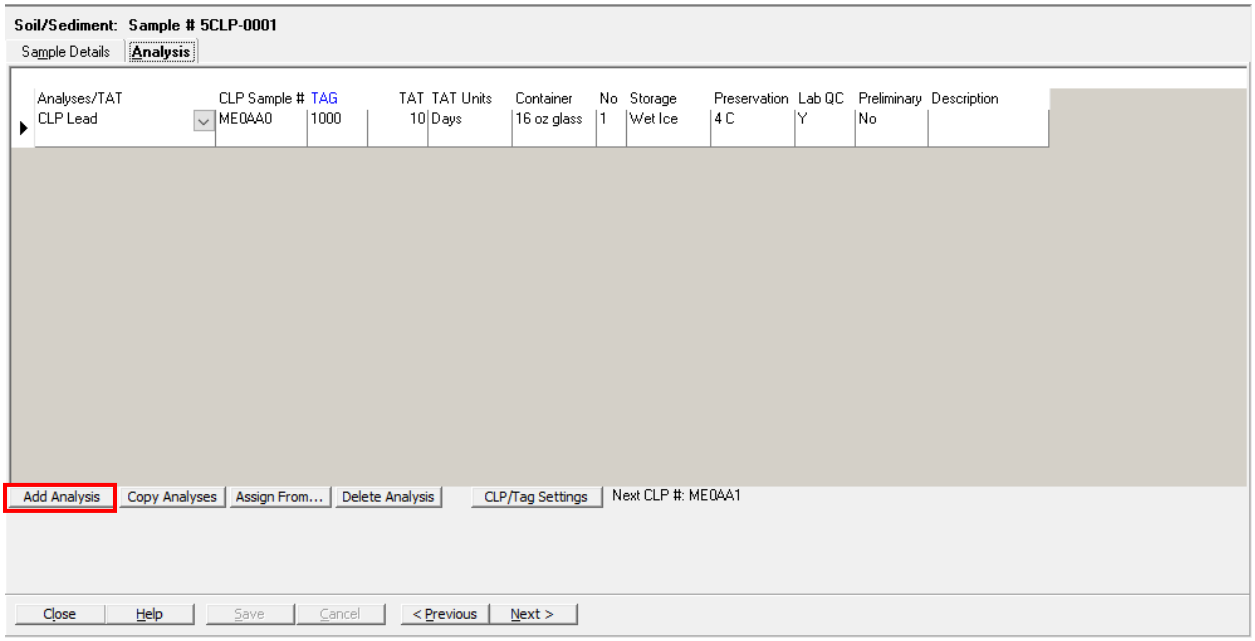
2. Select "Add" on the top menu, or "Add a Sample" on the bottom.



3. A new screen will appear as seen in the image below. Enter sample information in the "Sample Details" tab. After sample information is entered, select the "Analyses" Tab.



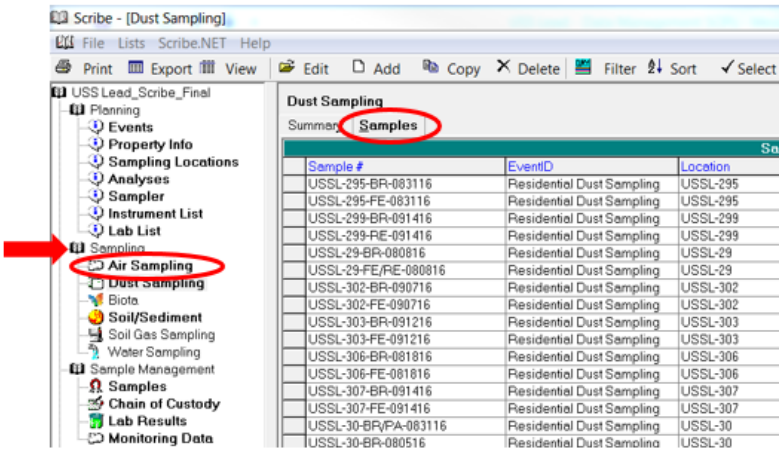
4. Select the "Analyses/TAT" field, and select the CLP Analyses to be performed from the drop down list as seen on the image below.
5. To assign additional Analyses, select "Add Analysis". When all have been added select "Close" at the bottom of the window to save and close.
6. Review the CLP Sample Number and Tag fields to ensure information is displayed according to project requirements as set in the CLP/Tag Settings.



3.0 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). Types of field testing or monitoring can be found under the "Sample Management" heading and the "Monitoring Data" subheading. When the proper subheading has been selected, select the "Samples" tab.



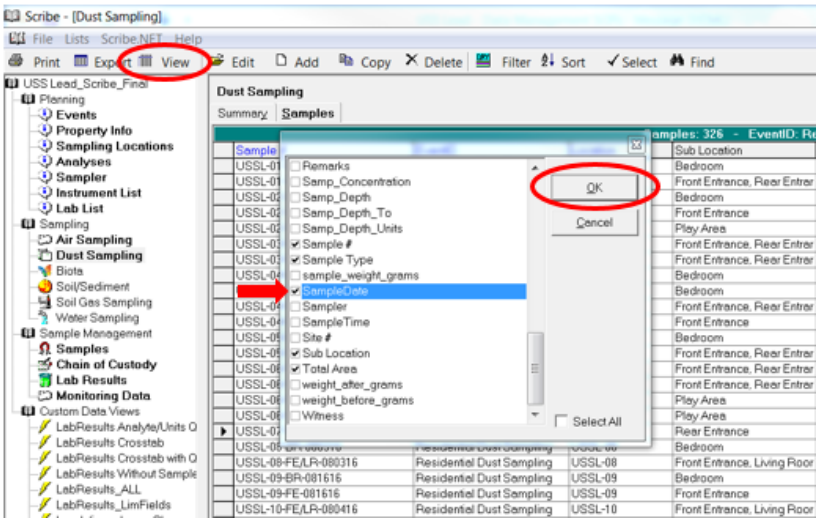
2. Once in the "Samples" tab, the data that have just been imported can be found via several methods.

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

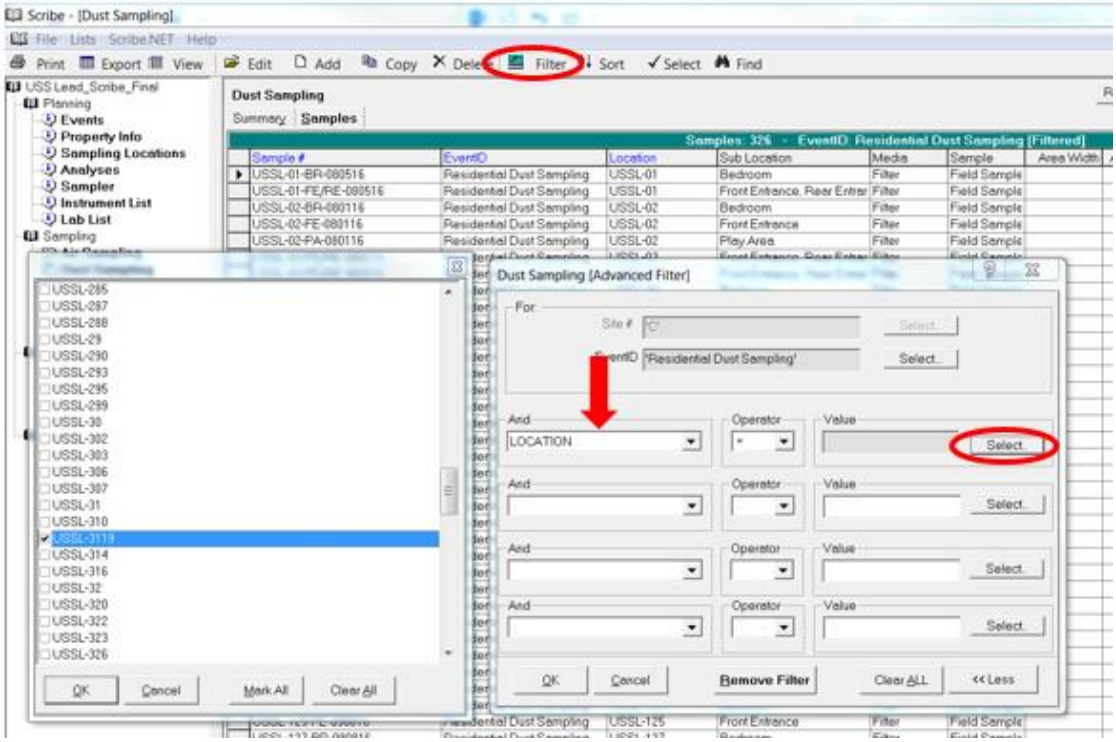
Descending" options are available. Select one of these options and navigate to the Sample Date of the desired data.

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 during the importing process (and after downloading if using digital data capture), 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.

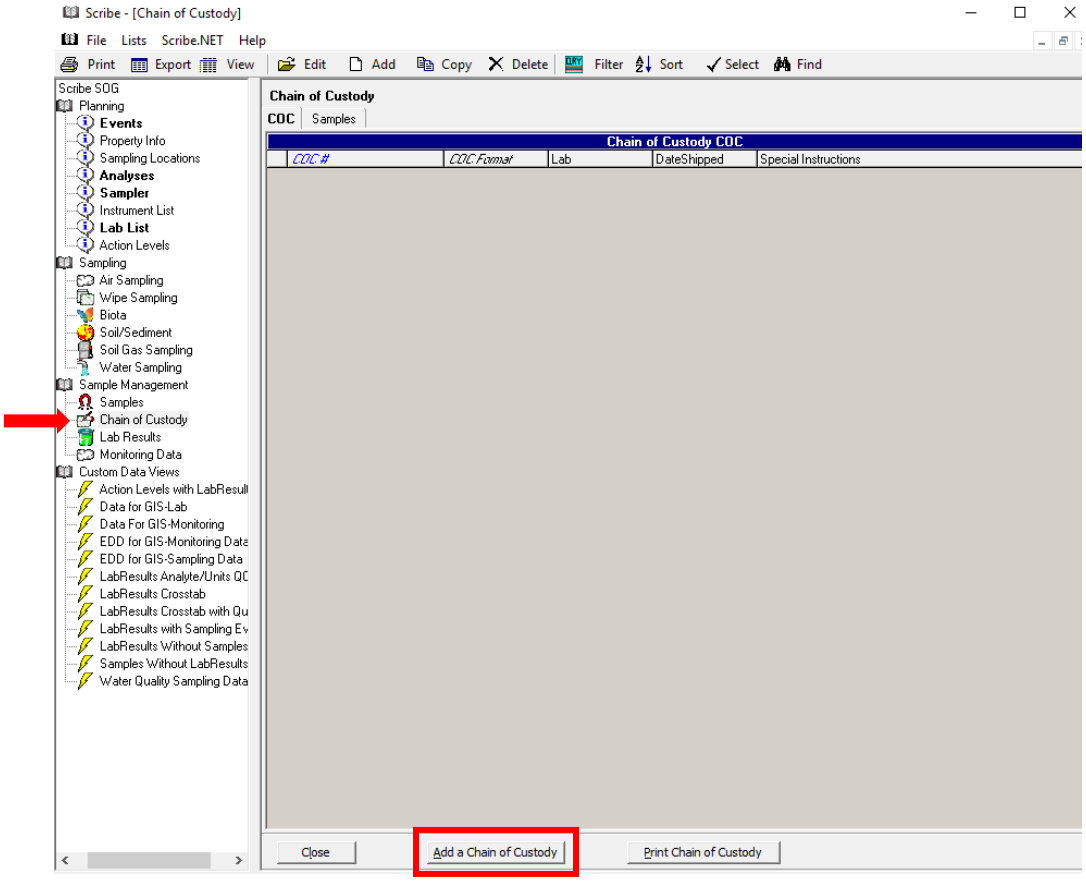
3.2. If any errors are identified, the data must be corrected in the original CSV file, saved, and then reimported following the procedures in the "Importing Data into Scribe" section above.

4.0 Producing a Chain of Custody

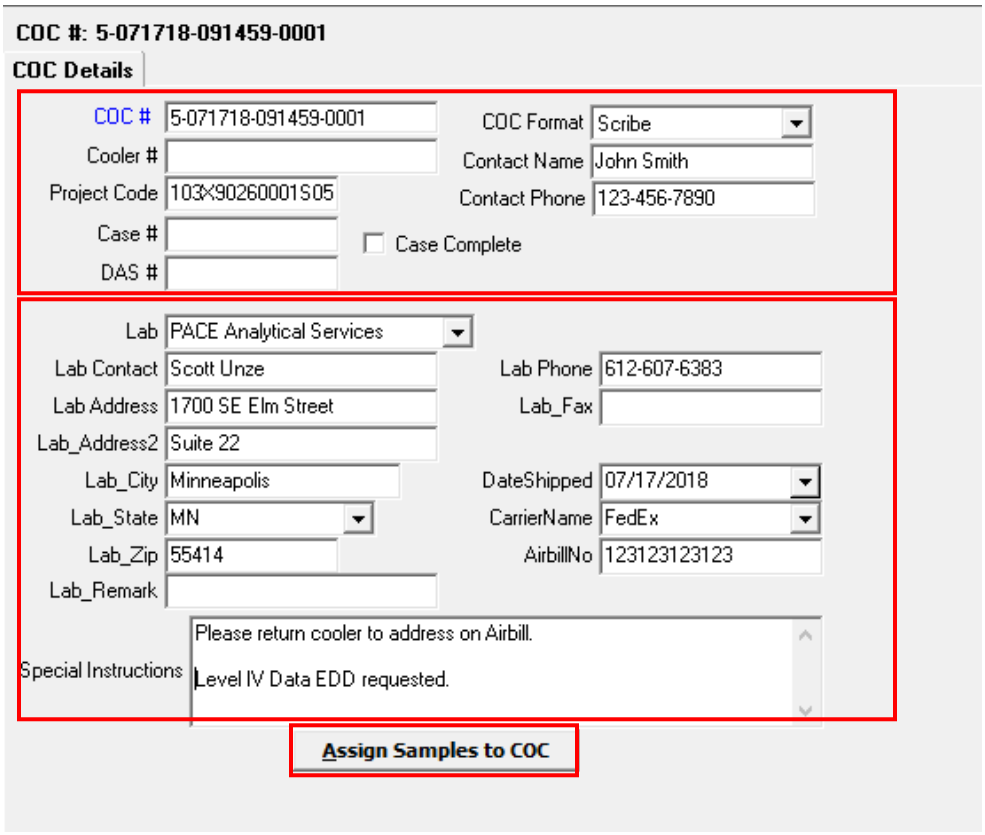
A COC form must be included in the package of samples being sent into a laboratory for testing to track each sample and the corresponding laboratory results. To create a COC form, the data for all the samples being processed must be loaded into the Scribe database following the procedures above. Once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

4.1 Generating Chain of Custody from Scratch

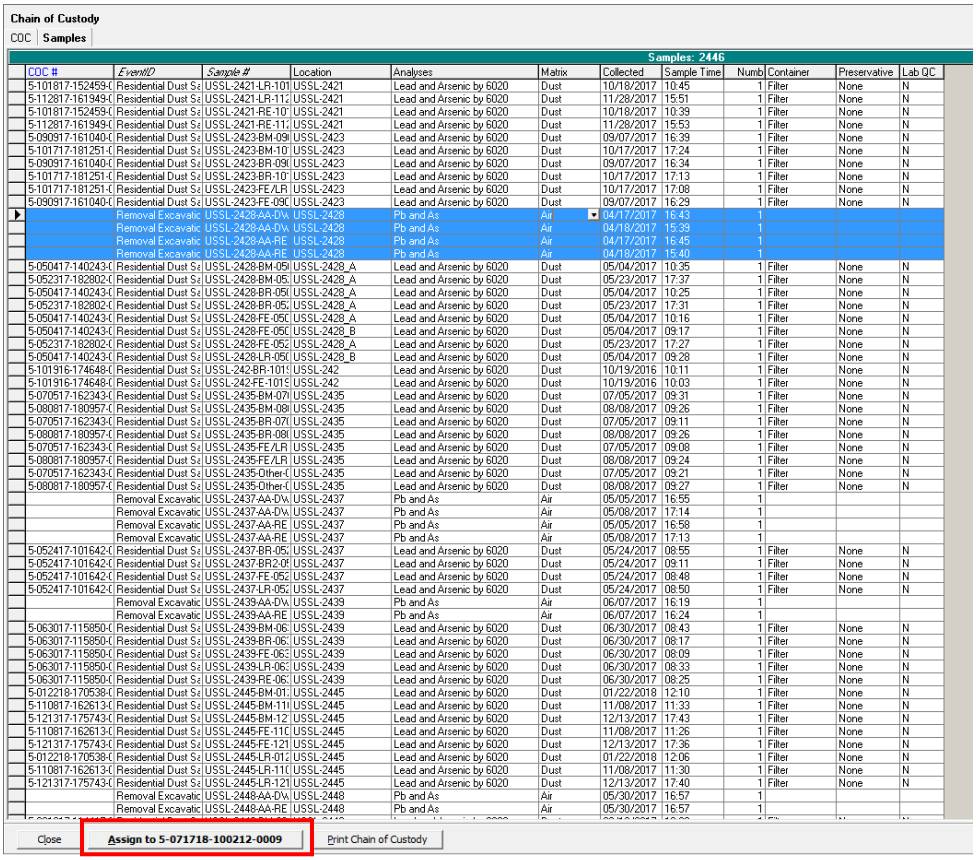
1. From the main interface, select "Chain of Custody" under the heading "Sample Management."
2. Select "Add a Chain of Custody" at the bottom of the window.



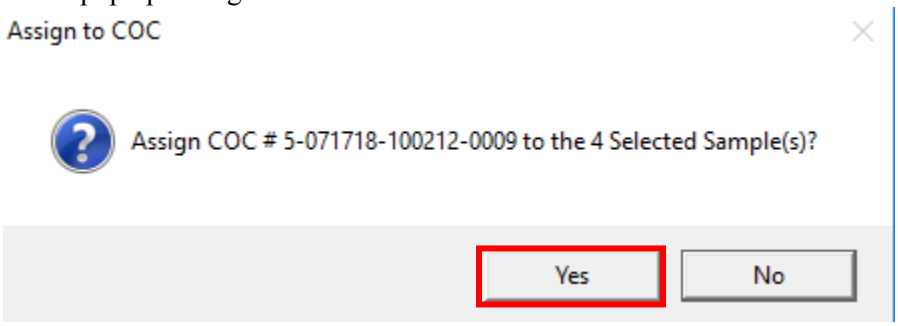
3. The COC details form will come up. Scribe automatically assigns a unique COC number that contains the Region number, current date, current time, and a unique numeric identifier.
4. Fill out the remainder of the COC details. The COC details will be printed in the header of the COC.
5. Select a Laboratory from the dropdown box, or hand enter the Laboratory information if the Laboratory was not added to the Laboratory table in Scribe.
6. Select a Date Shipped and the Carrier Name. If the carrier is not in the drop down list, manually enter the Carrier Name.
7. Add an Airbill number, and any special instructions as needed.



8. After preparing the COC details, you can assign samples to the Chain of Custody. Select "Assign Samples to COC". The list of samples will display.
9. Select the specific samples that are to be added to the COC. If all the samples are to be added, select the "Select" button on the toolbar and choose "Select All". If specific samples are to be added, highlight the samples by holding down the Ctrl key and selecting each sample that is to be on the COC.
10. After selecting samples for the COC, select the "Assign to …" button on the bottom of the window.



11. Select "Yes" in the pop up dialogue box.

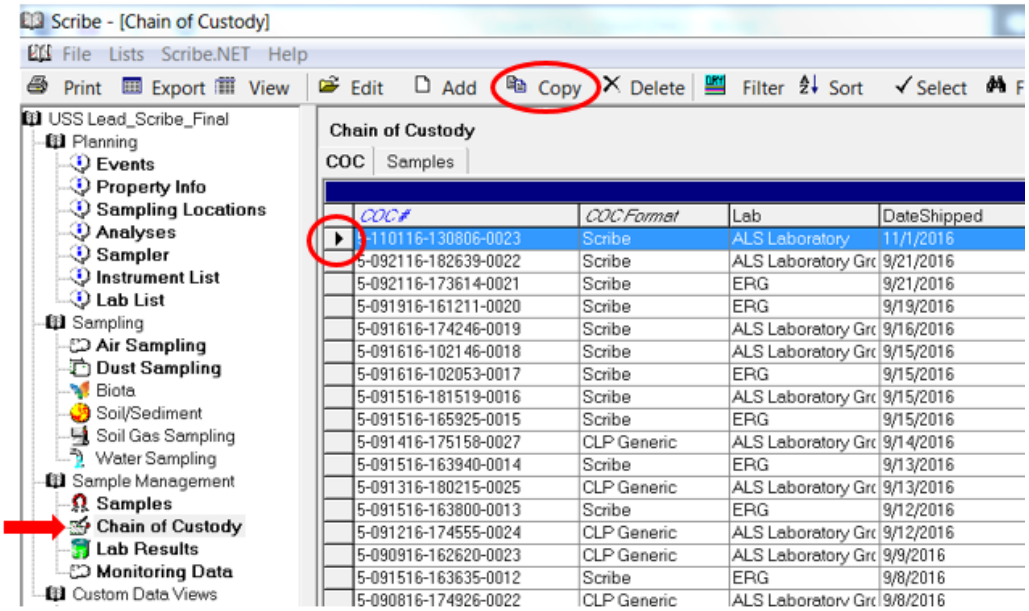


4.2 Generating Chain of Custody from Previous Chain of Custody

1. When generating new COCs for a project with an existing Scribe database and COC template, it is possible to copy the format of existing COC templates to avoid recreating COC templates multiple times. This is a recommended practice when practicable, as it saves times and avoids user-errors, which could lead to COCs with non-uniform templates. Use the following steps to create a new COC based on an existing COC template in the project Scribe database. 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.

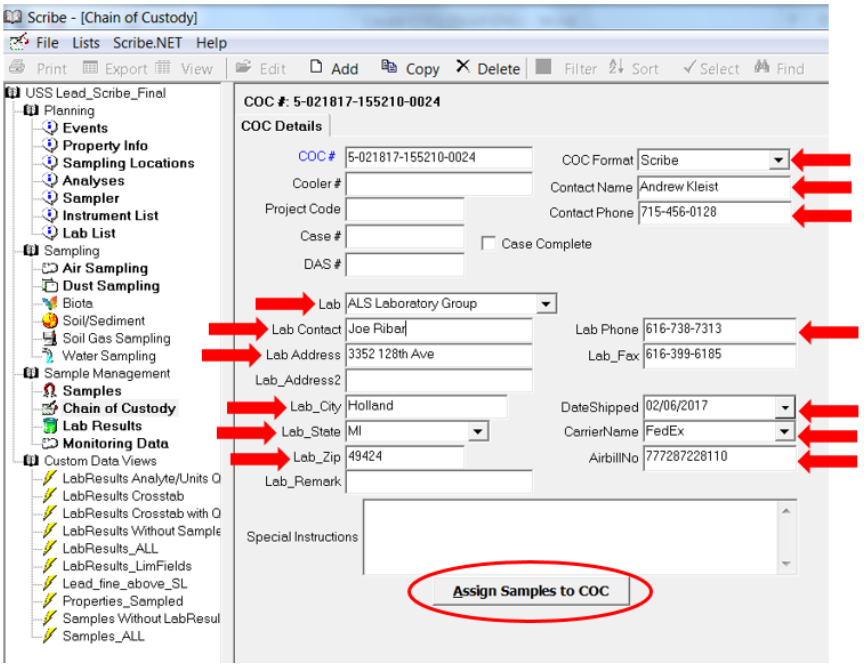
4.4. Next, input the contact information where the samples are being shipped. This information can either be entered by selecting the name of the laboratory from the drop-down menu next to the item "Lab" or by directly entering the laboratory's name, contact name, address, and phone number.

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."



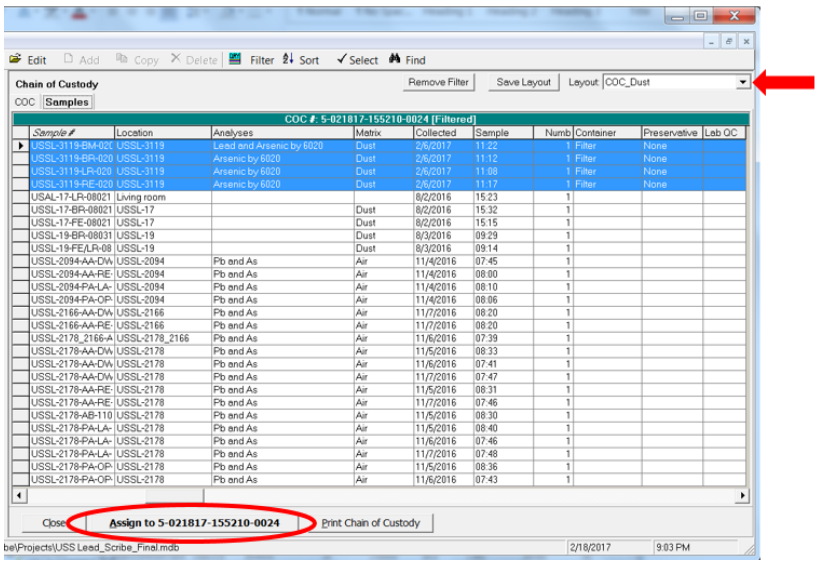
5. The next screen will be a list of the samples that have not yet been assigned to a COC.

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.

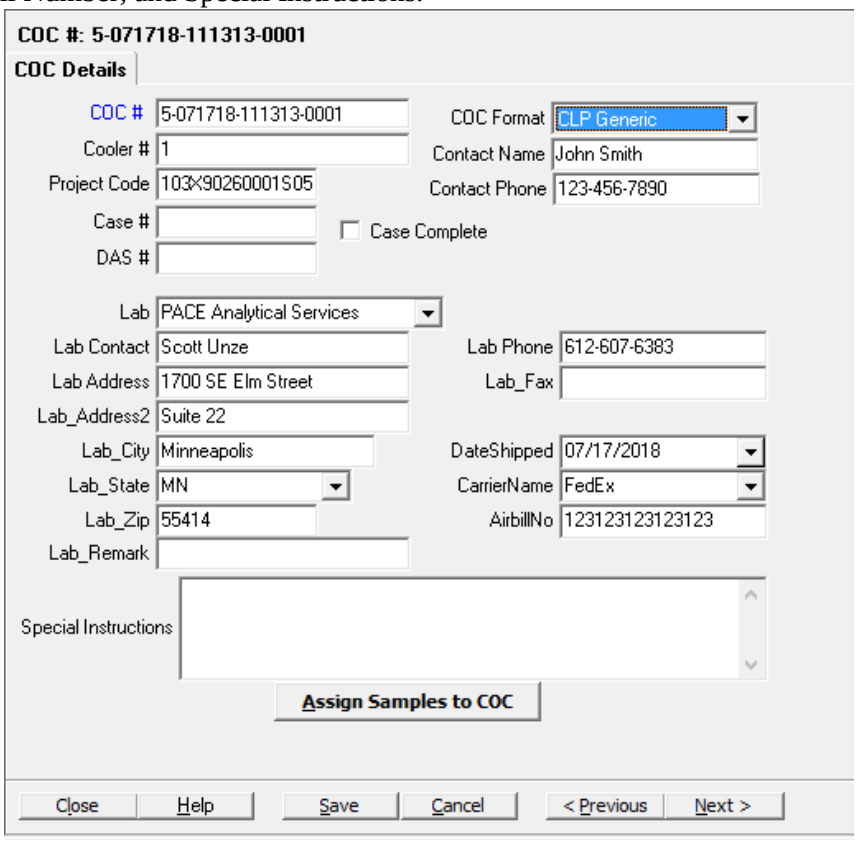
5.4. Before printing the COC, ensure that the "Layout" selection in the top-right corner of the screen corresponds to the type of samples being included on the COC. It can be changed by selecting a different layout from the drop-down menu. Note that each different sample type will require a different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



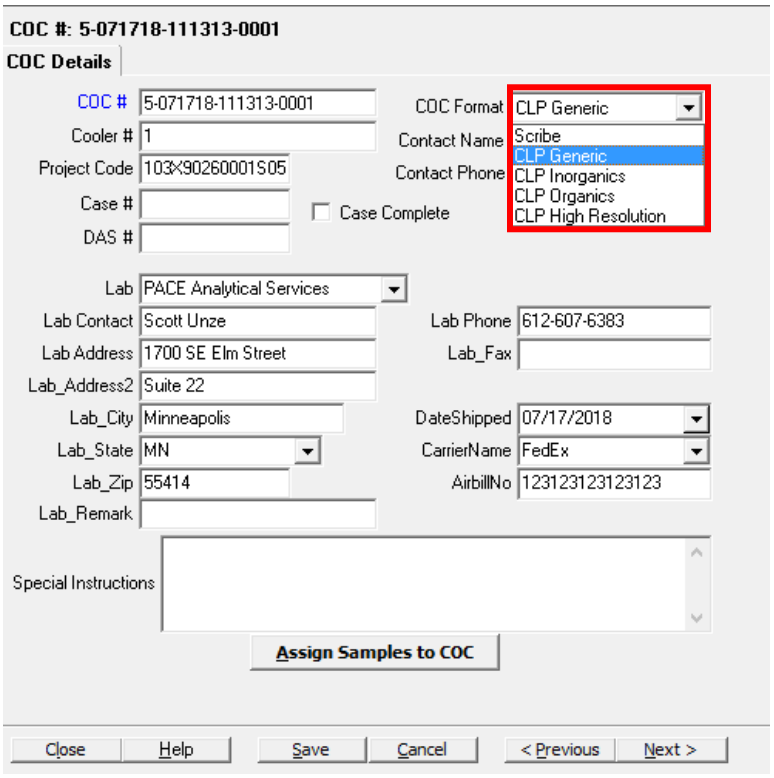
4.3 Generating Chain of Custody for CLP Samples

When creating a CLP COC in Scribe, multiple analysis types can be added to the same COC. For example, Inorganic, Organic, High Resolution and non-CLP analysis can all be placed on the same chain by selecting the "CLP Generic COC" format when creating a new COC or by removing the filter when on the Samples Tab of the COC section. As a convenience, Scribe contains functionality to group analyses by type when creating a COC. By selecting one of the CLP types (Organic, Inorganic, High Resolution) from the COC Format list, Scribe will filter the Samples for that specific analysis type. Remember, if multiple analysis types need to be added to the same COC, simply remove the filter and a complete list of analyses will be available.

1. From the main interface, select "Chain of Custody" under the heading "Sample Management."
2. Select "Add a Chain of Custody" at the bottom of the window.
3. The COC details form will appear. Scribe automatically assigns a unique COC number that contains the Region number, current date, current time, and unique numerical identifier.
4. Complete the form by selecting the Laboratory, entering Cooler Number, Date Shipped, Carrier Name, Airbill Number, and Special Instructions.



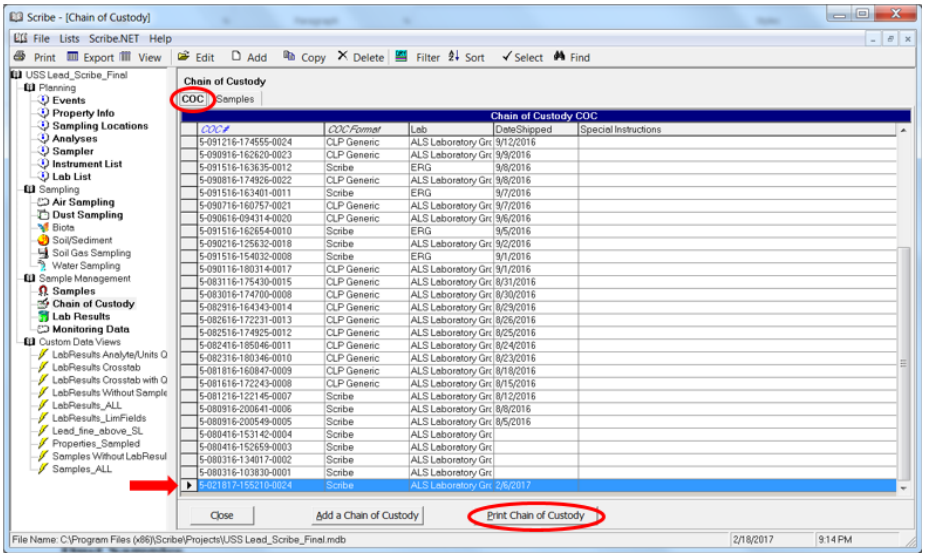
5. Select the correct COC Format based on the type of Samples. All CLP COCs are identical, however, selecting a COC Format is a convenience option that filters samples based on the format selected (i.e. CLP Inorganics Format will filter for Inorganic Analyses). However, if a COC needs to contain multiple Analyses types, select the "CLP Generic" format and all samples will be available to be placed on the COC.



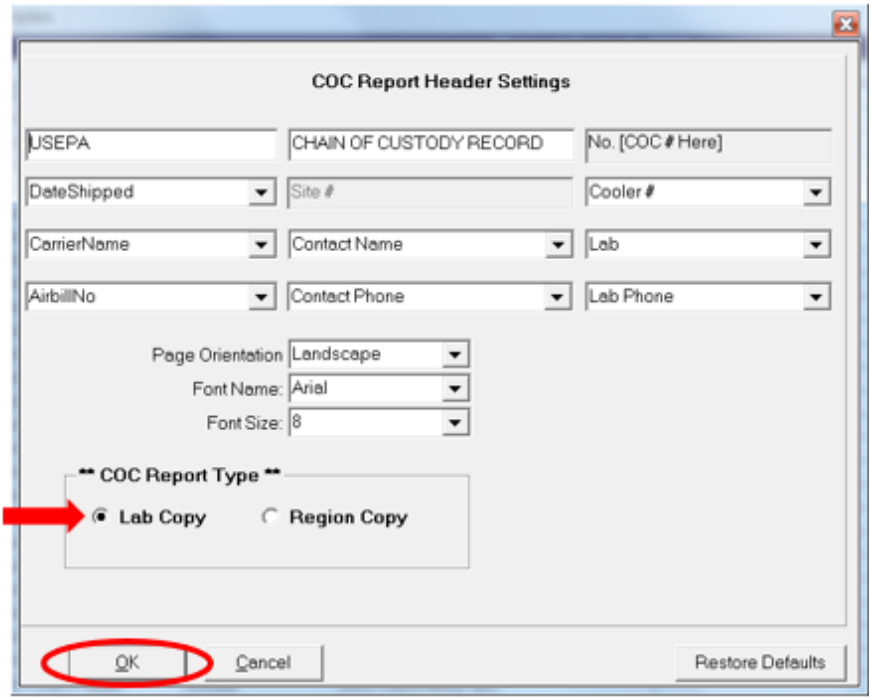
6. Select "Assign Samples to COC" to continue.
7. Select the specific samples that are to be added to the COC. If all the samples are to be added, select the "Select" button on the toolbar and select "Select All". If specific samples are to be added, highlight the samples by holding down the Ctrl key and selecting each sample that is to be on the COC.
8. After selecting samples for the COC, select the "Assign to …" On the bottom of the window.
9. Select "Yes" in the pop up dialogue box.

5.0 Printing Chain of Custody

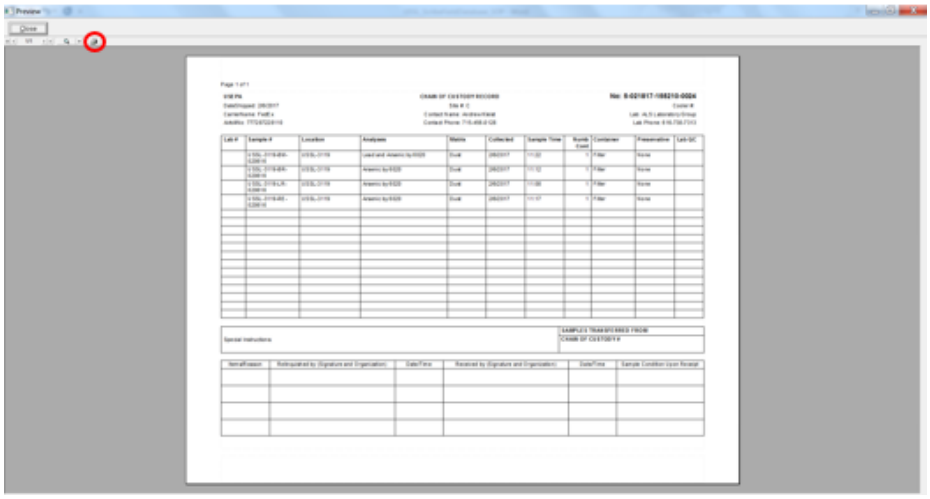
1. To print the COC, click the "COC" tab near the top of the page.
   - **1.1.** Browse by date and select the row of the newly created COC.
   - **1.2.** At the bottom of the screen, click the button on the right side labeled "Print Chain of Custody" (see below), then from the menu that appears, click "Preview."



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



2. 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.

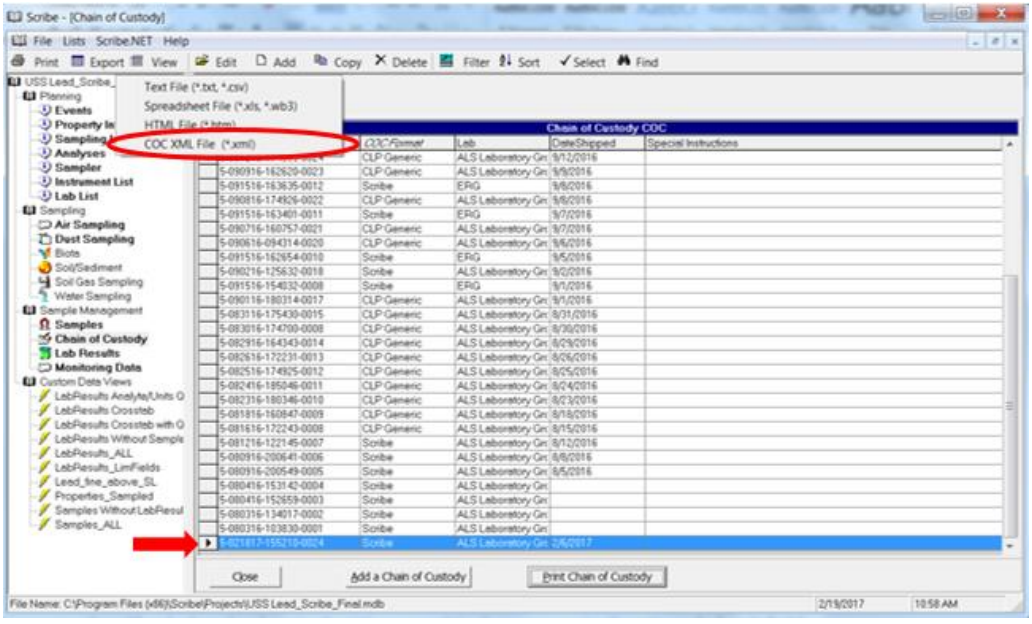


3. Once the COC is printed, export and save it as a PDF using the same printer icon. Be sure to save it to the appropriate project folder according to the type of sample and date (for example, Dust_COC_MMDDYY).
4. Close the preview window to return to the main Scribe interface.

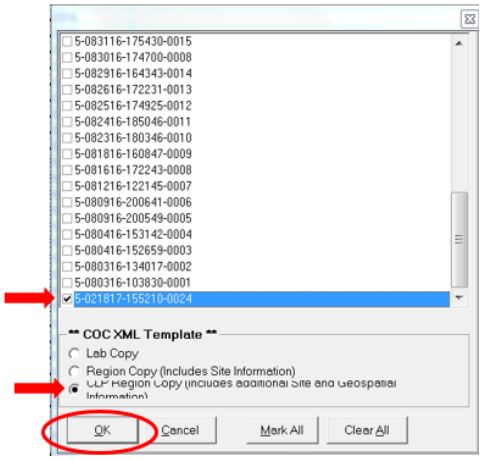
6.0 Exporting a Chain of Custody

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, "Groundwater_Samples_MMDDYY."
4. A web browser containing the XML data will appear. This browser should be closed.

7.0 Sending Files to Database Manager

After 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. Files used for data import must contain a unique file name as determined by the project database manager.
2. Attach the necessary files and send to the database manager no later than 1 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. For example, residential well samples cannot be found under the "VAS 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.
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 the 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."

SOG APPROVAL FORM

REGION 5 START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING GUIDE

Scribe Database Management

SOG NO. 004

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

	July 31, 2018
Quality Assurance Approved	Date

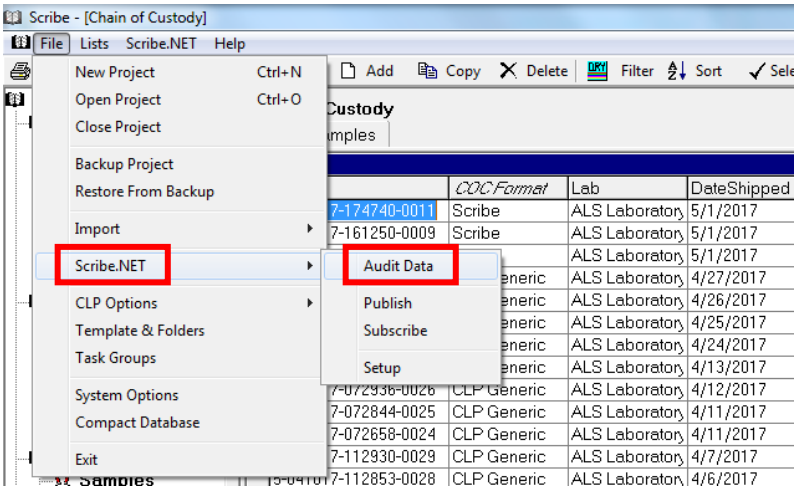
CONTENTS

This Standard Operating Guide (SOG) 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 data accuracy and formatting prior to 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. It is assumed that users of this SOG have read and understand the EPA Region 5 Data Management Plan, and are familiar with data management tools typically used in Region 5, such as Scribe and the EPA GeoPlatform. Images that are included in this SOG have been placed after a specific set of instructions, unless otherwise noted in the text. Red boxes and/or red arrows on the images are used to specify what portion of the image a reader should be focusing on.

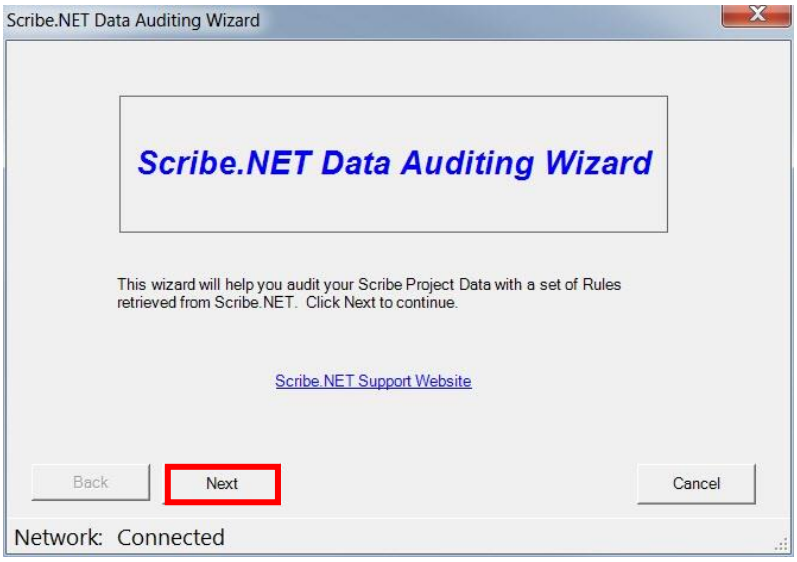
1.0 Scribe Database QA/QC

This guide assumes that the user has already uploaded and/or entered data into the Scribe database. If data has not been uploaded, users should refer to SOG 00The Scribe.NET Data Auditing Wizard should be run before publishing the Scribe project to Scribe.NET.
To start the Scribe.NET Data Auditing Wizard:

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

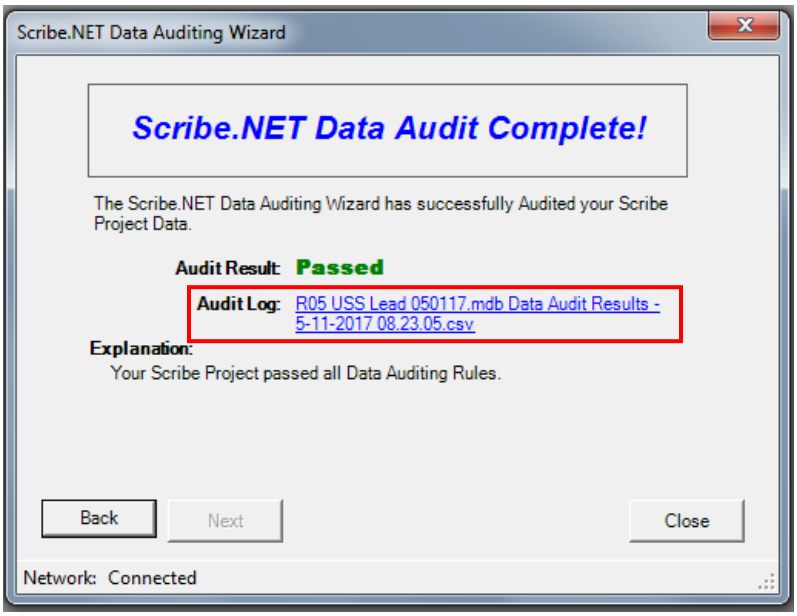


2. The Scibe.NET Data Auditing Wizard dialogue box should appear (see screenshot below). Click "Next."



3. Select the Data Auditing Rule Set(s) to be run. Auditor rule sets should be selected on a site-specific basis by the project Data Manager. For many sites, the Database Administrator creates a set of project-specific Auditor Rules, with individual rule sets for each type of data that is uploaded to Scribe. To determine which Auditor Rules to use on a specific project, consult the project Data Manager.

4. Ensure the appropriate Auditor Rule Sets are picked for the Scribe project.
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". If the results pass, then click "Close" in the lower right corner.

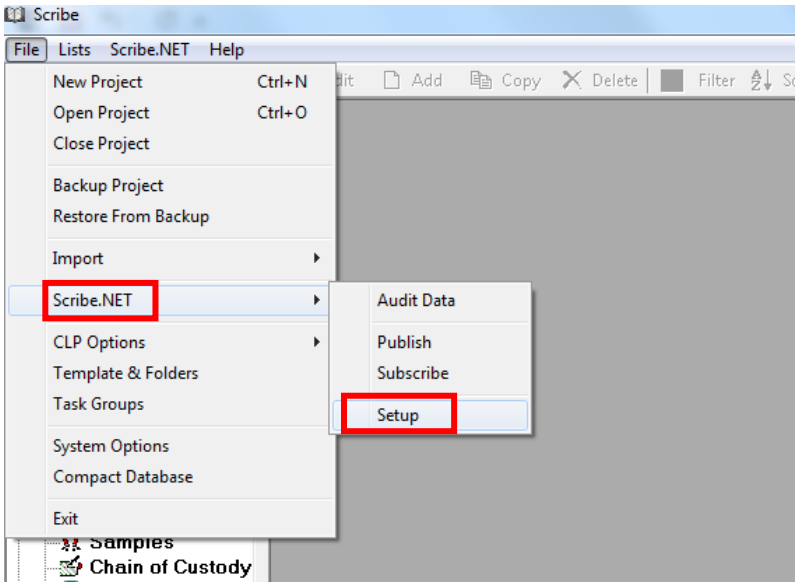


7. If any message other than "Passed" is displayed, the auditor log needs to be opened to view the rule violations. The auditor log downloads as a .CSV file. Data that does not pass the auditor should not be published.
8. The user then manually fixes the errors in the database. After addressing all the rule violations, rerun the Auditing Wizard to confirm all the rule violations have been addressed.

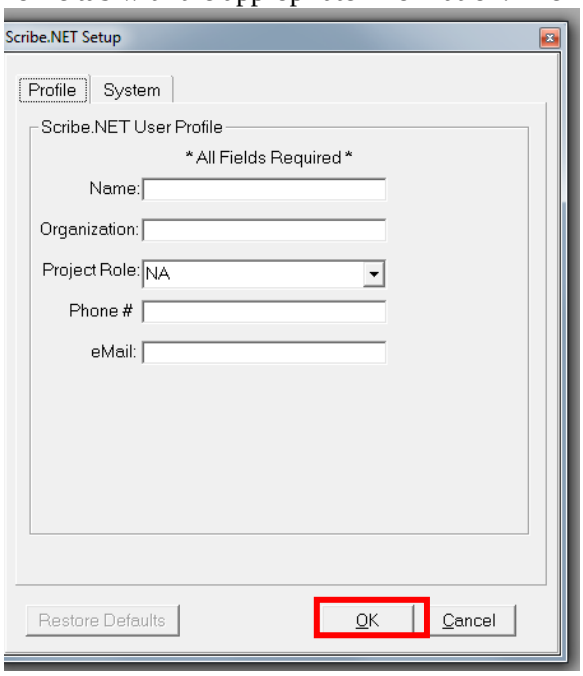
2.0 Scribe.net Setup

After the Auditing Wizard is run, and errors have been fixed in the database (if necessary), 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. The steps below detail publishing to Scribe.net for the first time.

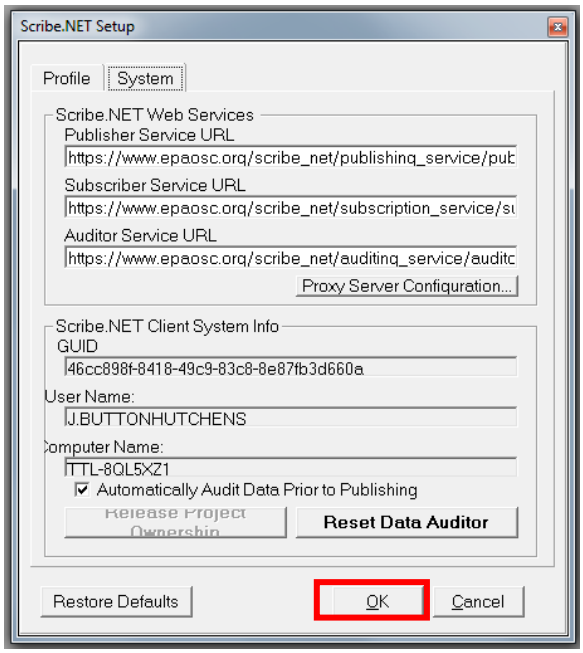
1. Navigate to the  icon on your computer desktop. Open Scribe.
2. Click on File, then place the cursor on "Scribe.NET", then slide the cursor onto Setup. Click on Setup.



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



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

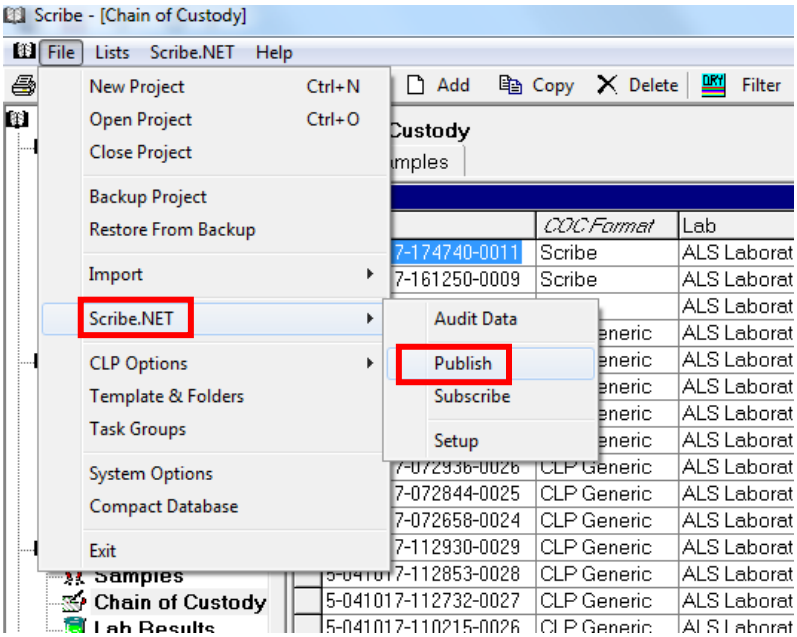


5. After the Profile information is completed, contact ERT to create a Project ID to allow the database to be published to Scribe.net.

3.0 Publishing to Scribe.net

Publishing a project(s) to Scribe.net stores your project(s) on ERT's web server with the intention of sharing your Scribe data with authorized subscribers via a subscription service. The subscription service is set up and managed by ERT. 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. Click on the Next button.

3. Enter the individual Publisher ID and password provided by ERT.
4. Click on the Publish button to publish your current project to Scribe.NET.

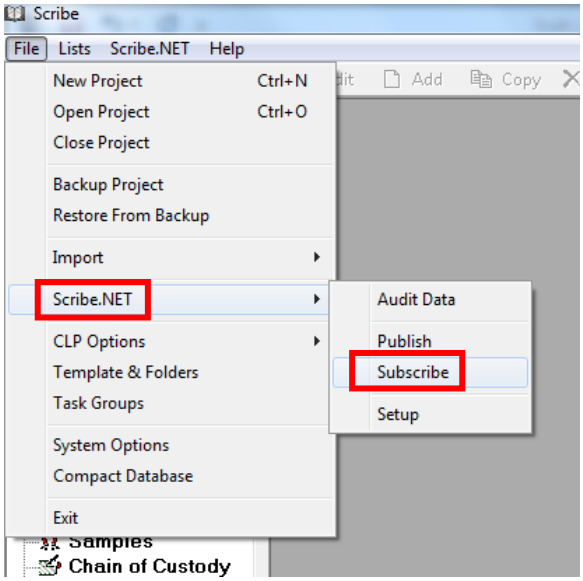
5. Once the project is published, contact ERT to create a subscription account. The subscription account will be used for others to access, or subscribe, to the most updated version of the project database.

4.0 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.

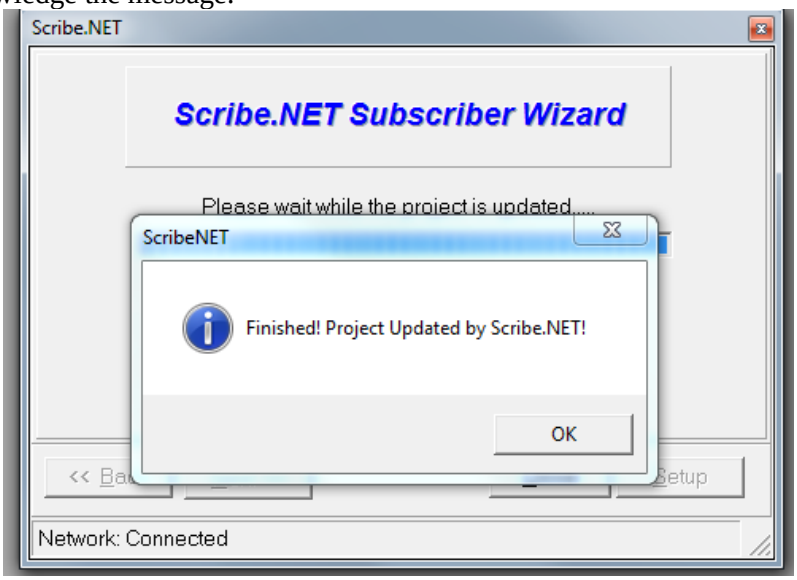


2. A Scribe.NET Subscriber Wizard screen is displayed. Click on the Next button.

3. 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 are requested, a list of emails should be given to ERT so they can send out an email notifying designated recipients when an update occurs to the database.

Troubleshooting

Problem	Possible Reason & Solution
Auditor repeatedly returns "Failed" message	• 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

SOG APPROVAL FORM

REGION 5 START CONTRACT-SPECIFIC

ENVIRONMENTAL STANDARD OPERATING GUIDE

Dashboard/GeoPlatform

SOG NO. 005

REVISION NO. 0

Last Reviewed: Not applicable (Revision No. 0)

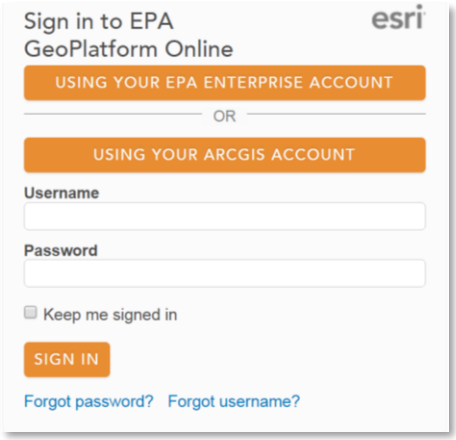
	July 31, 2018
Quality Assurance Approved	Date

CONTENTS

This Standard Operating Guide (SOG) is intended to provide the necessary steps for accessing and navigating the U.S. Environmental Protection Agency (EPA) GeoPlatform and the on-line applications which visualize the data collected at a project site. 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 project-specific group via the user's computer. Invitations to GeoPlatform Groups are provided by Group managers, who typically include the project GIS Lead and an EPA data manager. Sections 1.0 and 2.0 below will guide the user through the process of accessing and navigating the EPA GeoPlatform and associated on-line applications for a potential project site. Section 3.0 details the relationships between the components of the on-line applications. It is assumed that users of this SOG have read and understand the EPA Region 5 Data Management Plan, and are familiar with data management tools typically used in Region 5, such as Scribe and the EPA GeoPlatform. Images that are included in this SOG have been placed after a specific set of instructions, unless otherwise noted in the text. Red boxes and/or red arrows on the images are used to specify what portion of the image a reader should be focusing on.

1.0 EPA GeoPlatform

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



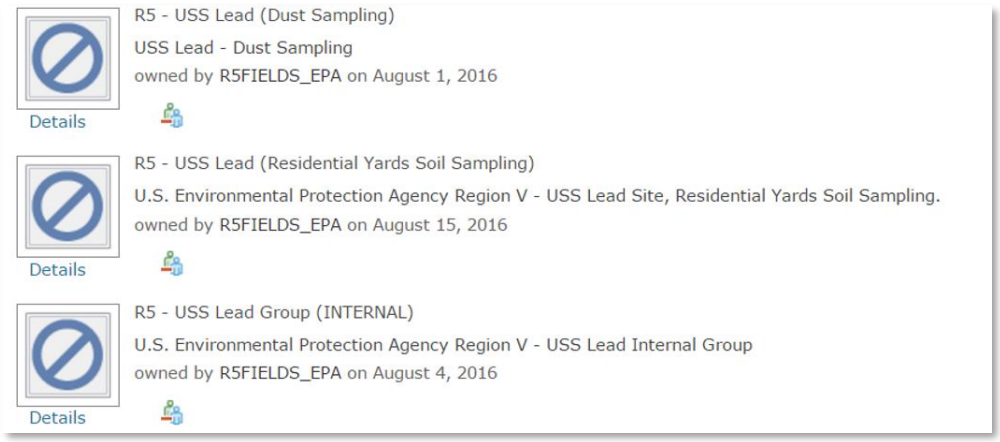
3. Once signed in, your web browser should look similar to the image below.

4. From the EPA 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. The groups below are examples. Depending on the project, you may have access to multiple groups. Multiple groups are often used on a single project to differentiate between differing levels of security clearance and information accessibility. For example, many projects utilize one group for the internal EPA project team that allows access to all project-related information, and a second group for limited public access that eliminates all personally identifiable information.

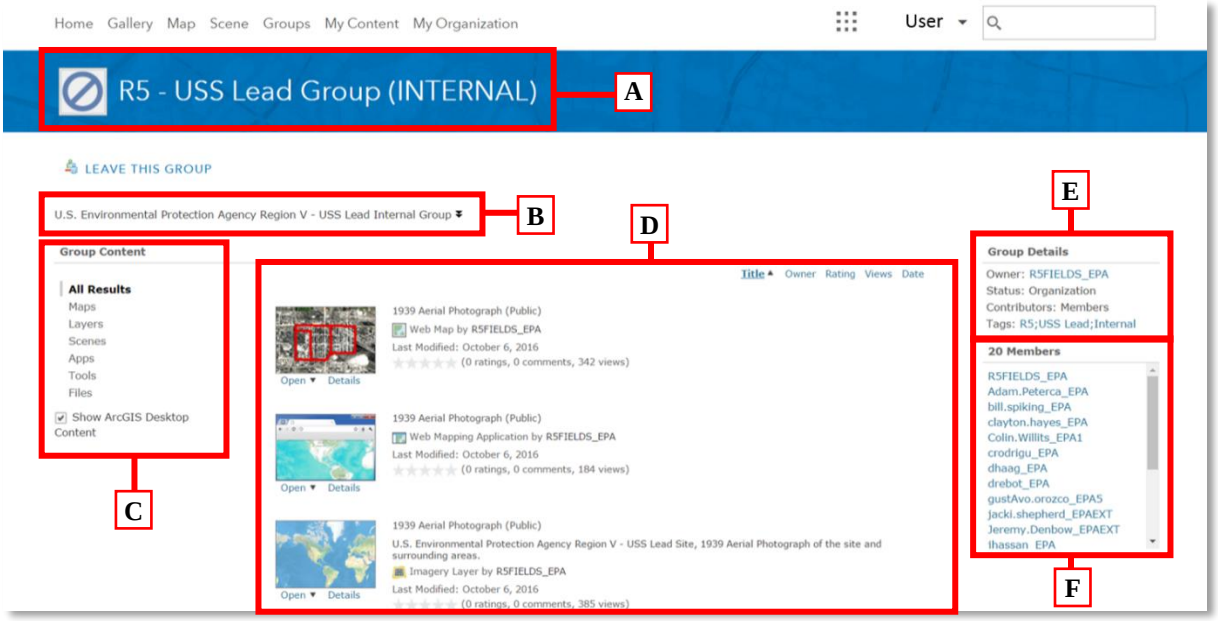

R5 - USS Lead (Dust Sampling)
USS Lead - Dust Sampling
owned by R5FIELDS_EPA on August 1, 2016
Details
R5 - USS Lead (Residential Yards Soil Sampling)
U.S. Environmental Protection Agency Region V - USS Lead Site, Residential Yards Soil Sampling.
owned by R5FIELDS_EPA on August 15, 2016
Details
R5 - USS Lead Group (INTERNAL)
U.S. Environmental Protection Agency Region V - USS Lead Internal Group
owned by R5FIELDS_EPA on August 4, 2016
Details

8. Click the "Details" link to open the selected Group's web page.

2.0 GeoPlatform Dashboards

1. Take note of the content within the selected Group's web page. The Web Maps contain *Feature Layers* overlaid on an aerial image. Normally, Web Maps will be accessed through a mobile device via a digital data collection application, such as ESRI ArcGIS Collector, for field data collection. Operations Views allow Project and Data Managers to monitor, track, and assess daily operations through real-time feeds. Web Mapping Applications combine and display data from Web Maps and Operations Views. All of these item types can be combined into project-specific dashboards often used by internal project teams.

GROUP PAGE LAYOUT EXAMPLE



A. Group Name – Name of current group

B. Group Description – Short description of group

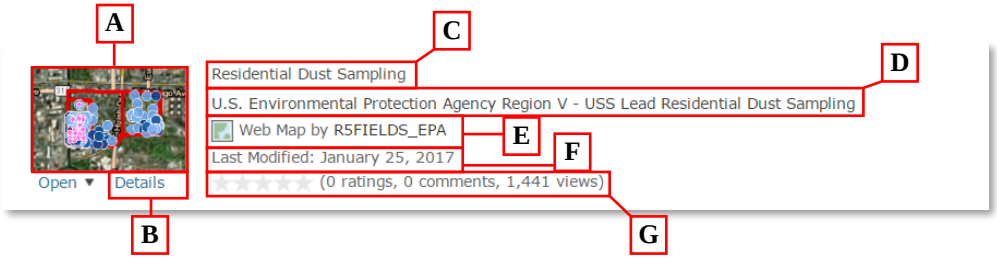
C. Group Content – Lists data types potentially found within group. Defaults to All Results; users can select Apps to sort data down to all applications within group.

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 EXAMPLE



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.

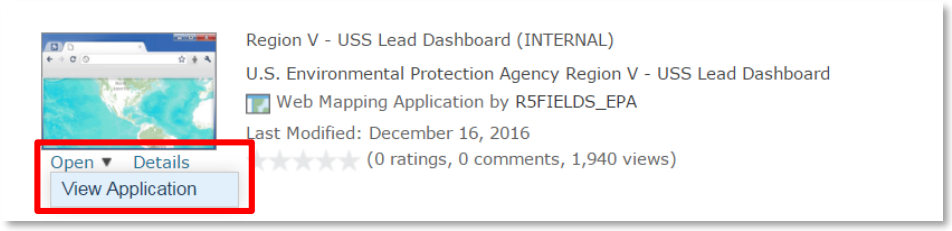
D. Item Description – Short description of the item.

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.

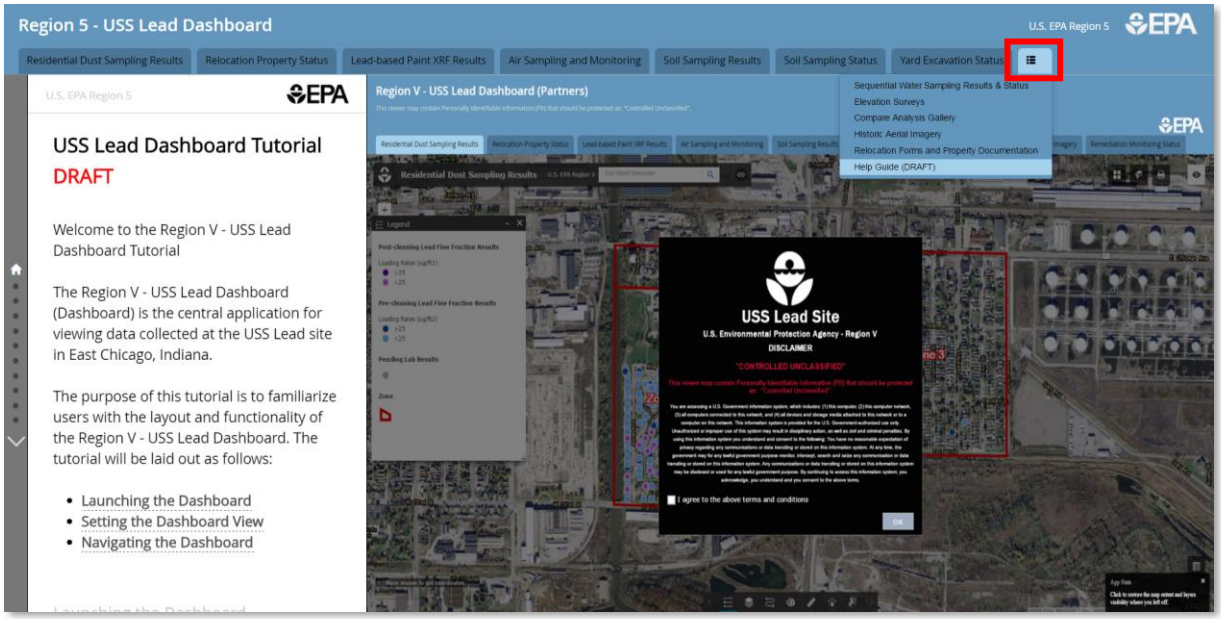
G. Item Ratings and Views – Star rating of item, number of ratings, comments, and views.

2. Navigate to the web application that you would like to view 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 site-specific group, the user can use a site-specific URL to launch the site dashboard. The user will have to enter their GeoPlatform credentials (as directed in Step 2 from Part I – EPA GeoPlatform) before the application will open. Repeat the steps above to open other site applications.

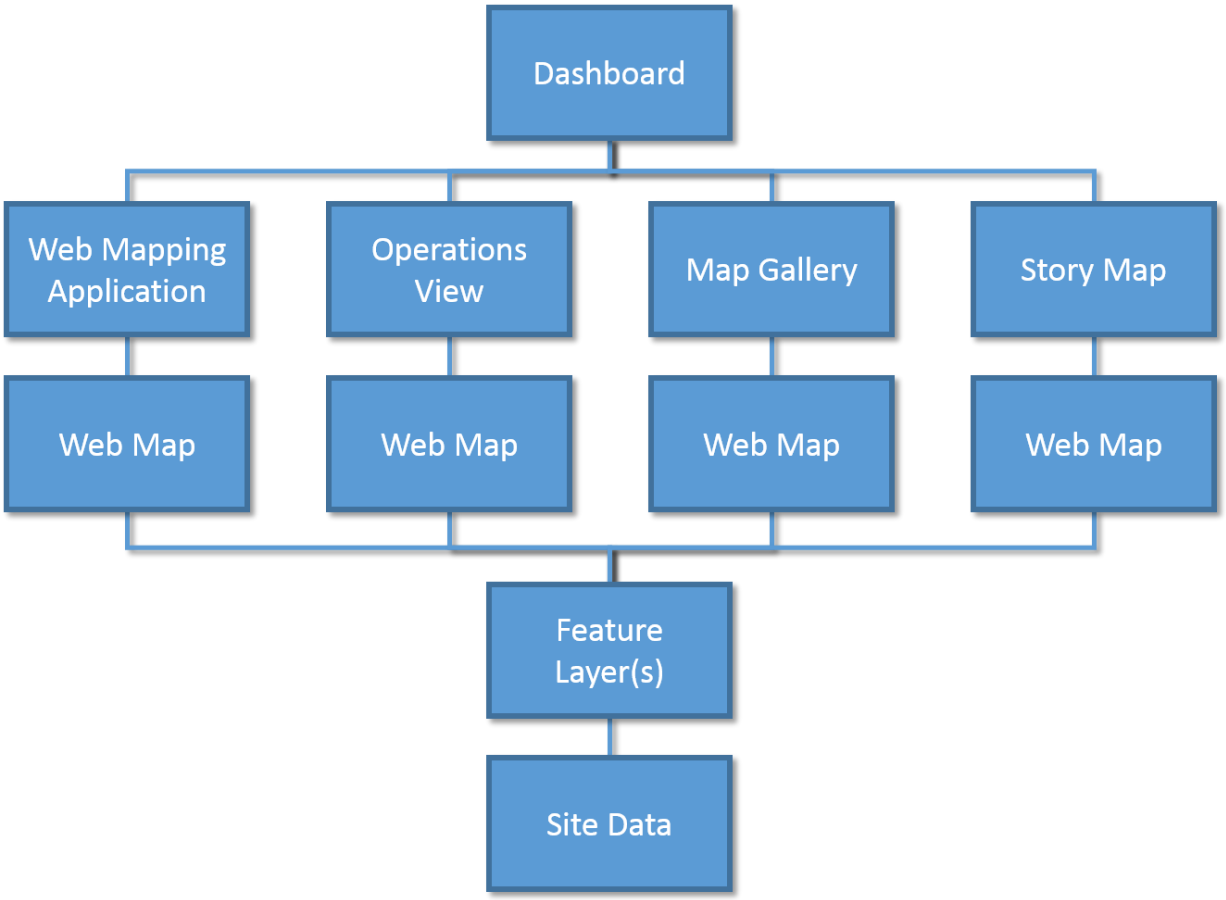
3. The site dashboard is a collection of Web Mapping Applications, Operations Views, Map Galleries, and Story Maps that visualize the data collected at the project site.



3.0 Data Relationships

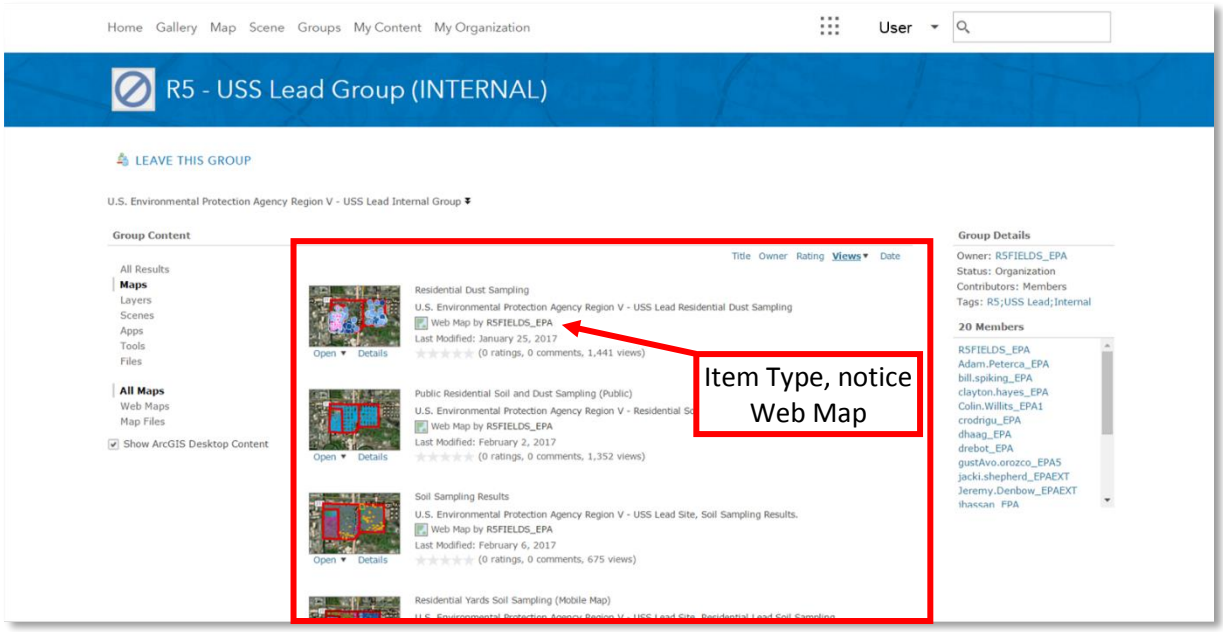
1. As stated in Step 3 in Part II, the site dashboard is a collection of Web Mapping Applications, Operations Views, Map Galleries, and Story Maps that visualize the data collected at the project site. Part III discusses the relationship between site applications and Web Maps, Web Maps and Feature Layers, Feature Layers and Site Data.

SITE DASHBOARD 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 a Residential Dust Sampling Results tab as an example.

2. The tab on a site dashboard may be a web mapping application (WMA) that is used for visualizing sampling site data. A sampling WMA is created from the sampling Web Map. The Web Map sets the data visualization criteria for the WMA and can be prepopulated with data that is used by the WMA. If changes to data visualization are needed, those changes are completed in the Web Map and not the WMA.



Notice below two web maps for residential dust sampling. The first, Residential Dust Sampling, is for an EPA Region 5 internal WMA, and the second, Public Residential Soil and Dust Sampling (Public), is for a public WMA. 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 in addition to being used to build WMAs. 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, a second Web Map is used to build the WMA for the site dashboard, and a third Web Map is used to build the public WMA.

3. The example 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.

WEB MAP DETAILS EXAMPLE

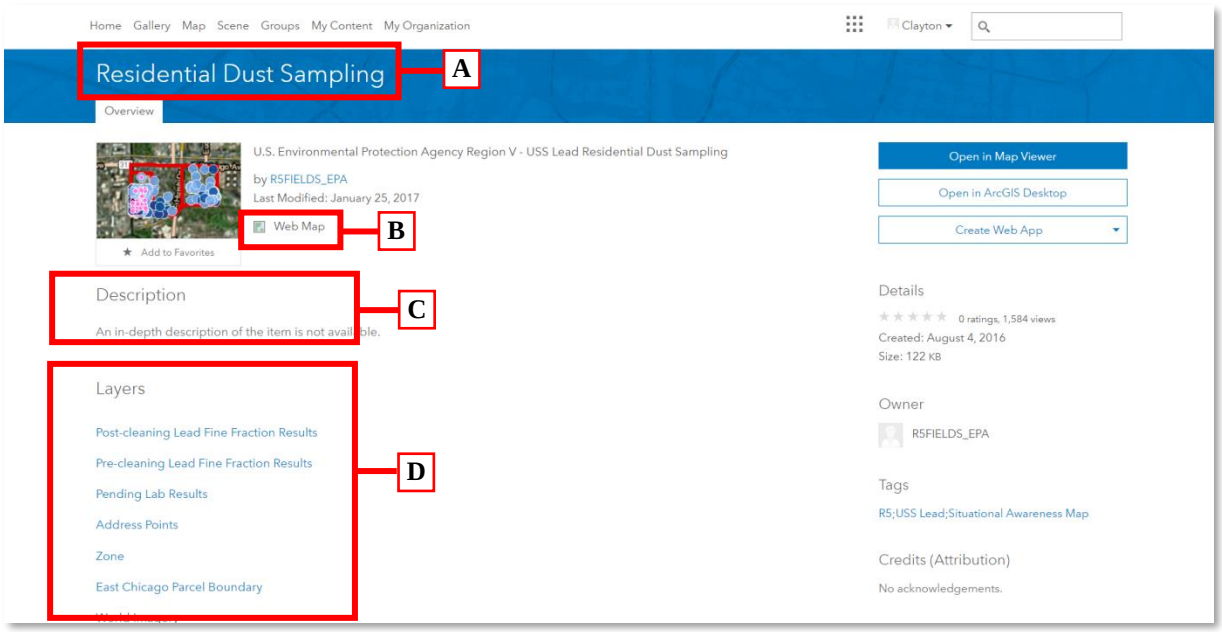
User

A. Item Title – Title of the item.

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

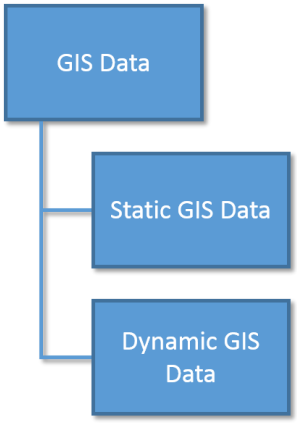
C. Item Description – More in-depth description of item.

D. Layer List – Layers within item.

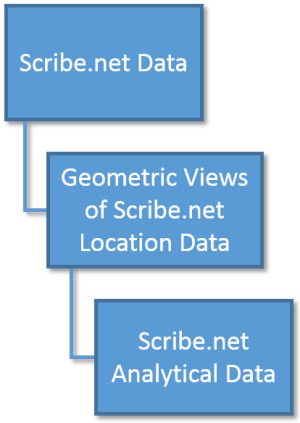


4. The Feature Layers within the sampling Web Map visualize the site data. The site data are either Geographic Information Systems (GIS) data or Scribe.net data.

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 WMA, Web Map or desktop application. Included in the static GIS data are identification (ID) data. These data should not be edited by field collection teams.

The Scribe.net data are geometric views of the published Scribe.net Subscription Location data for the project site. These data are updated when the Scribe.net Subscription is updated by the project Database Administrator. There are multiple symbolization options for displaying analytical data within a Web Map or WMA, including symbolization based on comparing analytical results to key screening levels. 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.

Appendix B:
Data Elements and Valid Values

Appendix B

Data Elements and Valid Values

The Data Element Dictionary must include the following information:

- ID (unique identifier for a data element)
- Name (name of the data element)
- Description (description of the data element)
- Database (the database which serves as the repository for this data element)
- Table (the database table for this data element)
- Data Type (formatting restrictions associated with this data element)
- Requirement (a description of the conditions by which this data element is required)
- Valid Values (a list of acceptable values for this data element)

Sampling Locations Data Elements						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Location	Sampling Location Code/Monitoring Location Code (PK)	Text	30	PK	Yes	Site Specific
Longitude	Longitude	Numeric	0	No	Yes	(minimum four decimal places)
Latitude	Latitude	Numeric	0	No	Yes	(minimum four decimal places)
Altitude	Altitude	Numeric	0	No	No	
Coord_Sys_Desc	Coordinate system	Text	70	No	No	
Datum	Geopositioning datum associated with the coordinates. (i.e. NAD83)	Text	50	No	No	NAD27, NAD83, WGS84
Easting	Easting	Numeric	0	No	No	
ElevDatum	Datum used to determine the elevation measurement. (i.e NAVD88)	Text	50	No	No	
ElevMethod	Method used to determine the elevation. (i.e. Altimetry; Global Positioning System (GPS))	Text	30	No	No	
GeoMethod	Geopositioning method used to establish the coordinates. (i.e. GPS)	Text	30	No	No	GPS, Digitize, Survey
GeoScale	Scale of the map or photo used to interpolate the coordinates	Text	20	No	No	
GPS_Collected_By	Collector of GPS Data	Text	30	No	Yes	Superfund Technical Assessment and Response Team (START)–Name, Environmental Protection Agency (EPA)–Name
GPS_Comment	GPS comment recorded	Text	50	No	No	
GPS_CorrectionType	GPS Correction Type (i.e. uncorrected; corrected)	Text	50	No	No	Corrected, Uncorrected
GPS_Date	GPS Date Recorded	DateTime	0	No	Yes	(MM/DD/YYYY)
GPS_PDOP	Position Dilution of Precision	Numeric	0	No	No	
GPS_Phase	Phase that GPS coordinate was captured.	Text	30	No	No	
GPS_Time	GPS Time Recorded	DateTime	0	No	No	
Location_Image_Path	File path to a related file or image	Text	255	No	No	
LocationComment	Location Comment	Text	250	No	No	
LocationDescription	Location Description further describes the Location Code.	Text	100	No	No	
LocationZone	Location Zone describes the area impacted relative to the site.	Text	25	No	No	
Northing	Northing	Numeric	0	No	No	
PropertyID	Property ID (FK)	Text	50	No	Yes	
Surf_Elev	Surface Elevation of the point where data are collected.	Numeric	0	No	No	
Surf_Units	Surface Elevation Units (i.e. feet; meters)	Text	20	No	No	Feet, Meters

Instrument List Data Elements						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
InstrumentID	Instrument ID (Required)	Text	50	PK	Yes	(examples) DataRAM01, DataRAM02, DataRAM03, XRF, pH, MultiRAE, MultiRaeS1, MultiRaeS2, TVA1000 Gastec Tube, UltraRAE
Detector_ID	Detector ID	Text	50	No	No	
Detector_Mode	Detector Mode	Text	50	No	No	
Detector_Type	Detector Type	Text	50	No	No	
Instrument_Cal_By	Instrument Calibrated By	Text	50	No	No	START-Name, EPA-Name
Instrument_Cal_Date	Instrument Calibration Date	DateTime	0	No	No	(MM/DD/YYYY)
Instrument_Descr	Instrument Description (i.e. Photo Ion Detector; HNU)	Text	100	No	No	
Instrument_Manufacturer	Instrument Manufacturer (i.e. HNU Systems)	Text	50	No	No	
Instrument_Model	Instrument Model (i.e. ISPI-101)	Text	50	No	No	Model Number
Instrument_Remark	Instrument Remark	Text	255	No	No	
Instrument_SN	Instrument SN (i.e. A11198)	Text	50	No	No	Serial Number
Instrument_Type	Instrument Type (i.e. PID/FID)	Text	50	No	No	(examples) XRF, PID/FID, HNU, GPS, Colorimetric
Instrument_Cal_Isotope	Instrument Calibration Isotope	Text	50	No	No	
Instrument_Efficiency	Instrument Efficiency	Text	50	No	No	
Instrument_Ref_Cal_Point	Instrument Ref Cal Point	Text	50	No	No	

Monitoring Data Elements						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
InstrumentID	Instrument ID (Required)	Text	50	PK	Yes	(examples) DataRAM01, DataRAM02, DataRAM03, XRF, pH, MultiRAE, MultiRaeS1, MultiRaeS2, TVA1000 Gastec Tube, UltraRAE
Location	Monitoring Location Code (Required)	Text	30	PK	Yes	Site Specific
Mon_Date	Monitoring Date (Required)	DateTime	0	PK	Yes	(MM/DD/YYYY)
Mon_Parameter	Monitoring Parameter. i.e. Mercury (Required)	Text	30	PK	Yes	(examples) Benzene VOC LEL O2 Pb As
Mon_Time	Monitoring Time (hh:mm:ss) (Required)	Text	30	PK	Yes	(hh:mm:ss)
Sub_Location	Sub Location. i.e. further describe Location info.	Text	25	No	No	Site Specific
Activity	Monitoring Activity	Text	50	No	No	
Altitude	Altitude	Numeric	0	No	No	

Monitoring Data Elements						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Coord_Sys_Desc	Sampling location coordinate system. i.e UTM NAD83	Text	70	No	No	
Datum	Datum of the stations coordinates	Text	50	No	No	NAD27, NAD83, WGS84
Detector_ID	Detector ID	Text	50	No	No	
Detector_Mode	Detector Mode	Text	50	No	No	
Detector_Type	Detector Type	Text	50	No	No	
Easting	Easting	Numeric	0	No	No	
ElevDatum	Datum used to determine the elevation measurement. i.e NAVD88; NGVD29; WGS84; Sea Level; Unknown Datum used to determine the elevation measurement Datum used to determine the elevation measurement. i.e. NAVD88; NGVD29; WGS84; Sea Level; Unknown	Text	50	No	No	
ElevMethod	Method used to determine the elevation measurement. i.e. Altimetry; GPS; Interpolation; Other; Survey	Text	30	No	No	
EventID	EventID. Use to group data by sampling events. Defaults to 'Monitoring' (i.e. Emergency Operations Center (EOC); Site Assessment)	Text	50	No	Yes	(examples) EOC; Site Assessment
GeoMethod	Geopositioning method used to establish Latitude and Longitude coordinates. Values: GPS; Interpolation; Survey	Text	30	No	No	GPS, Digitize, Survey
GeoScale	Scale of the map or photo used to interpolate the Latitude and Longitude coordinates	Text	20	No	No	
Imported	System field. N = Has Not been imported. Y = Has been imported into a Scribe project	Text	1	No	No	
Instrument_Cal_By	Instrument Calibrated By	Text	50	No	No	START-Name, EPA-Name
Instrument_Cal_Date	Instrument Calibration Date	DateTime	0	No	No	(MM/DD/YYYY)
Instrument_Descr	Instrument Description (i.e. Photo Ion Detector; HNU)	Text	100	No	No	
Instrument_Manufacturer	Instrument Manufacturer (i.e. HNU Systems)	Text	50	No	No	
Instrument_Model	Instrument Model (i.e. ISPI-101)	Text	50	No	No	Model Number
Instrument_Remark	Instrument Remark	Text	255	No	No	
Instrument_SN	Instrument SN (i.e. A11198)	Text	50	No	No	Serial Number
Instrument_Type	Instrument Type (i.e. PID/FID)	Text	50	No	No	(examples) XRF, PID/FID, HNU, GPS, Colorimetric
Instrument_Cal_Isotope	Instrument Calibration Isotope	Text	50	No	No	
Instrument_Efficiency	Instrument Efficiency	Text	50	No	No	
Instrument_Ref_Cal_Point	Instrument Ref Cal Point	Text	50	No	No	
Latitude	Latitude	Numeric	0	No	Yes	(minimum four decimal places)
Location_Image_Path	Location Image Path to related image file.	Text	255	No	No	
LocationComment	Location Comment	Text	250	No	No	
LocationDescription	Location Description	Text	100	No	No	
LocationZone	Describes the area impacted relative to the site	Text	25	No	No	

Monitoring Data Elements						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Longitude	Longitude	Numeric	0	No	Yes	(minimum four decimal places)
Mon_Criteria	Monitoring Criteria such as detection limit; action limit or other criteria	Numeric	0	No	No	
Mon_Criteria_Units	Monitoring Criteria Units	Text	20	No	No	
Mon_Meas_Surface	Monitoring Measurement Surface (i.e. concrete)	Text	50	No	No	
Mon_Meas_Units	Monitoring Measurement Units	Text	40	No	No	% mS/cm ppm deg C mV ppt deg F ng/m^3 ug/L mg/L ppb ug/m^3 mg/m^3 s.u.
Mon_Measurement	Monitoring Measurement	Numeric	0	No	No	
Mon_Operator	Monitoring/Sampler Name	Text	50	No	No	
Mon_Qualifier	Monitoring Criteria such as detection limit; action limit or other criteria	Text	10	No	No	
Mon_Remark	Monitoring Data Remark	Text	255	No	No	
Mon_Source	Monitoring Source (i.e. Radiation Type/Energy)	Text	50	No	No	
Northing	Northing	Numeric	0	No	No	
PropertyID	Property Id (FK)	Text	50	No	Yes	
RecordId	System field	Numeric	0	No	No	
SampleCounter	System field	Numeric	0	No	No	
Sub_Location	Sampling Sub Location (i.e. Fence Line; Perimeter. For residential: Living Room; Kitchen; etc.)	Text	30	No	No	
Surf_Elev	Surface Elevation	Numeric	0	No	No	
Surf_Units	Surface Elevation Units	Text	20	No	No	Feet, Meters
TimeStamp	System field	DateTime	0	No	No	
UnitID	System field	Numeric	0	No	No	
UserName	System field	Text	255	No	No	

Sampling Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Samp_No	Sample Number. Scribe requires a unique sample number (Required)	Text	25	PK	Yes	Site Specific (Examples) LocationID_mmddyy (LocationID if only one date for sample)
Location	Sampling Location Code (Required)	Text	30	No	Yes	Site Specific
Tag	Samples Tag (Required. Defaults to A)	Text	15	PK	No	
Altitude	Altitude	Numeric	0	No	No	

Sampling Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Analyses	Lab Analyses for this sample (i.e. VOCs) (FK)	Text	64	No	No	
Avg_Flow	Average Flow Rate	Numeric	0	No	No	
COC	Chain of Custody (COC) Number (FK)	Text	30	No	No	
Coll_Method	Collection Method	Text	30	No	No	
Color	Sample Color	Text	25	No	No	
Conductivity	Water Quality Measurement	Numeric	0	No	No	
ConductUnits	Water Quality Measurement	Text	15	No	No	
Container	Sample Container	Text	30	No	No	
Coord_Sys_Desc	Sampling location coordinate system.(i.e UTM NAD83)	Text	70	No	No	
Date_Cal	Date Sampler Calibrated	DateTime	0	No	Yes	
Datum	Datum of the stations coordinates	Text	50	No	No	NAD27, NAD83, WGS84
Description	Sample Analyses Description	Text	30	No	No	
Diss_O2	Water Quality Measurement	Numeric	0	No	No	
Diss02Units	Water Quality Measurement	Text	15	No	No	
Easting	Easting	Numeric	0	No	No	
ElevDatum	Datum used to determine the elevation measurement. (i.e NAVD88; NGVD29; WGS84; Sea Level; Unknown)	Text	50	No	No	
ElevMethod	Method used to determine the elevation measurement.(i.e. Altimetry; GPS; Interpolation; Other; Survey)	Text	30	No	No	
EventID	EventID. Use to group data by sampling events. Defaults to 'Sampling' (i.e. EOC; Site Assessment)	Text	50	No	Yes	
Flow_Units	Flow Rate Units (i.e. Liters)	Text	20	No	No	
GeoMethod	Geopositioning method used to establish Latitude and Longitude coordinates (i.e. GPS; Interpolation; Survey)	Text	30	No	No	
GeoScale	Scale of the map or photo used to interpolate the Latitude and Longitude coordinates	Text	20	No	No	
Image_Path	Image File Path	Text	100	No	No	
Imported	Scriblets System field. N = Has Not been imported. Y = Has been imported into a Scribe project	Text	1	No	No	
Latitude	Latitude	Numeric	0	No	Yes	(minimum four decimal places)
LinkSampleNo	Linked Sample Number	Text	25	No	No	
Location_Image_Path	Location Image Path to related image file	Text	255	No	No	
LocationComment	Location Comment	Text	250	No	No	
LocationDescription	Location Description further describes the Sample Location	Text	100	No	No	
LocationZone	Describes the area impacted relative to the site	Text	25	No	No	
Longitude	Longitude	Numeric	0	No	Yes	(minimum four decimal places)
Activity	Sampling Activity	Text	50	No	No	

Sampling Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Matrix	Sample Matrix (i.e. Air; Vapor, Water; Filtered Water; Ground Water; Soil; Sediment)	Text	40	No	Yes	Air Asbestos Blank Lab Sand Sand Sediment Soil Waste Filtered Water Ground Water Liquid Waste Potable Water Surface Water Wastewater Water
Media_Items	Air High Vol Sampling	Text	50	No	No	
Media_Type	Air High Vol Sampling	Text	30	No	No	
MS_MSD	Matrix Spike/Matrix Spike Duplicate (Y or N)	Text	1	No	No	
Munsel_R	Munsel Color Code	Text	30	No	No	
Munsel_Y	Munsel Color Code	Text	30	No	No	
No_Container	Number of Containers	Numeric	0	No	No	
Northing	Northing	Numeric	0	No	No	
Odor	Sample Data	Text	15	No	No	
Orifice_ID	Orifice ID	Text	50	No	No	
ORP	Water Quality Measurement	Numeric	0	No	No	
pH	Water Quality Measurement	Numeric	0	No	No	
Post_Cal	Stop Flow Rate	Numeric	0	No	No	
Post_Magnehelic	Ending Magnehelic reading	Numeric	0	No	No	
Pre_Cal	Start Flow Rate	Numeric	0	No	No	
Pre_Magnehelic	Starting Magnehelic reading	Numeric	0	No	No	
Preservation	Sample Preservation	Text	30	No	No	
PropertyID	Property ID (FK)	Text	50	No	Yes	
Pump_Fault	Pump Fault (Y;N)	Text	1	No	No	
RecordId	System field	Numeric	0	No	No	
Remarks	Remarks	Text	250	No	No	
Salinity	Water Quality Measurement	Numeric	0	No	No	
Samp_Concentration	Sample Concentration (i.e. low; medium; high)	Text	20	No	No	
SampleCounter	System field	Numeric	0	No	No	

Sampling Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
SampleDate	Date Sample Taken	DateTime	0	No	Yes	(MM/DD/YYYY)
Samp_Depth	Sampling Depth	Numeric	0	No	No	
Samp_Depth_To	Sampling Depth	Numeric	0	No	No	
Samp_Depth_Units	Sampling Depth Units	Text	20	No	No	Feet, Inches
Sampler	Sampler Name	Text	30	No	Yes	START-Name, EPA-Name
SamplerID	Air Sampler Equipment ID - Pump #	Text	50	No	No	
SampleTime	Time Sample Taken (hh:mm)	Text	5	No	No	
SampleMedia	(i.e. Summa Cannnister; Drainage; Groundwater; Monitoring Well; Residential; Tap)	Text	30	No	No	
SampleCollection	Sample Collection Method (i.e. Grab, Composite, Discrete Interval)	Text	30	No	Yes	Grab Composite Discrete Internval
SampleType	Sample Type (i.e. Field Sample, Field Duplicate, Lab quality control (QC), Spike, Trip Blank)	Text	30	No	No	Field Sample Preservative Blank Duplicate Lab QC Trip Blank Field Blank Rinsate Blank Split Spike
Soil_Descr	Soil Description (i.e. Sandy/Silty/Clay)	Text	25	No	No	
Start_Count	Air Sampler Start Counter	Numeric	0	No	No	
Start_Date	Air Sampling Start Date	DateTime	0	No	No	
Start_Pressure	Start Pressure (Hg)	Numeric	0	No	No	
Start_Temperature	Start Temperature (F)	Numeric	0	No	No	
Start_Time	Air Sampler Start time (hh:mm)	DateTime	0	No	No	
Stop_Count	Air Sampler Stop Counter	Numeric	0	No	No	
Stop_Date	Air Sampling Stop Date	DateTime	0	No	No	
Stop_Pressure	Stop Pressure	Numeric	0	No	No	
Stop_Temperature	Stop Temperature	Numeric	0	No	No	
Stop_Time	Air Sampler Stop time (hh:mm)	DateTime	0	No	No	
Storage	Sample Storage	Text	30	No	No	
Sub_Location	Sampling Sub Location (i.e. Fence Line; Perimeter. For residential: Living Room; Kitchen; etc.)	Text	25	No	No	
Surf_Elev	Surface Elevation	Numeric	0	No	No	
Surf_Units	Surface Elevation Units	Text	20	No	No	Feet, Meters
CLP_Sample_No	Contract Laboratory Program (CLP) Sample Number	Text	25	No	No	

Sampling Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Tag_Matrix	Tag Matrix	Text	20	No	No	
Tag_Measurement	Tag Measurement	Numeric	0	No	No	
Tag_Units	Tag Units of measurement	Text	20	No	No	
Task_ID	Scribe System Task_ID (FK)	Text	4	No	No	
Temp	Water Quality Measurement	Numeric	0	No	No	
Time_Counter	Use Sampling Time or Sampler Counter to calculate time. (Values: Counter; Time)	Text	10	No	No	
TimeStamp	System field	DateTime	0	No	No	
Turbidity	Water Quality Measurement	Numeric	0	No	No	
Total_Time	Total Sampling time	Numeric	0	No	No	
UnitID	System field	Numeric	0	No	No	
UserName	System field	Text	255	No	No	
Volume	Air Sampling Volume. Wipe Sampling Area.	Numeric	0	No	No	
Volume_Units	Volume Units	Text	20	No	No	
Witness	Witness Name	Text	30	No	No	

Lab Results Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Samp_No	Scribe/Field Sample Number (Required PK)	Text	25	PK	Yes	Site Specific (Examples) LocationID_mmddyy (LocationID if only one date for sample)
Analysis	Lab Analysis (i.e VOCs) (Required PK)	Text	100	PK	Yes	(examples) MSV (Mass Spec Volatile) AIR MSSV (Mass Spec Semivolatile) XRF See START Scribe template: Lists-Lab-Lab Analyses or Site Specific Analyses List
Analyte	Analyte/Paramater name (i.e. Lead; Arsenic; etc.) (Required PK)	Text	60	PK	Yes	
Result_Units	Result Unit of measurement (Required PK)	Text	20	PK	Yes	% mS/cm ppm deg C mV ppt deg F ng/m^3 ug/L mg/L ppb ug/m^3 mg/m^3 s.u.
Analytical_Method	Lab Analytical Method (i.e. 8270M)	Text	100	No	Yes	See START Scribe template: Lists-Lab-Lab Analytical Method or Site Specific Analytical Method List

Lab Results Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Basis	"Wet" for wet_weight basis reporting; "Dry" for dry_weight reporting	Text	10	No	No	
Cas_no	Chemical Abstract Number (CAS)	Text	50	No	Yes	
CLP_Sample_No	CLP Sample Number for samples submitted to the CLP program.	Text	25	No	No	
Comments	Result Comments	Text	250	No	No	
Date_Analyzed	Date Analysis was performed by Lab	DateTime	0	No	No	
Date_Collected	Date Sample Collected as reported by the Lab	DateTime	0	No	No	
Date_Extracted	Date Samples Extracted by Lab	DateTime	0	No	No	
Date_Received	Date Samples Received by Lab	DateTime	0	No	No	
Detected	Detected or Not Detected. i.e. "Y" for detected analytes or "N" for non_detects.	Text	20	No	No	
Dilution_Factor	Effective test dilution factor.	Numeric	0	No	No	
Extraction_Method	Lab Extraction Method (i.e. MEP; TCLP; SPLP; EP)	Text	100	No	No	
Final_Volume	The final volume of the sample after sample preparation. Include all dilution factors.	Numeric	0	No	No	
Final_Volume_Unit	The unit of measurement that corresponds to the final_amount.	Text	20	No	No	
Lab_Batch_No	Lab Batch Number	Text	30	No	Yes	
Lab_Coc_No	Chain of Custody Number as reported by the Lab	Text	50	No	No	
Lab_Location_ID	Sample Location ID reported by the lab	Text	30	No	No	
Lab_Name	Laboratory that performed the analysis	Text	50	No	No	
Lab_Result_Qualifier	Result Qualifier as Reported by the Lab	Text	10	No	No	
Lab_Samp_No	Lab Sample Number	Text	25	No	No	
Matrix_ID	Matrix ID reported by Lab. (i.e. Soil; Water; Air; etc.)	Text	20	No	Yes	Air Asbestos Blank Lab Sand Sand Sediment Soil Waste Filtered Water Ground Water Liquid Waste Potable Water Surface Water Wastewater Water
MDL	Method Detection Limit (MDL)	Numeric	0	No	No	
MDL_Units	MDL Units	Text	20	No	No	
Percent_Lipids	Percent Lipids	Numeric	0	No	No	

Lab Results Data Elements (Air, Water, Soil/Sediment, Hazardous Waste, Wipe, Chip)						
Data Element/ Scribe Table Field	**Description**	**Data Type**	**Length**	**Primary Key?**	**Required?**	**Valid Values (Where Applicable)**
Percent_Moisture	Percent Moisture of the sample portion used in the test	Numeric	0	No	No	
Percent_Recovery	Percent Recovery	Numeric	0	No	No	
Percent_Solids	Percent Solids	Numeric	0	No	No	
QA_Comment	QA Comment	Text	250	No	No	
QA_Date	QA Date	DateTime	0	No	No	
QA_UserName	QA Username	Text	50	No	No	
QAFlag	QAFlag (Values: 0 = Not QAed 1=QAed)	Numeric	0	No	Yes	
QC_Type	Laboratory_Control_Sample; Method_Blank	Text	40	No	No	
Quantitation_Limit	Quantitation Limits as determined by the lab.	Numeric	0	No	No	
Quantitation_Limit_Units	Quantitation Limit Units	Text	20	No	No	
Reportable_Result	"Yes" for results which are considered to be reportable; or "No" for other results	Text	5	No	No	
Reporting_Limit	Reporting Limits as determined by the lab.	Numeric	0	No	No	
Reporting_Limit_Units	Reporting Limit Units	Text	20	No	No	
Result	Result (number) returned from lab	Numeric	0	No	Yes	
Result_Qualifier	Final/Validated Result qualifier/flag (i.e. J;U;ND;<;>)	Text	10	No	Yes	
Result_Type_Code	"TRG" for a target or regular result; "TIC" for tentatively identified compounds; "SUR" for surrogates; "IS" for internal standards; or "SC" for spiked compounds.	Text	10	No	Yes	*TRG (Target Compound)* SC (Spiked Compound) SUR (Surrogate Compound) TIC (Tentatively Identified Compound) IS (Internal Standard)
Sample_Type_Code	Code which distinguishes between different types of samples. For example normal samples must be distinguished from lab method blank samples	Text	10	No	Yes	*SAMP (Field Sample)* Blank (Blank QA Sample) LCS (Laboratory Control Sample) LCSD (Laboratory Control Sample Duplicate) MS (Matrix Spike) MSD (Matrix Spike Duplicate)
SubSample_Amount	Amount of sample used for test.	Numeric	0	No	No	
SubSample_Amount_Unit	Unit of measurement for subsample amount.	Text	20	No	No	
Test_Type	Type of test (i.e. "initial"; "reextract1"; "reextract2"; "reextract3"; "reanalysis"; "dilution1"; "dilution2"; and "dilution3")	Text	10	No	No	
Total_Or_Dissolved	"D" for dissolved or filtered (metal) concentration; or "T" for everything else	Text	1	No	No	

Appendix C:
Site-Specific Data Management Plan Template

USEPA Region 5 Site-Specific Data Management Plan

Project Name:		**TDD No:**	
Author:		**Company:**	
Date Initialized:		**Date Updated:**	

Key Considerations:

- ☑ **Real-time continuous streaming of monitoring data (VIPER) is needed**
- ☑ **Digital data capture will be used (Survey123/Collector)**
- ☑ **Interactive map on EPA GeoPlatform is needed**
- ☑ **Custom Scribe database is needed**

Summary of Site Activities
Objectives of Data Collection

Environmental Data Procedures						
	Data Stream	**Capture Technique**	**Transmission Technique**	**Verification Procedures**	**Target Repository**	**Notes**
☐	Air Monitoring					
☐	Air Sampling					
☐	Surface Water Sampling					
☐	Groundwater Sampling					
☐	Water Quality Measurement					
☐	Soil Sampling					

USEPA Region 5 Site-Specific Data Management Plan

Environmental Data Procedures						
	Data Stream	**Capture Technique**	**Transmission Technique**	**Verification Procedures**	**Target Repository**	**Notes**
☐	XRF Measurement					
☐	Sediment Sampling					
☐	Soil Gas Sampling					
☐	Vapor Intrusion Sampling					
☐	Other					

Other Data Procedures						
	Data Stream	**Capture Technique**	**Transmission Technique**	**Verification Procedures**	**Target Repository**	**Notes**
☐	Photographs					
☐	Videos					
☐	Access Agreements					
☐	PDFs					
☐	Reports					
☐	Costs (RCMS)					
☐	Other					

Data Manager Approval:		8/1/2018 10:49 AM