



Geographic Information System (GIS)

I. General Requirements

- A. Geographic Information System (GIS) is a data-driven graphical tool used to present spatial data. Information for a GIS is typically stored in separate data files. Spatial information from each individual file can be overlain with another file to create data sets that show a collection of information for the same area of interest. For example, aerial photography from one data set may be overlain with street information to produce a basic map. Adding buildings, landmarks, and property lines from other data files can greatly increase the information available to the user and enhance the ability of the user to manage multiple layers of complex data at one time. The resulting GIS file can now be used (or saved for later use) while preserving the original sources of data.
- B. GIS is not “as-built” documentation. GIS integrates vast amounts of data from a variety of sources into one common user interface. GIS data provided to Doyon Utilities (DU) by a contractor is used to update the existing data base and add new information.
- C. DU maintains a master GIS database for all the utility systems it owns and operates on Fort Wainwright, Fort Greely, and Joint-Base Elmendorf-Richardson, Alaska. This database is managed by DU and shared with each military installation. This database is important to the operation and maintenance of each installation’s mission. It also serves as the “official” asset inventory of Doyon Utilities’ infrastructure at each installation that directly affects its monthly rates.
- D. Staffing for project-required GIS requirements depends on the scale of the project. The tasks can be accomplished by a single individual who has some background in surveying and is well-trained and knowledgeable about the capabilities and functionality of GIS. Staff may include:
 - 1. Surveyors for spatial data acquisition;
 - 2. Contractor office staff to compile product specific data; and
 - 3. GIS specialist to produce data files from spatial information and data.
- E. GIS information must be obtained throughout the construction project in cases where construction will be concealed (such as by burial) at project completion.
- F. Accuracy of source data in a GIS database must be maintained in order to have a reliable system. Descriptive metadata (information regarding the data) ensures the end user is aware of the sources and limitations of the data, such as the name of the person collecting the data, date the data was collected, resolution, frequency of sampling, or any other information that might be pertinent to users.

II. Submittal Requirements

- A. Within ten (10) days of contract award the Contractor or Consultant as the case may be shall submit the following Information and Qualifications for the person who will be responsible for the preparation of the GIS documents:
 - 1. Name
 - 2. Business Name
 - 3. GIS Qualification
 - 4. GIS experience
 - 5. Statement indicating ability to perform work indicated by this specification
- B. Submit GIS datasets for newly constructed or rebuilt, and demolished assets including all points, lines, and polygons, in compliance with this Section.

III. Scope of Work

- A. Upon completion of project work the Contractor is required to collect and submit Spatial Data Standards for Facilities, Infrastructure and Environment 3.1 (SDSFIE) compliant GIS data for all newly installed, rebuilt, or demolished utilities.
- B. Detailed GIS datasets of completed projects is required to be turned over to DU in one of the following formats compatible with version 10.3 or newer ArcGIS software:
 - 1. ESRI .mdb personal geodatabase feature class (preferred);
 - 2. ESRI .gdb file geodatabase feature class
- C. SDSFIE 3.1 compliant ESRI .mdb database will be provided by DU for use as a template. Additional copies will be available on the website.
- D. The GIS data files must include all new utilities installed, rebuilt utilities, and any demolished or abandoned utilities. Submitted GIS must have the predetermined SDSFIE based fields (as shown in GIS attribute sheet) appropriately filled out with SDSFIE 3.1 domains.
 - 1. Where fields are listed in the DU GIS Attributes Table their use is required.
 - a) The DU GIS Attributes Table is provided as an attachment to this document.
- E. Requests for existing GIS data may be made for particular project areas.
 - 1. Accuracy of existing GIS data is not guaranteed.
 - a) Provided data should not be used for engineering & locating purposes.
 - 2. Existing GIS data may be used in assisting for demo/abandoned utilities.

3. However, should not be used for new or rebuilt utilities.
- F. Data must be spatially accurate and represents the condition on the ground.
1. CAD design formats are unacceptable.
 2. For data where there are two lines on a pole they are to be shown layered on top of one another in the GIS data.
 3. For data where there are a valves or similar on a line they are to be shown snapped to the line they effect.
 4. This rule applies to all assets whether COMM, EDS, WTD, WWC, HCS, NGD, or GEN.
 5. There shall be no gaps between line segments for pipes or lines.
 6. All features should be surveyed from the center of the object.
 - a) Offsets should be used as needed.
 7. For utilidor systems that will not have their lids removed for access, measurements to be used in constructing the GIS submittal shall be taken from known points of reference. Construction drawings and redlines may also be geo-referenced and used in support of developing the GIS submittal. Surface points, if available, must be taken at intermediate vaults for centerline reference.
- G. Data shall be collected and submitted using sub-foot accuracy and the following coordinate system/datum as specified and identified for each applicable military instillation:
1. Fort Wainwright, Alaska (FWA) WGS 1984 UTM Zone 6N
 2. Fort Greely, Alaska (FGA) WGS 1984 UTM Zone 6N
 3. Joint Base Elmendorf-Richardson (JBER) WGS 1984 UTM Zone 6N
- H. Data submitted in AK State Plane or data that has not been properly converted to WGS 1984 using the proper geographic transformation for Alaska will be rejected.
- I. Elevation and depth data are to be ± 3 ".
- J. Vertical Datum of NAVD 88 with appropriate Geoid.
- K. The Contractor is responsible for verifying the accuracy and completeness of the submitted GIS data and subjecting the data to internal quality control processes. Submittals containing GIS data found to be spatially inaccurate or incomplete per the GIS Standard will not be reviewed, but returned for resubmittal with any necessary corrections made at Contractor's expense.
- L. DU has adopted the ESRI suite of products to support GIS work and spatial data editing. To utilize and have access to all of the tools for proper GIS support ESRI's ArcMap is recommended for the creation and editing of spatial data.

IV. Datasets

A. GIS Submittal Data

1. GIS datasets for newly constructed or rebuilt, and demolished (separate files) assets, including all points, lines, and polygons in compliance with this Section and attachments, must be submitted in one of the formats listed below. CAD files are not acceptable.
 - a) ESRI .mdb personal geodatabase feature class (preferred);
 - b) ESRI .gdb file geodatabase feature class
2. Coordinate system in WGS 1984 UTM Zone 6N.
3. There shall be a separate GIS feature class for each type of asset for each utility listed below.
 - a) WATER
 - b) WASTEWATER
 - c) HCS
 - d) NATURAL GAS
 - e) ELECTRICAL
 - f) GENERAL
 - g) COMMUNICATIONS

B. Feature classes must include all fields for that feature listed on the DU GIS Attributes Table, with a proper domain ID required as identified in the document. Additional SDSFIE specific 3.1 attribute domains are available from www.SDSFIE.org using the available prior release tools.

1. Additional domains IDs are acceptable if preapproved and are more specific.
2. SDSFIE domain list not exhaustive
3. The blank SDSFIE 3.1 geodatabase base available on the DU website has SDSFIE attribute domains integrated.

C. As required point and line features must be accompanied by a photo depicting such object.

1. A photo may be used for multiple features as long as each feature is visible.
2. Vault systems may be taken as one photo.

V. Other files as REQUIRED.

- A. Linked graphics or digital photographs
- B. Site Plans for Demolitions
- C. Quality Control Report

- D. Quality Assurance Report

VI. Submission

- A. Closeout data shall be submitted directly to the DU Project Manager in charge of the respective project.
- B. All data submitted to DU shall be subject to a quality assurance (QA) review by DU GIS staff. Any GIS data that does not pass the QA review shall be corrected by the contractor and resubmitted for approval prior to closure of the project or task.
- C. All GIS work for a project must be submitted to DU as a single submittal.
- D. Any changes required must be made by the Contractor before final acceptance by DU.
- E. Questions should be directed to the DU Project Manager or to the DU GIS Analyst
- F. The DU GIS Analyst for FWA and FGA can be reached by telephone at (907) 455-1548.
- G. The DU GIS Analyst for JBER can be reached by telephone at (907) 428-5379.
- H. Empty SDSFIE datasets will be made available upon request.

END

ATTACHMENT: Doyon Utilities GIS Attributes Table