

## Geographic Information System (GIS) Deliverables

1. Mapping requirements (Geographic IS :
  - a. All GIS data must adhere to the standards in Appendix X and the requirements listed here.
  - b. Construction drawing deliverables shall be reviewed for accuracy and completeness by a NFWASH GIS POC before acceptance.
  - c. Where possible, the contractor will utilize source GIS data provided by NAVFAC Washington.
    - i. A completed NAVFAC Washington GIS data release form is required.
    - ii. The contractor shall be provided a copy of any GIS data required meeting mapping deliverables in ESRI format (TBD shapefile or Personal Geodatabase). That data shall be structured according to the current version of the Spatial Data Standards (SDSFIE) in use by NAVFAC (version 2.6 as of October 010), and all data shall be returned in this format and structure.
    - iii. The GIS data provided shall be extracted from the Navy's GIS data Maintenance and Analysis (M&A) environment. This copy of the data will include existing populated layers, and non-populated layers. The non-populated layers are provided to ensure the data is returned in the required NAVFAC Washington GIS data model structure.
  - d. The contractor shall consult with the government GIS POC before populating the attribute tables to ensure the population matches the current NDW interpretation of the SDSFIE. Layer-level metadata updates are required for all updated or new layer deliverables and the contractor shall consult with the government GIS POC to identify the specific metadata content requirements.
2. GIS Deliverable Requirements:
  - a. Format is to be determined by the government project manager and the contractor project manager.
    - i. The GIS deliverable shall delivered on disc (CD-ROM or DVD) to the government for Quality Assurance (QA), and the government will have two weeks to QA the data and then the contractor will have two weeks to make any corrections and produce the final deliverable.  
or:
    - ii. The contractor will be required to deliver a copy of all data into the appropriate geodatabase schema within the NDW GeoRepository, located in the Maintenance and Analysis

environment (accessible via web access and Citrix). All data will be placed into a geodatabase editing version for government review, before acceptance and publishing. All completed and published data will be recorded in the NDW tracking table located in the M&A environment.

- b. Reporting: The contractor shall provide a document (MicroSoft Word format) that lists all layers developed or updated for the task.
  - c. Maps: In addition to any hardcopy or softcopy maps delivered, all source map files (ESRI ArcGIS (mxd)) for these maps shall be provided to the government.
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## **Appendix X: Naval District Washington Standards for Geographic Information System (GIS) Deliverables.**

All GIS deliverables will be created and submitted in accordance with the current NAVFAC GIS Data Guide GIS Data Deliverable Specifications (attached herein). All data collection should conform to Field Collection grade Digitizing/Conversion collection procedures as specified by task or the project as a whole.

GIS Data Deliverable Specifications  
(see contract SOW)

### **1. Overview:**

The GeoReadiness Center (GRC) is the single, authoritative source and distribution point for all geospatial facility data within the region. The GRC houses the most current geospatial information for the entire Region and provides access to the comprehensive data set and analysis tools to Regional and DOD decision makers/managers, sponsored contractors, and other sponsored individuals via a secure government Internet site.

### **2. Deliverable Requirements:**

A Note About CAD: All CAD drawings should conform to AEC CAD Standards as well as any specific standards set forth in NAVFAC's Engineering Design Guidelines. CAD drawings may be accepted as GIS deliverables provided that the drawings adhere to the following requirements regarding the coordinate system, metadata, and data integrity:

### 3. Projected Coordinate System

All geospatial data stored by the GRC resides in the appropriate State Plane coordinate system and Zone for the area of interest, NAD83 datum, Feet units. The Region's geospatial data collection is comprised of data from Maryland, Virginia, and the District of Columbia.

### 4. Metadata

The contractor will turn over, at a minimum, metadata for each feature class in XML format. The following elements of the FGDC Content Standard for Digital Geospatial Data (CSDGM) that must be included as part of the deliverable. Feature-level metadata may be required at the discretion of the government. Details on the standard can be found at <http://www.fgdc.gov/metadata/geospatial-metadata-standards>

- a. Contact Details
  - i. Contact information for the data steward
    - 1. Person
    - 2. Organization
    - 3. Position
    - 4. Telephone
    - 5. Email
  - ii. Description – characterization of the data
    - 1. Abstract
    - 2. Purpose
  - iii. Time Period - explains how current the dataset is
    - 1. Currentness Reference
    - 2. Date
  - iv. Keywords – word/phrase descriptors of the data
- b. Data Quality
  - i. Positional Accuracy – accuracy assessment of the data
    - 1. Horizontal Accuracy Report
    - 2. Vertical Accuracy Report (if applicable)
  - ii. Source Information – list of sources and a short citation of each
    - 1. Source Citation (Details)
      - a. Title
      - b. Originator
      - c. Publication Date
    - 2. Process Step – an explanation of how/when the data was created
      - a. Process Description
      - b. Process Date
- c. Spatial Reference
  - i. Horizontal Coordinate System

- ii. Vertical Coordinate System (if applicable) – vertical datum information
  1. Datum Name
  2. Distance Units

## **5. Data Integrity**

Data accuracy standards for all deliverables will be in accordance with those set forth in the section entitled 'Data Collection Procedures'. All deliverables should include an accuracy report in the metadata.

The contractor shall employ appropriate QA/QC standards to ensure that data is topologically correct, accurate and complete (to include):

- No erroneous overshoots, undershoots, dangles or intersections in the line work
- Point and line features will be snapped together where appropriate to support networks. For example, do not break linear features for labeling or other aesthetic purposes.
- Lines should be continuous and point features should be digitized as points. For example, point features, such as manholes, should not be drawn using only a circle (polygon) to represent its location. Preferably, use an attribute block symbol that has an insertion point in the center of the manhole.
- No sliver polygons
- Digital representation of the common boundaries for all graphic features must be coincident, regardless of feature layer
- Geometric network connectivity must be maintained for utility networks.

A summary of the methods used to correct inconsistencies and any remaining errors by case should be included in the metadata under the 'Logical Consistency Report' and 'Completeness Report' sections.

## **6. Data Model**

The geodatabase schema shall follow the GIS Data Guide implementation of the SDSFIE data model and data layers will be captured accordingly. Information on the SDSFIE data model can be found at: <https://sdsfie.org>.

If new data is being created the contractor must provide the GRC with a data dictionary identifying all of the SDSFIE Entity Types, attributes, and/or domain values associated with the new feature(s), the geographic area(s) covered by the data and Spatial extent information prior to the creation/editing of GIS data. Acceptable formats: MS Excel, MS Word, PDF. Local attributes (meeting SDS experienced level) will require precise schema definitions.

## **7. Government Furnished Materials**

The Government will provide the contractor access to necessary geospatial data, reports, schematics, or other pertinent information either through the regional NAVFAC GRC, or a data copy upon completion of the appropriate request forms and/or security information. All contractors are required to request an account from the regional GRC at the start of the contract.

The contractor must verify with the GRC that they are working with the most recent version of the dataset at the beginning of each contract and must delete any copies of data in their possession at the end of each contract.

When requesting data from the GRC, the contractor will identify the current SDSFIE data layer names or know which data layers they require. The government POC will be contacted prior to the release of any information to verify requirements. A non-disclosure agreement may need to be completed prior to the release of any data.

## **8. Data Collection Procedures**

All data collection must include:

**Feature Attributes:** The contractor shall identify the classification, type, location, ID number, and any other necessary attributes (specified by the Government) for all new/updated/edited features first by field verification and then by existing sources.

Metadata must include an accuracy statement at the 90% or 95% confidence interval. Accuracy statements should include the method of determination, preferably from a recognized standard such as National Standard for Spatial Data Accuracy (NSSDA) (as outlined in "Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy," published by the Federal Geographic Data Committee (FGDC), dated July 1998).

## **9. Field Collection**

Where field data collection is stipulated in the contract, the contractor shall utilize conventional and other methods, such as a total station, or Global Positioning System (GPS) in accordance with the applicable Geospatial Positioning Accuracy Standards published by the Federal Geographic Data Committee (FGDC).

At a minimum, the contractor shall provide, resource grade GPS collection at an accuracy level of +/- < 1m and shall use differential correction to target accuracies of +/- .5 m.

Where appropriate (as stipulated in the contract or as otherwise determined by the Government), the contractor shall use survey grade GPS, at an accuracy level of +/- 20cm. Global Positioning System (GPS) data collection activities will be based on a post-processed environment using an accurately sighted base station. Base station files for post processing acquired locally (off-site CORS Continuous Operating Reference Station) will be verified for accuracy.

GPS data on the location of utility lines and other features shall be captured at a minimum every 50ft and at each turn or bend in the line and processed as a line feature type. GPS data on the location of utility points and other features should be captured at the centroid of the feature unless signal obstruction or access prohibits; otherwise points will be captured at a uniform distance and direction from the centroid and the offset captured in the metadata for that feature. Data on polygon features will be collected at every vertex of the feature and processed as a polygon.

All survey-grade data collected shall be provided to the Government in a digital format with an attached Survey Report identifying survey method, equipment list, calibration documentation, survey layout, description of control points, control diagrams, quality control report and field survey data.

A digital Survey Control Database (consisting of a survey marker database and a survey traverse database) will be produced for all survey control points established under this contract, including the horizontal and vertical order and coordinate location of each point.

#### Digitizing/Conversion

Where Digitizing/Conversion is stipulated in the contract, the contractor shall digitize/convert features from designated sources (including remotely sensed data, hardcopy scans and vector data) to support various GIS applications.

Digitizing/conversion routines will insure that 90 percent of all features will measure within 0.01 inches when reproduced at the scale of original imagery or data source

### **10. Government Review**

The Government shall review the submitted data and documentation upon completion of all stated work. Missing or incomplete items will be documented and forwarded to the contractor for completion. Failure to adhere to any of the stated delivery specifications could result in rejection of deliverables and nonpayment. Contractors

should, at a minimum, submit data and documentation samples at 25% and 75% project completion to avoid the rejection of final deliverables.

