



PORT OF MOBILE
ALABAMA PORT AUTHORITY

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Alabama State Port Authority Port of Mobile

ASPA Geospatial Data Delivery Standards

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Table of Contents

Table of Contents	2
Purpose	3
Introduction	4
Explanation	4
Approach	4
Scope	4
Geospatial Data Delivery Standards	5
Spatial Reference	5
Data Format	6
Delivery Format.....	7
Processing Tolerances – Coordinate Precision	7
Topology.....	7
Naming Convention	8
Start data and field names with alphabetical characters	8
Do not include spaces, dashes, or other special characters	8
Do not use prefix or suffix for data type.....	8
Do not use geometry type as suffix	8
Avoid using reserved words.....	8
Always provide alias names for fields.....	9
Do not store attribute information only as annotation.....	9
Metadata.....	9

Purpose

Client	ASPA
Subject	GIS Standards for CAD
Author	NorthSouth GIS LLC

Introduction

Explanation

Approach

The approach of this document is to describe the Geospatial Data Delivery Standards for any and all GIS data, either existing or newly completed for the Alabama State Port Authority (ASPA), or the Port of Mobile, internally or by outside contract.

This encompasses all data developed in **GIS format** for delivery to the Port for inclusion in the Enterprise GIS for any project. Compliance with the Geospatial Data Delivery Standards facilitates smooth and timely integration and compatibility with the Port's Enterprise GIS.

Scope

This standard applies to all existing GIS data utilized by the Port and new GIS data delivered to the Port. Please note the scope applies to the acceptable formats of GIS data by the Port.

The consultant or contractor must get any existing data from the Port before beginning a project. If data was received by the consultant or contractor from the Port to be used, modified or added to during any phase of the pre-determined project, all data must be returned to the Port in the same format in which it was received (no dataset should be split, combined, or otherwise reorganized, and no fields should be renamed or deleted). If data does not exist, the consultant or contractor will work with the Sr. GIS Specialist, Project Manager, and/or GIS Technical Committee designee to design the data structure.

Any exemption requests must be submitted to the ASPA Sr. GIS Specialist at GIS@alports.com for decision before delivery.

Geospatial Data Delivery Standards

Spatial Reference

GIS data represents geospatial locations on Earth. Earth is not a perfect three-dimensional sphere. Any time multiple locations, areas or transecting lines need to be represented in two-dimensional space, such as on paper or on a computer screen, some amount of distortion must occur. Geographers use coordinate systems to define the rules by which those distortions are applied, with the goal of minimizing the distortion at the desired location.

All GIS data must be correctly projected into the following coordinate system:

- a. *Projection:* State Plane
- b. *Zone:* Alabama West
- c. *Units:* US Survey Feet
- d. *Horizontal Datum:* North American Datum 1983, 2011 adjustment (NAD83) (2011)
- e. *Vertical Datum:* North American Vertical Datum (NAVD) 1988 (height and depth)

This is defined as follows:

Parameter	Value
Projected Coordinate System	NAD 1983 (2011) StatePlane Alabama West (US Feet)
Projection	Transverse Mercator
WKID	9749
Authority	Esri
Linear Unit	US Survey Feet (0.3048006096012192)
False Easting	1968500
False Northing	0
Central Meridian	-87.5
Scale Factor	0.999933333
Latitude Of Origin	30
Horizontal	
Geographic Coordinate System	NAD 1983 (2011)
WKID	6318
Previous WKID	104145
Authority	EPSG
Angular Unit	Degree (0.0174532925199433)
Prime Meridian	Greenwich (0.0)
Datum	D NAD 1983 2011

Parameter	Value
Spheroid	GRS 1980
Semimajor Axis	6378137
Semiminor Axis	6356752.314
Inverse Flattening	298.2572221
Vertical (Height)	
Parameter	Value
Vertical Coordinate System	NAVD88 height (ftUS)
WKID	6360
Previous WKID	105703
Authority	EPSG
Linear Unit	US Survey Feet (0.3048006096012192)
Direction	positive up
Vertical Shift	0.0
Vertical Datum	North American Vertical Datum 1988
Vertical (Depth)	
Parameter	Value
Vertical Coordinate System	NAVD88 depth (ftUS)
WKID	6358
Authority	EPSG
Linear Unit	US Survey Feet (0.3048006096012192)
Direction	positive down
Vertical Shift	0.0
Vertical Datum	North American Vertical Datum 1988

Data Format

The Port requires that all GIS data developed either internally or by outside contract must be delivered in Esri File Geodatabase format. As the Esri File Geodatabase format stores geospatial data at a higher precision, has the capacity to store larger amounts of information, supports topology, and stores field name aliases internally among other estimable advantages, it is the required format.

Files such as .AI, .EPS/.PS, .PDF and/or .PSD created from graphics editing applications such as Adobe Illustrator, Adobe Photoshop, Adobe Acrobat or other PDF generating applications or drivers do not constitute a GIS format and are not acceptable.

Entities required to submit CAD drawings need to refer to the port CAD Standards documentation for requirements.

Delivery Format

Data developers will be provided the preferred data delivery format for a project. File geodatabases within an Esri Pro Map Package (.MPKX) are preferred as this packs and compresses all required geodata as well as example layer symbology, settings and map documents into a single file for easy transmission.

Go to [ArcGIS Map Package Overview¹](#) in the appropriate version of ArcGIS Pro Help for more information.

Otherwise, it is recommended to compress (for example, with WinZip) the file geodatabase folder in Windows Explorer to a single .ZIP file after ensuring that the ArcGIS Pro application is closed to be certain all changes have been saved and that no locks remain on the data.

Data developers are encouraged to include any ArcGIS Pro Layer files (.LYRX), Map files (.MAPX), or Layout files (.PAGX) created to display the data as they intended.

Processing Tolerances – Coordinate Precision

The precision of coordinates and attributes should be adequate to accurately represent the location and values of the data in question.

The following tolerances must be followed for all data:

- Double Precision
- Fuzzy Tolerance 0.0001
- Dangle Tolerance 0.0
- Edit 0.5
- NodeSnap 0.0001
- Snap 0.5

Topology

Topology confirms the accuracy of adjacency, connectivity, proximity, and coincidence and is therefore required for all polygonal and linear data sets submitted to the port.

To create and maintain topology, the following must be met:

- Correct arc directionality must be maintained on streets, facility data, and any dataset with flow.
- Polygons must close without overshoots or undershoots.
- Pseudo nodes must only exist where 1) a line closes on itself 2) only two lines intersect 3) there is a change in attribution along a line 4) to maintain the shape and measurements of an arc.
- Lines, polygons, points and annotation must not be duplicated.
- Streets and facility data do not break at overpasses and underpasses.
- Line segments have a maximum of 500 vertices.

¹ <https://pro.arcgis.com/en/pro-app/latest/help/sharing/overview/map-package.htm>

- Polygons must edge match without slivers.
- Polygons must not overlap.

Naming Convention

It is important that GIS data and field names in said data delivered to the Port's Enterprise GIS follow the same naming convention already applied to all existing data. Not all of the following rules may apply to all datasets (for example, if the delivery is for a singular dataset) but it is important to understand the geospatial naming convention already in place to alleviate any confusion or added work upon delivery of the data.

Start data and field names with alphabetical characters

Many processing workflows that GIS data are subjected to are unable to handle objects that start with numbers or special characters. Avoiding names starting with a number also helps to better sort the display of objects in the Enterprise GIS.

Do not include spaces, dashes, or other special characters

Many GIS software processes cannot handle spaces or any kind of special character in the file names and/or in field names. Avoid causing problems for the data later down the line by eliminating any special characters. Underscores, however, do not cause problems and can be used in the place of dashes and/or spaces.

Do not use prefix or suffix for data type

Do not use prefixes like 'tbl' for tables, nor 'fc' for feature classes. This is redundant as tables and feature classes are symbolized differently in the Enterprise GIS.

Do not use geometry type as suffix

The Port's Enterprise GIS provides a preview of the geometry type for each GIS dataset. Therefore, adding a feature type indicator in the name is generally unnecessary. However, data may occasionally be represented in alternative forms such as showing a feature as a polygon and as a point. In such a case, the data with the most logical shape should take on the base name without a geometry type, while the data with the alternative type should be augmented with a feature type suffix separated by an underscore (Point, Poly, Line, Anno), e.g., "Buildings" and "Buildings_Point"

Avoid using reserved words

Using reserved words for the underlying DBMS could easily result in unexplained errors. Avoid using words like Order, File, Range, etc., on their own. Using plurals for feature class names reduces this risk.

Always provide alias names for fields

Setting an alias for field names, especially field names that are cryptic or abbreviated, is the best way to maintain useful information and provide benefits in multiple areas. As the shapefile format does not support field name aliases, for data delivered to the port in that format, be sure to include field aliases as a part of the metadata. This is a required element of metadata.

Do not store attribute information only as annotation

The names, notes, area sizes, etc. of particular features should be stored in the attribute table of the feature and not only as a separate piece of annotation text.

Metadata

All GIS data must have Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM) as defined by the port Metadata Standards document. Refer to that document for more information.

Additionally, avoid using fields in the database to store metadata about the feature class, e.g. a Date Loaded field. Such information is required in the metadata and therefore superfluous in the attribute table. Only exceptions are to either capture row specific metadata, e.g., Modified By, where each record may have different values, or where the origin source of the individual features may vary and need to be tracked. In the second case, the metadata should also document the fact that there are multiple data origins.

Any exemption requests from any part of the metadata requirement must be submitted to the ASPA Sr. GIS Specialist at GIS@alports.com for decision before delivery.