U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: GENERAL GUIDANCE AND SPECIFICATIONS FOR SUBMISSION OF AERONAUTICAL SURVEYS TO NGS: FIELD DATA COLLECTION AND GEOGRAPHIC INFORMATION SYSTEM (GIS) STANDARDS

Date: 05/21/2009
Initiated by: AAS-100
AC No: 150/5300-18B

1. PURPOSE: This Advisory Circular (AC) provides the specifications for the collection of airport data through field and office methodologies in support of the Federal Aviation Administration (FAA). It also explains how to submit data to the FAA, who will forward the safety critical data to the National Geodetic Survey (NGS) for independent verification and validation. The primary purpose of these general guidelines and specifications is to list the requirements for data collection conducted at airports in support of the FAA Airport Surveying – Geographic Information System (GIS) Program. The FAA's Office of Airport Safety and Standards (AAS-1) administers this program. The standards covered in this document provide critical information for the operation and safety of the National Airspace System (NAS) and are classified as critical by the International Civil Aviation Organization (ICAO). ICAO Annex 15 defines data as critical when "there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe." The information furnished under these standards covers the entire spectrum of the FAA's airport data requirements, including but not limited to runway and stopway data, navigational aid data, obstruction data, and data on various airport features, including taxiways, aprons, and landmark features. Most of this information is source data, acquired by field survey and/or remote sensing methods.

2. CANCELLATION: AC 150/5300-18A, *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*, dated 9/15/2007, is cancelled.

3. PRINCIPAL CHANGES. The substantial revision of this AC incorporates new standards addressing the collection of a greater spectrum of airport related data and is reformatted to provide better understanding. Users should review the entire document to familiarize themselves with the new format.

4. APPLICATION: The FAA recommends the guidelines and standards in this AC for the collection of geospatial airport and aeronautical data. In general, this AC is not mandatory. However, use of these guidelines is mandatory for the collection of geospatial airport and aeronautical data funded under Federal grant assistance programs. It also provides one, but not the only, acceptable means of meeting the requirements of Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports* for the collection of geospatial airport and aeronautical data. Mandatory terms such as "shall" or "must" used herein apply only to those who purchase the collection of geospatial airport and aeronautical data using Airport Improvement Program (AIP) or Passenger Facility Charge Program (PFC) funds, or those who seek to demonstrate compliance by use of the specific method described by this AC.

5. COMMENTS OR SUGGESTIONS for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591

6. COPIES OF THIS AC. The Office of Airport Safety and Standards is in the process of making ACs available to the public through the Internet. Obtain these ACs through the FAA home page (www.faa.gov). A printed copy of this and other ACs can be ordered from:

U.S. Department of Transportation
Subsequent Business Office
Annmore East Business Center
3341 Q 75th Avenue
Landover, MD, 20785.

Michael J. O'Donnell
Director of Airport Safety and Standards

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CHAPTER 1. GENERAL GUIDANCE AND SPECIFICATIONS

1.1. INTRODUCTION

In developing the guidance in this Advisory Circular (AC), the Federal Aviation Administration (FAA) is striving to maximize the level of data collected while trying to minimize the cost to airports. However, the appropriate collection and safety implications of the prescribed data against defined, repeatable and verifiable standards far outweigh the potential costs. The collection and maintenance of the data regarding airports is a shared responsibility of the FAA and the Airport sponsor or proponent. The uses of the information collected according to these standards and specifications are in part to complete the following tasks:

- Provide geodetic control for engineering projects.
- Assist in airport planning and land use studies, and for other miscellaneous activities.
- Certify airports for certain types of operations.
- Develop instrument approach and departure procedures.
- Determine maximum takeoff weights.
- Update aeronautical publications.
- Plan for and site navigational aids supporting the airport.

The FAA developed these specifications to detail the data collection requirements and processing of airport data. Compliance with these requirements and standards without deviation is mandatory for federally obligated airports, and recommended for all other airports.

Refer all questions about the interpretation and use of these standards to the Manager, Airport Engineering Division (AAS-100), Office of Airport Safety and Standards, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, DC 20591.

1.2. ADMINISTRATION

1.2.1. Specifications

This document provides general specifications, standards, and guidelines for collecting and maintaining airport and related aeronautical data. These specifications provide the requirements for capturing the data used in all phases of airport development from planning to construction, and publication in selected U.S. Government aeronautical data and related products. These specifications are designed to provide information regarding the different types of data collection tasks on airports. A Statement of Work (SOW) in the contract agreement for each airport should detail the specific survey information for the individual airport. However, the requirements for reporting deviations, unusual circumstances, etc. described in the following paragraphs apply to both the General Specifications and to the SOW.

1.2.2. Conventions

The following conventions provide specific usage of words in this specification:

- The verbs “will” and “must” mean compliance is mandatory.
- The verb “should” implies compliance is strongly recommended but not required.
- The contraction “N/A” means not applicable.
- The term “position” means horizontal position (latitude and longitude) unless specified otherwise.
- The term “elevation” means the distance of a point above a specified datum, measured along the vertical direction of gravity.
- The term “vertical” refers to the direction in which the force of gravity acts.
- The term “height” means the distance, measured along a perpendicular, between a point and a datum (refer to paragraph 1.4 National Spatial Reference System (NSRS)).
- The term “observation” means the survey observations resulting in a position and/or elevation for the survey mark in question, whether it is pre-existing or newly set.
- The term “set” means physically constructed.
- Use the U.S. Survey Foot (3.28083333333333 feet = 1 meter) for any length conversions. If required by state law to use another value, identify this requirement in the project plan.
- “Airport Authority” refers to the administrators at an airport awarding the contract or their designated representatives.

1.3. CONTRACTOR REQUIREMENTS

The contractor will provide all labor, equipment, supplies, material, and transportation to produce and deliver data and related products as required under this guidance. The contractor will be responsible for ensuring all employees (including sub-contractors) meet airport security requirements and follow any other Airport Authority requirements, including making arrangements for escorts, radios, and training.

1.3.1. Maintenance and Calibration

All surveying equipment used will have maintenance logs showing routine preventive maintenance and repairs. Include in the Final Project Report the equipment model and serial numbers, and Electronic Distance Meter Instrument (EDMI) calibrations. If a hand–held EDMI is used, compare its distance-measuring accuracy to a distance measured with a calibrated EDMI and report the results in the Final Project Report.

1.3.2. Original Data

Original observation logs, electronic files, and other records prepared or obtained under the terms of the contract, are instruments of service and remain the property of the consultant unless agreed to by both parties. Provide reproducible copies of drawings and copies of other pertinent data to the Airport Authority. Submit the data required by the FAA under these specifications to the FAA Airport Surveying–Geographic Information System (GIS) Program at https://airports-gis.faa.gov. Original logs and records must be legible, neat, clear, accurate, and fully completed in indelible black ink. All available entries on the recording forms should be completed or indicated as N/A. Use blue ink when checking or verifying field notes and for any required signatures. Clearly write "original" (in blue ink) on the originals of all forms, notes, and computation sheets used. Save original data unmodified whether in handwritten or computer recorded form.

1.3.3. Corrections or Revisions to Data

In the original records (paper or digital), nothing is to be erased or obliterated. If a mistake is made on a form, draw a single line through the mistake and write the correction above or to the side. If space is too limited to permit a field correction, restart with a new log sheet; however, do not recopy the form in the office in order to make a "clean" copy. An explanatory note should be made for all corrections to the original recorded figures. All editing of computer-recorded data will be done on a copy of the original with all changes initialed.

1.3.4. Unusual Circumstances

The contractor will notify the airport sponsor/proponent, local FAA airports office and the FAA Airport Surveying–GIS Program of any unusual circumstances occurring during the data collection according to these specifications. The FAA Airport Surveying–GIS Program Manager will then consult with the government technical representatives to determine an appropriate course of action and advise the sponsor.

1.3.5. Specification Review and Familiarity

It is the responsibility of the potential contractor to ensure all personnel (including subcontractors) involved in the project are thoroughly familiar with the information in this guidance and any material covered in other cited references and publications.

1.4. NATIONAL SPATIAL REFERENCE SYSTEM (NSRS)

The FAA ties all Air Operations Area surveying and positioning to the NSRS. Refer to AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey*, for guidance on establishing geodetic control and the NSRS.

1.4.1. Horizontal Control

The contractor provides horizontal control referenced to the North American Datum of 1983 and year of the latest adjustment [abbreviated NAD83 (YYYY)]. **NOTE**: *The year of adjustment is on the NGS Data Sheet next to the latitude and longitude.*

1.4.2. Vertical Reference

The contractor provides vertical control referenced to the North American Vertical Datum of 1988 (NAVD 88). Information regarding NAVD88 is located at the following website: http://www.ngs.noaa.gov/PUBS_LIB/NAVD88/navd88report.htm. Reference all Ellipsoidal Heights to NAD83 (GRS 80) realization.

1.4.3. GEOID Model

The contractor uses the most recent NGS model, which is currently GEOID03 in CONUS and GEOID06 in Alaska. For information regarding GEOID03 refer to the following website http://www.ngs.noaa.gov/GEOID/GEOID03/. For information regarding GEOID06 refer to the following website http://www.ngs.noaa.gov/PC_PROD/GEOID06/. **NOTE:** *GEOID heights derived from the GEOID06 model are only reliable in Alaska.*

1.5. DATA FORMATS

The contractor submits data collected to the Airport Authority and to the FAA Airports GIS website (https://airports-gis.faa.gov/). Include an inventory of all geospatial digital data in the Final Project Report and identify the physical file formats. In order to facilitate communication and exchange of information, use the following standard formats for data submissions:

1.5.1. Ground Control Data

The contractor submits newly established permanent ground control data to NGS for inclusion into the NSRS. Format this data to meet NGS blue book standards as required by AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey.*

1.5.2. Digital Images from Hand-Held Camera

1.5.2.1. Use digital photographs taken during daylight hours to document monuments used or data collected. These photos assist in the retracing of the surveyor's steps by providing the evaluators with a picture of what the data is describing. Take sufficient photographs to document the conditions the surveyor encountered. They should illustrate the appearance, condition, and location of the points of interest, including visibility obstructions, roads, runways, taxiways, or other dangers and any special setup requirements. A photograph is acceptable if it meets the requirements of this AC and is of good visual quality. Use the highest resolution possible to ensure good clarity and detail definition.

Use at least one (more if required) of the following three types of photos to document a position or object. All three photographs require a digital caption and correct file name as specified in paragraph 1.5.2.3.

- Photograph type 1 is an extreme close up of the object as shown in Figure 1-1. Typically this type of photograph is only used to document control monuments or other defined points such as runway end or displaced threshold locations.

Figure 1-1. Photograph type 1

- Photograph type 2 (Figure 1-2) is taken at eye-level with the station or object 5 to 6 feet in the distance (when practical and accessible) and provides general information about the area immediately surrounding the station or point.

Figure 1-2. Photograph type 2

- Photograph type 3 (Figure 1-3) is taken horizontally with the station approximately 10 to 30 feet in the distance (Figure 1-4). Photograph type 3 provides general orientation information to the user and should include the cardinal direction the camera is pointing in the caption.

Figure 1-3. Photograph type 3

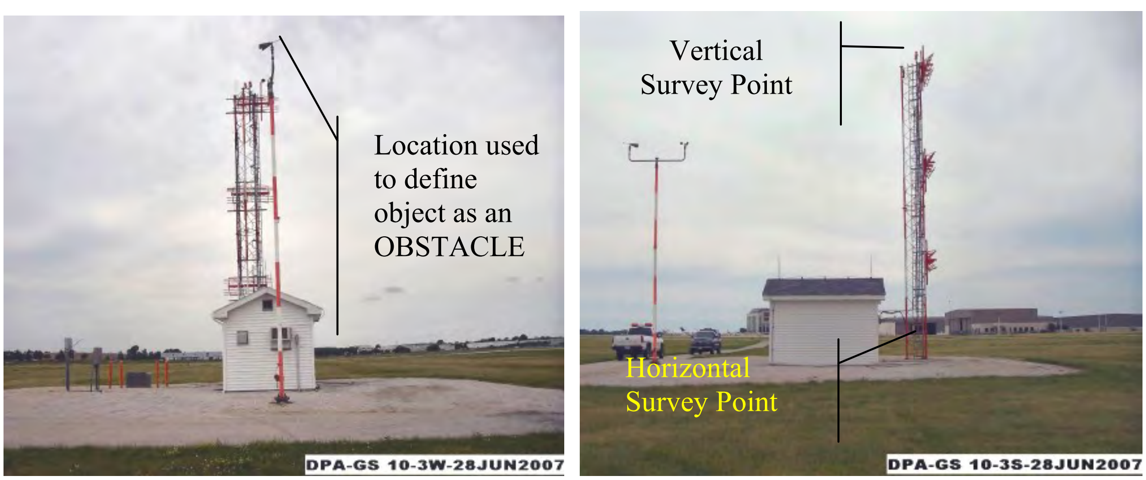

Figure 1-4. Illustrates the documentation of a glideslope antenna from different perspectives.

When documenting navigational aids surveyed, as in Figure 1-4, two photographs oriented from different cardinal directions. When documenting navigational aids, take the photograph with a tripod over the horizontal and vertical (if practical) survey point or electronically add arrows showing the point(s) surveyed. The independent verification and validation team uses these photos to check the correct point was surveyed based on the type of navigational aid.

1.5.2.2. Use the JPEG (Joint Photographic Experts Group) format for digital images taken with a hand-held digital camera. This includes the required images of photo control points.

1.5.2.3. Use the following file naming convention for photograph filenames. The filename is comprised of the airport location identifier assigned by the FAA, runway end designator, photo number, and date, followed by the file type extension, as in the example below. Separate each section of the file name with a underscore —except precede the photo number with a dash.

Sample filename for a runway end point:

LAX_CL_END_RWY_12R-3_04MAY2001.jpg

Decoding the example above, "LAX" provides the airport location identifier, "CL END RWY 12R" identifies the position photographed such as the centerline end of runway designator [CL=centerline, END=end, RWY= runway, 12=runway number, and R=right (or C=center, or L=left)], dash, "3"= photo number, and date. FAA approved location identifiers are located at the FAA web site http://www.faa.gov/airports_airtraffic/air_traffic/publications/.

1.5.2.4. Electronically add a caption to each photograph. The caption should include the following information separated by commas or dashes:

- Airport location identifier assigned by the FAA.
- Runway end designator.
- Photo number.
- Date the photo was taken.

For example, "LAX, 12R, 3, 23 Aug 2004". In addition, the caption for photograph types 2 and 3 include the cardinal direction (N, NE, E, SE, etc.) the camera is pointing.

1.5.3. Documents or Sketches

Provide reports and diagrams, such as Runway End sketches, GPS Visibility Diagrams, Field note sketches, etc., in a non-editable format such as the Adobe Portable Document Format™ (PDF). Obtain these forms from the FAA Airports GIS website (https://airports-gis.faa.gov). The FAA requires field sketches as documentation of the following features as a minimum:

- The selected runway end.
- The location of any displaced threshold.
- The stopway or blastpad associated with a runway.
- New taxiways, ramp (parking) area(s), runways or other construction areas that were not available or completed when the imagery was collected, including sketches or photographs of

photo reference points in the imagery. Include a mark or identifying feature available in the imagery that relates the construction and the field collection together.

- Sketches of the runway profile points (two runs - digital file) annotated with the distances of each of the points collected from the runway end.
- All NAVAIDS located off the airport (digital photographs are sufficient).

1.5.4. Geospatial Vector Files

Submit data to the FAA Airport Surveying–GIS Program in any of the following 3D geospatial vector file formats:

- DWG/DXF (Autodesk AutoCAD).
- SHP (ESRI Shapefile).
- DGN (MicroStation Design File V7/V8).

Submit requests to use other geospatial vector file formats in writing to the FAA Airport Surveying–GIS Program Manager. All geospatial vector files must conform to the data content standard specified in Chapter 5 as defined for each feature submitted.

1.5.5. ESRI Nuances for Dealing with FAA Attribute Names

When submitting data to the FAA Airport Surveying–GIS Program using ESRI software, some of the standard naming conventions specified by the FAA need to change to accommodate ESRI file naming constraints. This limitation is described by ESRI™ in their documentation as "A field's name must be no more than 10 characters in length; additional characters will be truncated". In most cases within the specified FAA naming structure this is not a problem until the truncation results in duplicate names. In order to solve this problem, data providers should use the following table to avoid the duplication of names in the following feature classes. In all other cases the truncation at 10 characters of attribute names should not have duplicates. A full listing of all FAA features and attributes with the truncated names, as established within the FAA Airports-GIS, is provided in Appendix D for use in quality assurance of the data before submission.

Table 1-1. ESRI Attribute Name Truncation to avoid Duplication

FeatureClass	AttributeName	Shp_Name
RunwayHelipadDesignSurface	determination	determinat
RunwayHelipadDesignSurface	determinationDate	detDate
RunwaySafetyAreaBoundary	determinationDate	detDate
NavaidEquipment	downWindBarElevation	downWindBa
NavaidEquipment	downWindBarThreshold	dWndBarThr
Obstacle	heightAboveAirport	heightAbov
Obstacle	heightAboveRunway	hAbovRwy
Obstacle	heightAboveTouchdownZone	hAbovTdz

1.5.6. Airport Layout Plan Data

Submit digital versions of airport data defined in this standard in one of the following formats.

- Autodesk™ DWG format (version 2002 or later) with attributes defined as object data.
- MicroStation™ DGN format (version 8 or later).
- ESRI™ Shape File format with attributes and metadata elements provided as attributes within each shape file.

1.5.7. Raster Imagery

Raster data is a form of spatial data where rectangular cells each carrying a value are organized into rows and columns. One of the most common forms of raster data is digital imagery in which each cell or pixel of the image carries a grayscale value in the case of black-and-white photographs or red/green/blue values in the case of color photographs. Images taken from aerial or satellite platforms must be orthorectified, meaning that the cells or pixels of the image are positioned to represent their true position on the face of the earth (i.e. removing distortions caused by camera angle, terrain, etc.). Figure 1-5 provides an example of an orthorectified raster image of an airport. Imagery requirements are specified in AC 150/5300-17, *General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey*.

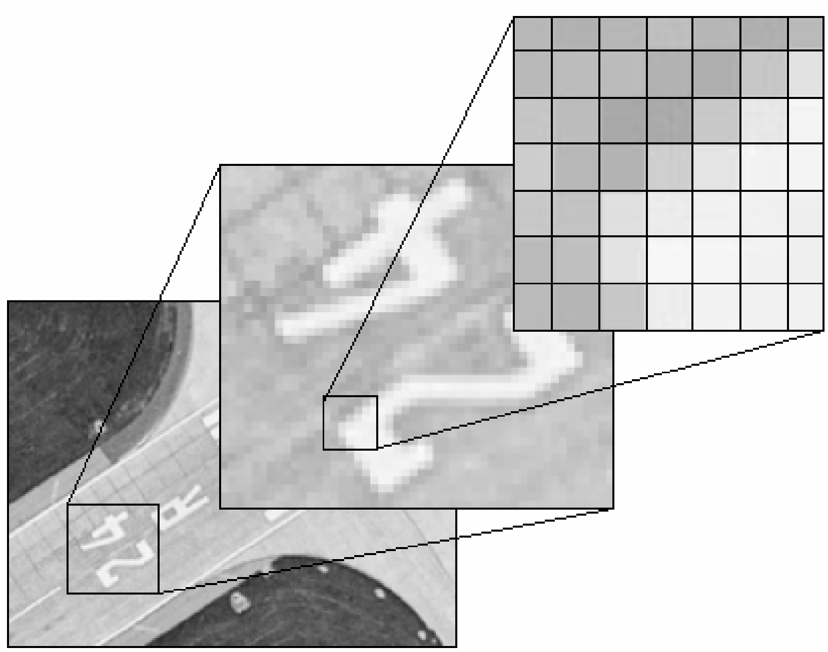

Figure 1-5. Example of Raster Imagery

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CHAPTER 2. SURVEY SPECIFICATIONS AND STANDARDS

2.1. OVERVIEW OF THE PROCESS

Airports have surveys conducted for many different reasons. However, all survey types require the collection, classification and reporting of accurate data about the project. All surveying completed on the airport will provide the information outlined in Chapter 5 within the stated accuracies. The methodology selected to gather the information is up to the professional surveyor's judgment. Some features require observation through ground field methods, while others lend themselves to collection via remote sensing technologies. Since each element of the National Airspace System (NAS) ties to a single reference framework, it is important for every survey conducted on the airport to tie in some way to the NSRS. When the project uses an engineering grid rather than a national grid, tie the local grid to the NSRS to ensure accurate relativity to other NAS elements. In order to tie an engineering grid to the NSRS, the surveyor is required to identify and use positions common to both reference systems to ensure the project remains tied to the other elements of the NAS. This chapter breaks down the different elements of typical airport surveys and provides guidance on completing those tasks. Chapter 5 provides the information on the proper collection, classification and reporting of many airport features.

2.2. INDEPENDENT VERIFICATION AND VALIDATION OF AIRPORT SAFETY DATA.

Due to the critical nature of some airport features, the FAA requires their independent verification and validation by the Aeronautical Survey Program of the National Geodetic Survey or a designated representative. Typically, these features are those associated with the airport's movement areas, navigational systems or those affecting navigable flight such as objects surrounding the airport. Once the independent verification, validation and quality assurance of the safety critical data is completed, the government technical representatives will provide a complete final written analysis of their findings including approval or disapproval of the data. They will identify and list any discrepancies discovered relating to these specifications and decide on the usability of the data.

2.2.1. Verification

In this guidance, "verification" is defined as the confirmation by examination and provision of objective evidence that the specified requirements are fulfilled. Verification is necessary to ensure the data set accurately represents the specifications and is uncorrupted. The verification process proves the data was properly collected. The following verification techniques comprise the government verification of the safety critical data.

- Comparison of a sample of the data set points with samples from an independent measurement system.

- Typically, the government uses photogrammetric analysis along with the provided ground observational data to resample the data set. The more samples checked, the higher the level of confidence in the quality of the data set.

- Comparison of the data set with other existing data sets. For this verification method, the verification must account for the vertical and horizontal reference datums for the data sets and the data sets should be independent. Typically, the government uses this technique when there is an existing good available data set to compare the submitted data against.

- Reasonability checks to ensure the data set does not violate known properties (such as obstacles must have positive orthometric heights).

2.2.2. Validation

In this guidance, “validation” differs from “verification” in scale. The validation process identifies the aeronautical information submission was correctly developed as an input to the system. Validation is the confirmation by examination and provisions of objective evidence showing the data set meets the particular requirements of the intended use. The purpose of the validation process is to demonstrate the data set has sufficient overall integrity to satisfy the requirements for its intended application. Validation answers the questions “is the data reasonable when compared against known data” and “does it meet the identified need.” Validation does not typically compare the data against photogrammetric analysis or review of the observational data.

2.3. ACCURACY REQUIREMENTS

The data about airports is critical to the operation and safety of the NAS. Collect this data through a combination of remotely sensed and field survey methods. When determining the best method of collection, consider the required accuracy and efficiency of operations. Remote sensing techniques do not currently meet the accuracy requirements of some airport and aeronautical features requiring their collection through field survey. Typically, linear features, some objects within the object identification surfaces, and visual navigational aids are good candidates for collection by remote sensing techniques. The geographic coordinate accuracies of this data must meet or exceed the requirements in this AC and in the following:

2.3.1. Geodetic Control

The survey monuments established in the airport vicinity must meet all accuracy requirements and other criteria specified in AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey.* These monuments and their accurate connection to the NSRS assure accurate relativity between all surveyed points on an airport and the NAS, including navigation satellites.

2.3.2. Imagery

The geo-referenced imagery of the survey area must meet the accuracy requirements specified in AC 150/5300-17, *General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey.*

2.3.3. Remotely Sensed Surveys

Due to the critical nature of airport and aeronautical data, it is important to position and attribute features accurately. Ensure the spatial resolution and vertex spacing provides an accurate representation of features without compromising the accuracy of the data. With respect to imagery, this document defines the word “resolution” as the smallest spacing between two display elements, expressed as dots per inch, pixels per line, or lines per millimeter. Also consider the attribute accuracy. Collecting and identifying attributes from imagery requires skill and knowledge of interpreting airport and aeronautical features. The user must be familiar with the feature classes, attributes, and valid record entries used to identify spatial features contained within this AC.

Features extracted using remote sensing technologies must have spatial accuracies reported in ground distances at the 95-percent confidence level. Use Root-Mean-Square Error (RMSE) to estimate spatial accuracies. Testing is the preferred method of reporting accuracy. Accomplish this by computing RMSE using the square root of the average of the set of squared differences between twenty or more checkpoint coordinate values and the coordinate values from an independent source of higher accuracy. However, if less than twenty checkpoints are available for testing, then report the accuracy as a deductive estimate based on knowledge of errors in each production step. Indicate in the metadata the methods used in the deductive method including complete calibration tests and describe assumptions about error propagation.

2.3.4. Feature Accuracy Requirements

The accuracy for geospatial vector airport features (taxiway, aprons, ramps, buildings, etc.) is typically mapping grade accuracy, nominally within 3 feet horizontally and 5 feet vertically (Refer to Chapter 5 Feature Descriptions for complete accuracy requirements). Specific runway, stopway and navigational aid data accuracies are nominally within 1 foot horizontal and 0.25 feet vertically. Accuracy requirements for geospatial features used for geographic orientation (major highways and roads, lakes, rivers, coastline, and other items of landmark value) are usually 20 feet horizontally and 10 feet vertically relative to the NSRS. Derived elevations must be within 10 feet vertically.

2.3.5. Field Surveys

Many airport features have accuracies greater than are achievable using remotely sensed methods and require field survey methods be used. These features, specifically the data for the runway(s) and some navigational aids, are nominally within 1 foot horizontally and 0.25 feet vertically. Chapter 5 lists the features and their required accuracies and unique requirements. Refer to the appropriate section in this chapter for specific guidance on the different types of surveys typically performed on or near an airport.

2.4. RESERVED

2.5. FEATURE ATTRIBUTION

As airports move toward a more data centric environment, more information about the objects on and around the airport is required. Each of the features in Chapter 5 has a list of attributes or information about the feature. Each of these attributes should be completed. Realizing this will be an iterative process, there are some business rules which apply to all submissions.

Generally, the surveyor or consultant hired to collect the data will gather some of this information in the field. Other values can and should be derived from the field measurements. While other values will require information from other sources such a record drawings or interviews. Each attribute for each feature should be submitted with the data. Sponsors should expect surveyors or consultants to complete these attributes based on the purpose of the survey or data collection effort. Typically any attribute that can be measured or computed should be completed as part of the statement of work. Depending on the airport's staff ability and workload other attributes can and should be completed by them. Base the requirement for which attributes the consultant should complete on the intent of the statement of work. If the consultant is hired is to collect data for an airport analysis survey then all attributes relating to those features should be completed.

The more complete the attribution the more complete and useful the data set will be to both the FAA and the airport sponsor in the future. Sponsors should also plan for the maintenance of this information. If a previously submitted features attribution changes it should be updated as soon as possible. Chapter 4 provides more information on the maintenance of data.

2.6. REPORTING REQUIREMENTS

2.6.1. General Reporting Requirements

Thorough reporting is required. Prior to beginning any fieldwork, submit a survey and quality control plan to the airport sponsor/proponent, the local FAA airports office and FAA Airport Surveying–GIS Program Manager. On project completion, provide to the airport sponsor/proponent, the local FAA airports office and the FAA Airport Surveying–GIS Program manager a final project report compliant with paragraph 2.6.4. Include the prime contractor's firm name on all reports. Submit all reports electronically to the FAA using the reporting tools provided by the Airports GIS web site https://airports-gis.faa.gov.

2.6.2. Survey and Quality Control Plan

2.6.2.1. General Requirements. Develop and submit survey work and quality control plans for airport sponsor/proponent and FAA approval before beginning any fieldwork. The FAA Airport Surveying–GIS Program manager or designated representative will review and approve the survey work and quality control plans. In these plans, detail the methodologies for data collection, data safeguarding and quality assurance. Provide insight into how you will completely check all data to ensure it is complete, reliable, and accurate. Identify data safeguards used to protect this sensitive and safety critical data. Utilize a checklist based quality control process with definable and repeatable standards for each element ensuring consistency of work between different personnel within an organization. Submit the plan in a non-editable format such as Adobe Portable Document Format (PDF)™ using the reporting functions of the Airports GIS web site https://airports-gis.faa.gov. A sample survey and quality control plan is available on the FAA Airports GIS website (https://airports-gis.faa.gov).

2.6.2.2. Remote Sensing and Field Survey. The use of remote sensing and ground survey techniques to accomplish the survey is highly recommended. The plans must include a description on the combinations of methods used and discuss the comparison of the results. The plan should detail the processes used to resolve discrepancies between the remote sensing survey and ground survey. The contractor will amend the original plans to identify any deviation to the Airport Authority or to the FAA Airport Surveying–GIS Program Manager immediately. The plan must address each of the following areas but is not specifically limited to these areas:

- **Project Observation (Execution) Plan:** Detail how you expect to execute the project including how you will make GPS observations to achieve two distinct data sets to determine positional data.

- **Geo-referencing**: Describe in detail the plan for utilizing geo-referenced (aero-triangulated) imagery with acceptable accuracies. Refer to AC 150/5300-17, *General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey*, for additional guidance and requirements.

- **Feature Extraction**: Detail methodologies for collecting airport features, such as airport buildings, the aircraft movement areas, landmark features, and obstructing area limits (3D), with the required horizontal and vertical accuracies as specified in Chapter 5. Identify any deviations from the data capture rules provided within this guidance.

- **Obstruction Analysis**: Provide a detailed description of the remote sensing and field survey methods used to identify, locate, and observe the required obstacles relative to the specified obstruction identification surfaces provided in this guidance. The contractor needs to describe the data collection methods and the associated horizontal and vertical accuracies expected.

- **Prior Survey Data**: Describe the procedure to use previous airport survey data if available and identify the source of the previous data. If the source of the data is not known or available, then the consultant should verify and document the data set as accurate using the techniques described in Chapter 4.

- **Field Survey Methods**: Identify the methods for data collection and processing used for observing required features. Include a description of the methods of analysis in the report.

- **Geodetic Control**: Describe in detail the plan for connecting to and verifying all existing airport control planned for use during the survey. Use of the established Primary Airport Control Station (PACS) and Secondary Airport Control Stations (SACS) is required.

- **Runway Data**: Describe in detail the methods for the ground survey and data collection used in identifying, locating, and observing all required runway data.

- **Navigational Aid Data**: Describe in detail the survey techniques and procedures used to identify, locate, and observe the required navigational aids associated with the airport. Provide details if you will collect the navigational aids individually or grouped by the type of navigational aid (electronic or visual).

- **Airport Feature Data**: Provide a detailed description of the procedures and methods used for identifying, locating, and observing the required airport feature data associated with the airport. If you plan to use existing data, describe its source, collection data and the techniques used to merge the data sets into a single comprehensive airport data set.

- **Equipment Listing**: Provide a complete listing of the equipment planned for use in the survey, including model and serial numbers, calibration reports, and equipment maintenance reports. This will include field survey and remote sensing hardware and software.

- **Quality Assurance Process**: Describe in detail what quality assurance methods you will use to ensure the quality and protection of the data from the time and point of collection to the time of submission.

2.6.2.3. Quality Control. The Survey and Quality Control Plan must include the quality control (including error analysis) procedures and practices followed during data collection and provide traceability and adherence to the requirements of this guidance. At a minimum, the plan will include the following:

- Summarize what methods you will use to ensure high-quality data.

- Describe the quality control measures used to ensure all data is checked, complete, reliable, and meets the accuracy requirements in this AC.

- Provide evidence of the methods used to collect the various types of features to meet the desired accuracies.

- Describe the data backup and archive procedures and methods used to ensure the integrity of the original data.

- Explain the methods used to check all file formats and provide a summary of the file-naming convention for all electronic files.

2.6.3. Project Status Report

Submit a project status report via email to the airport sponsor/proponent and FAA Airport Surveying–GIS Program Manager every Monday by 2:00 P.M. Eastern Time, from the date of the task order until the work is completed. Include in the reports the percentage complete for each of the major portions of the work with the estimated completion date or completion date. Provide the status of ongoing work (with expected completion dates) and any unusual circumstances and/or deviations from this guidance. Status reports should be brief and contain the current information in the text of the email. Submit all reports using the Add Note function of the Airports GIS web site. This allows all project stakeholders access to the reports in a single location tied directly to the project file. The following is an example Project Status report for an airspace analysis project:

Anyplace Field/Anywhere International Airport

AIP X-XX-XXXX-XXX-20XX

Survey progress update #1

July XX to July XX

Eagle Eye Surveying completed a second week of ground surveying. The first week verified PACS and SACS control, collected runway centerline, and primary surface topographic information.

To date we have surveyed for Runway 12-30:

Airport Control (PACS, SACS, ANY B540)	100%
Runway and Stopway Ends	100%
NAVAIDS (VOR, NDB, Airport Beacon, VASI, PAPI, and REILs)	100%
Runway and Stopway Obstructions (Primary surface, approaches, transitional surfaces)	100%
Aircraft Movement and apron areas	75%
Prominent airport buildings / potential close-in obstructions	42%

This week we will be analyzing the collected obstruction survey data relative to the object identification surfaces. We will check both the required points for each obstruction zone and the navigational aids, and generate the appropriate field documentation. We completed subcontract negotiations with aerial photography sub consultant SkyCamera, Inc. and are submitting the proposed flight map with ground reference points for review and approval before completing our final week of field surveying. This week we will be setting aerial targets and surveying in the targets and PhotoID points, and collecting final outlying obstruction data. Aerial photography is promised to us 2 to 4 days after our targets are in place.

Sincerely,

Any Surveyor, P.S.

Eagle Eye Surveying

2.6.4. Final Project Report

The Final Project Report is a compilation of documentation supporting the survey project providing a standardized delivery of field notes, raw survey data and project summary to facilitate the independent verification, validation, and quality assurance of the safety critical data. In the final project report, address each of the following areas.

2.6.4.1. Project Identification Data. List each of the following items on the first page of the document.

- Official name of airport and FAA assigned location identifier
- Airport Address (Street, City, State, Zip)
- Client Name
- Project, Contract, or Grant Number assigned
- FAA Region
- Start and end dates of project (From contract signing to delivery of data)
- Contractor point of contact (including name, company name, address, telephone number, email)

2.6.4.2. Project Summary. Provide a written overview of the project details and conclusions. In the summary, describe the scope of the survey identifying the key elements for collection (i.e. runway, obstruction, mapping and NAVAID collection). Provide background information on the source(s) of existing airport geospatial data (FAA, airport engineering, etc.) used in the project. Describe any conditions affecting the survey such as, any equipment failures, weather, scope of project, site accessibility, reconnaissance, and/or any other problems experienced.

2.6.4.3. Survey Data Conclusions. Provide your conclusions regarding the following subjects as they relate to this project.

2.6.4.3.1. Control Network Survey Results/Conclusions. Provide a description of the control network utilized as the basis of the survey completed. Include information on the source of the control referenced, whether it was established or verified, and comments on the recovery and status of the control monumentation. When utilizing an existing control network, provide verification computations and results between control points. Also provide information on the data collection methods used, and the third party software vendor used in data reduction.

2.6.4.3.2. Survey Data Collection Conclusions. Provide written and, as necessary, pictorial descriptions of significant findings from the survey results to ensure the information being provided is clear to the reader. Include information on the data collection methods used, and identify the hardware/software used during the survey. Examples of typical information to report are (but not limited to):

- Output information and published data comparison for runway end, stopway and displaced threshold positions.
- Significant objects of concern such as temporary or mobile objects.
- Comments on current or future planned construction at the airport that causes concern.
- Note conditions that affected the final solutions of the survey (vegetation, access, air traffic, etc.).

- Significant NAVAID situations (proposed locations, instruments/lighting removed, etc.).
- Boundary encroachments or significant misclosures.
- Utility system situations (significant utility systems found otherwise unknown, potentially hazardous situations, etc.).

2.6.4.3.3. Data Processing/Adjustment Conclusions. Provide information on the software used to reduce the data. Comment on issues or concerns discovered during the use or translation process of existing data. Also provide comments on any issues or outliers found during the reduction process considered important for the retracement of the survey by the validation team.

2.6.4.3.4. Recommendations/Additional Comments. Provide comments on the survey project including suggestions to improve future work specifications or any information providing additional explanation and understanding of survey project and results.

2.6.5. Field Note Information and Data

2.6.5.1. Geodetic Control Data. Provide the raw-data files collected containing the data used for establishment or verification of the geodetic control, including any data used to plot temporary points occupied. Typically, these files include the original raw GPS data files (in both the manufacture's download format and in RINEX II format), binary files containing ionosphere modeling information and vector reduction and adjustment files. If the project required the establishment of new PACS or SACS, this information is already available and does not require duplication here. Provide digital photographs, sketches, and scans of the field book or log sheets supporting the geodetic control survey (including temporary points occupied) as outlined in AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey*.

2.6.5.2. Survey Information and Data: Providing the survey data allows the independent verification and validation team to analyze the data. Provide the instrument or data collector raw measurement data files used to compute final positional data. Provide the independent verification and validation team the same information you provide for office computation/compilation. The internal and external quality assurance teams use this information to verify and validate the survey. Provide digital photographs taken during the survey to document or provide clarification of the survey data submitted. This includes photos of stations occupied, obstructions to visibility or any other information you wish to convey to the FAA and the independent verification and validation team regarding the survey. Scan and include all pages of the field book, log sheets or sketches completed during the survey.

2.6.6. Deliverables Checklist

The tasks completed during the survey process require careful planning and execution to ensure the geospatial data generated complies with the specifications in this AC. Provided below is a checklist identifying specific details to assist in ensuring proper planning and execution of a successful survey project. The FAA provides an appropriate checklist for the deliverables on the program website at https://airports-gis.faa.gov.

- Survey and Quality Control Plan (completed before data collection begins)
- Weekly Project Status reports provided to the sponsor

- Final Project Report (develop for all survey types)

- Digital Files to be delivered:

  - Provide the documentation required for each feature as defined by the descriptions in Chapter 5, Airport Data Features. Documentation types include data such as digital photographs, scans of field notes (log sheets, field sketches, field book pages, etc.), and field/office and quality assurance checklists used.

  - Provide the raw observational data collected from terrestrial and/or photogrammetric survey operations in formats identified in paragraph 2.6.5, Field Note Information and Data. Providing this data for all surveys allows the independent verification and validation team to retrace the survey. The types of data files to be delivered (but not limited to) are:

    - Data collector files

    - GPS receiver files

    - CORS data downloaded

    - Photogrammetric observation files

    - Other field measurement device's digital raw data (range finder, scanner, etc.)

  - Provide the final processing, adjustment or reduction files used to produce the final data. This includes the results of independent software files produced during the reduction of the final data. The intent is to provide the data necessary to recreate the data delivered if required.

  - Provide an airport point of contact list for use by the independent verification and validation team.

  - Copies of the transmittal letters for all deliveries posted to the sponsor or FAA.

2.6.7. Pre-Survey Preparation Activities

2.6.7.1. Contact with Airport Authorities. Close communication with airport management is critical throughout the entire survey process. Make appointments with airport management well in advance to ensure a qualified airport representative is available to discuss the survey. Obtain proper clearances to work in the aircraft operations areas prior to performing any work at an airport. A security and safety briefing may be required before field crews access the airfield. Follow standard safety procedures and equip all vehicles with flashing yellow lights and radios capable of receiving Air Traffic Control ground and aircraft frequencies. Contact with the airport traffic control tower is mandatory while during surveys at controlled airports. If vehicles are not properly equipped, an escort is required. Be sure to inquire about off airport navigational aids and the process for accessing them. Ensure approval to work on or near these sites is received not only from the airport authorities but also the FAA maintenance personnel and any private landowners whose land is adjacent or near the site. When approaching landowners regarding access, be sure to fully document their name, contact information and details about the discussions or copies of any correspondence sent or received from the landowners regarding access to their land.

2.6.7.2. Interviews. During the interviews, ask specific questions based on the interview checklists located on the FAA Airports GIS website (https://airports-gis.faa.gov). In addition, discuss with airport authorities the runway/stopway data published in the latest editions of the Airport/Facility Directory (A/FD) and U.S. Terminal Procedures (TPP), both U.S. Government Flight Information Publications (http://www.naco.faa.gov). During the survey, additional meetings may be required to discuss unusual circumstances, problems, or changes to published or given data. Include in the final report a summary of all such meetings. Upon completion of the survey, the airport authorities may require a final meeting. Turn in any badges, passes, or keys; discuss any significant and/or unusual findings with the data collection effort; and notify the airport authorities of your departure. Avoid discussing specific problems since the data is unverified. Especially avoid any statements about approaches being "clear," because the requirements for the use of the data are different based on the needs of the organizations within the FAA. Smaller airports might not have persons in all of these areas of expertise or they may not be located at the airport. Complete interviews with the following personnel if possible.

2.6.7.2.1. Airport Manager/operations. The airport manager/operations is the key individual on the airport. It is important for the contractor to contact the airport management prior to visiting the site. This allows the contractor to introduce themselves, their company and their purpose before arriving at the airport. It also allows the airport manager to prepare other airport staff members and schedules for the field team visit and to gather information the field team may require during their visit. In this interview, obtain permission to enter the airfield for the survey. Use this interview to gather valuable information about recent, ongoing, and future construction; obstruction changes; clearing; and operational considerations (scheduled runway closures or special events, high-security areas on the field, etc.). Include the contact information of the airport manager/operations person interviewed on the checklist.

2.6.7.2.2. Airport Engineering. This interview will only be necessary or helpful at larger airports. The engineering department can provide specific information about runway dimensions, construction projects, and control stations. They can be helpful in scheduling runway work. Include the engineering department point of contact in the Final Project Report in case questions arise after the survey.

2.6.7.2.3. Air Traffic Control. If an Airport Traffic Control Tower (ATCT) is operational during the time of survey, discuss the survey with the Chief Control Tower Operator or their designated representative. This interview can provide information on operational factors and facilitate the working relationship between the contractor and the controllers. Include contact information in the final report.

2.6.7.2.4. FAA Airway Facilities. An interview with FAA Airway Facilities personnel is necessary on any airport with FAA owned and maintained navigational facilities. In some cases, the personnel who maintain the facilities for the airport may be located at another site. Complete these portions of the interviews by telephone. The first purpose of the interview is to determine all pertinent facilities and changes to navigational aids within 10 nautical miles surrounding the airport. It might also be necessary to schedule a technician to accompany the contractor to certain facilities to let them through a gate or monitor an alarm while survey personnel are within critical areas of the site. Include the contact information for the assigned FAA Airway Facilities Point of Contact (POC) in the final report in case questions arise after the survey.

2.6.8. Field Survey Operations

2.6.8.1. Data. The project will include accurate positions and elevations of points, lines, or polygons based on the type of survey required (see Table 2-1 Survey Requirements Matrix). For airport airspace analysis surveys, specific points along runways, runway vertical profiles, positions and elevations of navigational aids, positions and elevations of obstructions, analysis of obstructing areas, and positions and elevations of certain non-obstructing obstacles are required. For other survey types, data portraying aircraft movement and apron areas, prominent airport buildings, selected roads and other traverse ways, cultural and natural features of landmark value, topography, other miscellaneous features, and special request items could be required. The accuracy of this data must meet the standards published in this guidance.

2.6.8.2. Preparation. Carefully evaluate the requirements in the statement of work from the airport sponsor or proponent. A careful review of all available data enables the team to begin the survey work in an efficient way and to conduct all necessary preparations and communications. The unique source data requirements of each survey requires the team to identify potential sources, research the necessary data, and review the requirements of the survey thoroughly. The following list provides information the survey team should review to prepare for the survey. Generally, addressing each item listed below will prepare the survey team to begin the survey:

- Ensure a thorough understanding of the specifications and requirements for the type of survey required. If you are unsure of a requirement, ask.
- Review imagery and USGS quadrangles of the airport (a terrain analysis tool).
- Prepare an imagery acquisition plan that ensures sufficient coverage of the entire survey area.
- Determine areas of private or government property and arrange for access.
- Prepare a list of questions to discuss with the airport sponsor or proponent about the survey.
- Review the descriptions for control stations identified for use in the project.
- Acquire and review an accurate airport diagram for use on the airport.
- Review FAA Form 5010, Airport Master Record, at http://www.gcr1.com/5010web/.
- Coordinate with airport authorities.
- Produce and deliver a Survey Plan and Quality Control Plan.

2.6.9. Determining the Survey Requirements.

The following matrix identifies the requirements for the different survey types typically encountered at an airport.

Intentionally left blank.

Table 2-1. Survey Requirements Matrix

This table is designed for use in two ways. First, it defines in a general fashion the task required to meet a specific objective. Each task listed is generalized and the process to complete it many contain many other pieces. Users should refer to the text of the referenced AC to ensure that all the required subtasks are completed. The second way to use this matrix is as a checklist to ensure all the required data is collected either before leaving the field or submitting the data to the FAA.

Intended End Use of the Data ➢	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Airport Obstruction Chart	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
Required Tasks ⮛			Non-Precision	Precision	Visual			Airside	Landside			
Provide a Survey and Quality Control Plan	150/5300-16/17/18	•	•	•	•	•	•	•	•	•	•	•
Establish or validate Airport Geodetic Control	150/5300-16	•	•	•		•	•	•		•	•	•
Perform, document and report the tie to National Spatial Reference System (NSRS)	150/5300-16	•	•	•	•	•	•			•		•
Survey runway end(s)/threshold(s)	150/5300-18	•		•	•	•	•	•[1]		•	•	•
Monument runway end(s)/threshold(s)	150/5300-18	•		•	•	•	•	•[1]		•	•	
Document runway end(s)/threshold location(s)	150/5300-18	•		•	•	•	•	•[1]		•[1]	•[1]	
Identify and survey any displaced threshold(s)	150/5300-18	•		•	•	•	•	•[1]		•	•	•
Monument displaced threshold(s)	150/5300-18	•		•	•	•[1]	•[1]	•[1]		•		
Document displaced threshold(s) location	150/5300-18	•		•	•	•	•	•[1]		•	•	•
Determine or validate runway length	150/5300-18	•				•	•	•[1]		•	•	•
Determine or validate runway width	150/5300-18	•				•	•	•[1]		•	•	•
Determine runway profile using 50 foot stations	150/5300-18			•[2]		•[2]	•[2]	•[1]		•	•[2]	
Determine runway profile using 10 foot stations	150/5300-18	•		•[2]		•[2]	•[2]	•[1]		•	•[2]	•[2]
Determine the touchdown zone elevation (TDZE)	150/5300-18	•		•		•	•			•	•	
Determine and document the intersection point of all specially prepared hard surface (SPHS) runways	150/5300-18	•				•	•					•
Determine and document the horizontal extents of any Stopways	150/5300-18	•				•	•			•		•
Determine any Stopway profiles	150/5300-18	•				•	•			•		•
Determine if the runway has an associated clearway	150/5300-18	•				•	•					
Survey clearway to determine objects penetrating the slope	150/5300-18	•				•	•			•		•
Determine and document the taxiway intersection to threshold distance	150/5300-18					•						
Determine runway true azimuth	150/5300-18	•		•		•	•			•		•
Determine or validate and document the position of navigational aids	150/5300-18	•	•	•	•	•	•			•		
Determine or validate and document the position of runway abeam points of navigational aids	150/5300-18	•		•	•		•			•		
Determine potential navigational aid screening objects	150/5300-18		•	•	•							
Collect and document VOR receiver checkpoint location and associated data	150/5300-18		•								•	
Perform or validate and document an airport airspace analysis	150/5300-18	•	•	•	•	•	•	•[1]		•		
Collect and document helicopter touchdown lift off area (TLOF)	150/5300-18				•	•	•	•		•	•	•
Collect and document helicopter final approach and takeoff area (FATO)	150/5300-18				•	•	•	•		•	•	•
Collect or validate and document airport planimetric data	150/5300-18					•	•	•	•			•
Determine or validate the elevation of the Air Traffic Control Tower Cab Floor (if one is on the airport)	150/5300-18	•				•	•	•	•			•

[1] Only when runway construction is involved.
[2] All 14 CFR Part 139 airports require 10 foot stations. At all other airports the distance between stations is between 10 and 50 feet to meet local requirements

Intended End Use of the Data ➤ / Required Tasks ⮟	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Airport Obstruction Chart	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
			Non-Precision	Precision	Visual			Airside	Landside			
Perform or validate a topographic survey	150/5300-18	•[3]	•	•		•		•	•	•[4]		
Collect and document runway and taxiway lighting	150/5300-18	•				•						•
Collect and document parking stand coordinates	150/5300-18											•
Collect cultural and natural features of landmark value	150/5300-18					•	•					•
Determine elevation of roadways at the intersecting point of the Runway Protection Zone (RPZ) or the runway centerline extended	150/5300-18	•				•						
Determine all Land Use to 65 DNL contour	150/5300-18					•						
Document features requiring digital photographs	150/5300-18	•	•	•	•	•		•		•		
Document features requiring sketches	150/5300-18	•	•	•	•	•		•		•		•
Collect position and type of runway markings	150/5300-18	•				•						•
Collect position and type taxiway markings	150/5300-18											•
Locate, collect, and document photo ID points	150/5300-17						•					
Identify collect, and document wetlands or environmentally sensitive areas	150/5300-18					•						
Collect imagery	150/5300-17	•				•	•			•		•
Provide a final Project Report	150/5300-16/18	•	•	•	•	•	•	•	•	•	•	•

[3] Only required for the identified Category II and III special topographic survey
[4] For Cat II and III radar altimeter area or if specifically requested

2.6.10. Types of Airport Survey Projects

2.6.10.1. Airport Geodetic Control. Recover (if existing) the Primary Airport Control Station (PACS) and the associated Secondary Airport Control Stations (SACS) at the airport. These marks are typically set at commercial service airports and some high activity general aviation airports. A listing of airports with PACS and SACS and the dates of observation is available from the NGS website http://www.ngs.noaa.gov/cgi-bin/airports.prl?TYPE=PACSAC. PACS are set to meet high-stability standards and positioned to meet high-accuracy standards. SACS have slightly less stringent stability and positioning specifications. Refer to AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey* for full PACS and SACS requirements. Use the established PACS and SACS as starting control for all airside surveys at the airport. When a local control grid is established for engineering purposes, make direct ties to existing control stations with published NSRS coordinates. Existing control should consist of monumented points such as the PACS, SACS, runway ends, displaced thresholds, other published NSRS monuments etc. Incorporate at least two existing recoverable control stations into the local control network to maintain the airport relative to the NAS. If the PACS and/or either of the SACS are not found, are destroyed, are damaged, or are not usable for some other reason, contact the FAA Airport Surveying–GIS Program Manager immediately. The FAA Airport Surveying–GIS Program will review the situation and may advise the airport proponent, Airports District Office, or Airports Regional Office to reschedule the work at the airport.

2.6.10.1.1. Verification of Survey Marks. Before use, verify the unmoved position and elevation of the PACS and SACS. The verification of each control station includes:

- Physically visiting each control station to determine its usability and checking its identity;
- Ascertaining its unmoved position;
- Determining its condition, stability, visibility; and
- The submission of recovery information to NGS.

Make two independent GPS sessions, each at least 10 minutes long with a 5-second collection interval, between the PACS and each SACS, or measure the distance between the PACS and each SACS using calibrated electronic distance meter instrument (EDMI), and compare the results to a computed inverse distance. Compute the inverse using either the NGS program INVERS3D (available on the NGS website at http://www.ngs.noaa.gov/TOOLS/) or a comparable commercial product. Compare the newly measured distances or inverse distances (from new observations) against the distances determined from the published positions. Provide the results or the comparisons as part of the observational data in the final report. Obtain elevation checks either from GPS observations or from spirit levels. The distances must agree within 3 cm; the difference in ellipsoidal height must agree to ±4 cm, and the difference in orthometric height must agree to ±5 cm or the data must be recollected.

Submit a recovery report for the PACS and SACS to the NGS at:

http://www.ngs.noaa.gov/FORMS_PROCESSING-cgi-bin/recvy_entry_www.prl

Verification is not required if the contractor performing the survey also established the monuments by satisfying the requirements of AC 150/5300-16, *General Guidance and Specifications for Aeronautical*

Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey, for the same airport as part of the same contract.

2.6.10.2. Runway Data. This section provides field surveyors with guidelines for properly identifying the precise survey point for runway ends, displaced thresholds, and stopway ends. It highlights the importance of resolving runway/stopway discrepancies with airport authorities and official U.S. Government aeronautical publications. Accurate runway data is critical to aircraft safety. Inaccurate data can result in unnecessary operational limitations or dangerous misassumptions. The positions and elevations of runway/stopway/displaced threshold points are elements used to determine airport design and operation information such as runway length, Accelerate Stop Distance Available (ASDA), Takeoff Distance Available (TODA), Takeoff Run Available (TORA), Landing Distance Available (LDA), runway gradient, and runway azimuth, among other data elements. In many cases, the location of these points is not intuitively obvious and the precise survey point selection may not be consistent among surveyors.

The FAA has issued a series of advisory circulars establishing standards for construction, markings (painting), lighting, signage, and other items pertaining to runways/stopways. Airports certified under 14 CFR 139 and those federally obligated must comply with the published standards; however, complicating this are situations where the repainting of markings based on runway/stopway changes is delayed, leaving inappropriate painting in place at the time of the survey. Other situations occur when the airport intends to comply with the AC, but the marking standard is misinterpreted or applied incorrectly. An example of misinterpreted criteria is, where the threshold bar is painted on a blast pad adjacent to a runway end rather than on the runway. These guidelines should help surveyors correctly identify runway/stopway survey points, not only when standard markings exist, but also in the many cases where a nonstandard situation is encountered.

2.6.10.2.1. Runway and Stopway Points. The location and orientation of the runway(s) are paramount to the safety, efficiency, economics, and environmental impact of the airport. This section provides guidance on the collection of data regarding the specific features and attributes about the runway, stopway, clearway and displaced threshold (if any). See Figure 2-1. Additionally, it provides guidance on the accurate collection of profile points along the runway, used in many different areas of airport planning and design as well as other initiatives within the FAA. Typically, the runway end, stopway, and displaced threshold positions are typically collected using GPS or ground based methods. Since the points are fairly high accuracy points and are used to establish the approach and departure characteristics for the runway, collection using remote sensing technologies is not acceptable. Provide the runway/stopway data required for a runways and stopways using the Runway, RunwayEnd, Stopway, and AirportControlPoint (for displaced thresholds and stopway ends) features in Chapter 5 for all runways and stopways with a specially prepared hard surface (SPHS) existing at the time of the field survey. Provide the data for non-specially prepared hard surface (non-SPHS) runways/stopways required existing at the time of the field survey and depicted in the current version of the U.S. Government flight information publication U.S. Terminal Procedures. Provide Stopway data (using the feature StopwayEnd or Stopway) and Clearway data using the RunwayProtectArea feature if it is requested by appropriate authorities (FAA, Airport sponsor, State Aviation authority).

Surveyors should refer to and document runways using the number painted on the runway at the time of the field survey. Use the runway number published in U.S. Terminal Procedures (version current at the time of the field survey) if a number is not painted on the runway. Use the FAA Runway Data Sheet form to document published data and collected data. Download the form from the FAA Airports GIS website at https://airports-gis.faa.gov.

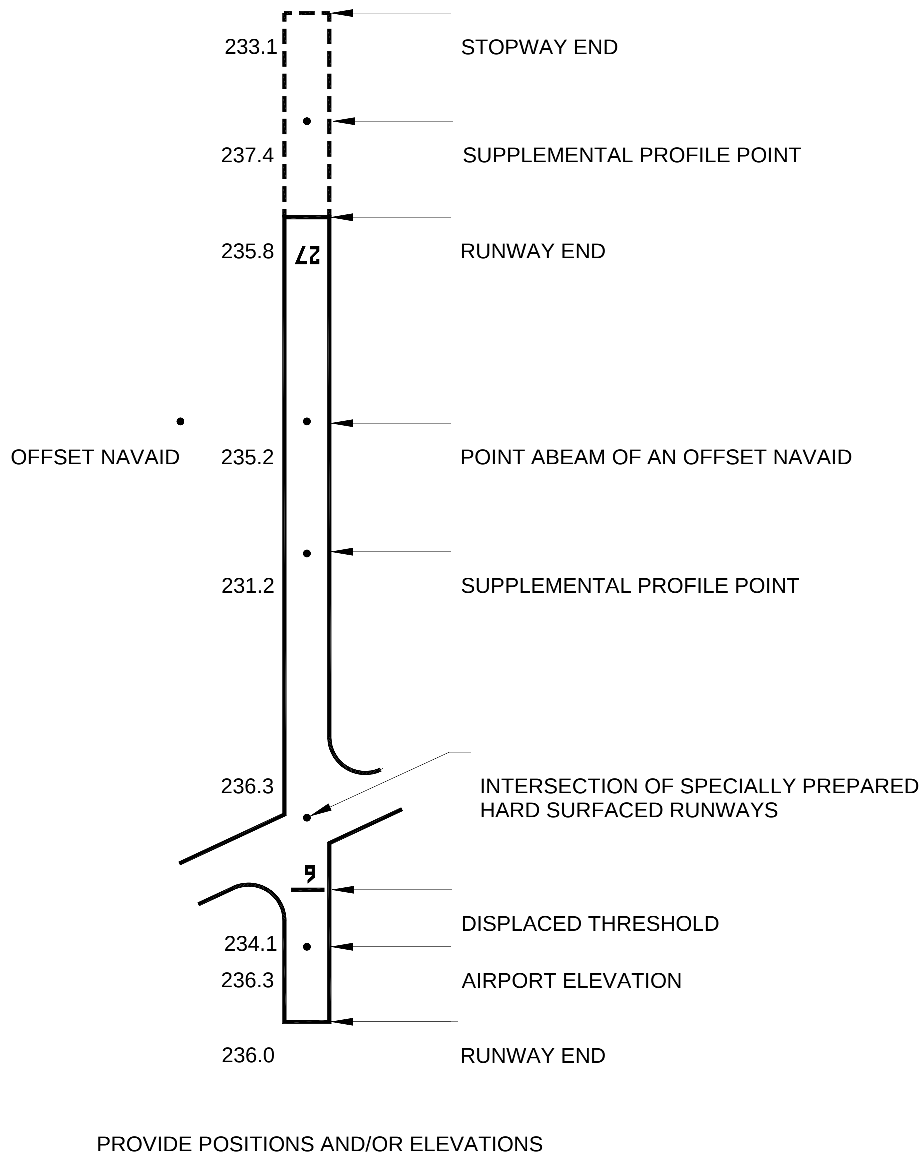
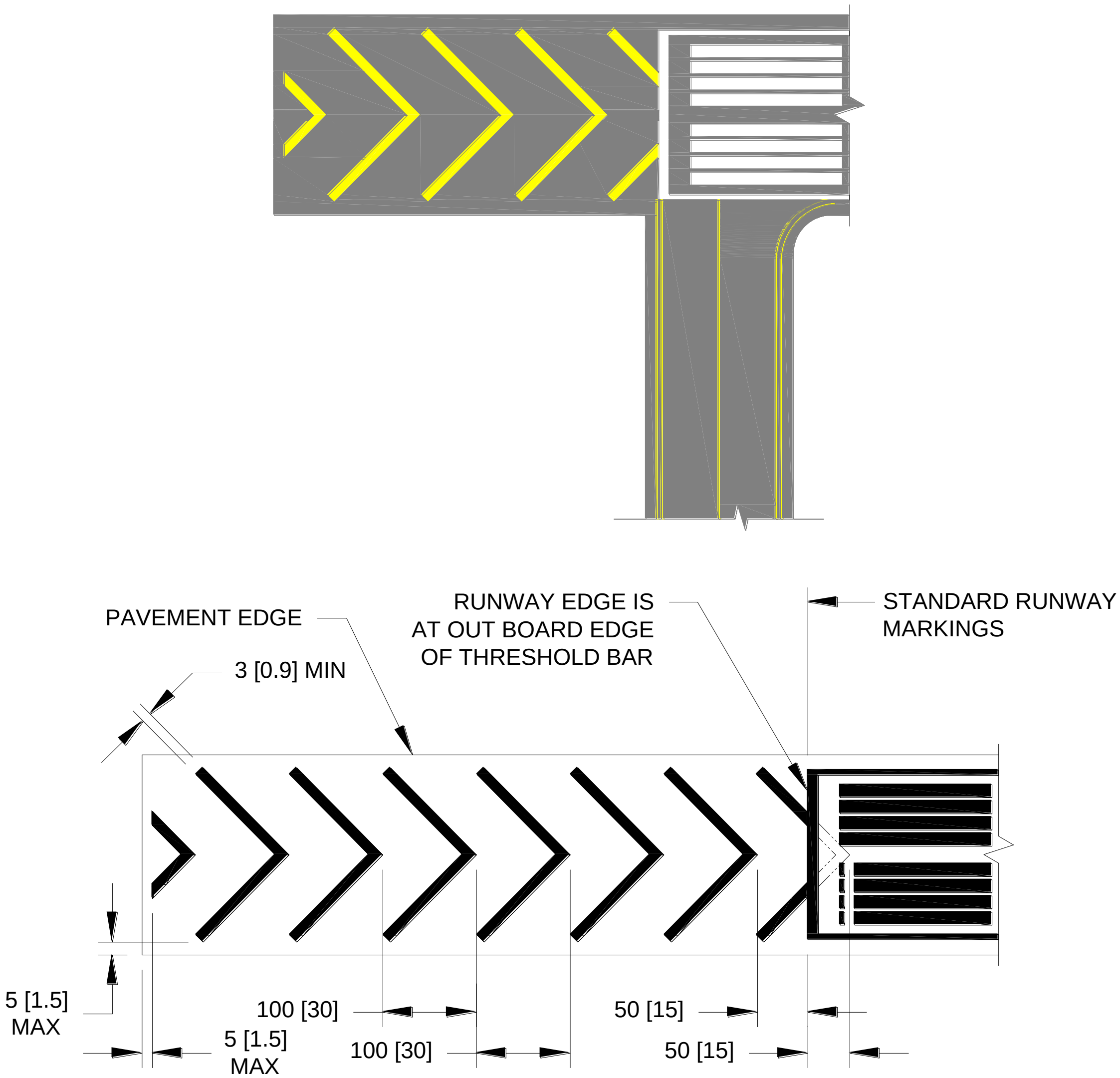


Figure 2-1. Depicts some of the required points and elements of a runway or stopway.

In order to be a stopway, the area must be officially designated, appropriately marked, and approved as a stopway by the airport and FAA authorities. The following points about stopways are important for the surveyor to keep in mind:

- A stopway is an area beyond the runway, with sufficient strength to support a decelerating aircraft in all weather conditions. It is not a runway safety area.

- A stopway must be designated as such. This means the airport owner/operator determines that a stopway exists and commits to maintaining the area as a stopway, including the appropriate marking and lighting (see Figure 2-2). The existence of a stopway means the runway has a declared accelerate/stop distance, even though it may not be published. Unless otherwise stated, all runway, stopway, and clearway points must be on the runway, stopway, or clearway (as appropriate) centerline.



NOTES:

1. 50 FOOT [15M] SPACING MAY BE USED WHEN LENGTH OF AREA IS LESS THAN 250 FEET [75M] IN WHICH CASE THE FIRST FULL CHEVRON STARTS AT THE INDEX POINT (INTERSECTION OF RUNWAY CENTERLINE AND RUNWAY THRESHOLD).
2. CHEVRONS ARE YELLOW AND AT AN ANGLE OF 45° TO THE RUNWAY CENTERLINE.
3. CHEVRON SPACING MAY BE DOUBLED IF LENGTH OF AREA EXCEEDS 1000 FEET [300M]
4. DIMENSIONS ARE IN: FEET [METERS].

Figure 2-2. An example of the proper marking for a blast pad or stopway.

2.6.10.2.2. Determining the Runway Length and Width. The runway length does not include blast pads or stopway surfaces located at one or both ends of a runway; however, the displaced threshold (if there is one) is included in the physical length of the runway. Runway lengths are determined from the positions of the runway ends. Determine the runway end positions using the guidance provided in the RunwayEnd feature in Chapter 5. Measure the runway width from the outer edge of the runway, excluding shoulders (see Figure 2-3) and stopways. The runway width is the physical width extending over the entire length of the rectangle, or the area within the runway side stripes if the full pavement width is not available as a runway. Measure and record runway widths to the nearest tenth of a foot (0.1 ft) and include the dimension on the runway end sketch. If the determined dimensions of the runway, displaced threshold, stopway, or blast pad dimensions do not agree with the information published for the airport, discuss the discrepancies with the airport manager or designated representative and resolve any discrepancies in the values before departing the site. If the discrepancy cannot be resolved, note the discrepancy and document the discussions with the airport officials in the final report for review by NGS and resolution by the FAA with the airport.

Determine and provide the runway true azimuth reckoned from North to the nearest thousandth of a degree as the azimuth between the physical runway ends. The runway true azimuth is documented as an attribute in the RunwayEnd feature. Each runway end will have a different runway true azimuth specified.

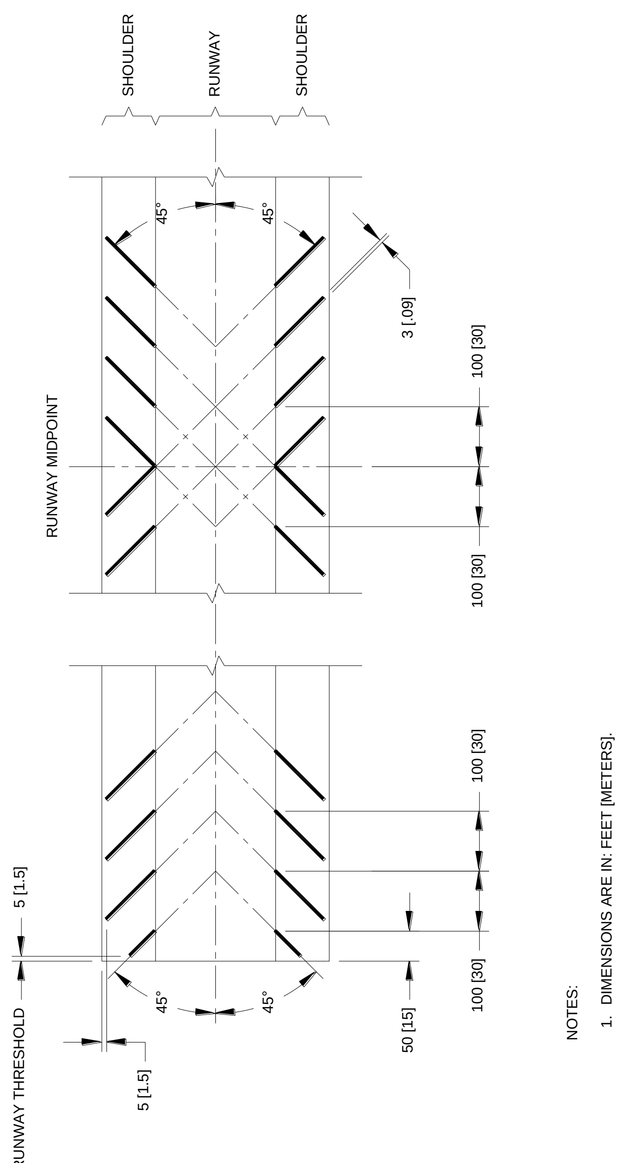


Figure 2-3. Standards for marking of runway shoulders.

2.6.10.2.3. Displaced Thresholds. On some runways, the threshold is displaced due to other requirements such as objects in the approach area penetrating the siting surface or where the airport is constrained to meet runway safety area length. When a displaced threshold is encountered it must be identified (see Figure 2-4), classified, and documented (see paragraphs 1.5.2 and 1.5.3 for documentation requirements) similarly to a runway end. In the FAA Airports GIS a displaced threshold is modeled using the AirportControlPoint feature in Chapter 5.

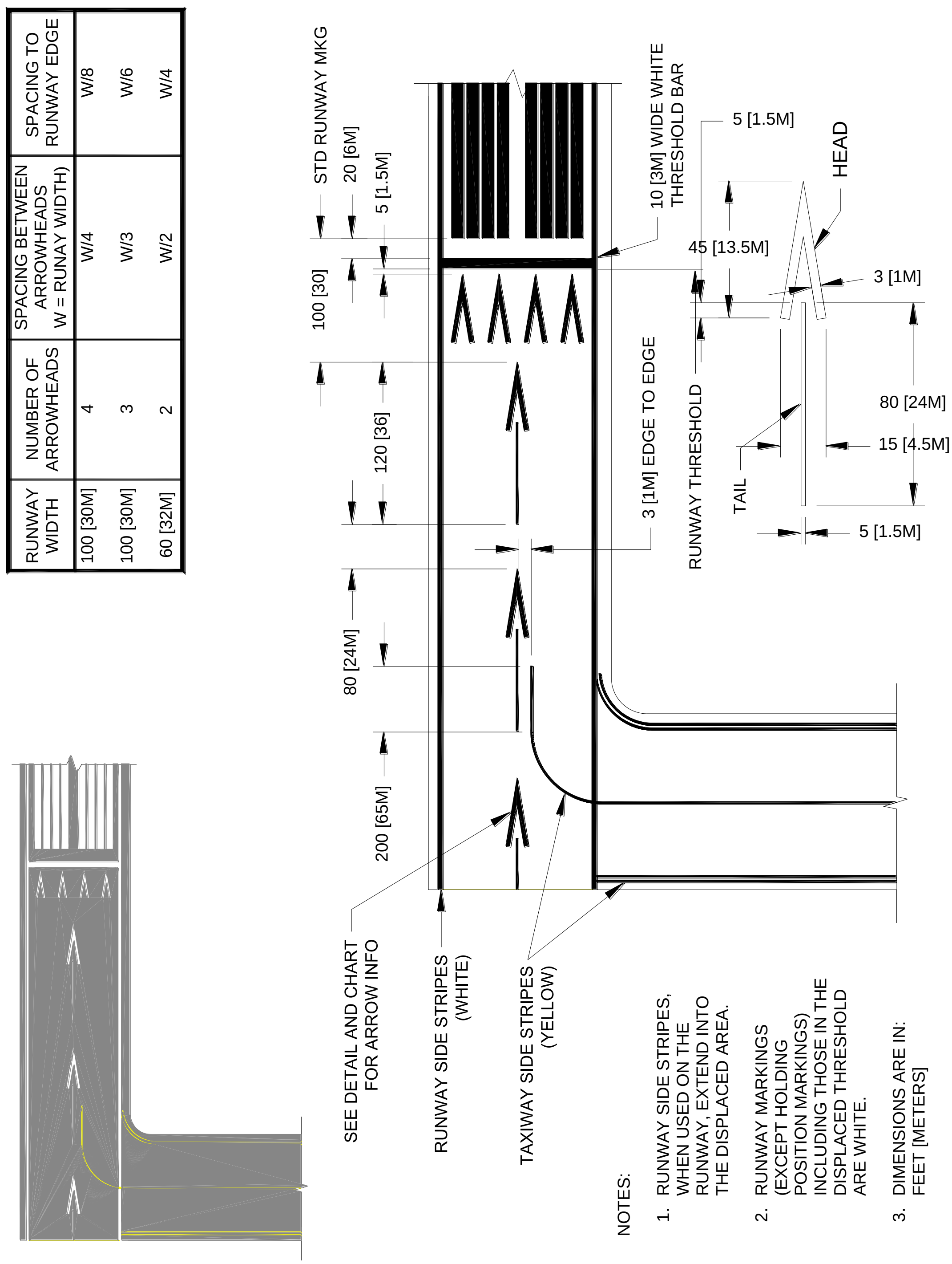


Figure 2-4. Illustrates the proper marking of a displaced threshold.

2.6.10.2.4. Establishing the Runway End Point**.** Use existing FAA or airport provided runway end point data to assist in locating the points identifying the ends (physical and displaced) of the runway. Proper identification of these points is in the data standard descriptions for the RunwayEnd, and AirportControlPoint (Displaced Threshold and stopway end) features in Chapter 5 of this AC, with further clarifying guidance provided in Appendix C. Recover, verify or establish and document (see paragraphs 1.5.2 and 1.5.3 for documentation requirements) the following points using the appropriate feature in Chapter 5.

- Runway end points
- Displaced threshold points
- Clearway end points
- Stopway end points

2.6.10.2.5. Location of Specific Survey Points**.** The locations of the following runway/stopway survey points are defined by the intersection of the runway/stopway centerline and one of the indicated survey point locators as detailed in the feature descriptions in Chapter 5. When the survey point is determined, the selection of the point is solidified through the use of various supporting features. Occasionally, a supporting feature will conflict with the selected survey point or another supporting feature. If this occurs, resolve the conflicts before leaving the airport. For example, a runway number may be located near the end of the pavement, but threshold lights and a threshold bar are located down the runway at an apparent displaced threshold. Discuss the conflict with airport authorities and, if necessary, contact the FAA Airport Surveying–GIS Program Manager for assistance. In the feature descriptions (see Chapter 5), reference is made to inboard or outboard threshold and runway end lights. These terms are defined in Appendix A. If light units or day markers are used to construct the trim line defining a survey point, as in the case of a runway end with an aligned taxiway, use the two units nearest to the runway (one light on each side of the runway). Always define the trim line perpendicular to the runway centerline. If a line connecting the lights (or markers if the runway is unlighted) is not perpendicular to the runway centerline, then the trim line must be best fit to the defining lights or markers.

2.6.10.2.6. Runway and Stopway Profiles**.** The runway profile provides information about the runway gradient, establishes the airport elevation and the touchdown zone elevation(s), and supports runway pavement roughness studies. Collect runway profile data along the runway centerline at 50-foot stations. Additionally, at 14 CFR 139 airports collect runway centerline profiles at 10-foot stations and two (2) additional profiles offset 10 feet on either side of the centerline. Collect the runway or stopway profiles beginning and ending on the runway ends. Each point collected in the profile should be accurate to within 0.5 inches relative to its adjacent points and modeled using the AirportControlPoint feature in Chapter 5. Use the actual date the profile was collected as the dateRecovered attribute. Specify the monumentType attribute as spot from the enumeration table codeMonumentType. Specify the pointType attribute as a CenterlinePoint from the enumeration table codePointType.

2.6.10.2.7. Preliminary Computations and Data Discrepancies. The runway end or displaced threshold position establish the starting and end point of the runway. Use these positions to compute the runway length, length of any threshold displacement and stopway length. Before leaving the airport, compute these safety critical distances and compare them to the known data provided by the FAA or airport authority. Determine these lengths using a three dimensional geodetic inverse computation between the end points. Using a three dimensional computation corrects for the elevation of the points and difference in elevation between points. The official runway, stopway, or displaced threshold length is the straight-line distance between end points. This line does not account for surface undulations between points.

Computed lengths seldom match published lengths exactly. Discrepancies are most likely caused by interpretation of runway/stopway survey point location, remarking of thresholds, or comparison with less accurate published data. As the magnitude of discrepancies increases, the probability also increases that physical changes have occurred to the runways/stopways or that the thresholds have been moved. Differences with published data should be considered as an alert that there may be a problem in the survey. However, published lengths are often not as accurate as the new surveyed lengths and are occasionally obsolete or otherwise grossly erroneous. Therefore, the validity of the published data must always be questioned when comparing it with the new survey data, especially if the survey points are selected correctly.

Even though published data is often incorrect or obsolete, new survey data should be carefully reexamined when discrepancies between published and surveyed data occur. The reasons for small discrepancies are often difficult or impossible to identify. As discrepancies become larger, the reasons typically become more apparent. Even though the source of the discrepancy may not be identified, the reexamination should be conducted to provide the highest level of confidence that accurate runway data has been provided. Fully document and report the situation in the final report for examination by the independent verification and validation team.

Stopway discrepancies pose a special problem. Before an area is officially declared a stopway and published in official U.S. Government documents, airport authorities must file the request for a stopway through appropriate FAA offices. Discrepancies in the reported value for a stopway are generally harder to determine. If the apparent stopway dimensions on the ground differ by more than 10 percent from the stopway dimensions as published by the FAA or given by the airport authority, contact the FAA Airport Surveying–GIS Program Manager for assistance. If a published stopway does not appear to meet the definition of a stopway, including the requirement to support an aircraft during an aborted takeoff, without causing structural damage to the aircraft, fully document (including taking digital photos of the area in question) for resolution by the FAA with the airport authority. If the airport authorities request an area be surveyed as a stopway but the stopway is not published in the current FAA publications or the airport authorities request a change to or do not concur with the published stopway data or data resulting from the new survey, complete the survey as requested and completely document the request and the data in the final report for resolution by the FAA.

Because of the importance of runway/stopway data, always discuss the location of runway, stopway and displaced thresholds with the appropriate airport authorities. Discrepancies occurring between the judgment of the surveyor and the opinions, understandings, or intentions of the airport authorities should be resolved. It may be necessary to revisit the field with airport personnel and explain the survey and survey point selection. If a discrepancy in the location of a position cannot be resolved, assistance should be sought from the FAA Airport Surveying–GIS Program Manager. In some cases, final resolution may ultimately require a FAA field visit.

2.6.10.2.8. Comparison With Critical Runway Length. Runway lengths that are whole thousands of feet (5,000, 8,000, etc.) or whole thousands of feet plus 500 feet (5,500, 8,500, etc.) often have special operational significance. For purposes of this document, these lengths are called critical lengths. Many aircraft operations require a minimum runway length, which is often a critical length, and many runways are built to these lengths. If a runway is incorrectly published shorter than a critical length, certain operations could be unnecessarily restricted. In addition to imposing unnecessary operational limitations, incorrectly surveyed runways may not be retrieved during a computer search. This situation is especially likely to occur with critical length runways. In some cases, this failure could have safety implications. While all runway/stopway lengths should be accurate, even small errors in critical length could have significant and far-reaching ramifications. Runway lengths determined to be less than, but within 20 feet of, a critical length should be carefully reexamined to provide the highest level of confidence that the survey is correct. This reexamination should include an inspection of the runway end survey points to ensure the longest runway length possible was provided.

2.6.10.3. Navigational Aid (NAVAID) Surveys.

2.6.10.3.1. Navigational Aids**.** Navigational aids are vital elements of the NAS. The FAA Pilot/Controller Glossary defines a navigational aid as "any visual or electronic device, airborne or on the surface, providing point-to-point guidance information or position data to aircraft in flight". The FAA operates over 4,000 ground-based electronic navigational aids, each broadcasting navigation signals within a limited area. The FAA and airports also provide a variety of approach lighting systems to assist the pilot in transitioning from instrument reference to visual reference for landing (see Figure 2-5). The navigational aid survey is the process of determining the position and/or elevation of one or more navigational aids and associated points on the airport or along the runway centerline(s) extended. Where a centerline abeam position (perpendicular to) the navigational aid is required it is detailed in Chapter 5. A navigational aid survey is normally completed as part of the total airport survey, airport layout plan update or accomplished entirely independently depending on the needs of the airport sponsor/proponent.

Figure 2-5. This photo illustrates how lights used at airports assist the landing pilot.

2.6.10.3.2. Determining the NAVAID Horizontal and Vertical Survey Position**.** Determine the horizontal survey point (HSP) by either field survey or remotely sensed means. The HSP may be the center of the navigational aid or, when the navigational aid is composed of more than one unit, the center of the array. If the DME and azimuth functions of VORTAC or VOR/DME facilities are located within 10 feet consider them collocated and report them as a single navigational aid. Be sure to include a note identifying the method used to determine the identification of collocation. Survey the navigational aid position if the navigational aid is associated with the airport surveyed. If the navigational aid penetrates a surface, also identify it in the airport airspace analysis evaluation with the associated object requirements and accuracies applying.

The data standards in Chapter 5 provide the data capture rules, horizontal and vertical survey points, accuracy requirements and necessary documentation for NAVAID observations. If you encounter a navigational aid not listed, contact the FAA Airport Surveying–GIS Program Manager for guidance.

In addition, survey Airport Surveillance Radar (ASR) and Air Route Surveillance Radar (ARSR) located within the limits of the Airport Airspace Analysis Area for the airport, but not located on a military airport.

2.6.10.3.3. Electronic Navigational Aids. Determine the position (and sometimes the elevation, depending on the navigational aid) for electronic signal generating navigational aids associated with the airport. Chapter 5 identifies the accuracy requirements for electronic navigational aids. Each navigational aid feature lists the HSP and VSP, and in many cases provides photos or sketches identifying the proper survey point, accuracy requirements, documentation and monumentation requirements and coordinate resolution for the electronic navigational aids typically found on and around airports.

Table 2-2. List of typical Electronic NAVAIDs associated with an Airport

Air Route Surveillance Radar (ARSR)	Outer Marker (OM)
Airport Surface Detection Equipment (ASDE)	Back Course Marker (BCM)
Airport Surveillance Radar (ASR)	Localizer Type Directional Aid (LDA)
Distance Measuring Equipment (DME)	MLS Azimuth Antenna (MLSAZ)
Fan Marker (FM)	MLS Elevation Antenna (MLSEL)
Localizer (LOC)	Non-directional Beacon (NDB)
Glide Slope (GS)	Simplified Directional Facility (SDF)
End Fire Type (GS)	Tactical Air Navigation (TACAN)
Inner Marker (IM)	VHF Omni Directional Range (VOR)
Middle Marker (MM)	VOR/TACAN (VORTAC)

2.6.10.3.4. Visual Navigational Aids. To enhance visual information to the pilot during the day, when visibility is poor, and at night, airports provide visual aids to pilots. These aids provide visual clues to the pilot about the aircraft's alignment or height in relation to the airport or runway. Visual navigational aids consist of a variety of lighting and marking aids used to guide the pilot both in the air and on the ground. Determine the position of the HSP for the visual aids located on the airport. The position of the HSP may be the center of the navigational aid or, when composed of more than one unit, the HSP is typically the center of the unit array. For approach lighting systems capture and report only the first and last lights.

The HSP, VSP, accuracy and resolution requirements for the visual navigational aids typically found on and around airports are provided with each navigational aid in Chapter 5. Chapter 5 provides sample images of most typical navigational aids depicting the horizontal and VSPs for each.

Table 2-3. List of Typical Visual Navigational Aids on an Airport

Airport Beacon (APBN)	Visual Glide Slope Indicators (VGSI)
Runway End Identifier Lights (REIL)	Approach Light System (ALS)

NOTE: *Visual navigational aids are associated with the runway end they serve; the Airport Beacon is an exception.*

2.6.10.3.5. Reference Measurements. For any navigational aid, provide reference measurements to other features, which could affect the system performance or separation from runways or taxiways. For all navigational aids provide at least two reference measurements to other prominent features (runway centerline, taxiway centerline, aircraft parking areas, detailing the navigational aid and its compound (area) and the point surveyed. Document these dimensions using the Navigational Aid Facility or Runway End Sketch form from the FAA Airports GIS website (https://airports-gis.faa.gov).

2.6.10.3.5.1. Navigational Aid Screening and Interference Reference Measurements. In addition to the reference measurements above provide the following reference measurements. All measurements are derived from the horizontal survey point. Document these measurements on the FAA Navigational Aid Screening and Interference Measurement Sketch.

- The distance and azimuth from the navigational aid to any structure located with 1,000 feet.
- The distance and azimuth from the navigational aid to any metal structure beyond 100 feet and above a 1.2° angle from the antenna base or proposed location.
- The distance and azimuth from the navigational aid to all non-metal structures greater than 1,000 feet from the navigational aid and penetrating a 2.5° plane from the antenna base or proposed location.
- The distance and azimuth to any metal fence within 500 feet of the navigational aid antenna or proposed location and any overhead powerline within 1,200 feet of the antenna or proposed location.
- The distance and azimuth to any trees within 1,000 feet of the antenna or proposed location, however, a single tree is acceptable as long as it is greater than 500 feet from the antenna or proposed location.
- The distance and azimuth to any tree(s) greater than 1,000 feet from the antenna penetrating a 2.0° plane from the antenna base or proposed location.
- The distance and azimuth to any building(s) or other objects with the potential to cause signal interference with an ASR antenna within 1,500 of the antenna and identify any other electronic equipment within 2500 feet of the ASR antenna or proposed location.

2.7. AIRPORT AIRSPACE ANALYSIS SURVEYS

When required, use the following specifications and associated figures to identify, collect, and analyze objects on, and surrounding airports. These specifications require extensive field/remote sensing operations, providing data to support a wide range of NAS activities. This section details the requirements for completing an Airport Airspace Analysis Survey to support the planning and design activities of airports and ancillary tasks such as instrument flight procedure design. This section is complementary to other sections on the collection of runway, navigational aid, and other airport data. Complete the analysis based on the highest runway designation. For example, if one end of the runway is designated as a precision runway and the other end non-precision use the Runways with Vertical Guidance analysis criteria for both ends. When both ends of the runway are or plan to be used for non-vertically guided or visual operations, complete the analysis using the Non-vertically Guided criteria.

2.7.1. Airport Airspace Survey Surfaces and Analysis

2.7.1.1. Runways with Vertical Guidance. These specifications support the airport's planning and design activities for the development of vertically guided instrument approaches such as ILS, PAR, MLS, LPV, TLS, RNP and Baro VNAV. These surfaces assist in the identification of possible hazards to air navigation and critical approach/departure obstructions within the vicinity of the airport. All surfaces identified below must be completed for both ends of a runway. Evaluate each surface independently of other surfaces. Design all appropriate airport surfaces in reference to the runway ends and not displaced thresholds.

2.7.1.1.1. Vertically Guided Runway Primary Surface (VGRPS). A 1,000-foot wide rectangular surface (500 feet either side of runway centerline) longitudinally centered on the runway centerline. The VGRPS also extends 200 feet beyond each runway end. The surface elevation of any point within the VGRPS is the same as the runway centerline elevation beam at the selected point (follows the runway centerline contour). The elevation of any point within the 200 foot VGRPS extension areas are equal to the runway end elevation on the side to which the extension applies.

2.7.1.1.2. Vertically Guided Primary Connection Surface (VGPCS). The VGPCS is a set of 500 foot wide lateral extensions of the VGRPS surface (one on each side of the runway) and is used to connect the VGRPS with the Vertically Guided Approach Transitional Surface (VGATS). The VGPCS starts along the outer edges of the VGRPS surface, and extends out laterally 500 feet. The VGPCS also extends 200 feet beyond each runway end. The surface elevation of any point within the VGPCS is the same as the runway centerline elevation abeam the selected point (follows the runway centerline contour). The elevation of any point within the 200 foot VGPCS extension areas is equal to the runway end elevation on the side to which the extension applies.

2.7.1.1.3. Vertically Guided Approach Surface (VGAS). The VGAS is a 40:1 (2.5%) sloping surface that is longitudinally centered on the extended runway centerline. It begins at the runway end, and extends outward towards the final approach course for a total horizontal distance of 20,200 feet. The surface is 2,000 feet wide (1000 feet either side of centerline) at the runway end, and expands to a width of 8,000 feet at 10,200 feet from runway end. From 10,200 to 20,200 feet from the runway end, the surface is 8,000 feet wide (4,000 feet either side) and parallel to the runway centerline extended. The surface begins at the runway end elevation and rises towards the final approach course for a total of 505 feet. This surface overlaps the VGRPS and VGPCS surfaces for 200 feet.

2.7.1.1.4. Vertically Guided Protection Surface (VGPS). The VGPS is a 62.5:1 sloping surface longitudinally centered on the runway centerline extended. The surface begins at the runway end and extends outward towards the final approach course for a distance of 6,000 feet. The surface is 400 feet wide at the runway end (200 feet either side of centerline) and expands to a final width of 1217.6 feet (608.8 feet either side of centerline). The surface begins at the runway end elevation and rises towards the final approach course for a total rise of 96 feet. This surface overlaps the VGRPS for 200 feet.

2.7.1.1.5. Vertically Guided Approach Transitional Surface (VGATS). The VGATS is a 3,000 foot wide, 20:1 (5%) sloping surface that extends outward from the outer edges of the VGPCS (from runway end to runway end) and along the VGAS tapered boundary, to a point 4,000 feet abeam the runway centerline (see Figure 2-6). The VGATS surface starts at the airport elevation along the VGPCS/VGATS edge (or imaginary extended edge for tapered area), and rises 150 feet above airport elevation abeam the runway centerline.

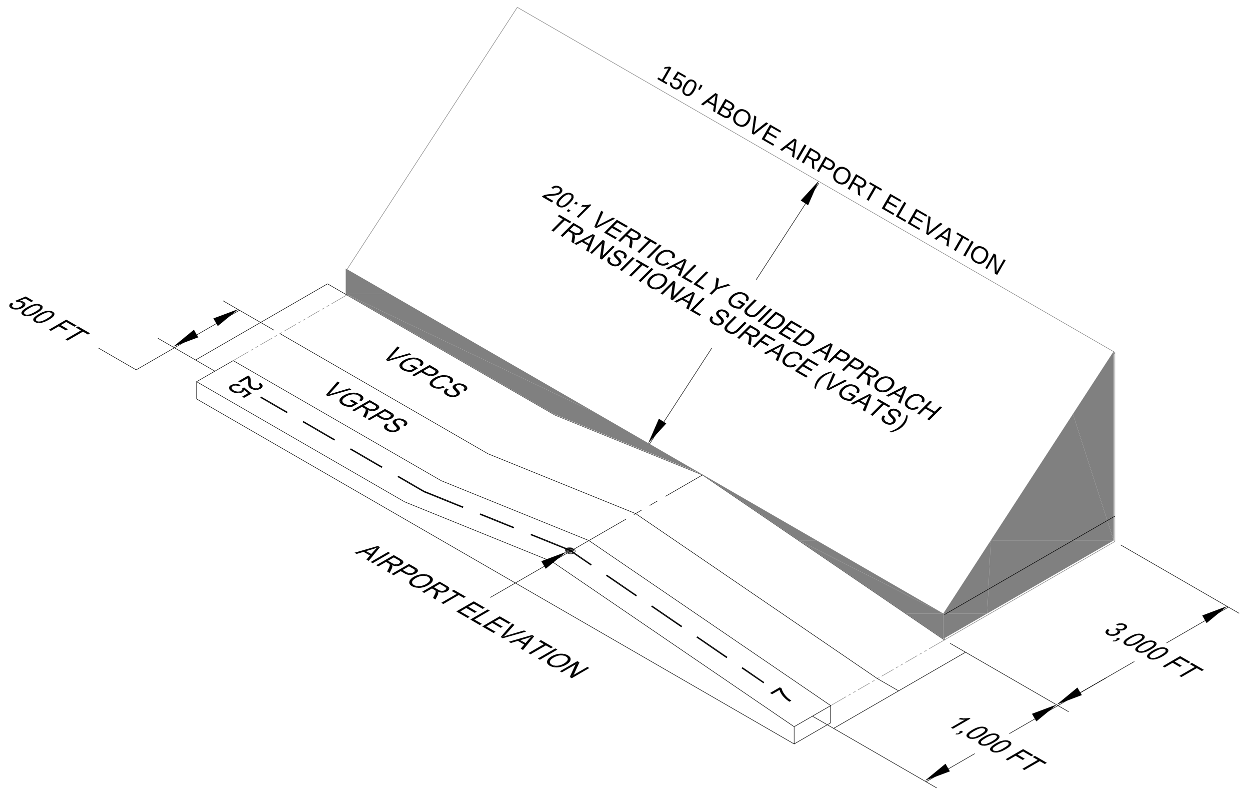


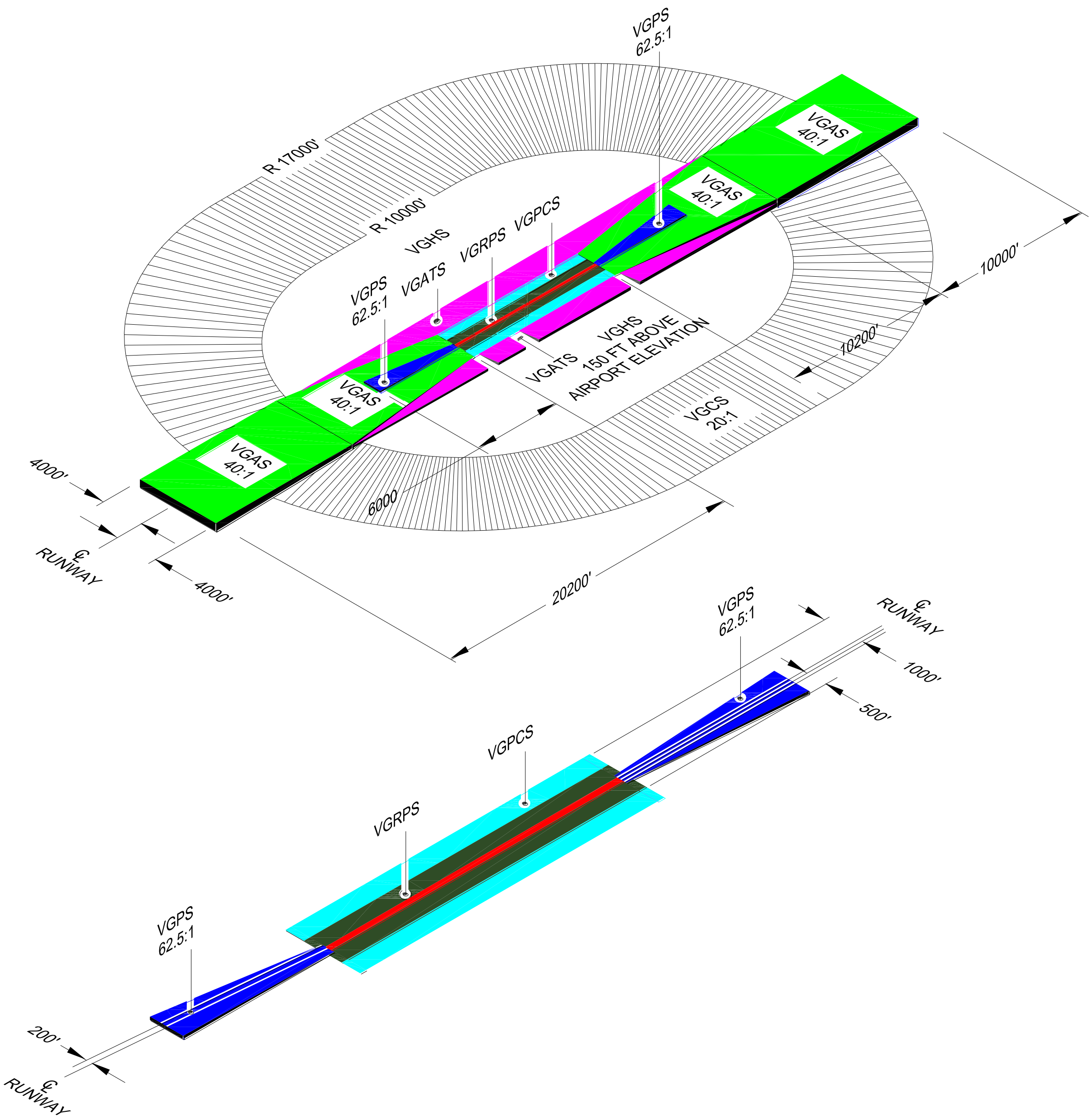
Figure 2-6. Illustrates the dimensional criteria associated with the VGATS and the connection to the VGPCS.

2.7.1.1.6. Vertically Guided Horizontal Surface (VGHS). Is a horizontal plane established 150 feet above the established airport elevation; construct the perimeter of the VGHS by scribing 10,000-foot arcs from the center of each end of the VGRPS. Use tangential lines to connect the arcs and complete the identification area.

2.7.1.1.7. Vertically Guided Conical Surface (VGCS). The VGCS is a sloping surface, extending upward and outward from the outer limits of the VGHS for a horizontal distance of 7,000 feet. The slope of the VGCS is 20:1 (5%) measured in the vertical plane. At the outer edge of the surface, the elevation of the VGCS is 500 feet above the airport elevation.

VGATS AREA (20:1)
MAXIMUM OBSTACLE HEIGHT = AIRPORT ELEVATION +
(150 - (DISTANCE FROM OUTER EDGE /20))

VGPS END WIDTH COMPUTATION (62.5:1)
(0.068133D) + 200
(0.68133 X 6000) + 200
(408.798) + 200
608.798 OR 608.8 FEET



DETAIL OF IMMEDIATE RUNWAY VICINITY

Figure 2-7. Illustrates the areas, dimensions, and slopes of the Vertically Guided Approach Survey and Analysis Specification required to support instrument procedure development.

2.7.1.2. Analysis of Runways with Vertically Guided Operations. Analyze the surfaces according to the following criteria for each runway end. Where an object meets multiple requirements (highest and most penetrating, highest and highest manmade etc.) the point only needs to be identified once. In this guidance the word "object" includes but is not limited to above ground structures, navigational aids, people, equipment, aircraft (parked or taxiing), equipment, vehicles, natural growth, and terrain. Where multiple runways are surveyed, perform and report the analysis for each runway separately. When an object is determined to be within one or more surfaces, identify the penetration value for each surface. Provide the penetration value (positive or negative) for the most adverse surface (closest to centerline or runway end) in the attribute field penValSpecified and provide the penetration amount (positive or negative) of the secondary surface in the attribute penValSupplemental.

2.7.1.2.1. Divide the VGRPS into three equal length zones each representing one third of the total length of the runway. Analyze all objects within the lateral confines (see Figure 2-8) of the surface to identify, classify, and report the following representative objects using either feature type Obstacle or ObstructionArea in Chapter 5 as appropriate:

- The highest object outward from the runway end to 200 feet from the end of the runway within the lateral limits of the VGRPS.
- The highest object, highest manmade object, and the highest natural (terrain or vegetation) object in each one-third (1/3) of runway length section of the VGRPS on each side (left and right) of the runway.
- When meteorological apparatus (see Figure 2-10) are located within the surface area, do not analyze this equipment against the surfaces as objects because their location is fixed by function and they are frangibly mounted. Instead, determine and report the distance from threshold, distance from all runway/taxiway centerline(s), the MSL elevation, the above ground height and distance from the edge of any apron or aircraft parking area. Use the FAA form Navigational Aid Facility or Runway End Sketch to document the information on meteorological apparatus.

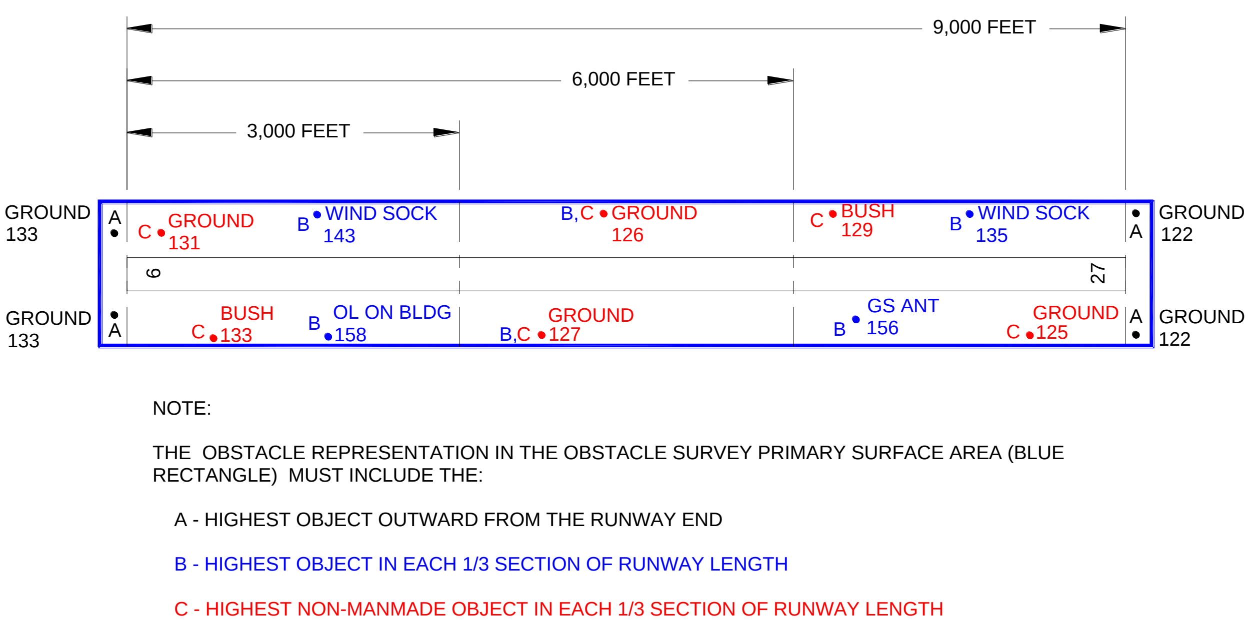


Figure 2-8. Object Representation in the VGRPS Area.

2.7.1.2.2. Divide the VGPCS into three equal length zones each representing one third of the total length of the runway. Analyze all objects within the lateral confines (see Figure 2-9) of the surface to identify, classify, and report the following representative objects using feature type Obstacle or ObstructionArea as appropriate:

- The highest object outward from the runway end to 200 feet from the end of the runway within the lateral limits of the VGPCS.
- The highest object, highest manmade object, and the highest natural object in each one-third (1/3) of runway length section of the VGPCS on each side (left and right, as viewed from the high numbered runway end) of the runway.
- When meteorological apparatus (see Figure 2-10) are located within the surface area, do not analyze this equipment against the surfaces as objects because their location is fixed by function and they are frangibly mounted. Instead, determine and report (as a sketch) the distance from threshold, distance from all runway/taxiway centerline(s), the MSL elevation, the above ground height and distance from the edge of any apron or aircraft parking area.

EXCEPTION: If the representative object(s) selected in the VGRPS sections are higher than the adjacent VGPCS sections, then selection and representation of an object in the VGPCS section is not required.

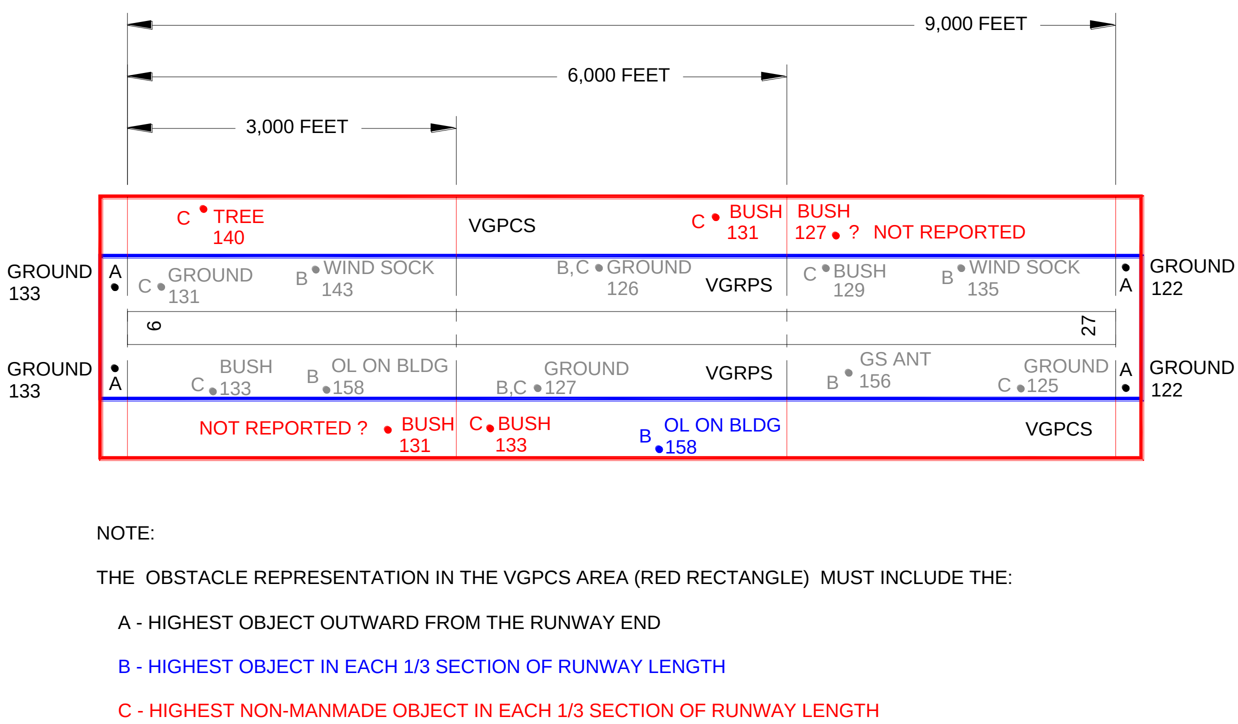


Figure 2-9. Illustrates the VGRPS and VGPCS object representations.

Figure 2-10. SAWS, AWOS and ASOS Station Installations.

2.7.1.2.3. In the Vertically Guided Approach Surface (VGAS) identify, classify and report all significant objects of landmark value underlying the VGAS using the respective feature type in Chapter 5 (i.e. Building, ForestStandArea, Fence, etc.) even if the objects(s) do not penetrate the surface.

In this guidance, objects of significant landmark value are geographic features located in the vicinity of an airport aiding in geographic orientation. These features include but are not limited to objects such as roads, railroads, fences, utility lines, shorelines, levees, quarries and nearby airports underlying the airport airspace analysis surfaces.

Identify, classify, and report the following representative objects using the feature type Obstacle or ObstructionArea according to the following criteria. For analysis as penetrating the VGAS, the VGAS area excludes VGPS area as illustrated in Figure 2-11 in blue.

- The five most penetrating objects within the VGAS.
- The highest manmade and natural objects in the first 10,200 feet of the VGAS on each side of the runway centerline extended.
- The highest manmade and natural objects in the area between the 10,200-foot point and the end of the VGAS on each side of the runway centerline extended.
- The overall highest object in the VGAS.

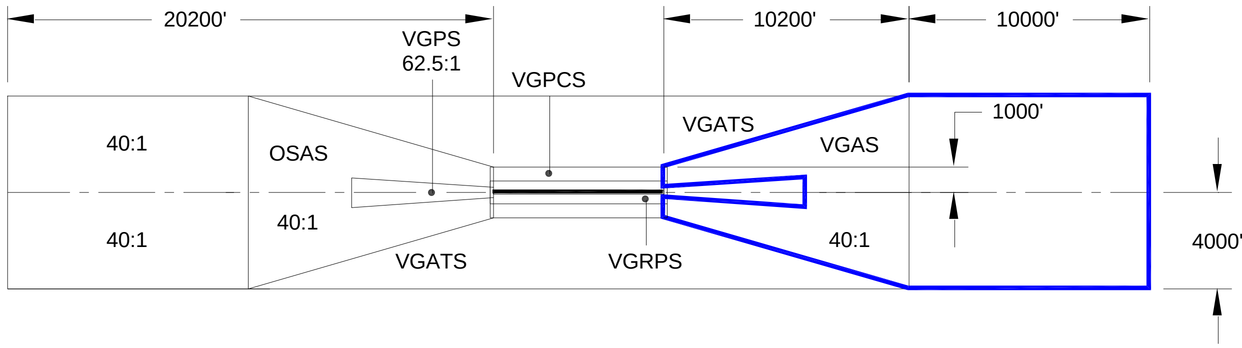


Figure 2-11. The area outlined in blue illustrates the lateral limits of the VGAS.

2.7.1.2.4. In the VGPS, identify, classify and report all significant objects of landmark value (for a definition refer to paragraph 2.7.1.2.3) underlying the surface using the respective feature type in Chapter 5 (i.e. Building, ForestStandArea, Fence, etc.) even if the objects(s) do not penetrate the surface.

Also, identify, classify, and report the following representative objects using the feature type Obstacle or ObstructionArea according to the following criteria.

In the VGPS, analyze all objects to identify, classify, and report the following representative objects.

- All objects penetrating the VGPS.
- The highest manmade and natural object on each side of the runway centerline extended within the lateral limits of the surface.

2.7.1.2.5. Divide the VGATS into four sections by drawing a line perpendicular to the runway centerline as illustrated in Figure 2-12 on each side of the centerline. Analyze the sections beginning with the northeasternmost section and analyze subsequent sections in a counterclockwise direction. Define left and right as viewed from the high numbered runway end.

- In the VGATS, identify, classify, and report the following representative objects using feature type Obstacle or ObstructionArea as appropriate: the highest manmade, highest natural, and the most penetrating object in each section of the VGATS.

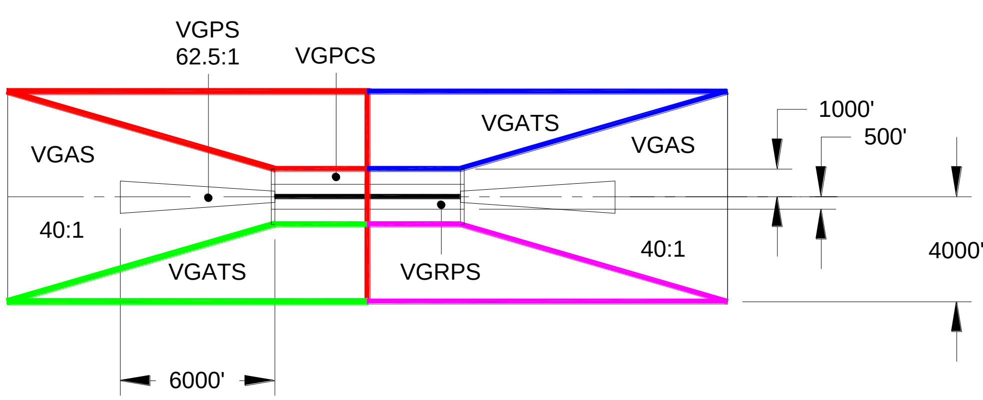


Figure 2-12. Illustrates the VGATS divided into four (4) sections for analysis.

2.7.1.2.6. Divide the VGHS into quadrants (as depicted by the red lines in Figure 2-13) centered on the meridian and parallel, intersecting the Airport Reference Point (ARP). Analyze all objects to identify, classify and report (using feature type Obstacle or ObstructionArea as appropriate) the two highest and the most penetrating object in each quadrant. Analyze the sections beginning with the northeastern most section and analyze subsequent sections in a counterclockwise direction.

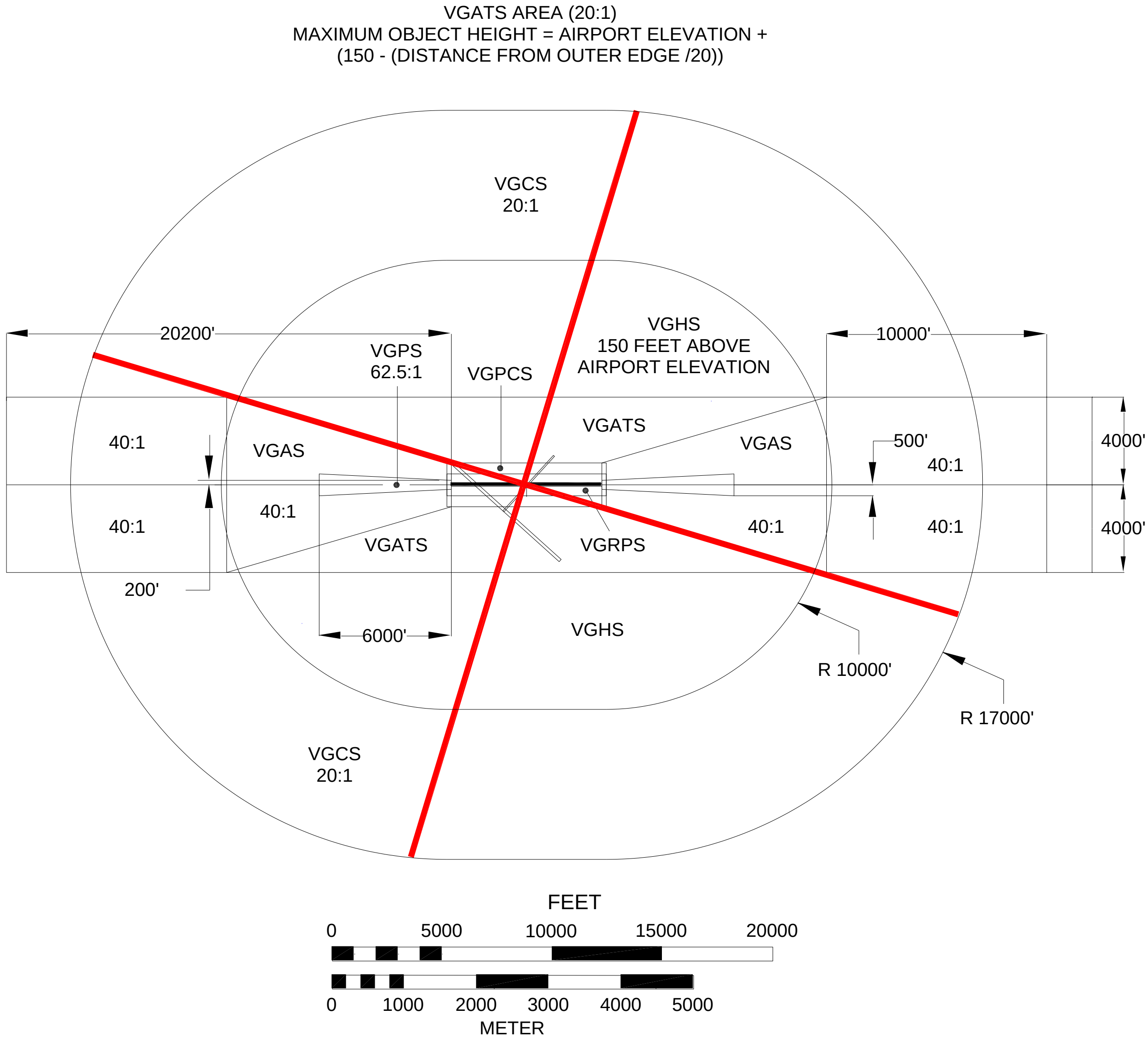


Figure 2-13. Illustrates dividing the VGHS into quadrants through the ARP.

2.7.1.2.7. Divide the VGCS into quadrants (as depicted by the red lines in Figure 2-13), extended to the outer edge of the VGCS, centered on the meridian and parallel intersecting the ARP. Analyze all objects to identify, classify, and report (using the feature type Obstacle or ObstructionArea as appropriate) the highest object and the most penetrating object in each quadrant. Analyze the sections beginning with the northeastern most section and analyze subsequent sections in a counterclockwise direction.

2.7.1.3. Runways without Vertical Guidance. These specifications and associated figures supports airport planning and design obstacle identification activities for runways designed for visual maneuvers, non-vertically guided (NVG) operations (Lateral Navigation (LNAV), Localizer Performance (LP), VOR, NDB, Localizer, Localizer Directional Aid (LDA), etc.) and instrument departure procedures. These surfaces assist in the identification of possible hazards to air navigation on, and within the vicinity of, the airport. Evaluate each surface independently of all other surfaces.

2.7.1.3.1. NVG Primary Surface (NVGPS). A 1,000-foot wide rectangular surface (500 feet either side of runway centerline) longitudinally centered on the runway centerline and extending from runway end to runway end. For runways that have, or plan to have, a Specially Prepared Hard Surface (SPHS), the NVGPS expands outward 200 feet beyond each runway end. The surface elevation of any point within the NVGPS is the same as the runway centerline elevation abeam the selected point (follows the runway centerline contour). The elevation of any point within the 200 foot SPHS runway type extension areas are equal to the runway end elevation on the side to which the extension applies.

2.7.1.3.2. NVG Approach Surface (NVGAS). (Must be completed for both ends of the runway) The NVGAS is a 20:1 (5.0%) sloping surface that is longitudinally centered on the extended runway centerline. It begins at the NVGPS and extends outward towards the final approach course. Runway ends that have the same elevation as the airfield elevation will have a standard NVGAS length of 10,000 feet from the NVGPS. Runway ends with elevations lower than the airfield elevation will have NVGAS length longer than 10,000 feet. The length of the NVGAS must be determined by subtracting the runway end elevation from the airfield elevation, adding 500 feet to the difference, then divide the total by .05 (20:1) as shown in the following formula:

$$NVGAS\ Length\ (Ft) = \frac{((Airport\ Elevation - Runway\ End\ Elevation) + 500\ feet)}{0.05}$$

The NVGAS surface is 1,000 feet wide (500 feet either side of runway centerline) at the NVGPS and expands to a width of 4,000 feet (2,000 feet either side of runway centerline) at a point 10,000 feet from the NVGPS. For NVGAS lengths longer than 10,000 feet, the NVGAS continues to expand laterally beyond the 10,000 foot point (to the distance calculated above) at the same rate as the initial portion of the NVGAS. The surface height begins at the runway end elevation and rises towards the final approach course at 20:1 (5.0%) until reaching 500' above the airport elevation (End Elevation = Airport Elevation + 500 feet).

2.7.1.3.3. NVG Transitional Surface (NVGTS). The NVGTS is a series of 20:1 (5.0%) sloping surfaces extending upward and outward from the edge of the NVGPS and the edge of the NVGAS (at right angles to the runway centerline/centerline extended) until reaching 500 feet above the airport elevation. The shape of each transitional surface varies based on location, runway type, runway end elevations, and airfield elevation. There are 3-types of transitional surfaces for runways with a SPHS (Type 1, Type 2, Type 3), and 2-types for runways without a SPHS (Type 1, Type 3 only).

NVGTS Type 1: A muli-sloped polygonal surface located directly between and abeam the runway end points. This surface starts at the edge of the NVGPS (at the straight line elevation slope created when joining runway end to runway end) and slopes upward and outward from the NVGPS at a 20:1 (5.0%) slope until reaching 500 feet above the airport elevation. Use the following formula to calculate the distance from the outer edge of the NVGPS abeam each runway end to the outer edge of the transitional surface:

Formula:

Distance NVGPS to Outer Edge = ([Airport Elevation – Runway End Elevation] + 500 feet) ÷ 0.05

NOTE: *Separate calculations must be made for each runway end. Always use real numbers when completing calculations. Always round numbers containing decimals down to their associated real numbers when making surface calculations.*

NVGTS Type 2 (For SPHS Runways Only): A single-sloped rectangular surface created to fill in the transitional area gap abeam the 200 foot runway end extension areas. This surface starts abeam the NVGPS surface between the runway end and the end of the 200 foot extension at the runway end elevation to which the extension applies. The surface rises upward and outward from the NVGPS at a 20:1 (5.0%) slope to a distance equal to the NVGAS length on the runway end to which the extension applies. The end height of the surface must be 500 feet above the airport elevation.

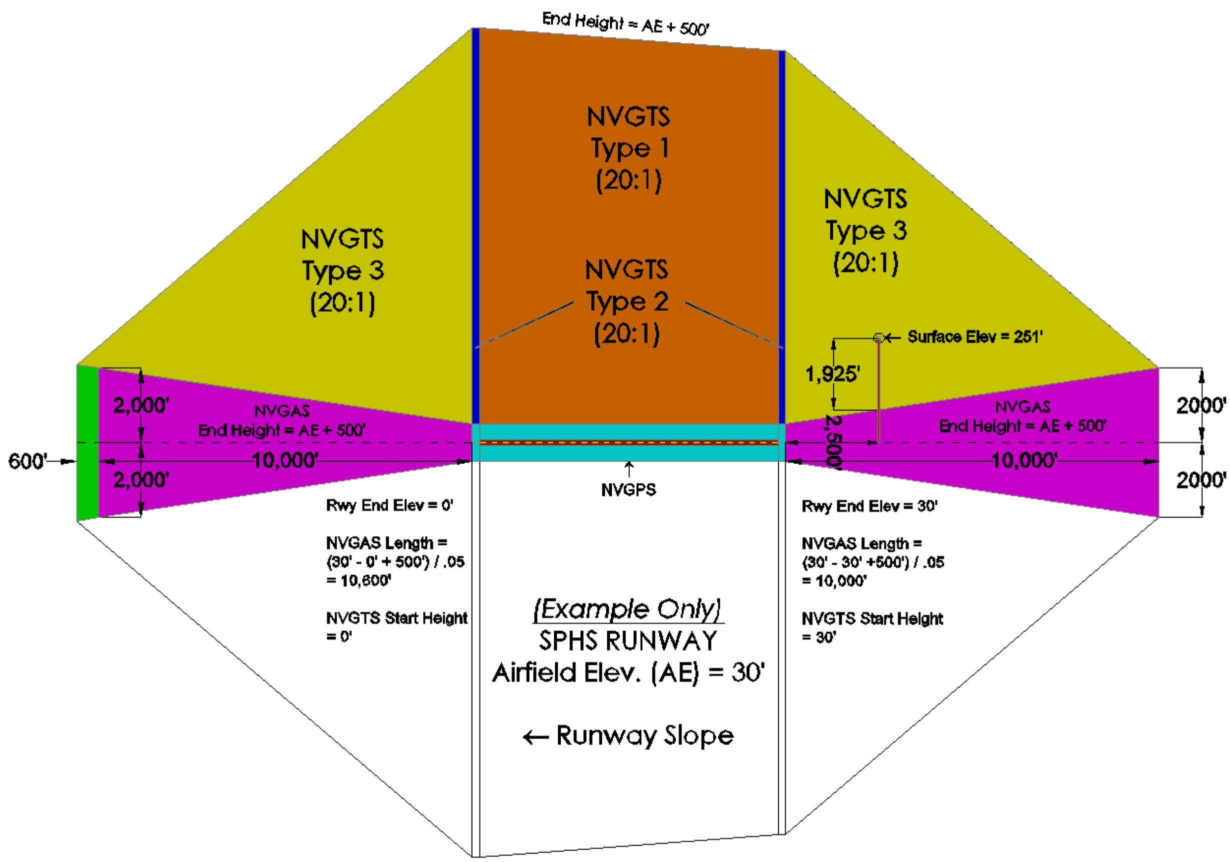


Figure 2-14. NVGPS, NVGAS, and NVGTS Types 1/2/3 for Non-Vertically Guided (NVG) Airport Surfaces

NVGTS Type 3: A single-sloped triangular surface that connects either the NVGTS Type 1 surface (for non-SPHS runways) or the NVGTS Type 2 (for SPHS runways) surface to the NVGAS. The slope of this surface is measured from the edge of the NVGAS perpendicular to the runway centerline extended. To complete this surface, draw a line connecting the outer corner of the NVGTS Type 1 or Type 2 surface (whichever surface applies) to the closest NVGAS outer corner. The low corner of this surface is located at the meeting point of the NVGPS, NVGAS, and NVGTS surfaces. The two outer corners must be 500 feet above the airport elevation.

2.7.1.3.4. NVG Horizontal Surface (NVGHS). A horizontal plane established 500 feet above the airport elevation extending outward from the edges of the NVGAS and NVGTS. The outer boundary of this area is constructed by scribing 20,000-foot arcs centered on the midpoint of the line that joins the NVGPS and the NVGAS for both runways. Tangential lines then connect the arcs to complete the surface.

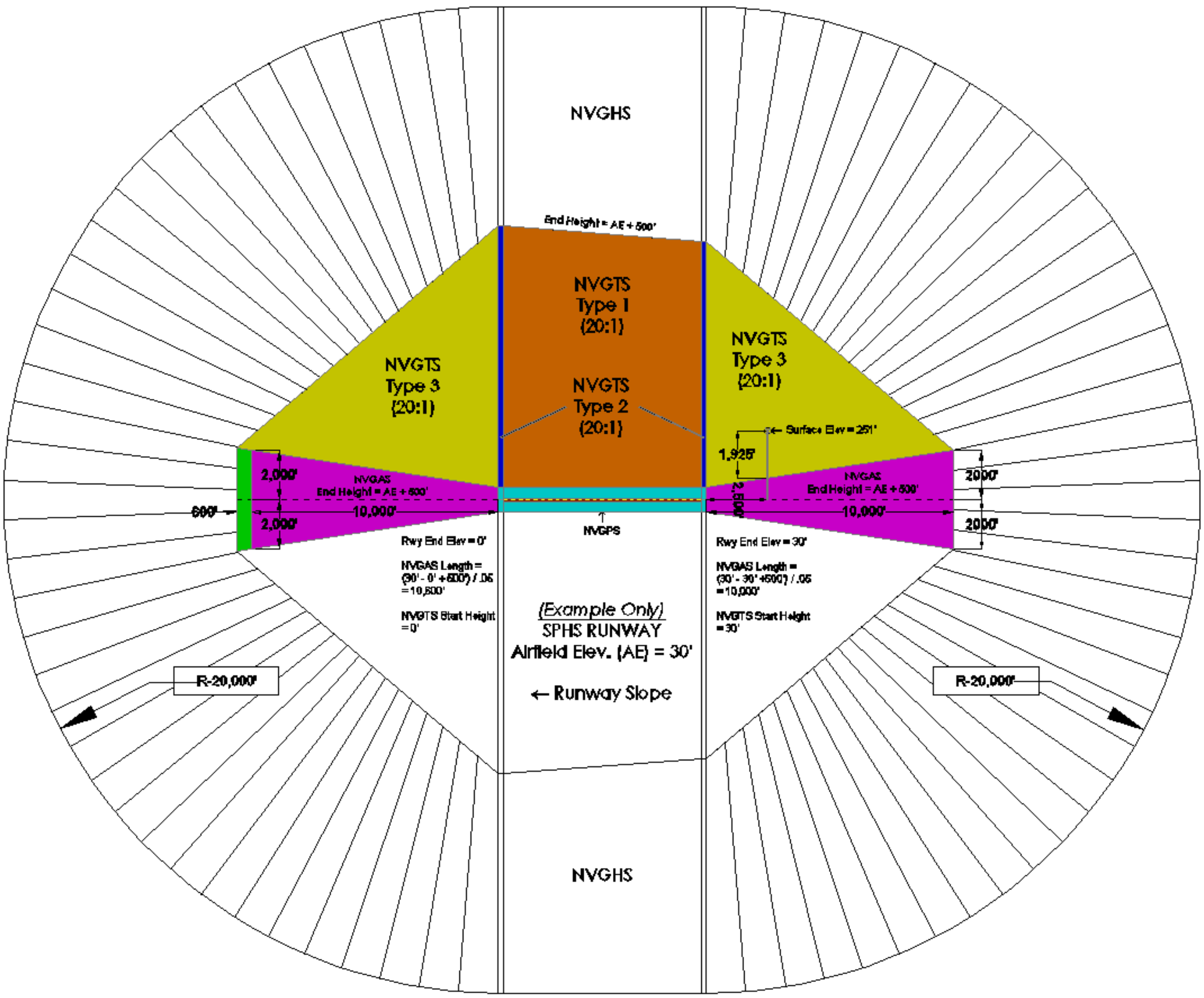


Figure 2-15. Horizontal Surface (NVGHS) for Non-Vertically Guided (NVG) Airport Surfaces

2.7.1.4. Analysis of Runways Non-Vertically Guided Operations. Perform an analysis of the NVG surfaces according to the following criteria for each runway end. Where multiple runways are surveyed, accomplish and report the analysis for each runway separately. When an object is determined to be within one or more surfaces, identify the penetration value for each surface. Provide the penetration value (positive or negative) for the most adverse surface (closest to centerline or runway end) in the attribute field penValSpecified and provide the penetration amount (positive or negative) of the secondary surface in the attribute penValSupplemental.

2.7.1.4.1. Divide the NVG Primary Surface (NVGPS) into three equal length zones each representing one third of the total length of the runway (see Figure 2-16). Analyze all objects within the lateral confines of the surface to identify, classify, and report the following representative objects using feature type Obstacle or ObstructionArea (as appropriate), the highest manmade and the highest natural obstacle in each one-third of runway length section of the primary surface on each side (left and right, as viewed from the high numbered runway end) of the runway.

Additionally identify, classify, and report the following representative object (using feature type Obstacle or ObstructionArea):

- The highest object outward from the runway end to 200 feet from the end of the runway, within the lateral limits of the NVGPS.

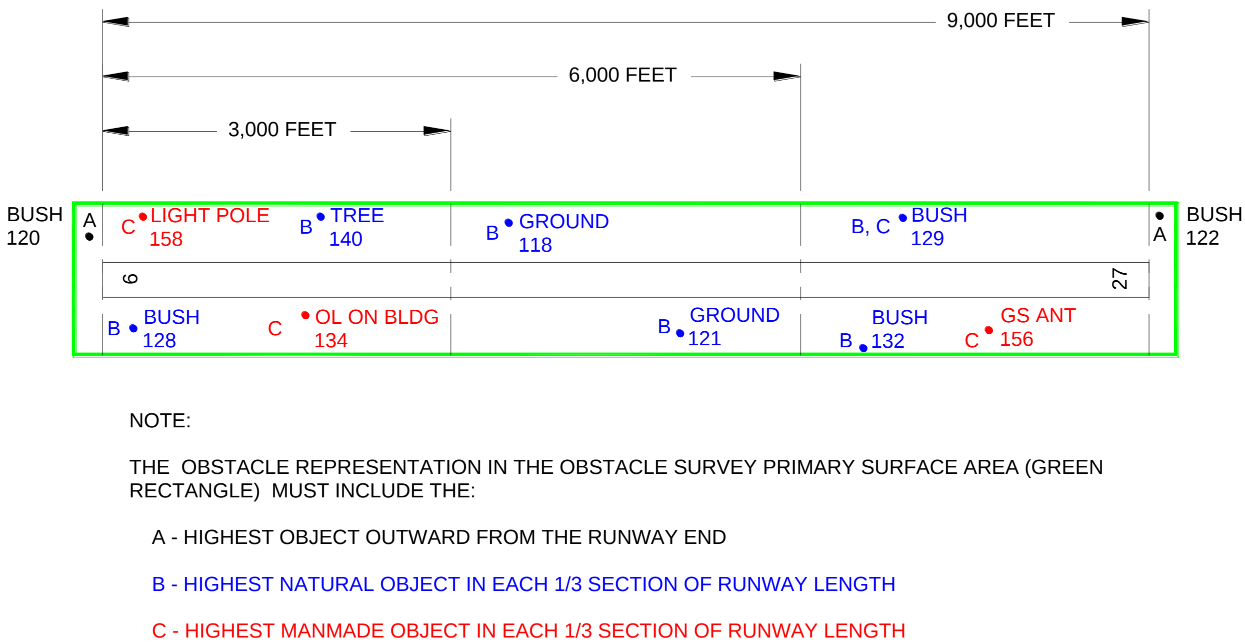


Figure 2-16. Object Representation in the non-vertically guided operations primary surface area.

2.7.1.4.2. In the NVG Approach Surface (NVGAS), identify, classify and report all significant objects of landmark value (for a definition refer to paragraph 2.7.1.2.3) underlying the NVGAS using the respective feature type in Chapter 5 (i.e. Building, ForestStandArea, Fence, etc.) even if the objects(s) do not penetrate the surface.

In this guidance, objects of significant landmark value are geographic features located in the vicinity of an airport aiding in geographic orientation. These features include but are not limited to objects such as roads, railroads, fences, utility lines, shorelines, levees, quarries and nearby airports underlying the airport airspace analysis surfaces.

Additionally identify, classify, and report the following representative objects using the feature type Obstacle or ObstructionArea according to the following criteria:

- The most penetrating object within the approach surface on each side of the centerline.

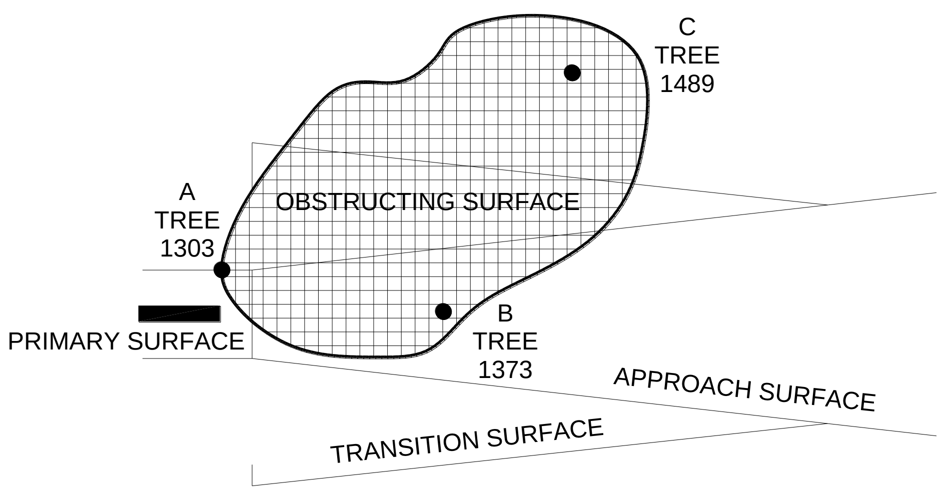
- The two highest manmade and natural objects on each side of the runway centerline extended and the overall highest object within the approach surface.

2.7.1.4.3. Transitional Surface(s). Divide the transitional surface into three sections (as illustrated in Figure 2-12 on each side of the runway). Analyze all objects within the lateral confines of the surface to identify, classify, and report the following representative objects using the feature type Obstacle or ObstructionArea (as appropriate), the highest manmade, natural, and the most penetrating object in each sub-section of the transitional surface(s). Analyze the sections beginning with the northeasternmost section and continue in a clockwise manner.

2.7.1.4.4. Horizontal Surface**.** In the NVG horizontal surface analyze all objects to, identify, classify and report using feature type Obstacle or ObstructionArea (as appropriate) all manmade and natural objects exceeding 500 feet above the established airport elevation

2.7.1.5. Airport Airspace Analysis Special Cases and Exemptions:

Area Limit Object Requirements – When a large area of objects such as buildings, terrain or vegetation penetrate a surface, identify the limits of the area using a bounding polygon within the lateral limits of the surface. Overlay the area lateral limits with a grid established parallel and perpendicular to the extended runway centerline of the surface (see Figure 2-17). Establish the grid beginning at the runway end using the appropriate spacing until reaching the obstructing area. Within 10,200 feet of the runway threshold, use 200-foot grid spacing; outside 10,200 feet from the threshold, use a grid spacing of 500 feet. Analyze, identify and report the highest manmade or natural object penetrating the surface within each grid sector. Additionally, report the highest manmade or natural object within the area limits (see Figure 2-17). If two objects with the exact same MSL elevation are within a grid sector, choose the sector object by first selecting the object closer to the centerline, then if required, by the object closer to the runway.



NOTES:

1. THIS GRAPHIC EXPLAINS OR CLARIFIES CERTAIN DATA REQUIREMENTS.
2. SEE TEXT WHEN OBJECT CONGESTION OCCURS.
3. DIMENSIONS ARE IN FEET. DO NOT SCALE THIS DRAWING.

Figure 2-17. Reporting highest object(s) within ObstructionArea limits.

Figure 2-18. This picture illustrates the importance of appropriately identifying catenaries.

Catenaries – In most cases, the position and elevation of supporting towers will adequately represent catenaries. Treat these towers as any other object. However, if one or both towers are outside the limits of the obstruction identification surface (OIS), the catenary itself may become a significant object (see Figure 2-18). In these cases, provide a position and elevation on the imaginary straight line connecting the tops of the two adjacent catenary support towers at the highest point within the OIS. Designate the elevation of this point as an estimated maximum elevation (EME).

Guyed Structures – The guys of a 2,000-foot skeletal tower are anchored 1,600 feet from the base of the structure. This places a portion of the guys 1,500 feet from the tower at a height of between 125 feet to 500 feet AGL. When surveying guyed structures, capture any guys penetrating a surface separately from the structure itself. Where the guys of any structure penetrate a surface at a distance greater than 100 feet from the actual structure, identify it as a separate point object where it penetrates the surface.

Vehicular Traverse Ways – Treat a vehicular traverse way as any other object, except include an appropriate vehicle height allowance in the elevation. Measure the clearance for roads and highways from the crown and edges of the road. Make measurements for railroads from the top of the rail. Make measurements for vehicle parking areas from the grade near the highest point. Use the following tolerances for vehicle height.

Non-interstate roads	15 feet
Interstate roads	17 feet
Railroads	23 feet

Mobile Objects – Determine the travel limits of mobile representative objects within a defined area (except vehicles on roads and railroads, and vessels, which treated under separate headings). Furnish an estimated maximum elevation (EME) for each of these mobile object areas penetrating the OIS (see Figure 2-19). If a non-penetrating mobile object is outward from the runway end, is the highest object in the VGRPS or VGPS, and is higher than the runway end, provide an EME point nearest to the runway centerline end, however the travel limits need not be determined. Include the word "MOBILE" which will always imply an EME, in the object name, such as, "MOBILE CRANE".

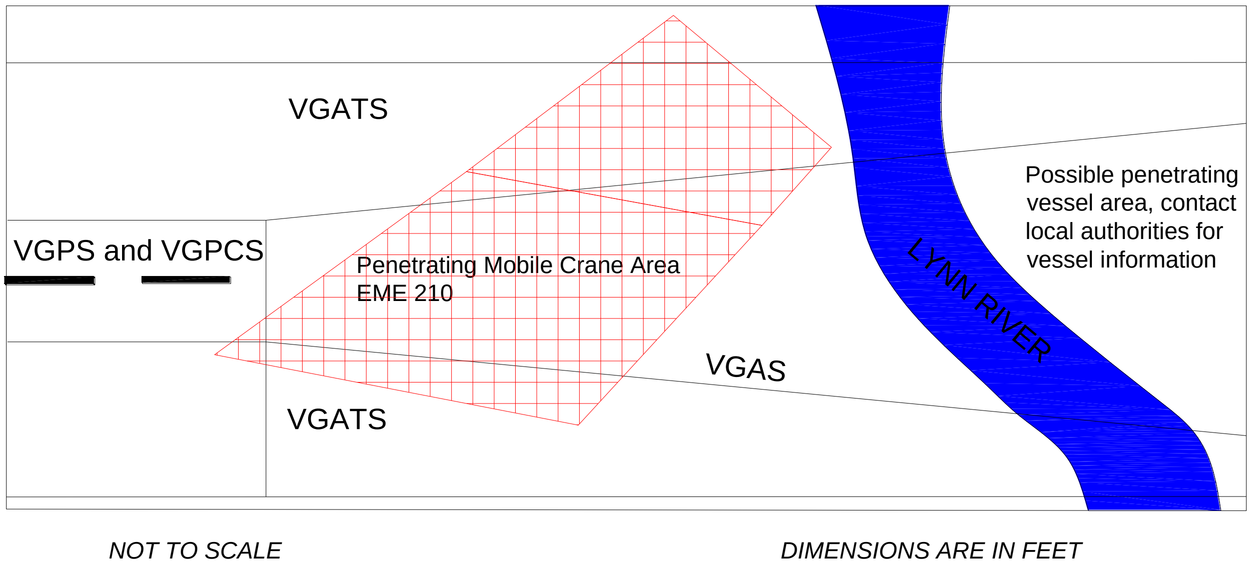


Figure 2-19. Illustrates the collection of penetrating vessel and mobile object areas.

Objects Under Construction – Identify representative objects under construction as, "BUILDING UNDER CONSTRUCTION". Determine the elevation of the object at the time of the survey. However, if a construction crane extends above the feature under construction, it is necessary and sufficient to determine the elevation and position of the crane. Identify, classify and report using the ConstructionArea feature and associated accuracies and collection requirements.

"Manmade" Objects –Measure the height from the highest point of ground in contact with either the object or the structure on which the object rests:

- *Within the boundaries of the airport,* determine the AGL elevation for all manmade objects.

  NOTE: *If any part of the RPZ falls outside of the airport boundary, also determine the AGL elevation of all manmade objects within this area.*

- *Outside the boundaries of the airport,* determine the AGL elevation for all manmade objects that are:

  - Determined as a representative object during the Airport Airspace Analysis Surveys, VG or NVG.

  - Have a height equal to or greater than 200 feet AGL.

Exemptions – The measurement and consideration of the following objects is not required.

- When vegetation exceeds the surface by less than three feet and has a maximum cross sectional diameter no greater than one-half inch where transected by a surface.

- Annual vegetation, such as annual weeds, corn, millet, and sugar cane.

- Roads with restricted public access intended for airport/facility maintenance only. This exemption does not apply to airport service roads associated with other airport operations, such as, food, fuel, and freight transportation.

- Construction equipment and debris, including dirt piles and batch plants, which are:

    - Temporary in nature

    - Under the control of airport authorities

    - Located on airport property

- Vessels, if possibly penetrating a surface, make an entry with the feature cautioning that vessels may penetrate certain surfaces at certain times and further investigation, travel limits, and frequency of passage is advised. This exemption does not apply to permanently moored vessels.

2.7.1.6. OBJECT DENSITY SELECTION CRITERIA. In some cases, strict adherence to the obstacle selection criteria listed above might result in congestion or inadequate obstruction representation. To minimize these situations, the following guidelines must be followed in obstacle selection:

- If obstacles that are required in the primary area or first 10,000 feet of an approach area are located within 100 feet of each other, the lower obstacle may be omitted.

- If obstacles that are required outside the primary or first 10,000 of an approach area are located within 500 feet of each other, the lower obstacle may be omitted. (Note: Required primary or approach obstacles must not be omitted because of the close proximity of higher obstacles outside of the primary or approach areas).

- When a required obstacle is omitted because of congestion, a replacement obstacle/obstacles must be selected, if possible, that meets the spacing criteria.

- Occasionally, additional obstruction information may be useful in representing certain obstructing conditions. While a rigorous selection criterion is not practical, information useful to obstruction clearing activities should be considered in the selection..

2.8. ONE ENGINE INOPERATIVE (OEI) ANALYSIS SURVEY REQUIREMENTS

AC 150/5300-13, *Airport Design*, describes the object evaluation area (OEA) and requirements for analyzing one engine inoperative (OEI) operations. This paragraph provides information about how to analyze the area and identify penetrations to the area. The OEI surface is an identification surface it does not require clearing of any penetrations of the surface. For analysis purposes, the evaluation area is subdivided into four areas. The extended runway centerline divides the first two areas on either side of the center section. These areas begin at the departure end of the runway or clearway and extend to 50,000 feet from the point of beginning. Define the third and fourth areas by constructing a line splaying 7° inside the outer area boundary and extending this line from the point of beginning to the point it intersects the outer boundaries of the OEA (40,000 feet). Further subdivide the entire OEA by constructing a series of lines perpendicular to the runway centerline extending to the edges of the OEA outer boundaries (see Figure 2-20). Within the first 21,000 feet of the surface, construct these lines every 300 feet. For the last 29,000 feet of the OEA construct these lines every 1,000 feet.

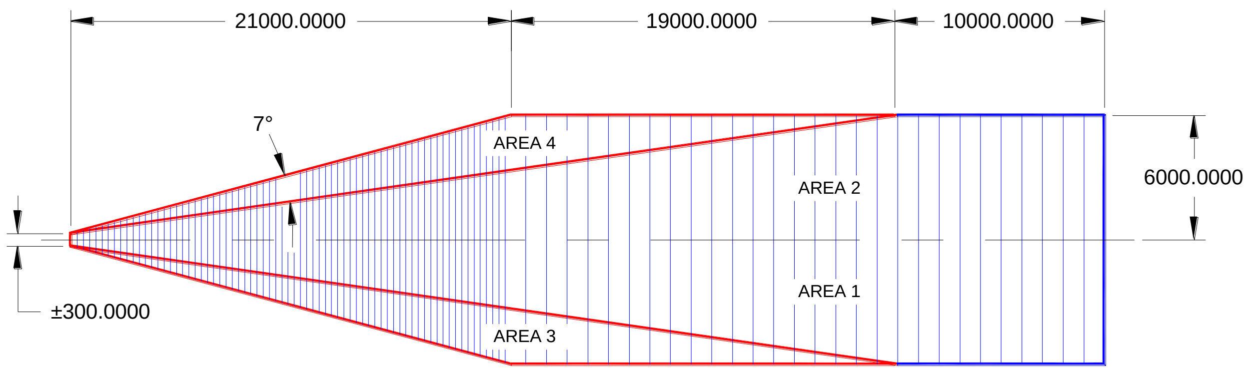


Figure 2-20. Illustrates the OEI object evaluation area and dimensions.

Analyze each polygon within the boundaries of the OEA and identify, classify and report all penetrations to the surface using the feature type Obstacle. If no object penetrates the surface in a specific polygon, no further representation is required in that polygon. When a group of objects (terrain, buildings, vegetations etc.) penetrates the surface, define it using a bounding polygon around the perimeter of the objects and identify, classify and report the object(s) using the ObstructingArea feature type. Use the Area limit Object requirements (see paragraph 2.7.1.5) grid method to analyze any ObstructionArea.

2.9. TOPOGRAPHIC SURVEYING

Complete topographic surveys to determine the shape and slope of the project area allowing the user to visualize the rise and fall of the land. Topographic surveys include the collection of natural and manmade features. Typically, airport topographic surveys provide landform data for planning studies, engineering designs, navigational aid installation and support instrument flight operations. At locations where there is (or plans to be) a Category II or III Instrument Landing System (ILS), the topography is important for operation of the navigational aid and in the design of the instrument procedure. Tie airport airside topographic surveys to the National Spatial Reference System. This tie ensures the data regarding airside operations is set to the same horizontal and vertical datum as the rest of the airport and the NAS. Create these ties directly to the established PACS or SACS at the airport. It is the responsibility of the surveyor to determine the equipment and methodologies used to meet the required accuracy. Planning projects typically require contours be established at two to ten-foot intervals yielding a map scale of in the range of 1” = 200 or 1” = 400 feet. Use the feature ElevationCountour in the Geospatial feature group to classify topographic surveys. When performing topographic surveys of the airside, ensure the collection and modeling of these following manmade features:

- Document the location of permanent structures including bridges, piers, culverts and docks using the Bridge feature in the Surface Transportation feature group.

- Document the location of street or road paving entrance drives, openings, and sidewalks using features from the Surface Transportation feature group.

- Classify the elevations on the top of curbs, gutters and sidewalks using features from the Surface Transportation feature group.

- Provide spot elevations covering the entire survey limits showing high points, low points, and grade changes. This should be done at sufficient intervals to represent the general character of the terrain using the AirportControlPoint feature in the Geospacial feature group.

- Location and elevation of lakes, rivers, streams or drainage courses on or near the airport or design area using the Shoreline feature in the Environmental feature group.

- Location, diameter, and species of all trees over a 6-inch diameter using features from the Environmental feature group.

- Outline the perimeter outline of thickly wooded areas unless otherwise directed using features from the Environmental feature group.

- Electric utilities – the location of power poles, guy wires, anchors, vaults, etc. using features from the Utilities feature group.

As with other aspects of airport surveys, the positional accuracy of the topographic survey ensures the data collected meets the needs of the FAA. The following relative (with respect to the established PACS, SACS, or temporary control stations occupied on the airport) positional accuracies are provided as a general guide for topographic surveys and are specified at the 95% confidence level.

Table 2-4. Topographic Survey Accuracy Requirements

Contour Interval	Vertical Positional Accuracy (in feet)	Horizontal Positional Accuracy (in feet)
1 foot	±0.50	±1.0
2 feet	±1.30	±2.0
4 feet	±2.60	±4.0
5 feet	±3.20	±4.0
10 feet	±6.50	±8.0
Spot ground elevations	±0.20	±2.0
Spot paving elevations	±0.05	±1.0
Well defined planimetric features	±0.10	±1.0

Table 2-5. Federal Geodetic Data Committee spatial data accuracy standards (ASPRS Class II Mapping Accuracy for large scale maps)

Map Accuracies as a Function of Photo/Map Scale

Map Scale 1"= -ft	Photo Scale 1"= -ft	Min Contour Interval, ft	Accuracy XY RMSE ft	Accuracy Z RMSE ft
20	200	0.5	0.4	0.33
40	320	1.0	0.8	0.66
50	400	1.0	1.0	0.66
100	800	2.0	2.0	1.32
200	1600	4.0	4.0	2.64
250	2000	5.0	5.0	3.30
400	3200	8.0	8.0	5.28
500	4000	10.0	10.0	6.60
800	6400	16.0	16.0	10.56
1000	8000	20.0	20.0	13.20
1667	12800	32.0	33.3	21.12

Collect and provide the location and elevation of water and gas components extending more than 3 inches above the surface. These components include items such as water or gas valves, standpipes, meters, regulators, fire hydrants, etc. Locate, classify, and determine the elevation (MSL) of other utility components such as telephone or light poles, manholes, boxes, etc., visible on the airport. Classify these features using the appropriate feature types in the Utility feature group in Chapter 5.

Determine and classify, according to the standards in Chapter 5, the location and dimensions of any existing buildings, tanks, fences, miscellaneous structures, driveways, or other objects on the airport. When required by the appropriate personnel, determine the location, classification (according to Chapter 5) and elevation of swamps; or wetland limits.

2.9.1. Category II and III Operation Area Topographic Survey.

This is a special topographic survey completed to provide specific information for the installation, maintenance and development of instrument procedures for Category II and III operations. The purpose of this area is to define the terrain within the area, which could provide for false radar altimeter readings. The collection of this information meets the requirements of the International Civil Aviation Organization (ICAO), Annex 15 regarding Area 4.

The area of consideration is an area 3000 feet long by 400 feet wide centered on the runway centerline extended (see Figure 2-21). In this area provide only terrain data to the accuracy requirements in Table 2-6. Classify the terrain using the Contour feature type in Chapter 5.

Table 2-6. Cat II and III Operation Area Accuracy Requirements

Area Attributes	Accuracy Requirement
Horizontal Accuracy	4.0 ft.
Vertical Accuracy	2.6 ft.
Vertical Resolution	0.1 ft.
Confidence Level	95%
Post Spacing	0.3 arc seconds (approximately 30 feet)

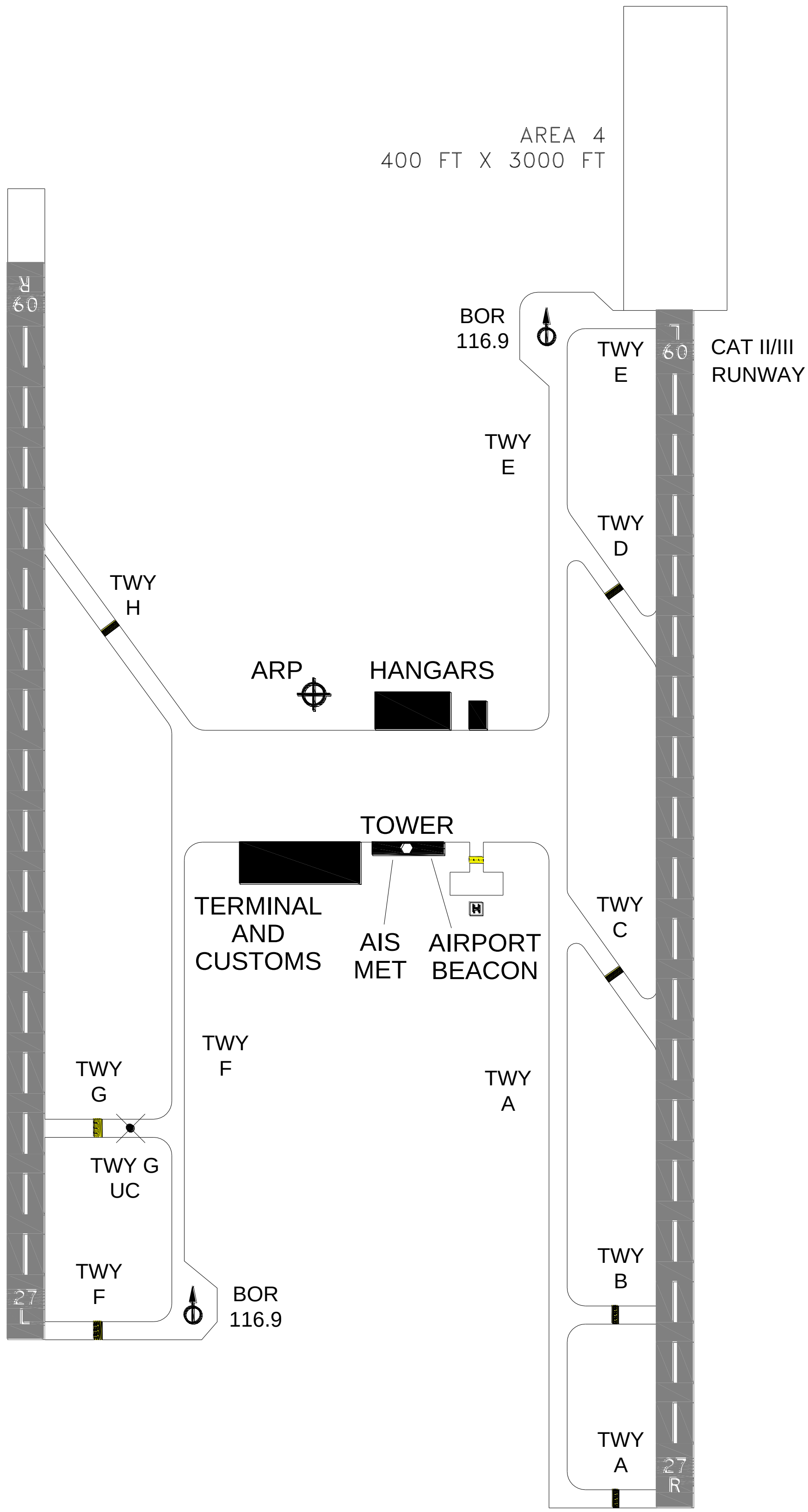


Figure 2-21. Terrain data collection surface – Area 4.

2.10. AIRPORT MAPPING DATABASE SURVEYS

Traditionally, pilots have relied on visual aids such as airfield markings (e.g. painted centerlines), signs and lighting in conjunction with a paper chart (see Figure 2-22) of the airport to navigate from point to point on the surface. Through radio communications, air traffic control (ATC) provides directions to pilots on the route to follow while on the surface. As a rule, the ground controller will issue route instructions to pilots using explicit instructions and strict protocol (phraseology) so that there is no misunderstanding. These instructions are sometimes very complex requiring the pilot to memorize it, write it down and repeat it to ATC to ensure comprehension. The pilot then needs to follow those instructions (typically without further assistance from ATC) following the surface markings and signs (see Figure 2-23) to the destination while avoiding other surface traffic (airplanes or on-airport vehicles).

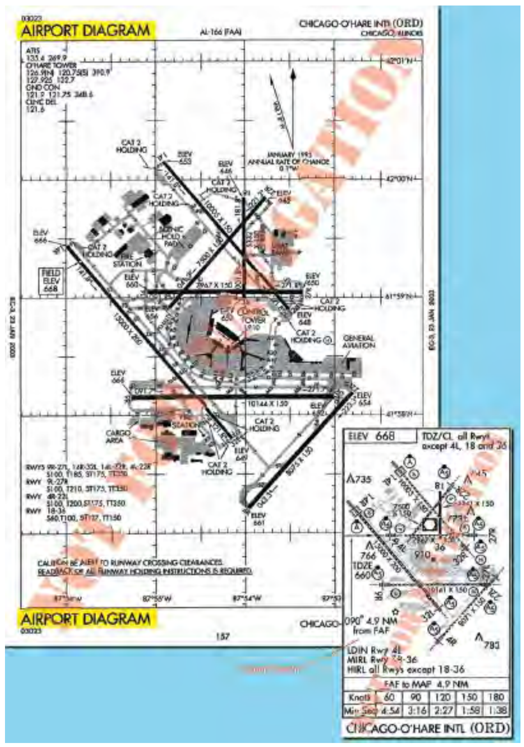


Figure 2-22. Paper chart.

Figure 2-23. The development of highly accurate digital representations of the airport environment will enhance the operational safety systems at the airport.

In extremely adverse weather, aircraft follow a designated route to ensure they avoid other traffic. The airport information used for airport mapping databases consists of airport features and associated information in the form of geometry, attribute, and attribute coding. This information is linked to data via a relational database schema or equivalent method. This information, when combined with other airport features such as the runways, taxiways, parking areas etc., forms a digital map of the airport for display in the aircraft flight deck.

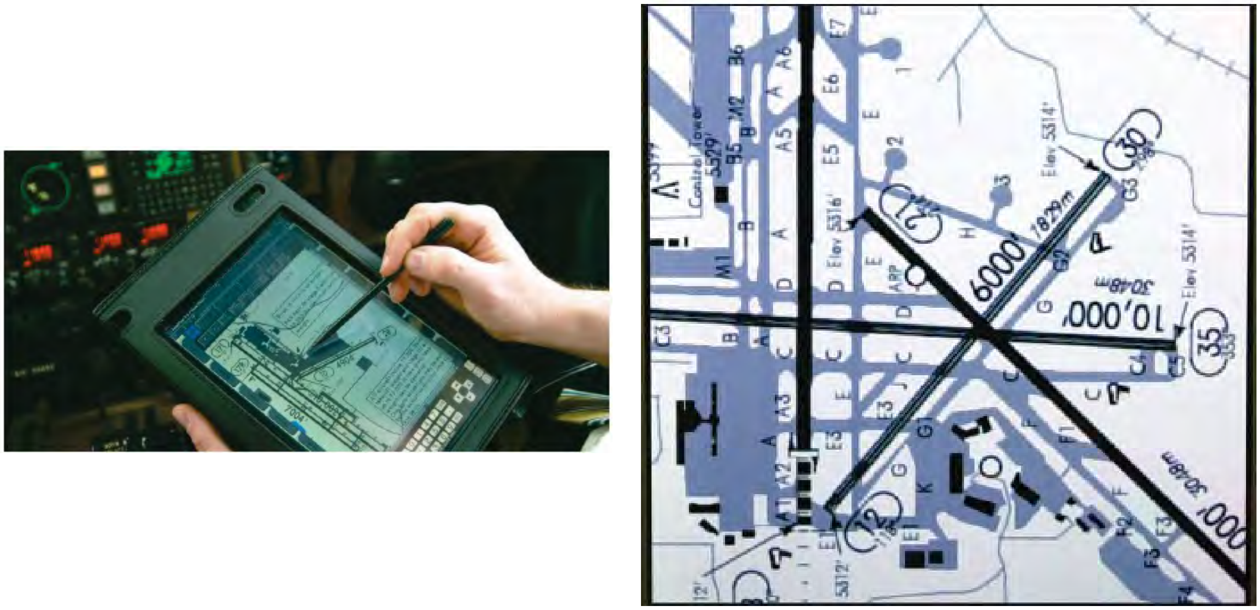


Figure 2-24. Highly accurate digital representations of the airport environment.

There are two areas of consideration: the collection and classification of vertical objects and the collection and classification of the movement area markings.

Collect and classify all runway markings using the feature marking line or marking area in Chapter 5. Delineate each feature further using the attribute enumerations for Color and Marking feature type.

Collect and classify all vertical objects exceeding 1.5 feet above the nearest movement area surface within 165 feet of the edge of the movement area, excluding the runways. For all runways, analyze, identify, classify (according to the features in Chapter 5) and report all vertical objects exceeding 1.5 feet above the elevation of the nearest runway surface surrounding the runway. The lateral area of consideration begins at the edge of the runway and extends until it is 300 feet from the centerline.

Use the greater of the accuracy defined in this specification for a feature (Chapter 5) or a horizontal and vertical accuracy of 1.5 feet with a resolution 0.25 feet. The confidence level of the data collected in this survey type is 95%. The collection of data under this section meets the requirements of the International Civil Aviation Organization (ICAO), Annex 15 requirements for Area 3.

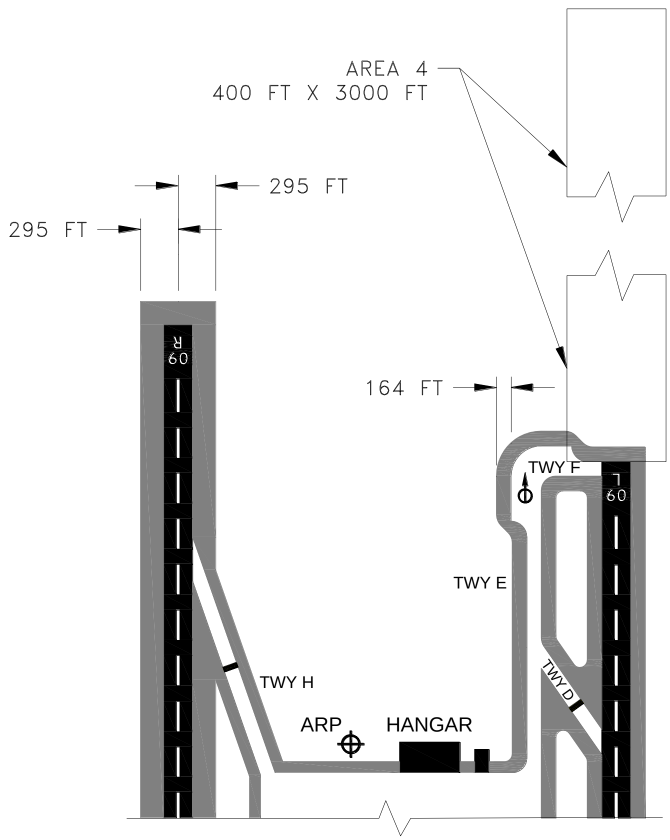


Figure 2-25. Areas of collection for vertical objects surrounding the movement areas.

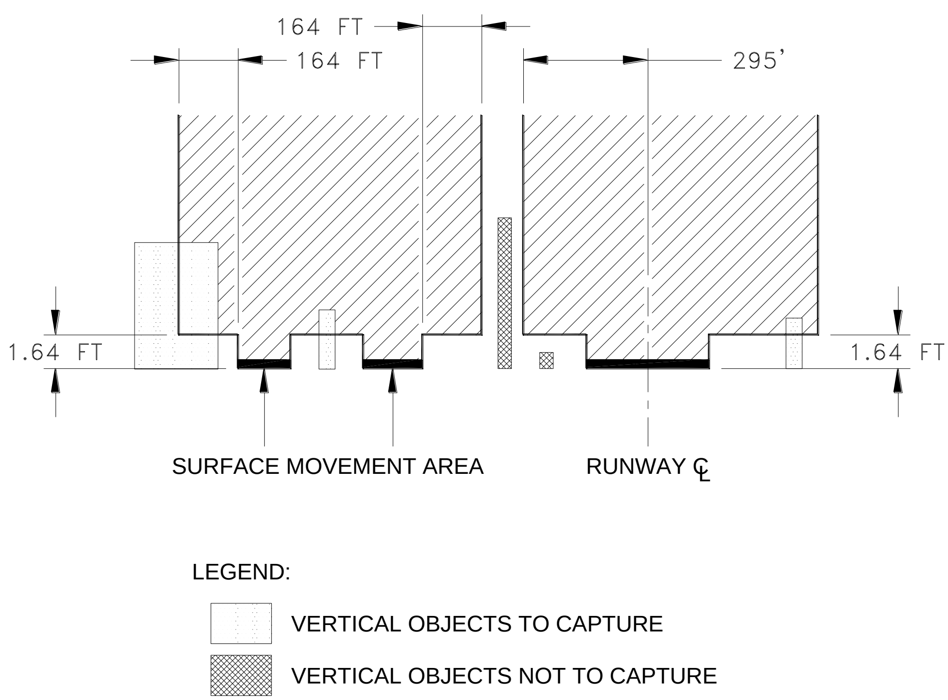


Figure 2-26. Airport Mapping Database Collection of Vertical objects meeting the requirements of ICAO Area 3.

2.11. ENGINEERING (CONSTRUCTION) SURVEYS

The typical engineering surveys encountered for an airport relate to the planning and construction of runways and taxiways. Tie all Airport Operating Area (AOA) planning and construction to the NSRS through inclusion of the PACS and SACS located on the airport. When used, engineering grids or coordinate systems must include these monuments as part of the survey control scheme. This tie to the NSRS ensures the relative connection of all AOA features to the entire NAS. In planning for or proceeding with construction on the airport, especially airside, it is essential to survey and document each element of construction according to the standards in this AC. This ensures that the airport authority and the FAA have the information regarding the construction to make the appropriate operational and safety decisions required. Through appropriate identification and classification of the proposed construction area and activities, the airport and the FAA can ensure the continuity of service and safety of operations during construction. This feature classification and identification ensures the data concerning the construction activity is available for other FAA offices to begin or plan their work such as Non-RuleMaking Airport (NRA) studies, navigational aid relocation, or flight procedure revision or establishment. For further information regarding safety during construction on airports refer to AC 150/5370-2, *Operational Safety During Construction on Airports*.

Engineering Surveys are those surveys associated with the engineering design (topographic, layout and as-built) and often require geodetic computations beyond normal civil engineering practices. AOA construction activities generally require two types of survey activities design and construction. Design data surveys require collecting the data needed for the planning and design of a project. In most cases, this involves a simple topographic survey but may require more detailed surveys especially when environmental considerations must be accounted for in the design. Construction surveys are typically further divided into layout, stake-out or As-Built surveys. Most airports require a record (drawings) of all construction projects at the airport. Layout or stake-out surveys are the translation of construction plans into physical points on the ground used as a basis for the actual construction. As-Built surveys include making measurements to verify or identify the location and dimensions of structures or objects.

The following is a checklist of features required on a typical As-Built survey. Define each of these elements according to the features in this guidance.

- The identification of the boundary lines of the project tract using the features in the Man Made Structures group.
- Show lines of original lot boundaries using features from the Cadastral group.
- The collection of all existing roads, alleys and easements with their widths and platted using the features in the Surface Transportation group.
- The collection of sufficient spot elevations defining the surface drainage on the project site and within 50 feet outside the boundary using the features of the Geotechnical group.
- Identification of control Benchmark(s) through use of Geotechnical group features.
- Locate and classify all visible evidence of utilities and storm water drainage features on or within 50 feet of the project boundary to include water lines, valves, backflow devices, meters and fire hydrants. This information uses features from the Utilities group.
- Sanitary sewer, manholes with invert and top elevation, pipe sizes through manholes with direction of flow indicated. Irrigation lines, catch basins, storm sewer pipes, junction boxes with

inverts, type of inlet, pipe sizes, pipe types and direction of flow. Swales, curbs, gutters with spot elevations and direction of flow can all be modeled with features from the Utilities group.

- Sidewalk, street parking, loading areas, driveway width(s) along with the edge(s) of existing paved areas using the SurfaceTransportation feature group.
- Power poles, guy wires, overhead power lines are classified using the Utilities features group.
- Trees, tree groupings and shrubs using the Environmental feature.
- Model existing building structures, fences or walls on site and within 50 feet of the property line using features within the Man Made Structures group.
- Show existing contours on 0.50 foot intervals if existing site elevations vary by greater than 1.5 feet using features from the Geotechnical group.
- Existing natural features such as high points, water courses, depressions, ponds, marshes, swamps, wooded areas and flood elevations (if available) are modeled using the features in the Environmental group.
- Location of any protected species habitat or environmentally sensitive lands or vegetation, as well as any known historical or archaeological resources using the Environmental and Man Made Structures feature groups.

2.12. AIRPORT PAVEMENTS

2.12.1. Construction/Roughness

Complete a pavement evaluation survey to determine airport pavement condition indexing through visual surveys of paved surfaces using the Pavement Condition Index (PCI) method of quantifying pavement condition. These pavement evaluations will include porous friction courses and plain or reinforced jointed Portland cement concrete pavements.

Most airports use the ASTM D5340 Standard Test Method for Airport Pavement Condition Index Surveys developed by the US Army Corps of Engineers through the funding provided by the US Air Force and the FAA.

By developing an airport pavement history an airport can predict the rate of deterioration of a runway or taxiway.

2.12.2. Airport Pavement Inventory

Airport pavement inventories are commonly broken into “networks”, “branches” and “sections”. A network is a group of pavements managed together – typically as a budget line item. For example, state aviation agencies manage multiple general aviation (GA) airports.

Consequently, each GA airport is a separate network within the state’s pavement management database. Commercial and military airports often break airside and landside pavements into separate networks. A branch is an area of pavement that shares a common use. For example, a specific runway is defined as a branch.

A "Section" is defined as a pavement area within a branch sharing similar structural characteristics and loading conditions. Of equal importance, however, is the fact that a section can be considered a management unit – meaning that condition analysis and work planning is performed at the section level and then rolled-up to the branch and network levels. There is often a one to one relationship between facilities and sections at GA airports. Commercial and military airports typically have multiple sections within a branch due primarily to the size of the facilities and the growth that occurs at larger airports which results in section extensions and structural improvements.

Using "user-defined-fields" available in most pavement management software at the network, branch, and section levels of the hierarchy an airport can further subdivide their pavement network. This capability can allow a state aviation department to store the county road network for an airport at the network level using county road standards and to store data on funding sources for pavement work at the section level. Additionally, new branch uses and pavement surface types can be defined as required. Assign new branch uses as either airside or landside, and define new surface types as either asphalt or concrete. These definitions are necessary for determining which PCI standard and set of distresses to use with the new surface type.

Enter information about pavement condition into the pavement management software as linear station offsets of the runway or feature collected with an offset left or right to give a field location of the pavement issue being measured and reported. Rotate the linear stations and offsets with the runway and convert to the correct NAD83 survey adjusted coordinates.

For further information on PCI, refer to the following Airport Circulars:

- AC 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*, provides FAA recommended guidelines and procedures for maintenance of rigid and flexible airport pavements. **NOTE**: *AC is not available on-line, but may be purchased from Superintendent of Documents.*

- AC 150/5380-7, *Pavement Management System*, presents concepts of a Pavement Management System, discusses the essential components of such a system, and outlines how to use it in making cost-effective decisions regarding pavement maintenance and rehabilitation.

2.13. SUB-SURFACE UTILITIES ENGINEERING (SUE)

Perform sub-surface utility engineering (SUE) surveys to:

- reduce conflicts with utilities;

- reduce delays in construction schedules because of unforeseen conflicts with utilities that have been eliminated;

- and added construction costs because of unexpected utility adjustments that are no longer needed.

Additionally, fewer contractor claims based on utility delays can be anticipated and the chance of severing a utility line can be greatly reduced, therefore increasing the safety level.

The strength of the geodetic control has a direct bearing on the quality of the mapping and utility surveys, which may require additional supplemental control stations in strategic locations. Reference all SUE work to the PACS and SACS established at the airport.

Reference the datum for X and Y coordinates to NAD 1983 for the airport. Record the datum for Z values in NAVD 88 datum with US Survey Feet being the unit of measure.

Although considerable time and effort goes into a utility investigation and mapping project, the locations of some utility lines can be somewhat obscure. This is due to the lack of clear source information and/or surface features. In many cases, the surveyor must make professional judgments regarding the validity and location of the utility alignments. As a result, some of these vagaries can impede the development of new projects for the improvement or expansion of the airport.

The American Society of Civil Engineers (ASCE) developed standard guidelines for the collection and depiction of existing subsurface utility information, *Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data (ASCE/C-I 38-02),* by the civil engineering profession, the FHWA, ASCE, AGC, and other national organizations.

The guideline breaks down utility collection into four separate levels of confidence. The initial field collection and mapping for most airports is Quality Level (QL) D. These four separate levels of confidence are as follows:

- **Quality Level "D" - Existing Records**: Results from review of available records. It gives overall "feel" for congestion of utilities, but is highly limited in terms of comprehensiveness and accuracy. For projects where route selection is an option, this Quality Level is useful when combined with cost estimates for utility relocations following applicable "clear zone" and other accommodation policies.

- **Quality Level "C" - Surface Visible Feature Survey**: QL "D" information for existing records is augmented using surface visible feature survey and digitizing data into Computer-Aided Drafting and Design (CADD) drawings. The danger here is that much of the data is "digitized fiction." There may be as much as a 15-30% error and omission rate in QL "C" information.

- **Quality Level "B" - Designating**: Two-dimensional horizontal mapping. Obtain this information through surface geophysical methods. It is highly useful for design basis information for conceptual design and for proceeding prudently to QL "A". Do not use this level for design basis vertical information or where exacting horizontal tolerances are expected.

- **Quality Level "A" - Locating**: Three-dimensional horizontal and vertical mapping. Collect this information through vacuum excavation of test holes at points of conflict. This is the highest level of accuracy of subsurface utility engineering data. It provides horizontal and vertical design basis information for engineering, construction, maintenance, remediation, condition assessment, and related efforts.

Put forth a concerted effort with maintenance personnel, engineers, planners, and GIS personnel to determine what features and attributes to collect in the field. It is more efficient to spend the time planning before entering the field to decide what data is needed. Data collection efforts can be costly and time consuming if it becomes necessary to survey features twice because of an overlooked, undetermined, or deemed unimportant attribute.

2.13.1. Utility Research

Prior to beginning the designation work, the contractor should contact the utility owners known to be within the project limits. Gather this information from a multitude of utility agencies including, the Airport representatives operating and maintaining facilities within the airport grounds, other utility owners, the one-call lists of utilities and past project contact lists. The contractor should ask for all record information within the project limits and specifically ask to speak to the engineering/planning departments to identify utility projects completed but not depicted in the utility owners' records section. Prepare a utility record log, and maintain records for future reference. Review the record information for the following:

- Material type joining procedures that will influence equipment selection.
- Amount of utilities to be expected, which will influence number and phasing of personnel assigned to the project.
- Local geology/soil conditions if data is available, which may influence equipment selection.
- Number and type of access points, such as manholes, etc., which will influence safety procedures.
- Expected depth of utilities, which will influence equipment selection.
- Presence of rebar or other paving characteristics, affecting the methods/procedures/equipment.

2.13.2. Utility Designation

Once the project control surveys, aerial photography and aerial mapping are completed, the appropriate surface geophysical locating equipment and methods (combined with existing utility records and field observations), the marks that designate the utility on the surface of the ground can be preformed. If the utility changes horizontal direction, but has no physical aperture at that point, every standard of care of the subsurface utility engineering profession will be taken to designate the point at which the utility 'bends' or changes direction.

The temporary utility paint marks on the ground will follow the Utility Location and Coordination Council Uniform Color Codes as shown in Figure 2-27:

(red)	**RED** – Electric power lines, cables, conduit and Lighting cables
(yellow)	**YELLOW** – Gas, Oil, Steam, Petroleum or Gaseous Materials
(orange)	**ORANGE** – Communications, Alarm or Signal lines, cables or conduits
(blue)	**BLUE** – Potable Water
(purple)	**PURPLE** – Reclaimed Water, Irrigation, or Slurry lines
(green)	**GREEN** – Sewers and Drain lines
(pink)	**PINK** – Temporary Survey Markings

Figure 2-27. Uniform Color Codes.

Divide the airport project area into appropriately sized grids and "sweep" for unknown/non-recorded utilities. Because not all utilities run parallel with, or perpendicular to buildings or hard surfaces such as roadways and sidewalks, sweeping will include multiple equipment orientations. If found, mark these utility locations in pink and recorded as an 'unknown' utility line.

2.13.3. Utility Field Collection

While the utility designating is taking place, the survey crew will simultaneously be collecting data for the utility features and the temporary paint marks over the utility line.

2.13.4. Optional SUE Quality Level A Testholes

If the Airport Authority determines specific utilities need additional information such as vertical depths/elevations and condition assessments, complete Quality Level A testhole services. Digitally photograph the testhole sites before and after the testhole operations. For Quality Level A data, provide a certification form in addition to the plotted position of the utility with additional information. This information includes:

- horizontal and vertical location of top and/or bottom of utility referenced to project datum,
- elevation of existing grade over utility at test hole referenced to project datum,
- outside diameter of utility and configuration of non-encased, multi-conduit systems,
- utility structure material composition, when reasonably ascertainable,
- benchmarks and/or project control used to determine elevations,
- paving thickness and type, where applicable,
- general soil type and site conditions, and
- other pertinent information as is reasonably ascertainable from each test hole site.

References to the project datum will maintain vertical tolerances to 0.05' (15mm) based on benchmarks used or established with the base mapping deliverables and horizontal tolerances to applicable surveying standards.

2.14. Boundary Surveying/Land Use

This section discusses the general guidelines for airport Boundary surveys; each state has various regulations and requirements. These guidelines are the basis for all surveys relating to the retracing of property boundaries at an airport. Where local or other prescribed regulations are more restrictive than these rules, the survey will conform to all local and state regulatory standards. When a client desires only a portion of his property surveyed, and this portion can be clearly isolated from the remainder of the property without affecting the interests of adjoining owners, these rules will apply to the survey of only the desired portion.

2.14.1. Research and Investigation.

When the deed description of the subject property and the deed descriptions of adjoining properties do not resolve the unique locations of the corners and lines of the property, identify and consult other sources of information to assemble the best possible written evidence of every corner and line of the property. These sources include, but are not limited to: records of previous surveys, deed descriptions of adjacent properties, records of adjacent highways, railroads and public utility lines; subdivision plats, tax maps, topographic maps, aerial photographs, and other sources as may be appropriate.

After analysis of the necessary written documents, the survey is based on a field investigation of the property. The surveyor will make a thorough search for physical monuments, analyze evidence of occupation and confer with the owner(s) of the property. In addition, the surveyor will, when necessary, confer with the owner(s) of the adjoining property and take statements.

2.14.2. Monumentation.

When necessary, the surveyor will set boundary monuments in accordance with the accepted surveying practice and legal requirements so that, upon completion of the survey, each corner of the property and each referenced control stations will be physically monumented.

When it is impossible or impracticable to set a boundary monument on a corner, the surveyor will set a reference monument, similar in character to the boundary monument and preferably along one of the property lines intersecting at the corner. When a reference monument is used, clearly identify it as a reference monument on the plat of the property and in any new deed description, written for the property.

Every boundary monument and/or reference monument set by the surveyor will, when practicable:

- Be composed of a durable material.
- Have a minimum length of thirty inches.
- Have a minimum cross-section area of material of 0.2 square inches.
- Be identified with a durable marker bearing the surveyor's registration number and/or name or company name.
- Be detectable with conventional instruments for finding ferrous or magnetic objects.

When a case arises due to physical obstructions where a boundary or reference monument cannot be conveniently or practically set in accordance with paragraph (C) of this rule, then alternative monumentation will be established for the particular situation. This alternative monumentation must be durable and identifiable (e.g. chiseled "X" in concrete, drillhole, etc.).

2.14.3. Measurement specifications.

Make all measurements in accordance with the following specifications:

- The surveyor will keep his equipment in such repair and adjustment as to conform to the requirements stipulated by the local State agency code. The specifications, tolerances, and regulations published in the National Bureau of Standards *Handbook 44* will be the specifications, tolerances and regulations for commercial weighing and measuring devices of the state.

- Make every measurement of distance either directly or indirectly so the linear error in the distance between any two points (not necessarily adjacent points) does not exceed the reported distance divided by five thousand (allowable linear error = reported distance ÷ five thousand). Make every angular measurement so the allowable (directional) error, in radians, does not exceed the allowable linear error divided by the reported distance (allowable (directional) error = allowable linear error ÷ reported distance). When the reported distance is less than one hundred feet, the linear error will not exceed 0.02 feet. The reported distance is the distance established by the survey.

- In all new deed descriptions and plats of survey, specify the length and direction of the lines so the mathematical error in closure of the property boundary does not exceed 0.02 feet in latitudes and 0.02 feet in departure.

2.14.4. Plat of survey.

The surveyor will prepare a scale drawing of every survey in which he retraces previously established property lines or establishes new boundaries. The features for this type of survey will be placed on feature types found in the Cadastral feature group.

Provide a copy of this drawing to the client. When required, file a copy with the proper state agency.

As a general guideline, include the following details:

- A title identifying the general location

- Provide a north arrow depicting a clear reference to the basis direction used.

- Identify the control station(s) or line cited in the deed description and the relationship of the property to this control.

- Provide a notation at each corner of the property stating the boundary monument type as found or set. In addition, there will be a statement describing the material, size, position and condition of every monument found or set.

- A general notation describing the evidence of occupation expected along every boundary line and/or occupation line.

- The length and direction of each line as specified in the deed description of the property or as determined in the actual survey if this differs from what is in the deed description by more than the tolerance specified in state regulations.

- A citation of pertinent documents and sources of data used as a basis for carrying out the work.
- The written and graphical scale of the drawing.
- The date of the survey.
- The surveyor's printed name and local state survey registration number, signature and seal (in a form, which may clearly reproduce on any copies, which may be made of the original drawing).

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CHAPTER 3. GEOSPATIAL SPECIFICATIONS AND STANDARDS

Geospatial data collected with remotely sensed or field survey methods consists of airport features such as navigational aids, taxiways, and aprons as well as potential obstacle features and features of landmark value used for general orientation, including shorelines, roads, and railroads. The collection of the features must adhere to cartographic rules to ensure topological integrity. These geospatial data features, when entered into the FAA Airport Surveying–GIS Program database, provide a foundation for GIS analysis and provide content to create various aeronautical charts.

3.1. INTEGRATING GIS AND ENGINEERING DATA

Engineering data, usually in the form of record drawings are the source of most GIS data. The basis for the FAA GIS standards is the National CADD Standards and the Aeronautical Information Conceptual Model (AICM). For a single system to remain compatible with two standards is a daunting task but, with appropriate management of the data, it is possible. The National CADD Standards form part of the Master Specifications used for engineering contract procurement. The AICM defines the modeling and exchange of aeronautical features worldwide. The adoption of these standards allow the uninhibited flow of data from the source or design phase to uploading of information to the FAA. This AC provides the information to connect the CADD data to the GIS elements allowing the data to move in a geospatial data format.

3.2. ADVANTAGES OF DATA COMPLIANCE

Complying with standards provides the airport sponsor or data provider the opportunity to "clean house" and properly classify the data they maintain. These specifications provide the framework for developing and maintaining the data about the airport so it can be shared with the FAA and other users. Complying with these specifications provides the following benefits to the sponsor or data provider:

- Uniform data distribution procedure complying with FAA requirements
- Clear digital distribution methods for airport staff to consistently use
- Flexibility to meet changing expectations and technical requirements of end-users
- Creating documentation and data-quality information for the data sets
- Automate distribution methods to the greatest extent possible so the data can be delivered on demand
- Available "raw" data can be quickly implemented into other projects and used appropriately (i.e. documentation)

3.3. RELATIONSHIP OF GIS FEATURES TO CADD LAYERS

3.3.1. Layering of Feature Types

Each Feature Type in Chapter 5 corresponds to a single GIS layer and one or more CADD layers in this standard. GIS and CADD software superimpose layers on top of one another to form a map or drawing, as shown in Figure 3-1. Because layers are a fundamental element of GIS and CADD software, layers are often associated with tables containing attributes (e.g., width, material type, condition, etc.), metadata (e.g., accuracy, source, date of relevance, etc.), and properties (i.e. color, line type, etc.). To maintain compatibility with both standards, specific drawing and layer naming conventions apply. These are covered, respectively, in more detail in the following sections.

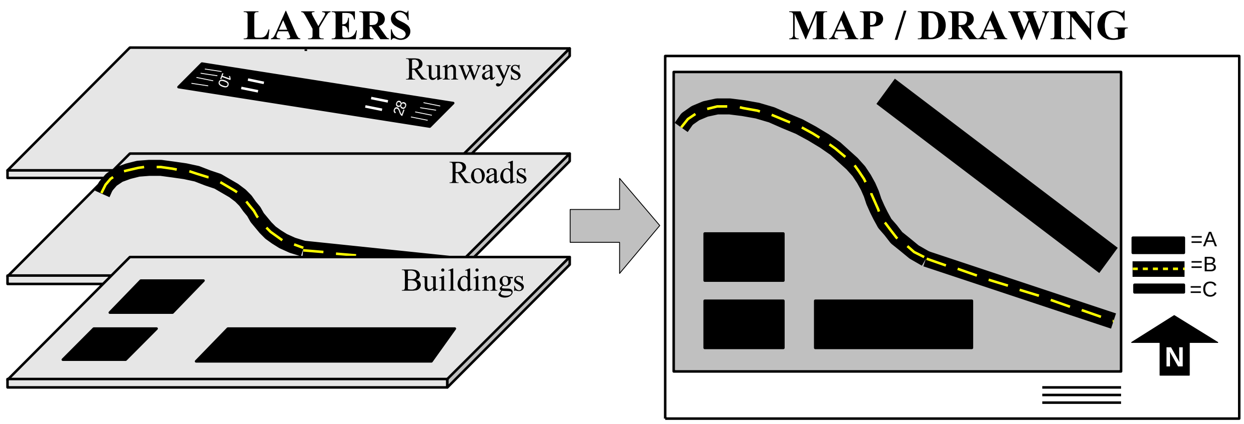

Figure 3-1. Portrays the layering of feature types to form a map or drawing.

3.3.2. Feature Type Layering in GIS Software

GIS software provides a great deal of flexibility when distinguishing, rendering, and annotating different types of features (i.e. feature instances) within a single layer (i.e. feature type) of a map. Because of this flexibility, features having the same properties and attributes but with only minor differences, such as type and status, allows us to group them onto a single layer and display them differently. The result is fewer layers used to represent more real world situations.

3.3.3. Relationship of GIS and CADD Layers

Because we use many more CADD layers to represent the same features represented on far fewer GIS layers, there is a natural many-to-one relationship in the matching of CADD to GIS layers. In order to manage all of the CADD drawings and associated layers effectively, data producers should establish and follow a drawing management hierarchy. This hierarchy should establish each drawing into a cascading flow of data from the overall airport view down to the minutest detail of a feature. At the highest level of the cascading system is the master airport drawing. Name this drawing using the full name of the airport or its ICAO identifier (i.e. KBOS, for Boston Logan International). Referenced into this master drawing are drawings representing each of the major feature groups (Airspace, Airfield, Cadastral, etc.). Referenced inside each of the major feature group drawings are drawings representing each of the airport features. The final level is the individual layers making up each of the feature drawings. Name these layers according to the National CADD layering specifications.

- Master Drawing - named using full airport name, ICAO identifier, or other meaningful method as desired by the airport sponsor.
    - Reference each feature group-drawing file to the master airport drawing.
        - Airfield Feature Group
        - Airspace Feature Group
        - Cadastral Feature Group

- Environmental Feature Group
- Geotechnical Feature Group
- Man Made Structure Feature Group
- Navigational Aids Feature Group
- Seaplane Feature Group
- Security Feature Group
- Surface Transportation Feature Group
- Utilities Feature Group

o Reference each individual feature to its parent group.

The final level of the hierarchy is the naming of the individual layers of each feature drawing. It is important these layer names use the following convention to remain complaint with the National CADD Standards.

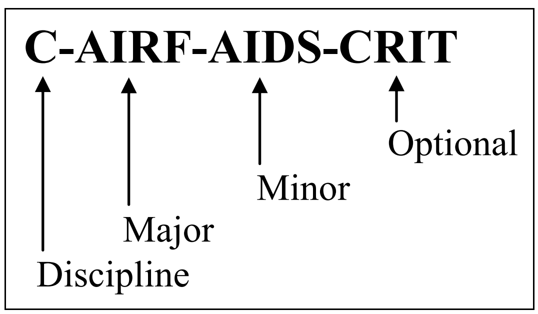

Figure 3-2. Format of CADD Layer Names.

3.3.4. Feature Type Layering in CADD Software

The use of these layers is a means to structure the data defined by this standard in CADD software. Each CADD layer is consistent with the layer name format used in the National CADD Standard, recommended by the American Institute of Architects CAD Layer Guidelines (AIA 2001). Please refer to Chapter 5 for more information about CADD layers associated with the Feature Types defined in this standard.

Assign each CADD layer a name made up of five (5) parts, each separated by a dash (-). The first part of the layer name is a single character indicating the discipline of the data contained on that layer. The disciplines used in this standard and the associated one-character codes are provided in the following list:

A	Architectural
C	Civil
E	Electrical
G	General
H	Hazardous Materials
L	Landscape

M	Mechanical
P	Plumbing
S	Structural
T	Telecommunications
V	Surveying/Mapping

The second part of the layer name is a four-character code for the major group. Major groups in this standard include:

AERI – Aerial Imagery
AIRF – Airfield related features
AIRS – Airspace related features
ANNO – Annotations
APRN – Apron related features
BCNS – Beacons
BLDG – Building related features
BRDG – Bridges
COMM – Communications
FUEL – Fuel related features
GRAD – Grading
GRID – Gridlines
HELI – Heliport/pad
INDW – Industrial Waste
IRRG – Irrigation
LITE – Lighting
OBST – Obstacle related features
OVRN – Overrun
PLNT – Plants
POLE – Pole
PROP – Property
PVMT – pavement
RAIL – Railroad
ROAD – Road
RUNW – Runway
SEAP – Seaplane
SITE – Site
SPCL – Special
SSWR – Sanitary Sewer
STOR – Storage
STRM – Storm
SURV – Survey
TANK – Tank
TAXI – Taxiway or Taxilane
TOPO – Topographic
TRAF – Traffic

The third part of the layer name is a four (4)-character code for the minor group. Minor groupings further distinguish layers, some examples are.

ACPK – Aircraft Parking
AIDS – Navigational Aids
AIRS – Airspace
AXIS – Axis
ANOM – Area Non-movement
AUZN – Auditory Zone
BLST – Blast Pad
BNDY – Boundary
CLRW – Clearway
CNTY – County
DEIC – Deicing
DISP – Displaced Threshold
DIST – Distance
DSRF – Design Surfaces
EDGE – Edge markings
ENDP – Endpoint
ESMT – Easement
FAAR – FAA Region
FENC – Fencing
FLZN – Flood Zone
HAZM – Hazardous Materials
IDEN – Markings
LINE – Line
LNDM – Landmark
LUSE – Land Use
LEAS – Leased
MAJR – Major
MUNI – Municipality
OTLN – Outline
OBSC – Obstruction Identification Surface
OBST – Obstructions
PART – 14 CFR Part 77 Surfaces
PLTS – Plants
PROP – Property
SAFT – Safety Areas
SAMP – Sampling station
SECR – Security
SHLD – Shoulder
SHOR - Shoreline
SIGN – Signs
SPEC – Special
STAT – State
TLOF – Helipad Takeoff and Landing
TOWR – Tower
WETL – Wetland(s)
VEGE – Vegetation
ZONG - Zoning

The fourth part of the layer name is similar to the third but it is optional and used to further distinguish features. An example is the breakdown of COMM for communications, WTHR for weather and ILS_ for instrument landing system navigational aids within the Major group AIRF and the minor group AIDS.

The fifth and last part of the layer name is an optional character established solely by the user, typically indicating the status of the data contained on the layer. Figure 3-2 provides an example of a CADD layer name for a NAVAID critical area.

3.4. GEOMETRIC REQUIREMENTS

3.4.1. Feature Types

These specifications focus on the definition of geographic features required to depict an airport and its surrounding environment. These include features unique to airports, such as runways and taxiways, as well as features of a more general nature such as roads and buildings. Each of these types of geographic features refers to a Feature Type. A specific instance of a Feature Type is referred to as a Feature Instance. For example, Runways is a Feature Type, but Runway 15R/33L at Boston's Logan International Airport is a Feature Instance. For simplicity in data development and transfer, this standard associates a single geometry with each feature type. This standard uses the UpperCamelCase convention in feature type naming.

3.4.2. Geometry

For the purposes of these specifications, points, lines, and polygons describe geometry. Refer to Chapter 5 for specific requirements for each feature type.

3.4.2.1. A "point" is the smallest unit of geometry and has no spatial extent (see Figure 3-3). Describe points in three-dimensional (3D) coordinates. Collect all point feature types except the ARP in 3D coordinates.

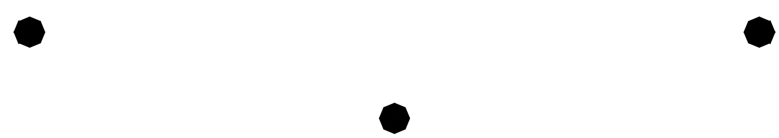

Figure 3-3. Typical depiction of a series of points.

3.4.2.2. A "line" or polyline consists of a connected sequence of points. Start and end points of a line are referred to as start and end nodes (see Figure 3-4). A vertex is the name for the connecting points in between start and end nodes and define the line structure, curvature, or shape. A start-node and an end-node define a line's directionality. A line can only change direction at vertices and only direction in 2D or a single plane. Provide an orthometric elevation for each vertex in a line.

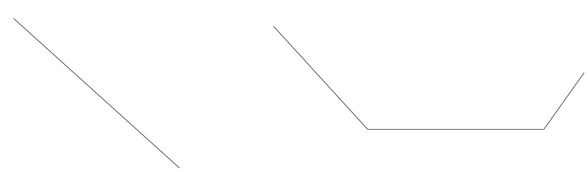

Figure 3-4. Illustrates examples of a line.

3.4.2.3. A "polygon" is a closed figure, or surface, bounded by lines (i.e. a series of lines whose start-node is coincident with another's end-node). These lines form the outer edge of the surfaces (see Figure 3-5). Provide all polygon vertices with 3D coordinates.

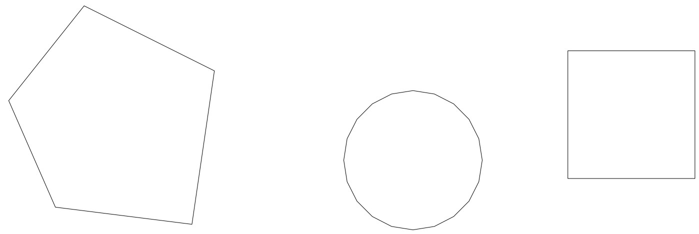

Figure 3-5. Depicts some typical polygon examples.

3.4.2.4. Complex Geometry Types**,** such as arcs, circles, donuts, and ellipses, are not included in this standard. This standard's intended use is to facilitate data exchange between software handling these complex data types differently. If, in a CADD drawing for example, arcs are used, they must first be broken into a line with vertices placed at intervals sufficient to maintain the accuracy requirements described in paragraph 3.4.3.

3.4.3. Topological Integrity

The placement of geometric elements (i.e. feature instances) in correlation to one another (i.e. next to, connected to, and on top of) is referred to as topology. Topology rules establish requirements for the placement of instances of a feature type in relation to one another and in relation to instances of other feature types. Follow these guidelines to ensure topological integrity:

3.4.3.1. Lines:

- Start-nodes and end-nodes of adjacent line segments belonging to a single feature type must be identical (collocated).
- Define the intersections of lines of the same feature type by a vertex/node shared by the intersecting lines.
- Eliminate all unintentional dangles (line segments extending beyond the intended end) and gaps (spaces between line segments intended to connect) between lines.
- Lines should contain one or more line segments with vertices placed at intervals required so the line feature does not stray from the actual feature by more than the half accuracy limit defined in Chapter 5 for the feature type, as shown in Figure 3-7.
- For lines not naturally joined by physical features (e.g., marking lines), place beginning and ending nodes where an attribute or other property change occurs.

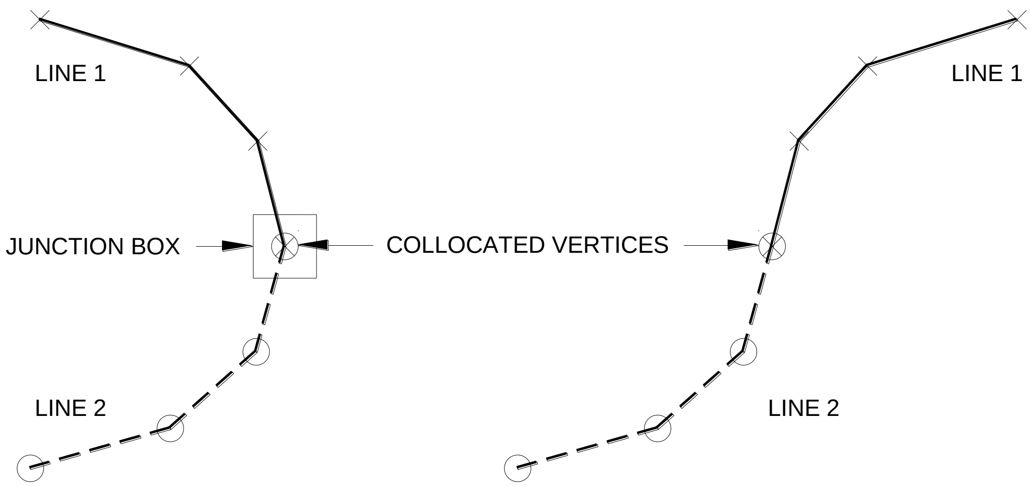

Figure 3-6. Depicts the topology rules for line segments.

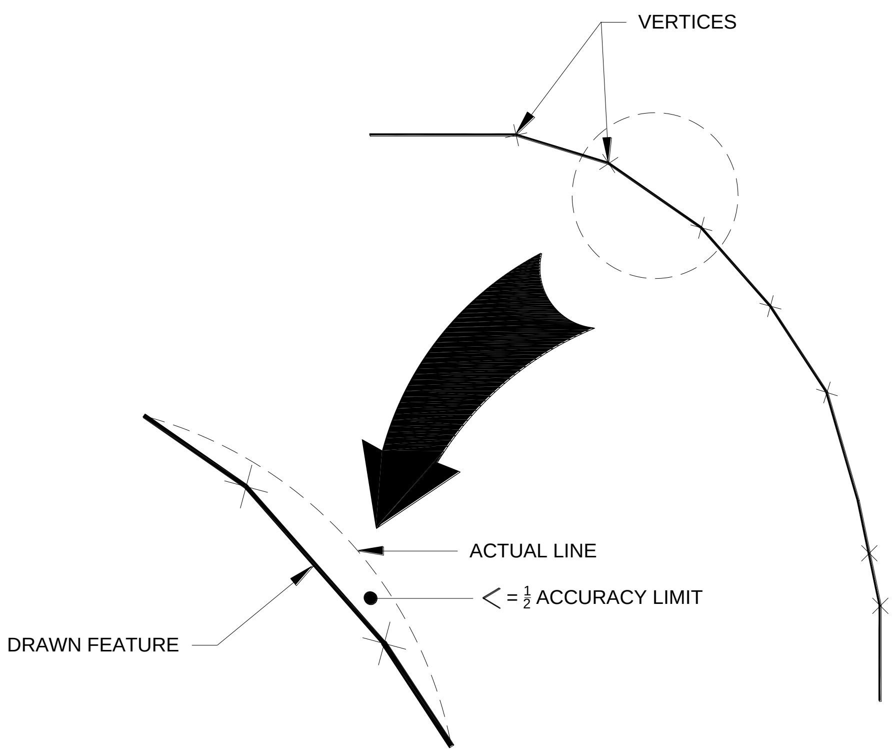

Figure 3-7. Depicting the placement of vertices along a curve.

3.4.3.2. Polygons:

- Geospatial locations of the start-node and end-node of any line forming the edge of a polygon must be identical (coincident) as in Figure 3-8.

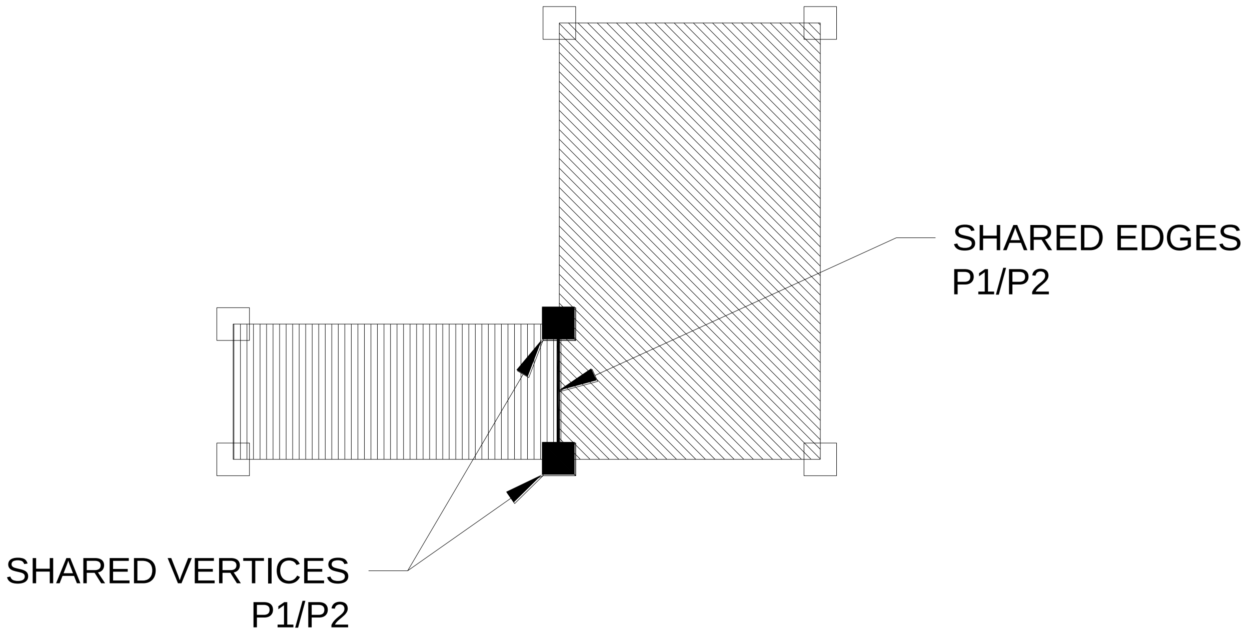

Figure 3-8. Illustrates the shared edges and shared vertices topological rule.

- Polygons sharing an edge (see Figures Figure 3-8 and Figure 3-9) must share all vertices along this edge. This rule applies to features of the same type and for features of different feature types.

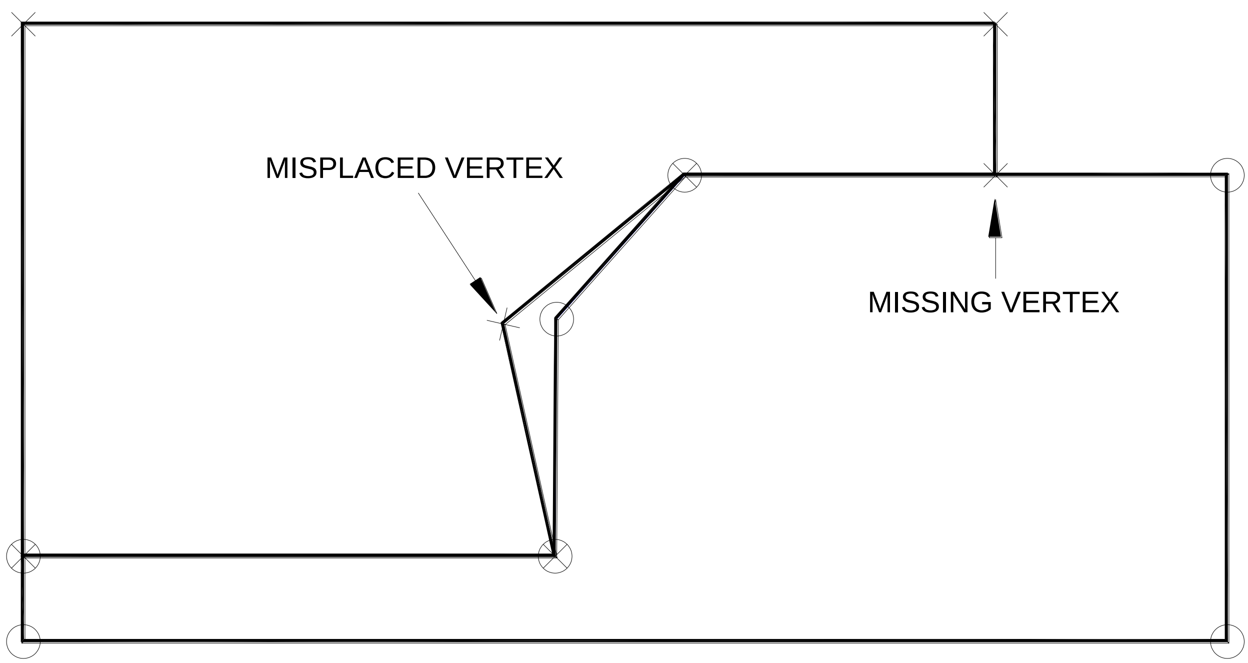

Figure 3-9. Depicts an example of the placement of vertices of adjacent polygons with misplaced vertices.

- No polygon will overlap, intersect or fall within another polygon of the same type (see Figure 3-10), except for the Runway feature type, whose polygons can overlap.

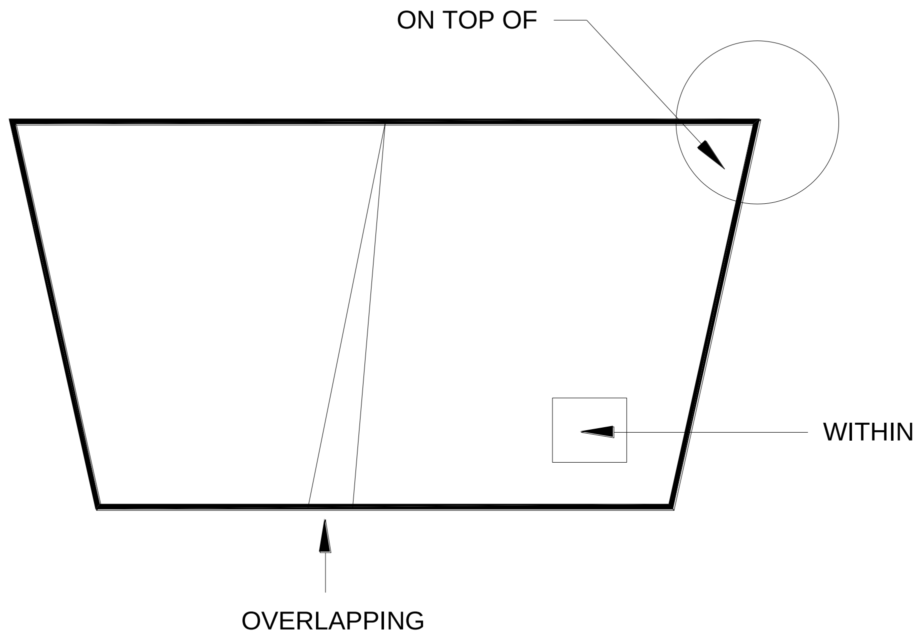

Figure 3-10. Illustrates the topological rule of overlapping polygons of the same feature type.

- Close all polygons (see Figure 3-11). Closed polygons, meaning each pair of adjacent line segments form the edges of the polygon as shown in Figure 3-9, must share all vertices.

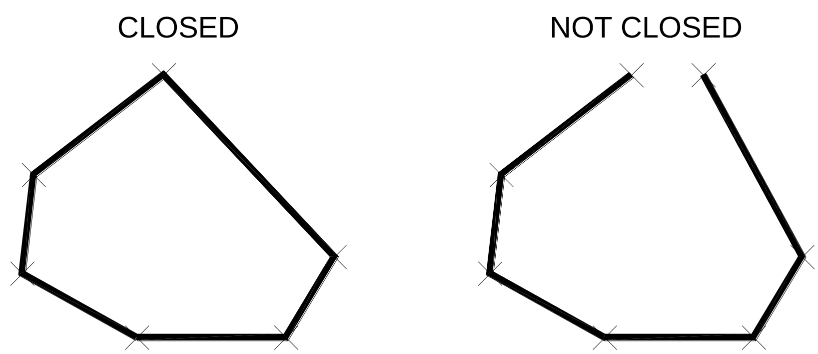

Figure 3-11. Illustrates the difference between closed and unclosed polygons.

3.5. ATTRIBUTES

Attributes add alphanumeric descriptors to the geometry of a feature. Attributes typically contain information such as the name, type, or condition of a feature. For example, the attributes of a runway include its designator (e.g., 15R/33L), material type (e.g., concrete) and length (e.g., 6,500 feet). In this standard attributes are typed in lowerCamelCase letters. Figure 3-12 shows a typical list of attributes associated with a feature type. Airport sponsors should work with the consultants to completely attribute each feature submitted to the FAA.

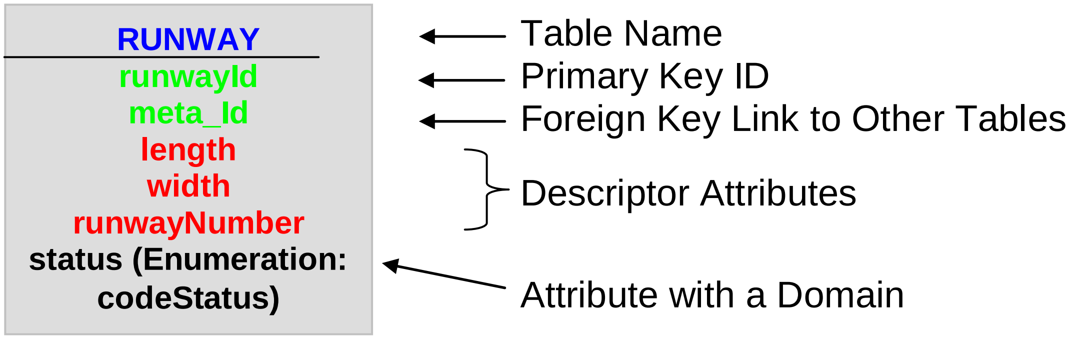

Figure 3-12. Sample Attribute Table for a Feature Type.

3.5.1. Domain Values

Sometimes it is necessary to limit the range of values for an attribute. This AC uses the domain for an attribute to list the acceptable values. Range domains limit the attribute values to a range of numeric or date values. List domains limit values to a selection of choices. A code list allows users to add values to a list of acceptable values and still be compliant with the standard. An enumeration is a list users cannot add to. In this standard, most of the list domains are enumerations. For each such attribute, there is an associated table in Chapter 5 listing the acceptable values and their definitions.

3.5.2. Primary Key Identifiers

Primary keys are unique attributes the system uses to identify each record (i.e. feature instances). Primary key values are globally unique, meaning there is no other record in the FAA Airports GIS system or any other system exchanging data with the FAA Airports GIS system having the same identifier. Maintaining this uniqueness is critical to ensuring long-term data integrity of the system. To help establish uniqueness, a numeric ID containing the FAA region, airport location ID, feature type, date, and a timestamp is used.

This key is is illustrative in nature. These values are assigned by the system and cannot be changed by the user.

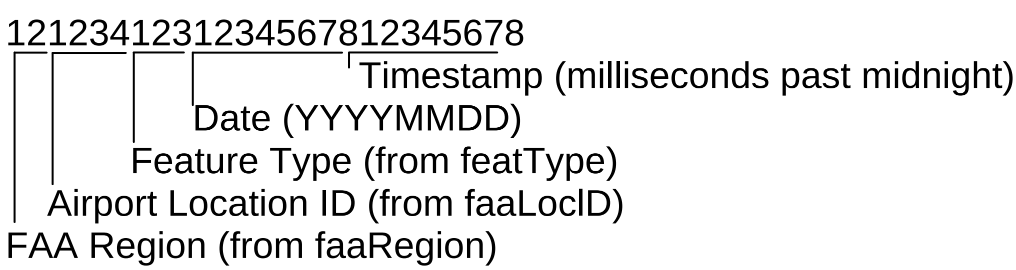

Figure 3-13. Format for globally unique primary keys.

3.5.3. Foreign Key Identifiers

Attributes containing primary key values of related records in other feature type tables are called foreign key identifiers. Foreign key identifiers provide a link between different types of features with logical relationships. For example, a taxiway leading to a runway might carry a foreign key to the runway table populated with the primary key value for that runway.

3.6. METADATA

Metadata is information about the data itself, such as its source, accuracy, and the dates during which it is valid. Metadata values take the form of alphanumeric descriptors of the data and in this way are very similar to attributes. For clarity and because they are stored separately, metadata descriptors are referred to in this standard as metadata elements and not as attributes.

Metadata elements can be applied at various levels of data aggregation. They can describe a collection of data submitted at one time. A collection may comprise one or more drawings containing several layers, such as those making up an Airport Layout Plan; several individual shape files each representing a layer; a single layer stored in a drawing or shape file; or any other combination of allowable data sets. Metadata elements can also describe all geometry and attributes on a given layer or feature type, as is the case with traditional FGDC-compliant metadata. This level of metadata applies if different layers within a collection have different metadata. Next, metadata elements can describe a given feature instance. This level applies when individual features or groups of features within a layer have different metadata. Finally, they can describe the geometry and each attribute of a given feature instance separately.

For this standard, metadata is required at the collection level (see Figure 3-14) when data is submitted. The standard also accommodates metadata elements at the feature type, feature instance, and attribute levels. More detailed metadata increases the usefulness of the data provided. Accordingly, data providers are encouraged to submit metadata at the most detailed level possible.

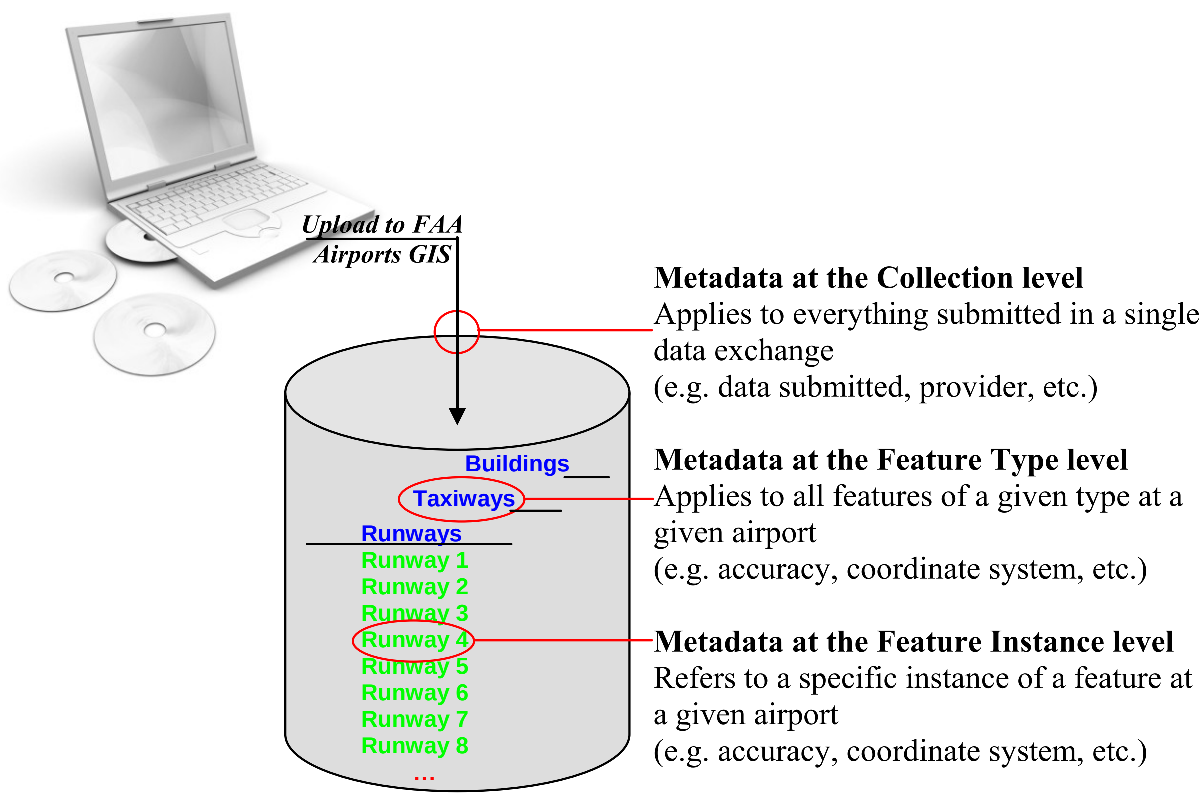

Figure 3-14. MetaData elements have different levels of aggregation.

This standard uses metadata elements defined by International Standards Organization's (ISO) Geographic Information–Metadata Standard (ISO 19115). Of the 409 elements defined in ISO 19115, only 29 are used by this standard because many of the elements defined in ISO are classified as optional or conditional and do not apply to this standard. Furthermore, some of the mandatory elements in the ISO standard are redundant with the specifications of this standard and are therefore not necessary for data exchange. For example, the security classification code is a mandatory ISO element, but since this standard sets the classification code based on the feature type, it is not necessary to convey the security classification code in metadata. Table 3-1 lists each metadata element used in this standard along with the level of applicability. Chapter 5 provides further details about these metadata elements.

Table 3-1. List of MetaData elements

	Collection	Set	Feature
Overview			
Abstract	X	X	X
Status	X	X	X
GeometricObjectCount	X	X	
Scope			
Dataset	X		
Features	X	X	
Attributes			X
Usage			
SpecificUsage	X	X	X
BegusageDateTime	X	X	X
EndUsageDateTime	X	X	X
Source			
Statement	X		
IndividualName	X		
OrganizationName	X		
PositionName	X		
DeliveryPoint	X		
City	X		
AdministrativeArea	X		
PostalCode	X		
ElectronicMailAddress	X		
VoicePhoneLine	X		
Coordinate System			
Projection	X	X	
HorizontalDatum	X	X	
VerticalDatum	X	X	
Code	X	X	
Data Quality			
HorizontalAccuracy	X	X	X
VerticalAccuracy	X	X	X
EvaluationMethodName	X	X	X
EvaluationMethodDescription	X	X	X
Pass	X	X	X
GroundSampleDistance	X	X	X

3.6.1. Temporal Relevance

One of the most critical metadata elements to the aviation industry is time. With changes in technology, it is possible for data to become outdated. Accordingly, spatial data needs to carry an indication of the time period for which it is valid. An aircraft's location along a flight path might only be valid for a moment, whereas the existence of a runway might be valid from when it was authorized for use until further notice. This standard defines the beginning and ending date and the time for which each feature instance is valid. All features must carry a beginning date (i.e. data is valid until further notice), an ending date (i.e. the data expires at a specified time) or both (i.e. the data is valid only during the period specified). These values are held in the begUsageDateTime and endUsageDateTime defined in Chapter 4. Dates and times should be recorded based on Aeronautical Information Regulation and Control (AIRAC) requirements defined in ICAO Annex 15–Aeronautical Information Services (AIS).

3.6.2. Accuracy

One metadata element particularly important to airport GIS applications is accuracy. "Accuracy" is broadly defined as the quality of nearness to the true value. For the exchange of data as specified in this standard, it is important to be more specific. This standard, therefore, provides limits for the absolute horizontal positional accuracy of each feature type. These limits are described as a maximum number of feet (or metric equivalent) between a feature's actual position and the position indicated in the data provided. The actual position is defined as the feature's true location on the specified datum or ellipsoid. Furthermore, the difference between a feature's true and recorded positions is required at a 95 percent confidence level. This means that statistically, 95 percent or more of the features provided fall within the required accuracy limit.

For some features types, vertical accuracy limits are also provided. These accuracies are expressed as the maximum number of feet a feature's recorded elevation can differ from its actual elevation. Since the earth's surface has many variations, it is approximated by what is referred to as a GEOID, with the actual elevation measured from the GEOID elevation at that location. Elevations are also provided at a 95 percent confidence level.

The driving factor in accuracy requirements relates to how the data is used. The location of an airport on a map used for aircraft navigation must be much more accurate than its location on a national map of airports intended for informational purposes. This standard provides accuracy guidelines for maps used for many airport and aeronautical functions. The accuracy guidelines provided in this standard are derived from several sources and compiled here for standardization. Further information on accuracy definitions and methods to assess the accuracy of existing data can be found in FGDC's Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (FGDC-STD-007.3-1998).

3.6.3. Security Sensitivity Levels

Another important metadata element is sensitivity level. Because spatial data can be used for nefarious purposes, it is important to protect it from unauthorized users. The Title 49, Code of Federal Regulations, Part 1520, defines Sensitive Security Information (SSI) and how it should be protected. Based on this definition, many forms of spatial data are considered SSI. Protecting sensitive spatial data is therefore not just good practice - it is the law. However, being too protective of data can unnecessarily limit its usefulness. The challenge is to restrict data to users having an operational need to know and whose credentials the data provider has qualified. With spatial data this challenge is particularly complex because there is such a wide variety of data users and ways in which they need to use the data. One of the more efficient ways of restricting access to spatial data is to apply specific restrictions at the feature type level. This standard applies one of the following sensitivity levels to each feature type. These are based on classifications listed in the MD_ClassificationCode list in ISO 19115.

- Unclassified data is available for general disclosure.
- Restricted data is not available for general disclosure.
- Confidential data is available to persons who can be entrusted with the information.
- Secret data is to be kept private, unknown, or hidden from all but a select group of people.
- Top Secret data is of the highest secrecy restricting access to only those requiring access to perform their jobs.

Since sensitivity levels are established for each feature type by this standard (see Chapter 5), it is not necessary to carry this information (i.e. a classification code in ISO terminology) in the metadata itself.

3.7. COORDINATE SYSTEMS

With the ability to provide spatial data in a variety of coordinate systems, datums, and units of measure, it is critical these elements are appropriately defined. For the purposes of data exchange, any combination of the following alternatives is acceptable.

3.7.1. Acceptable Coordinate Systems

Submit spatial data in either a latitude/longitude (i.e. unprojected) or a projected grid based coordinate system such as state plane or UTM.

3.7.1.1. Provide latitude/longitude data in decimal degrees with positive latitude values in the Northern hemisphere and negative longitude values in the Western hemisphere.

3.7.1.2. Provide state plane data in U.S. survey feet as defined by any of the accepted U.S. State Plane Coordinate System definitions. It is acceptable to provide data in another unit of measure if required by state law. Data providers should identify this requirement in survey plan.

3.7.2. Acceptable Datum

With regard to spatial data, a datum is a reference to an approximation of the earth’s surface or a Datum. Use the following Datums for spatial data submitted in compliance with this standard:

3.7.2.1. All horizontal data must be submitted referenced to the North American Datum of 1983 (NAD83).

3.7.2.2. All vertical data must be referenced to the North American Vertical Datum of 1988 (NAVD88).

CHAPTER 4. DATA TRANSLATION AND USE OF EXISTING DATA

4.1. USE OF EXISTING DATA

Many airports have developed and collected data over the years through different projects or planning efforts. This data exists in many forms from drawings in a CADD system, to individual records in databases or through a hardcopy management system. Since the 1980's the form of the data has evolved from a totally paper-based product to where many airports have some if not all the data available electronically. As the tools and technology changed from linen to Mylar and finally to digital CADD and GIS formats, only a few airports made the effort to ensure the quality of the data set. In some cases, the user performed data transformations from one datum to another without regard to the actual accuracy of the data. With the availability of more digital data and its associated detail, the expectations of those charged with maintaining this information also increased. However, no real effort or process related the data values to the true value and associated data accuracy by tracing the data back to its source. When considering the reuse of this data in a current or future project, the quality of the data is the first and most important factor determining its usability. The International Civil Aviation Organization (ICAO) defines data quality as, "A degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity"[5]. One of the first steps in determining the quality of a data set is determining its origin. What is the data source, and is it traceable to the time and point of collection? If the data is not traceable to the source, then the data provider should implement a defined and repeatable process to determine the spatial accuracy and reliability of the data before the data is used.

Today's aviation system requires us to build and maintain seamless aviation data sets reflecting the real world such as airport mapping databases. To accomplish this we must determine how the current data we have meets that vision. To provide "real world" airport data, it is required that the airport updates and integrates all of their legacy information and has all this information tied to a single consistent data standard and the same horizontal and vertical datums. These datum ties ensure the data accurately connects the different parts of the NAS together forming a seamless integrated system of navigational and airport data.

4.1.1. Maintenance of Data

Adherence to this guidance ensures the data quality remains at an acceptable level. Terrain and obstacle databases require updating to account for uncovered errors as well as to change appropriate data (e.g. due to construction activities or vegetation growth). Make updates to obstacle data as changes occur with sufficient lead-time to ensure the information is available when required to meet the AIRAC cycle amendment schedule. There is no update cycle specification for terrain data. Update terrain databases as required and in accordance with their intended use. Whenever a change affects safety critical data, immediately update it through the Notice to Airmen (NOTAM) process. Provide follow up information through the FAA Airport Surveying–GIS Program.

4.1.2. Data Set Maintenance and Update

The increasing use, sharing and interchange of geographic data sets in dynamic environments require both accuracy and temporal relevance. Airport and aeronautical data changes frequently while the base

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[5] International Civil Aviation Organization (ICAO), Annex 15 to the Convention on International Civil Aviation , Aeronautical Information Services, Twelfth Edition, Amendment 33, 24 November 2004

mapping data, such as terrain, changes infrequently. The data provider is responsible for updating the data set at appropriate intervals to ensure its accuracy. The appropriate management of a data set is an indicator of its reliability to meet the requirements for use. The purpose of describing the maintenance and update criteria of airport and aeronautical geographic data is to facilitate the selection of the data set best suited to the needs or requirements. Complete confidence in the maintenance and temporal quality of a data set encourages the sharing, interchange, and use of appropriate geographic databases. Continuous maintenance and timely updates of geographic databases are vital to the aeronautical users of such databases. Three principal conditions typically affect a geographical data set:

1. When any quantity of data is deleted from, modified in, or added to a data set
2. When there is a modification to the data set's specification(s)
3. When the actual geography changes

The first condition, a modification to a data set, may occur quite frequently since many data sets in an existing database are not static. As there is an increase in the interchange of information, there is a corresponding increase in the use of data sets for multiple purposes and the accompanying update and refinement of data sets to meet multiple purposes. If a database is likely to change with modifications to the elements of the encompassed data sets, assess the quality of the overall database and the data updated when changes occur. Using and updating the metadata provides the user with knowledge of the data quality. The only metadata element remaining static is the "usage" element provided as part of the data set creation. There is a reliance on data users to report uses of a database differing from its intended purpose. In these cases, make continual updates to particular data elements to reflect unforeseen uses that occur using the temporality functions of the system. The second condition, updates to this AC, will occur as needed to meet changing requirements based on the actual need. When this type of change occurs, the quality of the current data set also changes. The quality information for a data set should always reflect the current data set given its current product specification. The third condition, a change in the actual geography, occurs continuously. These changes can be caused by natural phenomena such as, movement in the earth's crust or erosion, but are most often a result of human activity. Changes are often very rapid and dramatic. For this reason, the date of data collection is important when judging the quality of a data set. In some cases, when known, even the rate of change is of interest. Throughout this document, the various identified data elements represent the minimum necessary for the development and interchange of accurate geographical airport and aeronautical information used for aeronautical purposes.

The following tables identify the safety critical and non-safety critical features:

Table 4-1. Airport-Related Safety Critical Data

The values published in these tables are the publication resolutions. The data should be collected to one decimal place more than required for publication for use in computations and to eliminate rounding errors in the final value.

Item	Publication Resolution (Unit of Measurement)	Integrity Classification
Airport Control Area (Airspace)	1 arc second in latitude and longitude	1×10^{-5}
NAVAIDs located at the airport/heliport	1/10 arc second in latitude and longitude	1×10^{-5}
Obstacles in the circling area and at the airport/heliport	1/10 arc second in latitude and longitude	1×10^{-5}

Item	Publication Resolution (Unit of Measurement)	Integrity Classification
Significant obstacles in the approach and departure area	1/10 arc second in latitude and longitude	1×10^{-5}
Runway threshold	1/100 arc second in latitude and longitude	1×10^{-8}
Runway end (flight path alignment point)	1/100 arc second in latitude and longitude	1×10^{-8}
Taxiway center line points	1/100 arc second in latitude and longitude	1×10^{-5}
Geometric center of a Touchdown Lift Off Area (TLOF) or the Final Approach and Takeoff Area (FATO) thresholds, heliports	1/100 arc second in latitude and longitude	1×10^{-8}
Airport/heliport elevation	1 ft (0.3 m)	1×10^{-5}
NAD-83 geoid undulation at airport/heliport elevation position	1 ft (0.3 m)	1×10^{-5}
Runway or FATO threshold elevation, non-precision runway	1 ft (0.3 m)	1×10^{-5}
NAD-83 geoid undulation at runway or FATO threshold, TLOF geometric center, non-precision runway	1 ft (0.3 m)	1×10^{-5}
Runway or FATO threshold elevation, precision runway	0.1 ft. (0.03 m)	1×10^{-8}
NAD-83 geoid undulation at runway or FATO threshold, TLOF geometric center, precision runway	0.1 ft. (0.03 m)	1×10^{-8}
Threshold crossing height, precision runway	0.1 ft. (0.03 m)	1×10^{-8}
Obstacles in the approach and departure areas	3 ft (1 m)	1×10^{-5}
Obstacles in the circling areas and at the airport	3 ft (1 m)	1×10^{-5}
Distance measuring equipment associated with a NAVAID providing precision approach guidance (DME/P)	1/100 arc second in latitude and longitude	1×10^{-5}
Distance Measuring Equipment (DME) associated with a NAVAID providing non-precision approach guidance	1/100 arc second in latitude and longitude	1×10^{-5}
VHF (Very High Frequency) Omni-directional Radio-range (VOR) Checkpoint alignment	±1 degree	1×10^{-5}
Airport/heliport magnetic variation	±1 degree	1×10^{-5}
Instrument Landing System (ILS) localizer antenna magnetic variation	±1 degree	1×10^{-5}
Microwave Landing System (MLS) azimuth antenna magnetic variation	±1 degree	1×10^{-5}
ILS localizer azimuth	1/100 degree (referenced to True North)	1×10^{-5}

Item	Publication Resolution (Unit of Measurement)	Integrity Classification
MLS zero azimuth alignment	1/100 degree (referenced to True North)	1×10^{-5}
Runway and FATO length, TLOF dimensions	1 ft (0.3 m)	1×10^{-8}
Stopway length	1 ft (0.3 m)	1×10^{-8}
Landing distance available	1 ft (0.3 m)	1×10^{-8}
ILS markers-threshold distance	10 ft (3.0 m)	1×10^{-5}
ILS DME antenna-threshold, distance along centerline	10 ft (3.0 m)	1×10^{-5}
MLS DME/P antenna-threshold, distance along centerline	10 ft (3.0 m)	1×10^{-5}
Touchdown Zone Elevation	1 ft (0.3 m)	1×10^{-8}
Displaced threshold data	1 ft (0.3 m)	1×10^{-8}

Table 4-2. Airport-Related Non-Safety Critical Data

The values published in these tables are the publication resolutions. The data should be collected to one decimal place more than required for publication for use in computations and to eliminate rounding errors in the final value.

Item	Publication Resolution (Unit of Measurement)	Integrity Classification
Obstacles outside Circling, Approach, Departure areas	1 arc second in latitude and longitude	1×10^{-3}
Obstacles outside Circling, Approach, Departure areas	10 ft (3 m)	1×10^{-3}
Airport/heliport reference point	1 arc second in latitude and longitude	1×10^{-3}
Aircraft parking positions (stand points) or Inertial Navigation System (INS) checkpoints	1/100 arc second in latitude and longitude	1×10^{-3}
Non-Directional Beacon (NDB) NAVAID magnetic variation	±1 degree	1×10^{-3}
Runway and FATO bearing	1/100 degree (referenced to True North)	1×10^{-3}
ILS localizer antenna-runway end, distance	1ft. (0.3 m)	1×10^{-3}
ILS glide slope antenna-threshold, distance along centerline	1ft. (0.3 m)	1×10^{-3}
MLS azimuth antenna-runway end, distance	10 ft (3.0 m)	1×10^{-3}
MLS elevation antenna-threshold, distance along centerline	10 ft (3.0 m)	1×10^{-3}

4.1.3. Establishing a Common Data Reference Framework

Establishing a common reference framework is the process of making sure the information (data) about the airport truly represents the airport as it is built. In other words, is it current and accurate? One of the most important tasks associated with integrating existing data and newly collected data is to reference all the data to the same horizontal and vertical datum.

If an overlay of information, depicting runway ends, is in relation to an accurate base map of some known standard (such as NAD27, State Plane), the conversion to the NSRS reference framework using commercially available coordinate conversion tools is a relatively straightforward process. A more difficult situation arises when an overlay map is drawn in relation to an inaccurate base map. When these data sources are merged and updated to a new standard and/or overlaid with a new base map or a rectified orthophotography, the errors and distortions should be obvious.

From field verification of various points around the airport, a comparison can be done to the same measured points in your CADD or base-mapping file to verify the positional accuracy as defined for each feature in Chapter 5. The choice of field measured points must coincide with known points in the CADD files and the known points on the orthophotographs. The choice of where the field verifications points should be taken represent a fairly even distribution of points around and across the airport property.

By comparing the field measured values to the CADD and orthophotography values, a determination of whether the data falls inside the acceptable accuracy for the features can be determined. All data to be submitted must meet the accuracies for the appropriate feature; otherwise additional transformation steps may be required.

The number of required field verification points is dependent on the size and complexity (volume of air traffic) of each airport, and is further described in Table 4-3.

Table 4-3. Required Field Validation Points based on Annual Aircraft Operations and Airport Area

Acres	Operations per year								
	<10,000	<25,000	<50,000	<100,000	<200,000	<300,000	<500,000	<750,000	>750,000
<2,500	20	20	20	40	80	80	80	80	80
<5,000	20	20	40	80	120	120	120	120	120
<7,500	20	40	80	120	120	120	120	150	150
<10,000	40	80	120	120	150	150	180	180	180
<12,500	40	80	120	150	150	180	200	200	200
<15,000	40	80	120	150	180	180	200	200	200
>15,000	40	80	120	150	180	200	200	200	200

Using Table 4-4 in conjunction with the acreage and operations information available within an airport's 5010 form, intersect the columns and rows to establish the number of field verification points (see Table 4-4) required to quality control the legacy datasets for an airport.

Table 4-4. Examples of Field Verification Points required of various airports

Sample Airport	Operations per year	Acres	Value From Chart	Sample Airport	Operations per year in 1,000's	Acres	Value From Chart
1	211,000	830	80	**9**	340,000	2500	80
2	121,000	4200	120	**10**	83,000	700	40
3	980,000	4700	120	**11**	651,000	3500	80
4	699,000	18,076	200	**12**	139,000	2800	5
5	71,000	2000	40	**13**	411,000	5200	120
6	972,000	7280	180	**14**	405,000	680	120
7	384,000	3300	120	**15**	409,000	2384	80
8	310,000	1380	120	**16**	352,000	5207	20

If the field verification process reveals a distortion in the base mapping, further analyze the data and the base map. As airports enter data into the system, they become the first level of independent verification and validation. The airports assume this role by offering the data they use to manage the airport into the aeronautical information "public domain" as source data. Regardless of the eventual use of the data, integrating new data with existing data requires the data provider (airport) to validate the usability of the combined data prior to using it for their own purposes. The data provider uses the combined and validated data to update the official aeronautical data sources at the State or FAA.

From reviewing similar types of features, an analysis of the errors can show when there are systematic errors that can be corrected or random errors that require data be verified or recollected to meet the accuracies required in Chapter 5.

In the sample plot (see Figure 4-1), above the circle is the field verified location with the direction of the arrows indicating the direction and magnitude of the error associated with features in either the vector file (red arrow) or orthophotography file (green arrow).

Arrows indicating the same direction and magnitude of error indicate a systematic type error which can be corrected using various transformation techniques. Arrows pointing in multiple directions and having multiple magnitudes indicate random type errors that are more difficult and perhaps even impossible to correct. Additional field checks may be required at this point in order to further isolate the error source(s) in the legacy datasets.

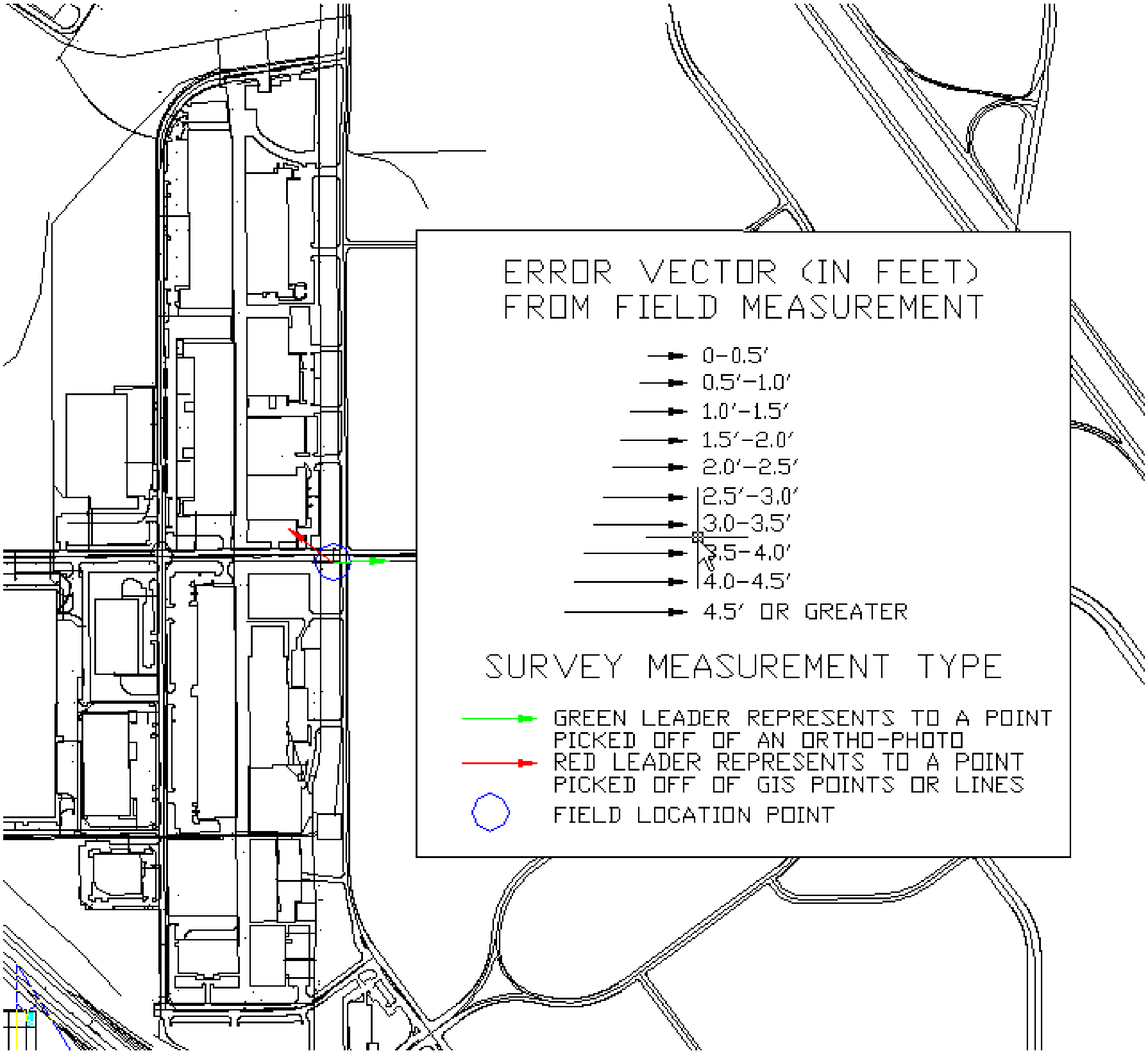

Figure 4-1. Sample Plot showing ranges of Error for Vector and Ortho-photography Mapping to field Verified Position.

4.1.4. Data Distortion Handling Strategy

Existing or legacy data regardless of the source, typically suffers from the following conditions:

- Shifts and translations occur when the data is in the correct relationship to one another, but this relationship is not maintained when compared against newer or more accurate sources or against a new reference framework (i.e. NAD27 vs. NAD83). Correct shifts and translations by field verifying a select group of points of the shifted and rotated data and moving to its true location.

- Linear Shifts or Stretching occurs when the data distorts in a single direction producing long or short data when compared to a higher accuracy source. To correct these errors use field verified points matched to the CADD data and processed to readjust the base mapping to fit the existing true positions.

- Multiple directional shifts occur when at least three validation coordinate pairs are located in close proximity but misplaced in very different directions. This kind of distortion is hard to repair, and may not allow the data to meet data accuracies required for data submission. Each data element identified in Chapter 5 has minimum data accuracies; the accuracy for each element in a data set must meet these minimum required accuracies prior to submission to the FAA.

When the quality of the source data is suspect, the data producer should apply one or more of the following strategies for handling the distortion error prior to submitting the data to the FAA.

- Convert the faulty data if error falls within allowable accuracies for the feature as stated in Chapter 5.
- Drop the faulty data when not required for submission to the FAA.
- Fix the source data and re-compare to field verified points.

Although working with legacy data (particularly converting it to meet new standards or specifications), can be a difficult and time-consuming task, dividing the problem into each individual data type usually makes the task more manageable. Working through data-oriented efforts in an iterative and incremental process is recommended.

4.1.5. Legacy Data Elements Standards Compliance

The FAA developed and provided to industry a Data Migration Tool (DMT) to assist in converting legacy data to the FAA standards. The DMT helps identify compliant and non-compliant data elements and aids in the changing of layer names from airport specific to FAA compliant names for submission to the FAA Airport Surveying–GIS System. Data submitted to the FAA Airport Surveying–GIS Program is a generalized or rolled up aggregation of features used at an airport. Additionally, by tying each drawing and its associated elements to a common coordinate reference frame (the NSRS, using the airport PACS and SACS) the data's accuracy is maintained relative to the entire NAS.

To submit data to the FAA, organize your CADD layers into drawings that represent themes (i.e. a drawing containing all the man made data where the drawing name would be 'ManmadeStructures.dwg' or .dgn). Inside each of the drawings would be the layer names as outlined in the National CADD Standard and AIA standard and the features have the correct attribute data attached using products such as Autodesk's Map™ or Civil 3D™ software. Files organized by theme and National CADD standards with attributes will allow for the data migration process to be initiated. Without this basic framework in place, the DMT cannot be used effectively.

4.2. PREPARING YOUR DATA FOR SUBMISSION TO THE FAA

Archive existing data before beginning any data organization or translation process. Now is also the time to organize your data into a more manageable form which will result in less time spent in the translation process. The translation process will not be done by converting all layers at one time. It will be an iterative process involving finding layers with all compliant objects, converting those layers, identifying layers with non-compliant objects and converting those objects to make them compliant, converting those layers, and transferring attribute data to describe the airport objects.

This is also a good time to clean up your data by eliminating dangles, ensuring all polygons are closed, extra layers or elements are deleted, etc. as this will yield time savings and promote an easier translation. Remember, the FAA is looking to aggregate data you have broken down into small details, so several features and layers may end up in the same feature class. All features in the file need to be primary objects (points, lines and polygons). The FAA system does not support other object types like text, solids, hatches, blocks etc. If you have features created as unsupported object types, you must change them to compliant types or delete them if not required. The DMT will identify any noncompliant objects and will allow the processing of the drawings with both compliant and non-compliant types in the layer, leaving the non-compliant types on the existing layer, while converting the compliant types to the new FAA compliant layer.

Metadata and attributes are required for the data conversion. The metadata standard does not specify how to organize the dataset in a computer system or in data transfer. The metadata standard provides the structure and content to describe the characteristics of the dataset allowing other users to know the origination, accuracy, and usage of the dataset. In moving to a system where the information is stored in a database, many of the clarifying elements such as text become a part of the feature as attributes. The data about a runway end is a good example. Typically, CADD systems provided clarifying data such as latitude, longitude, elevation, etc. as text. However, in a database or GIS these elements are attributes of the runway end feature. If the text in a drawing is critical to the understanding of the feature or an element or describe special information about the feature, move it to a text field in the feature's attributes. The attribute "userFlag" is associated with every feature and provides a place for this type of clarifying information. Chapter 5 provides recommended layer naming conventions according to the National CADD Standards and American Institute of Architects (AIA) and how the layers are aggregated to the features. These recommendations follow the drawing hierarchy discussed in paragraph 3.3.3. Data providers should complete each attribute about a feature before submission. Some of the features can be completed by the consultant(s) for the airport while others will require the input from the airport sponsor.

4.3. DATA MIGRATION TOOL (DMT)

The FAA Airports GIS website (https://airports-gis.faa.gov) has a link to download the FAA recommended DMT to assist the data provider in translating their data to comply with the standards established in this AC. The DMT requires Autodesk Civil 3D 2008™ to run. Versions of the DMT for use with other CADD and GIS software will be made available when they are developed and tested.

When using any other supported file format than Autodesk DWG files, your first step is running the DMT as outlined in paragraph 4.3.3, Run Data Migration Tool (DMT). After running the DMT, use the DMT to import your files see paragraph 4.3.3.1, Importing non-Autodesk files for conversion.

The flow chart in Figure 4-2 describes the process of using the DMT, with figures to follow that explain each step.

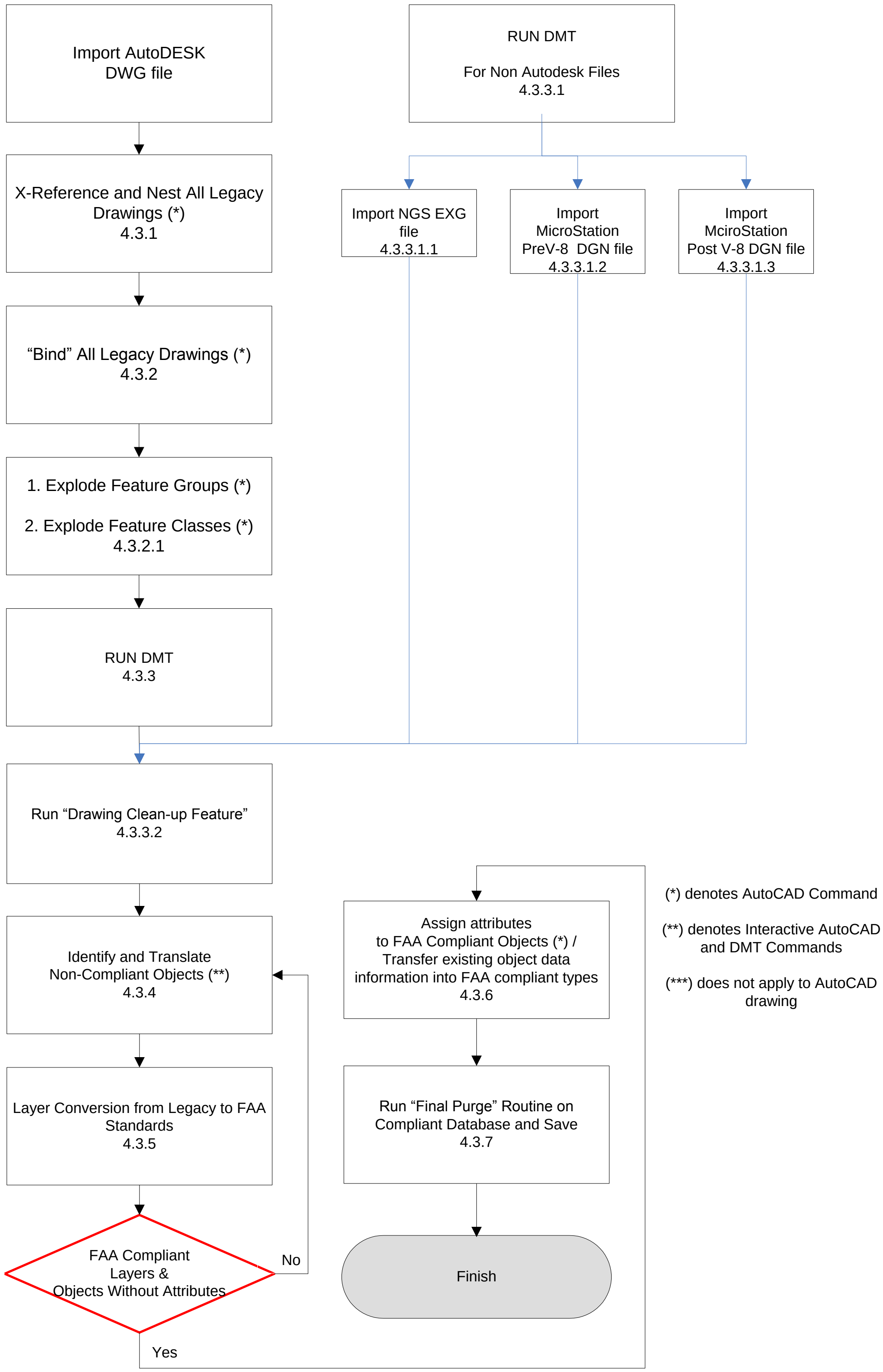

Figure 4-2. DMT Process.

4.3.1. External-reference and Nest all Legacy Drawings for Autodesk DWG format only

In order for the DMT to successfully translate legacy data to FAA standards, a hierarchy of AutoCAD drawings must be established. Once established, create the feature group drawings by "referencing" (use AutoCAD *Xref* command) all of the proper feature class drawings into the correct feature group. (For details on how to organize the files, see paragraph 3.3.3) The next step is to reference all feature group drawings to one master drawing identified generically (i.e. AIRPORT.dwg). The drawing now contains the airport data needed for the FAA submittal.

The way the files are structured, the AIRPORT.dwg is organized in such a way that it is updated automatically as you update your base feature class drawings. If you use your original file for conversion to the FAA standard you will have to bind your reference files which would mean your drawing will not update on its own. By doing a *Save As* from your AIRPORT.dwg and renaming it to 'Airport-FAA Submittal'.dwg, you now have a file that can be created from your base updated airport legacy files and converted at any time by executing the DMT.

4.3.2. Bind all Legacy Drawings

Once you have your Airport-FAA submittal.dwg, the ref files must have the *Bind* command run on the file. To *bind* the drawing, go into the *ref* box, press the shift key and select all reference drawings. Right-click and click on *bind* as shown in Figure 4-3.

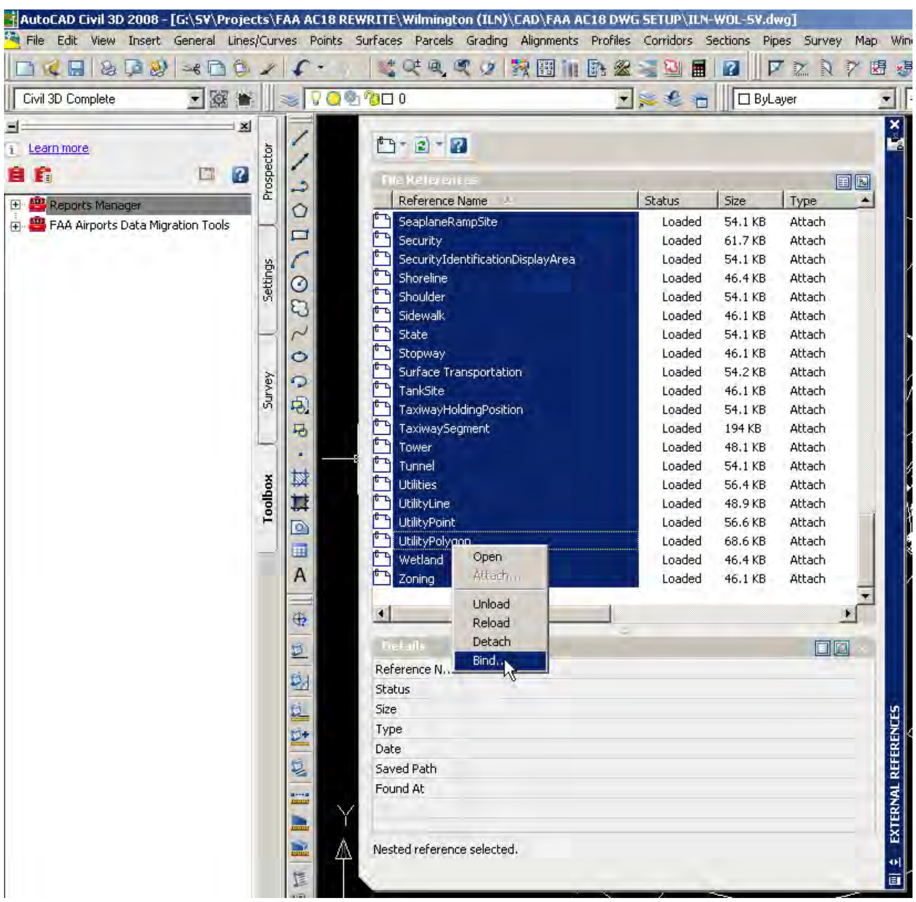

Figure 4-3. Binding Multiple Legacy Files.

Another box will come up asking whether to *Bind* or *Insert*, the difference between the two, is that *Bind* keeps the x-referenced drawing's name in front of the layer, whereas *Insert* only keeps the layer's name.

NOTE: *After binding this data, it is no longer x-referenced and has no link to the original file. If changes are made to a feature class drawing, you must go back into the AIRPORT.dwg (which contains your x-references unbound) and rerun a Save As to an 'AIRPORT-FAA Submittal.dwg'.*

After binding, the objects are now blocks inside of your drawing. You need to use the *Explode* command twice. First *Explode* the feature group type, then *Explode* the feature classes. All objects are now physically in this drawing, and layer conversion can be performed.

4.3.3. Run Data Migration Tool (DMT)

When using any of the other supported file types, running the DMT is your first step in the conversion process.

Ensure that Autodesk Civil 3D 2008™ has been loaded along with the latest service pack upgrade from Autodesk. Download the latest executable for the FAA DMT from the FAA Airports GIS website (https://airports-gis.faa.gov). With Autodesk Civil 3D 2008™ closed, run the FAA DMT installation executable. A shortcut to the readme file will be placed on the desktop, and it is recommended that you review it prior to using the DMT for the first time. (**NOTE:** *If a previous version of the DMT already exists on your computer, you must remove it by using the Add/Remove Programs feature in Windows before installing the new version.*)

After installation, open Autodesk Civil 3D 2008™. It should show the *Toolspace* box open on the left part of the screen. If the *Toolspace* box is not there, type the command *Showts* in the command line and hit enter; the application should then look like Figure 4-4.

Figure 4-4. Toolbox Tab.

Ensure that all four tabs ("Prospector," "Settings," "Survey," and "Toolbox") are displayed as shown in Figure 4-4. If you are missing the "Toolbox" tab go to the menu "General" and click on "Toolbox." If everything is properly installed, the software should now show all four tabs.

The "Convert Layers to FAA Standards" and the "Convert Object Data to FAA Standards" tools should be shown on the bottom of the Toolbox menu under the "FAA Airports Data Migration Tools" toolbox. (Expand the three tool groups to access the specific tools.) When these two objects are shown, you have now successfully loaded the FAA DMT.

4.3.3.1. Importing non-Autodesk files for conversion. The FAA DMT provides tools to import ESRI shapefiles, or MicroStation V7 (Pre-V8 DGN Files) or V8 DGN files. To load a new set of data for these files types to convert with the DMT, go the Toolbox Tab on the *Toolspace* box as shown in Figure 4-4. All three of these tools are available within the DMT Toolbox under the "Existing Data Migration Tools" category. For converting native AutoCAD .dwg or .dxf files, open the file using core AutoCAD Civil 3D 2008™ functionality.

When working with supported file types other than Autodesk DWG files, importing the file through the DMT import tool is the first step. Importing these file formats through the DMT assists with the conversion process. To run any of these import tools, right-click on the tool in the toolbox and select "Execute…" as in Figure 4-5. Each tool works in a slightly different manner, as explained in the following paragraphs:

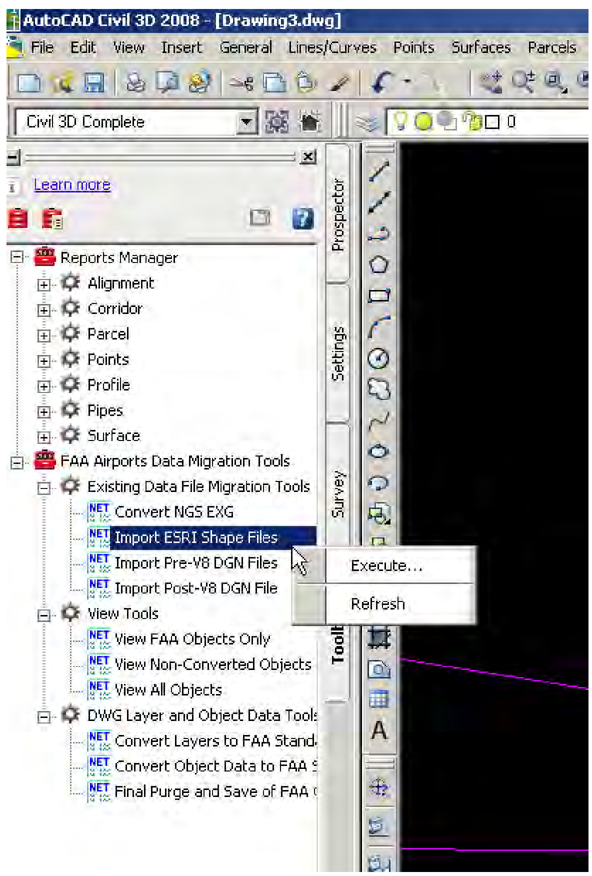

Figure 4-5. Import non-Autodesk file formats.

4.3.3.1.1. Importing ESRI Shapefiles. Existing airport data in ESRI shapefiles format can easily be migrated to the FAA standards using the existing tools in the DMT. It is recommended that you organize all of the shapefiles that you want to convert into a separate folder on your system. The DMT "Import ESRI Shapefiles" tool (see Figure 4-6) will read in the available shapefiles from the selected folder and allow you to select which files you want to import. (Hint: double-click on the "SHP File" column to select/unselect all files in the dialog). When you select "Convert File(s)," the tool will create a layer in your .dwg for each shapefile (with the same name) and will attach a default object data table to the layer from the shapefile's attributes. Then you can run the "Convert Layers to FAA Standards" and "Convert Object Data to FAA Standards" tools to continue the migration process. Shapefiles are a good starting point for converting GIS attribute data to the FAA standards.

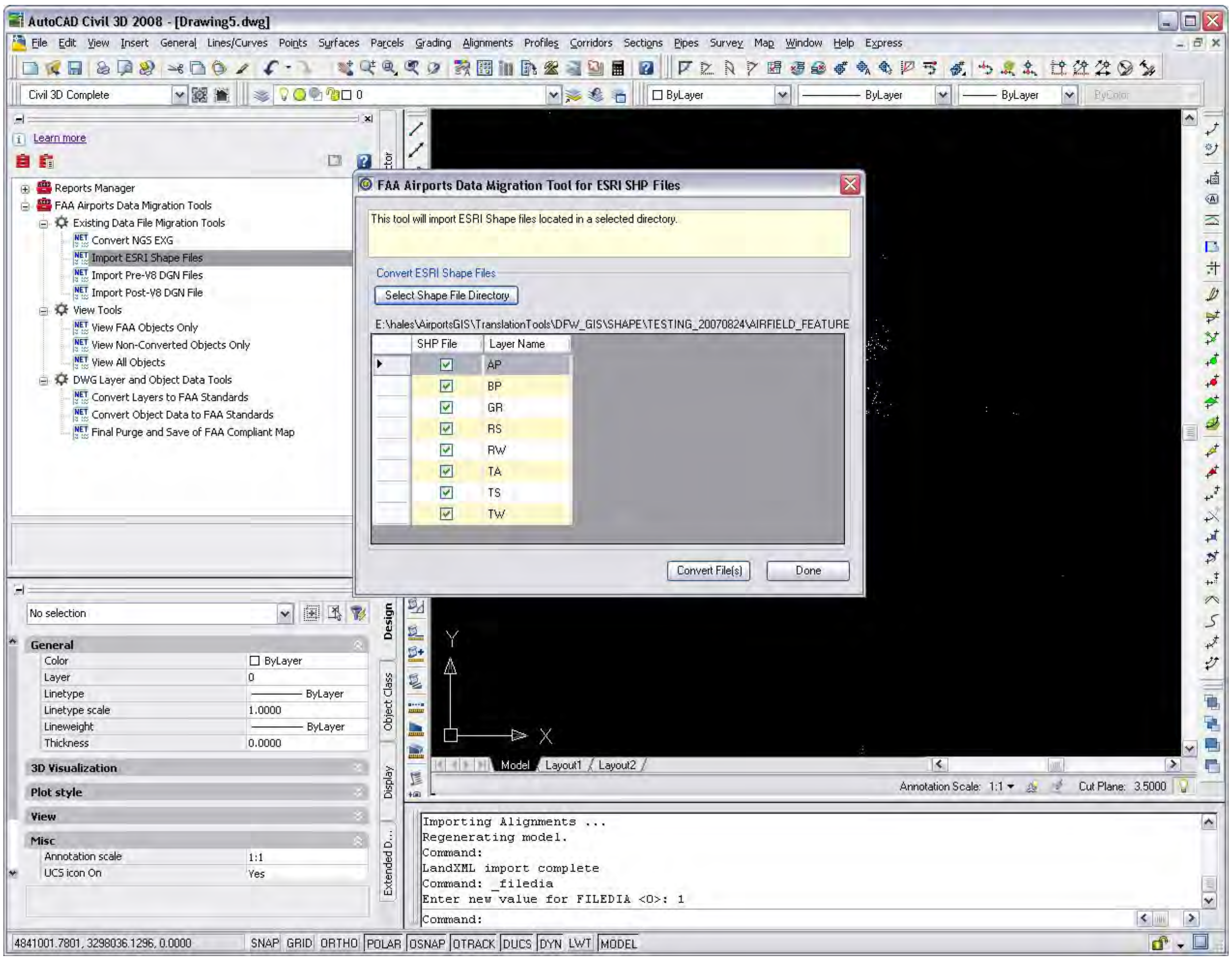

Figure 4-6. Import ESRI Shapefiles.

4.3.3.1.2. Importing MicroStation (pre-V8) DGN files. To import MicroStation™ (pre-V8) DGN files for migration, use the "Import Pre-V8 DGN Files" tool from the DMT toolbox (see Figure 4-7). This tool works in a similar manner to the ESRI™ Shapefile import, allowing you to select DGN files to import from a folder on your computer. When you select "Convert File(s)," the DGN layers are imported into your Autodesk DWG file. **NOTE:** *There is no option to import attribute data using pre-V8 MicroStation™ DGN files, as this is not supported in this file type.* Object data can be entered manually using the process described in 4.3.6 after running the "Convert Layers to FAA Standards" tool.

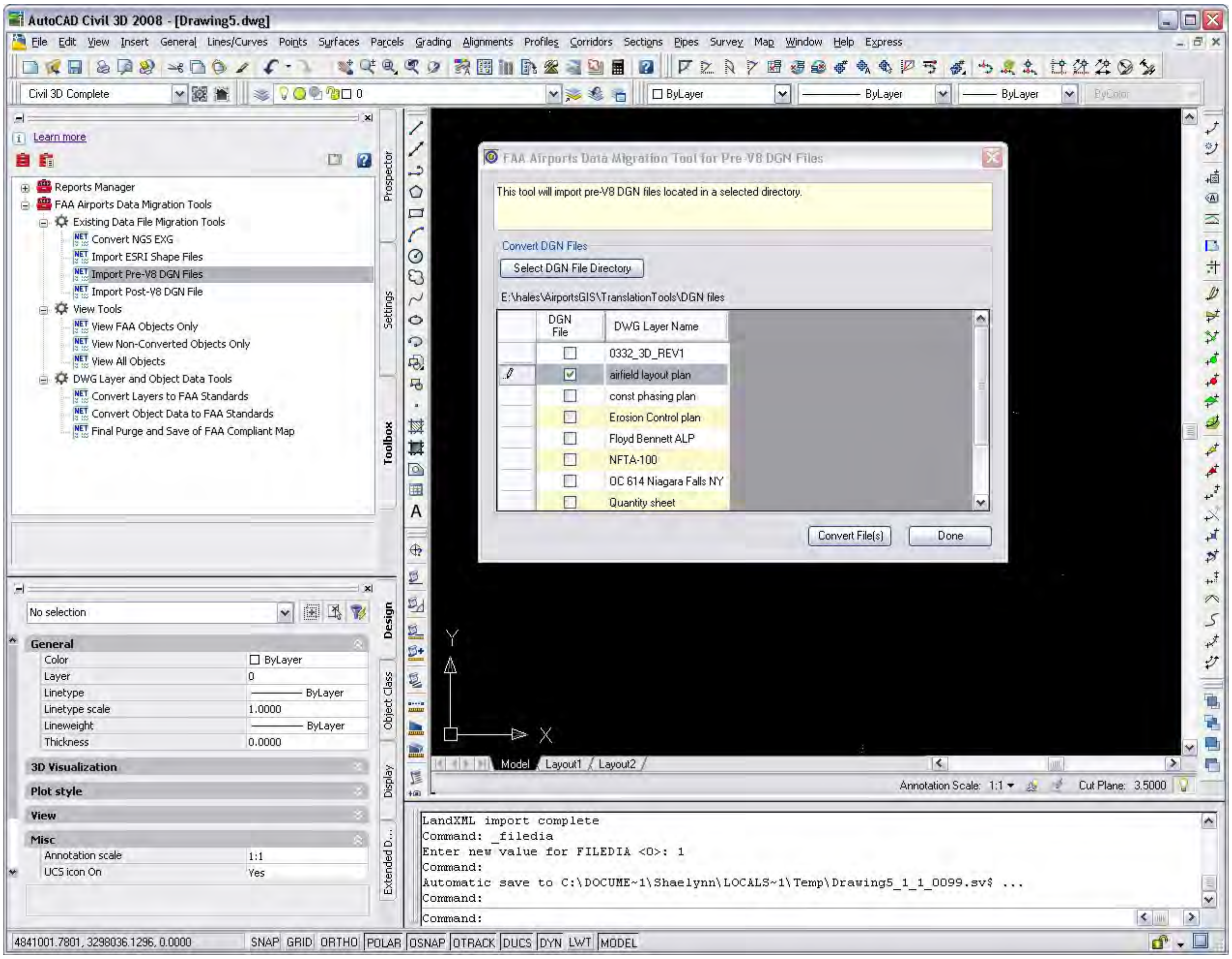

Figure 4-7. Import MicroStation™ (pre-V8) DGN files.

4.3.3.1.3. Importing MicroStation™ V8 DGN files. Using the import tool from the DMT, import the MicroStation™ V8 file. During the import process a dialog box will open as shown is Figure 4-8.

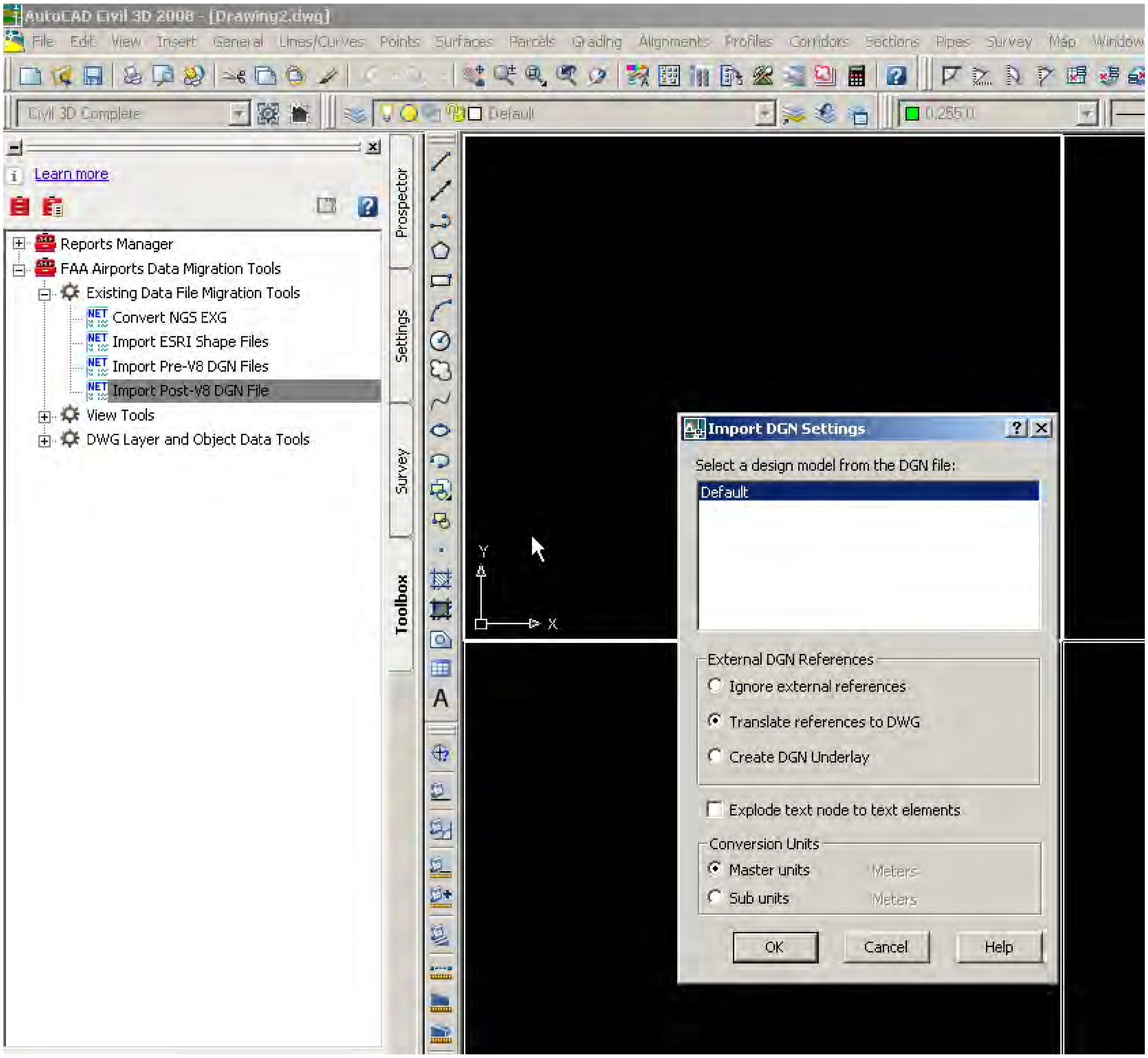

Figure 4-8. Translate Reference files.

When importing the MicroStation™ V8 design file, the system will ask if you want to translate references to DWG. The user will want to translate references by selecting the 'Translate references to DWG' option in the DMT. If you do not follow this process, you will have to run a similar process as in the Autodesk workflow of reattaching the references files in Autodesk.

4.3.4. Identify and Translate Non-Compliant Objects

The DMT provides you with a report showing the number of compliant objects and non-compliant objects on each of the CADD layers as shown in Figure 4-11. When you initially run the "Convert Layers to FAA Standards" tool, these values are based on all allowable object types (points, lines, polylines, and lightweight polylines) that can be converted to the FAA required simple geometry types of point, line, and polygon. It may be useful to run this on your data without completing the layer conversion (as described in paragraph 4.3.5) in order to get a feel for the distribution of valid/invalid objects on your layers. You may want to correct each layer so there are no non-compliant objects in the layer. The file will translate if there are non-compliant objects in the layer, but the non-compliant objects will not be moved to the new FAA Layer during the translation process. Instead, they will remain on the non-compliant layer, which can later be removed from the drawing using the "Final Purge and Save" tool.

Compliant and non-compliant object counts may change as you select potential FAA layers to convert to. This is because the valid/invalid status of the objects on the layer is being updated to meet the more stringent requirements of the specific geometry allowed for the feature class as defined in Chapter 5 of this AC. For example, if you have an airport specific layer that contains open lines that you want to convert to the APRON layer, those objects will change status to invalid when APRON is selected from the drop down menu. If you escape from the tool and clean up the open lines on the APRON layer by closing the lines and then rerun the tool, these objects will now be considered valid for the APRON polygon layer and will be converted.

The DMT also provides you with some viewing options so that you can see FAA objects (objects compliant and already converted) and Non-Converted objects. These tools are all run with the right-click "Execute" command. Figure 4-9 shows how to access these tools in the DMT.

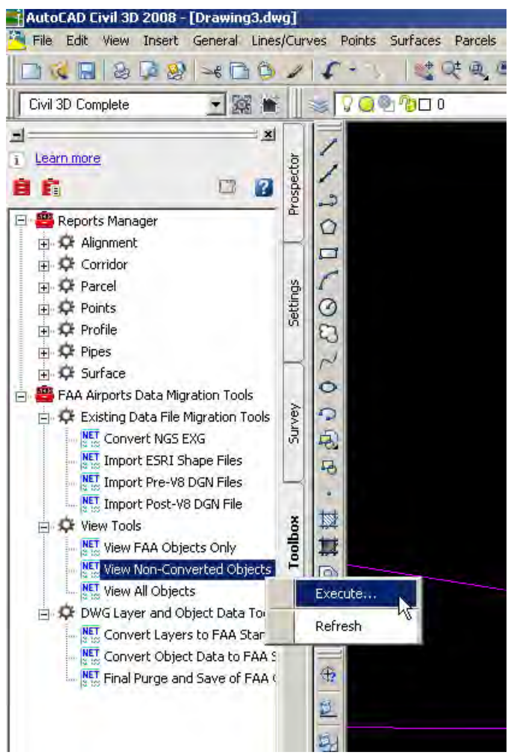

Figure 4-9. Tools to View Converted and non-converted data.

By working with each layer on its own to correct the invalid objects, they can be reorganized for translation. As shown in Figure 4-10, standard AutoCAD tools such as *Show Properties* can be used to identify non-compliant objects such as arcs, circles, blocks, etc. By using standard AutoCAD manipulation tools, these arcs can be moved to the correct layers and modified to a compliant object type and moved back or deleted, whichever is the correct action to make the file compliant.

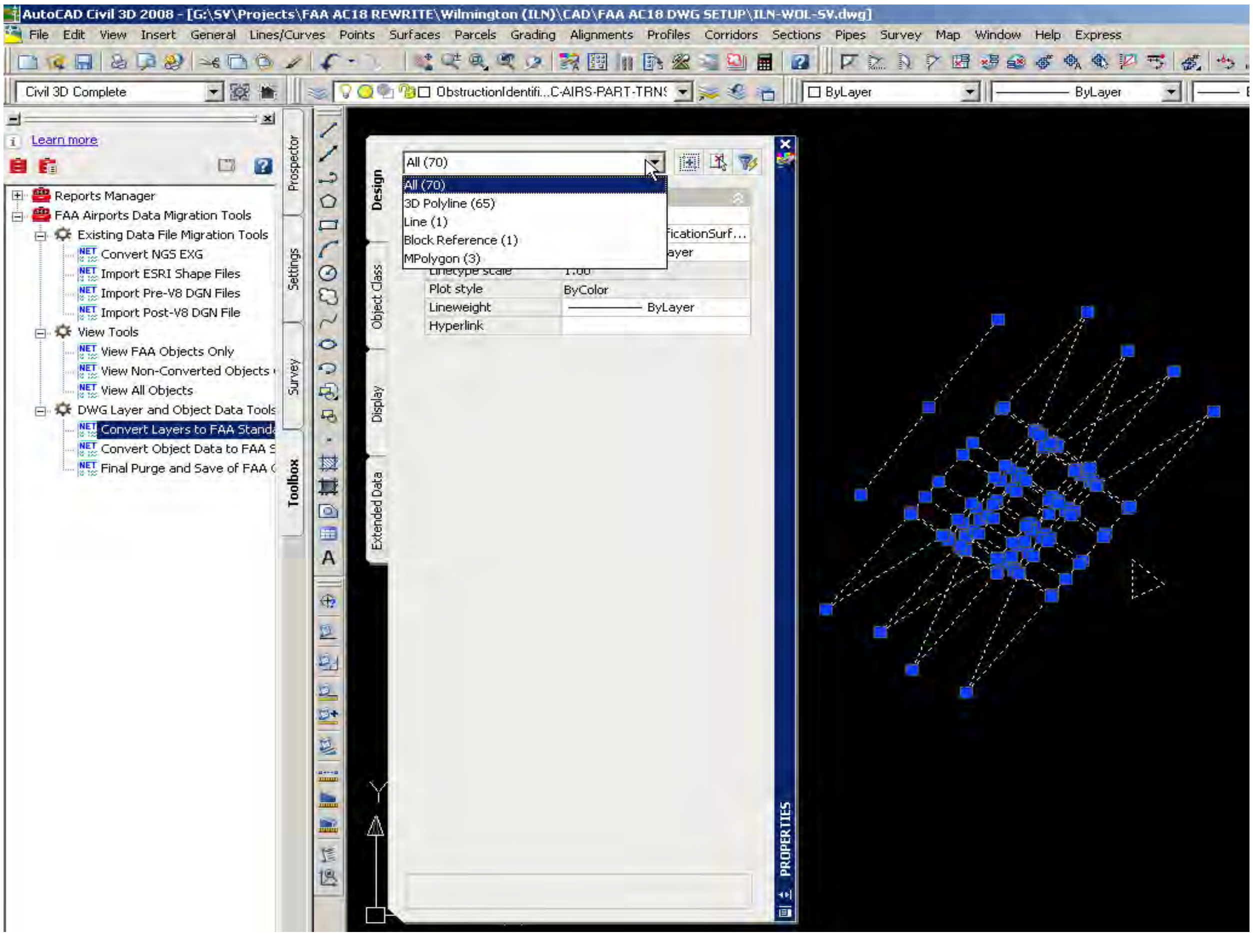

Figure 4-10. Isolated layer containing non-compliant data with *Show Properties* AutoCAD function.

4.3.5. Layer Conversion from Legacy to FAA Standards

Using standard AutoCAD tools, open the DWG file for conversion to the FAA Standard. The drawing will open and display in the main drawing panel (window). (Alternatively, you can also import other valid file formats into a new AutoCAD DWG using the DMT tools as described in paragraph 4.3.3.1.)

In the toolbox tab, right-click on the “Convert Layers to FAA Standards” and left-click on “Execute.” The DMT will run and generate a report as shown in Figure 4-11. The table created shows the existing drawing layers on the left. On the right are the FAA layers on the pull down Tab with the existing layer name. To change the name to compliant FAA named layers, select the pull down tab and all compliant FAA feature classes are listed.

Select the correct FAA layer name for the data set you are converting and put a check mark in the DMT column “Convert Layer Name”. (**NOTE:** *you can turn all of the layers on/off by double-clicking this* *column header*.) Only those layers that are checked and have been assigned a FAA compliant layer name will be converted. **NOTE**: *the DMT will highlight each layer in blue to indicate that the layer will be converted.*

When you initially run the "Convert Layers to FAA Standards" tool, these values are based on all allowable object types (points, lines, polylines, and lightweight polylines) that can be converted to the FAA required geometry types of point, line, polygon. You may want to correct each layer so there are no non-compliant objects in the layer. The file will translate if there are non-compliant objects in the layer, but the non-compliant objects will not be moved to the new FAA Layer during the translation process. Instead, they will remain on the non-compliant layer, which can later be removed from the drawing using the "Final Purge and Save" tool.

Compliant and non-compliant object counts may change as you select potential FAA layers to convert to. This is because the valid/invalid status of the objects on the layer is being updated to meet the more stringent requirements of the specific geometry allowed for the feature class chosen. Each feature may have more than one object type that is allowed for a feature. The number or count of objects is specific to a feature and its allowable geometry type depending upon the definition in Chapter 5 of this AC. For example, if you have an airport specific layer that contains open lines that you want to convert to the APRON layer, those objects will change status to invalid when APRON is selected from the drop down menu. The layer conversion tool can be viewed in Figure 4-11.

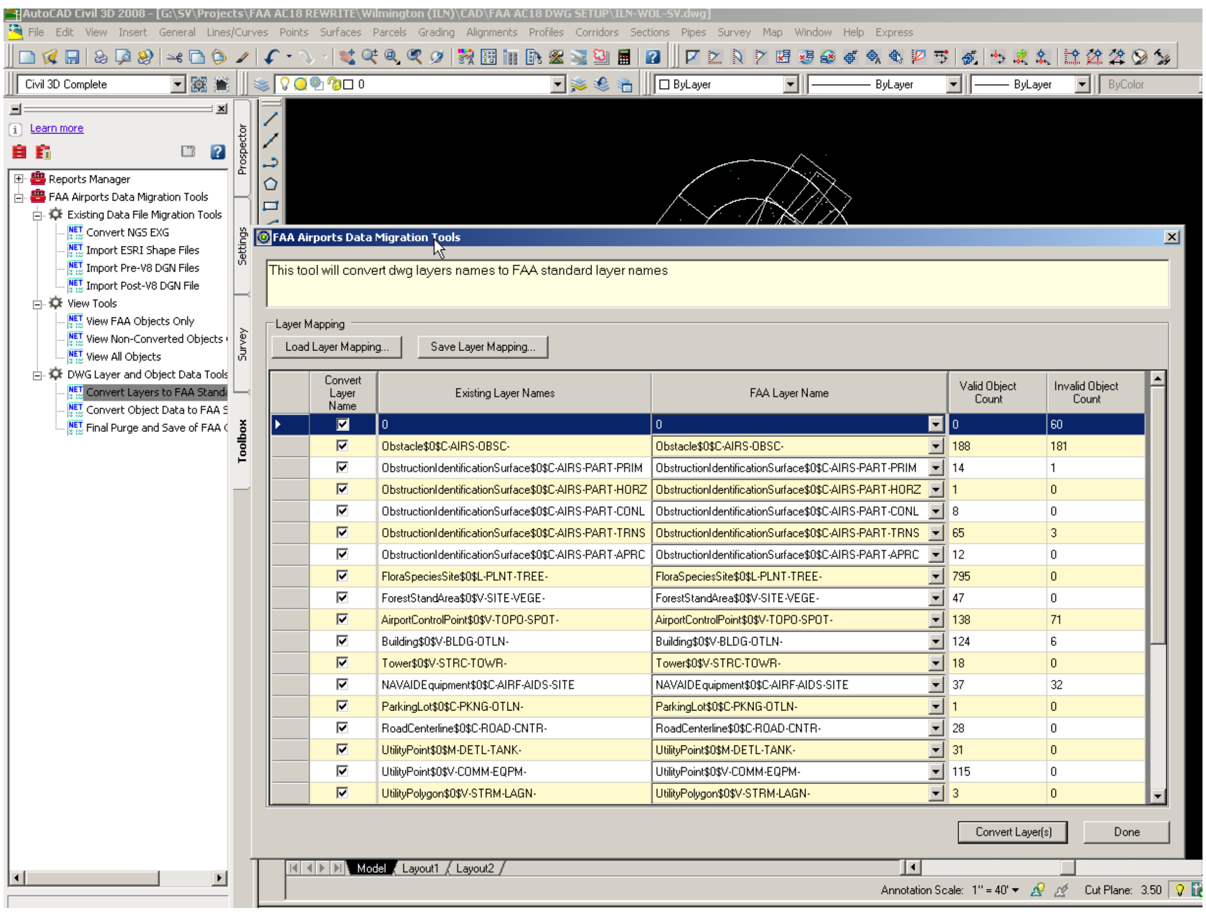

Figure 4-11. Layer mapping dialog box from DMT.

DMT also has a set of View tools that allowing you to quickly see layers with objects that have been converted to FAA standards (“View FAA Objects Only”) and those that still need to be converted (“View Non-Converted Objects Only”). These tools are all run with the right-click “Execute” command.

To complete the conversion, select the “Convert” button. Prior to converting, it is recommended that you save your mapping. The DMT was designed to allow the user to create the translation mapping and save it as a template for re-use in the future, as shown in Figure 4-12. This will also provide supporting evidence for the conversion process that was performed if audited. **NOTE**: *clicking the “Done” button quits the tool but does not perform the conversion.*

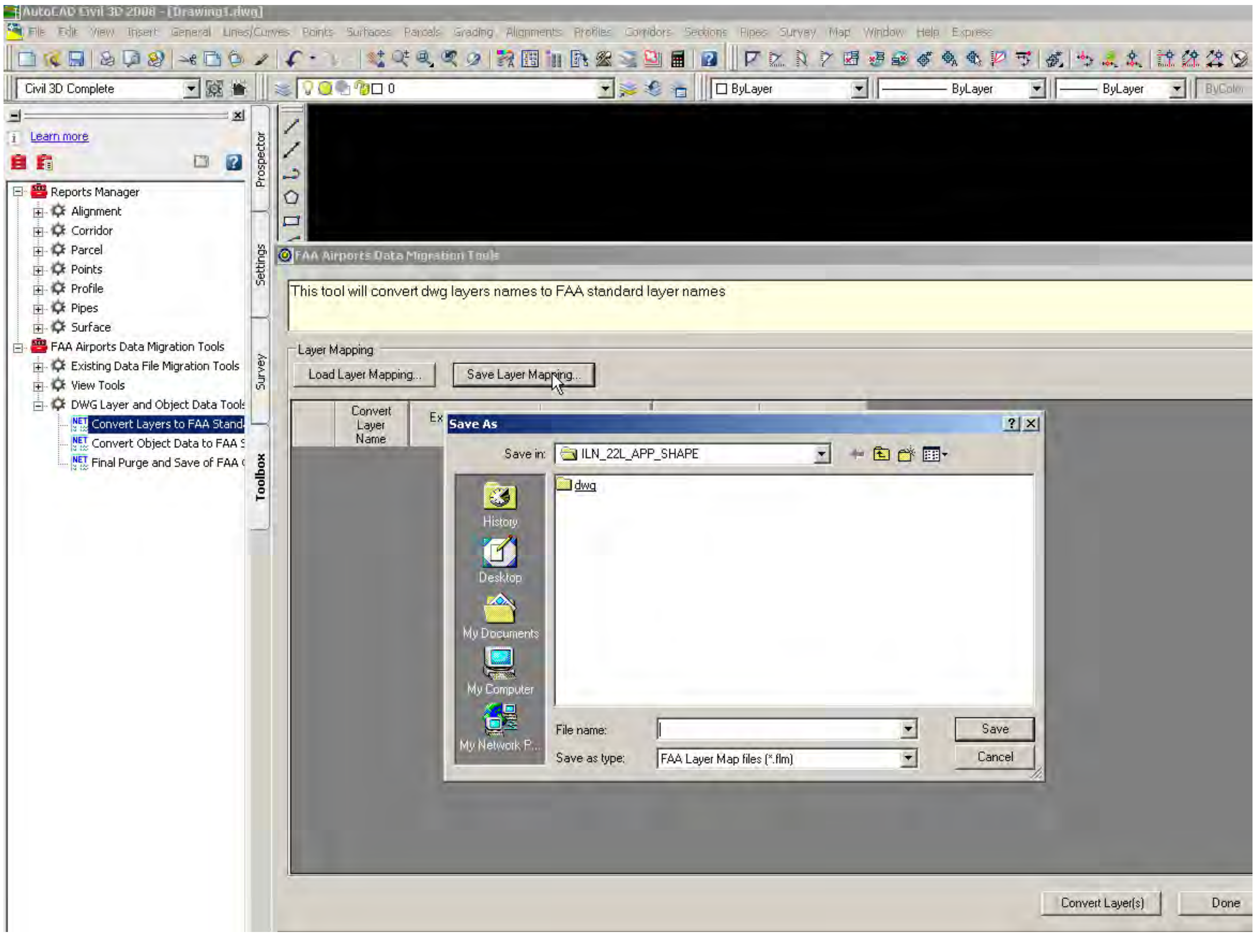

Figure 4-12. Saving the translation mapping template.

4.3.6. Assign Attributes to FAA Compliant Objects

Once the layer conversion is done, the “show properties” box is used for assigning object data. Since each layer has its own attribute requirements (as described in Chapter 5), the DMT automatically assigns an empty FAA compliant object data table to objects when doing the layer conversion. Figure 4-13 shows the object data table information in the bottom half of the show properties box. Using this box, you can fill in the correct attribute data required for each object.

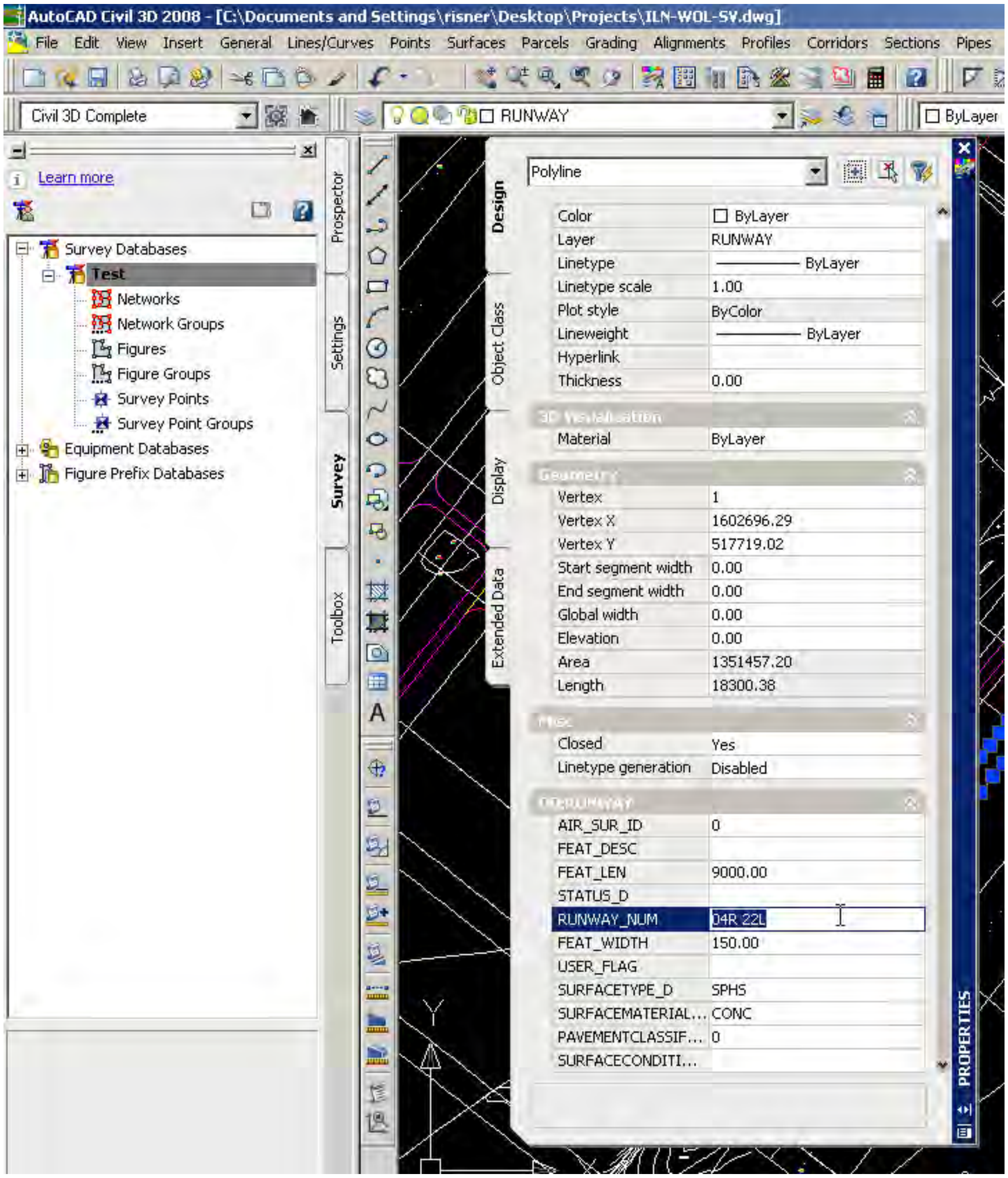

Figure 4-13. Assigning Object Data.

Some tips to keep in mind while assigning attributes:

- ESRI, MicroStation or AutoCAD files that initially had attribute tables attached during conversion are accessible and shown when filling in the attribute fields. In this scenario, it is recommended that you run the “Convert Object Data to FAA Standards” tool to map them to the FAA compliant object data tables (as described below).

- If there are multiple objects in a layer that have the same value for an attribute, try selecting them at the same time and then editing the attribute value in the Properties dialog. This will be more time efficient.

- Refer to the feature tables in Chapter 5 for acceptable values for attributes that have an enumeration datatype.

When you have object data tables attached to your original drawing, the DMT contains a tool “Convert Object Data to FAA Standards” that allows you to map your existing attributes to the required FAA attributes in the FAA compliant object data table. This tool also allows you to create an enumeration mapping from existing values to the FAA compliant enumeration values. **NOTE:** *the layer conversion must be done before the Convert Object Data Tool will process the information*. See Figure 4-14 to see how the Convert Object Data tool works.

Similar to the layer conversion tool, the object data conversion tool allows you to create and save your object data mapping to use again. It is highly recommended that you save your mapping configurations prior to completing the conversion.

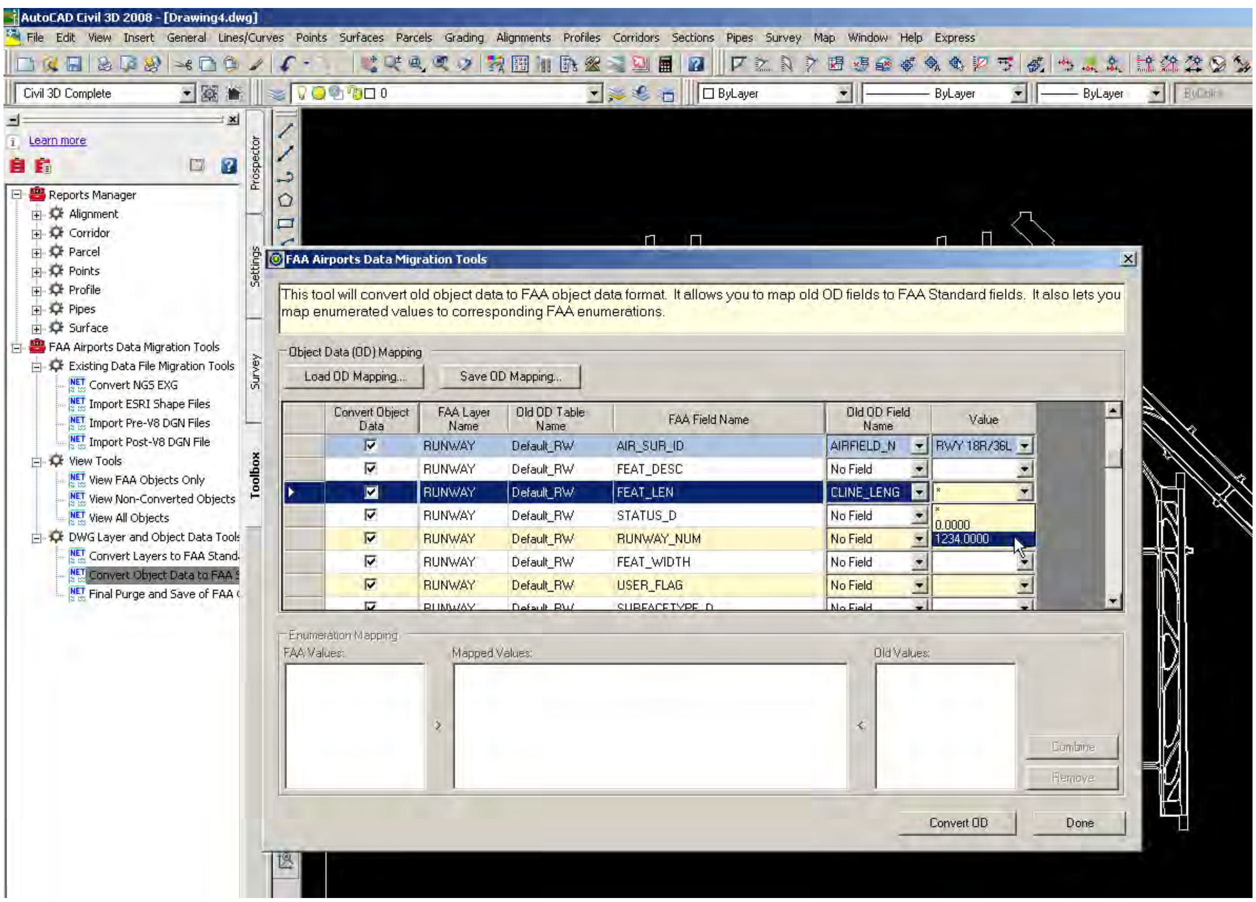

Figure 4-14. Convert Object Data to FAA screen.

4.3.7. Run "Final Purge" Routine on Compliant Database and Save

Once all layers and objects have become FAA compliant, the DMT has a "Final Purge and Save of FAA Compliant Map" command. Right-click on this command and then left-click to execute. A dialog will then come up on the screen asking you to save your drawing in an AutoCAD 2000 format. Before executing this command, be sure that everything is compliant, otherwise any non-compliant layer names and/or objects will be deleted from your drawing. Figure 4-15 shows the steps for the "Final Purge". This resulting .dwg should now be in a compliant format that can be uploaded by the data provider to the FAA Airports GIS website (https://airports-gis.faa.gov).

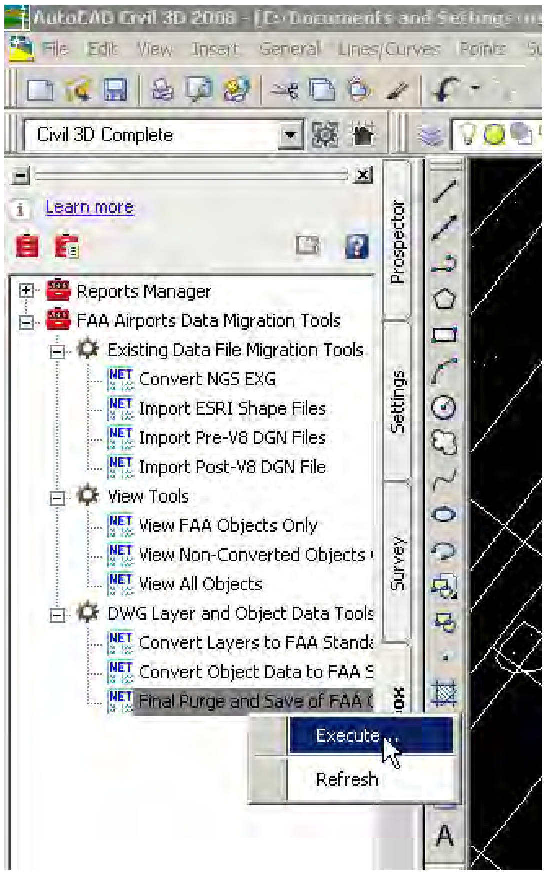

Figure 4-15. Final Purge.

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CHAPTER 5. AIRPORT DATA FEATURES

The following paragraphs list the airport feature descriptions defining the specifications for each feature group and class. Utilize the specifications defined to ensure the data delivered is accurate and meets standards. Each feature is described by geometry type, feature group, information assurance level, requirements, positional accuracy, data capture rule, and the attributes required to provide the data to the FAA.

5.1. FEATURE DOCUMENTATION MINIMUMS

In addition to the general feature documentation outlined in paragraphs 1.5.2 and 1.5.3, certain features require additional or expanded documentation. Where required for a feature, the additional requirements are identified in the Documentation and Submission section of the feature description.

5.2. MULTIPLE INSTANCES OF FEATURES

5.3. FEATURE CLASS DESCRIPTION LEGEND

The following table identifies how each feature description is setup and provides information on what is contained within the section.

5.3.1. Paragraph Number and FeatureClassName

<table>
<tr><td colspan="5">Definition: Definition of feature.</td></tr>
<tr><td>Feature Group</td><td colspan="4">The Feature Group of the element.</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">The proper name of the Feature Class.</td></tr>
<tr><td>Feature Type</td><td colspan="4">The compliant geometry of element.</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>Compliant layer name.</td><td colspan="4">Compliant layer description. [Siting]</td></tr>
<tr><td></td><td>Color</td><td>Line type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>Color code AutoCAD</td><td rowspan="2">Line type required</td><td>Line weight AutoCAD</td><td rowspan="2">Symbol type is user defined</td></tr>
<tr><td>MicroStation Standards</td><td>Color code MicroStation</td><td>Line weight MicroStation</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Security level credential</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="3">AIXM equivalent of feature.</td></tr>
<tr><td>FGDC</td><td colspan="3">FGDC equivalent of feature.</td></tr>
<tr><td>SDSFIE</td><td colspan="3">SDSFIE equivalent of feature.</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">The required documentation for feature class elements. Minimum requirements are defined in paragraphs 1.5.2 and 1.5.3. Additional or expanded documentation requirements are located here.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Description of proper collection limits and requirements for feature class element.</td></tr>
<tr><td>Monumentation</td><td colspan="4">Monumentation requirements.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">Description of specific HSP location.</td><td colspan="2">Description of specific VSP location.</td></tr>
</table>

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	Accuracy requirement	*Accuracy requirement*	*Accuracy requirement*
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Coordinate resolution requirement	*Coordinate resolution requirement*	
Feature Attributes			
Attribute (Datatype)	**Description**		
Name of attribute field	*Description of attribute specifications*		

5.4. Group: AIRFIELD

5.4.1. Aircraft Gate Stand

Definition: Geographic position of painted stand positions on the stand guidance line usually marked by a yellow crossbar according to aircraft type (e.g., for B-747, A-340).				
Feature Group	Airfield			
Feature Class Name	AircraftGateStand			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-APRN-ACPK	Aircraft gate/stand parking area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1 MM	User Defined
MicroStation Standards	5			
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*ApronElement*		Core
	FGDC	*AircraftGateStand*		
	SDSFIE	*airfield_surface_site*		
Documentation and Submission Requirements	No documentation is required for this feature.			

Related Features	

Data Capture Rules: *Collect the aircraft gate stand as individual points with a separate feature for each defined location. If a generic location is defined, ensure the length and wingspan attributes cover all the appropriate aircraft expected to use the location.*

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature.
gateStandType (Enumeration: codeGateStandType)	The type of aircraft gate/stand.
Status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
wingspan (Number)	The quantity representing the maximum wingspan which can be accommodated at the aircraft gate stand.
length (Number)	The overall length of the aircraft gate stand.
width (Number)	The overall width of the aircraft gate stand.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
pavementClassificationNumber	A number which expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load. [Source: AC 150/5335-5]

jetwayAvailability (boolean)	Indicates if a jetway or passenger loading bridge is available for use at the designated location.
towingAvailability (boolean)	Indicates if towing is available at the designated location.
dockingAvailability (boolean)	Indicates if docking light system is available at the designated location.
groundPowerAvailability (boolean)	Indicates the availability of ground power at the designated location.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.2. Aircraft Non Movement Area

Definition: Taxiways and apron (ramp) areas not under the control of air traffic.				
Feature Group	Airfield			
Feature Class Name	AircraftNonMovementArea			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-APRN-ANOM-	Aircraft non-movement area			
C-AIRF-DSRF-NMOV	Aircraft non-movement area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	7	Continuous	1 MM	User Defined
MicroStation Standards	0			
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*NonMovementArea*	Core	
	FGDC	*AircraftNonMovementArea*		
	SDSFIE	*None*		
Documentation and Submission Requirements	None			

Related Features	

Data Capture Rules: *The non-movement area is an area where aircraft are not under the direct control of Air Traffic Control and are responsible for their own separation from aircraft, vehicles and objects. Two parallel yellow lines located side by side delineate the area. One line is dashed and the other is solid. The dashed side is the movement area and the solid side is the non-movement area. Compile this line as a single line drawn mid-way between the solid and dashed lines. If using symbolized line note direction of line in data capture to ensure solid side of line is on Non-movement area.*

Aircraft non-movement area boundary line.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.3. Air Operations Area

Definition: Air Operations Area is where security measures are enforced as specified in the airport security program. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas and any adjacent areas (such as general aviation areas) not separated by adequate security systems, measures, or procedures. [Source: 49 CFR Part 1542, Airport Security]

Feature Group	Airfield
Feature Class Name	AirOperationsArea
Feature Type	Polygon

CADD Standard Requirements

Layer/Level	Description
C-AIRF-AHOA-	Air Operations Area

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	

Information Assurance Level	Unclassified		
Equivalent Standards	**AIXM**	*AirOperationsArea*	Extension
	FGDC	*AirOperationsArea*	
	SDSFIE	*None*	
Documentation and Submission Requirements	None		
Related Features			

Data Capture Rules: *Collect a closed polygon to the greatest horizontal extents as defined by the airport security plan.*

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.4. Airfield Light

Definition: Any lighting located within or near an airport boundary that provides guidance for airborne and ground maneuvering of aircraft [Source: AIM, AC 150/5345 Series of ACs]

Feature Group	Airfield
Feature Class Name	AirfieldLight
Feature Type	Point

CADD Standard Requirements

Layer/Level	Description	Layer/Level	Description
E-LITE-APPR-	Approach lights	V-LITE-RUNW-	Runway lights
E-LITE-DIST-	Distance and arresting gear markers and lights	V-LITE-TAXI-	Taxiway lights
E-LITE-LANE-	Hoverlane, taxilane, and helipad lights	V-LITE-THRS-	Threshold lights
E-LITE-OBST-	Obstruction lights	V-LITE-RUNW-TDZN	Runway Touchdown Zone lights

E-LITE-RUNW-EDGE	Runway edge lights	V-LITE-RUNW-CNTL	Runway Centerline lights
E-LITE-SIGN-	Taxiway guidance signs	E-LITE-RUNW-TDZN	Runway Touchdown Zone lights
E-LITE-TAXI-CNTL	Taxiway centerline lights	E-LITE-RUNW-CNTR	Runway Centerline lights
E-LITE-THRS-	Threshold lights	E-LITE-RUNW-DTGS1	Runway Distance to go lights
V-LITE-APPR-	Approach lights	E-LITE-TAXI-EDGE	Taxiway edge lights
V-LITE-LANE-	Hoverlane, taxilane, and helipad lights	E-LITE-RNWY-GARD	Runway guard lights
V-LITE-OBST-	Obstruction lights		

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	3	Point	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*LightElementExtension*	Extension	
	FGDC	*AirfieldLight*	Extension	
	SDSFIE	*airfield_light_point*		
Documentation and Submission Requirements	None			
Related Features				

Data Capture Rules: *Collect a point in the center of the object at the highest point. Other lights on the airfield such as apron lights, roof mounted lights etc. used for general illumination should be captured using the feature type UtilityPoint and delineated using the attribute codeUtilityType.*

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	Use this attribute to identify the use of the light such as Runway Edge Light, Taxiway Edge Light, Taxiway Centerline Light, etc.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
lightingType (Enumeration: codeLightingConfigurationType)	A description of the lighting system. Lighting system classifications are Approach; Airport; Runway; Taxiway; and Obstruction
color (Enumeration: codeColor)	The color of the airfield light.
luminescence (Integer)	The luminescence of the airfield light specified in candellas (cd).

pilotControlFrequency (Real)	The radio frequency used by pilots to control various airport lighting systems
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.5. ArrestingGear

<table>
<tr><td colspan="5">Definition: Location of the arresting gear cable across the runway [Source: RTCA DO-272]</td></tr>
<tr><td>Feature Group</td><td colspan="4">Airfield</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">ArrestingGear</td></tr>
<tr><td>Feature Type</td><td colspan="4">Line</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-RUNW-ARST-</td><td colspan="4">Runway Arresting Gear Location</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">ArrestingGear</td><td>Core</td></tr>
<tr><td>FGDC</td><td colspan="3">ArrestingGear</td></tr>
<tr><td>SDSFIE</td><td colspan="3">airfield_linear_safety_feature_line</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the arresting gear location as individual line objects, connecting the two fixed points of the arresting gear cable on each side of the runway.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 3 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
</table>

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
airportFacilityType (Enumeration: codeOperationsType)	Type of airfield.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
owner (Enumeration: codeOwner)	Owner of the facility.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.6. Frequency Area

Definition: Area specifying the designated part of the surface movement area where a specific frequency is required by ATC or ground control. If there is only one frequency area for the airport, the polygon must cover the total air operations area. [Source: RTCA DO-272]				
Feature Group	Airfield			
Feature Class Name	FrequencyArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRF-FREQ-	Frequency Area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*Frequency*		Core
	FGDC	*FrequencyArea*		
	SDSFIE	*communications_groundwave_polygon_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Collect a closed polygon to its greatest extents.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 3 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
station (String 30)	Service or Station assigned to primary frequency (e.g., ATC Tower, Ground Control) [Source: RTCA DO-272]
frequency (Real)	Primary frequency used on frequency area (in MHZ). [Source: RTCA DO-272]

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.7. Passenger Loading Bridge

Definition: A bridge for loading/unloading access to airplanes for passengers and crew.				
Feature Group	Airfield			
Feature Class Name	PassengerLoadingBridge			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRF-JETB-	Airport Jetbridge			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*PassengerLoadingBridge*		Core
	FGDC	*PassengerLoadingBridge*		
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Outline of the boarding Bridge with the vertical on the top of the bridge.*

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name, code or identifier used to identify the loading bridge.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
loadingBridgeType (Enumeration: CodeLoadingBridgeType)	Code indicating the type of loading bridge.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.8. Runway Centerline

Definition: Continuous line along the painted centerline of a runway connecting the middle-points of the two outermost thresholds. Centerline is composed of many centerline points (see RunwayControlPoint). It is used to calculate grade and line-of-sight criteria. [Source: AC 150/5300-13]

Feature Group	Airfield			
Feature Class Name	RunwayCenterline			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-CNTR-	Runway Centerline			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	7	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayMarking*		Core
	FGDC	*RunwayCenterline*		
	SDSFIE	*airfield_surface_centerline*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Determine the runway centerline as a continuous line along the centerline of the runway connecting the two runway end points.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 1 ft	± 0.25 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Thousandth of arc second	Nearest tenth of a foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature.
runwayDesignator (String 7)	Designator of the runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L) [Source: AC 150/5340-1]
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
isDerived (Boolean)	Indicates whether the centerline is derived or photo determined.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.9. Runway Helipad Design Surface

Definition: A three-dimensional surface used in runway or heliport/helipad design [Source: AC 150/5300-13]				
Feature Group	Airfield			
Feature Class Name	RunwayHelipadDesignSurface			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRF-DSRF-BLDR-	Building Restriction Line			
C-AIRF-DSRF-RSA-	Runway Safety Area			
C-AIRF-DSRF-RPZ-	Runway Protection Zone			
C-AIRF-DSRF-OFA-	Object Free Area			
C-AIRF-DSRF-OFZ-	Object Free Zone			
C-AIRF-DSRF-POFA-	Precision Object Free Area			
C-AIRF-DSRF-KEYH-	Key holes			
C-RUNW-CLRW-	Runway clearway			
C-HELI-DSRF-	Helipad design surface			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayFATODesignSurface*	Extension	
	FGDC	*RunwayHelipadDesignSurface*	Extension	
	SDSFIE	*airfield_imaginary_surface_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

<table>
<tr><td colspan="5">Data Capture Rules: N/A</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td>Horizontal</td><td colspan="3">Vertical</td></tr>
<tr><td>N/A</td><td colspan="3">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="3">Vertical</td></tr>
<tr><td colspan="2">Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>N/A</td><td colspan="2">N/A</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="3">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="3">Tenth of a foot</td></tr>
</table>

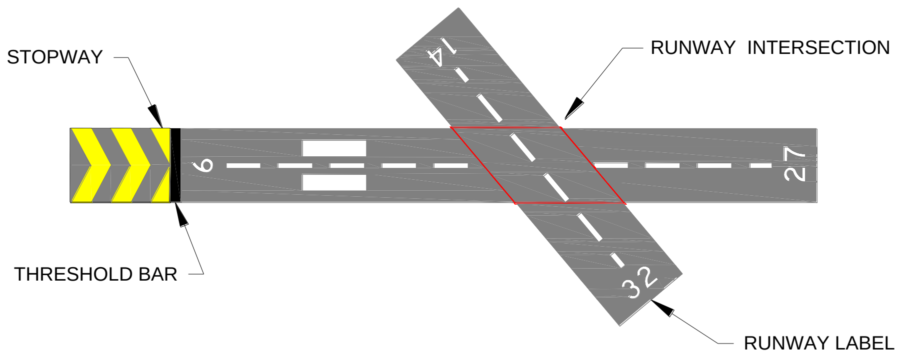
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature. [Source: SDSFIE Feature Table]
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
designSurfaceType (Enumeration: codeDesignSurfaceType)	A description of the design surface
zoneUse (String 50)	A description of the use of the zone.
determination (String 255)	A formal declaration of the runway/helipad/heliport safety area condition with respect to standards and any requirement improvements [Source: FAA Order 5200.8 and AC 150/5390-2]
determinationDate (Date)	The date the safety area determination was approved [Source: FAA Order 5200.8 and AC 150/5390-2B]
zoneInnerWidth (Real)	The width of the narrow end of a trapezoidal shaped DesignSurface feature. This is normally the end that is closest to the landing surface [Source: AC 150/5300-13 and 150/5390-2B]
zoneOuterWidth (Real)	The width of the wide end of a trapezoidal shaped DesignSurface feature. This is normally the end that is furthest from the landing surface.
zoneLength (Real)	The length of a trapezoidal shaped DesignSurface feature.
slope (Real)	The low to high gradient within the airspace.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

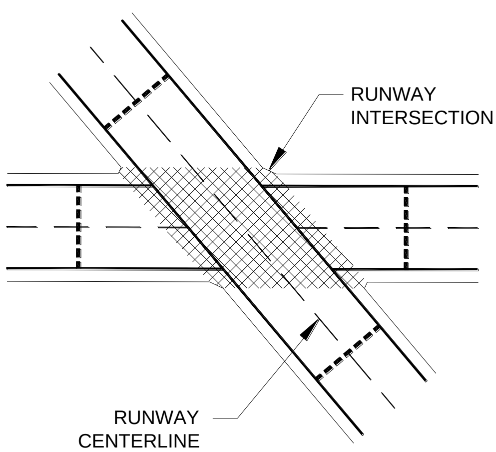
5.4.10. Runway Intersection

Definition: The area of intersection between two or more runways [Source: RTCA DO-272]	
Feature Group	Airfield
Feature Class Name	RunwayIntersection
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
C-RUNW-INTS	Runway intersection

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayElement*		Core
	FGDC	*RunwayElement*		
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *When two or more runways intersect, collect the area of overlap as an individual runway intersection polygon attached to the corresponding runway polygon(s) by way of shared lines. Define the polygon by the outer edge of the white runway edge marking or surface edge if no marking is present.*





Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of a foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayDesignator1 (String 7)	Designator of the 1st intersecting runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L).
runwayDesignator2 (String 7)	Designator of the 2nd intersecting runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L).
runwayDesignator3 (String 7)	Designator of the 3rd intersecting runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L).
pavementClassificationNumber	A number which expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load. [Source: AC 150/5335-5]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.11. Runway LAHSO

<table>
<tr><td colspan="5">Definition: Markings installed on a runway where an aircraft is to stop when the runway is normally used as a taxiway or used for Land and Hold Short Operations (LAHSO) as identified in a letter of agreement with the Air Traffic Control Tower (ATCT). A runway should be considered as normally used for taxiing if there is no parallel taxiway and no ATCT. Otherwise, seek input from ATCT. [Source: Order 7110.118]</td></tr>
<tr><td>Feature Group</td><td colspan="4">Airfield</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">RunwayLAHSO</td></tr>
<tr><td>Feature Type</td><td colspan="4">Line</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-RUNW-LAHS-</td><td colspan="4">Runway land and hold short area</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">RunwayMarking</td><td>Core</td></tr>
<tr><td>FGDC</td><td colspan="3">RunwayLAHSO</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required for this feature.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
</table>

Data Capture Rules: *Collect the LAHSO line as individual line objects delineated by the outer edge of the second painted line farthest from the intersecting runway.*

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of a foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
protectedRunwayDesignator (String 7)	Unique runway identifier for the airport of the runway, if any, being protected by the LAHSO (when the LAHSO precedes a runway intersection). Example 17L/35R.
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking
color (Enumeration: codeColor)	The color of the marking
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.12. Runway Element

Definition: A section of the runway surface. The runway surface can be defined by a set of non-overlapping RunwaySegment polygons for pavement management purposes. RunwayElements may overlap Runway and RunwayIntersection features. Use RunwayElement to model the physical runway pavement in terms of surface, material, strength and condition in greater detail than just as a single piece of pavement. [Source: AC 150/5335-5, AC 150/5320-12, AC 150/5320-17, AC 150/5320-6]	
Feature Group	Airfield

<table>
<tr><td>Feature Class Name</td><td colspan="4">RunwayElement</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-RUNW-SEGM-</td><td colspan="4">Runway Element</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">None</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">RunwayElementExtension</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">RunwayElement</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required for this feature.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect runway elements as individual polygon objects. Where two or more runways intersect, identify, classify and report runway elements in the intersecting area only once.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 3 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Hundredth of arc second</td><td colspan="2">Tenth of a foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
runwayDesignator (String 7)	Specify runway designator.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
pavementClassificationNumber	A number which expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load. [Source: AC 150/5335-5]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.13. Stopway

Definition: An area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff without causing structural damage to the airplane. It is designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

Feature Group	Airfield
Feature Class Name	Stopway
Feature Type	Polygon

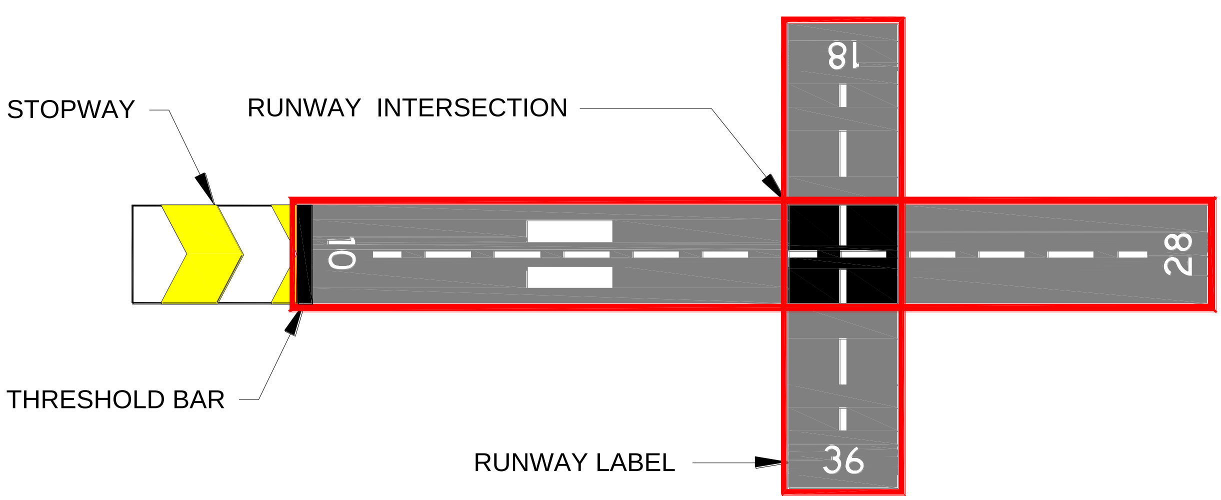
CADD Standard Requirements

Layer/Level	Description
C-RUNW-STWY-	Runway stopway markings

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	

Information Assurance Level	Restricted		
Equivalent Standards	**AIXM**	*Stopway*	Extension
	FGDC	*Stopway*	Extension
	SDSFIE	*None*	
Documentation and Submission Requirements	No documentation is required for this feature.		
Related Features			

Data Capture Rules: *Collect a closed polygon encompassing the entire area designated as stopway and connect it to associated runway by means of a shared line. Stopways do not have shoulders and can be wider than the associated runway. Pay special attention to the guidance on Runway end, Stopway end, and Displaced Threshold Identification for proper location of the Stopway.*



Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of a foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Real)	The length of the designated stopway from the end of the runway
width (Real)	The overall width of the feature
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
runwayEndDesignator (String 3)	Specify runwayEnd designator to identify which runway end the Stopway is on.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial (Enumeration: codeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

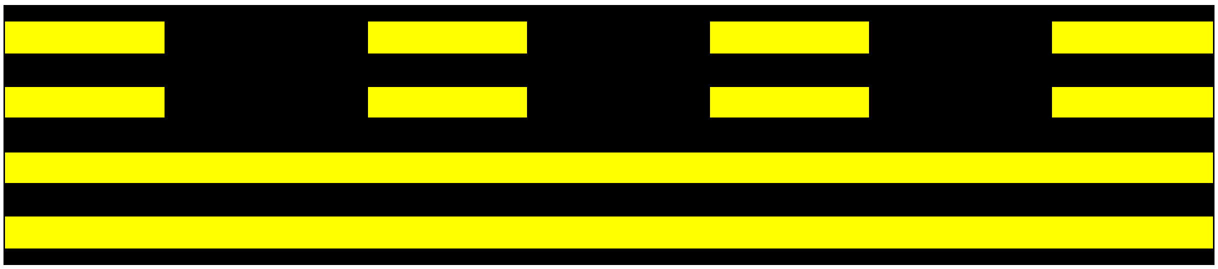
5.4.14. Taxiway Holding Position

Definition: A designated position at which taxiing aircraft and vehicles will stop and hold position, unless otherwise authorized by the airport control tower [Source: RTCA DO-272]				
Feature Group	Airfield			
Feature Class Name	TaxiwayHoldingPosition			
Feature Type	line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TAXI-HOLD--	Holding Lines			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*TaxiHoldingPosition*		Core
	FGDC	*TaxiwayHoldingPosition*		
	SDSFIE	*None*		

Documentation and Submission Requirements	None
Related Features	

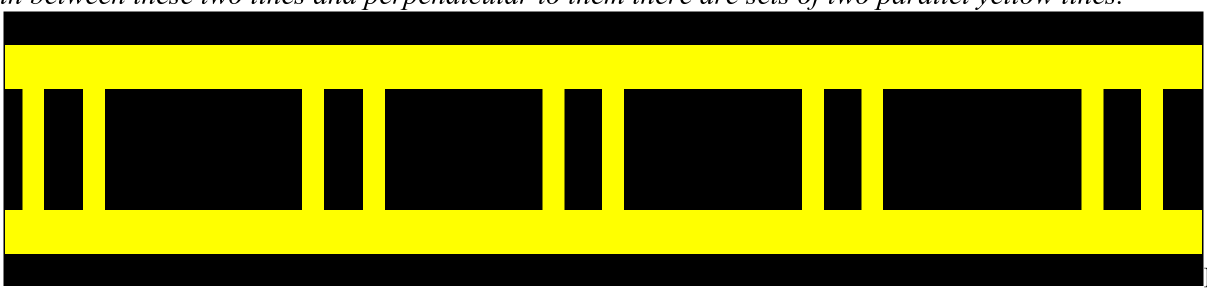
Data Capture Rules: *The painted markings extend across the taxiway and may consist of one of the following:*

- *Runway holding position markings are a set of four yellow lines and three spaces.*
- *The side with the two solid lines is the holding side.*



Runway Holding Position Marking.

ILS/MLS holding positions are marked using a set of two parallel yellow lines spaced four feet apart, in between these two lines and perpendicular to them there are sets of two parallel yellow lines.



ILS/MLS Holding Position Marking.

Collect taxiway holding position line as a line at the outer edge of the painted marking (stop bar) farthest away from the corresponding runway.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (VARCHAR2(255))	A description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayDesignator (String 7)	The designator for the approaching runway.
taxiwayDesignator (String 4)	The designator for the taxiway.
lowVisibilityCategroy (Enumeration: codeLowVisibilityCategory)	Code describing the Low visibility operation category of the TaxiwayHoldingPosition.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.15. Airport Sign

Definition: Signs at an airport other than surface painted signs. [Source: AC 150/5340-18]				
Feature Group	Airfield			
Feature Class Name	AirportSign			
Feature Type	Point			
CADD Standard Requirements				
Layer/ Level	**Description**			
A-ELEV-SIGN-	Signage			
A-FLOR-SIGN-	Signage			
C-PVMT-SIGN-	Other signs			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	1	Continuous		User Defined
MicroStation Standards	3			
Layer/ Level	**Description**			
C-NGAS-SIGN-	Surface markers/signs			
V-LITE-DIST-	Distance and arresting gear markers			
V-STRM-SIGN-	Surface markers/signs			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous		User Defined
MicroStation Standards	2			
Layer/ Level	**Description**			
C-SSWR-SIGN-	Surface markers/signs			
C-APRN-SIGN-	Airfield signs on the apron			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	7	Continuous		User Defined
MicroStation Standards	0			
Layer/ Level	**Description**			
C-STRM-SIGN-	Surface markers/signs			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous		User Defined
MicroStation Standards	7			
Layer/ Level	**Description**			
V-LITE-SIGN-	Taxiway guidance signs			
C-TAXI-SIGN-	Airfield signs on the taxiway such as taxiway designator, hold short and directional signs			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous		User Defined
MicroStation Standards	1			
Layer/ Level	**Description**			
E-SPCL-TRAF-	Traffic signal system			
V-NGAS-SIGN-	Surface markers/signs			
V-SPCL-TRAF-	Traffic signal system			

V-SSWR-SIGN-	Surface markers/signs			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1	User Defined
MicroStation Standards	4		3	

Layer/ Level	**Description**			
C-RUNW-SIGN-	Airfield signs on the runway such as distance remaining signs			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	8	Continuous		User Defined
MicroStation Standards	9			
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*AirportSign*		Extension
	FGDC	*AirportSign*		Extension
	SDSFIE	*general_improvement_feature_point*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Collect point at the highest point on the center of the sign structure. When completing the feature attribution or signs containing both location and direction information. Provide the data for the sign with the location information. If necessary or desired to provide the directional information also, provide as a separate feature.*

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	Center of sign structure	Top of sign structure at center	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of foot	

Feature Attributes

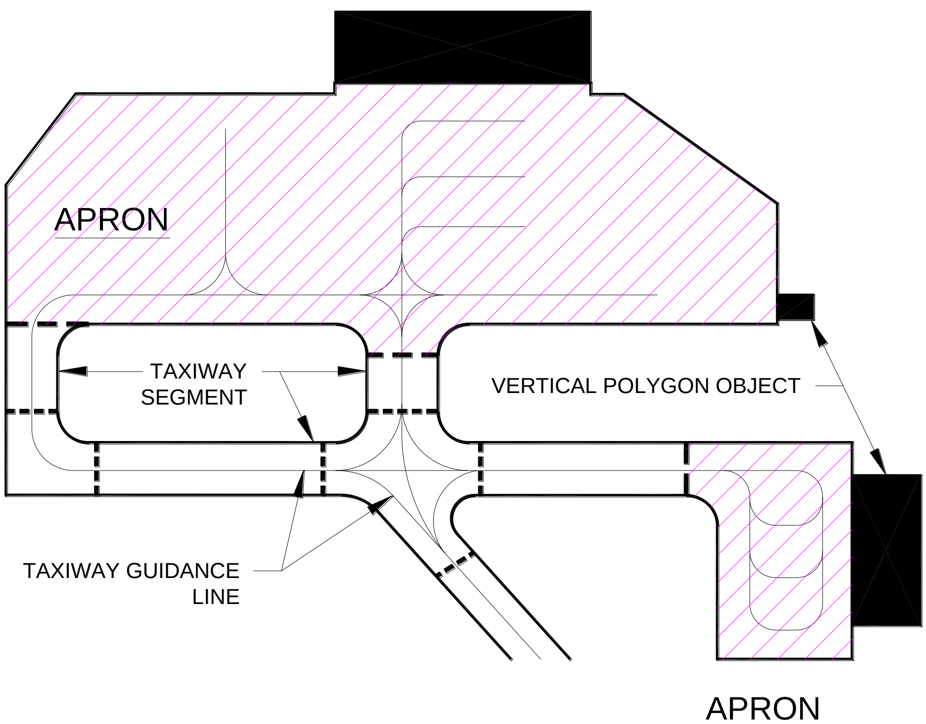
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature.
description (VARCHAR2(255))	A description of the improvement feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
signType (Enumeration: codeSignTypeCode)	The type of sign.
height (Real)	The overall height of the feature.
message (String 254)	The text message that appears on the sign.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.16. Apron

Definition: A defined area on an airport or heliport, paved or unpaved, intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance.

Feature Group	Airfield			
Feature Class Name	Apron			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-APRN-OTLN	Apron outline			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*ApronElementExtension*		Extension
	FGDC	*Apron*		Extension
	SDSFIE	*airfield_surface_type*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Collect a closed polygon to its greatest horizontal extents, encompassing apron areas.*



Illustrates the collection of the airport apron.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	The name of the feature.
description (String 255)	Description of the feature
apronType (Enumeration: CodeApronType)	A classification of the typical use for the apron
numberOfTiedowns (Integer)	The approximate number of tiedowns in the surface.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial (Enumeration: codeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
pavementClassificationNumber	A number that expresses the relative load-carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
fuel (Enumeration: codeFuel)	Code indicating the types of fuel available at the apron or delverable to the apron.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.17. Deicing Area

Definition: An aircraft deicing facility is a facility where: (1) frost, ice, or snow is removed (deicing) from the aircraft in order to provide clean surfaces and/or (2) clean surfaces of the aircraft receive protection (anti-icing) against the formation of frost or ice and accumulation of snow or slush for a limited period of time [Source: AC 150/5300-13].				
Feature Group	Airfield			
Feature Class Name	DeicingArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-APRN-DEIC	Aircraft Deicing Area			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	7	Continuous	1	User Defined
MicroStation Standards	0		1	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*DeicingArea*		Core
	FGDC	*DeicingArea*		
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			

Related Features			
Data Capture Rules: *Deicing areas may consist of a single or multiple polygons, capture the outer edges of area(s). Deicing areas can be remote sites from the terminal buildings or in the terminal area.*			
Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of foot	

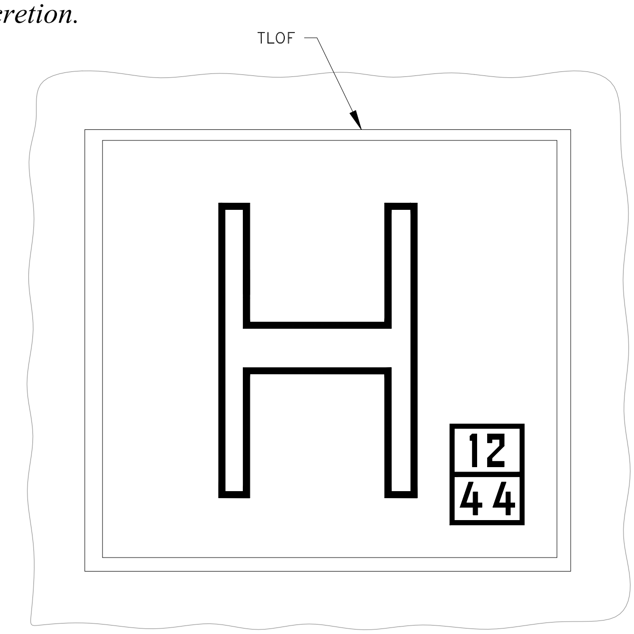
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	The name of the feature.
description (VARCHAR2(255))	A brief description of the area and any special characteristics.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.18. Touch Down Lift Off

Definition: A load-bearing, generally paved area, normally centered in the Final Approach and Takeoff Area (FATO), on which a helicopter lands or takes off. The Touchdown and Lift-off Area (TLOF) is frequently called a helipad or helideck.				
Feature Group	Airfield			
Feature Class Name	TouchDownLiftOff			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-HELI-TLOF	Helipad take off and landing area			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1 MM	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*TouchDownLiftOff*	Core	
	FGDC	*TouchDownLiftOff*		
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			

Related Features	

Data Capture Rules: *Collect a closed polygon in the center of the white paint stripes along the outer edges of the TLOF as a solid line and labeled "HELIPAD." Collect the outer edges of the TLOF pavement when there are no outer paint stripes. Collect all TLOFs located on the aircraft movement areas at compiler's discretion.*



Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 0.25 ft	± 0.20 ft
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes

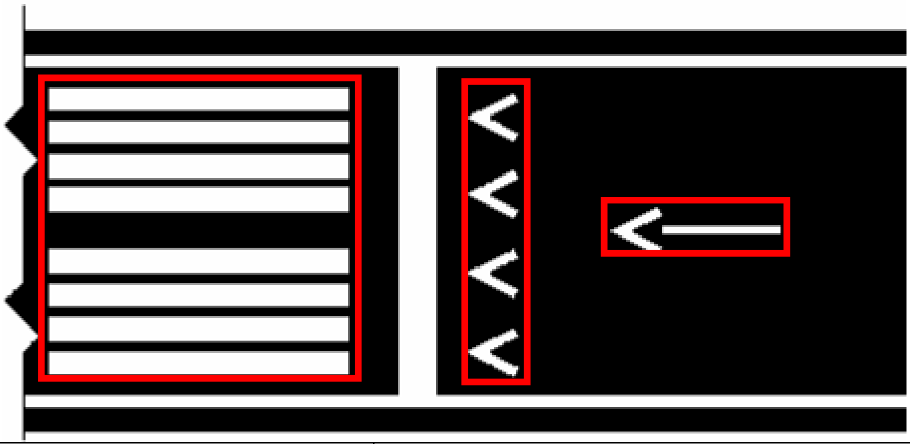
Attribute (Datatype)	Description
name (VARCHAR2(50))	The name of the feature.
description (VARCHAR2(255))	A brief description of the area and any special characteristics.
length (Real)	The overall length of the TLOF.
width (Real)	The overall width of the TLOF.
userFlag	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]

designHelicopter (String20)	A generic helicopter that reflects the maximum weight, maximum contact load/minimum contact area, overall length, rotor diameter, etc. of all helicopters expected to operate at the heliport. [Source: AC 150/5390-2]
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
gradient (real)	The gradient of the TLOF surface designed to provide positive drainage.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.19. Marking Area

Definition: Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. An element of marking whose geometry is a polygon. [Source: AC 150/5340-1 and RTCA DO-272]				
Feature Group	Airfield			
Feature Class Name	MarkingArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-HELI-IDEN-	Heliport numbers and letters			
C-RUNW-DIST-	Fixed distance markings			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1	User Defined
MicroStation Standards	1		7	
Layer/Level	**Description**			
C-HELI-TDZM-	Touchdown zone markers			
C-RUNW-NUMB-	Runway numbers and letters			
C-RUNW-TDZM-	Touchdown zone markers			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**			
	FGDC			
	SDSFIE	*airfield_surface_marking_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			

Related Features			
Data Capture Rules: *Collect the runway markings as closed polygons to encompass and delineate the individual markings.*			



Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	NA	NA	
	NA	NA	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 2 ft	± 3 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	Name of the feature.
description (VARCHAR2(255))	A description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking
color (Enumeration: codeColor)	The color of the marking
userflag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.20. Marking Line

Definition: Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. An element of marking whose geometry is a line. [Source: AC 150/5340-1 and RTCA DO-272]	
Feature Group	Airfield
Feature Class Name	MarkingLine
Feature Type	3D Line

CADD Standard Requirements			
Layer/Level	**Description**	**Layer/Level**	**Description**
C-APRN-CNTR-	Centerlines	C-PADS-OTLN-	Pad - outlines
C-APRN-HOLD-	Holding position markings	C-RUNW-CNTR-MARK	Centerline markings
C-APRN-MRKG-	Apron markings	C-RUNW-SHLD-	Shoulder markings
C-APRN-SECU-	Security zone markings	C-RUNW-SHLD-	Runway Shoulder
C-APRN-SHLD-	Shoulder stripes	C-RUNW-SIDE-	Side stripes
C-HELI-BLST-	Helipad blast pad and stopway markings	C-TAXI-CNTR-MARK	Centerline markings
C-HELI-CNTR-MARK	Centerline markings	C-TAXI-EDGE-	Edge markings
C-HELI-DIST-	Fixed distance markings	C-TAXI-SHLD-	Shoulder transverse stripes
C-HELI-SIDE-	Side stripes	V-PVMT-MRKG-	Pavement markings
C-OVRN-CNTR-	Centerlines	C-PVMT-MRKG-WHIT	Roadway markings (white)
C-OVRN-SHLD-	Shoulder markings	C-PVMT-MRKG-YELO	Roadway markings (yellow)
C-PADS-CNTR-	Centerlines		

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*MarkingElement*		Core
	FGDC	*Marking*		
	SDSFIE	*airfield_surface_marking_line*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Collect a line through the middle of the paint line.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 2 ft		± 3 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest tenth of foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name of the feature.
description (VARCHAR2(255))	A description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking

color (Enumeration: codeColor)	The color of the marking
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.21. Movement Area

<table>
<tr><td colspan="5">Definition: Runways, taxiways, and other areas of an airport used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas [Source: 14 CFR Part 139]</td></tr>
<tr><td>Feature Group</td><td colspan="4">Airfield</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">MovementArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-SECR-SECA</td><td colspan="4">Airfield security area</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="3"></td></tr>
<tr><td>FGDC</td><td colspan="3"></td></tr>
<tr><td>SDSFIE</td><td colspan="3">airfield_surface_marking_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required for this feature.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect each portion of the movement area as a closed polygon to its greatest horizontal extents. Multiple non-overlapping polygons may be used to adequately model the areas.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="3">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">NA</td><td colspan="2">NA</td></tr>
<tr><td colspan="2">NA</td><td colspan="2">NA</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 3 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Hundredth of arc second</td><td colspan="2">Nearest tenth of foot</td></tr>
</table>

Feature Attributes

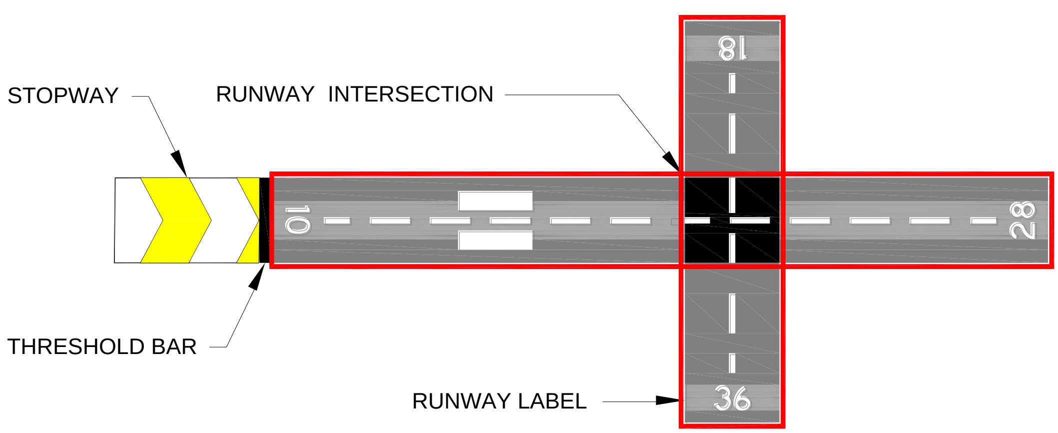
Attribute (Datatype)	Description
name (VARCHAR2(50))	Name of the feature
description (VARCHAR2(255))	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.22. Runway

Definition: A defined rectangular area on an airport prepared for the landing and takeoff of aircraft. [AC 150/5300-13]				
Feature Group	Airfield			
Feature Class Name	Runway			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-EDGE-	Airfield runway edges			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		3	
Information Assurance Level	Resticted			
Equivalent Standards	**AIXM**	*Runway*		Core
	FGDC	*Runway*		
	SDSFIE	*airfield_surface_site*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *In addition to the requirements for runway end collection, capture the runway as a closed polygon limited by the outer edge of the runway edge paint (shoulder side), excluding runway shoulders or stopways. If there are no painted runway edge markings, capture and report the runway as a polygon at its narrowest dimension based on the existing pavement.*



The red lines encompassing the runway illustrate the collection of the runways at an airport.

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 3 ft	± 5 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest tenth of foot	

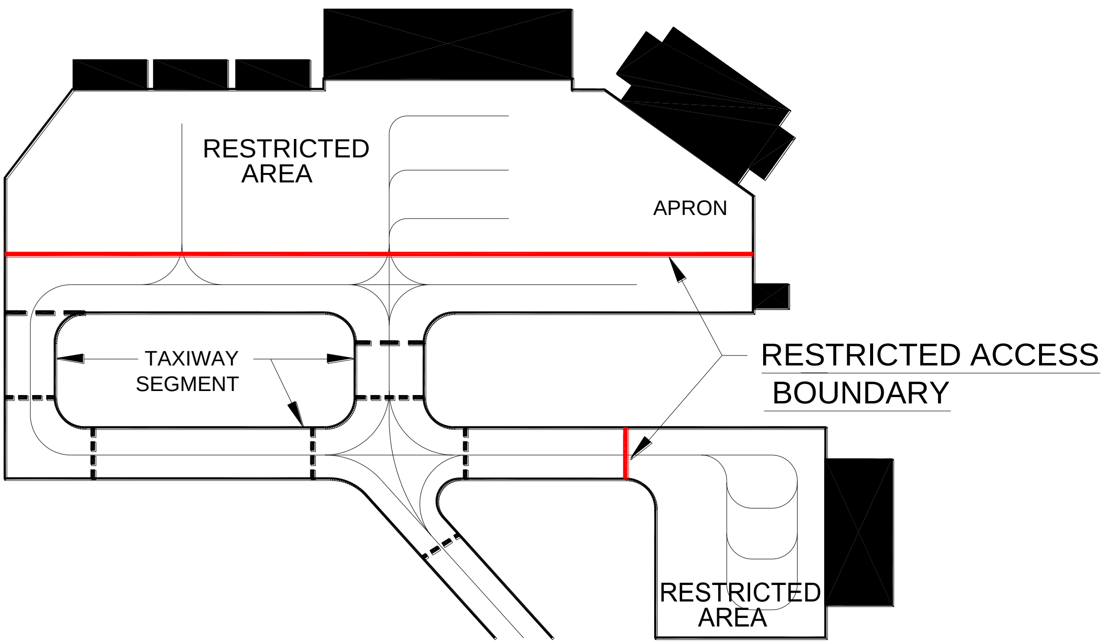
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayDesignator (String 7)	Designator of the runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L) [Source: AC 150/5340-1]
width (Real)	A perpendicular line to the surface centerline, extending to the edge of the runway pavement on both sides of the runway, through a runway end-point. If the runway width is less than 100 feet, the width is rounded up to the nearest 5 feet. If the runway width is more than 100 feet, the width is rounded to the nearest 10 feet. If the rounded width is different from the published width, NGS should be contacted for further advice. [Source: NGS]
length (Real)	The straight line distance between runway end points. This line does not account for surface undulations between points. Official runway lengths are normally computed from runway end coordinates and elevations.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
pavementClassificationNumber	A number that expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.23. Restricted Access Boundary

Definition: A restricted area boundary identifies areas strictly reserved for use by authorized personnel only.	
Feature Group	Airfield
Feature Class Name	RestrictedAccessBoundary
Feature Type	Line

CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRF-SECR-RSTR	Restricted access boundary			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*SecurityElement*		Extension
	FGDC	*RestrictedAccessBoundary*		Extension
	SDSFIE	*Military_restricted_access_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Collect a line through the center of each marking to its greatest extents. Restricted access paint lines are either dashed white lines or alternating white/red/white solid lines.*



Illustrates the collection of a restricted area boundary.

Monumentation	No monumentation required			
Survey Point Location	**Horizontal**		**Vertical**	
	NA		NA	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 3 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest tenth of foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	A common name for the restricted area.
description (VARCHAR2(255))	A description of the restricted area.

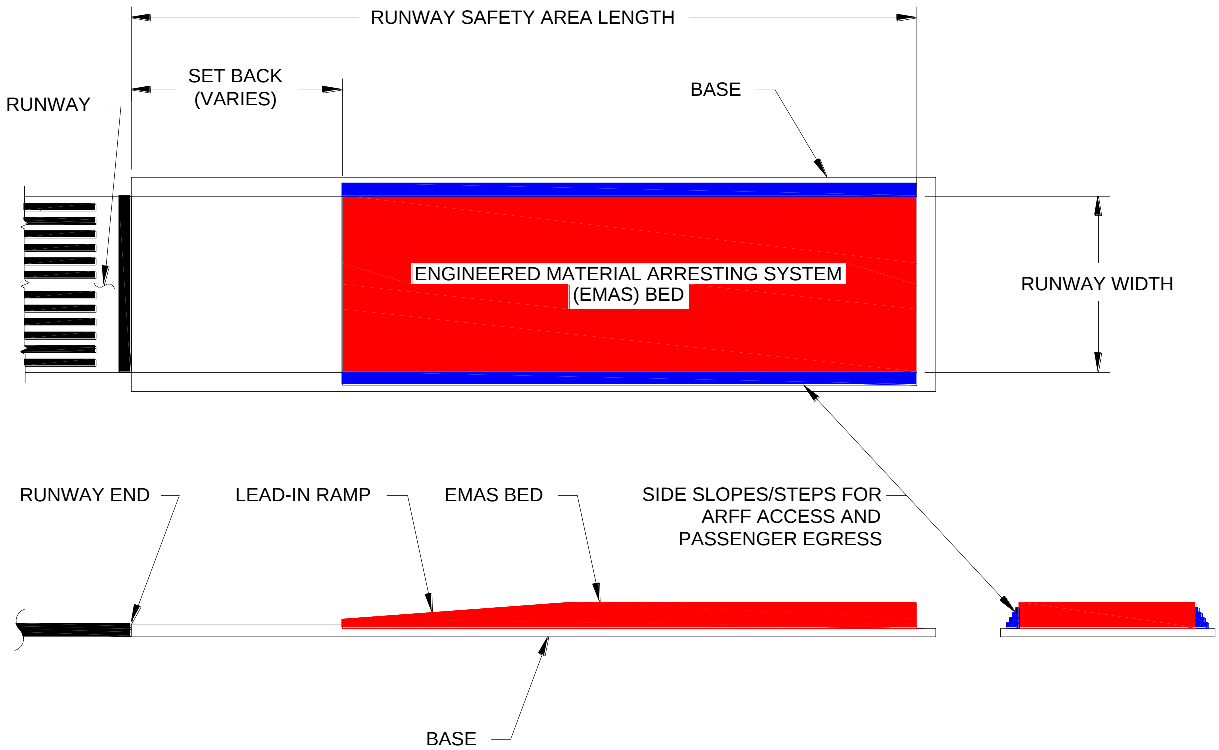
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.24. Runway Arresting Area

Definition: Any FAA-approved high energy absorbing material of a specific strength that will reliably and predictably bring an aircraft to a stop without imposing loads that exceed the aircraft's design limits, cause major structural damage, or impose excessive force on its occupants. [Source: AC 150/5220-22].				
Feature Group	Airfield			
Feature Class Name	RunwayArrestingArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-ARSTC-RUNW-ARST-AIDS-CRIT				
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*ArrestingGear*		Core
	FGDC	*RunwayArrestingArea*		
	SDSFIE	*airfield_linear_safety_feature_line*		
Documentation and Submission Requirements	No documentation is required for this feature.			

Related Features	

Data Capture Rules: *Collect a closed polygon limited by the chevron markings identifying the area.*



Illustrates the collection of the Runway Arresting Area.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoid**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

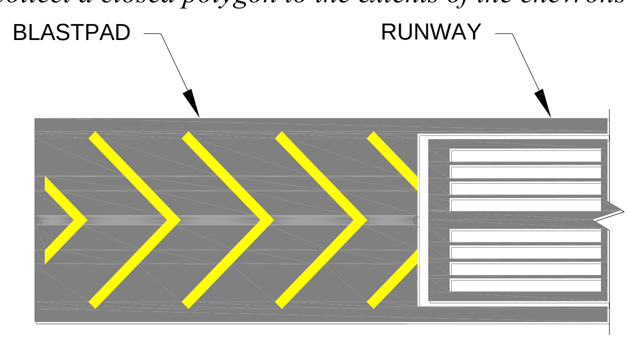
Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	A common name for the arresting area.
description (VARCHAR2(255))	A description of the arresting area.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Real)	The overall length of the feature.
width (Real)	The overall width of the feature.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceMaterial (Enumeration: codeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]

surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.
setback	The distance the EMAS begins beyond the end of the runway.

5.4.25. Runway Blast Pad

Definition: A specially prepared surface placed adjacent to the end of a runway to eliminate the erosive effect of the high wind forces produced by airplanes at the beginning of their takeoff rolls.				
Feature Group	Airfield			
Feature Class Name	RunwayBlastPad			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-BLST	Runway blast pad			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayBlastPad*		Core
	FGDC	*RunwayBlastPad*		
	SDSFIE	*airfield_linear_safety_feature_line*		
Documentation and Submission Requirements	No additional documentation is required.			
Related Features				
Data Capture Rules: *Collect a closed polygon to the extents of the chevrons marking the area.*				



Illustrates the collection of a blast pad.

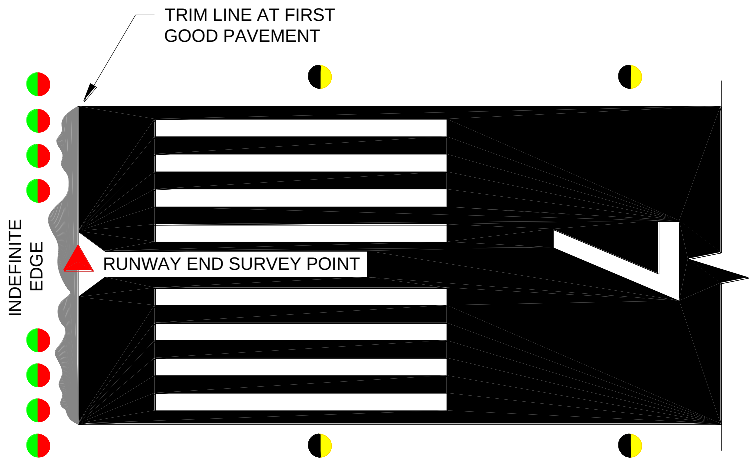
Monumentation	No monumentation is required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 2 ft	± 3 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

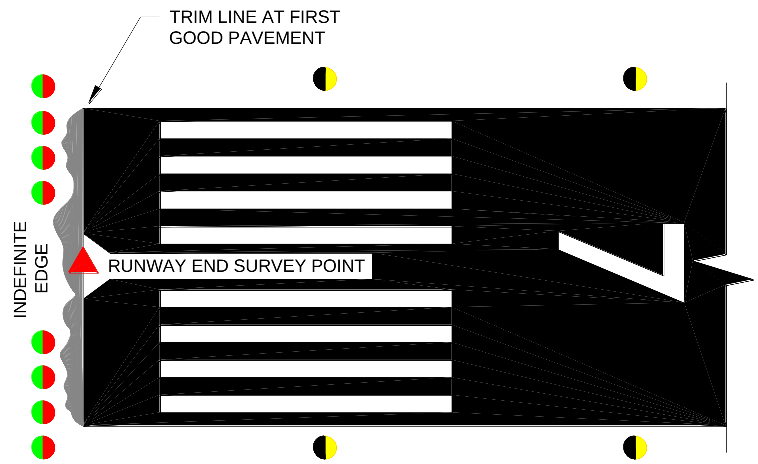
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name of the feature.
description (VARCHAR2(255))	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Integer)	The length of clearway as measured. Compare the measure value to the value reported in the government flight information publications.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
pavementClassificationNumber	A number that expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
runwayEndDesignator (String 3)	Specify runwayEnd designator to identify which runway end the Blast Pad is on.
surfaceCondition (Enumeration: codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
surfaceMaterial (Enumeration: codeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.26. Runway End

Definition: The end of the runway surface suitable for landing or takeoff runs of aircraft. Runway Ends describe the approach and departure procedure characteristics of a runway threshold. The Runway End is the same as the runway threshold when the threshold is not displaced.				
Feature Group	Airfield			
Feature Class Name	RunwayEnd			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-ENDP-	Runway endpoint			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayDirectionExtension*	Extension	
	FGDC	*RunwayEnd*		
	SDSFIE	*Airfield_surface_site*		
Documentation and Submission Requirements	*In addition to the requirements of paragraphs 1.5.2 and 1.5.3, document the selected location using four digital photographs:*			

	 **Photograph Type #1 (Eye Level).** Photo taken from above the mark, showing an area around the mark about 1 meter in diameter.	 **Photograph Type #2 (Approach).** Photo showing tripod over the mark in foreground and approach in the background.
	 **Photograph Type #3 (Across Runway).** Photo taken from the side of the runway looking across the end of the runway, with a tripod or arrow indicating the end point; include any features used to identify the runway end.	 **Photograph Type #4 (Close-in).** Close-up photo depicting nail, washer and markings.
Related Features		
Data Capture Rule: *Establish the runway end on the runway centerline at the physical end, or specified location based on other supporting features. The area between the runway end and the displaced threshold should be marked with white arrows.*		
Monumentation	When the ends of the runway surface have been determined, mark the positions using a nail and washer with the setting company's name and year inscribed, chisel square, or paint if possible with a distinctive inscription to ensure future identification.	
Survey Point Location	**Concrete Runway and No Aligned Taxiway**	
	Survey Point Locator is the limit of construction or the trim line at the first good pavement, unless these lines are located on the approach side of runway end lights. Supporting features include: • Runway end lights near runway end • Threshold bar near runway end (usually present only if non-runway pavement is aligned with runway) • Threshold lights near runway end and usually in same fixture as runway end lights (if threshold not displaced)	

	• Runway number near runway end (if threshold not displaced) • Runway edge lights (white or amber) extending to runway end Comments: The limit of construction usually defines the survey point for the ends of concrete runways. A surface discontinuity defines the limit of construction. Do not confuse the runway end with the end of a blast pad, stopway, or other non-runway surface. Refer to the figure below for an example of this scenario.  
	Paved/Non-concrete Runway and No Aligned Taxiway
	Survey Point Locator is the limit of construction or the trim line at first good pavement, unless these lines are located on approach side of runway end lights. Supporting features include: • Runway end lights near runway end • Threshold bar near runway end (usually present only if non-runway pavement is aligned with runway) • Threshold lights near runway end and usually in same fixture as runway end lights (if threshold not displaced) • Runway number near runway end (if threshold not displaced) • Runway edge lights (white or amber) extending to runway end

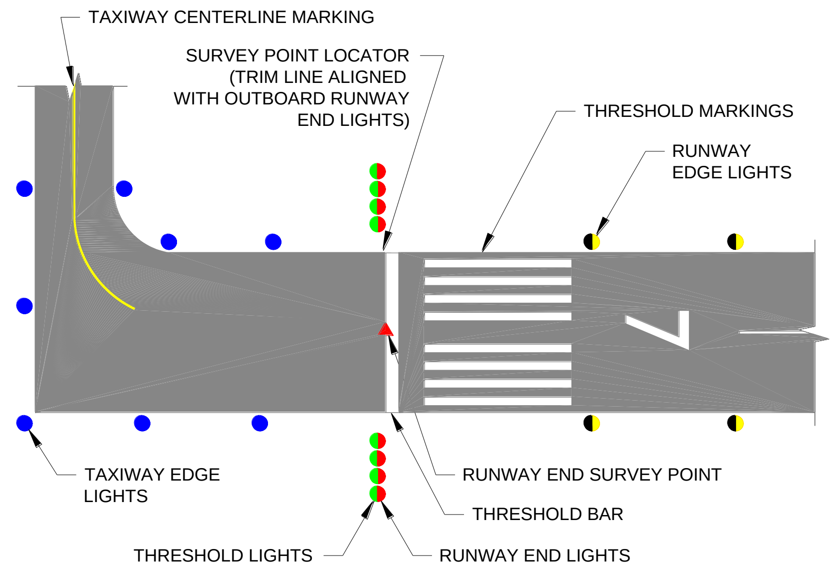
	Comments: While the limit of construction is the first choice, a trim line at first good pavement is usually required to define the ends of paved, non-concrete runways since the ends of these surfaces are almost always crumbling and/or not orthogonal to the runway centerline to some degree. Refer to the figures above and below as examples.  
	Unpaved Runway and No Aligned Taxiway
	Survey Point Locator is the trim line 10 feet on touchdown side of inboard runway end lights, a trim line connecting outboard runway end lights, a trim line 10 feet on touchdown side of inboard runway end day markers, or a trim line connecting outboard runway end day markers. Supporting features are threshold lights near threshold (if runway lighted and threshold not displaced) Comments: If no lights or markers exist, the existence of a runway is in question since by FAA definition, a runway is a defined area. Not all areas used for takeoff/landings are runways.

	  
	Paved Runway and Aligned Taxiway
	Survey Point Locator is the approach side of threshold bar unless this line is on the approach side of runway end lights and threshold is not displaced. Additionally, use the trim line connecting outboard runway end lights or the runway side of yellow demarcation bar provided this line is not located on approach side of runway end lights. The yellow demarcation bar usually occurs only if a displaced threshold and an aligned taxiway or stopway both exist.) Supporting features include: • Threshold lights near runway end and usually in same fixture as

runway end lights (if threshold not displaced)

- Runway number near runway end (if threshold not displaced)
- Yellow aligned taxiway painting on approach side of threshold bar
- Taxiway edge lights between runway end and taxiway end
- Absence of runway side stripes between runway end and end of pavement on Precision Instrument Runways

Comments: Use caution, especially on smaller, poorly marked airports, not to confuse a displaced threshold and a runway end for a runway with an aligned taxiway.



NOTES:

1. THIS GRAPHIC IS NOT TO SCALE. FEATURES ARE SYMBOLIZED AND INTENDED ILLUSTRATION PURPOSES ONLY.

2. RUNWAY/STOPWAY SURVEYS SHOULD BE DISCUSSED WITH APPROPRIATE AIRPORT AUTHORITIES.

3. SURVEY POINT LOCATOR:
   - TRIM LINE ALIGNED WITH OUTBOARD RUNWAY END LIGHTS IF NO THRESHOLD BAR OR IF APPROACH SIDE OF THRESHOLD BAR IS IN APPROACH SIDE OF RUNWAY END LIGHTS.

4. SUPPORTING FEATURES
   - RUNWAY END LIGHTS NEAR THRESHOLD BAR
   - THRESHOLD MARKINGS NEAR RUNWAY END LIGHTS
   - RUNWAY NUMBER NEAR RUNWAY END LIGHTS
   - TAXIWAY EDGE LIGHTS BETWEEN RUNWAY END AND END OF PAVEMENT

5. COMMENTS:
   - NONSTANDARD MARKINGS FOR RUNWAY WITH ALIGNED TAXIWAY.
   - THRESHOLD BAR EXTENDS TO APPROACH SIDE OF RUNWAY END LIGHTS
   - RUNWAY CANNOT EXTEND TO APPROACH SIDE OF RUNWAY END LIGHTS

<table>
<tr><td rowspan="2"></td><td colspan="3">Unpaved Runway and Aligned Taxiway</td></tr>
<tr><td colspan="3">Survey Point Locator is the trim line connecting outboard runway end lights or the trim line connecting outboard runway end day markers. Supporting features include threshold lights near threshold (if threshold not displaced) or runway/taxiway edge lights (if runway is lighted).

Comments: Unpaved runways with aligned taxiways are unusual. If this situation is suspected, verify any area immediately adjacent to, and aligned with, the runway is used for taxi onto the runway and is marked appropriately for this purpose.</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>± 1.00 ft</td><td>± 0.25 ft</td><td>± 0.20 ft</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="2">Nearest tenth of a foot</td></tr>
</table>

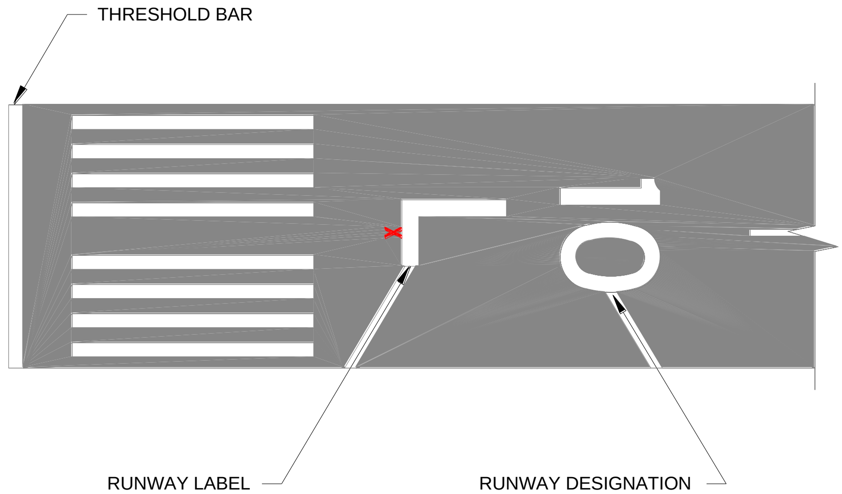
Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2(50))	Name of the feature.
description (VARCHAR2(255))	Description of the feature
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
approachCategory (Enumeration: codeApproachCategory)	A grouping of aircraft based on 1.3 times their stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions [Source: AC 150/5300-13]
approachGuidance (Enumeration: codeApproachGuidance)	The type of approach guidance in use for the runway end.
accelerateStopDistanceAvail (Integer)	The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff [Source: AC 150/5300-13]
magneticBearing (Real)	Magnetic runway bearing corresponding to threshold location valid at the day of data generation [Source: RTCA DO-272]
trueBearing (Real)	True bearing corresponding to the landing direction [Source: ICAO Annex 14]
designGroup (Enumeration: codeDesignGroup)	A grouping of airplanes based on wingspan and or tailheight, whichever is greatest. [Source: AC 150/5300-13]
displacedDistance (Integer)	The distance from the runway end to the landing threshold. When the thresholdType is normal, displacedDist = 0.
landingDistanceAvailable (Integer)	The runway length declared available and suitable for a landing airplane.
runwayEndDesignator	The designator for the runway end (i.e. 32L)
runwaySlope (Real)	Runway slope corresponding to landing direction [Source: RTCA DO-272]
takeOffDistanceAvailable	The takeoff run available plus the length of any remaining runway clearway beyond the far end of the takeoff run available. [Source: AC 150/5300-13]

takeOffRunwayAvailable	The runway length declared available and suitable for the ground run of an airplane taking off [Source: AC 150/5300-13]
touchdownZoneSlope	The longitudinal slope of the first 3000 feet of the runway beginning at the threshold.
touchdownZoneElevation	The highest elevation in the Touchdown Zone. The Touchdown Zone is the first 3,000 feet of the runway beginning at the threshold. [Source: FAA Order 8260.3]
thresholdType (enumeration: codeThresholdType)	A description of the landing threshold: either normal or displaced.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.27. Runway Label

Definition: The bottom center position of the runway designation marking				
Feature Group	Airfield			
Feature Class Name	RunwayLabel			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-IDEN-MARK	Runway numbers and letters			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1 MM	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayMarking*		Core
	FGDC	*RunwayLabel*		
	SDSFIE	*airfield_buffer_zone_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Collect the runway label as an individual point object.*				
Monumentation	No monumentation required.			

Survey Point Location	**Horizontal and Vertical**		
	Capture the point located at the base of each painted runway number on the runway centerline. If a runway number is not painted on the runway, identify and collect a point approximately 100 feet from the threshold as the runway label position.  **Illustrates the collection of the runway label.**		
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayEndDesignator (String 3)	The designator of the associated runway
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.28. Runway Safety Area Boundary

Definition: The boundary of the Runway Safety Area (RSA).	
Feature Group	Airfield
Feature Class Name	RunwaySafetyAreaBoundary
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
C-RUNW-SAFT-	Runway Safety Area

	Color	Line type	Line Weight	Symbol
AutoDesk Standards	5	Continuous	1	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*RunwaySafetyAreaBoundary*		Extension
	FGDC	*RunwaySafetyAreaBoundary*		Extension
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Collect as a closed polygon to its greatest horizontal extents.*				
Monumentation	No monumentation required			
Survey Point Location	**Horizontal**		**Vertical**	
	NA		NA	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 3 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest tenth of foot	

Feature Attributes

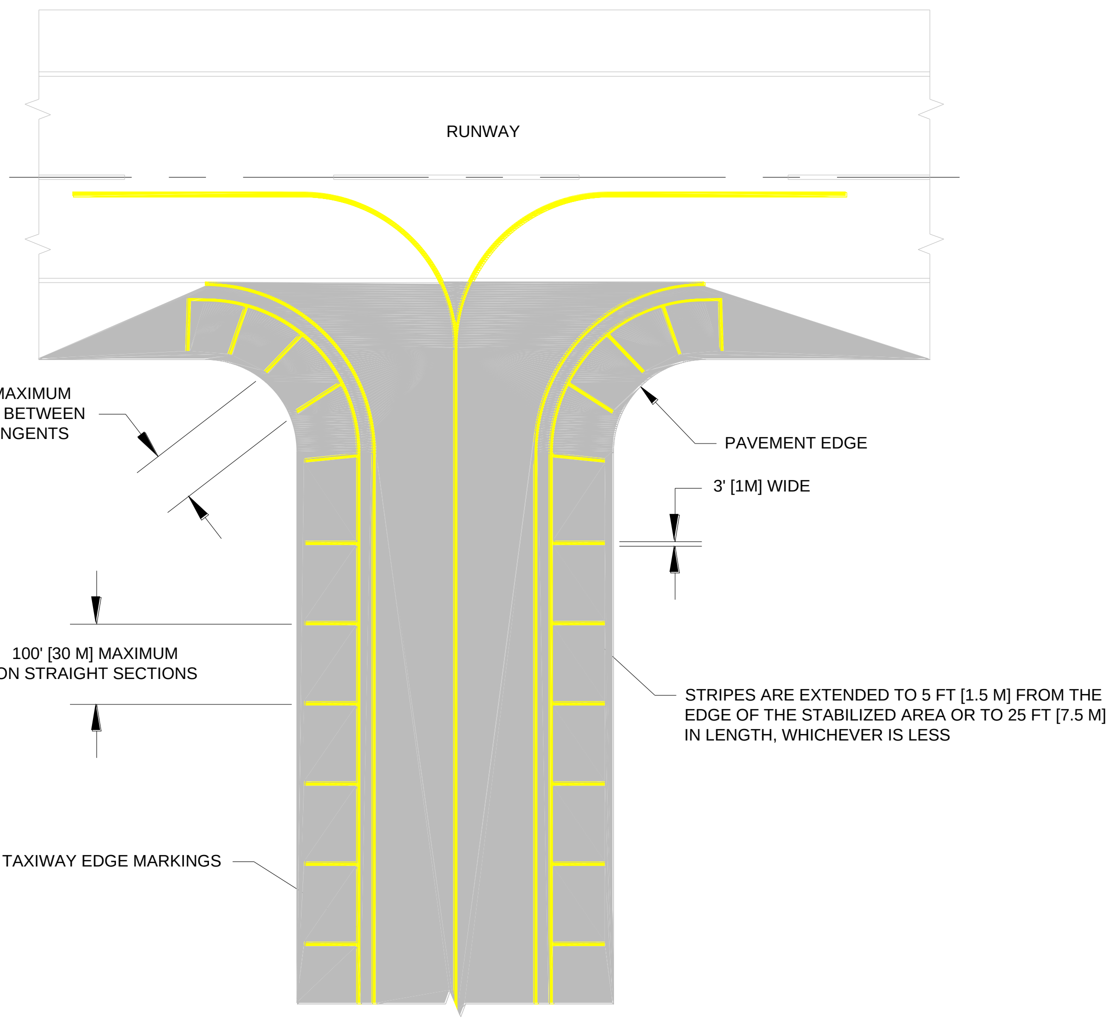
Attribute (Datatype)	Description
name (VARCHAR2(50))	Name of the feature
description (VARCHAR2 (255))	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayEndDesignator (String 3)	Specify runwayEnd designator
determinationDate (Date)	The date the RSA determination was approved
determination (VARCHAR2 (255))	A formal declaration of the RSA condition with respect to standards and any requirement improvements
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.29. Shoulder

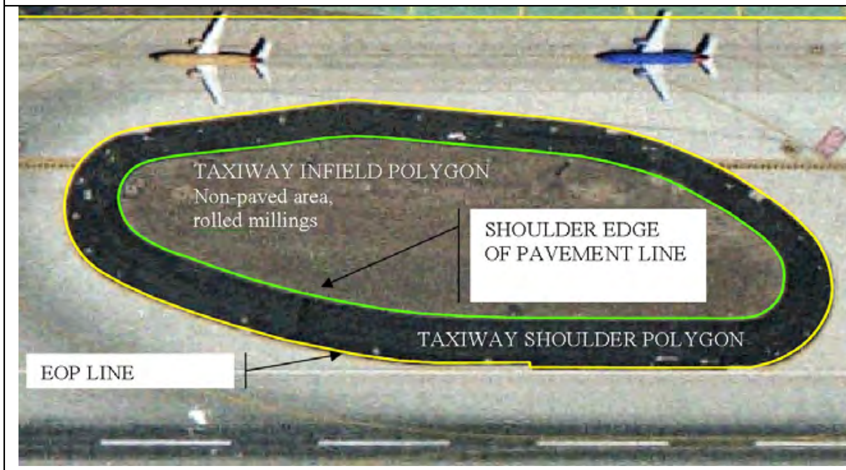
Definition: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement, enhance drainage, and blast protection. [Source: AC 150/5300-13]	
Feature Group	Airfield
Feature Class Name	Shoulder
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
C-HELI-SHLD-	Shoulder
C-PADS-SHLD-	Shoulders with annotation

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayElement*		Core
	FGDC	*RunwayElement*		
	SDSFIE	*Airfield_surface_site*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Collect non-intersecting shoulders as individual polygons. Collect intersecting shoulders as multiple polygons when intersected by taxiways, intersecting runway, or stopway/clearway.*



Monumentation	No monumentation required

Survey Point Location	**Horizontal and Vertical** 		
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes

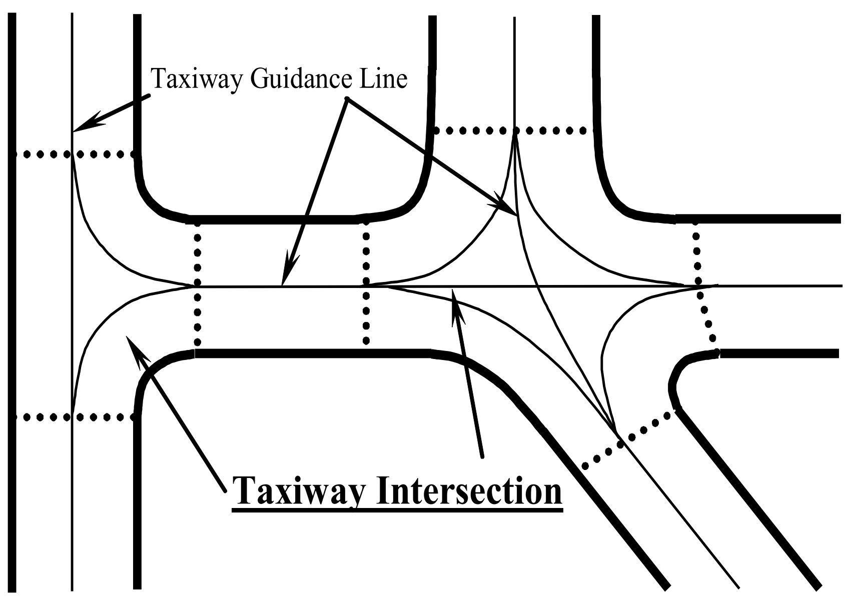
Attribute (Datatype)	Description
name (VARCHAR2(50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature
shoulderType (Enumeration: codeShoulderType)	Code for whether this is a runway shoulder or taxiway shoulder.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Real)	The overall length of the airfield surface.
width (Real)	The overall width of the airfield surface.
restricted (Boolean)	An indicator as to whether access to the feature is restricted
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]
sequence (String 5)	Sequential number of the element.
surfaceCondition (Enumeration codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
surfaceType (Enumeration: codeSurfaceType)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.30. Taxiway Intersection

Definition: The junction of two or more taxiways (Source: ICAO Annex 14, Volume 1, Aerodromes, Chapter 1, page 5).

Feature Group	Airfield			
Feature Class Name	TaxiwayIntersection			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TAXI-INTS	Taxiway intersection			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1 MM	User Defined
MicroStation Standards	0	Continuous	7	User Defined
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*TaxiwayElement*		Core
	FGDC	*TaxiwayIntersection*		
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Capture a polygon establishing the intersection of two or more taxiways.*

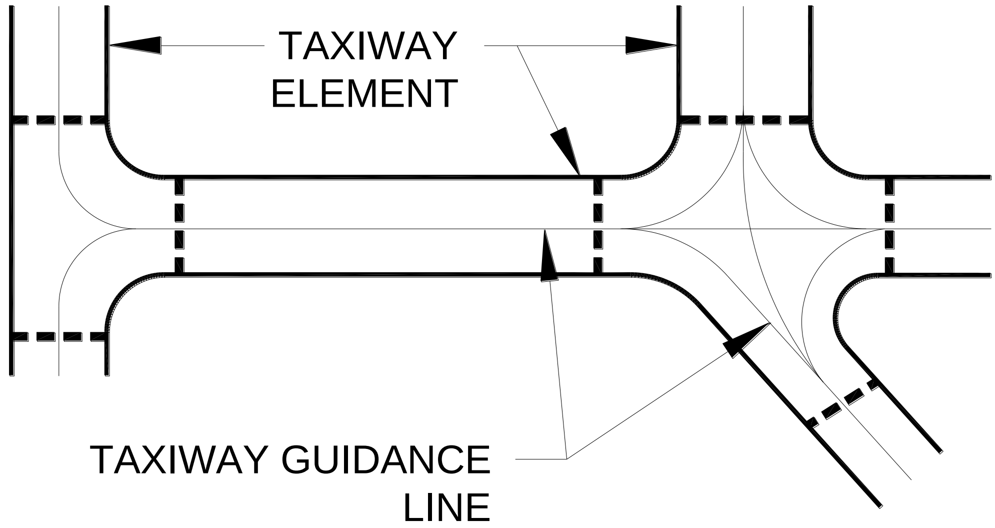


Monumentation	No monumentation required.		
Survey Point Location	**Horizontal and Vertical**		
	N/A		
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.4.31. Taxiway Element

Definition: Defined paths on an airport established for the taxiing of aircraft (excluding apron taxilanes) and intended to provide a link between one part of the airport and another.				
Feature Group	Airfield			
Feature Class Name	TaxiwayElement			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TAXI-OTLN	Taxiway - outlines			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*TaxiwayElement*		Core
	FGDC	*TaxiwayElement*		
	SDSFIE	*airfield_surface_site*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Collect all taxiway elements as individual polygon objects. Collect taxiway at the outer edge of pavement or defined paint line (excluding shoulder). Each taxiway will typically be comprised of more than one element. When multiple elements make up a taxiway, identify the taxiway elements as beginning, intersection and end in the name attribute. Be sure to comply with the no overlappping polygon rule.*				



Illustrates the collection of a taxiway element.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 255)	Description of the feature
taxiwayId (VarChar2(50))	Taxiway element name. The name should be identical to the corresponding taxiway name. Multiple taxiway elements can have the same name. If two or more taxiways intersect the taxiway element intersection will be named after the predominant taxiway. If two taxiways on the same level intersect, the element can be named arbitrarily after one of the taxiways.
taxiwayType (Enumeration: CodeTaxiwayType)	The type of taxiway
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	A code indicating the composition of the related surface [Source: NFDC]

pavementClassificationNumber	A number that expresses the relative load-carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition (Enumeration codeSurfaceCondition)	A description of the serviceability of the pavement [Source: NFDC]
directionality (Enumeration: CodeDirectionality)	Code used to define the directionality of traffic on the element.
sequence	Sequential number of the taxiway element.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.
surfaceType (Enumeration: codeSurfaceType)	Type of different materials used to construct the surface.
designGroup (Enumeration: codeDesignGroup)	Identifies the design group used in the design of the taxiway
length (Real)	Provides the length of the taxiwayElement polygon as measured along the centerline
width (Real)	Width of the taxiway
maximumSpeed (Real)	Identifies the maximum speed for the taxiwayElement
wingspan (Real)	Identifies the maximum aircraft wingspan which can traverse the taxiwayElement

5.5. Group: AIRSPACE

5.5.1. Landmark Segment

<table>
<tr><td colspan="5">Definition: Features providing geographic orientation near the airport vicinity. The features may or may not have obstruction value. Collect geographic features of landmark value aiding in geographic orientation as individual polyline objects. These features include, but are not limited to, the following:

(1). A selection of roads (i.e. major highways, primary roads, etc.) and railroads, especially in the airport vicinity, to assist the user in geographic orientation.
(2). Shoreline (i.e. coastlines, lakes, rivers, etc.) of landmark value that aid in geographic orientation.
(3). Utility lines (i.e. transmission lines), levees, fence lines, or other linear features having obstruction or landmark value.
(4). Buildings or other features of landmark value that aid in geographic orientation.
(5). Runways with specially prepared hard surfaces that are not located on the airport being surveyed, but fall within the survey limits.
(6). Closed runways if they are sufficiently prominent to be of value to a pilot in airport identification.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Airspace</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">LandmarkSegment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Line</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AIRS-LNDM</td><td colspan="4">Landmark segment</td></tr>
<tr><td></td><td>Color</td><td>Line type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4"></td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">LandmarkSegment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">LandmarkSegment</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required for this feature.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Be sure that the attribute field for “CodeLandmarkType” correctly identifies the linear object being drawn. Each landmark type feature has its own data capture rule, collect each feature as defined in individual feature data capture rule (RoadSegment, UtilityLine, Shoreline, etc.).</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
</table>

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
landmarkType (Enumeration: CodeLandmarkType)	Type of landmark feature
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.5.2. Obstacle

Definition: All fixed (whether temporary or permanent) and mobile objects, or parts thereof, located on an area intended for the surface movement of aircraft, penetrating an Obstruction Identification Surface (OIS), or selected as a representative object. Use this feature for modeling linear objects as obstacles.				
Feature Group	Airspace			
Feature Class Name	Obstacle			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRS-OBST-LINE	Airspace obstruction - Line			
C-AIRS-OBST-PPNT	Airfield obstruction			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*Obstacle*		Extension
	FGDC	*Obstacle*		Extension
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Use the Obstacle feature type for point or line features penetrating an Obstruction Identification Surface (OIS) or selected as a representative object. Model line features as points representing the vertices of the line.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of the object		Highest point	

Accuracy Requirements (in feet relative to the nearest PACS, SACS, HRP or TSM)				
Runways Supporting Vertically Guided Operations				
	Horizontal	**Vertical**		
		Orthometric	**Ellipsoid**	**AGL**
Vertically Guided Runway Primary Surface (VGRPS)	± 20	± 3	± 3	± 10
Vertically Guided Primary Connection Surface (VGPCS)	± 20	± 3	± 3	± 10
Vertically Guided Protection Surface (VGPS)	± 20	± 3	± 3	± 10
Vertically Guided Approach Transition Surface (VGATS)	± 20	± 3	± 3	± 10
Vertically Guided Approach Surface (VGAS)	± 20	± 3	± 3	± 10
Vertically Guided Horizontal Surface (VGHS)	± 20	± 10	± 10	± 10
Vertically Guided Conical Surface (VGCS)	± 20	± 10	± 10	± 10
Runways Supporting Non-Vertically Guided Operations				
	Horizontal	**Vertical**		
		Orthometric	**Ellipsoid**	**AGL**
Non-vertically guided primary surface	± 20	± 3	± 3	± 3
Non-vertically guided approach surface	± 20	± 10	± 10	± 10
Non-vertically guided transitional surface	± 20	± 10	± 10	± 10
Non-vertically guided horizontal surface	± 50	± 20	± 20	± 10

Resolution	**Geographic Coordinates**	**Distances and Elevations**
	Hundredth of arc second	Tenth of a foot

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
obstacleType (Enumeration: CodeObstacleType)	The type of object.
obstacleSource (Enumeration: CodeObstacleSource)	Identify how or where the object was identified.
aboveGroundLevel (Real)	The vertical distance from the ground to the highest point of the object.
distanceFromDisplacedThreshold (Real)	Distance measured along runway centerline or centerline extended from a Displaced Threshold to point abeam the object. A negative distance indicates that the object is on the touchdown side of the runway approach end. This data is not provided for objects penetrating the horizontal, conical and runway transitional surfaces.

distanceFromRunwayCenterline (Real)	Shortest distance from the runway centerline or centerline extended to the object. "L" (LEFT) or "R" (RIGHT) is relative to an observer facing forward in a landing aircraft. This data is not provided for objects penetrating the horizontal, conical and runway transitional surfaces.
distanceFromRunwayEnd (Real)	Distance measured along runway centerline or centerline extended from the physical end to point abeam the object. A negative distance indicates that the object is on the touchdown side of the runway approach end. This data is not provided for objects penetrating the horizontal, conical and transitional (HCT) surfaces.
groupCode (String 75)	A text code indicating that the object consists of a group of objects of the same type. For example, a group of trees, a group of buildings, a group of antennas, etc [Source: AIXM]
heightAboveAirport (Integer)	Height above airport the official airport elevation point [Source: NGS]
heightAboveRunway (Real)	Height above runway physical end for objects located underneath the approach surface.
heightAboveTouchdownZone (Real)	Height above touchdown zone elevation for objects located underneath the approach surface.
lightCode (Boolean)	A code indicating that the obstacle is lighted [Source: AIXM]
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking
penValSpecified (Integer)	The elevation difference between the height of the object and the specified surface. Used to identify the amount of penetration of the main OIS.
penValSupplemental (Integer)	The elevation difference between the height of the object and the supplemental surface. Used to identify the amount of penetration to a secondary OIS.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.
obstructionNumber (VARCHAR2(30))	Provide the Aeronautical Study Number assigned by the FAA in the appropriate format (if known). The appropriate format is YYYY-XXX-NNNNN-TTT, EXAMPLE: 2008- ASW-1234-OE where YYYY is the year, XXX is the FAA responsible region (ASW, AAL, AGL, AEA, etc.) or WTE for Wind Turbine cases in the eastern U.S. or WTW for wind turbine cases in the western U.S., NNNNN is the sequential number assigned to the case for the year, and TTT is either OE, NR or NRA as appropriate. The dashes in the format are important and if the information is not known leave this blank.
disposition (String 16)	The disposition of the airspace obstruction.
oisSurfaceCondition (Enumeration: is CodeOisSurfaceCondition)	The Obstruction Identification Surface that the obstacle represents.

frangible (Boolean)	A Boolean indicating whether the object is frangible.
faaCoordinationCode (Boolean)	A Boolean indicating whether the obstruction has received FAA coordination or review.

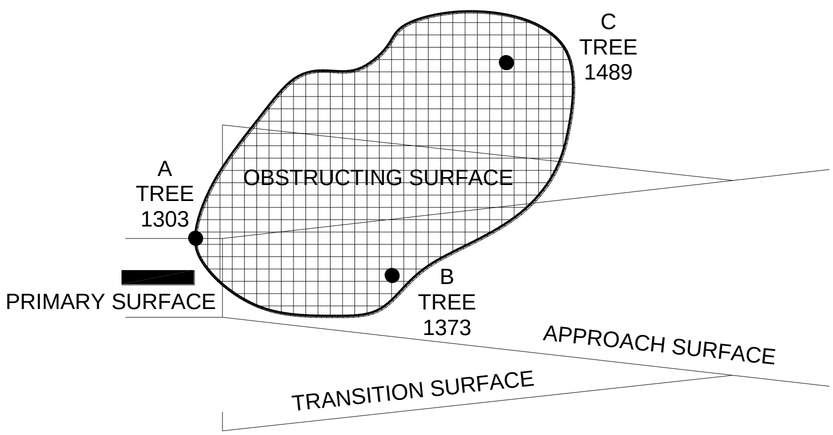
5.5.3. Obstruction Area

<table>
<tr><td colspan="5">Definition: Polygon features penetrating the plane of the obstruction identification surface (OIS) or selected as representative objects. Determine the type of obstructing area by the predominant feature within the grouped area. Penetrating groups of trees, ground, buildings, urban areas, mobile cranes, and agricultural area are the most common types of obstruction areas found within the surfaces of an Airport Airspace Analysis survey.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Airspace</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">ObstructionArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AIRS-OBST-POLY</td><td colspan="4">Airspace obstruction</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>2</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>0</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">ObstructionArea</td><td>Core</td></tr>
<tr><td>FGDC</td><td colspan="3">ObstructionArea</td></tr>
<tr><td>SDSFIE</td><td colspan="3">airspace_obstruction_navaid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required for this feature.</td></tr>
</table>

Related Features	

Data Capture Rules: *Use the ObstructionArea feature type to model features penetrating an OIS or is selected as a representative object using a bounding polygon encompassing the greatest extents of the area and the height of the highest point within the feature.*

Area Limit Object Requirements – When a large area of objects such as buildings, terrain or vegetation penetrate a surface, identify the limits of the area using a bounding polygon within the lateral limits of the surface. Overlay the area lateral limits with a grid established parallel and perpendicular to the extended runway centerline of the surface (see figure below). Establish the grid beginning at the runway end using the appropriate spacing until reaching the obstructing area. Within 10,200 feet of the runway threshold, use 200-foot grid spacing; outside 10,200 feet from the threshold, use a grid spacing of 500 feet. Analyze, identify and report the highest manmade or natural object penetrating the surface within each grid sector. Additionally, report the highest manmade or natural object within the area limits (see Figure 2-18). If two objects with the exact same MSL elevation are within a grid sector, choose the sector object by first selecting the object closer to the centerline, then if required, by the object closer to the runway.



NOTES:

1. THIS GRAPHIC EXPLAINS OR CLARIFIES CERTAIN DATA REQUIREMENTS.
2. SEE TEXT WHEN OBJECT CONGESTION OCCURS.
3. DIMENSIONS ARE IN FEET. DO NOT SCALE THIS DRAWING.

Reporting highest object(s) within ObstructionArea limits.

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

Accuracy Requirements (in feet relative to the nearest PACS, SACS, HRP or TSM)

Runways Supporting Vertically Guided Operations

	Horizontal	**Vertical**		
		Orthometric	**Ellipsoid**	**AGL**
Vertically Guided Runway Primary Surface (VGRPS)	± 20	± 3	± 3	± 10
Vertically Guided Primary Connection Surface (VGPCS)	± 20	± 3	± 3	± 10

Vertically Guided Protection Surface (VGPS)	± 20	± 3	± 3	± 10
Vertically Guided Approach Transition Surface (VGATS)	± 20	± 3	± 3	± 10
Vertically Guided Approach Surface (VGAS)	± 20	± 3	± 3	± 10
Vertically Guided Horizontal Surface (VGHS)	± 20	± 10	± 10	± 10
Vertically Guided Conical Surface (VGCS)	± 20	± 10	± 10	± 10

Runways Supporting Non-Vertically Guided Operations

	Horizontal	**Vertical**		
		Orthometric	**Ellipsoid**	**AGL**
Non-vertically guided primary surface	± 20	± 3	± 3	± 3
Non-vertically guided approach surface	± 20	± 10	± 10	± 10
Non-vertically guided transitional surface	± 20	± 10	± 10	± 10
Non-vertically guided horizontal surface	± 50	± 20	± 20	± 10

Resolution	**Geographic Coordinates**	**Distances and Elevations**
	Hundredths of arc second	Tenth of a foot

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2(50))	Name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
obstacleType (Enumeration: CodeObstacleType)	The type of object.
obstacleSource (Enumeration: CodeObstacleSource)	Identify how or where the object was identified.
aboveGroundLevel (Real)	The vertical distance from the ground to the highest point of the object.
distanceFromDisplacedThreshold (Real)	Distance measured along runway centerline or centerline extended from a Displaced Threshold to point abeam the object. A negative distance indicates that the object is on the touchdown side of the runway approach end. This data is not provided for objects penetrating the horizontal, conical and runway transitional surfaces.
distanceFromRunwayCenterline (Real)	Shortest distance from the runway centerline or centerline extended to the object. "L" (LEFT) or "R" (RIGHT) is relative to an observer facing forward in a landing aircraft. This data is not provided for objects penetrating the horizontal, conical and runway transitional surfaces.

distanceFromRunwayEnd (Real)	Distance measured along runway centerline or centerline extended from the physical end to point abeam the object. A negative distance indicates that the object is on the touchdown side of the runway approach end. This data is not provided for objects penetrating the horizontal, conical and transitional (HCT) surfaces.
groupCode (String 75)	A text code indicating that the object consists of a group of objects of the same type. For example, a group of trees, a group of buildings, a group of antennas, etc [Source: AIXM]
heightAboveAirport (Integer)	Height above airport the official airport elevation point [Source: NGS]
heightAboveRunway (Real)	Height above runway physical end for objects located underneath the approach surface.
heightAboveTouchdownZone (Real)	Height above touchdown zone elevation for objects located underneath the approach surface [Source: NGS]
lightCode (Boolean)	A code indicating that the obstacle is lighted [Source: AIXM]
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking
penValSpecified (Integer)	The elevation difference between the height of the object and the specified surface. Used to identify the amount of penetration of the main OIS.
penValSupplemental (Integer)	The elevation difference between the height of the object and the supplemental surface. Used when to identify the amount of penetration to a secondary OIS.
obstructionNumber (VARCHAR2(30))	Provide the Aeronautical Study Number assigned by the FAA in the appropriate format (if known). The appropriate format is YYYY-XXX-NNNNN-TTT, EXAMPLE: 2008- ASW-1234-OE where YYYY is the year, XXX is the FAA responsible region (ASW, AAL, AGL, AEA, etc.) or WTE for Wind Turbine cases in the eastern U.S. or WTW for wind turbine cases in the western U.S., NNNNN is the sequential number assigned to the case for the year, and TTT is either OE, NR or NRA as appropriate. The dashes in the format are important and if the information is not known leave this blank.
obstructionAreaType (Enumeration: CodeObstructionAreaType)	Type of obstructing area.
disposition (VARCHAR2(255))	The disposition of the airspace obstruction.
oisSurfaceCondition (Enumeration: CodeOisSurfaceCondition)	The Obstruction Identification Surface that Obstructing Area represents
length (Real)	The overall length of the obstruction.
width (Real)	The overall width of the obstruction.
frangible (Boolean)	A Boolean indicating whether the object is frangible.
faaCoordinationCode (Boolean)	A Boolean indicating whether the obstruction has received FAA coordination or review.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.5.4. Obstruction Identification Surface

<table>
<tr><td colspan="5">Definition: A derived imaginary surface defined by FAA.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Airspace</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">ObstructionIdSurface</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AIRS-OTHR</td><td colspan="4">Other airspace surfaces</td></tr>
<tr><td>C-AIRS-PART-PRIM</td><td colspan="4">14 CFR Part 77 - Primary Surface</td></tr>
<tr><td>C-AIRS-PART-HORZ</td><td colspan="4">14 CFR Part 77 - Horizontal Surface</td></tr>
<tr><td>C-AIRS-PART-CONL</td><td colspan="4">14 CFR Part 77 - Conical Surface</td></tr>
<tr><td>C-AIRS-PART-TRNS</td><td colspan="4">14 CFR Part 77 - Transitional Surfaces</td></tr>
<tr><td>C-AIRS-PART-APRC</td><td colspan="4">14 CFR Part 77 - Approach Surfaces</td></tr>
<tr><td>C-AIRS-AAAS-PRIM</td><td colspan="4">Airport Airspace Analysis Survey - Primary Surfaces</td></tr>
<tr><td>C-AIRS-AAAS-HORZ</td><td colspan="4">Airport Airspace Analysis Survey - Horizontal Surface</td></tr>
<tr><td>C-AIRS-AAAS-CONL</td><td colspan="4">Airport Airspace Analysis Survey - Conical Surface</td></tr>
<tr><td>C-AIRS-AAAS-TRNS</td><td colspan="4">Airport Airspace Analysis Survey - Transitional Surfaces</td></tr>
<tr><td>C-AIRS-AAAS-APRC</td><td colspan="4">Airport Airspace Analysis Survey - Approach Surfaces</td></tr>
<tr><td>C-AIRS-AAAS-VERT</td><td colspan="4">Airport Airspace Analysis Survey - Vertical Guidance Protection Surface</td></tr>
<tr><td>C-AIRS-TERP</td><td colspan="4">TERPS Surfaces</td></tr>
<tr><td>C-AIRS-TERP-DEPT</td><td colspan="4">Departure Analysis</td></tr>
<tr><td>C-AIRS-OEIA</td><td colspan="4">One Engine Inoperative Analysis</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>1 (all)</td><td rowspan="2">Continuous (all)</td><td>1 MM (all)</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>0 (all)</td><td>7 (all)</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">ObstructionAssessmentArea</td><td>Core</td></tr>
<tr><td>FGDC</td><td colspan="3">ObstructionIdentificationSurface</td></tr>
<tr><td>SDSFIE</td><td colspan="3">airfield_imaginary_surface_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required for this feature.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Identify the obstruction identification surface (OIS) required by the utilization type for the runway. Depict the horizontal limits of the appropriate obstruction imaginary surface.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

Resolution	Geographic Coordinates	Distances and Elevations
	N/A	N/A

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	A commonly used name for the zone.
description (VARCHAR2 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
runwayDesignator (String 7)	Specify runway designator for the Vertically Guided Runway Primary Surface (VGRPS), for the Vertically Guided Primary Connection Surface (VGPCS), and for the Vertically Guided Approach Transitional Surface (VGATS).
runwayEndDesignator (String 3)	Specify runwayEnd designator for the Vertically Guided Approach Surface (VGAS) and for the Vertically Guided Protection Surface (VGPS).
oisSurfaceType (Enumeration: CodeOisSurfaceType)	Surface Type refers to the general type of surface used to analyze features. Surfaces of the same type usually are similar in nature with respect to certain aspects of the surface definition or may merely be representative of different programs within the airport charting community.
oisZoneType (Enumeration: CodeOisZoneType)	Specifies zones within Obstruction Identification Surfaces (OIS)
oisSurfaceCondition (Enumeration: CodeOisSurfaceCondition)	The Obstruction Identification Surface that Obstructing Area represents
safetyRegulation (String 20)	An identifier for the safety regulations in effect within the zone.
zoneUse (String 50)	A description of the use of the zone.
approachGuidance (Enumeration: CodeApproachGuidance)	Defines the type of approach guidances the OIS is meant to protect.
slope (Real)	The low to high gradient within the airspace expressed as a ratio x:1, where X is the slope value. For example 40:1 for departures.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.5.5. Runway Protect Area

Definition: An area beyond the takeoff runway under control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations, and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

Feature Group	Airspace
Feature Class Name	RunwayProtectArea
Feature Type	Polygon

CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-CLRW	Runway Clearway			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	
MicroStation Standards	7		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*RunwayProtectAreaExtension*		Extension
	FGDC	*RunwayProtectArea*		Extension
	SDSFIE	*None*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *N/A*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	N/A		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Tenth of foot	

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	The name of the feature.
description (VARCHAR2(255))	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Integer)	The length of clearway as reported by the FAA Airport/Facility Directory and the Aeronautical Information Publication (AIP) for international airports
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
type (Enumeration: CodeRunwayProtectionAreaType)	Code indicating the type of runway protection area being classified.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6. Group: CADASTRAL

5.6.1. Airport Boundary

Definition: A polygon, or a set of polygons, encompassing all property owned or controlled by the airport for aviation purposes. [Source: Order 5190.6A, Section 5]				
Feature Group	Cadastral			
Feature Class Name	AirportBoundary			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-PROP-PROP-	Airport property			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1	
MicroStation Standards	4		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*AirportHeliport*		Core
	FGDC	*AirportBoundary*		
	SDSFIE	*Airfield_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Airport property information is usually obtainable from the county or local government.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 3 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Tenth of foot	

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	The name of the feature.
description (VARCHAR2 (255))	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
faaSiteNumber (String 8)	This is a number that contains a one-letter suffix. The number is assigned to the airport in ascending order, depending on the state and the associated city. If you do not know or have access to the appropriate site number contact your airports district/region airports office or state aviation authorities for assistance. [Source: FAA AC 150/5200-35]
faaLocationId (String 4)	The location identifier assigned to the feature by FAA
iataCode (String 4)	The location identifier assigned to the feature by International Air Transport Association (IATA)
icaoCode (String 4)	The location identifier assigned to the airport by the ICAO

airportFacilityType (Enumeration CodeAirportFacilityType)	The type of airfield
operationsType (Enumeration: CodeOperationsType)	The type of operations permitted on the airfield
owner (Enumeration: CodeOwner)	The type of owner of the airfield
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.2. Airport Parcel

Definition: A tract of land within the airport boundary acquired from surplus property, Federal funds, local funds, etc. Include easement interests in areas outside the fee property line as an airport parcel. [Source FAA Order 5190.6, Chapter 5]				
Feature Group	Cadastral			
Feature Class Name	AirportParcel			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-PROP-AIRF-LINE-	Property lines (Existing recorded plats)			
V-PROP-QTRS-	Quarter lines			
V-PROP-SECT-	Section lines			
V-PROP-SXTS-	Sixteenth lines (40 lines)			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		3	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*AirportParcel*		Extension
	FGDC	*AirportParcel*		Extension
	SDSFIE	*None*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect and reduce in accordance with state/local requirements.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	As required by state/local requirements.		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest tenth of a foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (String 255)	Description of the feature
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
authority (String 75)	The owner of the airport parcel
acquisitionType (Enumeration: codeAcquisitionType)	The type of acquisition used to acquire the parcel
costToAcquire (Real)	The amount paid to the owner in U.S. dollars for the parcel
dateAcquired (Date)	The date the parcel was acquired. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
grantProjectNumber (String 30)	The grant number if Federal funds were used to acquire the parcel
howAcquired (Enumeration: codeHowAcquired)	The manner in which the parcel was acquired
marketValue (Real)	The assessed market value of the parcel in U.S. dollars when it was acquired
yearAssessed (Number 4)	The year in which the market value assessment was made
yearBuilt (Number 4)	The year in which the most recent structure(s) were built on the parcel
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.
acquisitionPurpose (String 50)	Acquisition purpose
area (Real)	The size of the area, zone, or polygon in square units.
assessedValue (Real)	The most recent assessed value of the airport parcel.
deedReference (String 30)	Reference to where the deed to the airport parcel is recorded in such information as Plat Book and Page.
legalDescription (String 240)	The complete legal description of the property as it appears in the deed.
parcelNumber (String 12)	Any locally used number to identify the parcel.
passengerChargeNumber (String 30)	Passenger Facility Charge Number
previousOwner (String 75)	Previous owner of the airport parcel
useOfParcel (String 16)	The current primary use of the airport parcel.

5.6.3. County

Definition: Boundary line of the land and water under the right, power, or authority of the county government.	
Feature Group	Cadastral
Feature Class Name	County
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
V-PROP-CNTY-	County Boundary

	Color	Line type	Line Weight	Symbol
AutoDesk Standards	2	DASHED_SPACED	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*GovernmentalUnit*		Extension
	FGDC	*GovernmentalUnit*		Extension
	SDSFIE	*political_jurisdiction_county_line*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *County boundary information is usually obtainable from the county engineer, surveyor or auditor's office.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	As provided.		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	The description of the area.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
politicalName (String 30)	The common name associated with the property area.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.4. Easements And Rights of Ways

Definition: A parcel of land for which formal or informal deed easement rights exist [Source: SDSFIE (modified)]	
Feature Group	Cadastral
Feature Class Name	EasementsAndRightsofWay
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
C-PROP-ESMT-	Easements
C-PROP-RWAY-	Right of ways
V-PROP-ESMT-	Government easements/property lines
V-PROP-RWAY-	Right of ways

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Layer/Level	**Description**			
V-PROP-RWAY-	Right of ways			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1 MM	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*EasementsAndRightsofWay*	Extension	
	FGDC	*EasementsAndRightsofWay*	Extension	
	SDSFIE	*easement_right_of_way_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Easement and right of way information is usually obtainable from county engineer, surveyor, audit or recorder office.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	As provided.		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredths of arc second		Nearest foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A brief description of the feature.
status (Enumeration: codeStatus)	The status of the parcel. (Active, inactive, terminated)
purpose (String 30)	Project purpose for which the easement was acquired.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.5. FAA Region Area

Definition: This feature depicts the FAA regions.	
Feature Group	Cadastral
Feature Class Name	FAARegionArea
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
C-AIRF-FAAR-	FAA Region

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	1	Continuous	1 MM	User Defined
MicroStation Standards	3		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*FaaRegionArea*		Extension
	FGDC	*FaaRegionArea*		Extension
	SDSFIE	*faa_region_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect this information from official FAA sources.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	As provided.		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the FAA region.
description (VARCHAR2 (255))	Description of the FAA region.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.6. Land Use

Definition: A description of the human use of land and water.				
Feature Group	Cadastral			
Feature Class Name	LandUse			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-PROP-LUSE-	Land Use Area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1 MM	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*LandUse*		Extension
	FGDC	*LandUse*		Extension
	SDSFIE	*land_use_area*		

Documentation and Submission Requirements	None		
Related Features			
Data Capture Rules: *Collect the land use information from state/county/local zoning or other appropriate office.*			
Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	As provided.	N/A	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredths of arc second	Nearest foot	
Feature Attributes			

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the land use area.
description (VARCHAR2 (255))	Description of the land use area.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
useType (Enumeration: CodeLandUseType)	The way in which the land is being used.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.7. Lease Zone

Definition: A parcel of land leased by an individual, agency, or organization for their use.				
Feature Group	Cadastral			
Feature Class Name	LeaseZone			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-PROP-LEAS-	Lease line (surveyed)			
A-PROP-LEAS-	Lease line (interior)			
C-PROP-LEAS-	Lease line (exterior / ground lease)			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	1	Continuous	1 MM	User Defined
MicroStation Standards	3		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*LeaseZone*		Extension
	FGDC	*LeaseZone*		Extension
	SDSFIE	*lease_zone_area*		
Documentation and Submission Requirements	None			
Related Features				

Data Capture Rules: *Leasing information is usually obtainable from the airport.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	As provided.		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredths of arc second		Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A brief description of the feature.
tenantName (String 75)	The current name of the tenant occupying the leased parcel.
permitUse (String 20)	Permitted use of the leased parcel.
leasedArea (Real)	Area accounted for in the lease for a parcel.
actualArea (Real)	Actual measured area of the leased parcel.
expectedLeaseExpirationDate (Date)	The date the lease is expected to expire. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
legalDescription (String 240)	The complete legal description of the property as it appears in the deed.
status (Enumeration: codeStatus)	The status of the parcel. (Active, inactive, terminated)
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.8. Municipality

Definition: Boundary line of the land and water under the right, power, or authority of the municipal government.				
Feature Group	Cadastral			
Feature Class Name	Municipality			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-PROP-MUNI-	Municipal Boundary			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	1	Continuous	1 MM	User Defined
MicroStation Standards	3		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*GovernmentalUnit*		Extension
	FGDC	*GovernmentalUnit*		Extension
	SDSFIE	*political_jurisdiction_municipal_line*		
Documentation and Submission Requirements	None			

Related Features			
Data Capture Rules: *Municipality boundary limits are usually obtainable from county or local government offices.*			
Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	As provided.	N/A	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	
Feature Attributes			

Attribute (Datatype)	Description
name (VARCHAR2 (50))	The common name associated with the property area.
description (VARCHAR2 (255))	The description of the area.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.9. Parcel

Definition: A single cadastral unit, which is the spatial extent of the past, present, and future rights and interests in real property and the geographic framework to support the description of the spatial extent.				
Feature Group	Cadastral			
Feature Class Name	Parcel			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-PROP-LINE-	Property lines (Existing recorded plats)			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*GeographicArea*		Extension
	FGDC	*GeographicArea*		Extension
	SDSFIE	*parcel_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Parcel boundary information is usually obtainable from the county or local government.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	

<table>
<tr><td rowspan="2">Accuracy Requirements (in feet)</td><td rowspan="1">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td></td><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td></td><td>As provided.</td><td>N/A</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>Five hundredths of arc second</td><td colspan="2">Nearest foot</td></tr>
</table>

Feature Attributes

Attribute (Datatype)	Description
area (Real)	The size of the area, zone, or polygon in square units.
useOfParcel (String 16)	The current primary use of the parcel.
name (VARCHAR2 (50))	The common name associated with the property area.
description (VARCHAR2 (255))	The description of the area.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
parcelNumber (String 12)	Any locally used number to identify the parcel.
legalDescription (String 240)	The complete legal description of the property as it appears in the deed.
dateAcquired (Date)	The date the parcel was acquired by the current owner. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
assessedValue (Real)	The most recent assessed value of the parcel.
deedReference (String 30)	Reference to where the deed to the parcel is recorded in such information as Plat Book and Page.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.
authority (String 75)	The owner of the parcel
previousOwner (String 75)	Previous owner of the parcel
acquisitionType (Enumeration: CodeAcquisitionType)	The type of acquisition used to acquire the parcel
acquisitionPurpose (String 50)	Acquisition purpose
costToAcquire (Real)	The amount paid to the owner in U.S. dollars for the parcel
grantProjectNumber (String 30)	The grant number if Federal funds were used to acquire the parcel
howAcquired (enumeration: codeHowAcquired)	The manner in which the parcel was acquired
marketValue (Real)	The assessed market value of the parcel in U.S. dollars when it was acquired
yearAssessed (Number 4)	The year in which the market value assessment was made
yearBuilt (Number 4)	The year in which the most recent structure(s) were built on the parcel

5.6.10. State

Definition: Boundary line of the land and water under the right, power, or authority of the state government.	
Feature Group	Cadastral
Feature Class Name	State

Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-PROP-STAT-	State Boundary			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1 MM	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*GovernmentalUnit*		Extension
	FGDC	*GovernmentalUnit*		Extension
	SDSFIE	*political_jurisdiction_state_line*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *The state boundary is usually obtainable from the state government.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		**N/A**	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	As provided.		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredths of arc second		Nearest foot	
Feature Attributes				

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	The common name associated with the property area.
description (VARCHAR2 (255))	The description of the area.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.6.11. Zoning

Definition: A parcel of land zoned specifically for real estate and land management purposes; more specifically for commercial, residential, or industrial use.	
Feature Group	Cadastral
Feature Class Name	Zoning
Feature Type	Polygon
CADD Standard Requirements	
Layer/Level	**Description**
V-PROP-ZONG-	Zoning Areas

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	8	Continuous	1 MM	User Defined
MicroStation Standards	9		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*Zoning*		Extension
	FGDC	*Zoning*		Extension
	SDSFIE	*zoning_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				

Data Capture Rules: *Zoning limits and information is usually obtainable from the local zoning office.*

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	As provided.	N/A	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of a second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A brief description of the feature.
status (Enumeration: codeStatus)	The status of the parcel. (Active, inactive, terminated)
landOwnerRestriction (String 16)	Codes determining the land owner restriction for the parcel.
zoningClassification (Enumeration: CodeZoningClass)	The zoning classification of the parcel.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7. Group: ENVIRONMENTAL

5.7.1. Environmental Contamination Area

Definition: A facility or other locational entity, (as designated by the Environmental Protection Agency) that is regulated or monitored because of environmental concerns.				
Feature Group	Environmental			
Feature Class Name	EnvironmentalContaminationArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
H-POLL-CONC-	Polluted area of concern			
H-POLL-POTN-	Potential spill, emission, or release source			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*EnvironmentalContaminationArea*	Extension	
	FGDC	*EnvironmentalContaminationArea*	Extension	
	SDSFIE	*environmental_regulated_facility_site*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect a closed polygon to its greatest horizontal extents.*				
Monumentation	No monumentation required.			

Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	The name of a specific facility.
description (VARCHAR2 (255))	A description of the source of the pollution.
environmentalHazardCategory (String 16)	Indicates the broad category or type of the most prevalent or serious environmental hazard present at the site.
pollutantReleaseType (String 16)	A descriptor for the type of pollutant release experienced.
severity (String 16)	A descriptor for the severity of the pollution.
remediationUrgency (String 16)	A code indicating the urgency for accomplishing a site remediation project.
toxicStatusOfPollutant (String 16)	A descriptor for the toxic status of the pollution.
status (enumeration: codeStatus)	The code indicating whether the facility status is Active or Inactive.
dateFound (Date)	The date the pollution was discovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915)
cause (String 16)	A code indicating the cause of the pollution.

pollutantSource (String 16)	The actual or suspected source of the pollutant.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.2. Fauna Hazard Area

<table>
<tr><td colspan="5">Definition: An area where there are hazards due to wildlife activities. This includes bird aircraft strike hazard (BASH) areas, and deer strike areas.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Environmental</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">FaunaHazardArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>V-TOPO-SPEC-</td><td colspan="4">Species Site</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>2</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>4</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">AirspaceExtension</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">FaunaHazardArea</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">fauna_hazard_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect a closed polygon to its greatest horizontal extents.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 20 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
<tr><td>Attribute (Datatype)</td><td colspan="4">Description</td></tr>
<tr><td>name (VARCHAR2 (50))</td><td colspan="4">Name of the feature.</td></tr>
<tr><td>description (VARCHAR2 (255))</td><td colspan="4">A description or other unique information concerning the subject item, limited to 240 characters.</td></tr>
<tr><td>status (Enumeration: codeStatus)</td><td colspan="4">A temporal description of the operational status of the feature. This attribute is used to describe real-time status.</td></tr>
<tr><td>hazardType
(Enumeration: CodeHazardType)</td><td colspan="4">A descriptor of the type of the hazard.</td></tr>
</table>

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.3. Flood Zone

<table>
<tr><td colspan="5">Definition: Areas subject to 100-year, 500-year and minimal flooding.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Environmental</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">Floodzone</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-TOPO-FLZN-</td><td colspan="4">Flood Zone</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>5</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>1</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">FloodZone</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">FloodZone</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">flood_zone_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect a closed polygon to its greatest horizontal extents.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 20 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
zoneType (Enumeration: CodeZoneType)	The zoning classification of the area
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.4. Flora Species Site

Definition: The specific location where an individual flora species or an aggregate of flora species has been identified				
Feature Group	Environmental			
Feature Class Name	FloraSpeciesSite			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
L-PLNT-CTNR-	Containers or planters			
L-PLNT-PLTS-	Planting plants (e.g., ornamental annuals and perennials)			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1 MM	User Defined
MicroStation Standards	1		7	
CADD Standard Requirements				
Layer/Level	**Description**			
L-PLNT-TREE-	Trees (e.g., evergreen, deciduous, etc.)			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*FloraSpeciesSite*		Extension
	FGDC	*FloraSpeciesSite*		Extension
	SDSFIE	*flora_species_site*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect a point indicating the individual location or the center of a group.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 20 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Any brief description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
plantType (String 16)	A descriptor of the type of flora.
plantHeight (Real)	The average height of the flora species.
endangeredSpeciesActSite (String 1)	Defines if the habitat has been designated as a critical habitat under (C) the Endangered species Act or has not been so designated (N).

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.5. Forest Stand Area

Definition: A forest flora community with similar characteristics.				
Feature Group	Environmental			
Feature Class Name	ForestStandArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
L-DETL-GRAS-	Grass, sod			
L-PLNT-BEDS-	Planting beds			
L-PLNT-BUSH-	Bushes and shrubs (e.g., evergreen, deciduous)			
L-PLNT-BUSH-LINE	Bush and shrub line			
L-PLNT-GRND-	Groundcover and vines			
L-PLNT-MLCH-	Mulches - organic and inorganic			
L-PLNT-SPRG-	Sprigs			
L-PLNT-TREE-LINE	Tree line			
L-PLNT-TURF-	Lawn areas (turfing limits)			
V-SITE-VEGE-	Existing treelines and vegetation			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*ForestStandArea*		Extension
	FGDC	*ForestStandArea*		Extension
	SDSFIE	*flora_species_management_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *In capturing the limits of the tree outlines create the graphical line in a right hand direction so patterning of the element will form the scallops on the correct side of the forest outline.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 20 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.

description (VARCHAR2 (255))	A description of the flora species.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
habitatCategory (String 16)	Discriminator - The designation or type of the special wildlife habitat.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.6. Hazardous Material Storage Site

<table>
<tr><td colspan="5">Definition: A defined or bounded geographical area designated and used for the storage of contained hazardous materials.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Environmental</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">HazardousMaterialStorageSite</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>H-STOR-HAZM-</td><td colspan="4">Hazardous materials</td></tr>
<tr><td>H-STOR-HAZW-</td><td colspan="4">Hazardous waste</td></tr>
<tr><td></td><td>Color</td><td>Line type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>5</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>1</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">HazardousMaterialStorageSite</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">HazardousMaterialStorageSite</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">Contained_hazwaste_storage_site</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect closed polygon to its greatest horizontal extents.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 20 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
<tr><td>Attribute (Datatype)</td><td colspan="4">Description</td></tr>
<tr><td>name (VARCHAR2 (50))</td><td colspan="4">Name of the feature.</td></tr>
<tr><td>description (VARCHAR2 (255))</td><td colspan="4">A description or other unique information concerning the subject item, limited to 240 characters.</td></tr>
<tr><td>status (Enumeration: codeStatus)</td><td colspan="4">A temporal description of the operational status of the feature. This attribute is used to describe real-time status.</td></tr>
</table>

storeHazardousMaterialCategory (Enumeration: CodeHazardCategory)	The general type or category of contained hazardous material stored.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.7. Noise Contour

Definition: An area that describes the noise attributed to operations. For aircraft operations, the Day/Night average sound level (Ldn) descriptor is typically used to categorize noise levels. [Source: 14 CFR 150]				
Feature Group	Environmental			
Feature Class Name	NoiseContour			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-AUZN-	Noise contour zone			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1	User Defined
MicroStation Standards	2	Continuous	7	User Defined
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*NoiseContour*		Extension
	FGDC	*NoiseContour*		Extension
	SDSFIE	*Noise_contour_line*		
Documentation and Submission Requirements	Noise contour map			
Related Features				
Data Capture Rules: *Acquire from the Integrated Noise Model (INM).*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	N/A		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	N/A		N/A	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description for the noise zone.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
contourValue (Real)	The decibel level of the contour line

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.8. Noise Incident

Definition: A formal complaint by an individual or group regarding excessive noise resulting from airport operations.				
Feature Group	Environmental			
Feature Class Name	NoiseIncident			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-AUCO-	Noise Complaint			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1 MM	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*NoiseIncident*		Extension
	FGDC	*NoiseIncident*		Extension
	SDSFIE	*noise_incident_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Place collection point at address of complaint.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 50 ft		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A general description of the complete incident, including any reference material.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
reporter (String 50)	The name of the individual or organization reporting the incident.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.9. Noise Monitoring Point

Definition: The location of noise sensing equipment or where a noise sample is taken.				
Feature Group	Environmental			
Feature Class Name	NoiseMonitoringPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-AUST-	Noise Monitoring Station			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Point	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*NoiseMonitoringPoint*		Extension
	FGDC	*NoiseMonitoringPoint*		Extension
	SDSFIE	*noise_monitoring_point*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Collect point at the center of monitoring station.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 20 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.10. Sample Collection Point

Definition: The physical location at which one or more environmental hazards field samples are collected.	
Feature Group	Environmental
Feature Class Name	SampleCollectionPoint

<table>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>H-SAMP-AIRS-</td><td colspan="4">Air samples</td></tr>
<tr><td>C-TOPO-BORE-</td><td colspan="4">Boring locations</td></tr>
<tr><td>H-SAMP-BIOL-</td><td colspan="4">Biological samples</td></tr>
<tr><td>H-SAMP-GWTR-</td><td colspan="4">Ground water samples</td></tr>
<tr><td>H-SAMP-SEDI-</td><td colspan="4">Sediment samples</td></tr>
<tr><td>H-SAMP-SOIL-</td><td colspan="4">Soil samples</td></tr>
<tr><td>H-SAMP-SOLI-</td><td colspan="4">Solid material samples</td></tr>
<tr><td>H-SAMP-SWTR-</td><td colspan="4">Surface water samples</td></tr>
<tr><td>H-SAMP-WAST-</td><td colspan="4">Waste samples</td></tr>
<tr><td>V-TOPO-BORE-</td><td colspan="4">Boring locations</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Confidential</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">SampleCollectionPoint</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">SampleCollectionPoint</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">field_sample_collection_location_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect point at center of sample location.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 1 ft</td><td>± 1 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Descriptor providing any additional information to describe the sampling location in text format (e.g., monitoring well located 10 feet northeast of building 624 within spill area). IRPIMS. [Source: SDSFIE Feature Table]
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
collectionPointLocation (Enumeration: CodeSamplePointLocation)	Code describing the type of location which is undergoing sampling (e.g., bh= borehole, wl=well).
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.11. Shoreline

<table>
<tr><td colspan="5">Definition: The boundary where land meets the edge of a large body of fresh or salt water.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Environmental</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">Shoreline</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-DRED-OHWM-</td><td colspan="4">Ordinary high water marks</td></tr>
<tr><td>C-TOPO-SHOR-</td><td colspan="4">Shorelines, land features, and references</td></tr>
<tr><td>H-MNST-GWTR-</td><td colspan="4">Ground water</td></tr>
<tr><td>H-MNST-SWTR-</td><td colspan="4">Surface water</td></tr>
<tr><td>S-GRDL-WATR-</td><td colspan="4">Water surface</td></tr>
<tr><td>V-SITE-EWAT-</td><td colspan="4">Water features</td></tr>
<tr><td>V-SITE-WATR-</td><td colspan="4">Water features</td></tr>
<tr><td>V-TOPO-SHOR-</td><td colspan="4">Shorelines, land features, and references</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>1</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>3</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">GeoBorderExtension</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">Shoreline</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">shoreline</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect a closed polygon at its greatest horizontal extents coincident with land/water interface. Close the polygon at arbitrary points ensuring sufficient coverage of the water body.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
<tr><td>Attribute (Datatype)</td><td colspan="4">Description</td></tr>
<tr><td>name (VARCHAR2 (50))</td><td colspan="4">A commonly used name for the shoreline.</td></tr>
<tr><td>description (VARCHAR2 (255))</td><td colspan="4">A local description for the shoreline.</td></tr>
<tr><td>status (Enumeration: codeStatus)</td><td colspan="4">A temporal description of the operational status of the feature. This attribute is used to describe real-time status.</td></tr>
<tr><td>shorelineType (Enumeration: CodeShorelineType)</td><td colspan="4">Discriminator - A value indicating the type or kind of shoreline.</td></tr>
</table>

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.7.12. Wetland

<table>
<tr><td colspan="5">Definition: Transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. The soils are predominantly saturated with water and the plants and animals that live there are specialized for this ecosystem.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Environmental</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">Wetland</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>V-TOPO-WETL</td><td colspan="4">Wetland</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>2</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>4</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">AirspaceExtension</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">Wetland</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">Wetland_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect a closed polygon to establish the boundary between wetlands and uplands (or non-wetlands). There are two delineation procedures developed at the federal level and several states have their own wetland delineation procedures. Contact federal/state/local environmental agency for assistance.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 10 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Any commonly used name for the wetland.
description (VARCHAR2 (255))	A description of the wetland.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
featureType (String 16)	A descriptor of how the wetland is depicted graphically.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8. Group: GEOSPATIAL

5.8.1. Airport Control Point – Runway Intersection Point

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).				
Feature Group	Geospatial			
Feature Class Name	AirportControlPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-RNYE-	Runway centerline elevation point			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*SurveyControlPointExtension*		Extension
	FGDC	*AirportControlPoint*		
	SDSFIE	*Control_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect the point where the centerlines of two, or more, runways intersect.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 3 ft		± 0.25 ft	± 0.20 ft
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
name (VARCHAR2(50))	Any commonly used name for the control point.
runwayDesignator (String 7)	Not applicable to this point type
runwayEndDesignator (String 3)	Not applicable to this point type
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.

status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP
dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.2. Airport Control Point – Airport Elevation

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).				
Feature Group	Geospatial			
Feature Class Name	AirportControlPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-RNYE-	Runway centerline elevation point			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*AirportControlPoint*		
	FGDC	*SurveyControlPointExtension (Extension)*		
	SDSFIE	*Control_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Calculate the Airport Elevation using the runway profile data. The Airport Elevation is the highest point along all usable runways.*				

Monumentation	Filled in by survey group only		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 0.25 ft	± 0.20 ft
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
name (VARCHAR2 (50))	Any commonly used name for the control point.
runwayDesignator (String 7)	Specify Runway Designator
runwayEndDesignator (String 3)	Not applicable to this point type
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP
dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.3. Airport Control Point – Centerline Perpendicular Points

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).				
Feature Group	Geospatial			
Feature Class Name	AirportControlPoint			
Feature Type	3D Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-RNYE-	Runway centerline elevation point			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**			
	FGDC			
	SDSFIE	*Control_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collected point along runway centerline perpendicular to the location of required NAVAIDs. ILS, MLS, PAR, TLS, and VGSI NAVAIDs systems require this measurement refer to the appropriate feature class description for the NAVAID.*				
Monumentation	Filled in by survey group only			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 1 ft		± 0.25ft	± 0.25 ft
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest tenth of a foot	

Feature Attributes

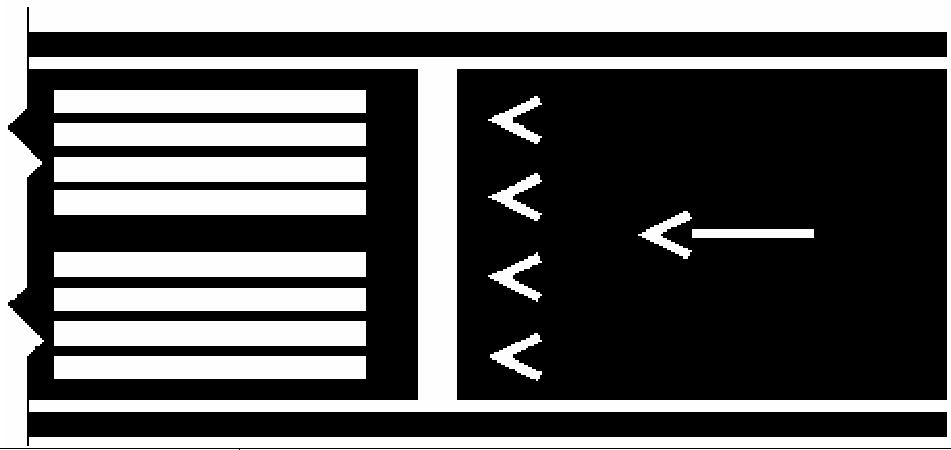
Attribute (Datatype)	**Description**
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
name (VARCHAR2 (50))	Any commonly used name for the control point.
runwayDesignator (String 7)	Not applicable to this point type
runwayEndDesignator (String 3)	Not applicable to this point type
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.

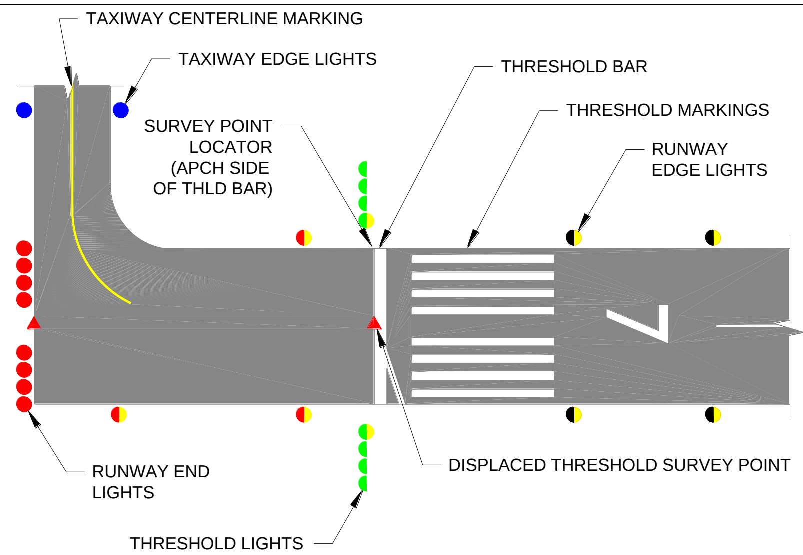
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP
dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.4. Airport Control Point – Displaced Threshold Point

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Displaced Threshold, Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).				
Feature Group	Geospatial			
Feature Class Name	AirportControlPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RUNW-DISP-	Runway centerline elevation point			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**			
	FGDC			
	SDSFIE	*Control_point*		
Documentation and Submission Requirements	In addition to the requirements of paragraphs 1.5.2 and 1.5.3, document the selected location using four digital photographs.			

	 **Photograph Type #1 (Eye Level).** Photo taken from above the mark, showing an area around the mark about 1 meter in diameter.	 **Photograph Type #2 (Approach).** Photo showing tripod over the mark in foreground and approach in the background.
	 **Photograph Type #3 (Across Runway).** Photo taken from the side of the runway looking across the end of the runway, with a tripod or arrow indicating the end point; include any features used to identify the runway end.	 **Photograph Type #4 (Close-in).** Close-up photo depicting nail, washer and markings.

<table>
<tr><td>Related Features</td><td></td></tr>
<tr><td colspan="2">Data Capture Rule: Establish the displaced threshold on the runway centerline a specified distance from the runway end. The area between the runway end and the displaced threshold should be marked with white arrows.
</td></tr>
<tr><td>Monumentation</td><td>When the ends of the runway surface have been determined, mark the positions using a nail and washer with the setting company's name and year inscribed, chisel square, or paint if possible with a distinctive inscription to ensure future identification.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td>Paved Runway</td></tr>
<tr><td>Survey Point Locator is the approach side of threshold bar or trim line connecting outboard threshold lights. Supporting features include:
• Threshold lights near threshold
• Runway end lights sited at another location on approach side of threshold lights
• White or amber runway edge lights, not blue taxiway lights, between threshold and end of runway
• Runway number near threshold
• White displaced threshold markings on approach side of threshold bar
• Runway side stripe on Precision Instrument Runways
Comments: Use caution, especially on smaller, poorly marked airports, not to confuse a displaced threshold with the end of a runway with an aligned taxiway.</td></tr>
</table>



NOTES:

1. THIS GRAPHIC IS NOT TO SCALE. FEATURES ARE SYMBOLIZED AND INTENDED ILLUSTRATION PURPOSES ONLY.
2. RUNWAY/STOPWAY SURVEYS SHOULD BE DISCUSSED WITH APPROPRIATE AIRPORT AUTHORITIES.
3. SURVEY POINT LOCATOR:
   - APPROACH SIDE OF THRESHOLD BAR
4. SUPPORTING FEATURES
   - RUNWAY END LIGHTS NEAR END OF PAVEMENT
   - THRESHOLD LIGHTS NEAR THRESHOLD BAR
   - RUNWAY NUMBER AND THRESHOLD MARKINGS NEAR THRESHOLD BAR
   - RUNWAY EDGE LIGHTS BETWEEN THRESHOLD AND END OF PAVEMENT
5. COMMENTS:
   - NONSTANDARD MARKINGS FOR DISPLACED THRESHOLD
   - THRESHOLD LIGHTS MAY NOT BE PRECISELY ALIGNED WITH APPROACH SIDE OF THRESHOLD BAR
   - DO NOT CONFUSE THIS SITUTION WITH A RUNWAY END AND ALIGNED TAXIWAY

Unpaved Runway

Survey Point Locator is the trim line connecting outboard threshold lights or the trim Line connecting outboard threshold day markers. Supporting features include

- The runway end lights sited at another location on approach side of threshold lights (if runway lighted)
- The runway end day markers located at another location on approach side of threshold (if runway unlighted)

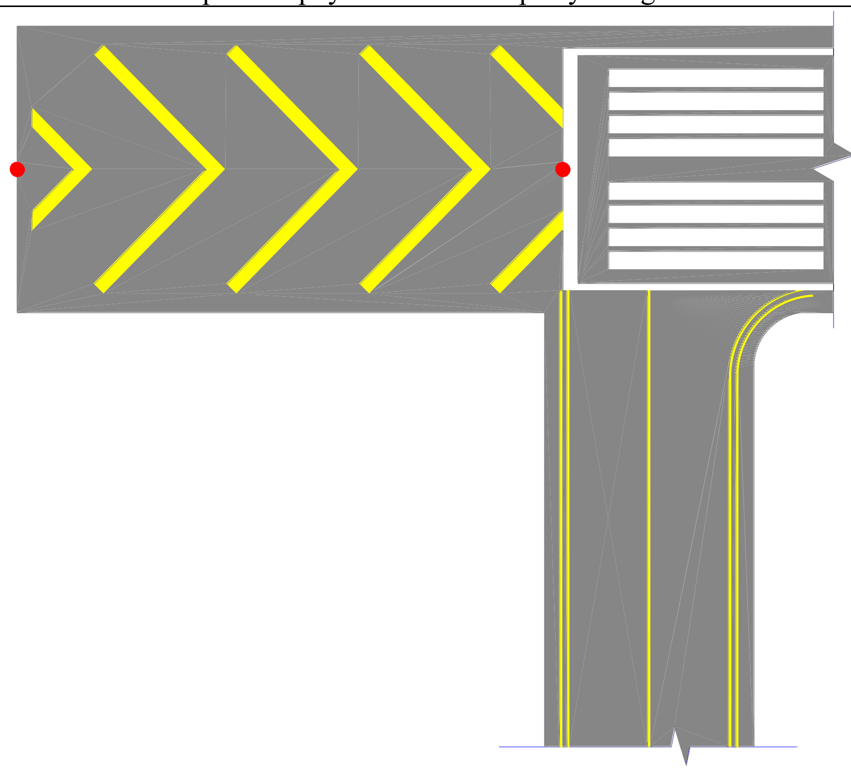
Comments**:** Displaced thresholds on unpaved runways are unusual. If this situation is suspected, verify that the runway end is identifiable at another location on the approach side of the threshold.

Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 0.25 ft	± 0.20 ft
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest tenth of a foot	

Feature Attributes	
Attribute (Datatype)	**Description**
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
runwayDesignator (String 7)	Not applicable to this point type
runwayEndDesignator (String 3)	Specify RunwayEnd Designator
name (VARCHAR2 (50))	Any commonly used name for the control point.
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP
dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.5. Airport Control Point – Stopway Ends

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).	
Feature Group	Geospatial
Feature Class Name	AirportControlPoint
Feature Type	Point

<table>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-TOPO-RNYE-</td><td colspan="4">Runway centerline elevation point</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="3"></td></tr>
<tr><td>FGDC</td><td colspan="3"></td></tr>
<tr><td>SDSFIE</td><td colspan="3">Control_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect point at physical end of stopway along extended centerline of runway.</td></tr>
<tr><td colspan="5">
Displays the standard marking a stopway or blast pad.</td></tr>
</table>

<table>
<tr><td>Monumentation</td><td colspan="4">The selected survey point must be marked and documented for verification by NGS and inclusion in the Airports GIS database. When the ends of the runway surface have been determined, mark the positions using a nail and washer, chisel square, or paint if possible with a distinctive inscription to ensure future identification. Mark the survey point with a nail and washer inscribed with the setting company’s name and year.</td></tr>
<tr><td rowspan="4">Survey Point Location</td><td></td><td colspan="2">Horizontal</td><td>Vertical</td></tr>
<tr><td>Concrete Stopway</td><td colspan="3">Survey Point Locator is the limit of construction or the trim line. Supporting Features include stopway chevrons. The stopway end survey point must be on the runway centerline extended. Stopways must be at least as wide as the runway but may be wider.</td></tr>
<tr><td>Paved/Non-concrete</td><td colspan="3">Survey Point Locator is the limit of construction or the trim line at first good pavement. Supporting Features are the stopway chevrons. The stopway end survey point must be on the runway centerline extended. Stopways must be at least as wide as the runway but may be wider.</td></tr>
<tr><td>Unpaved</td><td colspan="3">Survey Point Locator is the trim line at an apparent runway/stopway surface end. The stopway end survey points must be on the runway centerline extended.</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 1 ft</td><td>± 0.25 ft</td><td>± 0.20 ft</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Hundredth of arc second</td><td colspan="2">Nearest tenth of a foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	**Description**
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
name (VARCHAR2 (50))	Any commonly used name for the control point.
runwayDesignator (String 7)	Not applicable to this point type
runwayEndDesignator (String 3)	Specify RunwayEnd Designator
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP

dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.6. Airport Control Point – Profile Points

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).				
Feature Group	Geospatial			
Feature Class Name	AirportControlPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-RNYE-	Runway centerline elevation point			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**			
	FGDC			
	SDSFIE	*Control_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect three-dimensional points along all usable runways centerlines. Reduction of data must resolve to a profile with points at 10 foot intervals at certificated airports and no more than 50 feet at all airports.*				
Monumentation	None.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 1 ft	± 0.25 ft	± 0.20 ft
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest tenth of a foot	

Feature Attributes

Attribute (Datatype)	Description
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
name (VARCHAR2 (50))	Any commonly used name for the control point.
runwayDesignator (String 7)	Specify Runway Designator
runwayEndDesignator (String 3)	Not applicable to this point type
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP
dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.7. Airport Control Point – Touchdown Zone Elevation (TDZE)

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).

<table>
<tr><td>Feature Group</td><td colspan="4">Geospatial</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">AirportControlPoint</td></tr>
<tr><td>Feature Type</td><td colspan="4">3D Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-TOPO-RNYE-</td><td colspan="4">Runway centerline elevation point</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="3"></td></tr>
<tr><td>FGDC</td><td colspan="3"></td></tr>
<tr><td>SDSFIE</td><td colspan="3">Control_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: The TDZE is the highest elevation along the runway centerline within the first 3000 feet from the threshold and extracted from the centerline profile data.</td></tr>
<tr><td>Monumentation</td><td colspan="4">None.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 1 ft</td><td>± 0.25 ft</td><td>± 0.20 ft</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Hundredth of arc second</td><td colspan="2">Nearest tenth of a foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	**Description**
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
runwayDesignator (String 7)	Not applicable to this point type
runwayEndDesignator (String 3)	Specify Runway End Designator
name (VARCHAR2 (50))	Any commonly used name for the control point.
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP

dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.8. Airport Control Point – Primary and Secondary Airport Control Stations (PACS/SACS)

Definition: Use this feature for points on the airfield possessing significant geographic importance, such as the Primary and Secondary Airport Control Stations (PACS/SACS), Runway Intersections, Airport Elevation, centerline perpendicular points for NAVAIDs, Stopway Ends, Profile Points, and the Touchdown Zone Elevation (TDZE).				
Feature Group	Geospatial			
Feature Class Name	AirportControlPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
V-SURV-DATA-CTPT-	Survey data (benchmarks and horizontal control points or monuments)			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**			
	FGDC			
	SDSFIE	*Control_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Refer to AC 150/5300-16 for guidance on the airport control marks.*				
Monumentation	None.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	Refer to AC 150/5300-16 for accuracy requirements.			

Resolution	Geographic Coordinates	Distances and Elevations
	Thousanth of arc second	Nearest hundredth of a foot

Feature Attributes	
Attribute (Datatype)	**Description**
permanentId (String 6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType (Enumeration: CodePointType)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
name (VARCHAR2 (50))	Any commonly used name for the control point.
runwayDesignator (String 7)	Not applicable to this point type
runwayEndDesignator (String 3)	Not applicable to this point type
monumentType (Enumeration: CodeMonumentType)	The type of monument as defined by the Corps of Engineers EM 110-1-1002.
description (VARCHAR2 (255))	The monument description.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
ellipsoidHeight (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
yearOfSurvey (Number 4)	The year of the most recent runway end survey used to compute the ARP
dateRecovered (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
recoveredCondition (Enumeration: CodeRecoveredCondition)	The condition and type of the marker (witness post) used to identify the location of the monument.
fieldBook (String 254)	The field book.
globalPositionSystemSuitable (Boolean)	A Boolean indicating GPS suitability.
coordinateZone (Enumeration: CodeCoordinateZone)	The State Plane Coordinate System Code for where the airport is primarily located.
stampedDesignation (String 50)	The designation stamped onto the monument.
epoch (String 10)	Survey epoch used to establish the control point.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.9. Coordinate Grid Area

Definition: A regular pattern of horizontal and vertical lines used to represent regular coordinate intervals along the x and y axis. This grid line can be used to generate an arbitrary grid system which is common on locator maps.	
Feature Group	Geospatial
Feature Class Name	CoordinateGridArea
Feature Type	Line

CADD Standard Requirements			
Layer/Level	**Description**	**Layer/Level**	**Description**
C-DETL-GRPH-	Graphics, gridlines, non-text items	S-GRID-MSC3-	Miscellaneous grid lines (Type 3)
C-GRID-FRAM-	Frame (bounding frame of an area referenced by a grid)	S-GRID-MSC4-	Miscellaneous grid lines (Type 4)
C-GRID-MAJR-	Major grid lines	S-GRID-VERT-	Primary grid lines (vertical)
C-GRID-MINR-	Minor grid lines	V-GRID-FRAM-	Frame
S-GRID-HORZ-	Primary grid lines (horizontal)	V-GRID-MAJR-	Major grid lines
S-GRID-MSC-	Miscellaneous grid lines (Type 1)	V-GRID-MINR-	Minor grid lines
S-GRID-MSC2-	Miscellaneous grid lines (Type 2)		

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	

Information Assurance Level	Restricted		
Equivalent Standards	**AIXM**	*CoordinateGridArea*	Extension
	FGDC	*CoordinateGridArea*	
	SDSFIE	*Coordinate_grid_area*	
Documentation and Submission Requirements	No documentation is required for this feature.		
Related Features			
Data Capture Rules: *N/A*			
Monumentation	No monumentation required.		

Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	N/A	N/A	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	N/A	N/A	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	The name, code or identifier used to refer to an individual grid cell.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
gridType (Enumeration: CodeGridType)	Code indicating the type of grid.

Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.10. Elevation Contour

Definition: Connecting points on the surface of the earth of equal vertical elevation representing some fixed elevation interval.				
Feature Group	Geospatial			
Feature Class Name	ElevationContour			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-TOPO-MAJR-	Major contours			
C-TOPO-MINR-	Minor contours			
V-TOPO-MAJR-	Major contours			
V-TOPO-MAJR-IDEN	Major contours			
V-TOPO-MINR-	Minor contours			
V-TOPO-MINR-IDEN	Minor contours			
C-TOPO-MINR-ONEF	Minor contours			
C-TOPO-MINR-TWOF	Minor contours			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	2	N/A	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*ElevationContour*		Extension
	FGDC	*ElevationContour*		
	SDSFIE	*elevation_contour_line*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *N/A*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	One-half contour interval		One-half contour interval	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Five tenths of foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Real)	The overall length of the feature.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
contourValue	The elevation of the contour line.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.8.11. Image Area

Definition: The image footprint or coverage area.				
Feature Group	Geospatial			
Feature Class Name	ImageArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
V-AERI-BNDY-	Aerial photograph boundaries			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	1	Continuous	1 MM	User Defined
MicroStation Standards	3		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*ImageArea*		Extension
	FGDC	*ImageArea*		
	SDSFIE	*Image_area*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules: *Boundary of aerial imagery.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	Accuracy of the imagery		N/A	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	N/A		N/A	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
frameId (String 20)	Image identification number of the covered area.
photoDate (Date)	Date the aerial photography was flown. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915)

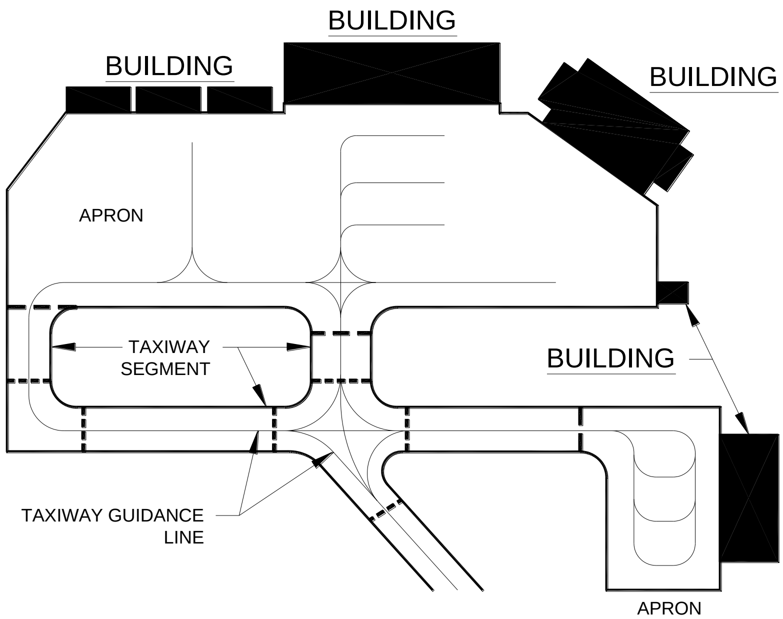
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.9. Group: MAN MADE STRUCTURES

5.9.1. Building

<table>
<tr><td colspan="5">Definition: A three-dimensional structure (i.e. hangars, terminals, etc.) modeled with a bounding polygon.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Manmade Structures</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">Building</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>A-ELEV-OTLN-</td><td colspan="4">Building outlines</td></tr>
<tr><td>C-BLDG-OTLN-</td><td colspan="4">Buildings and other structures</td></tr>
<tr><td>G-PLAN-OTLN-</td><td colspan="4">Floor outline/perimeter/building footprint</td></tr>
<tr><td>H-BLDG-OTLN-</td><td colspan="4">Command posts, information centers</td></tr>
<tr><td>M-ELEV-OTLN-</td><td colspan="4">Building outlines</td></tr>
<tr><td>V-BLDG-OTLN-</td><td colspan="4">Buildings and other structures</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>2</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>4</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">Building</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">Building</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">structure_existing_site</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Determine the terminal building complex, hangars, maintenance facilities, and other prominent buildings directly associated with aircraft operations and directly connected to the apron as individual polygon objects. Collect by field survey methods recently constructed and/or completed buildings not visible on imagery and meeting the above criteria. Extract the building outline feature as the footprint of the building at ground level. Determine the height at the highest point of the corresponding building. The AGL height of the polygon is determined as the difference between the base elevation and top elevation on the roof.

NOTE: If the building penetrates an OIS or is selected as a representative object, additionally identify, classify and document the building as an <u>ObstructionArea</u> and associated accuracy.</td></tr>
</table>



Illustrates the collection of airport buildings.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
buildingNumber (String 16)	The code indicating the number of the building.
structureType (Enumeration: CodeStructureType)	The type of structure.
status (Enumeration: codeStatus)	This value differentiates structure entities by operational status.
numberOfCurrentOccupants (Integer)	Number of persons currently occupying the structure
areaInside (Real)	Total inside area of structure
structureHeight (Real)	Maximum height of structure; i.e. AGL height
areaFloor (Real)	Total inside floor area
lightingType (Enumeration: codeLightingConfigurationType)	A description of the lighting system.
markingfeatureType (Enumeration: codeMarkingFeatureType)	The color of the marking(s)

color (Enumeration: codeColor)	The type of the marking(s)
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.9.2. Construction Area

Definition: A defined area that is under construction, not intended for active use until authorized by the concerned authority. The area defines a boundary for personnel, material, and equipment engaged in the construction activity.

Feature Group	Manmade Structures
Feature Class Name	ConstructionArea
Feature Type	Polygon

CADD Standard Requirements

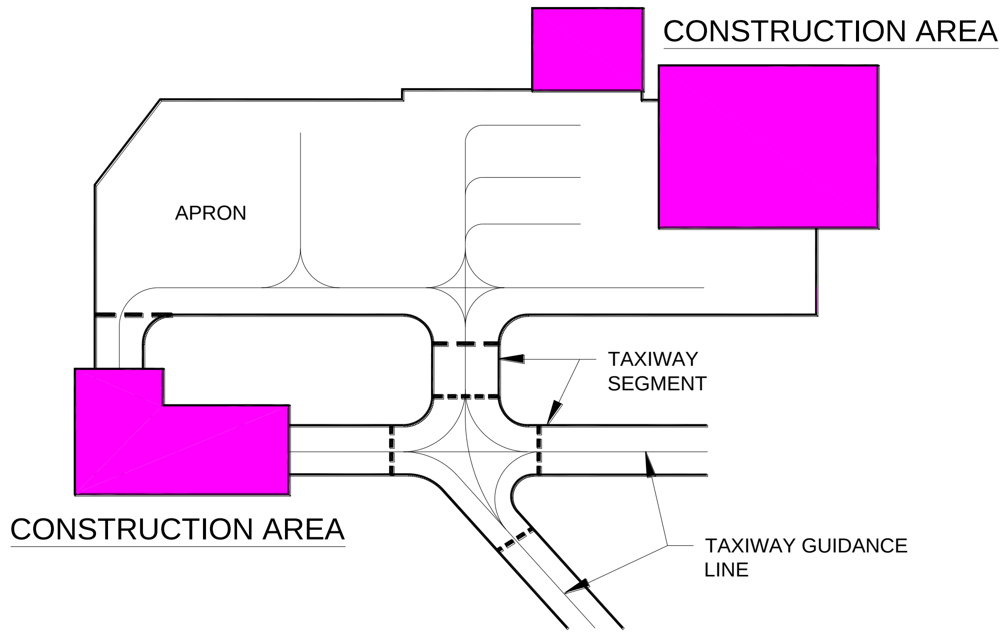
Layer/Level	Description	Layer/Level	Description
A-STAT-DEMO-	Demolition	L-STAT-FUTR-	Future work
A-STAT-DEMO-PHS1	Demolition - phase 1	L-STAT-NEWW-	New work
A-STAT-DEMO-PHS2	Demolition - phase 2	L-STAT-TEMP-	Temporary work
A-STAT-DEMO-PHS3	Demolition - phase 3	M-STAT-DEMO-	Demolition
A-STAT-FUTR-	Future work	M-STAT-DEMO-PHS1	Demolition - phase 1
A-STAT-NEWW-	New work	M-STAT-DEMO-PHS2	Demolition - phase 2
A-STAT-TEMP-	Temporary work	M-STAT-DEMO-PHS3	Demolition - phase 3
C-PROP-CONS-	Construction limits/controls, staging area	M-STAT-FUTR-	Future work
C-STAT-DEMO-	Demolition	M-STAT-NEWW-	New work
C-STAT-DEMO-PHS1	Demolition - phase 1	M-STAT-TEMP-	Temporary work
C-STAT-DEMO-PHS2	Demolition - phase 2	P-FUEL-NGAS-	Natural gas piping
C-STAT-DEMO-PHS3	Demolition - phase 3	P-STAT-DEMO-	Demolition
C-STAT-FUTR-	Future work	P-STAT-DEMO-PHS1	Demolition - phase 1
C-STAT-NEWW-	New work	P-STAT-DEMO-PHS2	Demolition - phase 2
C-STAT-TEMP-	Temporary work	P-STAT-DEMO-PHS3	Demolition - phase 3
E-STAT-DEMO-PHS1	Demolition - phase 1	P-STAT-FUTR-	Future work

E-STAT-DEMO-PHS2	Demolition - phase 2	P-STAT-NEWW-	New work
E-STAT-DEMO-PHS3	Demolition - phase 3	P-STAT-TEMP-	Temporary work
F-STAT-DEMO-	Demolition (**NOTE:** *comprehensive demolition is handled in Model File Type: Demolition Plan*)	S-STAT-DEMO-	Demolition
F-STAT-DEMO-PHS1	Demolition - phase 1	S-STAT-DEMO-PHS1	Demolition - phase 1
F-STAT-DEMO-PHS2	Demolition - phase 2	S-STAT-DEMO-PHS2	Demolition - phase 2
F-STAT-DEMO-PHS3	Demolition - phase 3	S-STAT-DEMO-PHS3	Demolition - phase 3
F-STAT-FUTR-	Future work	S-STAT-FUTR-	Future work
F-STAT-NEWW-	New work	S-STAT-NEWW-	New work
F-STAT-TEMP-	Temporary work	S-STAT-TEMP-	Temporary work
G-SITE-OTLN-	Site plan - key map	T-STAT-DEMO-PHS1	Demolition - phase 1
H-STAT-DEMO-PHS1	Demolition - phase 1	T-STAT-DEMO-PHS2	Demolition - phase 2
H-STAT-DEMO-PHS2	Demolition - phase 2	T-STAT-DEMO-PHS3	Demolition - phase 3
H-STAT-DEMO-PHS3	Demolition - phase 3	V-STAT-DEMO-	Demolition (**NOTE:** *comprehensive demolition is handled in Model File Type: Demolition Plan*)
L-STAT-DEMO-	Demolition (**NOTE:** *comprehensive demolition is handled in Model File Type: Demolition Plan*)	V-STAT-FUTR-	Future work
L-STAT-DEMO-PHS1	Demolition - phase 1	V-STAT-NEWW-	New work
L-STAT-DEMO-PHS2	Demolition - phase 2	V-STAT-TEMP-	Temporary work
L-STAT-DEMO-PHS3	Demolition - phase 3		

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	161	Continuous	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*ConstructionArea*	Extension	
	FGDC	*ConstructionArea*	Extension	
	SDSFIE	*structure_existing_site*		
Documentation and Submission Requirements	None			

Related Features	

Data Capture Rule: *Capture the outer edges of the area under construction. The limits could be a combination of building lines, construction fence lines, or natural features such as streams or rivers.*



Illustrates the collection of an airport construction area.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
projectName (String 60)	The name of the construction project
projectStatus (Enumeration: CodeProjectStatus)	The status of the construction project
coordinationContact (String 75)	Airport, emergency, airline, tenant, and contractor personnel who are responsible for coordinating on-airport construction work
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

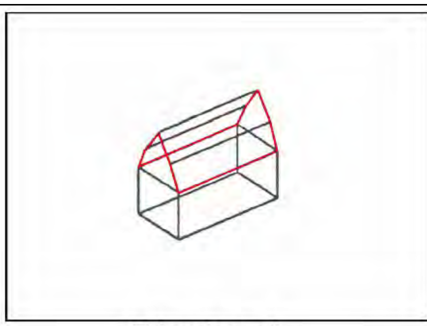
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.9.3. Roof

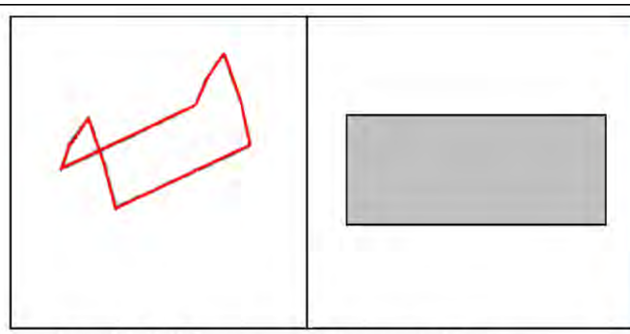
Definition: Structure on top of buildings, garages and other similar structures.				
Feature Group	Manmade Structures			
Feature Class Name	Roof			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
A-ROOF-OTLN	Roof outline			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1 MM	User Defined
MicroStation Standards	1	Continuous	7	User Defined
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*None*		
	FGDC	*None*		
	SDSFIE	*None*		
Documentation and Submission Requirements	None			
Related Features				

Data Capture Rules: *Collect the roof outline to represent the outer edge of the roof as well as the break line or ridge lines of a sloped or multiple level roof. On flat roofs with elevator shafts or large HVAC units on the roof collect these items at the top of the units and shown as a roof within a roof feature.*

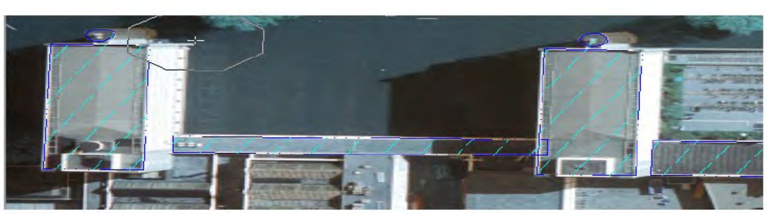
NOTE: *If the roof penetrates an OIS or is selected as a representative object, additionally identify, classify and document the roof as an* ObstructionArea *and associated accuracy.*



Triangle roof



Actual 3-D Polygon Planimetric View



Top Perimeter of Building Superimposed over Imagery

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	
Feature Attributes			

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
buildingNumber (String 16)	The code indicating the number of the building
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.9.4. Fence

Definition: Any fencing (chain-link, razor wire, PVC, etc.) [Source: FAA]				
Feature Group	Manmade Structures			
Feature Class Name	Fence			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-DETL-FENC-	Fencing			
C-SITE-FENC-	Fences and handrails			
L-DETL-FENC-	Fencing			
L-SITE-FENC-	Fencing			
S-SAFE-FENC-	Fencing			
V-SITE-FENC-	Fences and handrails			
C-SECU-FENC-	Security fencing			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	5	Continuous	1 MM	User Defined
MicroStation Standards	1		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*Fence*		Extension
	FGDC	*Fence*		Extension
	SDSFIE	*fence_line*		
Documentation and Submission Requirements	No documentation is required.			
Related Features				

Data Capture Rules: *Collect line along fence line.* **NOTE:** *If the fence penetrates an OIS or is selected as a representative object, additionally identify, classify and document the fence as an Obstacle and associated accuracy.*			
Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
type (String 16)	Indicate the fencing material used.
height (Real)	The overall distance from the surface of the ground to the top of the fence.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.9.5. Gate

Definition: A gate is an opening in a fence or other type of barrier between areas.				
Feature Group	Manmade Structures			
Feature Class Name	Gate			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
L-DETL-GATE-	Gate			
L-SITE-GATE-	Gate			
C-SITE-GATE-	Gates along fences or other barriers intended to restrict access			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	214	Continuous	1 MM	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*GateLine*		Extension
	FGDC	*GateLine*		Extension
	SDSFIE	*gate_line*		
Documentation and Submission Requirements	None			

<table>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect center of gate from post-to-post.

NOTE: If the gate penetrates an OIS or is selected as a representative object, additionally identify, classify and document the gate as an <u>Obstacle</u> and associated accuracy.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td>Horizontal</td><td colspan="3">Vertical</td></tr>
<tr><td>N/A</td><td colspan="3">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="3">Vertical</td></tr>
<tr><td colspan="2">Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>± 3 ft</td><td colspan="2">± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="3">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="3">Nearest foot</td></tr>
</table>

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name, code or identifier used to identify the gate.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 240 characters.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
type (VARCHAR2 (50))	The gate material and method of construction.
length (Real)	The overall distance from one end of the gate to the other.
height (Real)	The overall distance from the surface of the top of the gate.
attended (Boolean)	A Boolean indicating whether the gate is tended by a guard or other individual.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.9.6. Tower

<table>
<tr><td colspan="5">Definition: A structure created, by man, to facilitate an activity at an elevated level above the ground.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Manmade Structures</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">Tower</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-STRC-TOWR-</td><td colspan="4">Tower</td></tr>
<tr><td>E-POLE-GUYS-</td><td colspan="4">Guy equipment</td></tr>
<tr><td>V-POLE-GUYS-</td><td colspan="4">Guy equipment</td></tr>
<tr><td>V-STRC-TOWR-</td><td colspan="4">Tower</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>7</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>0</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td>Equivalent Standards</td><td>AIXM</td><td colspan="2">VerticalStructure</td><td>Extension</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>FGDC</td><td colspan="2">Tower</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">tower_site</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">No documentation is required.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the point at the highest location of the tower. When surveying guyed structures, capture any guys penetrating a surface separately from the structure itself. Determine and document the point where the guy wires penetrate the OIS at a distance greater than 100 feet from the actual structure, identify it as a separate point object.

NOTE: If the tower penetrates an OIS or is selected as a representative object, additionally identify, classify and document the tower as an <u>Obstacle</u> and associated accuracy.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 3 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
</table>

Feature Attributes

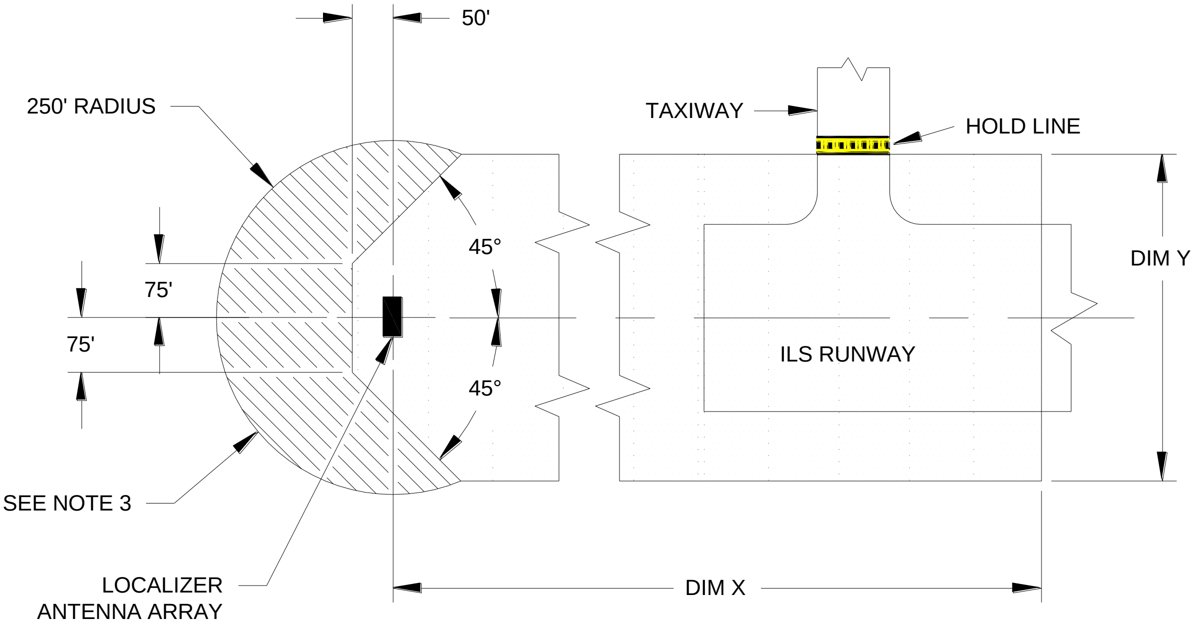
Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
verticalStructureMaterial (Enumeration: CodeVerticalStructureMaterial)	Classifies the predominant material of the vertical object
lightCode (Boolean)	A code indicating that the tower is lighted [Source: AIXM]
lightingType (Enumeration: codeLightingConfigurationType)	A description of the lighting system. Lighting system classifications are Approach; Airport; Runway; Taxiway; and Obstruction
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking(s)
color (Enumeration: codeColor)	The color of the marking(s)
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.
structureHeight (Real)	Maximum height of structure; i.e. AGL height

5.10. Group: NAVIGATIONAL AIDS

All of the different navigational aids are represented using a single feature type. To assist the data producer in identifying the different aids, each individual navigational aids is defined separately even though they are all represented by the single feature type NavigationalAidEquipment. Accuracies differ for many navigational aids. Be sure to collect the navigational aid within the accuracy stated in each navigational aid table.

5.10.1. NAVAID Critical Area

<table>
<tr><td colspan="5">Definition: A zone encompassing a specific ground area in the vicinity of a radiating antenna array which must be protected from parking and unlimited movement of surface and air traffic. The drawings included in this table are representative, be sure to refer to the official source to ensure the appropriate area is protected. [Source: FAA Order 6750.16C]</td></tr>
<tr><td>Feature Group</td><td colspan="4">NavigationalAids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidCriticalArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AIRF-AIDS-CRIT</td><td colspan="4">Airfield Navigational Aid - Critical Area</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">ObstacleAssessmentAreaExtension</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavigationalAidCriticalArea</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">airfield_buffer_zone_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect a closed polygon encompassing the greatest horizontal extents of the critical area for the NAVAID. Critical areas are normally associated with the localizer, glideslope, MLS azimuth, MLS elevation, and Precision Approach Radars. If necessary, identify the area using multiple polygons. Adjacent polygons must have shared edges and vertices and must not overlap polygons of the same feature.</td></tr>
</table>



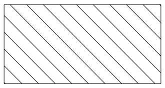
DIMENSIONS X AND Y VALUES (IN FEET)

	DIM X	DIM Y
CATEGORY I (SEE NOTE 4)	2000	400
CATEGORY II/III (SEE NOTE 5)	2000	400
CATEGORY II	4000	500
CATEGORY III	7000	500

LEGEND

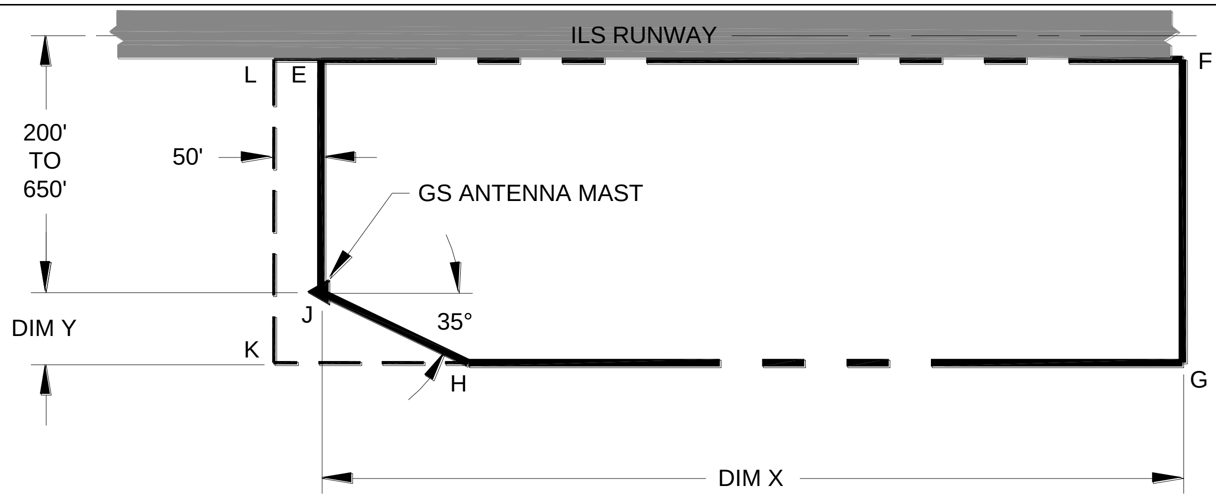
AREA A

AREA B



NOTES:

1. THE CRITICAL AREA IS INDICATED BY THE SHADED ZONES.
2. HOLD LINE/SIGNS INDICATE THE POSITION BEYOND WHICH AIRCRAFT/VEHICLES WILL REQUIRE ATCT AUTHORIZATION BEFORE PROCEEDING ON OR ACROSS THE RUNWAY.
3. AREA B IS DELETED FROM THE CRITICAL AREA WHEN A UNIDIRECTIONAL LOCALIZER ANTENNA IS INSTALLED. THE STANDARD LOG-PERIODIC DIPOLE ANTENNA ARRAY IS IN THIS CATEGORY.
4. FOR 8-ELEMENT LOCALIZER ARRAYS WITH COURSE WIDTHS LESS THEN 4 DEGREES AND RUNWAYS WHICH OPERATE B-747 SIZE OR LARGER AIRCRAFT, THE Y DIMENSION SHALL BE 600 FEET.
5. THESE DIMENSIONS APPLY WHERE AIRCRAFT SIZE IS EQUAL TO OR LESS THAN 135 FEET IN LENGTH OR 42 FEET IN HEIGHT(I.E.B-737).
6. CRITICAL AREAS FOR LDA, SDF, AND THE OFFSET LOCALIZER FACILITIES ARE THE SAME AS CATEGORY I, BUT ARE CENTERED ABOUT THE COURSE LINE.



NOTES:

1. THE CRITICAL AREA IS DEFINED BY THE PENTAGON "EFGHJ".

2. ALL AIRCRAFT MAY BE PARKED AS CLOSE AS 50' BEHIND A GLIDESLOPE MAST WITH DIRECTIONAL ANTENNAS AS DEFINED BY LINE "KL".

3. FACILITY TYPE

FACILITY TYPE	CATEGORY I DIM X	CATEGORY I DIM Y	CATEGORY II/III DIM X	CATEGORY II/III DIM Y
ALL IMAGE GLIDE SLOPES				
SMALL AIRCRAFT ●	800	100	800	100
NULL REFERENCE				
MEDIUM AIRCRAFT ●●	2000	200	2500	200
LARGE AIRCRAFT ●●●	3100	200	3200	200
SIDEBAND AND CAPTURE EFFECT				
MEDIUM AND LARGE AIRCRAFT ●●/●●●	1300	200	1300	200

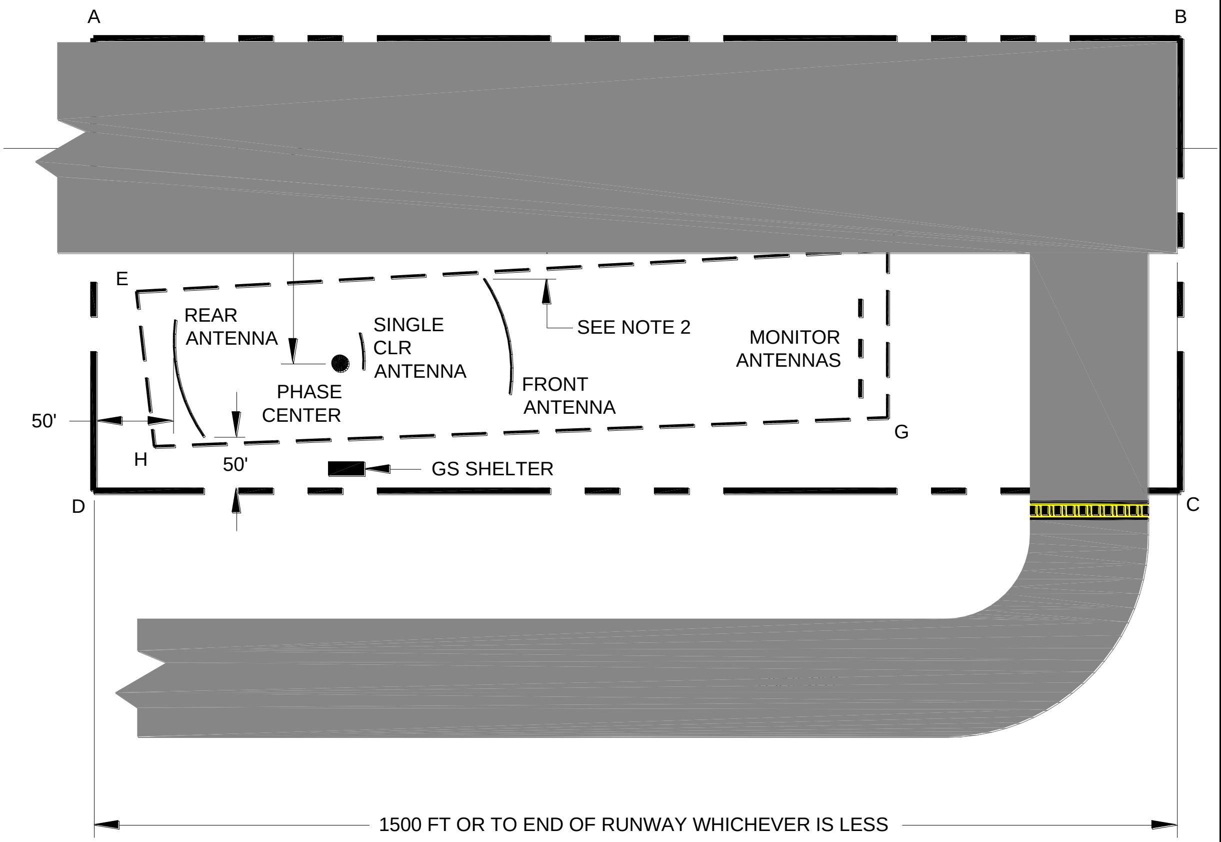
ALL DISTANCES ARE IN FEET AND REPRESENT THE MINIMUM ALLOWABLE DISTANCES FROM THE NEAREST POINT ON THE AIRCRAFT LONGITUDINAL AXIS (LINE FROM NOSE TO TAIL) TO THE GLIDE SLOPE ANTENNA, AS DEFINED IN FIGURE 1-3.

● SMALL AIRCRAFT ARE DEFINED AS AIRCRAFT WITH DIMENSIONS LESS THAN 60' IN LENGTH AND 20' IN HEIGHT (I.E. KINGAIR). THIS INCLUDES ALL SURFACE VEHICLES AND HELICOPTERS.

●● MEDIUM AIRCRAFT ARE DEFINED AS AIRCRAFT WITH DIMENSIONS LESS THAN 160' IN LENGTH AND 38' IN TAIL HEIGHT (I.E. B-737, MD-80).

●●● LARGE AIRCRAFT ARE DEFINED AS AIRCRAFT GREATER THAN 160' IN LENGTH OR GREATER THAN 38' IN TAIL HEIGHT.

THE SMALL, MEDIUM AND LARGE AIRCRAFT SIZES ARE BASED UPON THE DIMENSIONS USED IN COMPUTER MODELING OF CRITICAL AREAS AND APPLY TO THIS DOCUMENT ONLY.



NOTES:

1. THIS DISTANCE IS APPROXIMATELY 200 FEET DEPENDING ON RUNWAY WIDTH. REFER TO FAA DRAWINGS D-6226-1 AND D-6226-2 FOR INSTALLATION LAYOUT.
2. THIS DISTANCE SHALL NOT BE LESS THAN 25 FEET.
3. THE CRITICAL AREA IS DEFINED BY THE AREA "ABCD". UNRESTRICTED TAXIING OR HOLDING AIRCRAFT IS PERMITTED IN UNSHAPED AREA.
4. SNOW REMOVAL AREA IS DEFINED AS "EFGH".

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Tenth of foot	

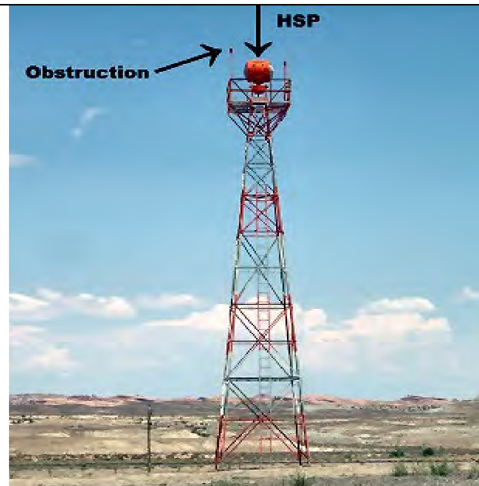
Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
dimensionX (Integer)	The linear dimension of the critical area in the X axis.

dimensionY (Integer)	The linear dimension of the critical area in the Y axis.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.2. Navaid Equipment – Airport Beacon (APBN)

Definition: A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are differentiated from civil beacons by dual-peaked (two quick) white flashes between the green flashes.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipmentExtension*	Extension	
	FGDC	*NavigationalAidEquipment*		
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the horizontal and vertical positions of the NAVAID using the survey point identified below. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID using the OBSTACLE feature type and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of cover or axis of rotation		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	



Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 5 ft	± 10 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidEquipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System.
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.

centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

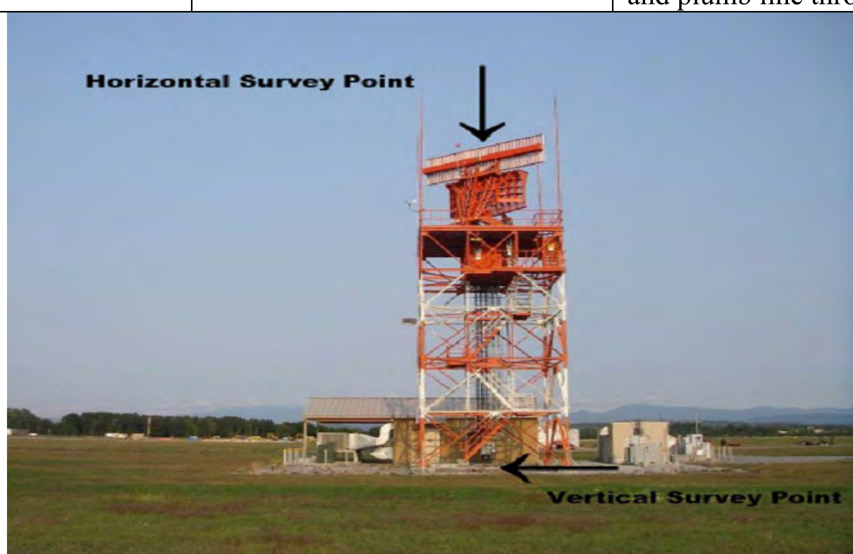
5.10.3. Navaid Equipment – Air Route Surveillance Radar (ARSR) or Airport Surveillance Radar (ASR)

Definition: These radars are used to detect and display an aircraft´s position while operating in the terminal area (ASR) and en route (ARSR) between terminal areas.	
Feature Group	Navigational Aids
Feature Class Name	NavaidEquipment
Feature Type	Point

CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*	Extension	
	FGDC	*NavaidEquipmentExtension*	Extension	
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				

Data Capture Rules: *Collect the horizontal and vertical positions of the NAVAID using the survey point identified below. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as using the OBSTACLE feature type and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	Center of cover or axis of rotation	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 10 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

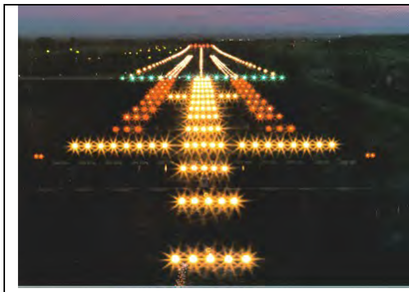
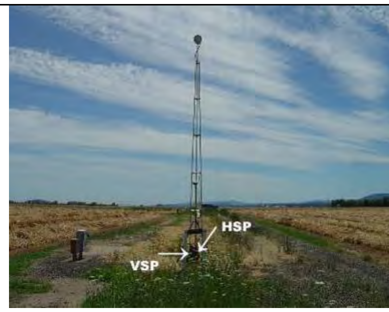
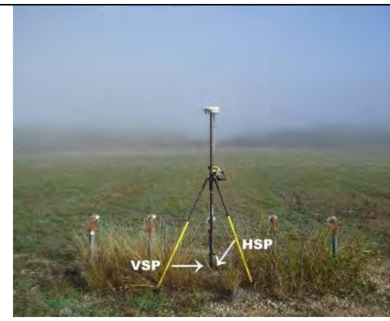
Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature

description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.4. Navaid Equipment – Approach Light System (ALS)

Definition: An airport lighting facility providing visual guidance to landing aircraft by radiating light beams in a directional pattern the pilot uses to align the aircraft with the extended centerline of the runway on final approach for landing. Some airports have Condenser-Discharge Sequential Flashing Lights or Sequenced Flashing Lights in conjunction with the ALS.					
Feature Group	Navigational Aids				
Feature Class Name	NavaidEquipment				
Feature Type	Point				
CADD Standard Requirements					
Layer/Level	**Description**				
C-AFLD-AIDS-	Airfield Navigational Aid -				
	Color		**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4		Continuous	1	User Defined
MicroStation Standards	7			7	
Information Assurance Level	Unclassified				
Equivalent Standards	**AIXM**	*NavaidEquipment*			Extension
	FGDC	*NavaidEquipmentExtension*			Extension
	SDSFIE	*navigational_aid_point*			
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.				
Related Features					
Data Capture Rules: *Collect the horizontal and vertical positions of the NAVAID using the survey point identified below. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as using the OBSTACLE feature type and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*					
Monumentation	No monumentation required.				
Survey Point Location	**Horizontal**			**Vertical**	
	Horizontal center of the center light of the first and last lights rows			The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	

 Pilot's perspective of an ALSF-2.	 Collecting the first light or center light of the first row.	 Collecting the last light or center light of last row.

Types of Approach Light Systems are:

1. ALSF-1- Approach Light System with Sequenced Flashing Lights in ILS Cat-I configuration.

2. ALSF-2- Approach Light System with Sequenced Flashing Lights in ILS Cat-II configuration. The ALSF-2 may operate as an SSALR when weather conditions permit.

3. SSALF- Simplified Short Approach Light System with Sequenced Flashing Lights.

4. SSALR- Simplified Short Approach Light System with Runway Alignment Indicator Lights.

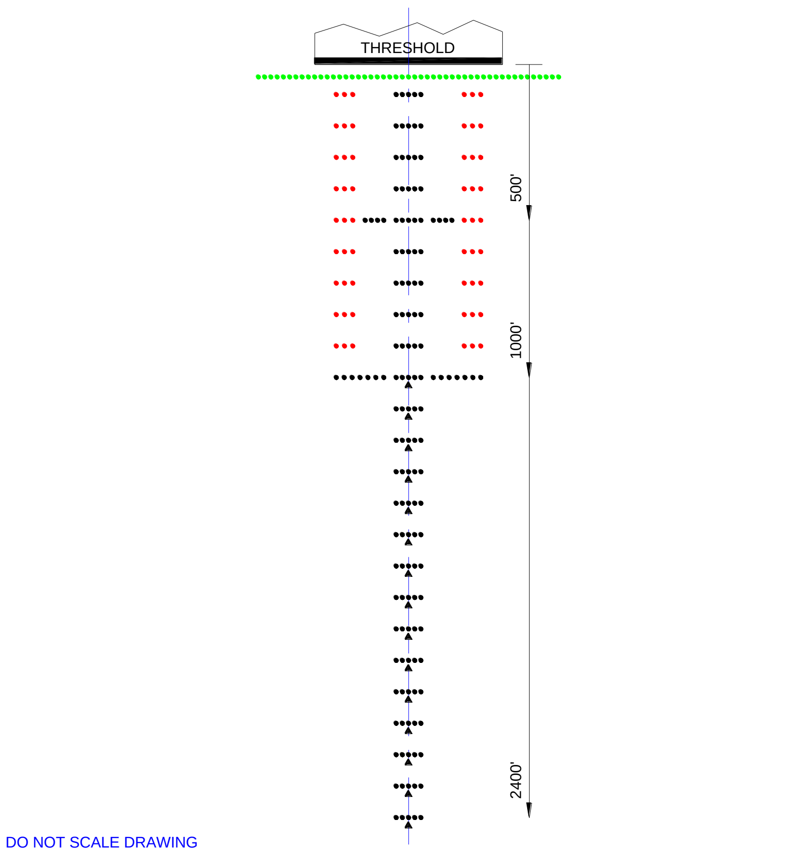
5. MALSF- Medium Intensity Approach Light System with Sequenced Flashing Lights.

6. MALSR- Medium Intensity Approach Light System with Runway Alignment Indicator Lights.

7. LDIN- Lead-in-light system.

8. RAIL- Runway Alignment Indicator Lights- Sequenced Flashing Lights which are installed only in combination with other light systems.

9. ODALS- Omnidirectional Approach Lighting System.

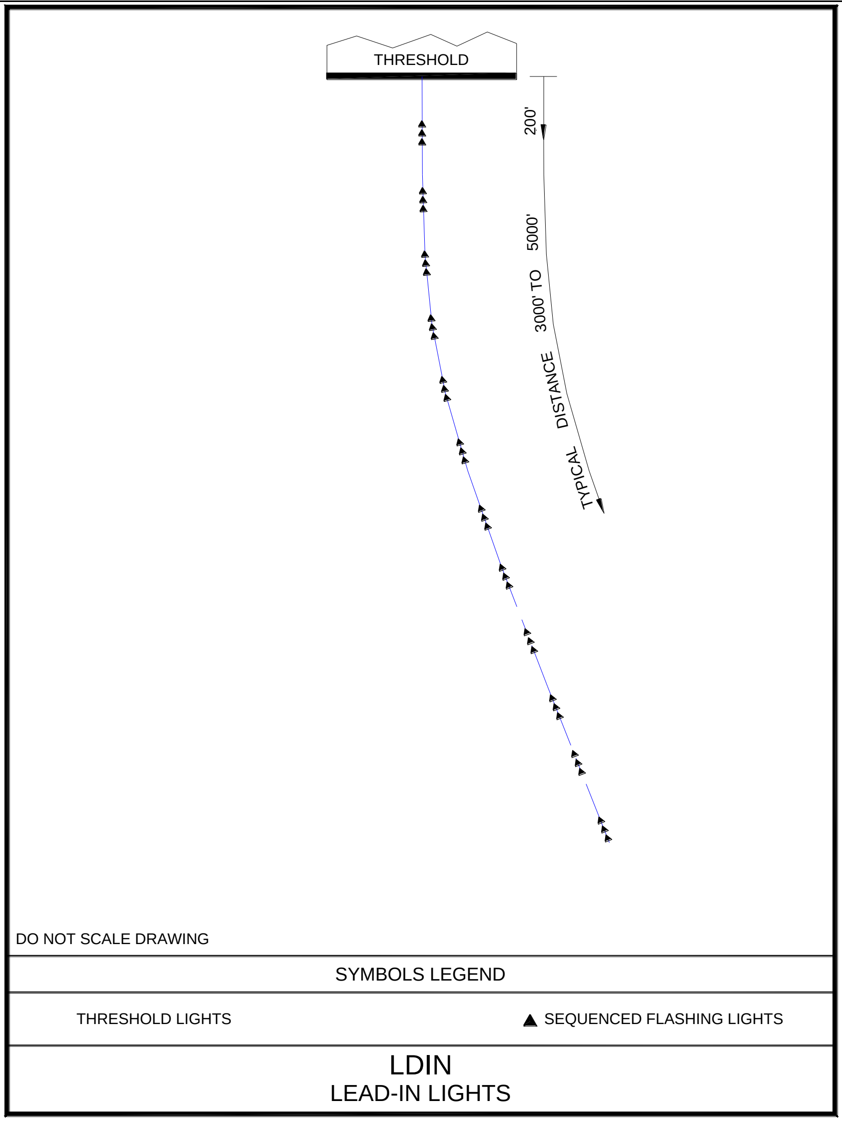


SYMBOLS LEGEND

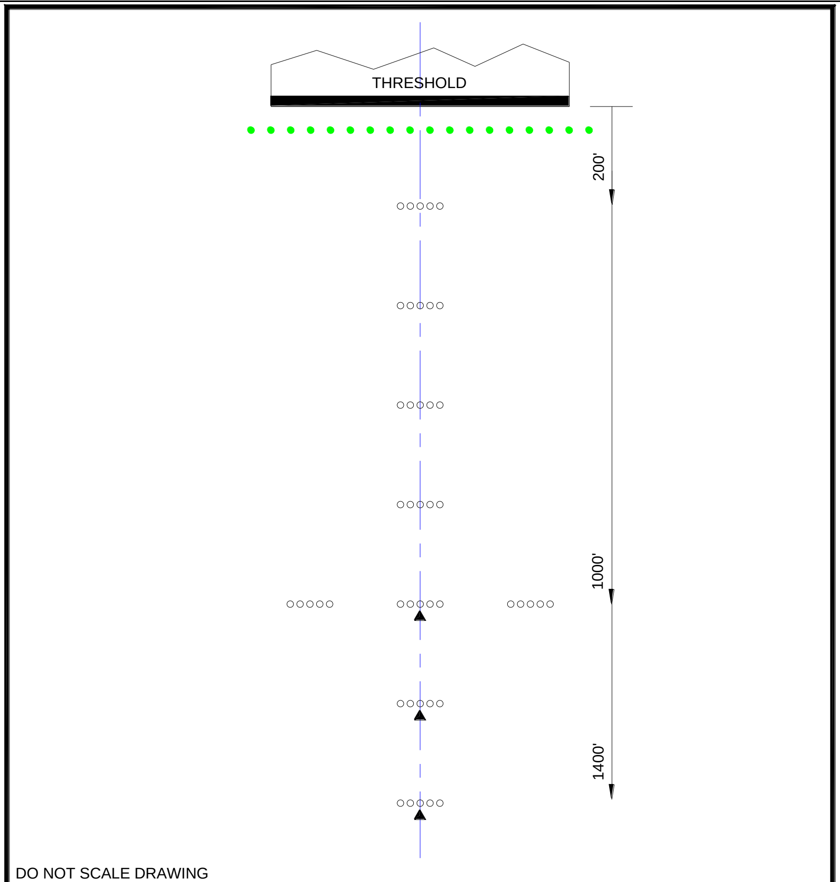
- STEADY BURNING RED LIGHTS (ALIGNED WITH TOUCHDOWN ZONE ON RUNWAY)
- HIGH INTENSITY STEADY BURNING WHITE LIGHTS
- SEQUENCED FLASHING LIGHTS
- THRESHOLD LIGHTS

ALSF-2
HIGH INTENSITY APPROACH LIGHTING SYSTEM WITH
SEQUENCED FLASHING LIGHTS (CAT II/CAT III)

The ALSF-2 is a system of light bars and barrettes in the approach zone immediately ahead of the runway threshold. The standard length of an ALSF-2 is 3000 feet unless terrain or other local conditions prevent a full length installation. Then the length may be shortened to not less than 2400 feet. The ALSF-2 consists of centerline light barrettes, sequence flashing lights, 1000-foot crossbar, 500-foot crossbar, side row barrettes, and threshold lights. A barrette is three or more lights closely spaced in a transverse line so that from a distance they appear as a single short illuminated bar. For the ALSF-2, the length of a barrette shall not exceed 15 feet and the center-to-center spacing of the lights shall not exceed 5 feet.



The LDIN consists of one or more series of flashing lights installed at or near ground level that provides positive visual guidance along an approach path, either curving or straight, where special problems exist with hazardous terrain, obstructions, or noise abatement procedures.

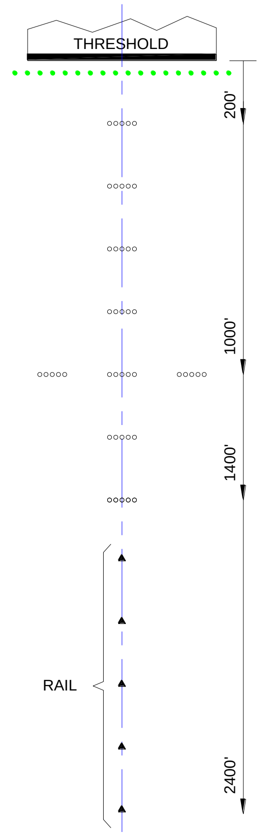


SYMBOLS LEGEND

- ● THRESHOLD LIGHTS
- ▲ SEQUENCED FLASHING LIGHTS
- ○ MEDIUM INTENSITY STEADY BURNING WHITE LIGHTS

MALSF
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHING LIGHTS

A MALSF is a subset of MALSR. A MALSR has 45 lights, 5 flashers, and is 2400 ft in length. A MALSF has 45 lights, 3 flashers, and is 1400 ft in length. MALS has 45 lights, no flashers, and is 1400 ft in length.



DO NOT SCALE DRAWING

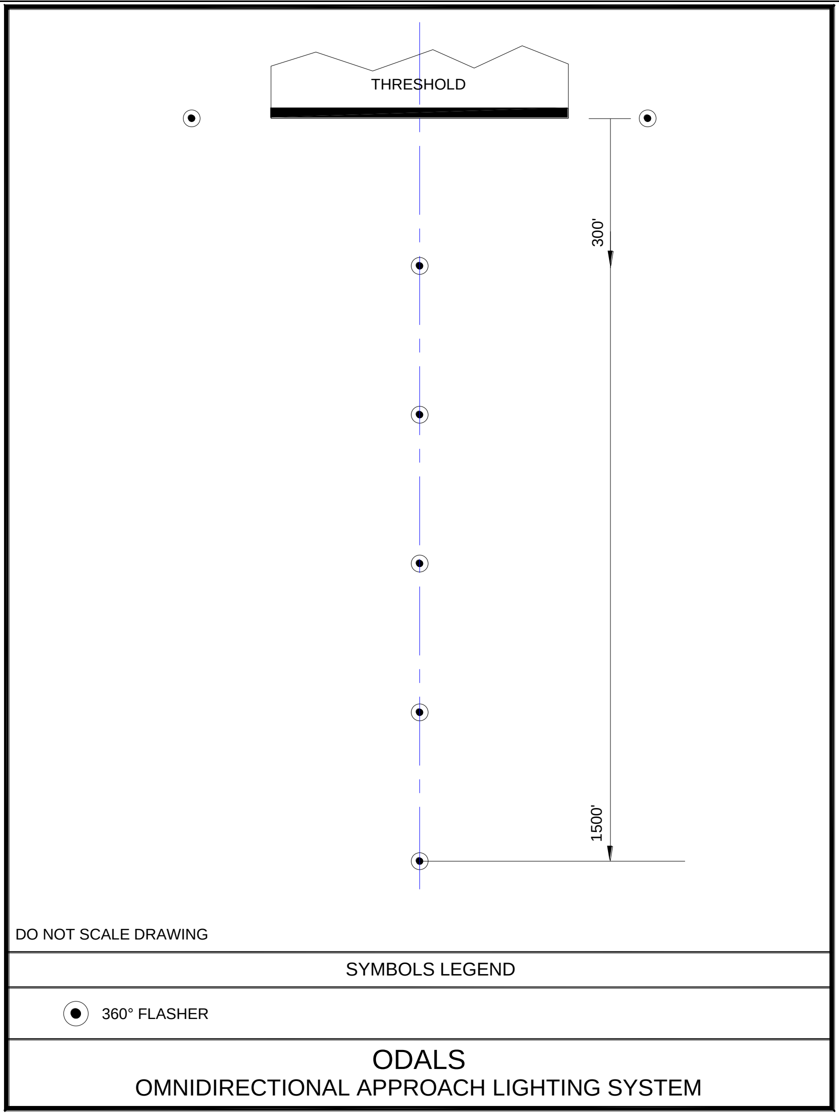
SYMBOLS LEGEND

● THRESHOLD LIGHTS ▲ SEQUENCED FLASHING LIGHTS

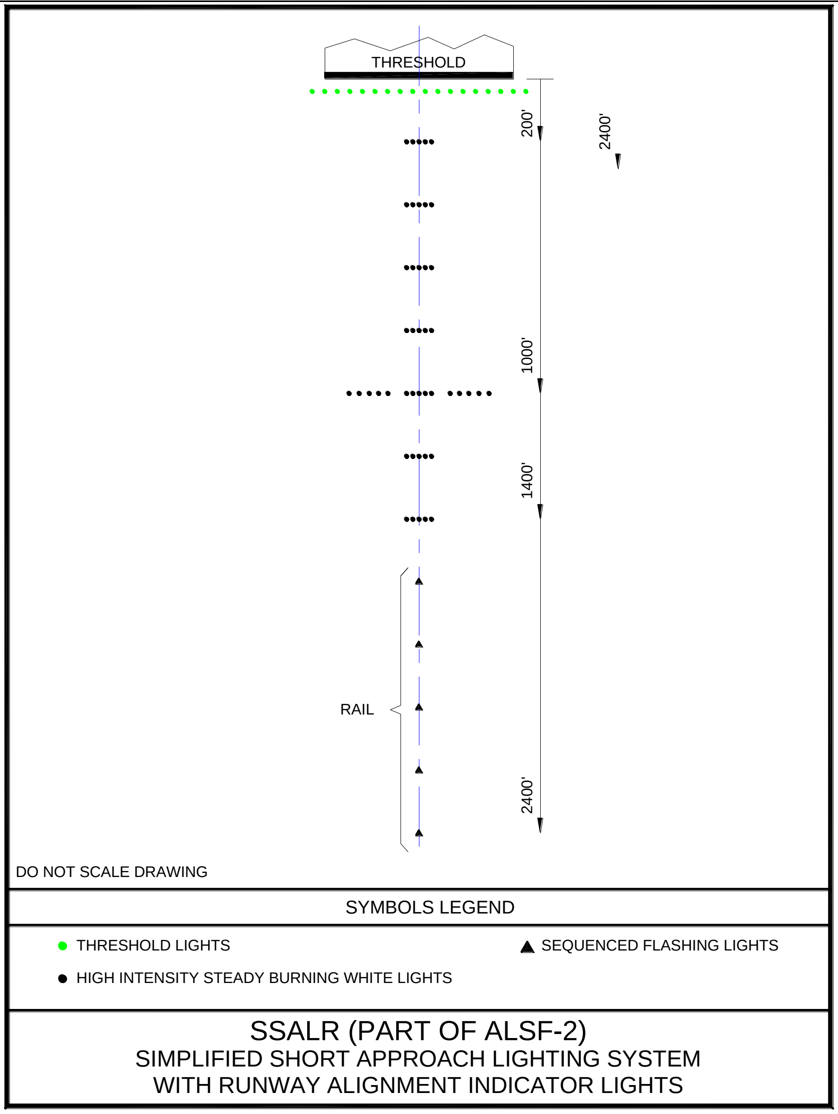
○ MEDIUM INTENSITY STEADY BURNING WHITE LIGHTS

MALSR
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH
RUNWAY ALIGNMENT INDICATOR LIGHTS (CAT I)

The MALSR is a system that supports Category I instrument approaches. It is a medium intensity light system that identifies the extended runway centerline from threshold to 2,400 feet before the threshold. The MALSR supports Category I instrument approaches and presents to the pilot the illusion of a ball of light traveling from the outer end of the system to a point approximately 1,400 feet from the end of the runway. A row of green lights marks the threshold of the runway.



The ODALS consists of seven omnidirectional flashing lights located in the approach area of a nonprecision runway. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located, one on each side of the runway threshold, at a lateral distance of 40 feet from the runway edge, or 75 feet from the runway edge when installed on a runway equipped with a VASI.



A SSALR System is a high intensity approach lighting system that provides a visual lighting path for landing aircraft. It usually is a 2400-foot-long array of lights but can be longer or shorter depending on local terrain and requirements.

A typical SSALR system consist of the following light fixture components:

• 9 light bars each with 5 steady burning white fixtures

• 5 sequence flashing white fixtures

• Threshold bar of 18 steady burning green fixtures.

Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]

thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.5. Navaid Equipment – Back Course Marker (BCM)

Definition: Provides runway alignment aircraft guidance on approach.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*	Extension	
	FGDC	*NavaidEquipmentExtension*	Extension	
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the horizontal and vertical positions of the NAVAID using the survey point identified below. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as using the OBSTACLE feature type and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**	**Vertical**		
	Center of antenna array.	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.		
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**		
		Orthometric	**Ellipsoidal**	
	± 10 ft	± 20 ft	N/A	
Resolution	**Geographic Coordinates**	**Distances and Elevations**		
	Hundredth of arc second	Nearest one foot		

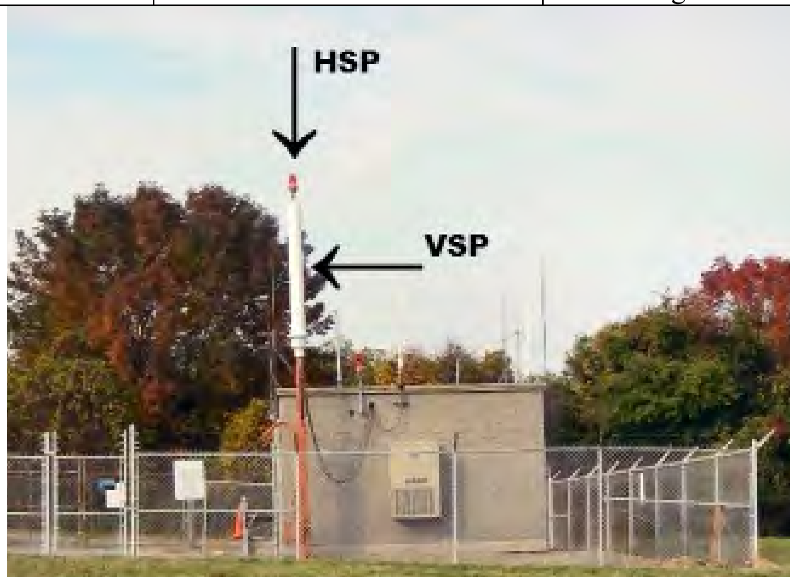
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.

referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.6. Navaid Equipment – Distance Measuring Equipment (DME)

Definition: Provides distance (and in some systems groundspeed) information only from the ground facility to aircraft.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
DME or DME paired with a LOC	Center of antenna cover.		Center of antenna cover.	

DME frequency paired with MLS azimuth, NDB or VOR	Center of antenna cover	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.



Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 1 ft	± 1 ft	N/A

Resolution	Geographic Coordinates	Distances and Elevations
	Hundredth of arc second	Nearest one foot

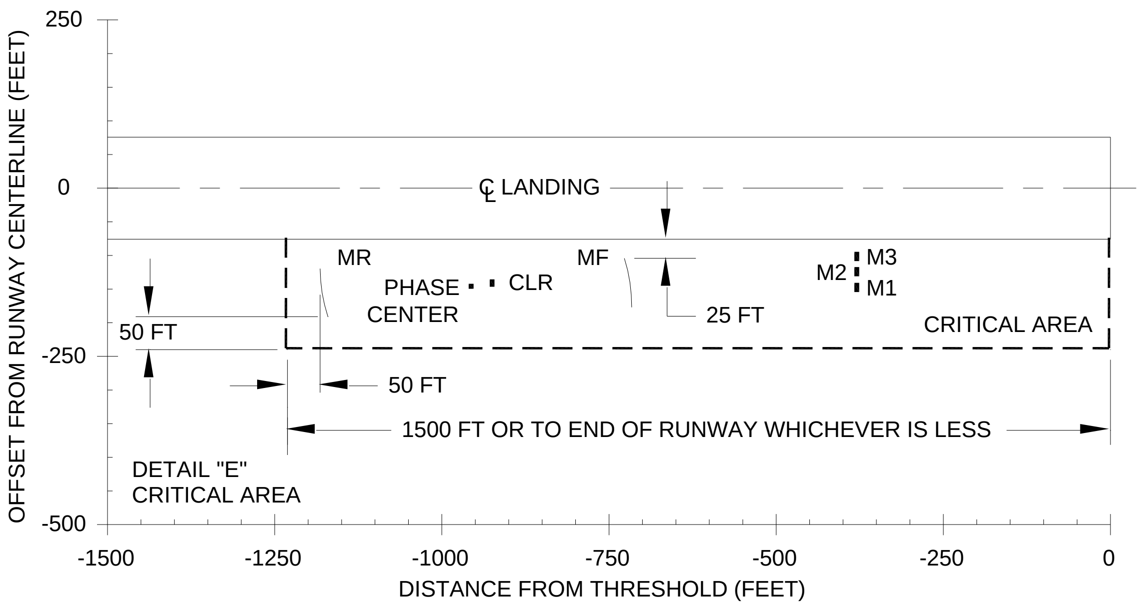
Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System

useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.7. Navaid Equipment –Glide Slope – End Fire (GS)

Definition: Provides vertical guidance for aircraft during approach and landing.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Phase center reference point.		Phase center reference point.	



ABBREVIATIONS USED ABOVE:

CLR:	CLEARANCE SIGNAL TRANSMITTING ANTENNA
MR:	REAR MAIN SIGNAL TRANSMITTING
MF:	FRONT MAIN SIGNAL TRANSMITTING
M1, M2, M3:	SIGNAL MONITOR ANTENNAS

Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 0.25 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]

navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System.
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.8. Navaid Equipment – Fan Marker (FM)

Definition: Electronic NAVAID that provides horizontal (alignment) guidance for aircraft on a final approach.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7	Continuous	7	User Defined
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*	Extension	
	FGDC	*NavaidEquipmentExtension*	Extension	
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				

Monumentation		No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**	
	Center of antenna array.	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 10 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 240 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.9. Navaid Equipment – Glideslope (GS)

Definition: Provides vertical guidance for aircraft during approach and landing.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of Antenna Supporting Structure		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 1 ft	± 0.25 ft	± 0.20 ft
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.

antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.10.Navaid Equipment – Ground Controlled Approach (GCA) Touchdown Reflectors

Definition: Electronic NAVAID equipment that provides precision approach information for incoming aircraft.	
Feature Group	Navigational Aids

<table>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">Center of Antenna Array</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
<tr><td colspan="5"></td></tr>
</table>

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 10 ft	± 20 ft	± 20 ft
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest one foot	

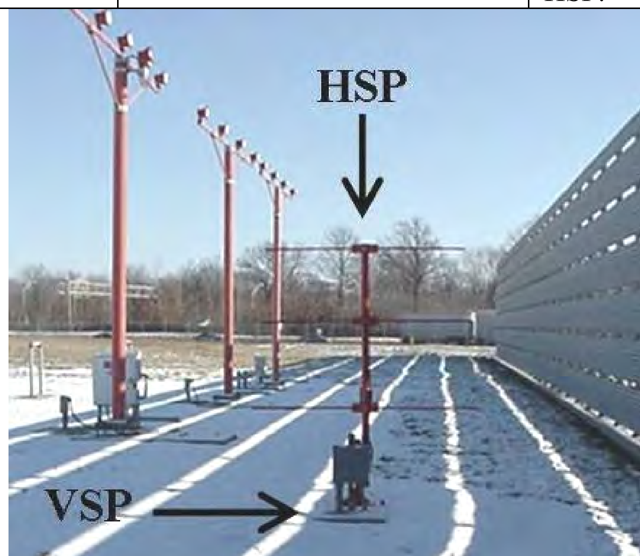
Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)

status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.11. Navaid Equipment – Inner Marker (IM)

Definition: Marker beacon used with an ILS (CAT II) precision approach located between the middle marker and the end of the ILS runway, transmitting a radiation pattern keyed at six dots per second and indicating to the pilot, both aurally and visually, that he/she is at the designated decision height (DH), normally 100 feet above the touchdown zone elevation, on the ILS CAT II approach. It also marks progress during a CAT III approach.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS- **-**	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			

<table>
<tr><td>Related Features</td><td colspan="3"></td></tr>
<tr><td colspan="4">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="3">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td>Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Center of Antenna Array</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
<tr><td colspan="4">
</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>± 10 ft</td><td>± 20 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="2">Nearest one foot</td></tr>
</table>

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]

navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.12.Navaid Equipment – Localizer (LOC)

<table>
<tr><td colspan="5">Definition: The component of an ILS that provides course guidance to the runway.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Navigational Aids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs <u>1.5.2</u> and <u>1.5.3</u>.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="4">Mark and document the selected survey point for validation by NGS and inclusion in the Airports GIS database. When the ends of the runway surface have been determined, mark the positions using a nail and washer, chisel square, or paint if possible with a distinctive inscription to ensure future identification. Mark the survey point with a nail and washer inscribed with the setting company’s name and year.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">Center of Antenna Supporting Structure</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
</table>

Determining the HSP and Vertical Point #1 of a Localizer

A localizer (LOC) antenna array is normally located beyond the departure end of the runway it serves (localizer 17 is on the south end of the runway) and generally consists of several pairs of directional antennas. The localizer operates as a component of the Instrument Landing System or ILS; however, it can be operated by itself. Since the localizer is made up of a set of arrays (antenna's) it provides a unique challenge in determining the center of the antenna unit. In the figure below, there are 14 antenna elements. The proper method of determining the HSP is to find the center of the supporting structure at the center of the antenna array. In this figure, this is the center of the center of structures supporting the seventh antenna element from each side.

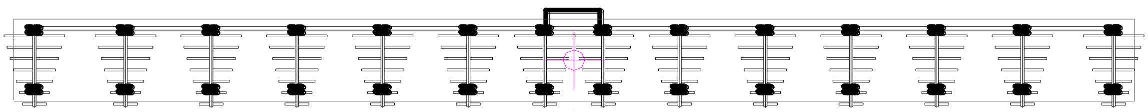
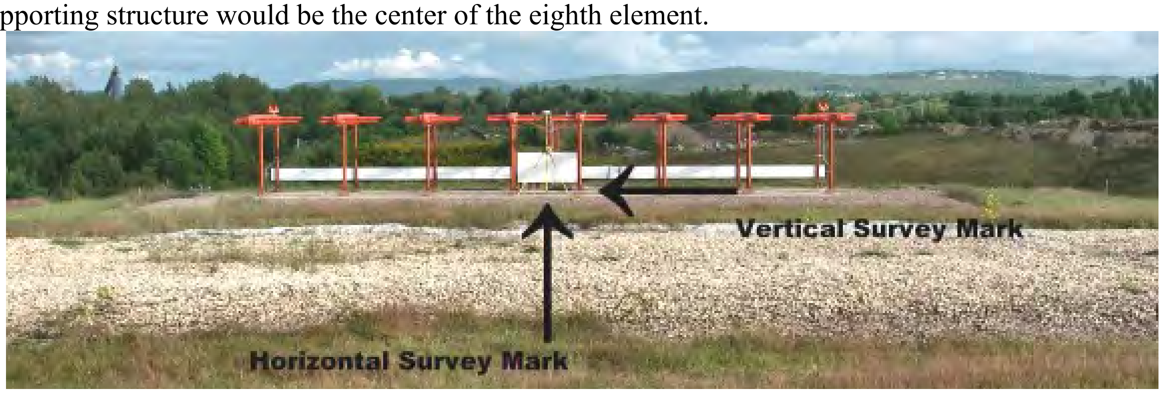


Illustration of a localizer antenna array depicting each of the elements and the selection of the HSP and Vertical Point #1.

In order to locate the center of the supporting structure the surveyor, is required to first locate the center of the array and then the center of the supporting structure. In order to locate the center of the supporting structure in the figure above, the surveyor would locate the center of the space between the seventh element from each end. It is recommended the surveyor use tape measures or string to form a "X" and then use a plumb bob to locate the point at the base of the antenna. Another method of the same technique is to draw lines in between the bolts supporting the elements and forming an "X" to locate the center. If the antenna array has an odd number of elements such as 15, then the center of the supporting structure would be the center of the eighth element.



Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 1 ft	± 0.25 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest one foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility

runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.13.Navaid Equipment – Localizer Type Directional Aid (LDA)

<table>
<tr><td colspan="5">Definition: A NAVAID used for nonprecision instrument approaches with utility and accuracy comparable to a localizer but which is not a part of a complete ILS and is not aligned with the runway.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Navigational Aids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
</table>

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	Center of Antenna Supporting Structure	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 1 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.

offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.14. Navaid Equipment – Middle Marker (MM)

Definition: A marker beacon that defines a point along the glideslope of an ILS normally located at or near the point of decision height (ILS Category I). It is keyed to transmit alternate dots and dashes, with the alternate dots and dashes keyed at the rate of 95 dot/dash combinations per minute on a 1300 Hz tone, which is received aurally and visually by compatible airborne equipment.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7	Continuous	7	User Defined

<table>
<tr><td>Information Assurance Level</td><td colspan="3">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td>NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td>NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="2">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="3">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
<tr><td>Related Features</td><td colspan="3"></td></tr>
<tr><td colspan="4">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="3">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td>Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Center of Antenna Array</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
</table>

<table>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>± 10 ft</td><td>± 20 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="2">Nearest one foot</td></tr>
</table>

Feature Attributes

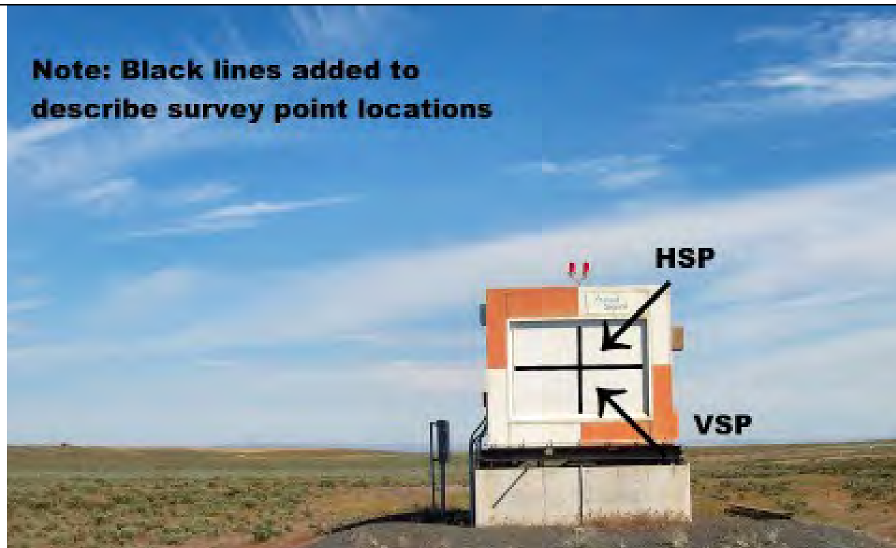
Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.15.Navaid Equipment – MLS Azimuth Antenna (MLSAZ)

Definition: Antenna in a Microwave Landing System (MLS) providing horizontal guidance for incoming aircraft. MLS is precision instrument approach system operating in the microwave spectrum which normally consists of an Azimuth Station, an Elevation Station and Precision Distance Measuring Equipment.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Phase Center Reference Point		Phase Center Reference Point	



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 1 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.

centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.16.Navaid Equipment – MLS Elevation Antenna (MLSEZ)

Definition: Antenna in a Microwave Landing System (MLS) providing vertical guidance for incoming aircraft. MLS is precision instrument approach system operating in the microwave spectrum which normally consists of an Azimuth Station, an Elevation Station and Precision Distance Measuring Equipment.	
Feature Group	Navigational Aids

Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Phase Center Reference Point		Phase Center Reference Point	

Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 1 ft	± 0.25 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	
Feature Attributes			

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature

description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.

referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

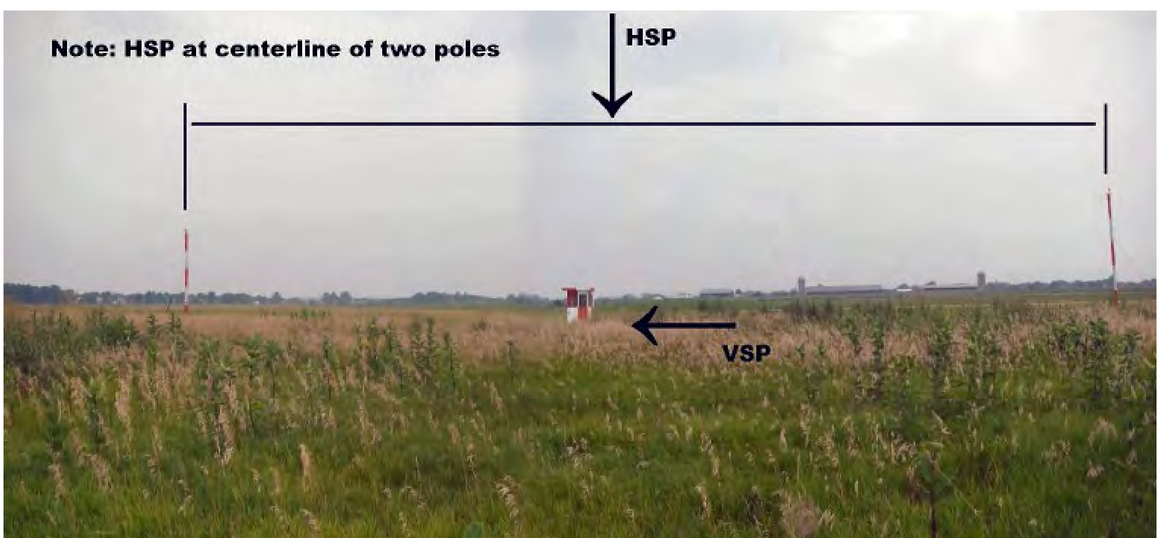
5.10.17. Navaid Equipment – Non-Directional Beacon (NDB)

Definition: An L/MF or UHF radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his/her bearing to or from the radio beacon and "home" on or track to or from the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			

	Horizontal	Vertical
Survey Point Location	Center of Antenna Array	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.

The following photograph displays an NDB of the single frame type:

The following photography displays a NDB of the dual frame type:



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 10 ft	± 20 ft	N/A

Resolution	Geographic Coordinates	Distances and Elevations
	Hundredth of arc second	Nearest one foot

Feature Attributes

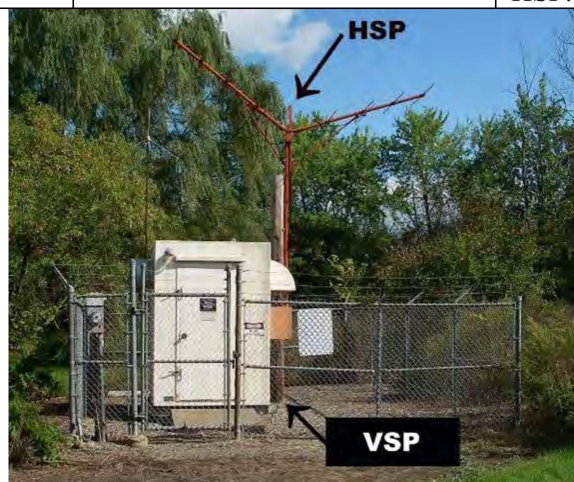
Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility

runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.18.Navaid Equipment – Outer Marker (OM)

<table>
<tr><td colspan="5">Definition: A marker beacon at or near the glideslope intercept altitude of an ILS approach. It is keyed to transmit two dashes per second on a 400 Hz tone, which is received aurally and visually by compatible airborne equipment. The OM is normally located four to seven miles from the runway threshold on the extended centerline of the runway.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Navigational Aids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
</table>

Related Features		
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*		
Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	Center of Antenna Array	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 10 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

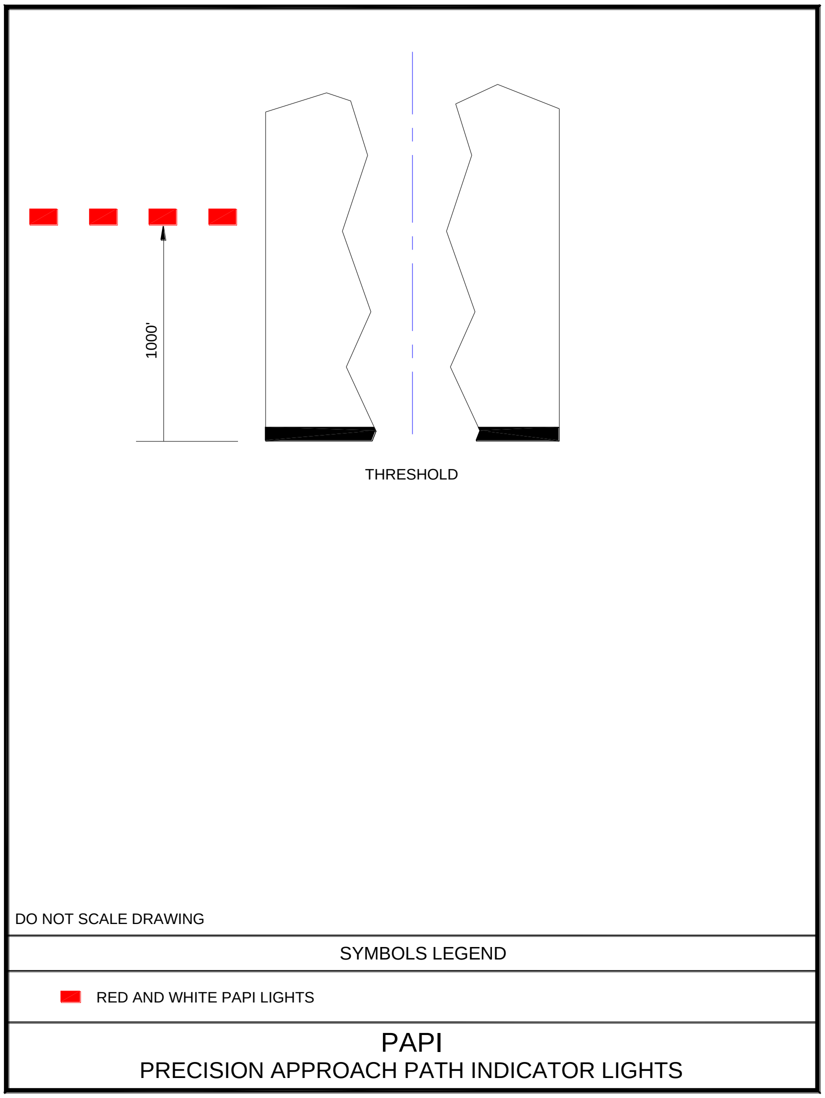
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]

navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

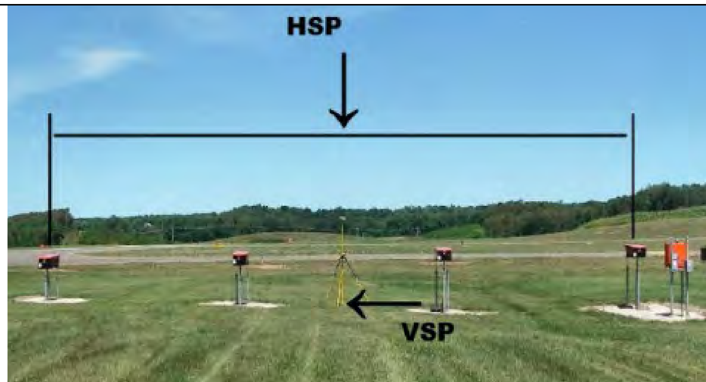
5.10.19. Navaid Equipment – Precision Approach Path Indicator (PAPI) System

Definition: An airport lighting facility, similar to VASI, providing vertical approach slope guidance to aircraft during approach to landing. PAPIs consist of a single row of either two or four lights, normally installed on the left side of the runway, and have an effective visual range of about 5 miles during the day and up to 20 miles at night. PAPIs radiate a directional pattern of high intensity red and white focused light beams which indicate that the pilot is "on path" if the pilot sees an equal number of white lights and red lights, with white to the left of the red; "above path" if the pilot sees more white than red lights; and "below path" if the pilot sees more red than white lights.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				



The PAPI is a simple visual aid to assist pilots during their approach to landing in Visual Flight Rules (VFR) conditions. It enables pilots to acquire the correct glide slope and subsequently to maintain their position on it, thus ensuring an accurate approach and landing. The PAPI system consists of four sharp transition projector units located at the side of the runway spaced laterally ±30 foot intervals. A second complementary set is sometimes provided on the opposite side of the runway. The setting angles of the red/white interfaces of the four units are graded; the differences in angle between the units being typically 20 minutes of arc. The nominal glide slope is midway between the angular settings of the center pair of units and the on-glide-slope signal and is thus two red and two white lights in the bar. If the aircraft goes below the glide slope, the pilot will see a progressively increasing number of red lights. Conversely, if the aircraft goes above the glide slope, the number of white lights seen is increased.

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	Center of light array	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 10 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.

stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.20. Navaid Equipment – Precision Approach Radar (PAR) Touchdown Reflectors

Definition: Radar equipment in some ATC facilities operated by the FAA and/or the military services at joint-use civil/military locations and separate military installations to detect and display azimuth, elevation, and range of aircraft on the final approach course to a runway.	
Feature Group	Navigational Aids
Feature Class Name	NavaidEquipment
Feature Type	Point
CADD Standard Requirements	
Layer/Level	**Description**
C-AFLD-AIDS-	Airfield Navigational Aid -

	Color	Line Type	Line Weight	Symbol
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of array		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 10 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID

navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.

Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.21.Navaid Equipment – Pulse Light Approach Slope Indicator (PLASI) System

Definition: Pulse Light Approach Slope Indicator (PLASI) systems are a visual approach aid for use in visual flight conditions.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*	Extension	
	FGDC	*NavaidEquipmentExtension*	Extension	
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of light array		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 10 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest one foot	
Feature Attributes				

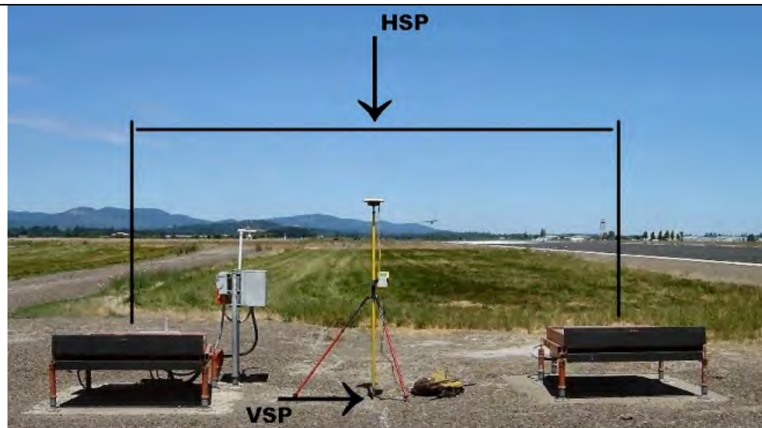
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.22.Navaid Equipment – Pulsating Visual Approach Slope Indicator (PVASI)

<table>
<tr><td colspan="5">Definition: The Visual Approach Slope Indicator (VASI) is a system of lights on the side of an airport runway that provides visual descent guidance information during the approach to a runway.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Navigational Aids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">Center of light array</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
</table>



<table>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>± 5 ft</td><td>± 10 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="2">Nearest one foot</td></tr>
</table>

Feature Attributes

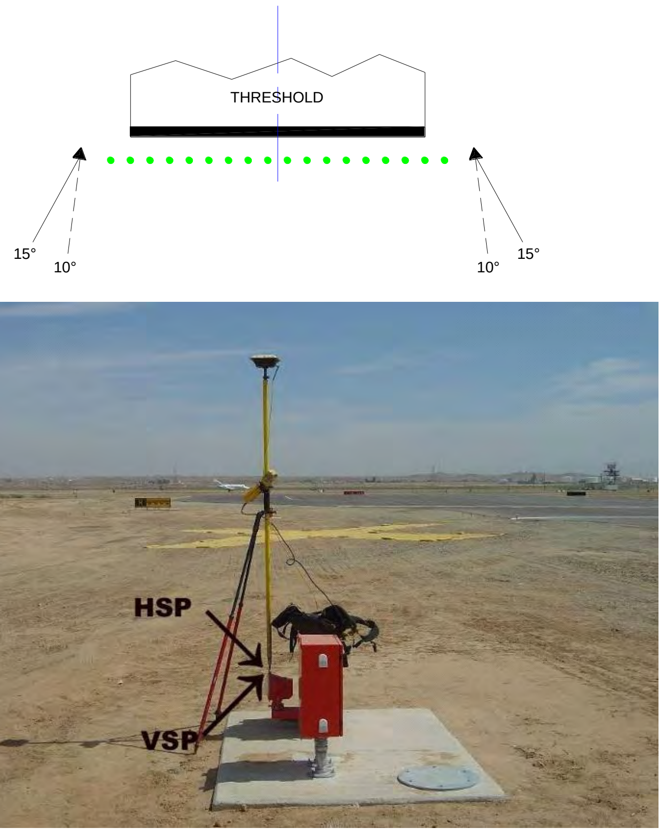
Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.

centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.23. Navaid Equipment – Runway End Identifier Lights (REIL)

Definition: Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.	
Feature Group	Navigational Aids
Feature Class Name	NavaidEquipment
Feature Type	Point

CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				



DO NOT SCALE DRAWING

SYMBOLS LEGEND

● THRESHOLD LIGHTS ▲ SEQUENCED FLASHING LIGHTS

REIL
RUNWAY END INDENTIFICATION LIGHTS

The REIL is an airport lighting system consisting of two flashing, white, high intensity lights located at each approach end corner of a runway. The REILs are directed towards the approach zone to enable pilots to identify the end of the runway.

Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	Center of Light	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	
Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	**Ellipsoidal**
	± 3 ft	± 5 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.24. Navaid Equipment – Simplified Directional Facility (SDF)

<table>
<tr><td colspan="5">Definition: NAVAID used for nonprecision instrument approaches. The final approach course is similar to that of an ILS localizer except that the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Navigational Aids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavaidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
</table>

<table>
<tr><td rowspan="2">Survey Point Location</td><td>Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Center of Antenna Supporting Structure</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>± 1 ft</td><td>± 1 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td>Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>Hundredth of arc second</td><td colspan="2">Nearest one foot</td></tr>
</table>

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.

offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

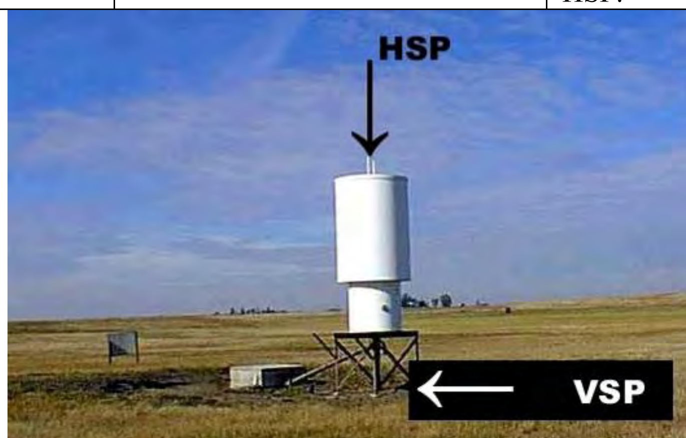
5.10.25.Navaid Equipment – Tactical Air Navigation (TACAN)

Definition: An ultra-high frequency electronic rho-theta air navigation aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension

	FGDC	*NavaidEquipmentExtension*	Extension
	SDSFIE	*navigational_aid_point*	
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.		
Related Features			

Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	Center of Antenna Cover	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 10 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

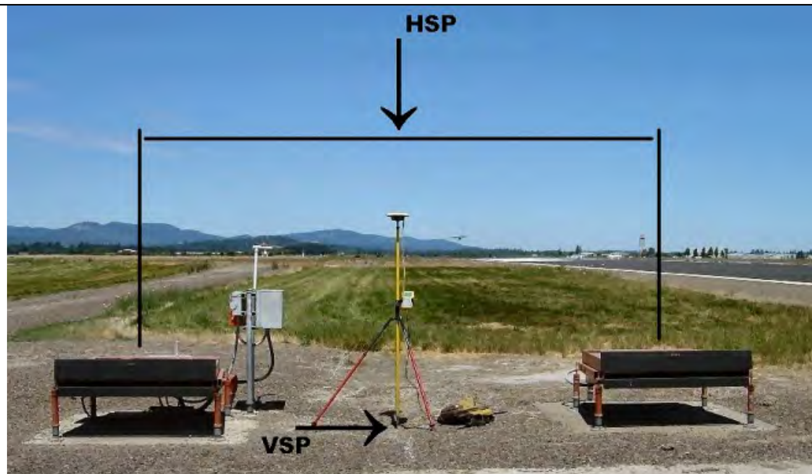
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.26.Navaid Equipment – Tricolor Visual Approach Slope Indicator System (TRCV)

Definition: Tri-color visual approach slope indicators normally consist of a single light unit projecting a three-color visual approach path into the final approach area of the runway upon which the indicator is installed.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of light array		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	



Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 10 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.

centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.27. Navaid Equipment – "T" Visual Approach Slope Indicator System (T-VASI)

Definition: T-VASI system provides approach slope guidance by means of illuminated symbols like the PAPI.	
Feature Group	Navigational Aids
Feature Class Name	NavaidEquipment
Feature Type	Point

CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of light array		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 10 ft	± 10 ft
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest one foot	

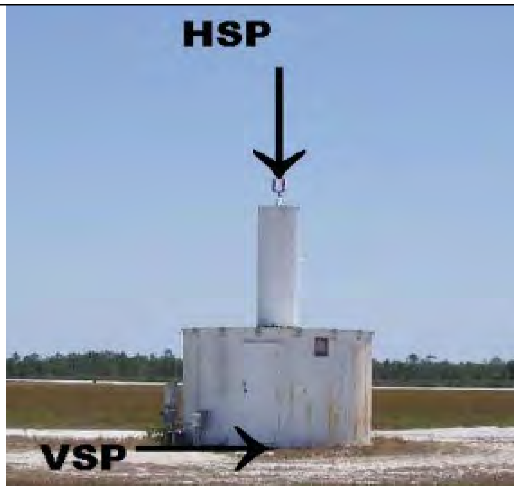
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID

navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.

Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.28. Navaid Equipment – VHF Omni Directional Range (VOR)

<table>
<tr><td colspan="5">Definition: A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the NAS. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Navigational Aids</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">NavaidEquipment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Point</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-AIDS-</td><td colspan="4">Airfield Navigational Aid -</td></tr>
<tr><td></td><td>Color</td><td>Line Type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">NavigationalAidEquipment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">NavaidEquipmentExtension</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">navigational_aid_point</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">Document this feature as described in paragraphs 1.5.2 and 1.5.3.</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">Center of Antenna Cover</td><td colspan="2">The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.</td></tr>
</table>

 Standalone VOR	 VOR coupled with DME

<table>
<tr><th rowspan="3">Accuracy Requirements (in feet)</th><th rowspan="2">Horizontal</th><th colspan="2">Vertical</th></tr>
<tr><th>Orthometric</th><th>Ellipsoidal</th></tr>
<tr><td>± 10 ft</td><td>± 20 ft</td><td>N/A</td></tr>
<tr><th rowspan="2">Resolution</th><th>Geographic Coordinates</th><th colspan="2">Distances and Elevations</th></tr>
<tr><td>Hundredth of arc second</td><td colspan="2">Nearest one foot</td></tr>
</table>

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.

centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

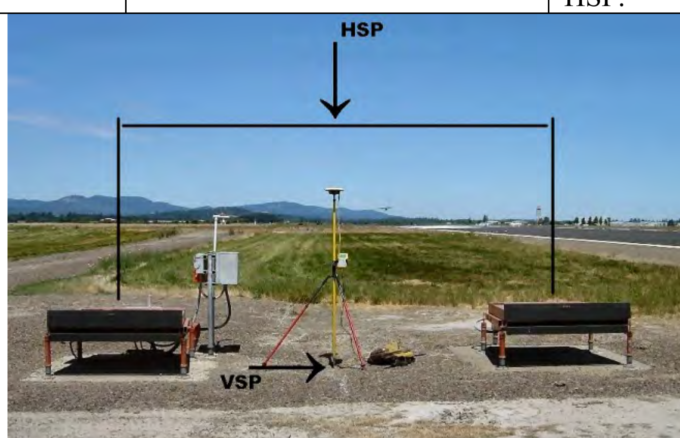
5.10.29.Navaid Equipment – Visual Approach Slope Indicator System (VASI)

Definition: An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he/she is "on path" if he/she sees red/white, "above path" if white/white, and "below path" if red/red. Some airports serving large aircraft have three-bar VASIs which provide two visual glide paths to the same runway.

Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				

Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*

Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	Center of Light Array	The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.



Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 10 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.

faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use "Z" plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.
centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to "visual")
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.

referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.30.Navaid Equipment – VOR/TACAN (VORTAC)

Definition: A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.				
Feature Group	Navigational Aids			
Feature Class Name	NavaidEquipment			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AFLD-AIDS-	Airfield Navigational Aid -			
	Color	**Line Type**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidEquipment*		Extension
	FGDC	*NavaidEquipmentExtension*		Extension
	SDSFIE	*navigational_aid_point*		
Documentation and Submission Requirements	Document this feature as described in paragraphs 1.5.2 and 1.5.3.			
Related Features				
Data Capture Rules: *Collect the position of the NAVAID using the HSP and the elevation at the VSP. If the NAVAID penetrates an OIS or is selected as a representative object, additionally identify, classify and document the NAVAID as an Obstacle and associated accuracy. When identifying a NAVAID as an obstacle, survey the highest point on the entire structure as the top elevation including appurtenances.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	Center of Antenna Cover		The intersection of the ground, gravel, concrete pad, or other base and plumb line through the HSP.	

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 10 ft	± 20 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Hundredth of arc second	Nearest one foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters.
faaFacilityId (String 4)	Enter the identifier. When reporting on a glide slope, enter the identifier of the associated localizer. Do not enter the prefix "I" for ILS or "M" used with the MLS systems. Where more than one ASR is in operation at the same location or at an associated location, these equipments will be identified with the letters A, B, C, etc., following the identification (e.g., NQIB). The same applies to PAR identifiers. These alpha codes must be the same as those used to accomplish the daily flight log. For ARSR facilities, use “Z” plus the identifier of the controlling ARTCC or military installation. Light systems will use the airport identifier and runway number. [Source:FAA Order 8250-42]
navaidEquipmentType (Enumeration: CodeNavaidequipmentType)	Specifies the type of NAVAID
navigationalAidSystemType (Enumeration: CodeNavaidSystemType)	Identifes the navigational aid equipment as part of an overall system. For example the localizer and glideslope together make up the Instrument landing system (ILS) or the MLS Azimuth and MLS Elevation make up a Microwave Landing System
useCode (Enumeration: CodeUseCode)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized.
antennaToThresholdDistance (Real)	The distance in feet that the antenna is from the runway threshold. Provide the distance to the nearest tenth of a foot.

centerlineDistance (Real)	Distance from the centerline perpendicular point to the physical runway end. This should be the same distance as the antenna to threshold distance unless the runway end the navigational aid serves has a displaced threshold. Provide this distance to the nearest tenth of a foot.
stopEndDistance (Real)	Provide the distance distance the from the antenna along the centerline to the stop end of the runway.
offsetDistance (Real)	The distance in feet that the feature is offset from the runway centerline. Provide this distance to the nearest tenth of a foot.
offsetDirection (Enumeration: CodeOffsetDirection)	Enter the direction (right, left, or on centerline) the navigational aid is offset from the runway. Determine the appropriate direction from the approach threshold down the runway.
lightingType (Enumeration: CodeLightingConfigurationType)	The type of Visual navigational aid system (use only when CodeNavaidEquipmentType is set to “visual”)
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String 75)	The owner of the facility
runwayEndId (String 3)	Identify the primary instrument runway served by the facility. When more than one runway is served by a precision approach aid (such as a PAR), provide a separate feature for each runway. This attribute is only required for ILS, MLS, TLS, and PAR.
referencePointEllipsoidHeight	Provide the height above the ellipsoid (HAE) for the referencePoint.
referencePointThreshold (Real)	Distance from the runway reference point to the threshold. Provide this distance to the nearest tenth of a foot. [Source: FAA AAS-100]
thresholdCrossingHeight (Real)	The designated crossing height of the flight path angle above the Landing Threshold Point (or Fictitious Threshold Point).
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
ellipsoidElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.10.31.NAVAID Site

Definition: The parcel, lease, or right-of-way boundary for a NAVAID or facility that is located off airport property.	
Feature Group	Navigational Aids
Feature Class Name	NAVAIDSite
Feature Type	Polygon

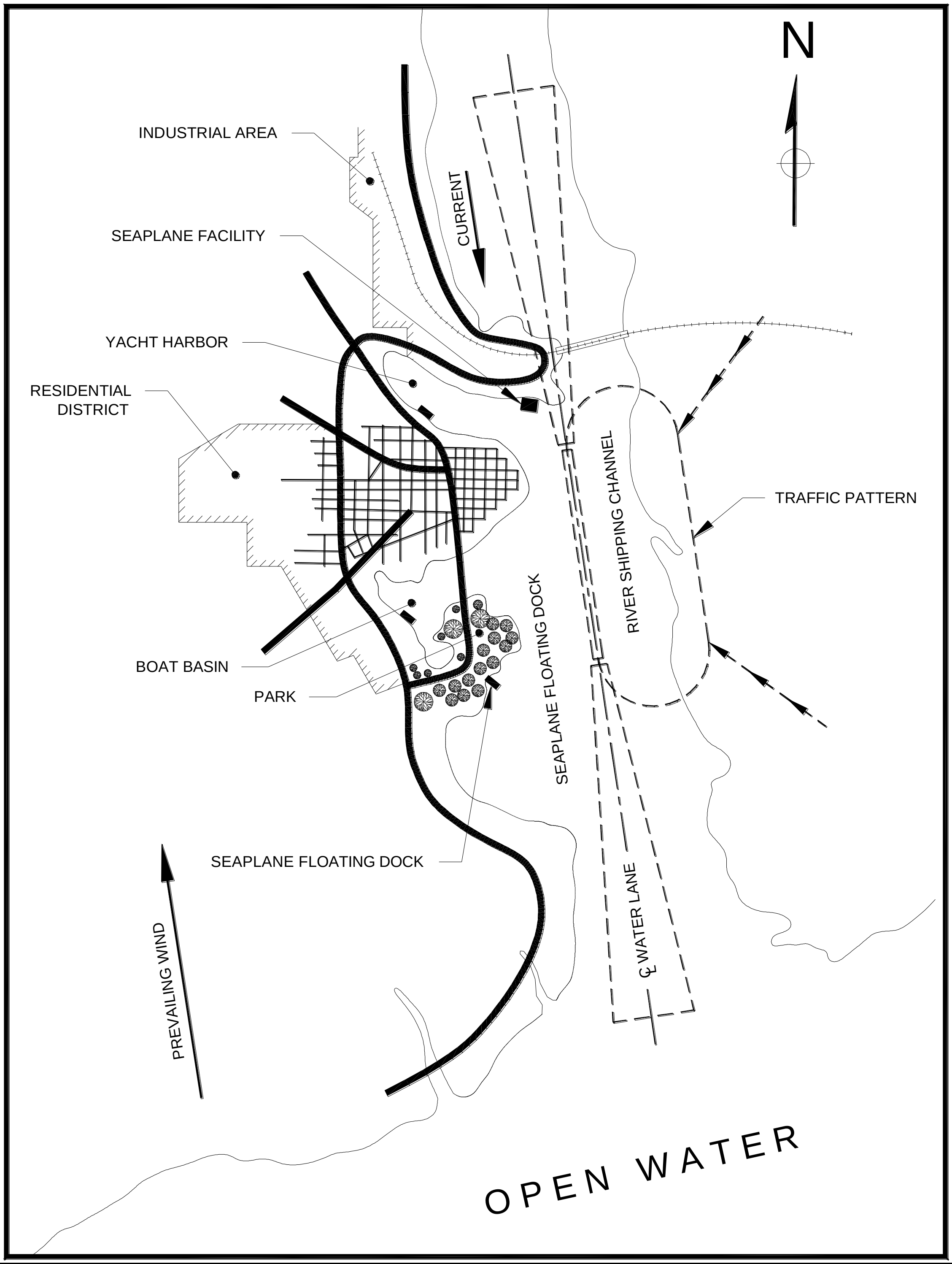
CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRF-AIDS-SITE	Airfield Navigational Aid - Site			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	1	Continuous	1	User Defined
MicroStation Standards	3		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavaidSite*		Extension
	FGDC	*NavigationalAidSite*		Extension
	SDSFIE	*Airfield_facility_surface_site*		
Documentation and Submission Requirements	No documentation required.			
Related Features				
Data Capture Rules: *Collect a closed polygon to its greatest horizontal extent.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 10 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Hundredth of arc second		Nearest one foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature
description (VARCHAR2 (255))	A brief description of the facility and any special characteristics.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
faaFacilityId (String 4)	The location identifier assigned to the feature by FAA
facilityType (String 16)	The type of facility or feature related to airfield operations.
propertyCustodian (String 50)	The regional property management office responsible for ownership of the site
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11. Group: SEAPLANE

5.11.1. Water Operating Area

<table>
<tr><td colspan="5">Definition: An area designated and marked for the takeoff and landing of aircraft. This is equivalent to the Airport Operating Area of a land based airport.</td></tr>
<tr><td>Feature Group</td><td colspan="4">SeaPlane</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">WaterOperatingArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-SEAP-WTOA-</td><td colspan="4">Seaplane dock</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">None</td><td></td></tr>
<tr><td>FGDC</td><td colspan="3">None</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the WaterOperatingArea using a bounding polygon to capture the area at its greatest extents.</td></tr>
</table>



Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 20 ft	N/A

Resolution	Geographic Coordinates	Distances and Elevations
	Five hundredth of arc second	Nearest foot

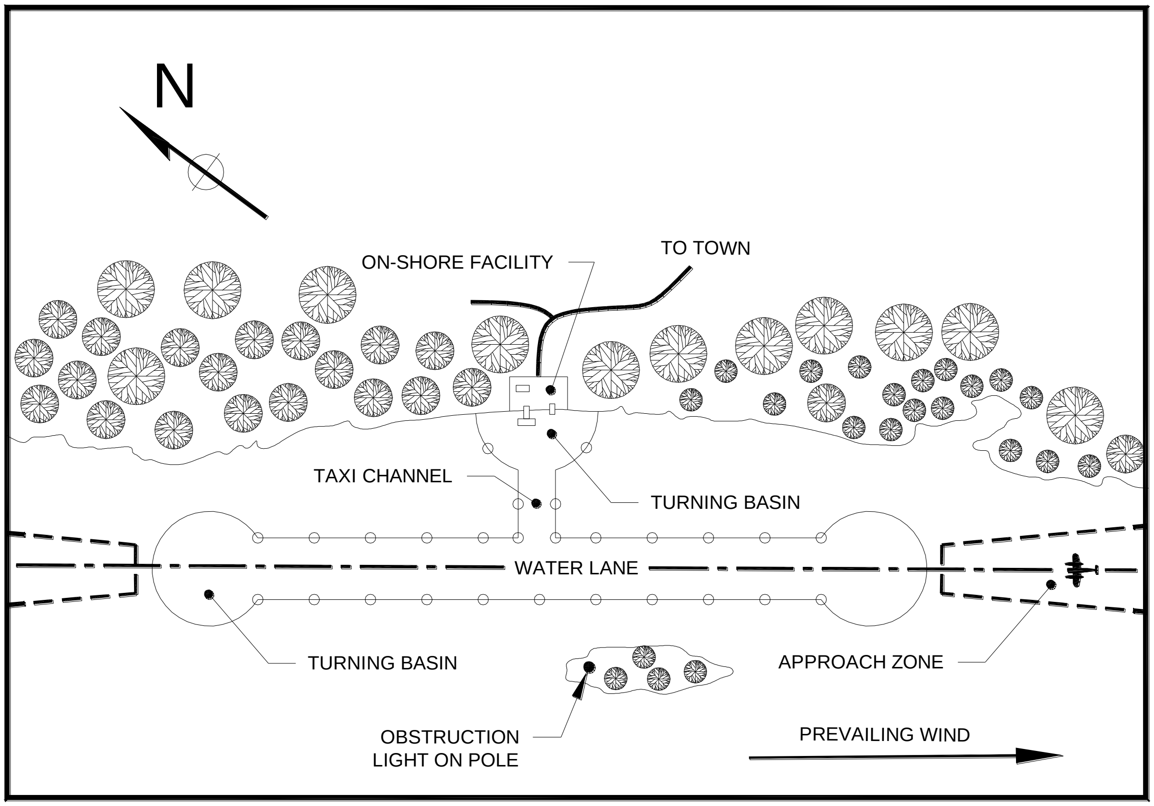
Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature water body (river/lake).
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
surfaceMaterial (Enumeration: CodeSurfaceMaterial	Code used to indicate the type of water the water operating area is on or planned to use.
length (Integer)	Specify the overall length of the WaterOperatingArea to the nearest 5 feet
width (Integer)	Specify the overall width of the waterOperatingArea to the nearest 5 feet
currentFlowRate (Integer)	Measure and specify the rate of the current flow in the WaterOperatingArea in miles per hour
compassLocation (Enumeration: CodeCompassLocation)	Specify the magnetic bearing of the current flow direction
tidalRange (Integer)	Specify (in feet) the height difference in height from mean low mean high tide
coordinatedUseType (Enumeration: CodeCoordinatedUseType)	Specify the primary coordinated use of the waterway. If no single activity comprises the majority of the coordinated use then specify multiple.
coordinatedUseActivityLevel (Integer)	Provide the amount of activity based on percentage of daily use of the primary coordinated use type. If coordinated use type is multiple provide the largest activity level of the single most expected activity.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.2. Water Lane End

Definition: The end of the water lane (typically located at the furthest end of a turning basin) suitable for landing or takeoff runs of aircraft. WaterLaneEnds define the water lane and describe the approach/departure procedure characteristics of a water lane.				
Feature Group	SeaPlane			
Feature Class Name	WaterLaneEnd			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-LNDA-	Seaplane landing area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			

Equivalent Standards	**AIXM**	*None*	
	FGDC	*None*	
	SDSFIE	*None*	
Documentation and Submission Requirements	None		
Related Features			

Data Capture Rules: *Collect a point on the turning basin boundary identifying the point where aeronautical activity is expected to occur. Typically, markers or buoys define the area, locate the WaterLaneEnd at least 10 feet inside the markers or buoys.*



Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
magneticBearing	Compute and specify the magnetic bearing of the primary water lane to the nearest degree based on the location of the reciprocal WaterLaneEnd points. This is similar to the runway magnetic bearing for a land based airport.

compassLocation (Enumeration: CodeCompassLocation)	Code indicating the cardinal compass location of the turning basin from centroid of the WaterLaneEnd. This feature is similar to the land based airport RunwayEnd.
restriction (String 240)	Any restrictions or cautions associated with the sea plane landing area.
airMarker (Boolean)	Code specifying if a standard air maker is used to indicate if a standard air marker is in use at the location.
type (Boolean)	Identifies the WaterLaneEnd as the primary or alternate. Primary = Y, alternate=N
color (Enumeration: CodeColor)	The color of the air marker at the location (if any)
lightingType (Enumeration: CodeLightingConfigurationType)	Type of lighting available at the location (if any)
approachGuidance (Enumeration: CodeApproachGuidance)	Identifies the type of approach guidance in use or planned for the water operating area.
Length (Number 10)	Specify the overall length of the primary water lane
width (Number 10)	Specify the overall width of the primary water lane
depth (Number 10)	Specify the depth of the primary water lane with respect to mean lowest low tide
centroid	The geographic location of the primary water centroid, used to determine the primary and alternate water lanes within the water operating area.
status (Enumeration: codeStatus)	Describes the operational status of the feature.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.3. Taxi Channel

Definition: A water channel used for the movement of aircraft between on shore facilities and the water lane. [Source AC 150/5395-1]				
Feature Group	SeaPlane			
Feature Class Name	TaxiChannel			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-TAXI-	Seaplane landing area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*None*		
	FGDC	*None*		
	SDSFIE	*None*		

Documentation and Submission Requirements	None		
Related Features			
Data Capture Rules: *Collect the taxi channel at its greatest horizontal extents. Existing markers or buoys may define the width. In the instance the taxi channel is not marked for width, refer to width published by FAA in the U.S. Terminal Procedures.*			
Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	
Feature Attributes			

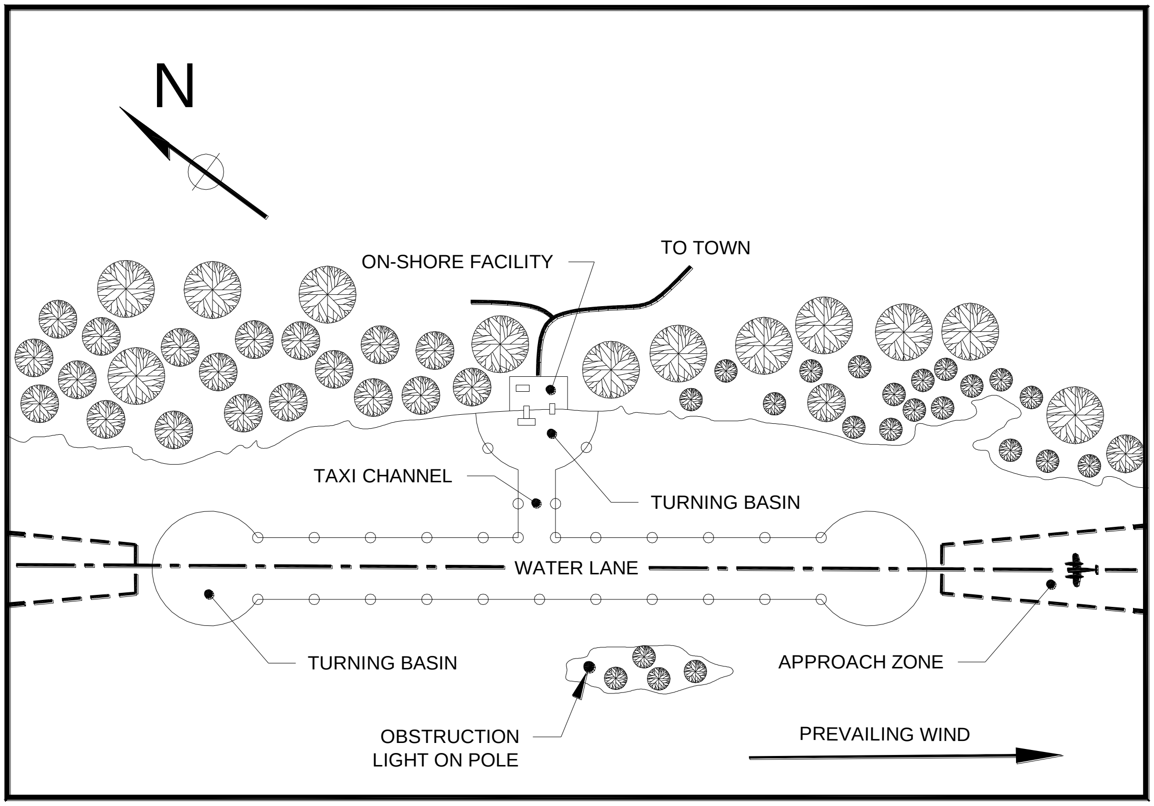
Attribute (Datatype)	Description
name (VARCHAR2 (50))	Any commonly used name associated with the taxi channel.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
restriction (String 240)	Any restrictions or cautions associated with the taxi channel
length (Number 10)	Specify the overall length of the taxi channel
width (Number 10)	Specify the overall width of the taxi channel
depth (Number 10)	Specify the depth of the taxi channel with respect to mean lowest low tide
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.4. Turning Basin

Definition: A water area used for the maneuvering of aircraft where the use of water surface is restricted. Turning basins should be located adjacent to shoreline facilities and at each end of the water operating area.[Source AC 150/5395-1]				
Feature Group	SeaPlane			
Feature Class Name	TurningBasin			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-TBSN-	Seaplane landing area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			

Equivalent Standards	**AIXM**	*None*	
	FGDC	*None*	
	SDSFIE	*None*	
Documentation and Submission Requirements	None		
Related Features			

Data Capture Rules: *Collect the turning basin at its greatest horizontal extents. Existing markers or buoys may define the boundary; if so collect the boundary inside the buoys.*



Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	A commonly used name for the turning basin
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
restriction (String 240)	Any restrictions or cautions associated with the turning basin
length (Number 10)	Specify the overall length of the turning basin to the nearest 5 feet.
width (Number 10)	Specify the overall width of the turning basin to the nearest 5 feet

depth (Number 10)	Specify the depth of the turning basin with respect to mean lowest low tide to the nearest 0.5 foot.
diameter (Number 10)	The diameter of the turning basin available for use by aircraft to the nearest 5 feet.
compassLocation (Enumeration: CodeCompassLocation)	Code indicating the cardinal compass location of the turning basin from centroid of the WaterLaneEnd
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.5. Navigation Buoy

Definition: A floating marker which is moored to the bottom at a specific known location, which is used as an aid to navigation or for other special purpose.				
Feature Group	SeaPlane			
Feature Class Name	NavigationBuoy			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-BUOY-	Seaplane navigation buoy			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*NavigationBuoy*		Core
	FGDC	*NavigationBuoy*		
	SDSFIE	*marine_navigation_buoy_point*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect at the center and highest point on the buoy regardless of water level at time of data collection.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 20 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	
Feature Attributes				
Attribute (Datatype)	**Description**			
name (VARCHAR2 (50))	Any commonly used name associated with the buoy.			

description (VARCHAR2 (255))	A description or other unique information concerning the buoy limited to 255 characters. Use this to describe navigational requirements or warnings.
designator (String 20)	The official number of the buoy.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
type (Enumeration: CodeBuoyType)	Discriminator - The type of the buoy or marker.
lightingType (Enumeration: CodeLightingConfigurationType)	Type of lighting available at the location (if any)
color (Enumeration:CodeColor)	Code used to indicate the navigational color of the buoy.
owner (Enumeration: CodeOwner)	Code indicating the owner of the navigation buoy.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.6. Seaplane Ramp Centerline

Definition: The centerline of ramps specifically designed to transit seaplanes to or from land or water				
Feature Group	SeaPlane			
Feature Class Name	SeaplaneRampCenterline			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-RAMP-CNTR	Seaplane ramp centerline			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1 MM	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*SeaplaneRampSite*		Core
	FGDC	*SeaplaneRampCenterline*		
	SDSFIE	*sea_plane_ramp_centerline*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect centerline of ramp from edge of pavements or other surface type utilized for entering and exiting water. Line extends from edge of water to apron or taxiway.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 20 ft	N/A

Resolution	Geographic Coordinates	Distances and Elevations
	Five hundredth of arc second	Nearest foot

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
length (Integer)	Specify the length of the seaplane ramp centerline from the water to the shoreline
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.7. Seaplane Ramp Site

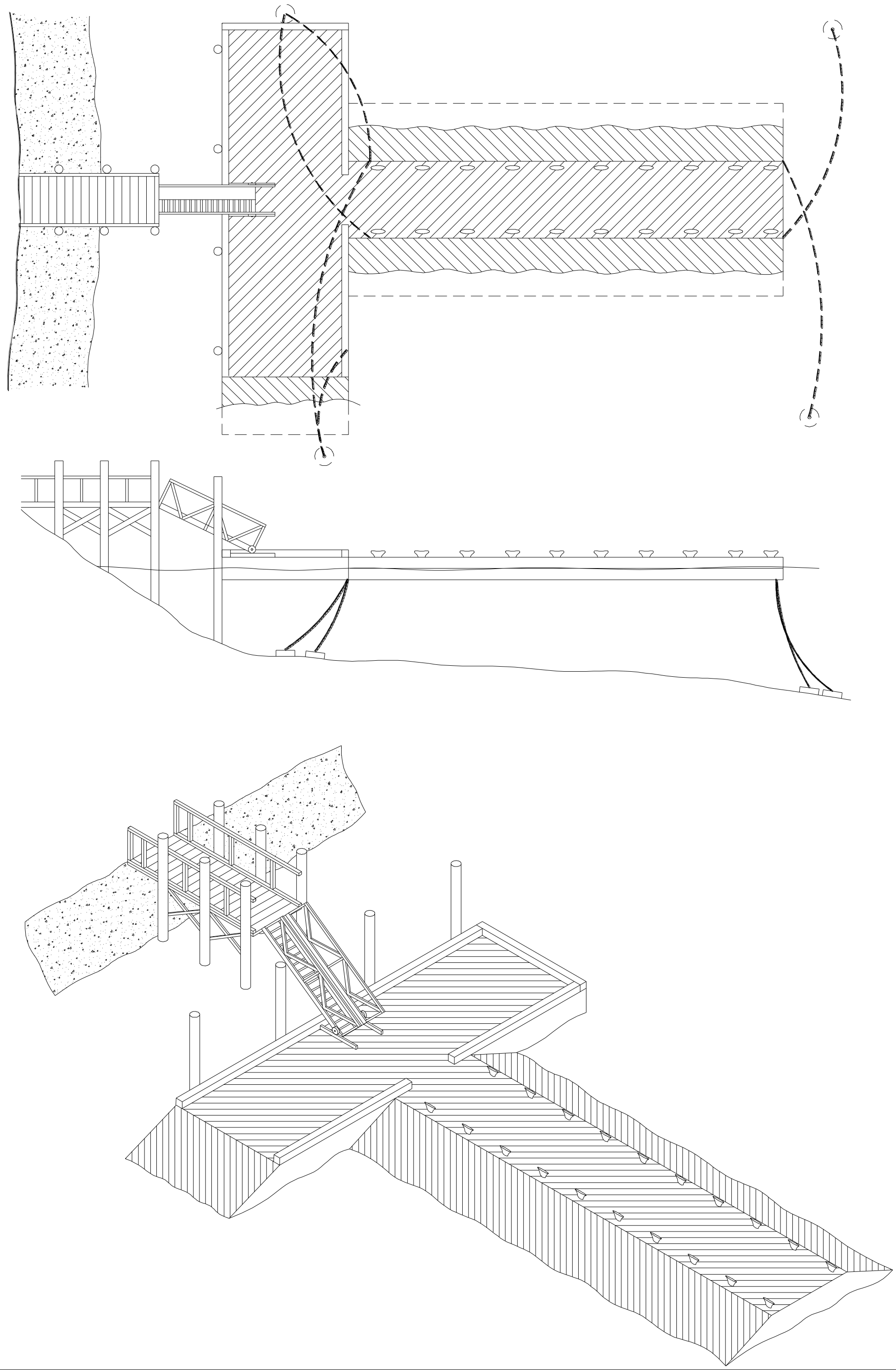
Definition: Ramps specifically designed to transit seaplanes to or from land to water.				
Feature Group	SeaPlane			
Feature Class Name	SeaplaneRampSite			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-RAMP-	Seaplane ramp site			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*SeaplaneRampSite*	Core	
	FGDC	*SeaplaneRampSite*		
	SDSFIE	*sea_plane_ramp_site*		
Documentation and Submission Requirements	No documentation is required for this feature.			
Related Features				
Data Capture Rules*:* *Collect the ramp width at its greatest horizontal limits.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**	**Vertical**		
	N/A	N/A		
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**		
		Orthometric	**Ellipsoidal**	
	± 5 ft	± 20 ft	N/A	
Resolution	**Geographic Coordinates**	**Distances and Elevations**		
	Five hundredth of arc second	Nearest foot		

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.

status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
width (Integer)	Identify the width of the seaplane ramp site
slope (integer)	The slope of the ramp specified as an integer value.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.8. Docking Area

Definition: A defined area on a seaplane base either fixed or floating, intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance.				
Feature Group	SeaPlane			
Feature Class Name	DockArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SEAP-DOCK-	Seaplane dock			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	3	Continuous	1 MM	User Defined
MicroStation Standards	2		7	
Information Assurance Level	Unclassified			
Equivalent Standards	**AIXM**	*FloatingDockSite*		Core
	FGDC	*FloatingDockSite*		
	SDSFIE	*floating_dock_site*		
Documentation and Submission Requirements	None			

Related Features		
Data Capture Rules: *Collect the dockArea at its greatest horizontal extents.*		
		
Monumentation	No monumentation required.	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

Accuracy Requirements (in feet)	Horizontal	Vertical	
		Orthometric	Ellipsoidal
	± 5 ft	± 20 ft	N/A
Resolution	Geographic Coordinates	Distances and Elevations	
	Five hundredth of arc second	Nearest foot	

Feature Attributes

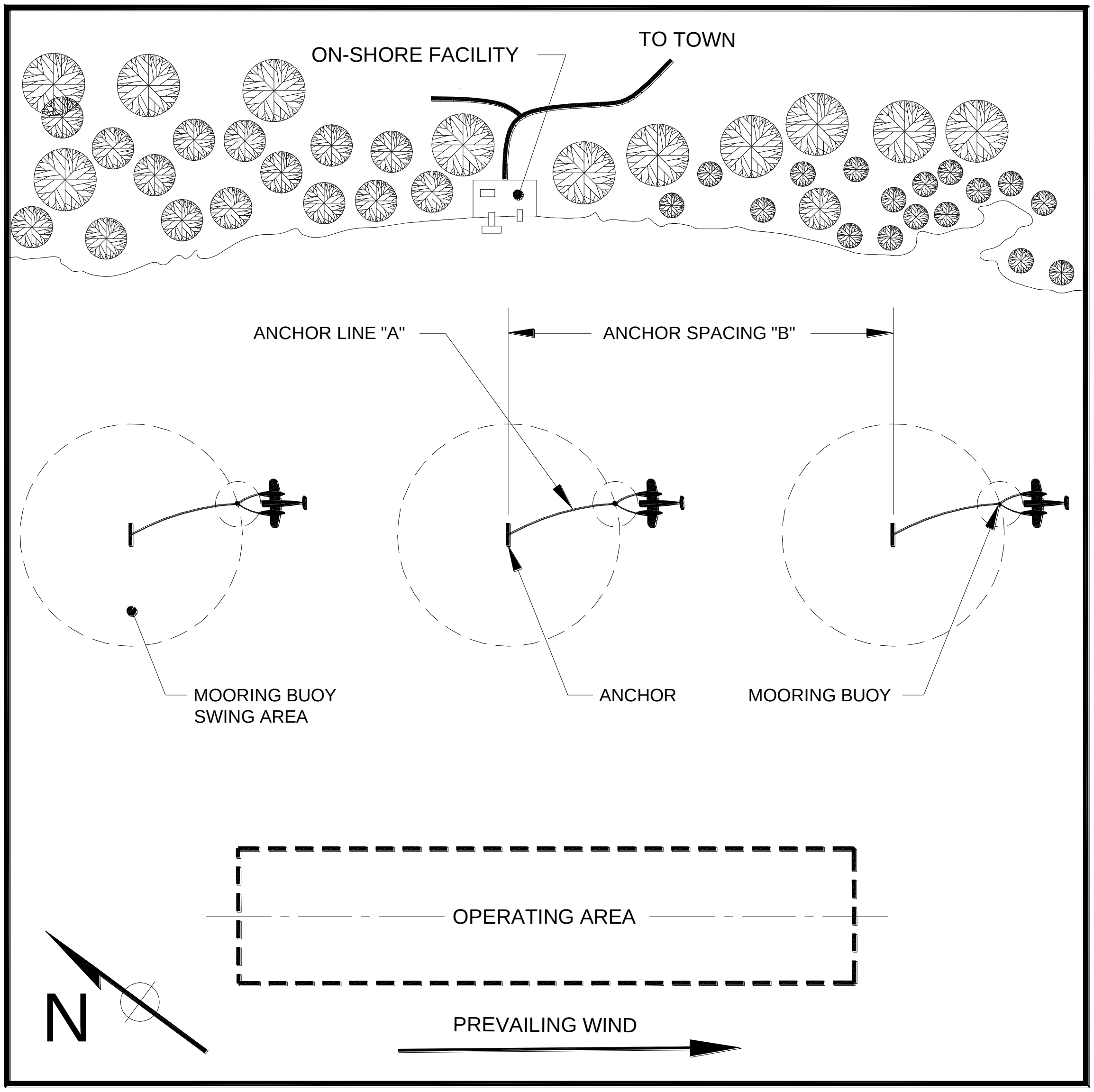
Attribute (Datatype)	Description
name (VARCHAR (50))	Name of the feature.
description (VARCHAR (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
pier (Boolean)	Specify if a pier is available in the dockArea
pierLength (Integer)	Specify the overall length available for the pier
pierWidth (Integer)	Specify the overall length available for the pier
pierMaterial (Enumeration: CodeVerticalStructureMaterial))	Specify the materials used in the construction of the pier.
hoistingCapability (Integer)	Specify the hoisting capability in pounds
marineRailwayPlatformLength (Integer)	Specify the length of the marine railway platform
marineRailwayPlatformWidth (Integer)	Specify the width of the marine railway platform
marineRailwayPlatformCapacity (Integer)	Specify the capacity of the marine railway platform in pounds
gangway (Boolean)	Specify if a gangway is available
gangwayLength (Integer)	Specify the overall length available for the gangway
gangwayWidth (Integer)	Specify the overall length available for the gangway
floatingDock (Boolean)	Specify if a floating dock is available
gangwayMaterial (Enumeration: CodeVerticalStructureMaterial)	Specify the material used to construct the gangway
floatingDockLength (Integer)	Specify the overall length available for the floating dock
floatingDockWidth (Integer)	Specify the overall length available for the floating dock
floatingDockMaterial (Enumeration: CodeVerticalStructureMaterial)	Specify the material used in constructing the dockArea
floatingBarge (Boolean)	Specify if a floating barge is available
floatingBargeLength (Integer)	Specify the overall length available for the floating barge
floatingBargeWidth (Integer)	Specify the overall length available for the floating barge
floatingBargeMaterial Enumeration: CodeVerticalStructureMaterial)	Specify the material used in constructing the floatingBarge
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.11.9. Anchorage Area

Definition: An area designated specifically for the parking of seaplanes.	
Feature Group	SeaPlane

<table>
<tr><td>Feature Class Name</td><td colspan="4">AnchorageArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-SEAP-ANCH-</td><td colspan="4">Seaplane dock</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>3</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>2</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Unclassified</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">None</td><td></td></tr>
<tr><td>FGDC</td><td colspan="3">None</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
</table>

Related Features	
Data Capture Rules: *Collect the anchorage area at its greatest horizontal extents.*	



Monumentation	No monumentation required.		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 20 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.

userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
mooringLocations (Integer)	Specify the number of mooring locations provided in the AnchorageArea.
length (Integer)	Specify the overall length available for the AnchorageArea
width (Integer)	Specify the overall length available for the floating dock
depth (Integer)	Specify the depth of the turning basin with respect to mean lowest low tide to the nearest 0.5 foot.
bottomConditions (String 240)	Specify the type of bottom conditions in the AnchorageArea.
restriction (String 240)	Any restrictions or cautions associated with the AnchorageArea
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.12. Group: SECURITY

5.12.1. Security Area

<table>
<tr><td colspan="5">Definition: An area of the airport in which security measures required by 49 CFR 1542.201 must be carried out [Source: 49 CFR 1542]</td></tr>
<tr><td>Feature Group</td><td colspan="4">Security</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">SecurityArea</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C- SECR-SECA</td><td colspan="4">An area of the airport in which security measures required by 49 CFR 1542.201</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Secret</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">SecurityElement</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">SecurityArea</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect outline of security area at its greatest horizontal extents. Extents can be defined by fences, paint lines, or specific limits defined by airport authorities.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredths of arc second</td><td colspan="2">Nearest foot</td></tr>
</table>

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.12.2. Security Identification Display Area

Definition: Portions of an airport, specified in the airport security program, in which security measures required by regulation must be, carried out. This area includes the security area and may include other areas of the airport. [Source: DHS]				
Feature Group	Security			
Feature Class Name	SecurityIdDisplayArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-AIRF-SECR-SIDA	Security Identification Display Area			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	6	Continuous	1 MM	User Defined
MicroStation Standards	5		7	
Information Assurance Level	Secret			
Equivalent Standards	**AIXM**	*SecurityElement*	Extension	
	FGDC	*SecurityIdentificationDisplayArea*	Extension	
	SDSFIE	*none*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect outline of security area at its greatest horizontal extents. Extents can be defined by fences, paint lines, or specific limits defined by airport authorities.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.12.3. Security Perimeter Line

Definition: Any type of perimeter, such as barbed wire, high fences, motion detectors and armed guards at gates, that ensure no unauthorized visitors can gain entry.	
Feature Group	Security
Feature Class Name	SecurityPerimeterLine

Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-DETL-FENC-SECU	Security Fencing			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	None	1 MM	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*SecurityElement*		Extension
	FGDC	*SecurityPerimeterLine*		Extension
	SDSFIE	*security_perimeter_line*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect outline of security area at its greatest horizontal extents. Extents can be defined by fences, paint lines, or specific limits defined by airport authorities.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters. [Source: SDSFIE Attribute Table]
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.12.4. Sterile Area

Definition: Portions of an airport defined in the airport security program that provide passengers access to boarding aircraft and to which the access is generally controlled by TSA, an aircraft operator, or a foreign air carrier. [Source: DHS]	
Feature Group	Security
Feature Class Name	SterileArea
Feature Type	Polygon

<table>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-AFLD-SECR-STER</td><td colspan="4">Airfield sterile area</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Secret</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">SecurityElement</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">SterileArea</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect outline of security area at its greatest horizontal extents. Extents can be defined by fences, paint lines, or specific limits defined by airport authorities.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest foot</td></tr>
</table>

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13. Group: SURFACE TRANSPORTATION

5.13.1. Bridge

Definition: A structure used by vehicles that allows passage over or under an obstacle such as a river, chasm, mountain, road or railroad.				
Feature Group	Surface Transportation			
Feature Class Name	Bridge			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-STRC-OTLN-	Bridges, piers, breakwaters, docks, floats, etc. - outlines			
L-SITE-BRDG-	Bridges			
M-MATL-CRAN-	Bridge cranes, jib cranes, and monorails			
V-SITE-STRC-	Structures (bridges, sheds, foundation pads, footings, etc.)			
V-STRC-OTLN-	Bridges, piers, breakwaters, docks, floats, etc. – outlines			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4 (all)	Continuous (all)	1 (all)	User Defined
MicroStation Standards	7 (all)		7 (all)	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*Bridge*		Extension
	FGDC	*Bridge*		Extension
	SDSFIE	*road_bridge_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Capture the outline of bridge at its greatest horizontal extents.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	The material used as a surface for the bridge.

bridgeType (Enumeration: CodeBridgeType)	
verticalStructureMaterial Enumeration: CodeVerticalStructureMaterial)	
directionality (Enumeration: CodeDirectionality)	Code indicating the traffic flow of the bridge being classified.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.2. Driveway Area

Definition: An access to a building or other vehicle parking lot or storage area.				
Feature Group	Surface Transportation			
Feature Class Name	DrivewayArea			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-ROAD-DRIV-	Driveway edge of pavement			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	4	Continuous	1	User Defined
MicroStation Standards	7		7	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*DrivewayArea*		Extension
	FGDC	*DrivewayArea*		Extension
	SDSFIE	*driveway_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Capture the outline of driveway at its greatest horizontal extents.*				
Monumentation	No monumentation required.			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest Foot	
Feature Attributes				

Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

surfaceMaterial (enumeration: CodeSurfaceMaterial)	The material used as a surface for the driveway.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.3. Driveway Centerline

<table>
<tr><td colspan="5">Definition: The center of the driveway as measured from the edge of the paved surface. The segments of a driveway centerline will coincide with the road segments in order to provide network connectivity.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Surface Transportation</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">DrivewayCenterline</td></tr>
<tr><td>Feature Type</td><td colspan="4">Line</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-ROAD-DRIV-CNTR</td><td colspan="4">Driveway centerline</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">DrivewayCenterline</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">DrivewayCenterline</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">None</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect in the horizontal plane at the center of driveway, and to intersect with centerline of road/drive/ramp.</td></tr>
<tr><td>Monumentation</td><td colspan="4">No monumentation required.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest Foot</td></tr>
</table>

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.4. Parking Lot

Definition: An area of an airport used for parking of automobiles, buses, etc.				
Feature Group	Surface Transportation			
Feature Class Name	ParkingLot			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-PKNG-ISLD-	Parking islands			
C-PKNG-OTLN-	Parking lots			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	84 (all)	Dashed-Spaced (all)	1 mm (all)	User Defined
MicroStation Standards	256 (all)		7 (all)	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*ParkingLot*		Extension
	FGDC	*ParkingLot*		Extension
	SDSFIE	*vehicle_parking_area*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect outline of parking lot at its greatest horizontal extents.*				
Monumentation	None			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest Foot	
Feature Attributes				

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Any commonly used name for the parking area.
description (VARCHAR2 (255))	A description of the parking lot.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
parkingLotUse (String 16)	The primary use of the parking area.
totalNumberSpaces (Integer)	The total parking spaces available in the area including handicapped or reserved spaces.
numberHandicapSpaces (Integer)	The total number of spaces marked as being handicapped parking.
owner (Enumeration: CodeOwner)	The owner of the parking lot
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceType (Enumeration: codeSurfaceType)	Type of different materials used to construct the surface.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.5. Railroad Centerline

Definition: Represents the centerline of each pair of rails [Source: ANSI: Data Content Standards For Transportation Networks: Roads]				
Feature Group	Surface Transportation			
Feature Class Name	RailroadCenterline			
Feature Type	Line			
CADD Standard Requirements				
Layer/Level	**Description**			
C-RAIL-CNTR-	Centerlines			
C-RAIL-TRAK-	Railroads			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	91 (all)	Continuous (all)	1 (all)	User Defined
MicroStation Standards	106 (all)		7 (all)	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*RailroadCenterline*		Extension
	FGDC	*RailroadCenterline*		Extension
	SDSFIE	*railroad_centerline*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *In the horizontal plane, collect a line along the centerline of each pair of rails. In the vertical plane, collect the height at the top of highest rail.*				
Monumentation	None			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest Foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Any commonly used name for the railroad.
description (VARCHAR2 (255))	Any narrative remarks concerning the railroad.
Status (Enumeration codeStatus)	The current status as to whether the railroad segment is being used.
numberOfTracks (Integer)	The number of tracks present
owner (Enumeration: CodeOwner)	The owner of the rail track
isBridge (Boolean)	Indicates given railroad segment is bridge (Y- a is bridge, N- is not a bridge).
istunnel (Boolean)	Indicates given railroad segment is tunnel (Y- is a tunnel, N- is not a tunnel).
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

directionality (Enumeration: CodeDirectionality)	Code indicating the traffic flow of the railroad segment being classified.
segmentType (Enumeration: CodeSegmentType)	Code indication the sequence or position of the segment being classified by the feature.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.6. Railroad Yard

<table>
<tr><td colspan="5">Definition: Represents a railroad yard [Source: ANSI: Data Content Standards For Transportation Networks: Roads]</td></tr>
<tr><td>Feature Group</td><td colspan="4">Surface Transportation</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">RailroadYard</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-RAIL-YARD-</td><td colspan="4">Railroad Yard</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Confidential</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">RailroadYard</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">RailroadYard</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">railroad_yard_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect outline of the yard area its greatest horizontal extents. Represented by fences, road or change in ground surfaces.</td></tr>
<tr><td>Monumentation</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest Foot</td></tr>
</table>

Feature Attributes	
Attribute (Datatype)	**Description**
name (VARCHAR2 (50))	A name that represent the railroad yard.
description (VARCHAR2 (255))	Any brief description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (Enumeration: CodeOwner)	The owner of the rail track
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.7. Road Centerline

<table>
<tr><td colspan="5">Definition: The center of the roadway as measured from the edge of the paved surface. The segments of a road centerline will coincide with the road segments in order to have similar characteristics.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Surface Transportation</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">RoadCenterline</td></tr>
<tr><td>Feature Type</td><td colspan="4">Line</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-ROAD-CNTR-</td><td colspan="4">Centerlines</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>6</td><td rowspan="2">Continuous</td><td>1</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>5</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Confidential</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">RoadCenterline</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">RoadCenterline</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">road_centerline</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the centerline of road by splitting the edge of pavement or painted centerline, which ever is better defined.</td></tr>
<tr><td>Monumentation</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest Foot</td></tr>
</table>

<table>
<tr><td colspan="2">Feature Attributes</td></tr>
<tr><td>Attribute (Datatype)</td><td>Description</td></tr>
<tr><td>name (VARCHAR2 (50))</td><td>Any commonly used name for the road centerline.</td></tr>
<tr><td>description (VARCHAR2 (255))</td><td>Description of the feature.</td></tr>
<tr><td>status (Enumeration: codeStatus)</td><td>A temporal description of the operational status of the feature. This attribute is used to describe real-time status.</td></tr>
<tr><td>Color (Enumeration: CodeColor)</td><td>The color of the centerline marking.</td></tr>
<tr><td>userFlag (String 254)</td><td>An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.</td></tr>
<tr><td>Alternative (Number(2))</td><td>Discriminator used to tie features of a plan or proposal together into a version.</td></tr>
</table>

5.13.8. Road Point

Definition: A point along the roadway system which has some special significance either for starting or ending a road segment or for representing a significant position along the roadway system such as the start or center of a bridge or the center of an intersection [Source: ANSI: Data Content Standards For Transportation Networks: Roads]				
Feature Group	Surface Transportation			
Feature Class Name	RoadPoint			
Feature Type	Point			
CADD Standard Requirements				
Layer/Level	**Description**			
C-ROAD-POIN-	Road Point			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	2	Continuous	1 mm	User Defined
MicroStation Standards	4		7	
Information Assurance Level	Confidential			
Equivalent Standards	**AIXM**	*RoadPoint*		Extension
	FGDC	*RoadPoint*		Extension
	SDSFIE	*None*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect point at desired location using the technique necessary to achieve accuracy*				
Monumentation	None			
Survey Point Location	**Horizontal**		**Vertical**	
	N/A		N/A	
Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	± 5 ft		± 5 ft	N/A
Resolution	**Geographic Coordinates**		**Distances and Elevations**	
	Five hundredth of arc second		Nearest Foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.9. Road Segment

<table>
<tr><td colspan="5">Definition: Represents a linear section of the physical road system designed for, or the result of, human or vehicular movement; must be continuous (no gaps) and cannot branch; no mandates are provided on how to segment the road system except that data providers adopt a consistent method [Source: ANSI: Data Content Standards For Transportation Networks: Roads]</td></tr>
<tr><td>Feature Group</td><td colspan="4">Surface Transportation</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">RoadSegment</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>C-PROF-ROAD-</td><td colspan="4">Roads</td></tr>
<tr><td>C-ROAD-CURB-</td><td colspan="4">Curbs</td></tr>
<tr><td>C-ROAD-OTLN-</td><td colspan="4">Roads</td></tr>
<tr><td>V-PROF-ROAD-</td><td colspan="4">Roads</td></tr>
<tr><td></td><td>Color</td><td>Linetype</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>1 (all)</td><td rowspan="2">Continuous (all)</td><td>1 mm (all)</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>3 (all)</td><td>7 (all)</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Confidential</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">RoadSegment</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">RoadSegment</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">road_site</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect all road segments as individual polygon objects. Where two or more roadway segments intersect, collect as separate polygons depicting beginning, intersection and end. Collect roadway at the outer edge of pavement or defined paint line (excluding shoulder).</td></tr>
<tr><td>Monumentation</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest Foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	Description
name (VARCHAR2 (50))	A common name or street name used to refer to the stretch of road.
description (VARCHAR2 (255))	A general description of the road.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
alternateName (String 30)	The alternate name or second name for the road.
route1Name (String 30)	The route number or other identifier that is affiliated with the first route type
route1Type (Enumeration: CodeRouteType)	The first route type for the road (Interstate, US, State, etc.)

route2Name (String 30)	The route number or other identifier that is affiliated with the second route type
route2Type (Enumeration: CodeRouteType)	The second route type for the road (Interstate, US, State, etc.)
route3Name (String 30)	The number or other identifier that is affiliated with the third route type
route3Type (Enumeration: CodeRouteType)	The third route type for the road (Interstate, US, State, etc.)
numberOfLanes (Integer)	The total number of lanes of traffic, counting both directions, not including turning lanes. [Source: SDSFIE Feature Table]
length (Real)	The length of the road segment measured at the centerline. [Source: SDSFIE Feature Table]
width (Real)	The average width of the road segment. [Source: SDSFIE Feature Table]
isBridge (Boolean)	Indicates given road segment is bridge (Y- a is bridge, N- is not a bridge). [Source: SDSFIE Feature Table]
isTunnel (Boolean)	Indicates given road segment is tunnel (Y- is a tunnel, Nis not a tunnel). [Source: SDSFIE Feature Table]
directionality (Enumeration: CodeDirectionality)	Code indicating the traffic flow on the road segment.
segmentType (Enumeration: CodeSegmentType)	Code indicating the type of segment being classified.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
surfaceType (Enumeration: codeSurfaceType)	Type of material used to construct the surface.
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	Material used to construct the surface of the road.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.10.Sidewalk

Definition: A paved or concrete pad used as a pedestrian walkway. Usually is composed of one or more SideWalkSegments.				
Feature Group	Surface Transportation			
Feature Class Name	Sidewalk			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SITE-WALK-	Walks, trails and bicycle paths			
L-SITE-WALK-	Walks and steps			
V-SITE-WALK-	Walks, trails, and bicycle paths			
	Color	**Linetype**	**Line Weight**	**Symbol**
AutoDesk Standards	8 (all)	Continuous (all)	1 mm (all)	User Defined
MicroStation Standards	9 (all)		7 (all)	
Information Assurance Level	Restricted			

Equivalent Standards	**AIXM**	*Sidewalk*	Extension
	FGDC	*Sidewalk*	Extension
	SDSFIE	*pedestrian_sidewalk_area*	
Documentation and Submission Requirements	None		
Related Features			
Data Capture Rules: *Collect all sidewalks as individual polygon objects. Where two or more sidewalks intersect, collect as separate polygons depicting beginning, intersection and end. Collect sidewalk at the outer edge of pavement.*			
Monumentation	None		
Survey Point Location	**Horizontal**	**Vertical**	
	N/A	N/A	
Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	± 5 ft	± 5 ft	N/A
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Five hundredth of arc second	Nearest Foot	

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A brief description of any special characteristics of the sidewalk.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
walkUse (String 26)	A short description of the primary use of the sidewalk.
AmericanDisabilitiesAct (Boolean)	Boolean indicating whether or not the walkway is in compliance with the American Disabilities Act.
length (Real)	The overall length of the sidewalk section.
width (Real)	The mean width of the sidewalk section.
surfaceMaterial (Enumeration: CodeSurfaceMaterial)	Primary material used in the sidewalk and/or trail.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
segmentType (Enumeration: CodeSegmentType)	Code indicating the type of segment being classified.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.13.11.Tunnel

Definition: The area of a transportation passage, open at both ends, used to provide access through or under a natural obstacle.	
Feature Group	Surface Transportation
Feature Class Name	Tunnel
Feature Type	Polygon

<table>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><th>Layer/Level</th><th colspan="4">Description</th></tr>
<tr><td>L-SITE-TUNL-</td><td colspan="4">Tunnels</td></tr>
<tr><td></td><th>Color</th><th>Linetype</th><th>Line Weight</th><th>Symbol</th></tr>
<tr><td>AutoDesk Standards</td><td>7</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>0</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Restricted</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">Tunnel</td><td>Extension</td></tr>
<tr><td>FGDC</td><td colspan="2">Tunnel</td><td>Extension</td></tr>
<tr><td>SDSFIE</td><td colspan="3">tunnel_area</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Collect the tunnel extending between the entrance points with a width defined by edge of pavement at either entrance.</td></tr>
<tr><td>Monumentation</td><td colspan="4">None</td></tr>
<tr><td rowspan="2">Survey Point Location</td><th colspan="2">Horizontal</th><th colspan="2">Vertical</th></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><th colspan="2" rowspan="2">Horizontal</th><th colspan="2">Vertical</th></tr>
<tr><th>Orthometric</th><th>Ellipsoidal</th></tr>
<tr><td colspan="2">± 5 ft</td><td>± 5 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><th colspan="2">Geographic Coordinates</th><th colspan="2">Distances and Elevations</th></tr>
<tr><td colspan="2">Five hundredth of arc second</td><td colspan="2">Nearest Foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
type (String 16)	The code that represents the type of tunnel
verticalClearance (Real)	Indicates the actual vertical clearance to the top of the tunnel imposed by any restrictions.
averageHeight (Real)	The average height of the tunnel.
averageWidth (Real)	The average width of the tunnel.
length (Real)	The length of the tunnel.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
directionality (Enumeration:CodeDirectionality)	
segmentType (Enumeration: CodeSegmentType)	Code indicating the type of segment being classified.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.14. Group: UTILITIES

5.14.1. Tank Site

<table>
<tr><td colspan="5">Definition: An above or below grade receptacle or chamber for holding anything (e.g., fuels, water, waste, etc.) on a temporary basis prior to transfer, use, or disposal. Tanks are typically located on TankSites.</td></tr>
<tr><td>Feature Group</td><td colspan="4">Utilities</td></tr>
<tr><td>Feature Class Name</td><td colspan="4">TankSite</td></tr>
<tr><td>Feature Type</td><td colspan="4">Polygon</td></tr>
<tr><td colspan="5">CADD Standard Requirements</td></tr>
<tr><td>Layer/Level</td><td colspan="4">Description</td></tr>
<tr><td>L-DETL-TKST-</td><td colspan="4">Tank Site</td></tr>
<tr><td></td><td>Color</td><td>Line type</td><td>Line Weight</td><td>Symbol</td></tr>
<tr><td>AutoDesk Standards</td><td>4</td><td rowspan="2">Continuous</td><td>1 MM</td><td rowspan="2">User Defined</td></tr>
<tr><td>MicroStation Standards</td><td>7</td><td>7</td></tr>
<tr><td>Information Assurance Level</td><td colspan="4">Confidential</td></tr>
<tr><td rowspan="3">Equivalent Standards</td><td>AIXM</td><td colspan="2">VerticalStructure</td><td>Core</td></tr>
<tr><td>FGDC</td><td colspan="3">TankSite</td></tr>
<tr><td>SDSFIE</td><td colspan="3">undefined_tank_site</td></tr>
<tr><td>Documentation and Submission Requirements</td><td colspan="4">None</td></tr>
<tr><td>Related Features</td><td colspan="4"></td></tr>
<tr><td colspan="5">Data Capture Rules: Outer limits of tank outline.</td></tr>
<tr><td>Monumentation</td><td colspan="4">As required by local, State, or national standards for this type of data.</td></tr>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="3">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td colspan="2">+/- 3 ft</td><td>+/- 3 ft</td><td>N/A</td></tr>
<tr><td rowspan="2">Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td colspan="2">Five hundredths of arc second</td><td colspan="2">Nearest Foot</td></tr>
<tr><td colspan="5">Feature Attributes</td></tr>
</table>

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	A description or other unique information concerning the subject item, limited to 255 characters. [Source: SDSFIE Feature Table]
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
tankType (String 40)	A brief description of the tpye of tank.
topElevation (Real)	The dimension indicating the elevation of exterior top surface of the tank's lid, hatch, rim, or roof in feet (English units) or meters (SI units) above some datum, if it is known. [Source: SDSFIE Feature Table]
lightCode (Boolean)	A code indicating that the obstacle is lighted [Source: AIXM]
verticalStructureMaterial (Enumeration: CodeVerticalStructureMaterial)	Classifies the predominant material of the vertical object

lightingType (Enumeration: codeLightingConfigurationType)	A description of the lighting system. Lighting system classifications are Approach; Airport; Runway; Taxiway; and Obstruction
markingFeatureType (Enumeration: codeMarkingFeatureType)	The type of the marking(s)
color (Enumeration: codeColor)	The color of the marking(s)
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.14.2. Utility Line

Definition: Any utility feature typically represented as a line.			
Feature Group	Utilities		
Feature Class Name	UtilityLine		
Feature Type	Line		
CADD Standard Requirements			
Layer/Level	**Description**	**Layer/Level**	**Description**
C-FUEL-ABND-	Abandoned piping	M-HTCW-LTPL-	Main low temperature piping
C-FUEL-DEFL-	Defueling piping	M-HTCW-LTPS-	Low temperature service piping
C-FUEL-MAIN-	Main fuel piping	M-HTCW-STML-	Main steam piping
C-FUEL-SERV-	Service piping	M-HTCW-STMS-	Steam service piping
C-FUEL-TRCH-	Fuel line trench	M-HVAC-RETN-	Return ductwork
C-NGAS-ABND-	Abandoned piping	M-HVAC-SUPP-	Supply ductwork
C-NGAS-MAIN-	Main natural gas piping	M-HYDR-PIPE-	Hydraulic system piping
C-NGAS-SERV-	Service piping	M-INSL-PIPE-	Insulating oil piping
C-PROF-PIPE-	Piping	M-LUBE-PIPE-	Lubrication oil piping
C-SSWR-ABND-	Abandoned piping	M-PROC-PIPE-	Process piping
C-SSWR-MAIN-	Sanitary sewer piping	M-RCOV-PIPE-	Piping (includes fittings, valves)
C-SSWR-SERV-	Sanitary sewer service piping	M-REFG-PIPE-	Piping (includes fittings, valves)
C-STRM-ABND-	Abandoned piping	M-RWTR-PIPE-	Raw water piping
C-STRM-HDWL-	Headwalls and endwalls	M-STEM-PIPE-	Steam piping
C-STRM-MAIN-	Storm sewer piping	P-CMPA-PIPE-	Piping
C-STRM-ROOF-	Roof drain line	P-FUEL-FGAS-	Fuel gas piping
C-STRM-SERV-	Storm sewer service piping	P-FUEL-FOIL-	Fuel oil piping
C-STRM-SUBS-	Subsurface drain piping	P-LGAS-PIPE-	Piping
E-AIRF-DUCT-	Ductbanks	P-MDGS-PIPE-	Piping
E-CABL-COAX-	Coax cable	P-SANR-COND-	Condensate piping
E-CABL-FIBR-	Fiber optics cable	P-SANR-PIPE-	Piping

E-CABL-MULT-	Multi-conductor cable	P-SANR-VENT-	Vent piping
E-CABL-TRAY-	Cable trays and wireways	P-STRM-PIPE-	Storm drain piping
E-CIRC-CTRL-	Control and monitoring circuits	T-CABL-TRAY-	Cable trays and wireways
E-CIRC-MULT-	Multiple circuits	V-AIRF-DUCT-	Ductbanks
E-CIRC-SERS-	Series circuits	V-CIRC-CTRL-	Control and monitoring circuits
E-COMM-OVHD-	Overhead communications/telephone lines	V-CIRC-MULT-	Multiple circuits
E-COMM-UNDR-	Underground communications/telephone lines	V-CIRC-SERS-	Series circuits
E-DUCT-MULT-	Ductbank	V-COMM-OVHD-	Overhead communications/telephone lines
E-GRND-CIRC-	Circuits	V-COMM-UNDR-	Underground communications/telephone lines
E-LITE-CIRC-	Lighting circuits (including crosslines and homeruns)	V-DUCT-MULT-	Ductbank
E-POWR-CIRC-	Power circuits (including crosslines and homeruns)	V-ELEC-VALT-	Vaults
E-PRIM-OVHD-	Overhead electrical utility lines	V-FUEL-ABND-	Abandoned piping
E-PRIM-UNDR-	Underground electrical utility lines	V-FUEL-DEFL-	Defueling piping
E-SECD-OVHD-	Overhead electrical utility lines	V-FUEL-MAIN-	Main fuel piping
E-SECD-UNDR-	Underground electrical utility lines	V-FUEL-SERV-	Service piping
F-AFFF-PIPE-	Piping	V-FUEL-TRCH-	Fuel line trench
F-CO2S-PIPE-	CO2 piping or CO2 discharge nozzle piping	V-GTHP-PIPE-	Piping (includes fittings, valves)
F-HALN-PIPE-	Halon piping	V-HTCW-ABND-	Abandoned piping
F-IGAS-PIPE-	Inert gas piping	V-HTCW-CHLL-	Main chilled water piping
F-PROT-HOSE-	Fire hoses	V-HTCW-CHLS-	Chilled water service piping
F-SPRN-PIPE-	Sprinkler piping	V-HTCW-HTPL-	Main high temperature piping
F-WATR-PIPE-	Piping	V-HTCW-HTPS-	High temperature service piping
L-DETL-WIRE-	Wiring	V-HTCW-LTPL-	Main low temperature piping
L-IRRG-PIPE-	Piping	V-HTCW-LTPS-	Low temperature service piping

M-ACID-PIPE-	Acid, alkaline, and oil waste piping	V-HTCW-STML-	Main steam piping
M-ACID-VENT-	Acid, alkaline, and oil waste vent piping	V-HTCW-STMS-	Steam service piping
M-AFRZ-PIPE-	Anti-freeze piping	V-NGAS-ABND-	Abandoned piping
M-AFRZ-WAST-	Waste anti-freeze piping	V-PRIM-OVHD-	Overhead electrical utility lines
M-BRIN-PIPE-	Brine system piping	V-PRIM-UNDR-	Underground electrical utility lines
M-CHEM-PIPE-	Piping (includes fittings, valves)	V-PROF-PIPE-	Piping
M-CNDW-PIPE-	Condenser water piping	V-SECD-OVHD-	Overhead electrical utility lines
M-COND-PIPE-	Condensate piping (includes fittings, valves)	V-SECD-UNDR-	Underground electrical utility lines
M-CONT-WIRE-	Low voltage wiring	V-SSWR-ABND-	Abandoned piping
M-CWTR-PIPE-	Piping (includes fittings, valves)	V-SSWR-MAIN-	Sanitary sewer piping
M-DETL-PIPE-	Piping	V-SSWR-SERV-	Sanitary sewer service piping
M-DETL-WIRE-	Electrical wiring	V-STRM-ABND-	Abandoned piping
M-DUAL-PIPE-	Piping (includes fittings, valves)	V-STRM-MAIN-	Storm sewer piping
M-GTHP-PIPE-	Piping (includes fittings, valves)	V-STRM-SUBS-	Subsurface drain piping
M-HTCW-ABND-	Abandoned piping	V-UTIL-ELEC-	Power lines, lights, telephone poles, communication lines
M-HTCW-CHLL-	Main chilled water piping	V-UTIL-STEM-	Steam lines
M-HTCW-CHLS-	Chilled water service piping	V-UTIL-STRM-	Storm sewer lines, culverts, manholes, and headwalls
M-HTCW-HTPL-	Main high temperature piping	V-UTIL-WATR-	Water lines, hydrants, tanks
M-HTCW-HTPS-	High temperature service piping		

	Color	Linetype	Line Weight	Symbol
AutoDesk Standards	6 (all)	Continuous (all)	1 MM (all)	User Defined
MicroStation Standards	5 (all)		7 (all)	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*VerticalStructure*		Core
	FGDC	*Utility*		
	SDSFIE	*None*		
Documentation and Submission Requirements	None			
Related Features				

Data Capture Rules: *Capture feature using technique as required to meet accuracies below. Collect in line segments.*

Monumentation	As required by local, State, or national standards for this type of data.		
Survey Point Location	Horizontal		Vertical
	N/A		N/A
Accuracy Requirements (in feet)	Horizontal		Vertical	
			Orthometric	Ellipsoidal
	A	± 1 ft	± 0.25 ft	N/A
	B	± 3 ft	± 10 ft	
	C	± 5 ft	± 10 ft	
	D	± 10 ft	± 20 ft	

Resolution	Geographic Coordinates	Distances and Elevations
A	Hundredth of arc second	Nearest Tenth of a foot
B	Five Hundredths of arc second	Nearest Foot
C	Five Hundredths of arc second	Nearest Foot
D	Tenth of arc second	Nearest Foot

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
utilityType (Enumeration: CodeUtilityType)	The type of utility represented by the feature.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
directionality (Enumeration: CodeDirectionality)	Code indicating the flow of the utility being classified.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.14.3. Utility Point

Definition: Any utility feature typically represented as a point.	
Feature Group	Utilities
Feature Class Name	UtilityPoint
Feature Type	Point

CADD Standard Requirements

Layer/Level	Description	Layer/Level	Description
C-DETL-TANK-	Tanks	V-STRM-INLT-	Inlets (curb, surface, and catch basins)
C-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves	V-STRM-MHOL-	Manholes
C-FUEL-FTTG-	Caps, crosses, and tees	V-STRM-PUMP-	Pump stations
C-FUEL-HYDR-	Hydrant control pits	V-TRAN-PADM-	Pad mounted transformers
C-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes	V-TRAN-POLE-	Pole mounted transformers

C-FUEL-METR-	Meters	V-UTIL-LINE-	Utilities
C-FUEL-PUMP-	Booster pump stations	V-UTIL-NGAS-	Gas lines, features, and valves
C-FUEL-TANK-	Fuel tanks	V-UTIL-SSWR-	Sanitary lines and manholes
C-FUEL-VENT-	Vent pits	E-SPCL-SRFS-	Surface Sensor System
C-FUEL-VLVE-	Valve pits	T-COMM-ANTN-	Telecommunications antennae
C-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves	C-SITE-SECU-	CMRA Security camera locations outside of buildings
C-NGAS-FTTG-	Caps, crosses, and tees	E-LITE-PANL-	Main distribution panels, switchboards, lighting panels
C-NGAS-METR-	Meters	E-LITE-SPCL-	Special fixtures
C-NGAS-PUMP-	Compressor stations	E-LITE-SWCH-	Lighting contactors, photoelectric controls, low-voltage lighting controls, etc.
C-NGAS-REDC-	Reducing stations	E-LITE-WALL-	Wall mounted fixtures
C-NGAS-VENT-	Vent pits	E-LTNG-COND-	Lightning protection conductors
C-NGAS-VLVE-	Valve pits/boxes	E-LTNG-TERM-	Lightning protection terminals
C-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves	E-POLE-UTIL-	Utility poles
C-SSWR-FILT-	Filtration beds	E-POWR-BUSW-	Busways and wireways
C-SSWR-FTTG-	Caps and cleanouts	E-POWR-CABL-	Cable trays
C-SSWR-JBOX-	Junction boxes and manholes	E-POWR-FEED-	Feeders
C-SSWR-PUMP-	Booster pump stations	E-POWR-GENR-	Generators and auxiliary equipment
C-SSWR-TANK-	Septic tanks	E-POWR-JBOX-	Junction boxes
C-STRM-CULV-	Culverts	E-POWR-PANL-	Panelboards, switchboards, MCC, unit substations
C-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates	E-POWR-SWCH-	Disconnect switches, motor starters, contactors, etc.
C-STRM-EROS-	Erosion control (riprap)	E-SERT-BURD-	Buried sensors
C-STRM-FMON-	Flow monitoring station	E-SERT-UNDR-	Buried sensors
C-STRM-FTTG-	Caps and cleanouts	E-SPCL-JBOX-	Junction boxes
C-STRM-INLT-	Inlets (curb, surface, and catch basins)	E-SPCL-PANL-	Panelboards, backing boards, patch panel racks
C-STRM-MHOL-	Manholes	E-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)
C-STRM-PUMP-	Pump stations	E-TRAN-PADM-	Pad mounted transformers

C-STRM-STRC-	Storm drainage, headwalls, inlets, manholes, culverts, and drainage structures	E-TRAN-POLE-	Pole mounted transformers
E-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	F-AFFF-EQPM-	Equipment
E-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	F-ALRM-INDC-	Indicating appliances
E-CATH-ANOD-	Sacrificial anode system	F-ALRM-MANL-	Manual fire alarm pull stations
E-CATH-CURR-	Impress current system	F-ALRM-PHON-	Fire service or emergency telephone stations
E-CATH-TEST-	Test stations	F-CO2S-EQPM-	Equipment
E-COMM-EQPM-	Other communications distribution equipment	F-CTRL-PANL-	Control panels
E-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices	F-HALN-EQPM-	Halon equipment
E-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	F-IGAS-EQPM-	Inert gas equipment
E-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	F-LITE-EMER-	Emergency fixtures
E-ELEC-SUBS-	Other substation equipment	F-LITE-EXIT-	Exit fixtures
E-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches	F-LSFT-EGRE-	Egress requirements designator
E-ELEC-VALT-	Vaults	F-LSFT-OCCP-	Occupant load for egress capacity
E-GRND-EQUI-	Equipotential ground system	F-WATR-CONN-	Fire department connections
E-GRND-REFR-	Reference ground system	F-WATR-HYDR-	Hydrants
E-LITE-EMER-	Emergency fixtures (outline of light (if ceiling mounted) should go on E-LITE-CLNG)	F-WATR-PUMP-	Fire pumps
E-LITE-EXIT-	Exit fixtures (outline of light (if ceiling mounted) should go on	H-DECN-EQPM-	Decontamination equipment
E-LITE-CLNG-	Ceiling Fixtures	H-DISP-TANK-	Spill containment tanks
E-LITE-EXTR-	Exterior lights	L-DETL-VLVE-	Valves, fittings
E-LITE-JBOX-	Junction boxes	L-IRRG-SPKL-	Sprinklers
E-LITE-PANL-	Main distribution panels, switchboards, lighting panels	M-ACID-EQPM-	Acid, alkaline, and oil waste equipment
E-LITE-SPCL-	Special fixtures	M-BRIN-EQPM-	Brine system equipment

E-LITE-SWCH-	Lighting contactors, photoelectric controls, low-voltage lighting controls, etc.	M-CHEM-EQPM-	Equipment
E-LITE-WALL-	Wall mounted fixtures	M-CNDW-EQPM-	Condenser water equipment
E-LTNG-COND-	Lightning protection conductors	M-CONT-THER-	Thermostats, controls, instrumentation, and sensors
E-LTNG-TERM-	Lightning protection terminals	M-CWTR-EQPM-	Equipment
E-POLE-UTIL-	Utility poles	M-DETL-BOIL-	Boilers
E-POWR-BUSW-	Busways and wireways	M-DETL-COIL-	Coils and fin tubes
E-POWR-CABL-	Cable trays	M-DETL-DUCT-	Ducts
E-POWR-FEED-	Feeders	M-DETL-EQPT-	Equipment and fixtures
E-POWR-GENR-	Generators and auxiliary equipment	M-DETL-FANS-	Fans
E-POWR-JBOX-	Junction boxes	M-DETL-PUMP-	Pumps and compressors
E-POWR-PANL-	Panelboards, switchboards, MCC, unit substations	M-DETL-TANK-	Tanks
E-POWR-SWCH-	Disconnect switches, motor starters, contactors, etc.	M-DETL-TRAP-	Traps and drains
E-SERT-BURD-	Buried sensors	M-DETL-VENT-	Vents
E-SERT-UNDR-	Buried sensors	M-DETL-VLVE-	Valves and fittings
E-SPCL-JBOX-	Junction boxes	M-DUAL-EQPM-	Equipment
E-SPCL-PANL-	Panelboards, backing boards, patch panel racks	M-DUST-DUCT-	Dust and fume ductwork
E-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)	M-DUST-EQPM-	Dust and fume collection equipment
E-TRAN-PADM-	Pad mounted transformers	M-GTHP-EQPM-	Equipment
E-TRAN-POLE-	Pole mounted transformers	M-HTCW-CHLP-	Chilled water plant
F-AFFF-EQPM-	Equipment	M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
F-ALRM-INDC-	Indicating appliances	M-HTCW-FTTG-	Caps and flanges
F-ALRM-MANL-	Manual fire alarm pull stations	M-HTCW-HTPP-	High temperature water plant
F-ALRM-PHON-	Fire service or emergency telephone stations	M-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
F-CO2S-EQPM-	Equipment	M-HTCW-PITS-	Valve pits/vaults, steam pits
F-CTRL-PANL-	Control panels	M-HTCW-PUMP-	Pump stations
F-HALN-EQPM-	Halon equipment	M-HTCW-RTRN-	Return for all HTCW lines
F-IGAS-EQPM-	Inert gas equipment	M-HVAC-DAMP-	Fire and smoke dampers
F-LITE-EMER-	Emergency fixtures	M-HVAC-EQPM-	Air system equipment
F-LITE-EXIT-	Exit fixtures	M-HVAC-ROOF-	Roof mounted HVAC equipment
F-LSFT-EGRE-	Egress requirements designator	M-HWTR-EQPM-	Equipment

F-LSFT-OCCP-	Occupant load for egress capacity	M-HWTR-PIPE-	Piping (includes fittings, valves)
F-WATR-CONN-	Fire department connections	M-HYDR-EQPM-	Hydraulic system equipment
F-WATR-HYDR-	Hydrants	M-INSL-EQPM-	Insulating oil equipment
F-WATR-PUMP-	Fire pumps	M-LUBE-EQPM-	Lubrication oil equipment
H-DECN-EQPM-	Decontamination equipment	M-MACH-BASE-	Machinery bases
H-DISP-TANK-	Spill containment tanks	M-MATL-LIFT-	Miscellaneous lifting equipment
L-DETL-VLVE-	Valves, fittings	M-PROC-EQPM-	Equipment
L-IRRG-SPKL-	Sprinklers	M-RCOV-EQPM-	Equipment
M-ACID-EQPM-	Acid, alkaline, and oil waste equipment	M-REFG-EQPM-	Equipment
M-BRIN-EQPM-	Brine system equipment	M-RWTR-EQPM-	Raw water equipment
M-CHEM-EQPM-	Equipment	M-STEM-EQPM-	Equipment
M-CNDW-EQPM-	Condenser water equipment	P-CMPA-EQPM-	Equipment
M-CONT-THER-	Thermostats, controls, instrumentation, and sensors	P-FUEL-EQPM-	Equipment
M-CWTR-EQPM-	Equipment	P-LGAS-EQPM-	Equipment
M-DETL-BOIL-	Boilers	P-MDGS-EQPM-	Equipment
M-DETL-COIL-	Coils and fin tubes	P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)
M-DETL-DUCT-	Ducts	P-SANR-FLDR-	Floor drains, sinks, and cleanouts
M-DETL-EQPT-	Equipment and fixtures	S-BRAC-VERT-	Vertical bracing
M-DETL-FANS-	Fans	S-GRAT-SUBS-	Subsurface grating
M-DETL-PUMP-	Pumps and compressors	S-PIPE-GATE-	Gates (flap gates, sluice gates, other)
M-DETL-TANK-	Tanks	T-CABL-COAX-	Coax cable
M-DETL-TRAP-	Traps and drains	T-CABL-FIBR-	Fiber optics cable
M-DETL-VENT-	Vents	T-CABL-MULT-	Multi-conductor cable
M-DETL-VLVE-	Valves and fittings	T-COMM-JBOX-	Junction boxes
M-DUAL-EQPM-	Equipment	T-EQPM-COPP-	Distribution equipment for copper
M-DUST-DUCT-	Dust and fume ductwork	T-EQPM-FIBR-	Distribution equipment for fiber optic
M-DUST-EQPM-	Dust and fume collection equipment	T-EQPM-OTHR-	Other telecommunications equipment
M-GTHP-EQPM-	Equipment	T-JACK-DATA-	Data/LAN jacks
M-HTCW-CHLP-	Chilled water plant	T-JACK-PHON-	Telephone jacks

M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves	V-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
M-HTCW-FTTG-	Caps and flanges	V-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
M-HTCW-HTPP-	High temperature water plant	V-CATH-ANOD-	Sacrificial anode system
M-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes	V-CATH-CURR-	Impress current system
M-HTCW-PITS-	Valve pits/vaults, steam pits	V-CATH-TEST-	Test stations
M-HTCW-PUMP-	Pump stations	V-COMM-EQPM-	Other communications distribution equipment
M-HTCW-RTRN-	Return for all HTCW lines	V-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices
M-HVAC-DAMP-	Fire and smoke dampers	V-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
M-HVAC-EQPM-	Air system equipment	V-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
M-HVAC-ROOF-	Roof mounted HVAC equipment	V-ELEC-SUBS-	Other substation equipment
M-HWTR-EQPM-	Equipment	V-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches
M-HWTR-PIPE-	Piping (includes fittings, valves)	V-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves
M-HYDR-EQPM-	Hydraulic system equipment	V-FUEL-FTTG-	Caps, crosses, and tees
M-INSL-EQPM-	Insulating oil equipment	V-FUEL-HYDR-	Hydrant control pits
M-LUBE-EQPM-	Lubrication oil equipment	V-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes
M-MACH-BASE-	Machinery bases	V-FUEL-METR-	Meters
M-MATL-LIFT-	Miscellaneous lifting equipment	V-FUEL-PUMP-	Booster pump stations
M-PROC-EQPM-	Equipment	V-FUEL-TANK-	Fuel tanks
M-RCOV-EQPM-	Equipment	V-FUEL-VENT-	Vent pits

M-REFG-EQPM-	Equipment	V-FUEL-VLVE-	Valve pits
M-RWTR-EQPM-	Raw water equipment	V-GTHP-EQPM-	Equipment
M-STEM-EQPM-	Equipment	V-HTCW-CHLP-	Chilled water plant
P-CMPA-EQPM-	Equipment	V-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
P-FUEL-EQPM-	Equipment	V-HTCW-FTTG-	Caps and flanges
P-LGAS-EQPM-	Equipment	V-HTCW-HTPP-	High temperature water plant
P-MDGS-EQPM-	Equipment	V-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)	V-HTCW-PITS-	Valve pits/vaults, steam pits
P-SANR-FLDR-	Floor drains, sinks, and cleanouts	V-HTCW-PUMP-	Pump stations
S-BRAC-VERT-	Vertical bracing	V-HTCW-RTRN-	Return for all HTCW lines
S-GRAT-SUBS-	Subsurface grating	V-LITE-FIXT-	Exterior Lights
S-PIPE-GATE-	Gates (flap gates, sluice gates, other)	V-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves
T-CABL-COAX-	Coax cable	V-NGAS-FTTG-	Caps, crosses, and tees
T-CABL-FIBR-	Fiber optics cable	V-NGAS-METR-	Meters
T-CABL-MULT-	Multi-conductor cable	V-NGAS-PUMP-	Compressor stations
T-COMM-JBOX-	Junction boxes	V-NGAS-REDC-	Reducing stations
T-EQPM-COPP-	Distribution equipment for copper	V-NGAS-VENT-	Vent pits
T-EQPM-FIBR-	Distribution equipment for fiber optic	V-NGAS-VLVE-	Valve pits/boxes
T-EQPM-OTHR-	Other telecommunications equipment	V-POLE-UTIL-	Utility poles
T-JACK-DATA-	Data/LAN jacks	V-PROF-MHOL-	Manholes
T-JACK-PHON-	Telephone jacks	V-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)
V-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	V-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves
V-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	V-SSWR-FILT-	Filtration beds
V-CATH-ANOD-	Sacrificial anode system	V-SSWR-FTTG-	Caps and cleanouts
V-CATH-CURR-	Impress current system	V-SSWR-JBOX-	Junction boxes and manholes

V-CATH-TEST-	Test stations	V-SSWR-PUMP-	Booster pump stations
V-COMM-EQPM-	Other communications distribution equipment	V-SSWR-TANK-	Septic tanks
V-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices	V-STRM-CHUT-	Chutes and concrete erosion control structures
V-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	V-STRM-CULV-	Culverts
V-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	V-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates
V-ELEC-SUBS-	Other substation equipment	V-STRM-EROS-	Erosion control (riprap)
V-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches	V-STRM-FMON-	Flow monitoring station
V-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves	V-STRM-FTTG-	Caps and cleanouts
V-FUEL-FTTG-	Caps, crosses, and tees	V-STRM-HDWL-	Headwalls and endwalls
V-FUEL-HYDR-	Hydrant control pits	V-STRM-INLT-	Inlets (curb, surface, and catch basins)
V-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes	V-STRM-MHOL-	Manholes
V-FUEL-METR-	Meters	V-STRM-PUMP-	Pump stations
V-FUEL-PUMP-	Booster pump stations	V-TRAN-PADM-	Pad mounted transformers
V-FUEL-TANK-	Fuel tanks	V-TRAN-POLE-	Pole mounted transformers
V-FUEL-VENT-	Vent pits	V-UTIL-LINE-	Utilities
V-FUEL-VLVE-	Valve pits	V-UTIL-NGAS-	Gas lines, features, and valves
V-GTHP-EQPM-	Equipment	V-UTIL-SSWR-	Sanitary lines and manholes
V-HTCW-CHLP-	Chilled water plant	E-SPCL-SRFS-	Surface Sensor System
V-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves	T-COMM-ANTN-	Telecommunications antennae
V-HTCW-FTTG-	Caps and flanges	C-SITE-SECU-	CMRA Security camera locations outside of buildings
V-HTCW-HTPP-	High temperature water plant	F-IGAS-EQPM-	Inert gas equipment
V-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes	F-LITE-EMER-	Emergency fixtures
V-HTCW-PITS-	Valve pits/vaults, steam pits	F-LITE-EXIT-	Exit fixtures
V-HTCW-PUMP-	Pump stations	F-LSFT-EGRE-	Egress requirements designator

V-HTCW-RTRN-	Return for all HTCW lines	F-LSFT-OCCP-	Occupant load for egress capacity
V-LITE-FIXT-	Exterior Lights	F-WATR-CONN-	Fire department connections
V-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves	F-WATR-HYDR-	Hydrants
V-NGAS-FTTG-	Caps, crosses, and tees	F-WATR-PUMP-	Fire pumps
V-NGAS-METR-	Meters	H-DECN-EQPM-	Decontamination equipment
V-NGAS-PUMP-	Compressor stations	H-DISP-TANK-	Spill containment tanks
V-NGAS-REDC-	Reducing stations	L-DETL-VLVE-	Valves, fittings
V-NGAS-VENT-	Vent pits	L-IRRG-SPKL-	Sprinklers
V-NGAS-VLVE-	Valve pits/boxes	M-ACID-EQPM-	Acid, alkaline, and oil waste equipment
V-POLE-UTIL-	Utility poles	M-BRIN-EQPM-	Brine system equipment
V-PROF-MHOL-	Manholes	M-CHEM-EQPM-	Equipment
V-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)	M-CNDW-EQPM-	Condenser water equipment
V-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves	M-CONT-THER-	Thermostats, controls, instrumentation, and sensors
V-SSWR-FILT-	Filtration beds	M-CWTR-EQPM-	Equipment
V-SSWR-FTTG-	Caps and cleanouts	M-DETL-BOIL-	Boilers
V-SSWR-JBOX-	Junction boxes and manholes	M-DETL-COIL-	Coils and fin tubes
V-SSWR-PUMP-	Booster pump stations	M-DETL-DUCT-	Ducts
V-SSWR-TANK-	Septic tanks	M-DETL-EQPT-	Equipment and fixtures
V-STRM-CHUT-	Chutes and concrete erosion control structures	M-DETL-FANS-	Fans
V-STRM-CULV-	Culverts	M-DETL-PUMP-	Pumps and compressors
V-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates	M-DETL-TANK-	Tanks
V-STRM-EROS-	Erosion control (riprap)	M-DETL-TRAP-	Traps and drains
V-STRM-FMON-	Flow monitoring station	M-DETL-VENT-	Vents
V-STRM-FTTG-	Caps and cleanouts	M-DETL-VLVE-	Valves and fittings
V-STRM-HDWL-	Headwalls and endwalls	M-DUAL-EQPM-	Equipment
V-STRM-INLT-	Inlets (curb, surface, and catch basins)	M-DUST-DUCT-	Dust and fume ductwork
V-STRM-MHOL-	Manholes	M-DUST-EQPM-	Dust and fume collection equipment
V-STRM-PUMP-	Pump stations	M-GTHP-EQPM-	Equipment
V-TRAN-PADM-	Pad mounted transformers	M-HTCW-CHLP-	Chilled water plant

V-TRAN-POLE-	Pole mounted transformers	M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
V-UTIL-LINE-	Utilities	M-HTCW-FTTG-	Caps and flanges
V-UTIL-NGAS-	Gas lines, features, and valves	M-HTCW-HTPP-	High temperature water plant
V-UTIL-SSWR-	Sanitary lines and manholes	M-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
E-SPCL-SRFS-	Surface Sensor System	M-HTCW-PITS-	Valve pits/vaults, steam pits
T-COMM-ANTN-	Telecommunications antennae	M-HTCW-PUMP-	Pump stations
C-SITE-SECU-	MRA Security camera locations outside of buildings	M-HTCW-RTRN-	Return for all HTCW lines
C-STRM-FTTG-	Caps and cleanouts	M-HVAC-DAMP-	Fire and smoke dampers
C-STRM-INLT-	Inlets (curb, surface, and catch basins)	M-HVAC-EQPM-	Air system equipment
C-STRM-MHOL-	Manholes	M-HVAC-ROOF-	Roof mounted HVAC equipment
C-STRM-PUMP-	Pump stations	M-HWTR-EQPM-	Equipment
C-STRM-STRC-	Storm drainage, headwalls, inlets, manholes, culverts, and drainage structures	M-HWTR-PIPE-	Piping (includes fittings, valves)
E-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	M-HYDR-EQPM-	Hydraulic system equipment
E-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	M-INSL-EQPM-	Insulating oil equipment
E-CATH-ANOD-	Sacrificial anode system	M-LUBE-EQPM-	Lubrication oil equipment
E-CATH-CURR-	Impress current system	M-MACH-BASE-	Machinery bases
E-CATH-TEST-	Test stations	M-MATL-LIFT-	Miscellaneous lifting equipment
E-COMM-EQPM-	Other communications distribution equipment	M-PROC-EQPM-	Equipment
E-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices	M-RCOV-EQPM-	Equipment
E-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	M-REFG-EQPM-	Equipment
E-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	M-RWTR-EQPM-	Raw water equipment
E-ELEC-SUBS-	Other substation equipment	M-STEM-EQPM-	Equipment

E-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches	P-CMPA-EQPM-	Equipment
E-ELEC-VALT-	Vaults	P-FUEL-EQPM-	Equipment
E-GRND-EQUI-	Equipotential ground system	P-LGAS-EQPM-	Equipment
E-GRND-REFR-	Reference ground system	P-MDGS-EQPM-	Equipment
E-LITE-EMER-	Emergency fixtures (outline of light (if ceiling mounted) should go on E-LITE-CLNG)	P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)
E-LITE-EXIT-	Exit fixtures (outline of light (if ceiling mounted) should go on	P-SANR-FLDR-	Floor drains, sinks, and cleanouts
E-LITE-CLNG-		S-BRAC-VERT-	Vertical bracing
E-LITE-EXTR-	Exterior lights	S-GRAT-SUBS-	Subsurface grating
E-LITE-JBOX-	Junction boxes	S-PIPE-GATE-	Gates (flap gates, sluice gates, other)
E-LITE-PANL-	Main distribution panels, switchboards, lighting panels	T-CABL-COAX-	Coax cable
E-LITE-SPCL-	Special fixtures	T-CABL-FIBR-	Fiber optics cable
E-LITE-SWCH-	Lighting contactors, photoelectric controls, low-voltage lighting controls, etc.	T-CABL-MULT-	Multi-conductor cable
E-LITE-WALL-	Wall mounted fixtures	M-DUAL-EQPM-	Equipment
E-LTNG-COND-	Lightning protection conductors	M-DUST-DUCT-	Dust and fume ductwork
E-LTNG-TERM-	Lightning protection terminals	M-DUST-EQPM-	Dust and fume collection equipment
E-POLE-UTIL-	Utility poles	M-GTHP-EQPM-	Equipment
E-POWR-BUSW-	Busways and wireways	M-HTCW-CHLP-	Chilled water plant
E-POWR-CABL-	Cable trays	M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
E-POWR-FEED-	Feeders	M-HTCW-FTTG-	Caps and flanges
E-POWR-GENR-	Generators and auxiliary equipment	M-HTCW-HTPP-	High temperature water plant
E-POWR-JBOX-	Junction boxes	M-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
E-POWR-PANL-	Panelboards, switchboards, MCC, unit substations	M-HTCW-PITS-	Valve pits/vaults, steam pits
E-POWR-SWCH-	Disconnect switches, motor starters, contactors, etc.	M-HTCW-PUMP-	Pump stations
E-SERT-BURD-	Buried sensors	M-HTCW-RTRN-	Return for all HTCW lines
E-SERT-UNDR-	Buried sensors	M-HVAC-DAMP-	Fire and smoke dampers
E-SPCL-JBOX-	Junction boxes	M-HVAC-EQPM-	Air system equipment
E-SPCL-PANL-	Panelboards, backing boards, patch panel racks	M-HVAC-ROOF-	Roof mounted HVAC equipment

E-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)	M-HWTR-EQPM-	Equipment
E-TRAN-PADM-	Pad mounted transformers	M-HWTR-PIPE-	Piping (includes fittings, valves)
E-TRAN-POLE-	Pole mounted transformers	M-HYDR-EQPM-	Hydraulic system equipment
F-AFFF-EQPM-	Equipment	M-INSL-EQPM-	Insulating oil equipment
F-ALRM-INDC-	Indicating appliances	M-LUBE-EQPM-	Lubrication oil equipment
F-ALRM-MANL-	Manual fire alarm pull stations	M-MACH-BASE-	Machinery bases
F-ALRM-PHON-	Fire service or emergency telephone stations	M-MATL-LIFT-	Miscellaneous lifting equipment
F-CO2S-EQPM-	Equipment	M-PROC-EQPM-	Equipment
F-CTRL-PANL-	Control panels	M-RCOV-EQPM-	Equipment
F-HALN-EQPM-	Halon equipment	M-REFG-EQPM-	Equipment
F-IGAS-EQPM-	Inert gas equipment	M-RWTR-EQPM-	Raw water equipment
F-LITE-EMER-	Emergency fixtures	M-STEM-EQPM-	Equipment
F-LITE-EXIT-	Exit fixtures	P-CMPA-EQPM-	Equipment
F-LSFT-EGRE-	Egress requirements designator	P-FUEL-EQPM-	Equipment
F-LSFT-OCCP-	Occupant load for egress capacity	P-LGAS-EQPM-	Equipment
F-WATR-CONN-	Fire department connections	P-MDGS-EQPM-	Equipment
F-WATR-HYDR-	Hydrants	P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)
F-WATR-PUMP-	Fire pumps	P-SANR-FLDR-	Floor drains, sinks, and cleanouts
H-DECN-EQPM-	Decontamination equipment	S-BRAC-VERT-	Vertical bracing
H-DISP-TANK-	Spill containment tanks	S-GRAT-SUBS-	Subsurface grating
L-DETL-VLVE-	Valves, fittings	S-PIPE-GATE-	Gates (flap gates, sluice gates, other)
L-IRRG-SPKL-	Sprinklers	T-CABL-COAX-	Coax cable
M-ACID-EQPM-	Acid, alkaline, and oil waste equipment	T-CABL-FIBR-	Fiber optics cable
M-BRIN-EQPM-	Brine system equipment	T-CABL-MULT-	Multi-conductor cable
M-CHEM-EQPM-	Equipment	P-CMPA-EQPM-	Equipment
M-CNDW-EQPM-	Condenser water equipment	P-FUEL-EQPM-	Equipment
M-CONT-THER-	Thermostats, controls, instrumentation, and sensors	P-LGAS-EQPM-	Equipment
M-CWTR-EQPM-	Equipment	P-MDGS-EQPM-	Equipment
M-DETL-BOIL-	Boilers	P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)
M-DETL-COIL-	Coils and fin tubes	P-SANR-FLDR-	Floor drains, sinks, and cleanouts
M-DETL-DUCT-	Ducts	S-BRAC-VERT-	Vertical bracing

M-DETL-EQPT-	Equipment and fixtures	S-GRAT-SUBS-	Subsurface grating
M-DETL-FANS-	Fans	S-PIPE-GATE-	Gates (flap gates, sluice gates, other)
M-DETL-PUMP-	Pumps and compressors	T-CABL-COAX-	Coax cable
M-DETL-TANK-	Tanks	T-CABL-FIBR-	Fiber optics cable
M-DETL-TRAP-	Traps and drains	T-CABL-MULT-	Multi-conductor cable
M-DETL-VENT-	Vents	T-COMM-JBOX-	Junction boxes
M-DETL-VLVE-	Valves and fittings	T-EQPM-COPP-	Distribution equipment for copper
M-DUAL-EQPM-	Equipment	T-EQPM-FIBR-	Distribution equipment for fiber optic
M-DUST-DUCT-	Dust and fume ductwork	T-EQPM-OTHR-	Other telecommunications equipment
M-DUST-EQPM-	Dust and fume collection equipment	T-JACK-DATA-	Data/LAN jacks
M-GTHP-EQPM-	Equipment	T-JACK-PHON-	Telephone jacks
M-HTCW-CHLP-	Chilled water plant	V-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves	V-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
M-HTCW-FTTG-	Caps and flanges	V-CATH-ANOD-	Sacrificial anode system
M-HTCW-HTPP-	High temperature water plant	V-CATH-CURR-	Impress current system
M-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes	V-CATH-TEST-	Test stations
M-HTCW-PITS-	Valve pits/vaults, steam pits	V-COMM-EQPM-	Other communications distribution equipment
M-HTCW-PUMP-	Pump stations	V-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices
M-HTCW-RTRN-	Return for all HTCW lines	V-ELEC-SUBS-	Other substation equipmentmarkers, oil/water separators, reducers, regulators, and valves
M-HVAC-DAMP-	Fire and smoke dampers	V-FUEL-FTTG-	Caps, crosses, and tees
M-HVAC-EQPM-	Air system equipment	V-FUEL-HYDR-	Hydrant control pits
M-HVAC-ROOF-	Roof mounted HVAC equipment	V-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes
M-HWTR-EQPM-	Equipment	V-FUEL-METR-	Meters

M-HWTR-PIPE-	Piping (includes fittings, valves)	V-FUEL-PUMP-	Booster pump stations
M-HYDR-EQPM-	Hydraulic system equipment	V-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches
M-INSL-EQPM-	Insulating oil equipment	V-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves
M-LUBE-EQPM-	Lubrication oil equipment	V-FUEL-FTTG-	Caps, crosses, and tees
M-MACH-BASE-	Machinery bases	V-FUEL-HYDR-	Hydrant control pits
M-MATL-LIFT-	Miscellaneous lifting equipment	V-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes
M-PROC-EQPM-	Equipment	V-FUEL-METR-	Meters
M-RCOV-EQPM-	Equipment	V-FUEL-PUMP-	Booster pump stations
M-REFG-EQPM-	Equipment	V-FUEL-TANK-	Fuel tanks
M-RWTR-EQPM-	Raw water equipment	V-FUEL-VENT-	Vent pits
M-STEM-EQPM-	Equipment	V-FUEL-VLVE-	Valve pits
P-CMPA-EQPM-	Equipment	V-GTHP-EQPM-	Equipment
P-FUEL-EQPM-	Equipment	V-HTCW-CHLP-	Chilled water plant
P-LGAS-EQPM-	Equipment	V-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
P-MDGS-EQPM-	Equipment	V-HTCW-FTTG-	Caps and flanges
P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)	V-HTCW-HTPP-	High temperature water plant
P-SANR-FLDR-	Floor drains, sinks, and cleanouts	V-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
S-BRAC-VERT-	Vertical bracing	V-HTCW-PITS-	Valve pits/vaults, steam pits
S-GRAT-SUBS-	Subsurface grating	V-HTCW-PUMP-	Pump stations
S-PIPE-GATE-	Gates (flap gates, sluice gates, other)	V-HTCW-RTRN-	Return for all HTCW lines
T-CABL-COAX-	Coax cable	V-LITE-FIXT-	Exterior Lights
T-CABL-FIBR-	Fiber optics cable	V-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves
T-CABL-MULT-	Multi-conductor cable	V-NGAS-FTTG-	Caps, crosses, and tees

T-COMM-JBOX-	Junction boxes	V-NGAS-METR-	Meters
T-EQPM-COPP-	Distribution equipment for copper	V-NGAS-PUMP-	Compressor stations
T-EQPM-FIBR-	Distribution equipment for fiber optic	V-NGAS-REDC-	Reducing stations
T-EQPM-OTHR-	Other telecommunications equipment	V-NGAS-VENT-	Vent pits
T-JACK-DATA-	Data/LAN jacks	V-NGAS-VLVE-	Valve pits/boxes
T-JACK-PHON-	Telephone jacks	V-POLE-UTIL-	Utility poles
V-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	V-PROF-MHOL-	Manholes
V-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	V-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)
V-CATH-ANOD-	Sacrificial anode system	V-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves
V-CATH-CURR-	Impress current system	V-SSWR-FILT-	Filtration beds
V-CATH-TEST-	Test stations	V-SSWR-FTTG-	Caps and cleanouts
V-COMM-EQPM-	Other communications distribution equipment	V-SSWR-JBOX-	Junction boxes and manholes
V-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices	V-SSWR-PUMP-	Booster pump stations
V-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers	V-SSWR-TANK-	Septic tanks
V-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices	V-STRM-CHUT-	Chutes and concrete erosion control structures
V-ELEC-SUBS-	Other substation equipment	V-STRM-CULV-	Culverts
V-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches	V-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates
V-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves	V-STRM-EROS-	Erosion control (riprap)
V-FUEL-FTTG-	Caps, crosses, and tees	V-STRM-FMON-	Flow monitoring station
V-FUEL-HYDR-	Hydrant control pits	V-STRM-FTTG-	Caps and cleanouts
V-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes	V-STRM-HDWL-	Headwalls and endwalls

V-FUEL-METR-	Meters	V-STRM-INLT-	Inlets (curb, surface, and catch basins)
V-FUEL-PUMP-	Booster pump stations	V-STRM-MHOL-	Manholes
V-FUEL-TANK-	Fuel tanks	V-STRM-PUMP-	Pump stations
V-FUEL-VENT-	Vent pits	V-TRAN-PADM-	Pad mounted transformers
V-FUEL-VLVE-	Valve pits	V-TRAN-POLE-	Pole mounted transformers
V-GTHP-EQPM-	Equipment	V-UTIL-LINE-	Utilities
V-HTCW-CHLP-	Chilled water plant	V-UTIL-NGAS-	Gas lines, features, and valves
V-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves	V-UTIL-SSWR-	Sanitary lines and manholes
V-HTCW-FTTG-	Caps and flanges	E-SPCL-SRFS-	Surface Sensor System
V-HTCW-HTPP-	High temperature water plant	T-COMM-ANTN-	Telecommunications antennae
V-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes	C-SITE-SECU-	CMRA Security camera locations outside of buildings
V-HTCW-PITS-	Valve pits/vaults, steam pits	V-NGAS-VLVE-	Valve pits/boxes
V-HTCW-PUMP-	Pump stations	V-POLE-UTIL-	Utility poles
V-HTCW-RTRN-	Return for all HTCW lines	V-PROF-MHOL-	Manholes
V-LITE-FIXT-	Exterior Lights	V-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)
V-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves	V-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves
V-NGAS-FTTG-	Caps, crosses, and tees	V-SSWR-FILT-	Filtration beds
V-NGAS-METR-	Meters	V-SSWR-FTTG-	Caps and cleanouts
V-NGAS-PUMP-	Compressor stations	V-SSWR-JBOX-	Junction boxes and manholes
V-NGAS-REDC-	Reducing stations	V-SSWR-PUMP-	Booster pump stations
V-NGAS-VENT-	Vent pits	V-SSWR-TANK-	Septic tanks
V-NGAS-VLVE-	Valve pits/boxes	V-STRM-CHUT-	Chutes and concrete erosion control structures
V-POLE-UTIL-	Utility poles	V-STRM-CULV-	Culverts
V-PROF-MHOL-	Manholes	V-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates
V-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)	V-STRM-EROS-	Erosion control (riprap)
V-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves	V-STRM-FMON-	Flow monitoring station
V-SSWR-FILT-	Filtration beds	V-STRM-FTTG-	Caps and cleanouts

V-SSWR-FTTG-	Caps and cleanouts	V-STRM-HDWL-	Headwalls and endwalls
V-SSWR-JBOX-	Junction boxes and manholes	V-STRM-INLT-	Inlets (curb, surface, and catch basins)
V-SSWR-PUMP-	Booster pump stations	V-STRM-MHOL-	Manholes
V-SSWR-TANK-	Septic tanks	V-STRM-PUMP-	Pump stations
V-STRM-CHUT-	Chutes and concrete erosion control structures	V-TRAN-PADM-	Pad mounted transformers
V-STRM-CULV-	Culverts	V-TRAN-POLE-	Pole mounted transformers
V-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates	V-UTIL-LINE-	Utilities
V-STRM-EROS-	Erosion control (riprap)	V-UTIL-NGAS-	Gas lines, features, and valves
V-STRM-FMON-	Flow monitoring station	V-UTIL-SSWR-	Sanitary lines and manholes
V-STRM-FTTG-	Caps and cleanouts	E-SPCL-SRFS-	Surface Sensor System
V-STRM-HDWL-	Headwalls and endwalls	T-COMM-ANTN-	Telecommunications antennae
		C-SITE-SECU-	CMRA Security camera locations outside of buildings

	Color	Line type	Line Weight	Symbol
AutoDesk Standards	6 (all)	Continuous (all)	1 MM (all)	User Defined
MicroStation Standards	5 (all)		7 (all)	

Information Assurance Level	Restricted		
Equivalent Standards	**AIXM**	*Utility*	Core
	FGDC	*VerticalStructure*	
	SDSFIE	*None*	
Documentation and Submission Requirements	None		
Related Features			

Data Capture Rules: *Collect the center of the object at the highest point.*

Monumentation	N/A	
Survey Point Location	**Horizontal**	**Vertical**
	N/A	N/A

Accuracy Requirements (in feet)	**Horizontal**		**Vertical**	
			Orthometric	**Ellipsoidal**
	A	± 1ft	± 0.25ft	
	B	± 3 ft	± 10 ft	
	C	± 5 ft	± 10 ft	
	D	± 10 ft	± 20 ft	

Resolution	**Geographic Coordinates**	**Distances and Elevations**
A	Hundredth of arc second	Nearest Tenth of a foot
B	Five Hundredths of arc second	Nearest Foot
C	Five Hundredths of arc second	Nearest Foot
D	Tenth of arc second	Nearest Foot

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.

description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
utilityType (Enumeration: CodeUtilityType)	The type of utility the feature represents.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.14.4. Utility Polygon

Definition: Any utility feature typically represented as a polygon, or hydro vaults.				
Feature Group	Utilities			
Feature Class Name	UtilityPolygon			
Feature Type	Polygon			
CADD Standard Requirements				
Layer/Level	**Description**			
C-SSWR-LAGN-	Lagoons			
C-SSWR-LEAC-	Leach field			
C-SSWR-NITF-	Nitrification drain fields			
C-SSWR-PLNT-	Treatment plants			
C-STRM-AFFF-	AFFF lagoon/detention pond			
C-STRM-CHUT-	Chutes and concrete erosion control structures			
C-STRM-LAGN-	Lagoons, ponds, watersheds, and basins			
E-AIRF-VALT-	Airfield lighting vaults			
V-STRM-LAGN-	Lagoons, ponds, watersheds, and basins			
E-COMM-VALT-	Communications vault			
V-COMM-VALT-	Communications vault			
V-SSWR-LAGN-	Lagoons			
V-SSWR-LEAC-	Leach field			
V-SSWR-NITF-	Nitrification drain fields			
V-SSWR-PLNT-	Treatment plants			
V-STRM-AFFF-	AFFF lagoon/detention pond			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	6 (all)	Continuous (all)	1 MM (all)	User Defined
MicroStation Standards	5 (all)		7 (all)	
Information Assurance Level	Restricted			
Equivalent Standards	**AIXM**	*Utility*		Core
	FGDC	*VerticalStructure*		
	SDSFIE	*None*		
Documentation and Submission Requirements	None			
Related Features				
Data Capture Rules: *Collect the outline of utility feature to its greatest horizontal extents.*				
Monumentation	N/A			

<table>
<tr><td rowspan="2">Survey Point Location</td><td colspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td colspan="2">N/A</td><td colspan="2">N/A</td></tr>
<tr><td rowspan="6">Accuracy Requirements (in feet)</td><td colspan="2" rowspan="2">Horizontal</td><td colspan="2">Vertical</td></tr>
<tr><td>Orthometric</td><td>Ellipsoidal</td></tr>
<tr><td>A</td><td>± 1ft</td><td>± 0.25ft</td><td rowspan="4">N/A</td></tr>
<tr><td>B</td><td>± 3 ft</td><td>± 10 ft</td></tr>
<tr><td>C</td><td>± 5 ft</td><td>± 10 ft</td></tr>
<tr><td>D</td><td>± 10 ft</td><td>± 20 ft</td></tr>
<tr><td>Resolution</td><td colspan="2">Geographic Coordinates</td><td colspan="2">Distances and Elevations</td></tr>
<tr><td>A</td><td colspan="2">Hundredth of arc second</td><td colspan="2">Nearest Tenth of a foot</td></tr>
<tr><td>B</td><td colspan="2">Five Hundredths of arc second</td><td colspan="2">Nearest Foot</td></tr>
<tr><td>C</td><td colspan="2">Five Hundredths of arc second</td><td colspan="2">Nearest Foot</td></tr>
<tr><td>D</td><td colspan="2">Tenth of arc second</td><td colspan="2">Nearest Foot</td></tr>
</table>

Feature Attributes

Attribute (Datatype)	Description
name (VARCHAR2 (50))	Name of the feature.
description (VARCHAR2 (255))	Description of the feature.
status (Enumeration: codeStatus)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
utilityType (Enumeration: CodeUtilityType)	The type of utility the feature represents.
userFlag (String 254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject Item's data.
Alternative (Number(2))	Discriminator used to tie features of a plan or proposal together into a version.

5.15. ATTRIBUTE ENUMERATIONS

The following tables contain the expected values in fields that are of type enumeration.

5.15.1. CodeAcqusitionType

Value	Description
FEE_SIMPLE	Purchased real property; absolute ownership
EASEMENT	Rights given to use land in a specific manner
LEASED	Restricted use of land for a specific period of time

5.15.2. CodeAirportFacilityType

Value	Description
AD	Airport only
AH	Airport with helicopter landing area
H	Helicopter (the stall speed method of calculating aircraft category does not apply)
HP	Heliport only
LS	Landing Site

5.15.3. CodeApproachCategory

Value	Description
A	Speed less than 91 knots
B	Speed 91 knots or more but less than 121 knots
C	Speed 121 knots or more but less than 141 knots
D	Speed 141 knots or more but less than 166 knots
E	Speed 166 knots or more

5.15.4. CodeApproachGuidance

Value	Description
NON_VERTICAL	Runway is used for or planned use is for Non-Vertically Guided operations
PRECISION_CAT_I	Runway is used or or planned use is for Precision Category 1 operations
PRECISION_CAT_II	Runway is used for or planned use is for Precision Category II operations
PRECISION_CAT_IIIA	Runway is used for or planned use is for Precision Category IIIa operations.
PRECISION_CAT_IIIB	Runway is used for or planned use is for Precision Category IIIb operations
PRECISION_CAT_IIIC	Runway is used for or planned use is for Precision Category IIIc operations
VERTICAL	Runway is used for or planned use is for Vertically Guided (other than precision) operations
VISUAL	Runway is used for or planned use is for visual operations only

5.15.5. CodeApronType

Value	Description
CARGO	Cargo loading area used for the loading/unloading of cargo
DE_ICING	Area used for deicing of aircraft
FUEL	Area used for aircraft fueling

Value	Description
HARDSTAND	Area used for parking a single aircraft. More temporary than parking
LOADING	Passenger loading area used for the loading/unloading of passengers
MAINT	Area used for maintenance of aircraft
MILITARY	Apron used by military
NORMAL	Apron
OTHER	Other
PARKING	Area used to park aircraft
RAMP	Access pavement between maintenance hangars opening to the apron and the apron edge
STAIRS	Stairs
TAXILANE	Area where plane is still under terminal control (airline dispatched) as opposed to tower control.
TEMPORARY	Temporary
TURNAROUND	Area used for aircraft to turn around

5.15.6. CodeBridgeType

Value	Description
ROAD	Road or highway bridge
RR	Railroad or Monorail Bridge
RWY	Runway Bridge
TWY	Taxiway Bridge

5.15.7. CodeBuoyType

Value	Description
Bn	Beacon
C	Can Buoy
F	Fixed
J	Junction (S or T Dayboard)
K	Rectangular (Range Dayboard)
Lb	Lighted buoy
M	Octagonal Dayboard
N	Nun Buoy
O	Other marking
S	Square Dayboard
T	Triangle Dayboard

5.15.8. CodeClassAirspace

Name	Definition
A	Class of Airspace per ICAO Annex 11, Appendix 4
B	Class of Airspace per ICAO Annex 11, Appendix 4
C	Class of Airspace per ICAO Annex 11, Appendix 4
D	Class of Airspace per ICAO Annex 11, Appendix 4
E	Class of Airspace per ICAO Annex 11, Appendix 4
F	Class of Airspace per ICAO Annex 11, Appendix 4
G	Class of Airspace per ICAO Annex 11, Appendix 4
other	Other

5.15.9. CodeColor

Value	Description
AMBER	Amber [U.S. CADD]
BLACK	Black [U.S. CADD]
BLUE	Blue [U.S. CADD]
BROWN	Brown [U.S. CADD]
GREEN	Green [U.S. CADD]
GREEN-GREEN	Bidirectional (Source AC 150/5345-46C)
GREEN-RED	Bidirectional (Source AC 150/5345-46C)
GREEN-YELLOW	Bidirectional (Source AC 150/5345-46C)
GREY	Grey [U.S. CADD]
LIGHTGREY	LightGrey [U.S. CADD]
MAGENTA	Magenta [U.S. CADD]
ORANGE	Orange [U.S. CADD]
OTHER	Other [U.S. CADD]
PINK	Pink [U.S. CADD]
PURPLE	Purple [AIXM]
RED	Red [U.S. CADD]
RED-GREEN	Bidirectional (Source AC 150/5345-46C)
RED-RED	Bidirectional (Source AC 150/5345-46C)
TBD	To be determined
VIOLET	Violet [U.S. CADD]
WHITE	White [U.S. CADD]
WHITE-RED	Bidirectional (Source AC 150/5345-46C)
WHITE-WHITE	Bidirectional (Source AC 150/5345-46C)
WHITE-YELLOW	Bidirectional (Source AC 150/5345-46C)
YELLOW	Yellow [U.S. CADD]
YELLOW-GREEN	Bidirectional (Source AC 150/5345-46C)
YELLOW-RED	Bidirectional (Source AC 150/5345-46C)
YELLOW-YELLOW	Bidirectional (Source AC 150/5345-46C)

5.15.10. CodeCompassLocation

Value	Description
E	East (076 to 105° magnetic)
ESE	East Southeast (106 to 135° magnetic)
N	North (346 to 015° magnetic)
NE	Northeast (046 to 075° magnetic)
NNE	North Northeast (016 to 045° magnetic)
NW	Northwest (316 to 345° magnetic)
S	South (166 to 195° magnetic)
SE	Southeast (136 to 165° magnetic)
SSW	South Southwest (196 to 225° magnetic)
SW	Southwest (226 to 255° magnetic)
W	West (256 to 285° magnetic)
WNW	West NorthWest (286 to 315° magnetic)

5.15.11. CodeCoordinatedUseType

Value	Description
A	Aeronautical
M	Multiple
R	Recreational boating/fishing
S	Commercial Shipping/Fishing

5.15.12. CodeCoordinateZone

Value	Description
AK-1	NAD27 Alaska State Planes- Zone 1- US Foot (EPSG #26731)
AK-10	NAD27 Alaska State Planes- Zone 10- US Foot (EPSG #26740)
AK-2	NAD27 Alaska State Planes- Zone 2- US Foot (EPSG #26732)
AK-3	NAD27 Alaska State Planes- Zone 3- US Foot (EPSG #26733)
AK-4	NAD27 Alaska State Planes- Zone 4- US Foot (EPSG #26734)
AK-5	NAD27 Alaska State Planes- Zone 5- US Foot (EPSG #26735)
AK-6	NAD27 Alaska State Planes- Zone 6- US Foot (EPSG #26736)
AK-7	NAD27 Alaska State Planes- Zone 7- US Foot (EPSG #26737)
AK-8	NAD27 Alaska State Planes- Zone 8- US Foot (EPSG #26738)
AK83-1	NAD83 Alaska State Planes- Zone 1- Meter (EPSG #26931)
AK83-10	NAD83 Alaska State Planes- Zone 10- Meter (EPSG #26940)
AK83-10F	NAD83 Alaska State Planes- Zone 10- US Foot
AK83-1F	NAD83 Alaska State Planes- Zone 1- US Foot
AK83-2	NAD83 Alaska State Planes- Zone 2- Meter (EPSG #26932)
AK83-2F	NAD83 Alaska State Planes- Zone 2- US Foot
AK83-3	NAD83 Alaska State Planes- Zone 3- Meter (EPSG #26933)
AK83-3F	NAD83 Alaska State Planes- Zone 3- US Foot
AK83-4	NAD83 Alaska State Planes- Zone 4- Meter (EPSG #26934)
AK83-4F	NAD83 Alaska State Planes- Zone 4- US Foot
AK83-5	NAD83 Alaska State Planes- Zone 5- Meter (EPSG #26935)
AK83-5F	NAD83 Alaska State Planes- Zone 5- US Foot
AK83-6	NAD83 Alaska State Planes- Zone 6- Meter (EPSG #26936)
AK83-6F	NAD83 Alaska State Planes- Zone 6- US Foot
AK83-7	NAD83 Alaska State Planes- Zone 7- Meter (EPSG #26937)
AK83-7F	NAD83 Alaska State Planes- Zone 7- US Foot
AK83-8	NAD83 Alaska State Planes- Zone 8- Meter (EPSG #26938)
AK83-8F	NAD83 Alaska State Planes- Zone 8- US Foot
AK83-9	NAD83 Alaska State Planes- Zone 9- Meter (EPSG #26939)
AK83-9F	NAD83 Alaska State Planes- Zone 9- US Foot
AK-9	NAD27 Alaska State Planes- Zone 9- US Foot (EPSG #26739)
AL83-E	NAD83 Alabama State Planes- Eastern Zone- Meter (EPSG #26929)
AL83-EF	NAD83 Alabama State Planes- Eastern Zone- US Foot
AL83-W	NAD83 Alabama State Planes- Western Zone- Meter (EPSG #26930)
AL83-WF	NAD83 Alabama State Planes- Western Zone- US Foot
AL-E	NAD27 Alabama State Planes- Eastern Zone- US Foot (EPSG #26729)
ALHP-E	HPGN Alabama State Planes- Eastern Zone- Meter (EPSG #2759)
ALHP-EF	HPGN Alabama State Planes- Eastern Zone- US Foot
ALHP-W	HPGN Alabama State Planes- Western Zone- Meter (EPSG #2760)
ALHP-WF	HPGN Alabama State Planes- Western Zone- US Foot
AL-W	NAD27 Alabama State Planes- Western Zone- US Foot (EPSG #26730)

Value	Description
AR83-N	NAD83 Arkansas State Planes- Northern Zone- Meter (EPSG #26951)
AR83-NF	NAD83 Arkansas State Planes- Northern Zone- US Foot
AR83-S	NAD83 Arkansas State Planes- Southern Zone- Meter (EPSG #26952)
AR83-SF	NAD83 Arkansas State Planes- Southern Zone- US Foot
ARHP-N	HARN (HPGN) Arkansas State Planes- Northern Zone- Meter (EPSG #2764)
ARHP-NF	HARN (HPGN) Arkansas State Planes- Northern Zone- US Foot
ARHP-S	HARN (HPGN) Arkansas State Planes- Southern Zone- Meter (EPSG #2765)
ARHP-SF	HARN (HPGN) Arkansas State Planes- Southern Zone- US Foot
AR-N	NAD27 Arkansas State Planes- Northern Zone- US Foot (EPSG #26751)
AR-S	NAD27 Arkansas State Planes- Southern Zone- US Foot (EPSG #26752)
AZ83-C	NAD83 Arizona State Planes- Central Zone- Meter (EPSG #26949)
AZ83-CCM	NAD83 Arizona State Planes- Central Zone- Centimeter
AZ83-CF	NAD83 Arizona State Planes- Central Zone- US Foot
AZ83-CIF	NAD83 Arizona State Planes- Central Zone- Intnl Foot (EPSG #2223)
AZ83-E	NAD83 Arizona State Planes- East Zone- Meter (EPSG #26948)
AZ83-EF	NAD83 Arizona State Planes- East Zone- US Foot
AZ83-EIF	NAD83 Arizona State Planes- East Zone- Intnl Foot (EPSG #2222)
AZ83-W	NAD83 Arizona State Planes- West Zone- Meter (EPSG #26950)
AZ83-WF	NAD83 Arizona State Planes- West Zone- US Foot
AZ83-WIF	NAD83 Arizona State Planes- West Zone- Intnl Foot (EPSG #2224)
AZ-C	NAD27 Arizona State Planes- Central Zone- US Foot (EPSG #26749)
AZ-E	NAD27 Arizona State Planes- East Zone- US Foot (EPSG #26748)
AZHP-C	HPGN Arizona State Planes- Central Zone- Meter (EPSG #2762)
AZHP-CF	HPGN Arizona State Planes- Central Zone- US Foot
AZHP-CIF	HPGN Arizona State Planes- Central Zone- Intnl Foot (EPSG #2868)
AZHP-E	HPGN Arizona State Planes- East Zone- Meter (EPSG #2761)
AZHP-EF	HPGN Arizona State Planes- East Zone- US Foot
AZHP-EIF	HPGN Arizona State Planes- East Zone- Intnl Foot (EPSG #2867)
AZHP-W	HPGN Arizona State Planes- West Zone- Meter (EPSG #2763)
AZHP-WF	HPGN Arizona State Planes- West Zone- US Foot
AZHP-WIF	HPGN Arizona State Planes- West Zone- Intnl Foot (EPSG #2869)
AZ-W	NAD27 Arizona State Planes- West Zone- US Foot (EPSG #26750)
CA83-I	NAD83 California State Planes- Zone I- Meter (EPSG #26941)
CA83-IF	NAD83 California State Planes- Zone I- US Foot (EPSG #2225)
CA83-II	NAD83 California State Planes- Zone II- Meter (EPSG #26942)
CA83-IIF	NAD83 California State Planes- Zone II- US Foot (EPSG #2226)
CA83-III	NAD83 California State Planes- Zone III- Meter (EPSG #26943)
CA83IIIF	NAD83 California State Planes- Zone III- US Foot (EPSG #2227)
CA83-IV	NAD83 California State Planes- Zone IV- Meter (EPSG #26944)
CA83-IVF	NAD83 California State Planes- Zone IV- US Foot (EPSG #2228)
CA83-V	NAD83 California State Planes- Zone V- Meter (EPSG #26945)
CA83-VF	NAD83 California State Planes- Zone V- US Foot (EPSG #2229)
CA83-VI	NAD83 California State Planes- Zone VI- Meter (EPSG #26946)
CA83-VIF	NAD83 California State Planes- Zone VI- US Foot (EPSG #2230)
CAHP-I	HPGN California State Planes- Zone I- Meter (EPSG #2766)
CAHP-IF	HPGN California State Planes- Zone I- US Foot (EPSG #2870)
CAHP-II	HPGN California State Planes- Zone II- Meter (EPSG #2767)

Value	Description
CAHP-IIF	HPGN California State Planes- Zone II- US Foot (EPSG #2871)
CAHP-III	HPGN California State Planes- Zone III- Meter (EPSG #2768)
CAHPIIIF	HPGN California State Planes- Zone III- US Foot (EPSG #2872)
CAHP-IV	HPGN California State Planes- Zone IV- Meter (EPSG #2769)
CAHP-IVF	HPGN California State Planes- Zone IV- US Foot (EPSG #2873)
CAHP-V	HPGN California State Planes- Zone V- Meter (EPSG #2770)
CAHP-VF	HPGN California State Planes- Zone V- US Foot (EPSG #2874)
CAHP-VI	HPGN California State Planes- Zone VI- Meter (EPSG #2771)
CAHP-VIF	HPGN California State Planes- Zone VI- US Foot (EPSG #2875)
CA-I	NAD27 California State Planes- Zone I- US Foot (EPSG #26741)
CA-II	NAD27 California State Planes- Zone II- US Foot (EPSG #26742)
CA-III	NAD27 California State Planes- Zone III- US Foot (EPSG #26743)
CA-IV	NAD27 California State Planes- Zone IV- US Foot (EPSG #26744)
CA-V	NAD27 California State Planes- Zone V- US Foot (EPSG #26745)
CA-VI	NAD27 California State Planes- Zone VI- US Foot (EPSG #26746)
CA-VII	NAD27 California State Planes- Zone VII- US Foot (EPSG #26747)
CO83-C	NAD83 Colorado State Planes- Central Zone- Meter (EPSG #26954)
CO83-CF	NAD83 Colorado State Planes- Central Zone- US Foot (EPSG #2232)
CO83-N	NAD83 Colorado State Planes- Northern Zone- Meter (EPSG #26953)
CO83-NF	NAD83 Colorado State Planes- Northern Zone- US Foot (EPSG #2231)
CO83-S	NAD83 Colorado State Planes- Southern Zone- Meter (EPSG #26955)
CO83-SF	NAD83 Colorado State Planes- Southern Zone- US Foot (EPSG #2233)
CO-C	NAD27 Colorado State Planes- Central Zone- US Foot (EPSG #26754)
COHP-C	HPGN Colorado State Planes- Central Zone- Meter (EPSG #2773)
COHP-CF	HPGN Colorado State Planes- Central Zone- US Foot (EPSG #2877)
COHP-N	HPGN Colorado State Planes- Northern Zone- Meter (EPSG #2772)
COHP-NF	HPGN Colorado State Planes- Northern Zone- US Foot (EPSG #2876)
COHP-S	HPGN Colorado State Planes- Southern Zone- Meter (EPSG #2774)
COHP-SF	HPGN Colorado State Planes- Southern Zone- US Foot (EPSG #2878)
CO-N	NAD27 Colorado State Planes- Northern Zone- US Foot (EPSG #26753)
CO-S	NAD27 Colorado State Planes- Southern Zone- US Foot (EPSG #26755)
CT	NAD27 Connecticut State Plane Zone- US Foot (EPSG #26756)
CT83	NAD83 Connecticut State Plane Zone- Meter (EPSG #26956)
CT83F	NAD83 Connecticut State Plane Zone- US Foot (EPSG #2234)
CTHP	HPGN/HARN Connecticut State Plane Zone- Meter (EPSG #2775)
CTHPF	HPGN/HARN Connecticut State Plane Zone- US Foot (EPSG #2879)
DE	NAD27 Delaware State Planes- US Foot (EPSG #26757)
DE83	NAD83 Delaware State Planes- Meter (EPSG #26957)
DE83F	NAD83 Delaware State Planes- US Foot (EPSG #2235)
DEHP	HPGN Delaware State Planes- Meter (EPSG #2776)
DEHPF	HPGN Delaware State Planes- US Foot (EPSG #2880)
FL83-E	NAD83 Florida State Planes- Eastern Zone- Meter (EPSG #26958)
FL83-EF	NAD83 Florida State Planes- Eastern Zone- US Foot (EPSG #2236)
FL83-N	NAD83 Florida State Planes- Northern Zone- Meter (EPSG #26960)
FL83-NF	NAD83 Florida State Planes- Northern Zone- US Foot (EPSG #2238)
FL83-W	NAD83 Florida State Planes- Western Zone- Meter (EPSG #26959)
FL83-WF	NAD83 Florida State Planes- Western Zone- US Foot (EPSG #2237)

Value	Description
FL-E	NAD27 Florida State Planes- Eastern Zone- US Foot (EPSG #26758)
FLHP-E	HPGN Florida State Planes- Eastern Zone- Meter (EPSG #2777)
FLHP-EF	HPGN Florida State Planes- Eastern Zone- US Foot (EPSG #2881)
FLHP-N	HPGN Florida State Planes- Northern Zone- Meter (EPSG #2779)
FLHP-NF	HPGN Florida State Planes- Northern Zone- US Foot (EPSG #2883)
FLHP-W	HPGN Florida State Planes- Western Zone- Meter (EPSG #2778)
FLHP-WF	HPGN Florida State Planes- Western Zone- US Foot (EPSG #2882)
FL-N	NAD27 Florida State Planes- Northern Zone- US Foot (EPSG #26760)
FL-W	NAD27 Florida State Planes- Western Zone- US Foot (EPSG #26759)
GA83-E	NAD83 Georgia State Planes- Eastern Zone- Meter (EPSG #26966)
GA83-EF	NAD83 Georgia State Planes- Eastern Zone- US Foot (EPSG #2239)
GA83-W	NAD83 Georgia State Planes- Western Zone- Meter (EPSG #26967)
GA83-WF	NAD83 Georgia State Planes- Western Zone- US Foot (EPSG #2240)
GA-E	NAD27 Georgia State Planes- Eastern Zone- US Foot (EPSG #26766)
GAHP-E	HARN (HPGN) Georgia State Planes- Eastern Zone- Meter (EPSG #2780)
GAHP-EF	HARN (HPGN) Georgia State Planes- Eastern Zone- US Foot (EPSG #2884)
GAHP-W	HARN (HPGN) Georgia State Planes- Western Zone- Meter (EPSG #2781)
GAHP-WF	HARN (HPGN) Georgia State Planes- Western Zone- US Foot (EPSG #2885)
GA-W	NAD27 Georgia State Planes- Western Zone- US Foot (EPSG #26767)
HI-1	NAD27 Hawaii State Planes- Zone 1- US Foot
HI-2	NAD27 Hawaii State Planes- Zone 2- US Foot
HI-3	NAD27 Hawaii State Planes- Zone 3- US Foot
HI-4	NAD27 Hawaii State Planes- Zone 4- US Foot
HI-5	NAD27 Hawaii State Planes- Zone 5- US Foot
HI83-1	NAD83 Hawaii State Planes- Zone 1- Meter (EPSG #26961)
HI83-1F	NAD83 Hawaii State Planes- Zone 1- US Foot
HI83-2	NAD83 Hawaii State Planes- Zone 2- Meter (EPSG #26962)
HI83-2F	NAD83 Hawaii State Planes- Zone 2- US Foot
HI83-3	NAD83 Hawaii State Planes- Zone 3- Meter (EPSG #26963)
HI83-3F	NAD83 Hawaii State Planes- Zone 3- US Foot
HI83-4	NAD83 Hawaii State Planes- Zone 4- Meter (EPSG #26964)
HI83-4F	NAD83 Hawaii State Planes- Zone 4- US Foot
HI83-5	NAD83 Hawaii State Planes- Zone 5- Meter (EPSG #26965)
HI83-5F	NAD83 Hawaii State Planes- Zone 5- US Foot
HIHP-1	NAD83(HARN) / Hawaii zone 1 (EPSG #2782)
HIHP-2	NAD83(HARN) / Hawaii zone 2 (EPSG #2783)
HIHP-3	NAD83(HARN) / Hawaii zone 3 (EPSG #2784)
HIHP-4	NAD83(HARN) / Hawaii zone 4 (EPSG #2785)
HIHP-5	NAD83(HARN) / Hawaii zone 5 (EPSG #2786)
IA83-N	NAD83 Iowa State Planes- Northern Zone- Meter (EPSG #26975)
IA83-NF	NAD83 Iowa State Planes- Northern Zone- US Foot
IA83-S	NAD83 Iowa State Planes- Southern Zone- Meter (EPSG #26976)
IA83-SF	NAD83 Iowa State Planes- Southern Zone- US Foot
IAHP-N	HARN (HPGN) Iowa State Planes- Northern Zone- Meter (EPSG #2794)
IAHP-NF	HARN (HPGN) Iowa State Planes- Northern Zone- US Foot
IAHP-S	HARN (HPGN) Iowa State Planes- Southern Zone- Meter (EPSG #2795)
IAHP-SF	HARN (HPGN) Iowa State Planes- Southern Zone- US Foot

Value	Description
IA-N	NAD27 Iowa State Planes- Northern Zone- US Foot (EPSG #26775)
IA-S	NAD27 Iowa State Planes- Southern Zone- US Foot (EPSG #26776)
ID83-C	NAD83 Idaho State Planes- Central Zone- Meter (EPSG #26969)
ID83-CF	NAD83 Idaho State Planes- Central Zone- US Foot (EPSG #2242)
ID83-E	NAD83 Idaho State Planes- Eastern Zone- Meter (EPSG #26968)
ID83-EF	NAD83 Idaho State Planes- Eastern Zone- US Foot (EPSG #2241)
ID83-W	NAD83 Idaho State Planes- Western Zone- Meter (EPSG #26970)
ID83-WF	NAD83 Idaho State Planes- Western Zone- US Foot (EPSG #2243)
ID-C	NAD27 Idaho State Planes- Central Zone- US Foot (EPSG #26769)
ID-E	NAD27 Idaho State Planes- Eastern Zone- US Foot (EPSG #26768)
IDHP-C	HARN (HPGN) Idaho State Planes- Central Zone- Meter (EPSG #2788)
IDHP-CF	HARN (HPGN) Idaho State Planes- Central Zone- US Foot (EPSG #2887)
IDHP-E	HARN (HPGN) Idaho State Planes- Eastern Zone- Meter (EPSG #2787)
IDHP-EF	HARN (HPGN) Idaho State Planes- Eastern Zone- US Foot (EPSG #2886)
IDHP-W	HARN (HPGN) Idaho State Planes- Western Zone- Meter (EPSG #2789)
IDHP-WF	HARN (HPGN) Idaho State Planes- Western Zone- US Foot (EPSG #2888)
ID-W	NAD27 Idaho State Planes- Western Zone- US Foot (EPSG #26770)
IL83-E	NAD83 Illinois State Planes- Eastern Zone- Meter (EPSG #26971)
IL83-EF	NAD83 Illinois State Planes- Eastern Zone- US Foot
IL83-W	NAD83 Illinois State Planes- Western Zone- Meter (EPSG #26972)
IL83-WF	NAD83 Illinois State Planes- Western Zone- US Foot
IL-E	NAD27 Illinois State Planes- Eastern Zone- US Foot (EPSG #26771)
ILHP-E	HARN (HPGN) Illinois State Planes- Eastern Zone- Meter (EPSG #2790)
ILHP-EF	HARN (HPGN) Illinois State Planes- Eastern Zone- US Foot
ILHP-W	HARN (HPGN) Illinois State Planes- Western Zone- Meter (EPSG #2791)
ILHP-WF	HARN (HPGN) Illinois State Planes- Western Zone- US Foot
ILLIMAP	NAD27 Illinois Survey Mapping System- US Foot
IL-W	NAD27 Illinois State Planes- Western Zone- US Foot (EPSG #26772)
IN83-E	NAD83 Indiana State Planes- Eastern Zone- Meter (EPSG #26973)
IN83-EF	NAD83 Indiana State Planes- Eastern Zone- US Foot (EPSG #2244)
IN83-W	NAD83 Indiana State Planes- Western Zone- Meter (EPSG #26974)
IN83-WF	NAD83 Indiana State Planes- Western Zone- US Foot (EPSG #2245)
IN-E	NAD27 Indiana State Planes- Eastern Zone- US Foot (EPSG #26773)
INHP-E	HARN (HPGN) Indiana State Planes- Eastern Zone- Meter (EPSG #2792)
INHP-EF	HARN (HPGN) Indiana State Planes- Eastern Zone- US Foot (EPSG #2889)
INHP-W	HARN (HPGN) Indiana State Planes- Western Zone- Meter (EPSG #2793)
INHP-WF	HARN (HPGN) Indiana State Planes- Western Zone- US Foot (EPSG #2890)
IN-W	NAD27 Indiana State Planes- Western Zone- US Foot (EPSG #26774)
KS83-N	NAD83 Kansas State Planes- Northern Zone- Meter (EPSG #26977)
KS83-NF	NAD83 Kansas State Planes- Northern Zone- US Foot
KS83-S	NAD83 Kansas State Planes- Southern Zone- Meter (EPSG #26978)
KS83-SF	NAD83 Kansas State Planes- Southern Zone- US Foot
KSHP-N	HARN (HPGN) Kansas State Planes- Northern Zone- Meter (EPSG #2796)
KSHP-NF	HARN (HPGN) Kansas State Planes- Northern Zone- US Foot
KSHP-S	HARN (HPGN) Kansas State Planes- Southern Zone- Meter (EPSG #2797)
KSHP-SF	HARN (HPGN) Kansas State Planes- Southern Zone- US Foot
KS-N	NAD27 Kansas State Planes- Northern Zone- US Foot (EPSG #26777)

Value	Description
KS-S	NAD27 Kansas State Planes- Southern Zone- US Foot (EPSG #26778)
KY83-N	NAD83 Kentucky State Planes- Northern Zone- Meter (EPSG #26979)
KY83-NF	NAD83 Kentucky State Planes- Northern Zone- US Foot (EPSG #2246)
KY83-S	NAD83 Kentucky State Planes- Southern Zone- Meter (EPSG #26980)
KY83-SF	NAD83 Kentucky State Planes- Southern Zone- US Foot (EPSG #2247)
KYHP-N	HPGN Kentucky State Planes- Northern Zone- Meter (EPSG #2798)
KYHP-NF	HPGN Kentucky State Planes- Northern Zone- US Foot (EPSG #2891)
KYHP-S	HPGN Kentucky State Planes- Southern Zone- Meter (EPSG #2799)
KYHP-SF	HPGN Kentucky State Planes- Southern Zone- US Foot (EPSG #2892)
KY-N	NAD27 Kentucky State Planes- Northern Zone- US Foot (EPSG #26779)
KY-S	NAD27 Kentucky State Planes- Southern Zone- US Foot (EPSG #26780)
LA83-N	NAD83 Louisiana State Planes- Northern Zone- Meter (EPSG #26981)
LA83-NF	NAD83 Louisiana State Planes- Northern Zone- US Foot
LA83-O	NAD83 Louisiana State Planes- Offshore- Meter (EPSG #32199)
LA83-OF	NAD83 Louisiana State Planes- Offshore- US Foot
LA83-S	NAD83 Louisiana State Planes- Southern Zone- Meter (EPSG #26982)
LA83-SF	NAD83 Louisiana State Planes- Southern Zone- US Foot
LAHP-N	HPGN Louisiana State Planes- Northern Zone- Meter (EPSG #2800)
LAHP-NF	HPGN Louisiana State Planes- Northern Zone- US Foot
LAHP-O	HPGN Louisiana State Planes- Offshore- Meter
LAHP-OF	HPGN Louisiana State Planes- Offshore- US Foot
LAHP-S	HPGN Louisiana State Planes- Southern Zone- Meter (EPSG #2801)
LAHP-SF	HPGN Louisiana State Planes- Southern Zone- US Foot
LA-N	NAD27 Louisiana State Planes- Northern Zone- US Foot (EPSG #26781)
LA-O	NAD27 Louisiana State Planes- Offshore- US Foot (EPSG #32099)
LA-S	NAD27 Louisiana State Planes- Southern Zone- US Foot (EPSG #26782)
LL-83	NAD83 Latitude/Longitude- Degrees
LL84	WGS84 Lat/Long- Degrees- -180 ==> +180 (EPSG #4326)
MA	NAD27 Massachusetts State Planes- Mainland Zone- US Foot (EPSG #26786)
MA27-IS	NAD27 Massachusetts State Planes- Island Zone- US Foot (EPSG #26787)
MA83	NAD83 Massachusetts State Planes- Mainland Zone- Meter (EPSG #26986)
MA83F	NAD83 Massachusetts State Planes- Mainland Zone- US Foot (EPSG #2249)
MA83-IS	NAD83 Massachusetts State Planes- Island Zone- Meter (EPSG #26987)
MA83-ISF	NAD83 Massachusetts State Planes- Island Zone- US Foot (EPSG #2250)
MAHP	HPGN/HARN Massachusetts State Planes- Mainland Zone- Meter (EPSG #2805)
MAHPF	HPGN/HARN Massachusetts State Planes- Mainland Zone- US Foot (EPSG #2894)
MAHP-IS	HPGN/HARN Massachusetts State Planes- Island Zone- Meter (EPSG #2806)
MAHP-ISF	HPGN/HARN Massachusetts State Planes- Island Zone- US Foot (EPSG #2895)
MD	NAD27 Maryland State Plane Zone- US Foot (EPSG #26785)
MD83	NAD83 Maryland State Plane Zone- Meter (EPSG #26985)
MD83F	NAD83 Maryland State Plane Zone- US Foot (EPSG #2248)
MDHP	HPGN Maryland State Plane Zone- Meter (EPSG #2804)
MDHPF	HPGN Maryland State Plane Zone- US Foot (EPSG #2893)

Value	Description
ME83-E	NAD83 Maine State Planes- Eastern Zone- Meter (EPSG #26983)
ME83-EF	NAD83 Maine State Planes- Eastern Zone- US Foot
ME83-W	NAD83 Maine State Planes- Western Zone- Meter (EPSG #26984)
ME83-WF	NAD83 Maine State Planes- Western Zone- US Foot
ME-E	NAD27 Maine State Planes- Eastern Zone- US Foot (EPSG #26783)
MEHP-E	HPGN Maine State Planes- Eastern Zone- Meter (EPSG #2802)
MEHP-EF	HPGN Maine State Planes- Eastern Zone- US Foot
MEHP-W	HPGN Maine State Planes- Western Zone- Meter (EPSG #2803)
MEHP-WF	HPGN Maine State Planes- Western Zone- US Foot
ME-W	NAD27 Maine State Planes- Western Zone- US Foot (EPSG #26784)
MI27-C	NAD27 Michigan State Planes- Central Zone- US Foot (EPSG #26812)
MI27-N	NAD27 Michigan State Planes- Northern Zone- US Foot (EPSG #26811)
MI27-S	NAD27 Michigan State Planes- Southern Zone- US Foot (EPSG #26813)
MI83-C	NAD83 Michigan State Planes- Central Zone- Meter (EPSG #26989)
MI83-CF	NAD83 Michigan State Planes- Central Zone- US Foot
MI83-CIF	NAD83 Michigan State Planes- Central Zone- Intnl Foot (EPSG #2252)
MI83-N	NAD83 Michigan State Planes- Northern Zone- Meter (EPSG #26988)
MI83-NF	NAD83 Michigan State Planes- Northern Zone- US Foot
MI83-NIF	NAD83 Michigan State Planes- Northern Zone- Intnl Foot (EPSG #2251)
MI83-S	NAD83 Michigan State Planes- Southern Zone- Meter (EPSG #26990)
MI83-SF	NAD83 Michigan State Planes- Southern Zone- US Foot
MI83-SIF	NAD83 Michigan State Planes- Southern Zone- Intnl Foot (EPSG #2253)
MIHP-C	HARN (HPGN) Michigan State Planes- Central Zone- Meter (EPSG #2808)
MIHP-CF	HARN (HPGN) Michigan State Planes- Central Zone- US Foot
MIHP-CIF	HARN (HPGN) Michigan State Planes- Central Zone- Intnl Foot (EPSG #2897)
MIHP-N	HARN (HPGN) Michigan State Planes- Northern Zone- Meter (EPSG #2807)
MIHP-NF	HARN (HPGN) Michigan State Planes- Northern Zone- US Foot
MIHP-NIF	HARN (HPGN) Michigan State Planes- Northern Zone- Intnl Foot (EPSG #2896)
MIHP-S	HARN (HPGN) Michigan State Planes- Southern Zone- Meter (EPSG #2809)
MIHP-SF	HARN (HPGN) Michigan State Planes- Southern Zone- US Foot
MIHP-SIF	HARN (HPGN) Michigan State Planes- Southern Zone- Intnl Foot (EPSG #2898)
MN83-C	NAD83 Minnesota State Planes- Central Zone- Meter (EPSG #26992)
MN83-CF	NAD83 Minnesota State Planes- Central Zone- US Foot
MN83-N	NAD83 Minnesota State Planes- Northern Zone- Meter (EPSG #26991)
MN83-NF	NAD83 Minnesota State Planes- Northern Zone- US Foot
MN83-S	NAD83 Minnesota State Planes- South Zone- Meter (EPSG #26993)
MN83-SF	NAD83 Minnesota State Planes- South Zone- US Foot
MN-C	NAD27 Minnesota State Planes- Central Zone- US Foot (EPSG #26792)
MNHP-C	HARN (HPGN) Minnesota State Planes- Central Zone- Meter (EPSG #2811)
MNHP-CF	HARN (HPGN) Minnesota State Planes- Central Zone- US Foot
MNHP-N	HARN (HPGN) Minnesota State Planes- Northern Zone- Meter (EPSG #2810)
MNHP-NF	HARN (HPGN) Minnesota State Planes- Northern Zone- US Foot
MNHP-S	HARN (HPGN) Minnesota State Planes- South Zone- Meter (EPSG #2812)
MNHP-SF	HARN (HPGN) Minnesota State Planes- South Zone- US Foot

Value	Description
MN-N	NAD27 Minnesota State Planes- Northern Zone- US Foot (EPSG #26791)
MN-S	NAD27 Minnesota State Planes- South- US Foot (EPSG #26793)
MO83-C	NAD83 Missouri State Planes- Central Zone- Meter (EPSG #26997)
MO83-CF	NAD83 Missouri State Planes- Central Zone- US Foot
MO83-E	NAD83 Missouri State Planes- Eastern Zone- Meter (EPSG #26996)
MO83-EF	NAD83 Missouri State Planes- Eastern Zone- US Foot
MO83-W	NAD83 Missouri State Planes- Western Zone- Meter (EPSG #26998)
MO83-WF	NAD83 Missouri State Planes- Western Zone- US Foot
MO-C	NAD27 Missouri State Planes- Central Zone- US Foot (EPSG #26797)
MO-E	NAD27 Missouri State Planes- Eastern Zone- US Foot (EPSG #26796)
MOHP-C	HARN (HPGN) Missouri State Planes- Central Zone- Meter (EPSG #2816)
MOHP-CF	HARN (HPGN) Missouri State Planes- Central Zone- US Foot
MOHP-E	HARN (HPGN) Missouri State Planes- Eastern Zone- Meter (EPSG #2815)
MOHP-EF	HARN (HPGN) Missouri State Planes- Eastern Zone- US Foot
MOHP-W	HARN (HPGN) Missouri State Planes- Western Zone- Meter (EPSG #2817)
MOHP-WF	HARN (HPGN) Missouri State Planes- Western Zone- US Foot
MO-W	NAD27 Missouri State Planes- Western Zone- US Foot (EPSG #26798)
MS83-E	NAD83 Mississippi State Planes- Eastern Zone- Meter (EPSG #26994)
MS83-EF	NAD83 Mississippi State Planes- Eastern Zone- US Foot (EPSG #2254)
MS83-TM	NAD83 Mississippi Transverse Mercator Projection (meters)
MS83-W	NAD83 Mississippi State Planes- Western Zone- Meter (EPSG #26995)
MS83-WF	NAD83 Mississippi State Planes- Western Zone- US Foot (EPSG #2255)
MS-E	NAD27 Mississippi State Planes- Eastern Zone- US Foot (EPSG #26794)
MSHP-E	HPGN Mississippi State Planes- Eastern Zone- Meter (EPSG #2813)
MSHP-EF	HPGN Mississippi State Planes- Eastern Zone- US Foot (EPSG #2899)
MSHP-W	HPGN Mississippi State Planes- Western Zone- Meter (EPSG #2814)
MSHP-WF	HPGN Mississippi State Planes- Western Zone- US Foot (EPSG #2900)
MS-W	NAD27 Mississippi State Planes- Western Zone- US Foot (EPSG #26795)
MT83	NAD83 Montana State Plane Zone- Meter (EPSG #32100)
MT83F	NAD83 Montana State Plane Zone- US Foot
MT83IF	NAD83 Montana State Planes- Intnl Foot (EPSG #2256)
MT-C	NAD27 Montana State Planes- Central Zone- US Foot (EPSG #32002)
MTHP	HPGN Montana State Plane Zone- Meter (EPSG #2818)
MTHPF	HPGN Montana State Plane Zone- US Foot
MTHPIF	HPGN Montana State Planes- Intnl Foot (EPSG #2901)
MT-N	NAD27 Montana State Planes- Northern Zone- US Foot (EPSG #32001)
MT-S	NAD27 Montana State Planes- Southern Zone- US Foot (EPSG #32003)
NB83	NAD83 Nebraska State Planes- Meter (EPSG #32104)
NB83F	NAD83 Nebraska State Planes- US Foot
NBHP	HPGN/HARN Nebraska State Planes- Meter (EPSG #2819)
NBHPF	HPGN/HARN Nebraska State Planes- US Foot
NB-N	NAD27 Nebraska State Planes- Northern Zone- US Foot (EPSG #32005)
NB-S	NAD27 Nebraska State Planes- Southern Zone- US Foot (EPSG #32006)
NC	NAD27 North Carolina State Planes- US Foot (EPSG #32019)
NC83	NAD83 North Carolina State Planes- Meter (EPSG #32119)
NC83F	NAD83 North Carolina State Planes- US Foot (EPSG #2264)
NCHP	HARN (HPGN) North Carolina State Planes- Meter

Value	Description
NCHPF	HARN (HPGN) North Carolina State Planes- US Foot
ND83-N	NAD83 North Dakota State Planes- Northern Zone- Meter (EPSG #32120)
ND83-NF	NAD83 North Dakota State Planes- Northern Zone- US Foot
ND83-S	NAD83 North Dakota State Planes- Southern Zone- Meter (EPSG #32121)
ND83-SF	NAD83 North Dakota State Planes- Southern Zone- US Foot
NDHP-N	HARN (HPGN) North Dakota State Planes- Northern Zone- Meter (EPSG #2832)
NDHP-NF	HARN (HPGN) North Dakota State Planes- Northern Zone- US Foot
NDHP-S	HARN (HPGN) North Dakota State Planes- Southern Zone- Meter (EPSG #2833)
NDHP-SF	HARN (HPGN) North Dakota State Planes- Southern Zone- US Foot
ND-N	NAD27 North Dakota State Planes- Northern Zone- US Foot (EPSG #32020)
ND-S	NAD27 North Dakota State Planes- Southern Zone- US Foot (EPSG #32021)
NE83	NAD83 Nebraska State Planes- Meter
NE83F	NAD83 Nebraska State Planes- US Foot
NE-N	NAD27 Nebraska State Planes- Northern Zone- US Foot
NE-S	NAD27 Nebraska State Planes- Southern Zone- US Foot
NH	NAD27 New Hampshire State Planes- US Foot (EPSG #32010)
NH83	NAD83 New Hampshire State Planes- Meter (EPSG #32110)
NH83F	NAD83 New Hampshire State Planes- US Foot
NHHP	HPGN/HARN New Hampshire State Planes- Meter (EPSG #2823)
NHHPF	HPGN/HARN New Hampshire State Planes- US Foot
NJ	NAD27 New Jersey State Planes- US Foot (EPSG #32011)
NJ83	NAD83 New Jersey State Planes- Meter (EPSG #32111)
NJ83F	NAD83 New Jersey State Planes- US Foot
NJHP	HARN (HPGN) New Jersey State Planes- Meter (EPSG #2824)
NJHPF	HARN (HPGN) New Jersey State Planes- US Foot
NM83-C	NAD83 New Mexico State Planes- Central Zone- Meter (EPSG #32113)
NM83-CF	NAD83 New Mexico State Planes- Central Zone- US Foot (EPSG #2258)
NM83-E	NAD83 New Mexico State Planes- Eastern Zone- Meter (EPSG #32112)
NM83-EF	NAD83 New Mexico State Planes- Eastern Zone- US Foot (EPSG #2257)
NM83-W	NAD83 New Mexico State Planes- Western Zone- Meter (EPSG #32114)
NM83-WF	NAD83 New Mexico State Planes- Western Zone- US Foot (EPSG #2259)
NM-C	NAD27 New Mexico State Planes- Central Zone- US Foot (EPSG #32013)
NM-E	NAD27 New Mexico State Planes- Eastern Zone- US Foot (EPSG #32012)
NMHP-C	HPGN New Mexico State Planes- Central Zone- Meter (EPSG #2826)
NMHP-CF	HPGN New Mexico State Planes- Central Zone- US Foot (EPSG #2903)
NMHP-E	HPGN New Mexico State Planes- Eastern Zone- Meter (EPSG #2825)
NMHP-EF	HPGN New Mexico State Planes- Eastern Zone- US Foot (EPSG #2902)
NMHP-W	HPGN New Mexico State Planes- Western Zone- Meter (EPSG #2827)
NMHP-WF	HPGN New Mexico State Planes- Western Zone- US Foot (EPSG #2904)
NM-W	NAD27 New Mexico State Planes- Western Zone- US Foot (EPSG #32014)
NV83-C	NAD83 Nevada State Planes- Central Zone- Meter (EPSG #32108)
NV83-CF	NAD83 Nevada State Planes- Central Zone- US Foot
NV83-E	NAD83 Nevada State Planes- Eastern Zone- Meter (EPSG #32107)
NV83-EF	NAD83 Nevada State Planes- Eastern Zone- US Foot
NV83-W	NAD83 Nevada State Planes- Western Zone- Meter (EPSG #32109)

Value	Description
NV83-WF	NAD83 Nevada State Planes- Western Zone- US Foot
NV-C	NAD27 Nevada State Planes- Central Zone- US Foot (EPSG #32008)
NV-E	NAD27 Nevada State Planes- Eastern Zone- US Foot (EPSG #32007)
NVHP-C	HARN (HPGN) Nevada State Planes- Central Zone- Meter (EPSG #2821)
NVHP-CF	HARN (HPGN) Nevada State Planes- Central Zone- US Foot
NVHP-E	HARN (HPGN) Nevada State Planes- Eastern Zone- Meter (EPSG #2820)
NVHP-EF	HARN (HPGN) Nevada State Planes- Eastern Zone- US Foot
NVHP-W	HARN (HPGN) Nevada State Planes- Western Zone- Meter (EPSG #2822)
NVHP-WF	HARN (HPGN) Nevada State Planes- Western Zone- US Foot
NV-W	NAD27 Nevada State Planes- Western Zone- US Foot (EPSG #32009)
NY83-C	NAD83 New York State Planes- Central Zone- Meter (EPSG #32116)
NY83-CF	NAD83 New York State Planes- Central Zone- US Foot (EPSG #2261)
NY83-E	NAD83 New York State Planes- Eastern Zone- Meter (EPSG #32115)
NY83-EF	NAD83 New York State Planes- Eastern Zone- US Foot (EPSG #2260)
NY83-LI	NAD83 New York State Planes- Long Island- Meter (EPSG #32118)
NY83-LIF	NAD83 New York State Planes- Long Island- US Foot (EPSG #2263)
NY83-W	NAD83 New York State Planes- Western Zone- Meter (EPSG #32117)
NY83-WF	NAD83 New York State Planes- Western Zone- US Foot (EPSG #2262)
NY-C	NAD27 New York State Planes- Central Zone- US Foot (EPSG #32016)
NY-E	NAD27 New York State Planes- Eastern Zone- US Foot (EPSG #32015)
NYHP-C	HARN (HPGN) New York State Planes- Central Zone- Meter (EPSG #2829)
NYHP-CF	HARN (HPGN) New York State Planes- Central Zone- US Foot (EPSG #2906)
NYHP-E	HARN (HPGN) New York State Planes- Eastern Zone- Meter (EPSG #2828)
NYHP-EF	HARN (HPGN) New York State Planes- Eastern Zone- US Foot (EPSG #2905)
NYHP-LI	HARN (HPGN) New York State Planes- Long Island- Meter (EPSG #2831)
NYHP-LIF	HARN (HPGN) New York State Planes- Long Island- US Foot (EPSG #2908)
NYHP-W	HARN (HPGN) New York State Planes- Western Zone- Meter (EPSG #2830)
NYHP-WF	HARN (HPGN) New York State Planes- Western Zone- US Foot (EPSG #2907)
NY-LI	NAD27 New York State Planes- Long Island- US Foot (EPSG #32018)
NY-W	NAD27 New York State Planes- Western Zone- US Foot (EPSG #32017)
OH83-N	NAD83 Ohio State Planes- Northern Zone- Meter (EPSG #32122)
OH83-NF	NAD83 Ohio State Planes- Northern Zone- US Foot
OH83-S	NAD83 Ohio State Planes- Southern Zone- Meter (EPSG #32123)
OH83-SF	NAD83 Ohio State Planes- Southern Zone- US Foot
OHHP-N	HARN (HPGN) Ohio State Planes- Northern Zone- Meter (EPSG #2834)
OHHP-NF	HARN (HPGN) Ohio State Planes- Northern Zone- US Foot
OHHP-S	HARN (HPGN) Ohio State Planes- Southern Zone- Meter (EPSG #2835)
OHHP-SF	HARN (HPGN) Ohio State Planes- Southern Zone- US Foot
OH-N	NAD27 Ohio State Planes- Northern Zone- US Foot (EPSG #32022)
OH-S	NAD27 Ohio State Planes- Southern Zone- US Foot (EPSG #32023)
OK83-N	NAD83 Oklahoma State Planes- Northern Zone- Meter (EPSG #32124)
OK83-NF	NAD83 Oklahoma State Planes- Northern Zone- US Foot (EPSG #2267)
OK83-S	NAD83 Oklahoma State Planes- Southern Zone- Meter (EPSG #32125)
OK83-SF	NAD83 Oklahoma State Planes- Southern Zone- US Foot (EPSG #2268)

Value	Description
OKHP-N	HPGN Oklahoma State Planes- Northern Zone- Meter (EPSG #2836)
OKHP-NF	HPGN Oklahoma State Planes- Northern Zone- US Foot (EPSG #2911)
OKHP-S	HPGN Oklahoma State Planes- Southern Zone- Meter (EPSG #2837)
OKHP-SF	HPGN Oklahoma State Planes- Southern Zone- US Foot (EPSG #2912)
OK-N	NAD27 Oklahoma State Planes- Northern Zone- US Foot (EPSG #32024)
OK-S	NAD27 Oklahoma State Planes- Southern Zone- US Foot (EPSG #32025)
OR83-N	NAD83 Oregon State Planes- Northern Zone- Meter (EPSG #32126)
OR83-NF	NAD83 Oregon State Planes- Northern Zone- US Foot
OR83-NIF	NAD83 Oregon State Planes- Northern Zone- Intnl Foot (EPSG #2269)
OR83-S	NAD83 Oregon State Planes- Southern Zone- Meter (EPSG #32127)
OR83-SF	NAD83 Oregon State Planes- Southern Zone- US Foot
OR83-SIF	NAD83 Oregon State Planes- Southern Zone- Intnl Foot (EPSG #2270)
OR83-SSCGIS	NAD83 Oregon GIS- International Foot (EPSG #2992)
ORHP-N	HPGN Oregon State Planes- Northern Zone- Meter (EPSG #2838)
ORHP-NF	HPGN Oregon State Planes- Northern Zone- US Foot
ORHP-NIF	HPGN Oregon State Planes- Northern Zone- Intnl Foot (EPSG #2913)
ORHP-S	HPGN Oregon State Planes- Southern Zone- Meter (EPSG #2839)
ORHP-SF	HPGN Oregon State Planes- Southern Zone- US Foot
ORHP-SIF	HPGN Oregon State Planes- Southern Zone- Intnl Foot (EPSG #2914)
OR-N	NAD27 Oregon State Planes- Northern Zone- US Foot (EPSG #32026)
OR-S	NAD27 Oregon State Planes- Southern Zone- US Foot (EPSG #32027)
PA83-N	NAD83 Pennsylvania State Planes- Northern Zone- Meter (EPSG #32128)
PA83-NF	NAD83 Pennsylvania State Planes- Northern Zone- US Foot (EPSG #2271)
PA83-S	NAD83 Pennsylvania State Planes- Southern Zone- Meter (EPSG #32129)
PA83-SF	NAD83 Pennsylvania State Planes- Southern Zone- US Foot (EPSG #2272)
PAHP-N	HARN (HPGN) Pennsylvania State Planes- Northern Zone- Meter
PAHP-NF	HARN (HPGN) Pennsylvania State Planes- Northern Zone- US Foot
PAHP-S	HARN (HPGN) Pennsylvania State Planes- Southern Zone- Meter
PAHP-SF	HARN (HPGN) Pennsylvania State Planes- Southern Zone- US Foot
PA-N	NAD27 Pennsylvania State Planes- Northern Zone- US Foot (EPSG #32028)
PA-S	NAD27 Pennsylvania State Planes- Southern Zone- US Foot (EPSG #32029)
PR-1	NAD27 Puerto Rico and Virgin Islands- Zone 1- US Foot
PR-2	NAD27 Puerto Rico- St Croix Virgin Island- Zone 2- US Foot
PR83	NAD83 Puerto Rico and Virgin Islands- Meter (EPSG #32161)
PR83F	NAD83 Puerto Rico and Virgin Islands- US Foot
PRHP	HPGN Puerto Rico and Virgin Islands- Meter (EPSG #2866)
PRHPF	HPGN Puerto Rico and Virgin Islands- US Foot
RI	NAD27 Rhode Island State Planes- US Foot (EPSG #32030)
RI83	NAD83 Rhode Island State Planes- Meter (EPSG #32130)
RI83F	NAD83 Rhode Island State Planes- US Foot
RIHP	HPGN/HARN Rhode Island State Planes- Meter (EPSG #2840)
RIHPF	HPGN/HARN Rhode Island State Planes- US Foot
SC83	NAD83 South Carolina State Planes- Meter (EPSG #32133)
SC83F	NAD83 South Carolina State Planes- US Foot
SC83IF	NAD83 South Carolina State Planes- Intnl Foot (EPSG #2273)
SCHP	HARN (HPGN) South Carolina State Planes- Meter

Value	Description
SCHPF	HARN (HPGN) South Carolina State Planes- US Foot
SCHPIF	HARN (HPGN) South Carolina State Planes- Intnl Foot
SC-N	NAD27 South Carolina State Planes- Northern Zone- US Foot (EPSG #32031)
SC-S	NAD27 South Carolina State Planes- Southern Zone- US Foot (EPSG #32033)
SD83-N	NAD83 South Dakota State Planes- Northern Zone- Meter (EPSG #32134)
SD83-NF	NAD83 South Dakota State Planes- Northern Zone- US Foot
SD83-S	NAD83 South Dakota State Planes- Southern Zone- Meter (EPSG #32135)
SD83-SF	NAD83 South Dakota State Planes- Southern Zone- US Foot
SDHP-N	HARN (HPGN) South Dakota State Planes- Northern Zone- Meter (EPSG #2841)
SDHP-NF	HARN (HPGN) South Dakota State Planes- Northern Zone- US Foot
SDHP-S	HARN (HPGN) South Dakota State Planes- Southern Zone- Meter (EPSG #2842)
SDHP-SF	HARN (HPGN) South Dakota State Planes- Southern Zone- US Foot
SD-N	NAD27 South Dakota State Planes- Northern Zone- US Foot (EPSG #32034)
SD-S	NAD27 South Dakota State Planes- Southern Zone- US Foot (EPSG #32035)
TN	NAD27 Tennessee State Plane Zone- US Foot (EPSG #2204)
TN83	NAD83 Tennessee State Plane Zone- Meter (EPSG #32136)
TN83F	NAD83 Tennessee State Plane Zone- US Foot (EPSG #2274)
TNHP	HPGN Tennessee State Plane Zone- Meter (EPSG #2843)
TNHPF	HPGN Tennessee State Plane Zone- US Foot (EPSG #2915)
TX83-C	NAD83 Texas State Planes- Central Zone- Meter (EPSG #32139)
TX83-CF	NAD83 Texas State Planes- Central Zone- US Foot (EPSG #2277)
TX83-N	NAD83 Texas State Planes- Northern Zone- Meter (EPSG #32137)
TX83-NC	NAD83 Texas State Planes- North Central Zone- Meter (EPSG #32138)
TX83-NCF	NAD83 Texas State Planes- North Central Zone- US Foot (EPSG #2276)
TX83-NF	NAD83 Texas State Planes- Northern Zone- US Foot (EPSG #2275)
TX83-S	NAD83 Texas State Planes- Southern Zone- Meter (EPSG #32141)
TX83-SC	NAD83 Texas State Planes- South Central Zone- Meter (EPSG #32140)
TX83-SCF	NAD83 Texas State Planes- South Central Zone- US Foot (EPSG #2278)
TX83-SF	NAD83 Texas State Planes- Southern Zone- US Foot (EPSG #2279)
TX-C	NAD27 Texas State Planes- Central Zone- US Foot (EPSG #32039)
TXHP-C	HPGN/HARN Texas State Planes- Central Zone- Meter (EPSG #2846)
TXHP-CF	HPGN/HARN Texas State Planes- Central Zone- US Foot (EPSG #2918)
TXHP-N	HPGN/HARN Texas State Planes- Northern Zone- Meter (EPSG #2844)
TXHP-NC	HPGN/HARN Texas State Planes- North Central Zone- Meter (EPSG #2845)
TXHP-NCF	HPGN/HARN Texas State Planes- North Central Zone- US Foot (EPSG #2917)
TXHP-NF	HPGN/HARN Texas State Planes- Northern Zone- US Foot (EPSG #2916)
TXHP-S	HPGN/HARN Texas State Planes- Southern Zone- Meter (EPSG #2848)
TXHP-SC	HPGN/HARN Texas State Planes- South Central Zone- Meter (EPSG #2847)
TXHP-SCF	HPGN/HARN Texas State Planes- South Central Zone- US Foot (EPSG #2919)
TXHP-SF	HPGN/HARN Texas State Planes- Southern Zone- US Foot (EPSG #2920)
TX-N	NAD27 Texas State Planes- Northern Zone- US Foot (EPSG #32037)
TX-NC	NAD27 Texas State Planes- North Central Zone- US Foot (EPSG #32038)

Value	Description
TX-S	NAD27 Texas State Planes- Southern Zone- US Foot (EPSG #32041)
TX-SC	NAD27 Texas State Planes- South Central Zone- US Foot (EPSG #32040)
UT83-C	NAD83 Utah State Planes- Central Zone- Meter (EPSG #32143)
UT83-CF	NAD83 Utah State Planes- Central Zone- US Foot
UT83-CIF	NAD83 Utah State Planes- Central Zone- Intnl Foot (EPSG #2281)
UT83-N	NAD83 Utah State Planes- Northern Zone- Meter (EPSG #32142)
UT83-NF	NAD83 Utah State Planes- Northern Zone- US Foot
UT83-NIF	NAD83 Utah State Planes- Northern Zone- Intnl Foot (EPSG #2280)
UT83-S	NAD83 Utah State Planes- Southern Zone- Meter (EPSG #32144)
UT83-SF	NAD83 Utah State Planes- Southern Zone- US Foot
UT83-SIF	NAD83 Utah State Planes- Southern Zone- Intnl Foot (EPSG #2282)
UT-C	NAD27 Utah State Planes- Central Zone- US Foot (EPSG #32043)
UTHP-C	HARN (HPGN) Utah State Planes- Central Zone- Meter (EPSG #2850)
UTHP-CF	HARN (HPGN) Utah State Planes- Central Zone- US Foot
UTHP-CIF	HARN (HPGN) Utah State Planes- Central Zone- Intnl Foot (EPSG #2922)
UTHP-N	HARN (HPGN) Utah State Planes- Northern Zone- Meter (EPSG #2849)
UTHP-NF	HARN (HPGN) Utah State Planes- Northern Zone- US Foot
UTHP-NIF	HARN (HPGN) Utah State Planes- Northern Zone- Intnl Foot (EPSG #2921)
UTHP-S	HARN (HPGN) Utah State Planes- Southern Zone- Meter (EPSG #2851)
UTHP-SF	HARN (HPGN) Utah State Planes- Southern Zone- US Foot
UTHP-SIF	HARN (HPGN) Utah State Planes- Southern Zone- Intnl Foot (EPSG #2923)
UTM27-1	NAD27 UTM- Zone 1 North- Meter
UTM27-10	NAD27 UTM- Zone 10 North- Meter (EPSG #26710)
UTM27-10F	NAD27 UTM- Zone 10 North- US Foot
UTM27-10IF	NAD27 UTM- Zone 10 North- Intnl Foot
UTM27-11	NAD27 UTM- Zone 11 North- Meter (EPSG #26711)
UTM27-11F	NAD27 UTM- Zone 11 North- US Foot
UTM27-11IF	NAD27 UTM- Zone 11 North- Intnl Foot
UTM27-12	NAD27 UTM- Zone 12 North- Meter (EPSG #26712)
UTM27-12F	NAD27 UTM- Zone 12 North- US Foot
UTM27-12IF	NAD27 UTM- Zone 12 North- Intnl Foot
UTM27-13	NAD27 UTM- Zone 13 North- Meter (EPSG #26713)
UTM27-13F	NAD27 UTM- Zone 13 North- US Foot
UTM27-13IF	NAD27 UTM- Zone 13 North- Intnl Foot
UTM27-14	NAD27 UTM- Zone 14 North- Meter (EPSG #26714)
UTM27-14F	NAD27 UTM- Zone 14 North- US Foot
UTM27-14IF	NAD27 UTM- Zone 14 North- Intnl Foot
UTM27-15	NAD27 UTM- Zone 15 North- Meter (EPSG #26715)
UTM27-15F	NAD27 UTM- Zone 15 North- US Foot
UTM27-15IF	NAD27 UTM- Zone 15 North- Intnl Foot
UTM27-16	NAD27 UTM- Zone 16 North- Meter (EPSG #26716)
UTM27-16F	NAD27 UTM- Zone 16 North- US Foot
UTM27-16IF	NAD27 UTM- Zone 16 North- Intnl Foot
UTM27-17	NAD27 UTM- Zone 17 North- Meter (EPSG #26717)
UTM27-17F	NAD27 UTM- Zone 17 North- US Foot
UTM27-17IF	NAD27 UTM- Zone 17 North- Intnl Foot
UTM27-18	NAD27 UTM- Zone 18 North- Meter (EPSG #26718)

Value	Description
UTM27-18F	NAD27 UTM- Zone 18 North- US Foot
UTM27-18IF	NAD27 UTM- Zone 18 North- Intnl Foot
UTM27-19	NAD27 UTM- Zone 19 North- Meter (EPSG #26719)
UTM27-19F	NAD27 UTM- Zone 19 North- US Foot
UTM27-19IF	NAD27 UTM- Zone 19 North- Intnl Foot
UTM27-1N	NAD27 / UTM zone 1N (EPSG #26701)
UTM27-2	NAD27 UTM- Zone 2 North- Meter
UTM27-20	NAD27 UTM- Zone 20 North- Meter (EPSG #26720)
UTM27-20F	NAD27 UTM- Zone 20 North- US Foot
UTM27-20IF	NAD27 UTM- Zone 20 North- Intnl Foot
UTM27-21	NAD27 UTM- Zone 21 North- Meter (EPSG #26721)
UTM27-21F	NAD27 UTM- Zone 21 North- US Foot
UTM27-21IF	NAD27 UTM- Zone 21 North- Intnl Foot
UTM27-22	NAD27 UTM- Zone 22 North- Meter (EPSG #26722)
UTM27-22F	NAD27 UTM- Zone 22 North- US Foot
UTM27-22IF	NAD27 UTM- Zone 22 North- Intnl Foot
UTM27-23	NAD27 UTM- Zone 23 North- Meter
UTM27-23F	NAD27 UTM- Zone 23 North- US Foot
UTM27-23IF	NAD27 UTM- Zone 23 North- Intnl Foot
UTM27-2N	NAD27 / UTM zone 2N (EPSG #26702)
UTM27-3	NAD27 UTM- Zone 3 North- Meter (EPSG #26703)
UTM27-3F	NAD27 UTM- Zone 3 North- US Survey Foot
UTM27-3IF	NAD27 UTM- Zone 3 North- Intnl Foot
UTM27-4	NAD27 UTM- Zone 4 North- Meter (EPSG #26704)
UTM27-4F	NAD27 UTM- Zone 4 North- US Survey Foot
UTM27-4IF	NAD27 UTM- Zone 4 North- Intnl Foot
UTM27-5	NAD27 UTM- Zone 5 North- Meter (EPSG #26705)
UTM27-58	NAD27 UTM- Zone 58 North- Meter
UTM27-59	NAD27 UTM- Zone 59 North- Meter
UTM27-5F	NAD27 UTM- Zone 5 North- US Foot
UTM27-5IF	NAD27 UTM- Zone 5 North- Intnl Foot
UTM27-6	NAD27 UTM- Zone 6 North- Meter (EPSG #26706)
UTM27-60	NAD27 UTM- Zone 60 North- Meter
UTM27-6F	NAD27 UTM- Zone 6 North- US Foot
UTM27-6IF	NAD27 UTM- Zone 6 North- Intnl Foot
UTM27-7	NAD27 UTM- Zone 7 North- Meter (EPSG #26707)
UTM27-7F	NAD27 UTM- Zone 7 North- US Foot
UTM27-7IF	NAD27 UTM- Zone 7 North- Intnl Foot
UTM27-8	NAD27 UTM- Zone 8 North- Meter (EPSG #26708)
UTM27-8F	NAD27 UTM- Zone 8 North- US Foot
UTM27-8IF	NAD27 UTM- Zone 8 North- Intnl Foot
UTM27-9	NAD27 UTM- Zone 9 North- Meter (EPSG #26709)
UTM27-9F	NAD27 UTM- Zone 9 North- US Foot
UTM27-9IF	NAD27 UTM- Zone 9 North- Intnl Foot
UTM83-1	NAD83 UTM- Zone 1 North- Meter (EPSG #26901)
UTM83-10	NAD83 UTM- Zone 10 North- Meter (EPSG #26910)
UTM83-10F	NAD83 UTM- Zone 10 North- US Foot

Value	Description
UTM83-10IF	NAD83 UTM- Zone 10 North- Intnl Foot
UTM83-11	NAD83 UTM- Zone 11 North- Meter (EPSG #26911)
UTM83-11F	NAD83 UTM- Zone 11 North- US Foot
UTM83-11IF	NAD83 UTM- Zone 11 North- Intnl Foot
UTM83-12	NAD83 UTM- Zone 12 North- Meter (EPSG #26912)
UTM83-12F	NAD83 UTM- Zone 12 North- US Foot
UTM83-12IF	NAD83 UTM- Zone 12 North- Intnl Foot
UTM83-13	NAD83 UTM- Zone 13 North- Meter (EPSG #26913)
UTM83-13F	NAD83 UTM- Zone 13 North- US Foot
UTM83-13IF	NAD83 UTM- Zone 13 North- Intnl Foot
UTM83-14	NAD83 UTM- Zone 14 North- Meter (EPSG #26914)
UTM83-14F	NAD83 UTM- Zone 14 North- US Foot
UTM83-14IF	NAD83 UTM- Zone 14 North- Intnl Foot
UTM83-15	NAD83 UTM- Zone 15 North- Meter (EPSG #26915)
UTM83-15F	NAD83 UTM- Zone 15 North- US Foot
UTM83-15IF	NAD83 UTM- Zone 15 North- Intnl Foot
UTM83-16	NAD83 UTM- Zone 16 North- Meter (EPSG #26916)
UTM83-16F	NAD83 UTM- Zone 16 North- US Foot
UTM83-16IF	NAD83 UTM- Zone 16 North- Intnl Foot
UTM83-17	NAD83 UTM- Zone 17 North- Meter (EPSG #26917)
UTM83-17F	NAD83 UTM- Zone 17 North- US Foot
UTM83-17IF	NAD83 UTM- Zone 17 North- Intnl Foot
UTM83-18	NAD83 UTM- Zone 18 North- Meter (EPSG #26918)
UTM83-18F	NAD83 UTM- Zone 18 North- US Foot
UTM83-18IF	NAD83 UTM- Zone 18 North- Intnl Foot
UTM83-19	NAD83 UTM- Zone 19 North- Meter (EPSG #26919)
UTM83-19F	NAD83 UTM- Zone 19 North- US Foot
UTM83-19IF	NAD83 UTM- Zone 19 North- Intnl Foot
UTM83-2	NAD83 UTM- Zone 2 North- Meter (EPSG #26902)
UTM83-20	NAD83 UTM- Zone 20 North- Meter (EPSG #26920)
UTM83-20F	NAD83 UTM- Zone 20 North- US Foot
UTM83-20IF	NAD83 UTM- Zone 20 North- Intnl Foot
UTM83-21	NAD83 UTM- Zone 21 North- Meter (EPSG #26921)
UTM83-21F	NAD83 UTM- Zone 21 North- US Foot
UTM83-21IF	NAD83 UTM- Zone 21 North- Intnl Foot
UTM83-22	NAD83 UTM- Zone 22 North- Meter (EPSG #26922)
UTM83-22F	NAD83 UTM- Zone 22 North- US Foot
UTM83-22IF	NAD83 UTM- Zone 22 North- Intnl Foot
UTM83-23	NAD83 Universal Transverse Mercator- Zone 23 North- Meter
UTM83-3	NAD83 UTM- Zone 3 North- Meter (EPSG #26903)
UTM83-3F	NAD83 UTM- Zone 3 North- US Survey Foot
UTM83-4	NAD83 UTM- Zone 4 North- Meter (EPSG #26904)
UTM83-4F	NAD83 UTM- Zone 4 North- US Survey Foot
UTM83-5	NAD83 UTM- Zone 5 North- Meter (EPSG #26905)
UTM83-58	NAD83 UTM- Zone 58 North- Meter
UTM83-59	NAD83 UTM- Zone 59 North- Meter
UTM83-5F	NAD83 UTM- Zone 5 North- US Survey Foot

Value	Description
UTM83-5IF	NAD83 UTM- Zone 5 North- Intnl Foot
UTM83-6	NAD83 UTM- Zone 6 North- Meter (EPSG #26906)
UTM83-60	NAD83 UTM- Zone 60 North- Meter
UTM83-6F	NAD83 UTM- Zone 6 North- US Foot
UTM83-6IF	NAD83 UTM- Zone 6 North- Intnl Foot
UTM83-7	NAD83 UTM- Zone 7 North- Meter (EPSG #26907)
UTM83-7F	NAD83 UTM- Zone 7 North- US Foot
UTM83-7IF	NAD83 UTM- Zone 7 North- Intnl Foot
UTM83-8	NAD83 UTM- Zone 8 North- Meter (EPSG #26908)
UTM83-8F	NAD83 UTM- Zone 8 North- US Foot
UTM83-8IF	NAD83 UTM- Zone 8 North- Intnl Foot
UTM83-9	NAD83 UTM- Zone 9 North- Meter (EPSG #26909)
UTM83-9F	NAD83 UTM- Zone 9 North- US Foot
UTM83-9IF	NAD83 UTM- Zone 9 North- Intnl Foot
UTM84-10N	WGS 1984 UTM- Zone 10 North- Meter (EPSG #32610)
UTM84-10S	WGS 1984 UTM- Zone 10 South- Meter (EPSG #32710)
UTM84-11N	WGS 1984 UTM- Zone 11 North- Meter (EPSG #32611)
UTM84-11S	WGS 1984 UTM- Zone 11 South- Meter (EPSG #32711)
UTM84-12N	WGS 1984 UTM- Zone 12 North- Meter (EPSG #32612)
UTM84-12S	WGS 1984 UTM- Zone 12 South- Meter (EPSG #32712)
UTM84-13N	WGS 1984 UTM- Zone 13 North- Meter (EPSG #32613)
UTM84-13S	WGS 1984 UTM- Zone 13 South- Meter (EPSG #32713)
UTM84-14N	WGS 1984 UTM- Zone 14 North- Meter (EPSG #32614)
UTM84-14S	WGS 1984 UTM- Zone 14 South- Meter (EPSG #32714)
UTM84-15N	WGS 1984 UTM- Zone 15 North- Meter (EPSG #32615)
UTM84-15S	WGS 1984 UTM- Zone 15 South- Meter (EPSG #32715)
UTM84-16N	WGS 1984 UTM- Zone 16 North- Meter (EPSG #32616)
UTM84-16S	WGS 1984 UTM- Zone 16 South- Meter (EPSG #32716)
UTM84-17N	WGS 1984 UTM- Zone 17 North- Meter (EPSG #32617)
UTM84-17S	WGS 1984 UTM- Zone 17 South- Meter (EPSG #32717)
UTM84-18N	WGS 1984 UTM- Zone 18 North- Meter (EPSG #32618)
UTM84-18S	WGS 1984 UTM- Zone 18 South- Meter (EPSG #32718)
UTM84-19N	WGS 1984 UTM- Zone 19 North- Meter (EPSG #32619)
UTM84-19S	WGS 1984 UTM- Zone 19 South- Meter (EPSG #32719)
UTM84-1N	WGS 1984 UTM- Zone 1 North- Meter (EPSG #32601)
UTM84-1S	WGS 1984 UTM- Zone 1 South- Meter (EPSG #32701)
UTM84-20N	WGS 1984 UTM- Zone 20 North- Meter (EPSG #32620)
UTM84-20S	WGS 1984 UTM- Zone 20 South- Meter (EPSG #32720)
UTM84-21N	WGS 1984 UTM- Zone 21 North- Meter (EPSG #32621)
UTM84-21S	WGS 1984 UTM- Zone 21 South- Meter (EPSG #32721)
UTM84-22N	WGS 1984 UTM- Zone 22 North- Meter (EPSG #32622)
UTM84-22S	WGS 1984 UTM- Zone 22 South- Meter (EPSG #32722)
UTM84-23N	WGS 1984 UTM- Zone 23 North- Meter (EPSG #32623)
UTM84-23S	WGS 1984 UTM- Zone 23 South- Meter (EPSG #32723)
UTM84-24N	WGS 1984 UTM- Zone 24 North- Meter (EPSG #32624)
UTM84-24S	WGS 1984 UTM- Zone 24 South- Meter (EPSG #32724)
UTM84-25N	WGS 1984 UTM- Zone 25 North- Meter (EPSG #32625)

Value	Description
UTM84-25S	WGS 1984 UTM- Zone 25 South- Meter (EPSG #32725)
UTM84-26N	WGS 1984 UTM- Zone 26 North- Meter (EPSG #32626)
UTM84-26S	WGS 1984 UTM- Zone 26 South- Meter (EPSG #32726)
UTM84-27N	WGS 1984 UTM- Zone 27 North- Meter (EPSG #32627)
UTM84-27S	WGS 1984 UTM- Zone 27 South- Meter (EPSG #32727)
UTM84-28N	WGS 1984 UTM- Zone 28 North- Meter (EPSG #32628)
UTM84-28S	WGS 1984 UTM- Zone 28 South- Meter (EPSG #32728)
UTM84-29N	WGS 1984 UTM- Zone 29 North- Meter (EPSG #32629)
UTM84-29S	WGS 1984 UTM- Zone 29 South- Meter (EPSG #32729)
UTM84-2N	WGS 1984 UTM- Zone 2 North- Meter (EPSG #32602)
UTM84-2S	WGS 1984 UTM- Zone 2 South- Meter (EPSG #32702)
UTM84-30N	WGS 1984 UTM- Zone 30 North- Meter (EPSG #32630)
UTM84-30S	WGS 1984 UTM- Zone 30 South- Meter (EPSG #32730)
UTM84-31N	WGS 1984 UTM- Zone 31 North- Meter (EPSG #32631)
UTM84-31S	WGS 1984 UTM- Zone 31 South- Meter (EPSG #32731)
UTM84-32N	WGS 1984 UTM- Zone 32 North- Meter (EPSG #32632)
UTM84-32S	WGS 1984 UTM- Zone 32 South- Meter (EPSG #32732)
UTM84-33N	WGS 1984 UTM- Zone 33 North- Meter (EPSG #32633)
UTM84-33S	WGS 1984 UTM- Zone 33 South- Meter (EPSG #32733)
UTM84-34N	WGS 1984 UTM- Zone 34 North- Meter (EPSG #32634)
UTM84-34S	WGS 1984 UTM- Zone 34 South- Meter (EPSG #32734)
UTM84-35N	WGS 1984 UTM- Zone 35 North- Meter (EPSG #32635)
UTM84-35S	WGS 1984 UTM- Zone 35 South- Meter (EPSG #32735)
UTM84-36N	WGS 1984 UTM- Zone 36 North- Meter (EPSG #32636)
UTM84-36S	WGS 1984 UTM- Zone 36 South- Meter (EPSG #32736)
UTM84-37N	WGS 1984 UTM- Zone 37 North- Meter (EPSG #32637)
UTM84-37S	WGS 1984 UTM- Zone 37 South- Meter (EPSG #32737)
UTM84-38N	WGS 1984 UTM- Zone 38 North- Meter (EPSG #32638)
UTM84-38S	WGS 1984 UTM- Zone 38 South- Meter (EPSG #32738)
UTM84-39N	WGS 1984 UTM- Zone 39 North- Meter (EPSG #32639)
UTM84-39S	WGS 1984 UTM- Zone 39 South- Meter (EPSG #32739)
UTM84-3N	WGS 1984 UTM- Zone 3 North- Meter (EPSG #32603)
UTM84-3S	WGS 1984 UTM- Zone 3 South- Meter (EPSG #32703)
UTM84-40N	WGS 1984 UTM- Zone 40 North- Meter (EPSG #32640)
UTM84-40S	WGS 1984 UTM- Zone 40 South- Meter (EPSG #32740)
UTM84-41N	WGS 1984 UTM- Zone 41 North- Meter (EPSG #32641)
UTM84-41S	WGS 1984 UTM- Zone 41 South- Meter (EPSG #32741)
UTM84-42N	WGS 1984 UTM- Zone 42 North- Meter (EPSG #32642)
UTM84-42S	WGS 1984 UTM- Zone 42 South- Meter (EPSG #32742)
UTM84-43N	WGS 1984 UTM- Zone 43 North- Meter (EPSG #32643)
UTM84-43S	WGS 1984 UTM- Zone 43 South- Meter (EPSG #32743)
UTM84-44N	WGS 1984 UTM- Zone 44 North- Meter (EPSG #32644)
UTM84-44S	WGS 1984 UTM- Zone 44 South- Meter (EPSG #32744)
UTM84-45N	WGS 1984 UTM- Zone 45 North- Meter (EPSG #32645)
UTM84-45S	WGS 1984 UTM- Zone 45 South- Meter (EPSG #32745)
UTM84-46N	WGS 1984 UTM- Zone 46 North- Meter (EPSG #32646)
UTM84-46S	WGS 1984 UTM- Zone 46 South- Meter (EPSG #32746)

Value	Description
UTM84-47N	WGS 1984 UTM- Zone 47 North- Meter (EPSG #32647)
UTM84-47S	WGS 1984 UTM- Zone 47 South- Meter (EPSG #32747)
UTM84-48N	WGS 1984 UTM- Zone 48 North- Meter (EPSG #32648)
UTM84-48S	WGS 1984 UTM- Zone 48 South- Meter (EPSG #32748)
UTM84-49N	WGS 1984 UTM- Zone 49 North- Meter (EPSG #32649)
UTM84-49S	WGS 1984 UTM- Zone 49 South- Meter (EPSG #32749)
UTM84-4N	WGS 1984 UTM- Zone 4 North- Meter (EPSG #32604)
UTM84-4S	WGS 1984 UTM- Zone 4 South- Meter (EPSG #32704)
UTM84-50N	WGS 1984 UTM- Zone 50 North- Meter (EPSG #32650)
UTM84-50S	WGS 1984 UTM- Zone 50 South- Meter (EPSG #32750)
UTM84-51N	WGS 1984 UTM- Zone 51 North- Meter (EPSG #32651)
UTM84-51S	WGS 1984 UTM- Zone 51 South- Meter (EPSG #32751)
UTM84-52N	WGS 1984 UTM- Zone 52 North- Meter (EPSG #32652)
UTM84-52S	WGS 1984 UTM- Zone 52 South- Meter (EPSG #32752)
UTM84-53N	WGS 1984 UTM- Zone 53 North- Meter (EPSG #32653)
UTM84-53S	WGS 1984 UTM- Zone 53 South- Meter (EPSG #32753)
UTM84-54N	WGS 1984 UTM- Zone 54 North- Meter (EPSG #32654)
UTM84-54S	WGS 1984 UTM- Zone 54 South- Meter (EPSG #32754)
UTM84-55N	WGS 1984 UTM- Zone 55 North- Meter (EPSG #32655)
UTM84-55S	WGS 1984 UTM- Zone 55 South- Meter (EPSG #32755)
UTM84-56N	WGS 1984 UTM- Zone 56 North- Meter (EPSG #32656)
UTM84-56S	WGS 1984 UTM- Zone 56 South- Meter (EPSG #32756)
UTM84-57N	WGS 1984 UTM- Zone 57 North- Meter (EPSG #32657)
UTM84-57S	WGS 1984 UTM- Zone 57 South- Meter (EPSG #32757)
UTM84-58N	WGS 1984 UTM- Zone 58 North- Meter (EPSG #32658)
UTM84-58S	WGS 1984 UTM- Zone 58 South- Meter (EPSG #32758)
UTM84-59N	WGS 1984 UTM- Zone 59 North- Meter (EPSG #32659)
UTM84-59S	WGS 1984 UTM- Zone 59 South- Meter (EPSG #32759)
UTM84-5N	WGS 1984 UTM- Zone 5 North- Meter (EPSG #32605)
UTM84-5S	WGS 1984 UTM- Zone 5 South- Meter (EPSG #32705)
UTM84-60N	WGS 1984 UTM- Zone 60 North- Meter (EPSG #32660)
UTM84-60S	WGS 1984 UTM- Zone 60 South- Meter (EPSG #32760)
UTM84-6N	WGS 1984 UTM- Zone 6 North- Meter (EPSG #32606)
UTM84-6S	WGS 1984 UTM- Zone 6 South- Meter (EPSG #32706)
UTM84-7N	WGS 1984 UTM- Zone 7 North- Meter (EPSG #32607)
UTM84-7S	WGS 1984 UTM- Zone 7 South- Meter (EPSG #32707)
UTM84-8N	WGS 1984 UTM- Zone 8 North- Meter (EPSG #32608)
UTM84-8S	WGS 1984 UTM- Zone 8 South- Meter (EPSG #32708)
UTM84-9N	WGS 1984 UTM- Zone 9 North- Meter (EPSG #32609)
UTM84-9S	WGS 1984 UTM- Zone 9 South- Meter (EPSG #32709)
UTM89-30N	WGS 1984 UTM- Zone 30 North- Meter
UTMHP-10	HPGN UTM- Zone 10 North- Meter
UTMHP-10F	HPGN UTM- Zone 10 North- US Foot
UTMHP-10IF	HPGN UTM- Zone 10 North- Intnl Foot
UTMHP-11	HPGN UTM- Zone 11 North- Meter
UTMHP-11F	HPGN UTM- Zone 11 North- US Foot
UTMHP-11IF	HPGN UTM- Zone 11 North- Intnl Foot

Value	Description
UTMHP-12	HPGN UTM- Zone 12 North- Meter
UTMHP-12F	HPGN UTM- Zone 12 North- US Foot
UTMHP-12IF	HPGN UTM- Zone 12 North- Intnl Foot
UTMHP-13	HPGN UTM- Zone 13 North- Meter
UTMHP-13F	HPGN UTM- Zone 13 North- US Foot
UTMHP-13IF	HPGN UTM- Zone 13 North- Intnl Foot
UTMHP-14	HPGN UTM- Zone 14 North- Meter
UTMHP-14F	HPGN UTM- Zone 14 North- US Foot
UTMHP-14IF	HPGN UTM- Zone 14 North- Intnl Foot
UTMHP-15	HPGN UTM- Zone 15 North- Meter
UTMHP-15F	HPGN UTM- Zone 15 North- US Foot
UTMHP-15IF	HPGN UTM- Zone 15 North- Intnl Foot
UTMHP-16	HPGN UTM- Zone 16 North- Meter
UTMHP-16F	HPGN UTM- Zone 16 North- US Foot
UTMHP-16IF	HPGN UTM- Zone 16 North- Intnl Foot
UTMHP-17	HPGN UTM- Zone 17 North- Meter
UTMHP-17F	HPGN UTM- Zone 17 North- US Foot
UTMHP-17IF	HPGN UTM- Zone 17 North- Intnl Foot
UTMHP-18	HPGN UTM- Zone 18 North- Meter
UTMHP-18F	HPGN UTM- Zone 18 North- US Foot
UTMHP-18IF	HPGN UTM- Zone 18 North- Intnl Foot
UT-N	NAD27 Utah State Planes- Northern Zone- US Foot (EPSG #32042)
UT-S	NAD27 Utah State Planes- Southern Zone- US Foot (EPSG #32044)
VA83-N	NAD83 Virginia State Planes- Northern Zone- Meter (EPSG #32146)
VA83-NF	NAD83 Virginia State Planes- Northern Zone- US Foot (EPSG #2283)
VA83-S	NAD83 Virginia State Planes- Southern Zone- Meter (EPSG #32147)
VA83-SF	NAD83 Virginia State Planes- Southern Zone- US Foot (EPSG #2284)
VAHP-N	HPGN/HARN Virginia State Planes- Northern Zone- Meter (EPSG #2853)
VAHP-NF	HPGN/HARN Virginia State Planes- Northern Zone- US Foot (EPSG #2924)
VAHP-S	HPGN/HARN Virginia State Planes- Southern Zone- Meter (EPSG #2854)
VAHP-SF	HPGN/HARN Virginia State Planes- Southern Zone- US Foot (EPSG #2925)
VA-N	NAD27 Virginia State Planes- Northern Zone- US Foot (EPSG #32046)
VA-S	NAD27 Virginia State Planes- Southern Zone- US Foot (EPSG #32047)
VT	NAD27 Vermont State Planes- US Foot (EPSG #32045)
VT83	NAD83 Vermont State Planes- Meter (EPSG #32145)
VT83F	NAD83 Vermont State Planes- US Foot
VTHP	HPGN/HARN Vermont State Planes- Meter (EPSG #2852)
VTHPF	HPGN/HARN Vermont State Planes- US Foot
WA83-N	NAD83 Washington State Planes- Northern Zone- Meter (EPSG #32148)
WA83-NF	NAD83 Washington State Planes- Northern Zone- US Foot (EPSG #2285)
WA83-S	NAD83 Washington State Planes- Southern Zone- Meter (EPSG #32149)
WA83-SF	NAD83 Washington State Planes- Southern Zone- US Foot (EPSG #2286)
WAHP-N	HPGN Washington State Planes- Northern Zone- Meter (EPSG #2855)
WAHP-NF	HPGN Washington State Planes- Northern Zone- US Foot (EPSG #2926)
WAHP-S	HPGN Washington State Planes- Southern Zone- Meter (EPSG #2856)
WAHP-SF	HPGN Washington State Planes- Southern Zone- US Foot (EPSG #2927)
WA-N	NAD27 Washington State Planes- Northern Zone- US Foot (EPSG #32048)

Value	Description
WA-S	NAD27 Washington State Planes- Southern Zone- US Foot (EPSG #32049)
WI83-C	NAD83 Wisconsin State Planes- Central Zone- Meter (EPSG #32153)
WI83-CF	NAD83 Wisconsin State Planes- Central Zone- US Foot (EPSG #2288)
WI83-N	NAD83 Wisconsin State Planes- Northern Zone- Meter (EPSG #32152)
WI83-NF	NAD83 Wisconsin State Planes- Northern Zone- US Foot (EPSG #2287)
WI83-S	NAD83 Wisconsin State Planes- Southern Zone- Meter (EPSG #32154)
WI83-SF	NAD83 Wisconsin State Planes- Southern Zone- US Foot (EPSG #2289)
WI-C	NAD27 Wisconsin State Planes- Central Zone- US Foot (EPSG #32053)
WIHP-C	HPGN Wisconsin State Planes- Central Zone- Meter (EPSG #2860)
WIHP-CF	HPGN Wisconsin State Planes- Central Zone- US Foot (EPSG #2929)
WIHP-N	HPGN Wisconsin State Planes- Northern Zone- Meter (EPSG #2859)
WIHP-NF	HPGN Wisconsin State Planes- Northern Zone- US Foot (EPSG #2928)
WIHP-S	HPGN Wisconsin State Planes- Southern Zone- Meter (EPSG #2861)
WIHP-SF	HPGN Wisconsin State Planes- Southern Zone- US Foot (EPSG #2930)
WI-N	NAD27 Wisconsin State Planes- Northern Zone- US Foot (EPSG #32052)
WI-S	NAD27 Wisconsin State Planes- Southern Zone- US Foot (EPSG #32054)
WV83-N	NAD83 West Virginia State Planes- Northern Zone- Meter (EPSG #32150)
WV83-NF	NAD83 West Virginia State Planes- Northern Zone- US Foot
WV83-S	NAD83 West Virginia State Planes- Southern Zone- Meter (EPSG #32151)
WV83-SF	NAD83 West Virginia State Planes- Southern Zone- US Foot
WVHP-N	HARN (HPGN) West Virginia State Planes- Northern Zone- Meter (EPSG #2857)
WVHP-NF	HARN (HPGN) West Virginia State Planes- Northern Zone- US Foot
WVHP-S	HARN (HPGN) West Virginia State Planes- Southern Zone- Meter (EPSG #2858)
WVHP-SF	HARN (HPGN) West Virginia State Planes- Southern Zone- US Foot
WV-N	NAD27 West Virginia State Planes- Northern Zone- US Foot (EPSG #32050)
WV-S	NAD27 West Virginia State Planes- Southern Zone- US Foot (EPSG #32051)
WY83-E	NAD83 Wyoming State Planes- Eastern- Meter (EPSG #32155)
WY83-EC	NAD83 Wyoming State Planes- East Central Zone- Meter (EPSG #32156)
WY83-ECF	NAD83 Wyoming State Planes- East Central Zone- US Foot
WY83-EF	NAD83 Wyoming State Planes- Eastern- US Foot
WY83-W	NAD83 Wyoming State Planes- Western- Meter (EPSG #32158)
WY83-WC	NAD83 Wyoming State Planes- West Central Zone- Meter (EPSG #32157)
WY83-WCF	NAD83 Wyoming State Planes- West Central Zone- US Foot
WY83-WF	NAD83 Wyoming State Planes- Western- US Foot
WY-E	NAD27 Wyoming State Planes- Eastern Zone- US Foot (EPSG #32055)
WY-EC	NAD27 Wyoming State Planes- East Central Zone- US Foot (EPSG #32056)
WYHP-E	HPGN/HARN Wyoming State Planes- Eastern- Meter (EPSG #2862)
WYHP-EC	HPGN/HARN Wyoming State Planes- East Central Zone- Meter (EPSG #2863)
WYHP-ECF	HPGN/HARN Wyoming State Planes- East Central Zone- US Foot
WYHP-EF	HPGN/HARN Wyoming State Planes- Eastern- US Foot
WYHP-W	HPGN/HARN Wyoming State Planes- Western- Meter (EPSG #2865)
WYHP-WC	HPGN/HARN Wyoming State Planes- West Central Zone- Meter (EPSG #2864)
WYHP-WCF	HPGN/HARN Wyoming State Planes- West Central Zone- US Foot
WYHP-WF	HPGN/HARN Wyoming State Planes- Western- US Foot

Value	Description
WY-W	NAD27 Wyoming State Planes- Western Zone- US Foot (EPSG #32058)
WY-WC	NAD27 Wyoming State Planes- West Central Zone- US Foot (EPSG #32057)

5.15.13.CodeDesignGroup

Group #	Tail Height (ft)	Wingspan (ft)
I	<20	<49
II	20 - <30	49 - <79
III	30 - <45	79 - <118
IV	45 - <60	118 - <171
V	60 - <66	171 - <214
VI	66 - <80	214 - <262

5.15.14.CodeDesignSurfaceType

Value	Description
BRL	Building restriction line (not a standard)
FATO	Final Approach and Takeoff Clearance Surface
HAS	Heliport Safety Area
HPZ	Heliport Protection Zone
IAOFZ	Inner Approach Obstacle Free Zone
ITOFZ	Inner Transitional Obstacle Free Zone
OFZ	Obstacle Free Zone
POFZ	Precision obstacle free zone (See AC 150/5300-13)
PRSIFR	Parallel Runway Separation Simultaneous IFR Operations
PRSVFR	Parallel Runway Separation Simultaneous VFR Operations
ROFA	Runway Object Free Area
RPZ	Runway protection zone (See AC 150/5300-13)
RSA	Runway safety area
RWYPTX	Runway to Parallel Taxiway and Taxiline Separation
TOFA	Taxiway and taxilane object free area (See AC 150/5300-13)
TSA	Threshold sighting area
TSS	Threshold Siting Surface (See AC 150/5300-13)
TXSA	Taxiway safety area (See AC 150/5300-13)

5.15.15.CodeDirectionality

Value	Description
BI	Bidirectional
ES	One way from end-to-startpoint
SE	One way from start-to-endpoint

5.15.16.CodeFaaRegion

Value	Description
AAL	Alaska
ACE	Central
AEA	Eastern
AGL	Great Lakes
ANE	New England
ANM	Northwest Mountain
ASO	Southern

Value	Description
ASW	Southwest
AWP	Western Pacific

5.15.17.CodeFuel

Value	Description
A	Jet A, without icing inhibitor
A+	Jet A+, Kerosene fuel, Type A, Jet A or JP-1 With icing inhibitor.
A1	Jet A1, without icing inhibitor
A1+	Jet A1+, Jet A1 with icing inhibitor.
B	Jet B, Wide cut turbine fuel, Without icing inhibitor.
B+	Jet B+, wide cut turbine fuel with icing inhibitor.
C	91/96 octane gasoline, leaded, No MIL Spec.
F	80 octane gasoline, unleaded, No MIL Spec.
G	Aviation Gasoline (AVGAS), octane unknown
H	108/135 octane gasoline, leaded, No MIL Spec
J	Jet fuel available but type is unknown
J4	JP-4, Wide cut turbine fuel MIL Spec T-5624
J5	JP-5, Kerosene MIL Spec T-5624
J8	JP-8, Semi Kerosene MIL Spec T-83133, without icing inhibitor
K	73 octane gasoline, unleaded, No MIL Spec
X	Storage tanks available and fuel type unknown or the tanks were used at one time for aviation products but may now store other products
7	JP-7, Jet Propellant type 7 (Glass Tank Fuel)
80	80/87 octane gasoline, leaded, MIL-L-5572F (RED)
100	100/130 octane gasoline, leaded, MIL-L-5572F (GREEN)
100LL	100/130 MIL Spec, low lead, aviation gasoline (BLUE)
115	115/145 octane gasoline, leaded, MIL-L-5572F (PURPLE)

5.15.18.CodeGateStandType

Name	Definition
ANG-NI	Angled nose-in parking position
ANG-NO	Angled nose-out parking position
HS	Hard stand
ISO	Isolated parking position.
JB	Jet bridge
NI	Nose-in parking position.
OTHER	Other
PR	Portable ramp
RMT	Remote parking position.
SR	Stairs
TM	Temporary
UNK	unknown

5.15.19.CodeGridType

Name	Definition
ed50	European Datum 1950
gaussKruger	Gauss Kruger
GEOREF	World Geographic Reference System

Name	Definition
ING	Irish National Grid Reference Survey
LCC	Lambert Conformal Conic
LL	Latitude, longitude
MIL	Military
OTHER	Other
RT90	Swedish Coordinate System
SPCS	State Plane Coordinate System
UPS	Universal Polar Stereographic
USNG	United States National Grid for Spatial Addressing
UTM	Universal Transverse Mercator

5.15.20.CodeHazardCategory

Class	Division	Description
1		Explosives are any substance or article, including a device, which is designed to function by explosion or which, by chemical reaction within itself is able to function in a similar manner even if not designed to function by explosion (unless the article is otherwise classed under a provision of 49CFR).
	1.1	Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously
	1.2	Explosives that have a projection hazard but not a mass explosion hazard
	1.3	Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or, both but not a mass explosion hazard.
	1.4	Explosives that present a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.
	1.5	Blasting agents consist of very insensitive explosives. This division comprises substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.
	1.6	Consists of extremely insensitive articles which do not have a mass explosive hazard. This division comprises articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.
2		HazMat Class 2 includes all gases which are compressed and stored for transportation. Class 2 has three divisions: Flammable (also called combustible), Non-Flammable/Non-Poisonous, and Poisonous.
	2.1	Flammable Gas - 454 kg (1001 lb) of any material which is a gas at 20 °C (68 °F) or less and 101.3 kPa (14.7 psi) of pressure (a material which has a boiling point of 20 °C (68 °F) or less at 101.3 kPa (14.7 psi)) which- 1. Is ignitable at 101.3 kPa (14.7 psi) when in a mixture of 13 percent or less by volume with air; or 2. Has a flammable range at 101.3 kPa (14.7 psi) with air of at least 12 percent regardless of the lower limit.

Class	Division	Description
	2.2	Non-Flammable, Non-Poisonus Gas - This division includes compressed gas, liquefied gas, pressurized cryogenic gas, compressed gas in solution, asphyxiant gas and oxidizing gas. A non-flammable, nonpoisonous compressed gas (Division 2.2) means any material (or mixture) which: 1. Exerts in the packaging an absolute pressure of 280 kPa (40.6 psia) or greater at 20 °C (68 °F), and 2. Does not meet the definition of Division 2.1 or 2.3.
	2.3	Poison Gas - Gas poisonous by inhalation means a material which is a gas at 20 °C or less and a pressure of 101.3 kPa (a material which has a boiling point of 20 °C or less at 101.3kPa (14.7 psi)) and which: 1. Is known to be so toxic to humans as to pose a hazard to health during transportation, or 2. In the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has an LC50 value of not more than 5000 ml/m³. See 49CFR 173.116(a) for assignment of Hazard Zones A, B, C or D. LC50 values for values for mixtures may be determined using the formula in 49 CFR 173.133(b)(1)(i)
3		HazMat Class 3 are flammable liquids. They are liquids with flash point of not more than 60.5°C (141°F), or any material in a liquid phase with a flash point at or above 37.8°C (100°F).
4		HazMat Class 4 are Flammable solids. Flammable Solids are any materials in the solid phase of matter that can readily undergo combustion in the presence of a source of ignition under standard circumstances, i.e. without: Artificially changing variables such as pressure or density; or Adding accelerants.
	4.1	Flammable Solid
	4.2	Spontaneously Combustible
	4.3	Dangerous When Wet - Dangerous when wet material is material that, by contact with water, is liable to become spontaneously flammable or to give off flammable or toxic gas at a rate greater than 1 liter per kilogram of the material, per hour, when tested in accordance with the UN Manual of Tests and Criteria.
5		HazMat Class 5 Oxidizing Agents and Organic Peroxides - An oxidizer is a chemical that readily yields oxygen in reactions, thereby causing or enhancing combustion
	5.1	Oxidizers - An oxidizer is a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials
	5.2	Organic Peroxides - An organic peroxide is any organic compound containing oxygen (O) in the bivalent -O-O- structure and which may be considered a derivative of hydrogen peroxide, where one or more of the hydrogen atoms have been replaced by organic radicals (with some exceptions)

Class	Division	Description
6		HazMat Class 6 is Toxic and Infectious Substances. Poisonous material is a material, other than a gas, known to be so toxic to humans that it presents a health hazard during transportation
	6.1	Poisonous material is a material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or which, in the absence of adequate data on human toxicity:
	6.2	Biohazards
7		HazMat Class 7 is Radioactive substances. Radioactive substances are materials that emit radiation.
8		Hazmat Class 8 is Corrosive Substances. A corrosive material is a liquid or solid that causes full thickness destruction of human skin at the site of contact within a specified period of time. A liquid that has a severe corrosion rate on steel or aluminum based on the criteria in 49CFR 173.137(c)(2) is also a corrosive material.
9		HazMat Class 9 is Miscellaneous Substances. The miscellaneous hazardous materials category encompasses all hazardous materials that do not fit one of the definitions listed in Class 1 through Class 8.

5.15.21.CodeHazardType

Value	Description
BASH	Bird Aircraft Strike Hazard
DEER STRIKE	
TBD	Hazard yet to be determined
TORTOISE_PITFALL	
UNKNOWN	

5.15.22.CodeHowAcquired

Value	Description
AIP_DEVELOPMENT	Land acquired using AIP funds for airport development
AIP_APPROACH_PROTECTION	Land acquired using AIP funds for approach protection
AIP_NOISE	Land acquired using AIP funds for noise
DONATION	Land acquired by donation
PFC_DEVELOPMENT	Land acquired using PFC funds for airport development
PFC_APPROACH_PROTECTION	Land acquired using PFC funds for approach protection
PFC_NOISE	Land acquired using PFC funds for noise
SURPLUS_PROPERTY	Land acquired as surplus property

5.15.23.CodeLandmarkType

Value	Description
AERIAL CABLEWAY	
AGRICULTURE AREA	
AIRPORT	
ATHLETIC FIELD	
BOAT RAMP	
BREAKWATER	
CANAL	
CEMETERY	
CREEK	

Value	Description
DAM	
FENCE	
GOLF COURSE	
LEVEE	
MILITARY AREA	
MOUNTAIN PASS	
OTHER	
PIER	
POWERPLANT	
QUARRY	
QUAY	
RACECOURSE OR TRACK	
RAILROAD	
RIVER	
ROAD	
SHORELINE	
STADIUM	
STREAM	
TANK TRAP	
TRENCH	
URBAN AREA	
UTILITY LINE	
WALL	
WHARF	

5.15.24.CodeLandUseType

Value	Description
1000	Residential activities (Source: APA LBCS)
1100	Household activities (Source: APA LBCS)
1200	Transient living (Source: APA LBCS)
1300	Institutional living (Source: APA LBCS)
2000	Shopping, business, or trade activities (Source: APA LBCS)
2100	Shopping (Source: APA LBCS)
2110	Goods-oriented shopping (Source: APA LBCS)
2120	Service-oriented shopping (Source: APA LBCS)
2200	Restaurant-type activity (Source: APA LBCS)
2210	Restaurant-type activity with drive-through (Source: APA LBCS)
2300	Office activities (Source: APA LBCS)
2310	Office activities with high turnover of people (Source: APA LBCS)
2320	Office activities with high turnover of automobiles (Source: APA LBCS)
3000	Industrial, manufacturing, and waste-related activities (Source: APA LBCS)
3100	Plant, factory, or heavy goods storage or handling activities (Source: APA LBCS)
3110	Primarily plant or factory-type activities (Source: APA LBCS)
3120	Primarily goods storage or handling activities (Source: APA LBCS)
3200	Solid waste management activities (Source: APA LBCS)
3210	Solid waste collection and storage (Source: APA LBCS)
3220	Landfilling or dumping (Source: APA LBCS)
3230	Waste processing or recycling (Source: APA LBCS)

Value	Description
3300	Construction activities (grading, digging, etc.) (Source: APA LBCS)
4000	Social, institutional, or infrastructure-related activities (Source: APA LBCS)
4100	School or library activities (Source: APA LBCS)
4110	Classroom-type activities (Source: APA LBCS)
4120	Training or instructional activities outside classrooms (Source: APA LBCS)
4130	Other instructional activities including those that occur in libraries (Source: APA LBCS)
4200	Emergency response or public-safety-related activities (Source: APA LBCS)
4210	Fire and rescue-related activities (Source: APA LBCS)
4220	Police, security, and protection-related activities (Source: APA LBCS)
4230	Emergency or disaster-response-related activities (Source: APA LBCS)
4300	Activities associated with utilities (water, sewer, power, etc.) (Source: APA LBCS)
4310	Water-supply-related activities (Source: APA LBCS)
4311	Water storing, pumping, or piping (Source: APA LBCS)
4312	Water purification and filtration activities (Source: APA LBCS)
4313	Irrigation water storage and distribution activities (Source: APA LBCS)
4314	Flood control, dams, and other large irrigation activities (Source: APA LBCS)
4320	Sewer-related control, monitor, or distribution activities (Source: APA LBCS)
4321	Sewage storing, pumping, or piping (Source: APA LBCS)
4322	Sewer treatment and processing (Source: APA LBCS)
4330	Power generation, control, monitor, or distribution activities (Source: APA LBCS)
4331	Power transmission lines or control activities (Source: APA LBCS)
4332	Power generation, storage, or processing activities (Source: APA LBCS)
4340	Telecommunications-related control, monitor, or distribution activities (Source: APA LBCS)
4350	Natural gas or fuels-related control, monitor, or distribution Activities (Source: APA LBCS)
4400	Mass storage, inactive (Source: APA LBCS)
4410	Water storage (Source: APA LBCS)
4420	Storage of natural gas, fuels, etc. (Source: APA LBCS)
4430	Storage of chemical, nuclear, or other materials (Source: APA LBCS)
4500	Health care, medical, or treatment activities (Source: APA LBCS)
4600	Interment, cremation, or grave digging activities (Source: APA LBCS)
4700	Military base activities (Source: APA LBCS)
4710	Ordnance storage (Source: APA LBCS)
4720	Range and test activities (Source: APA LBCS)
5000	Travel or movement activities (Source: APA LBCS)
5100	Pedestrian movement (Source: APA LBCS)
5200	Vehicular movement (Source: APA LBCS)
5210	Vehicular parking, storage, etc. (Source: APA LBCS)
5220	Drive-in, drive through, stop-n-go, etc. (Source: APA LBCS)
5400	Trains or other rail movement (Source: APA LBCS)
5410	Rail maintenance, storage, or related activities (Source: APA LBCS)
5500	Sailing, boating, and other port, marine and water-based Activities (Source: APA LBCS)
5510	Boat mooring, docking, or servicing (Source: APA LBCS)
5520	Port, ship-building, and related activities (Source: APA LBCS)
5600	Aircraft takeoff, landing, taxiing, and parking (Source: APA LBCS)

Value	Description
5700	Spacecraft launching and related activities (Source: APA LBCS)
6000	Mass assembly of people (Source: APA LBCS)
6100	Passenger assembly (Source: APA LBCS)
6200	Spectator sports assembly (Source: APA LBCS)
6300	Movies, concerts, or entertainment shows (Source: APA LBCS)
6400	Gatherings at fairs and exhibitions (Source: APA LBCS)
6500	Mass training, drills, etc. (Source: APA LBCS)
6600	Social, cultural, or religious assembly (Source: APA LBCS)
6700	Gatherings at galleries, museums, aquariums, zoological parks, etc. (Source: APA LBCS)
6800	Historical or cultural celebrations, parades, reenactments, etc. (Source: APA LBCS)
7000	Leisure activities (Source: APA LBCS)
7100	Active leisure sports and related activities (Source: APA LBCS)
7110	Running, jogging, bicycling, aerobics, exercising, etc. (Source: APA
7120	Equestrian sporting activities (Source: APA LBCS)
7130	Hockey, ice skating, etc. (Source: APA LBCS)
7140	Skiing, snowboarding, etc. (Source: APA LBCS)
7150	Automobile and motorbike racing (Source: APA LBCS)
7160	Golf (Source: APA LBCS)
7180	Tennis (Source: APA LBCS)
7190	Track and field, team sports (baseball, basketball, etc.), or other sports (Source: APA LBCS)
7200	Passive leisure activity (Source: APA LBCS)
7210	Camping (Source: APA LBCS)
7220	Gambling (Source: APA LBCS)
7230	Hunting (Source: APA LBCS)
7240	Promenading and other activities in parks (Source: APA LBCS)
7250	Shooting (Source: APA LBCS)
7260	Trapping (Source: APA LBCS)
7300	Flying or air-related sports (Source: APA LBCS)
7400	Water sports and related leisure activities (Source: APA LBCS)
7410	Boating, sailing, etc. (Source: APA LBCS)
7420	Canoeing, kayaking, etc. (Source: APA LBCS)
7430	Swimming, diving, etc. (Source: APA LBCS)
7440	Fishing, angling, etc. (Source: APA LBCS)
7450	Scuba diving, snorkeling, etc. (Source: APA LBCS)
7460	Water-skiing (Source: APA LBCS)
8000	Natural resources-related activities (Source: APA LBCS)
8100	Farming, tilling, plowing, harvesting, or related activities (Source: APA)
8200	Livestock related activities (Source: APA LBCS)
8300	Pasturing, grazing, etc. (Source: APA LBCS)
8400	Logging (Source: APA LBCS)

5.15.25. CodeLightingConfigurationType

Value	Description
ALSF-1	High Intensity Approach Lighting System - Configuration 1
ALSF-2	High Intensity Approach Lighting System - Configuration 2
APAP	Alignment of Element Systems

Value	Description
APBN	Airport Rotating Beacon
CLRBAR	Taxiway Clearance Bar Lights
CODEBEACON	Code Beacon
COURSE	Course Lights
F	Fixed
FL	Flashing (Sea Plane Navigation Buoy use only)
FL (2)	Group Flashing (Sea Plane Navigation Buoy use only)
FL (2+1)	Composite Group-Flashing (Sea Plane Navigation Buoy use only)
HLL	Hover Lane Light
HLLL	Hover Lane Limit Light
HPIL	Helipad Perimeter Inset Light
HPPEL	Helipad Perimeter Light (Elevated)
HPPLSF	Helipad Perimeter Light (Semiflush)
ISO	Isophase (Sea Plane Navigation Buoy use only)
L-804	Unidirectional elevated runway guard lights
L-850A	Bi directional or unidirectional runway in pavement light used for runway centerline, Land and Hold Short Operations (LAHSO).
L-850B	Unidirectional runway in pavement light used for runway touchdown zone and medium intensity approach light system applications.
L-850C	Bi directional runway in pavement light used for runway edge lights and displaced threshold applications.
L-850D	Bi directional or unidirectional runway in pavement lights used for runway threshold or runway end light applications.
L-850E	Unidirectional runway in pavement light used for runway threshold light and Medium Intensity Approach Light System applications
L-850F	Unidirectional runway in pavement lights white flashing lights used for LAHSO
L-852A	Bi directional or unidirectional taxiway centerline in pavement lights used for the straight sections of taxiways where operations are permitted when the Runway Visual Range (RVR) is greater than or equal to 1200 feet.
L-852B	Bi directional or unidirectional taxiway centerline in pavement lights for curved sections of taxiways where operations are permitted when the Runway Visual Range (RVR) is greater than or equal to 1200 feet.
L-852C	bi directional or unidirectional taxiway centerline in pavement lights for straight portions of taxiways where operations are permitted when the Runway Visual Range (RVR) is less than 1200 feet.
L-852D	Bi directional or unidirectional taxiway centerline in pavement lights used for curved portions of taxiways where operations are permitted when the Runway Visual Range is less than 1200 feet.
L-852E	Omni directional taxiway intersection in pavement lights where operations are permitted when the Runway Visual Range is greater than or equal to 1200 feet.
L-852E/F	Runway Guard Light in-pavement
L-852F	Omni directional taxiway intersection in pavement lights where operations are permitted when the Runway Visual Range is less than 1200 feet.
L-852G	Unidirectional Runway Guard in pavement lights

Value	Description
L-852G/S	Combination Runway Guard/Stop bar light in-pavement
L-852J	Bi directional taxiway centerline in pavement lights for the curved portions of taxiways where operations are permitted when the Runway Visual Range is greater than or equal to 1200 feet.
L-852K	Bi directional taxiway centerline in pavement lights for the curved portions of taxiway where operation are permitted when the Runway Visual Ranger is less than 1200 feet.
L-852S	Unidirectional in pavement Stop Bar lights
L-852T	Omni directional in pavement taxiway edge and Apron edge lights
L-853	Reflective Marker
L-854	Radio Controller (Pilot Controlled Lights)
L-860	Omni directional elevated runway edge lights for Visual Flight Rules (VFR) operations.
L-860E	Bi directional or unidirectional elevated runway threshold or runway end lights for Visual Flight Rules operations.
L-861	Omni directional or bi directional elevated runway edge or displaced threshold lights for non-precision Instrument Flight Rules (IFR) operations.
L-861E	Bi directional or unidirectional elevated runway threshold or runway end lights for non-precision Instrument Flight Rule operations.
L-861SE	Bi directional and unidirectional elevated runway threshold, runway end, and displaced threshold lights for non-precision Instrument Flight Rule operations
L-861T	Omni directional elevated taxiway and apron edge lights.
L-862	Bi directional elevated runway edge, threshold, and displaced threshold lights for precision Instrument Flight Rule operations.
L-862E	Bi directional or unidirectional elevated runway threshold, runway end, and displaced threshold lights for precision Instrument Flight Rule operations.
L-862S	Unidirectional elevated stop bar lights
L-880/L881	Precision Approach Path Indicator
LDIN	Lead In Lighting System
MALS	Medium Intensity Approach Lighting System
MALSF	Medium Intensity Approach Lighting System with Sequenced Flashing Lights
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (RAIL)
MO (A)	Morse Code (Sea Plane Navigation Buoy use only)
NONE	No lights
OBSCAT	Catenary Lighting
OBSDUAL	A combination of OBSRED and OBSWHT
OBSRED	Aviation red Obstruction Lights
OBSWHITE	Flashing White Obstruction Lights
OC	Occulting (Sea Plane Navigation Buoy use only)
ODALS	Omnidirectional Approach Lighting System
OTHER	Other
PAPI2	Precision Approach Path Indicator with 2 lights
PAPI4	Precision Approach Path Indicator with 4 lights

Value	Description
PORTABLE	Portable Lights
PVASI	Pulsating visual Approach Slope Indicator
Q	Quick (Flashing) (Sea Plane Navigation Buoy use only)
RAIL	Runway Alignment Indicator Lights
REIL	Runway End Identifier Lights
RWSL	Runway Status Lights
SALS	Short Approach lighting System
SMGCS	Surface Movement Guidance Control System
SSALF	Short Simplified Approach Light System with Sequenced Flashing Lights
SSALR	Simplified Short Approach Lighting System with Runway Alignment Indicator
TRCV	TriColor VASI
T-VASI	"T" Visual Approach Slope Indicator
TWYON_OFFLGT	Taxiway Lead on/off lights
VASI-12	Visual Approach Slope Indicator with 2 bars and 12 boxes
VASI-16	Visual Approach Slope Indicator with 3 bars and 16 boxes
VASI-2	Visual Approach Slope Indicator with 2 bars
VASI-2-2	Visual Approach Slope Indicator with 2 bars and 2 boxes
VASI-3	Visual Approach Slope Indicator with 3 bars

5.15.26.CodeLoadingBridgeType

Value	Description
ARM	Moveable Arm
PORTABLE_RAMP	Portable Ramp
PORTABLE_STAIRS	Portable Stairs
OTHER	Other

5.15.27.CodeLowVisibilityCategory

Value	Description
0	No low visibility operation supported
1	Supports ILS CAT I low visibility operations
2	Supports ILS CAT II III low visibility operations

5.15.28.CodeMarkingFeatureType

Value	Description
AIMING_POINT	Runway Aiming Point (Geometry Type: Polygon) [Source: AC 150/5340-1]
ALTBAND	lternating bands of aviation orange and white [Source AC 70/7640-1]
APRON_SIGN	Surface painted apron position/entrance sign (Geometry Type: Polygon) [Source: AC 150/5340-1]
ARROW	Arrows identify the displaced threshold area to provide centerline guidance for takeoffs and rollouts (Geometry Type: Line) [Source: AC 150/5340-1]
ARROW_HEAD	Arrow heads are used in conjunction with a threshold bar to further highlight the beginning of a runway (Geometry Type: Line) [Source: AC 150/5340-1]

Value	Description
CHECKERBOARD	Checkerboard obstruction marking pattern [Source AC 70/7640-1]
CHEVRON	A marking used to designate blast pads and other areas that are not suitable for aircraft (Geometry Type: Line) [Source: AC 150/5340-1]
DEMARCATION	Demarcation Bar (Geometry Type: Line) [Source: AC 150/5340-1]
DIR_SIGN	Surface painted taxiway direction signs (Geometry Type: Polygon) [Source: AC 150/5340-1]
GATE_LINE	All painted taxilines covering a parking stand area are regarded as stand guidance lines and will be individual objects in the database. There may be several stand guidance taxilines leading to an aircraft stand to accommodate different aircraft types.
GATE_SIGN	Surface painted gate position signs (Geometry Type: Polygon) [Source: AC 150/5340-1]
HOLD_SIGN	Surface painted holding position signs (Geometry Type: AC 150/5340-1]
ILS_HOLD	Holding position markings for Instrument Landing Systems (Geometry Type: Polygon) [Source: AC 150/5340-1]
INTERSECTION_HOLD	Holding position marking for taxiway/taxiway intersections (Geometry Type: Line) [Source: AC 150/5340-1]
LAHSO	Marking associated with a Land And Hold Short Operations (LAHSO)
LOCATION_SIGN	Surface painted taxiway location signs (Geometry Type: Polygon) [Source: AC 150/5340-1]
NON_MOVE_AREA	Non-movement area marking (Geometry Type: Line) [Source: AC 150/5340-1]
NONE	No marking(s)
OTHER	Other markings not listed
OTHER_LINE	Other markings suitable for representation as a line
OTHER_POLYGON	Other markings suitable for representation as a polygon
PERM_CLOSED	Markings for permanently closed runways and taxiways (Geometry Type: Polygon) [Source: AC 150/5340-1]
POS_SIGN	Geographic position markings (Geometry Type: Polygon) [Source: AC 150/5340-1]
RWY_CL	Runway Centerline (Geometry Type: Line) [Source: AC150/5340-1]
RWY_HOLD	Runway holding position markings on Runways (Geometry Type: Polygon) [Source: AC 150/5340-1]
RWY_ID	Runway Designation Marking (Geometry Type: Polygon) [Source: AC 150/5340-1]
RWY_SHD	Runway shoulder markings (Geometry Type: Line) [Source: AC 150/5340-1]
RWY_THRSH	Runway Threshold Marking (Geometry Type: Polygon) [Source: AC 150/5340-1]
SIDE_STRP	Runway Side Stripe Marking (Geometry Type: Line) [Source: AC 150/5340-1]
SOLID	Solid pattern obstruction marking [Source AC 70/7640-1]
TDZ_MARK	Runway Touchdown Zone Marking (Geometry Type: Polygon) [Source: AC 150/5340-1]

Value	Description
TEMP_CLOSED	Markings for temporarily closed runways and taxiways (Geometry Type: Line) [Source: AC 150/5340-1]
THRSH_BAR	Runway Threshold Bar (Geometry Type: Polygon) [Source: AC 150/5340-1]
TIEDOWN	Aircraft tiedown
TWY_CL	Taxiway Centerline (Geometry Type: Line) [Source: AC 150/5340-1]
TWY_EDGE	Taxiway edge marking (Geometry Type: Line) [Source: AC 150/5340-1]
TWY_HOLD	Runway hold position markings on taxiways (Geometry Type: Polygon) [Source: AC 150/5340-1]
TWY_SHD	Taxiway shoulder marking (Geometry Type: Line) [Source: AC 150/5340-1]
VEHICLE	Vehicle roadway markings (Geometry Type: Line) [Source: AC 150/5340-1]

5.15.29.CodeMonumentType

Value	Description
1ST_ORDER_CLASS_I	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [NGS]
1ST_ORDER_CLASS_II	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [NGS]
2ND_ORDER_CLASS_I	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [NGS]
2ND_ORDER_CLASS_II	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [NGS]
3RD_ORDER_NO_TABLET	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [NGS]
3RD_ORDER_WITH_TABLET	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [NGS]
A_Order	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [FGCS]
B_Order	Meets the standards and specifications for geodetic control network accuracy according to the Federal Geodetic Control Subcommittee [FGCS]
BM	Benchmark is a location whose elevation and horizontal position has been surveyed as accurately as possible. Benchmarks are designed for use as reference points, and are usually marked by small brass plates

Value	Description
FOUND_CLOSING_CORNER	A found corner is a corner whose original or restored monument or mark is recovered, or whose position is definitely established by one or more witness corners or monuments
FOUND_SECTION_CORNER	A found corner is a corner whose original or restored monument or mark is recovered, or whose position is definitely established by one or more witness corners or monuments
MEANDER_CORNER	A corner established where a township line, section line, or other survey intersects the bank of a navigable stream or other meanderable body of water [USGS, 1996, Part 5: Public Land Survey System]
SPOT	A point with a measured vertical position of less than third order accuracy, measured relative to a reference datum [USGS, 2001, Part 7: Hypsography]
UNMONUMENTED	Indicates that no permanent marker has been placed
WEAK_CORNER	Corners established by the USDA Forest Service that have been found but their location has not been tied to their true ground position [USGS, 2003]
WITNESS_CORNER	A monumented station on a line of the survey that is used to perpetuate an important location more or less remote from and without special relation to any regular corner [USGS, 1996, Part 5: Public Land Survey System]

5.15.30.CodeNavaidEquipmentType

Value	Description
ARSR	Air Route Surveillance Radar
ASR	Airport Surveillance Radar
DF	Direction Finding Equipment
DME[1]	Distance Measuring Equipment
FM	Fan Marker
FMH	Fan Marker located with a radio beacon
GS CE	Glide Slope Capture Effect
GS EF	Glide Slope End Fire
GS NR	Glide Slope Null Reference
GS SB	Glide Slope Side Band
LOC	Localizer
MLSAZ	Microwave Landing System Azimuth Antenna
MLSDME	Microwave Landing System DME
MLSEL	Microwave Landing System Elevation Antenna
MSBLS-AZ	Microwave Scan Beam Landing System Azimuth
MSBLS-DME	Microwave Scan Beam Landing System Distance Measuring Equipment
MSBLS-EL	Microwave Scan Beam Landing System Elevation
MTI	Moving Target Indicator Reflector
NDB/C	Nondirectional Radio Beacon -- Compass Locator
NDB/H	Nondirectional Radio Beacon -- High Frequency
NDB/M	Nondirectional Radio Beacons/Medium HF

Value	Description
NDB/U	Nondirectional Radio Beacons/Ultra HF
PAR	Precision Approach Radar
SDF	Simplified Direction Finding Equipment
SECRA	Secondary Radar Antenna
TACAN	Tactical Air Navigation
TDR	Touchdown Reflector
TLS-APGS	Transponder Landing System Approach Glideslope
TLS-LOC	Transponder Landing System – Localizer
VISUAL	Used to identify the navaid as a visual system
VOR[1]	VHF Omnidirectional Range
VORTAC	VOR and collocated TACAN
VOT	VOR Test Facility
VOR/DME[1]	VHF Omnidirectional Range collocated with Distance Measuring Equipment

[1] For information about collocating the DME and VOR, see paragraph 2.6.10.3.2.

5.15.31.CodeNavaidSystemType

Value	Description
ILS	Instrument Landing System
MLS	Microwave Landing System
MSBLS	Microwave Scan Beam Landing System
TLS	Transponder Landing System
VOR/DME[1]	VHF Omnidirectional Range collocated with Distance Measuring Equipment

[1] For information about collocating the DME and VOR, see paragraph 2.6.10.3.2.

5.15.32.CodeObstacleSource

Value	Description
AD	Airport Design and Planning
AF	FAA Tech Ops Field Survey
AO	Airports Field Office
DD	Digital Terrain Elevation Data
DI	U.S. Department of Interior Maps
DM	USGS Digital Elevation Model
EO	Estimated by Airport Owner
F77	Part 77 Analysis
FI	Flight Inspection
NV	Non-Vertically Guided Airport Airspace Analysis
OF	Digital Obstacle File (FAA)
OR	Other Source not named
RS	Remote Sensed
SE	Spot Elevations
SR	Shuttle Radar Terrain Model
ST	State Coded
SV	Field Survey
TE	TERPS Analysis
VG	Vertically Guided Airport Airspace Analysis

Value	Description
WW	Worldwide DoD

5.15.33.CodeObstacleType

Value	Description
AERIAL CABLEWAY	
AERIAL CABLEWAY PYLON	
AGRICULTURE EQUIPMENT	Generic for any agricultural equipment
AIRCRAFT	Generic for a parked or moving aircraft
AMUSEMENT PARK STRUCTURE	
ANTENNA	
AQUEDUCT	
ARCH	
ATHLETIC FIELD	Generic for any type of athletic field or stadium
BILLBOARD	
BLAST FURNACE	
BLEACHERS	
BRIDGE SUPERSTRUCTURE	Generic for larger bridges such as cable stayed bridges etc.
BRIDGE TOWER	
BRIDGE/OVERPASS/VIADUCT	Generic for any type of bridge
BUILDING	Generic for any type of building
BUSH	Generic for bushes and other low growing vegetation
CABLE CAR/RAILWAY	
CATALYTIC CRACKER	An oil refinery unit in which the cracking of petroleum takes place in the presence of a catalyst
CATENARY	The curve formed by a perfectly flexible, uniformly dense, and inextensible cable suspended from its endpoints.
CHIMMNEY/SMOKESTACK	
CHURCH	Generic for houses of worship
COMMUNICATION BUILDING	
COMMUNICATION TOWER	
CONTROL TOWER	
CONVEYOR	
COOLING TOWER	A large tower or similar structure typically attached to a power plant through which water is circulated to lower its temperature by partial evaporation
CRANE	
DAM	
DEBRIS/RUINS	
DIRT PILE	
DOME	
DREDGE/POWERSHOVEL /DRAG	
ELEVATOR	
FLAGPOLE	
FLARE PIPE	
FORTIFICATION OR FORT	
GRAIN BIN/SILO	

Value	Description
GRAIN ELEVATOR	
HOPPER	
HORIZONTAL POINT	Point of known horizontal position
INTERSTATE	Interstate highways with 17 foot vehicle allowance added to the features elevation
LAUNCHPAD	
LIGHT RAILWAY	Generic for people mover systems serving airports
LIGHT SUPPORT STRUCTURE	
LIGHT VESSEL/LIGHTSHIP	
LIGHTHOUSE	
MONUMENT	Generic for historical or cultural monuments
NATURAL HIGH POINT	Generic for high terrain features
NAVAID	Used when defined as an obstacle
NUCLEAR REACTOR	
OFF-SHORE PLATFORM	
PARKING LOT	
PLANT	Generic for manufacturing facilities
POLE	Generic for utility or light poles providing local service
POWER PLANT	
POWER TRANSMISSION LINE	Larger Tower high power Utility lines
POWER TRANSMISSION PYLON	Larger tower high power utility structures
PRIMARY ROAD	Non-Interstate roads with 15 foot vehicle allowance added to the features elevation
PROCESING/TREATMENT PLANT	
RAILROAD	Railroad track with 23 foot vehicle allowance added to the features elevation.
REFINERY	
RIG/SUPERSTRUCTURE	
ROAD SIGN	Interstate highway overhead signs
SCRUB	
SECONDARY ROAD	Local city, county state roads with 10 foot vehicle allowance added to the features elevation
SHIP	Ship underway
SHIP STORAGE	Ship manufacturing or storage facilities
SIGN	Generic for any type of sign other than interstate or street signs
SKI JUMP	
SKI LIFT	
SKI PYLON	
SKYSCRAPER	
SPIRE	
STACK	
STADIUM	
STEEPLE	
STORAGE DEPOT	
STREET SIGN	Signs used to control traffic or provide direction information other than interstate signs

Value	Description
SUBSTATION/TRANSFORMER	
TANK	Generic for other types of tanks
TELEPHONE LINE	
TELEPHONE PYLON/POLE	
TETHERED BALLOON	
TOWER (NON-COMMUNICATON TOWERS)	
TRAFFIC LIGHT/SIGNAL	
TRAMWAY	
TREE	Generic for a single or small group of trees
TREE OUTLINE	Dense area of trees
UTILITY LINE	Generic for local utility service
VEGETATION	
VEHICLE	Generic for any type of vehicle
VERTICAL POINT	Point of known elevation
VERTICAL STRUCTURE	Generic for items not classified otherwise in this list
WALL	
WATER TOWER	Generic for water towers
WIND MOTOR	
WINDMILL	Single windmill
WINDMILL FARMS	Multiple Windmills located close together

5.15.34.CodeObstructionAreaType

Value	Description
AG_EQUIP	Agricultural equipment
BUILDING	
GROUND	
MOBILE_CRANE	
OTHER	
TREE	
URBAN	
VESSEL	

5.15.35.CodeOffsetDirection

Value	Description
CL	On centerline
L	Offset to the left
R	Offset to the right

5.15.36.CodeOisSurfaceCondition

Value	Description
PRIMARY	Identifies an obstructing area solely within a single surface.
SUPPLEMENTARY	Used to identify when an obstructing area covers more than a single OIS.

5.15.37.CodeOisSurfaceType

Value	Description
AAAA	Approach Surfaces
AAAC	Conical Surface
AAAH	Horizontal Surface
AAAP	Primary Surfaces
AAAT	Transitional Surfaces
AAAV	Vertical Guidance Protection Surface
APRC77	14 CFR Part 77 Approach Surfaces
CONL77	14 CFR Part 77 Conical Surface
DEPT	Departure Analysis
HORZ 77	14 CFR Part 77 Horizontal Surface
OEIA	One Engine Inoperative Analysis
PRIM77	14 CFR Part 77 Primary Surface
TERP	TERPS Surfaces
TRNS77	14 CFR Part 77 Transitional Surfaces

5.15.38.CodeOisZoneType

Value	Description
APPROACH	
CONICAL	
HORIZONTAL	
PRIMARY	
TRANSITION	

5.15.39.CodeOperationsType

Value	Description
CIVIL	Civil operations only
JOINT	Joint military and civil operations
MIL	Military operations only

5.15.40.CodeOwner

Value	Description
A	Air Force
B	Public
C	Coast Guard
E	FAA F&E Projects
F	FAA (Other Than F&E)
H	International Public
I	International
J	International Private
K	International Military
L	International (U.S. Aid Funds)
N	Navy
O	Other (Specify In Metadata)
P	Private
R	Army
S	State
X	Special

5.15.41.CodePointType

Value	Description
AIRPORT_ELEVATION	Indicates the point of highest elevation on the landing surface of the airport.
ARP	Point identified is computed as the Airport reference point for the airport
ASOS	Location of the Automated Surface Observing System
AWOS	Location of the Aviation Weather Observing System
CENTERLINE_POINT	A point collected along the runway centerline whose location is variable based on collection method etc. Typically this point is used for runway profile points.
DISPLACED_THRESHOLD	Point provides the location of the displaced threshold for a runway
HELIPAD_REFERENCE_POINT	The point defined as the HelipadReferencePoint
IMAGERY	Imagery Control Point
OTHER	
PACS	Point referenced is the airport's Primary Airport Control Station
RUNWAY_CONTROL_POINT	Point provides the location and elevation of a specific point on the runway such as the point abeam an offset navaid or the intersection point of two runways defined in this standard as required information.
SACS	Point referenced is the airport's Secondary Airport Control Station
SAWS	Location of the Stand Alone Weather System
SEGMENTED_CIRCLE	Location of the airport segmented circle
SPOT_ELEVATION	Spot Elevation Point
STOPWAY_END	Point provides the end point for the stopway
TDZE	Touchdown Zone Elevation (TDZE) - Indicates the highest point along the runway centerline within the first 3000 feet from the threshold.
TEMPORARY_SURVEY_MARK	Temporary Survey Mark
VERTICAL_OBJECT	Point reference is a VerticalPointObject not classified by another feature but of possible significance
WIND_CONE	Location of the wind cone

5.15.42.CodeProjectStatus

Value	Description
IN_PROGRESS	In progress
PLAN_ON_FILE	Indicates a project that is part of a long term (11 + years) plan
PLANNED	Indicates a project that is a part of a short term (0 - 5 year) plan
PROPOSED	Indicates a project that is part of a midterm (6 - 10 year) plan

5.15.43.CodeRecoveredCondition

Value	Description
Disturbed but not missing	Surface mark destroyed (do not classify a mark as destroyed unless the actual disk is found and returned to the setting agency).
Good	Mark recovered in good condition
Other	

Value	Description
Poor	Mark recovered in poor condition and should be considered for replacement
Set now (for a first time description)	To identify a condition not available in the list.
Surface mark destroyed	Underground mark destroyed (do not classify a mark as destroyed unless the actual disk is found and returned to the setting agency).
Underground mark destroyed	Newly established mark

5.15.44.CodeRouteType

Value	Description
ALLEY	Hard-surface or loose-surface narrow street or passageway primarily found between or behind buildings
CITY	City or subdivision streets
COUNTY	Hard-surface roads not included in a higher class and improved, loose-surface roads passable in all kinds of weather. These roads are adjuncts to the primary and secondary highway systems. These roads are under the jurisdiction and maintained by county authorities
FIFTHCLASS	Fifth Class Unimproved roads passable only with 4-wheel-drive vehicles [USGS, 2001, Part 3: Transportation]
FIRSTCLASS	
FOURTHCLASS	Unimproved roads which are generally passable only in fair weather and used mostly for local traffic. Also included are driveways, regardless of construction [USGS, 2001, Part 3: Transportation]
INTERSTATE	First Class - Hard-surface highways including Interstate and U.S. numbered highways (including alternates), primary State routes, and all controlled access highways [USGS, 2001, Part 3: Transportation]
JEEPTRAIL	Unimproved roads passable only with 4-wheel-drive vehicles
LOCAL	Local jurisdiction roads
NATIONAL	First Class - Hard-surface highways including Interstate and U.S. numbered highways (including alternates), primary State routes, and all controlled access highways [USGS, 2001, Part 3: Transportation]. E.g. U.S. 66
OTHER	Other class of road
SECONDCLASS	Second Class Hard-surface highways including secondary State routes, primary county routes, and other highways that connect principal cities and towns, and link these places with primary highway system [USGS, 2001, Part 3: Transportation]
STATE	Hard-surface State routes under the control and jurisdiction of State authorities
THIRDCLASS	Hard-surface roads not included in a higher class and improved, loose-surface roads passable in all kinds of weather. These roads are adjuncts to the primary and secondary highway systems. Also included are important private roads such as main logging or industrial roads which serve as connecting links to the regular road network [USGS, 2001, Part 3: Transportation]
TRAIL	Unimproved roads passable only with 4-wheel-drive vehicles, snowmobiles, motocross bikes, and so forth

5.15.45. CodeRunwayProtectionAreaType

Value	Description
CWY	Clearway
ILS	ILS protection area. Protects ILS signal distortion by forbidding large objects in the area.
LIGHT	Light Plane Surface
OTHER	Other
SNOW	Area protected from snow accumulation
STOPWAY	A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off.
VGSI	Visual Glide Slope Indicator (VGSI) protection area. Protects VGSI signal coverage by forbidding objects in the area.

5.15.46. CodeSamplePointLocation

Value	Description
AS	Air sample
BH	Borehole
BIO	Biological sample
GWS	Ground water sample
OTHER	Other
SEDS	Sediment sample
SOIL	Soil sample
SOLM	Solid material sample
SURF	Surface water sample
WAS	Waste water sample
WL	Well

5.15.47. CodeSegmentType

Value	Description
BEGIN	Beginning section of the segment
CONNECTING	Intermediate segments connecting beginning and ending, beginning and intersection, or intersection and end.
END	Ending section of the segment
INTERSECTION	Defined intersection of multiple segments

5.15.48. CodeShorelineType

Value	Description
APPARENT	Apparent edge of vegetation. Representation of the vegetative border is considered approximate because this line cannot be accurately identified on the ground, due to intricate growth patterns and change over time
INDEFINITE	Conditions prevent the feature from being confidently positioned. Horizontal data are confidently positioned within 0.02", at map scale, of the true ground position. Vertical data are confidently positioned within one-half contour interval of true ground position
MEAN_HIGH_LEVEL	The average limit of dry land during periods of highest water level (for example, high tide
MEAN_LOW_LEVEL	The average limit of dry land during periods of lowest water level (for example, low tide

Value	Description
MEAN_SEA_LEVEL	The arithmetic mean of hourly heights observed over some specified time

5.15.49.CodeShoulderType

Value	Description
O	Other airfield pavement with a shoulder
R	Runway
T	Taxiway

5.15.50.CodeSignTypeCode

Value	Description
CARGO	Inbound Destination Sign - areas set aside for cargo handling
FBO	Inbound Destination Sign - fixed base operator
FUEL	Inbound Destination Sign - areas where aircraft are fueled or serviced
HOLD_INSTRUMENT_LANDING_SYSTEM	Holding Position Sign for ILS Critical Areas
HOLD_RUNWAY_APPROACH	Holding Position Sign for Runway Approach Areas
HOLD_RUNWAY_INTERSECTION	Holding Position Sign for Runway/Runway Intersections
INFO	Signs installed on the airside of an airport, other than taxiway guidance signs or runway distance remaining signs.
MIL	Inbound Destination Sign - areas set aside for military aircraft
NO_ENTRY	No Entry Sign
OUTBOUND_DESTINATION	Outbound Destination Sign
PAX	Inbound Destination Sign - areas set aside for passenger handling
ROAD_STOP	Stop sign in areas where vehicle roadways intersect runways or taxiways
ROAD_YIELD	Yield sign in areas where vehicle roadways intersect runways or taxiways
RSA_RUNWAY_APPROACH	Runway Safety Area/OFZ and Runway Approach Boundary Sign
RUNWAY_DISTANCE_REMAINING	Sign that designates the remaining runway distance to pilots during takeoff and landing operations
RUNWAY_EXIT	Runway Exit Sign
RUNWAY_LOCATION	Runway Location Sign
TAXIWAY_DIRECTION	Taxiway Direction Sign
TAXIWAY_END	Taxiway Ending Marker
TAXIWAY_LOCATION	Taxiway Location Sign
TERMINAL	Inbound Destination Sign - gate positions at which aircraft are loaded and unloaded

5.15.51.CodeStatus

Value	Description
ABANDONED	Abandoned
ACTIVE	Active surface
AIRSPACED	A favorable airspace determination has been issued
AS_BUILT	
BROKEN	Broken or rough surface
CLOSED	Closed surface
CONDEMNED	
DEMOLISHED	
ENV_CLEARED	All required environmental actions and documentation described in FAAO 5050.4 “National Environmental Policy Act (NEPA) have been satisfied
FAILED_AID	Failure or irregular operation of visual aides
INACTIVE	
LIMITED	Limited operations]
LONG_TERM	Indicates the feature is part of a long term (11 + years) plan
MEDIUM_TERM	Indicates the feature is part of a midterm (6 - 10 year) plan
NON_OPERATIONAL	Non-operational
OCCUPIED	
OPERATIONAL	Operational (fully)
OTHER	
PARKED	Parked or disabled aircraft
PERMANENT	
PORTABLE	
RELEASED	Used to track land released by the airport
S_POWER	Secondary power supply in operation
SEMI_PERMANENT	
SHORT_TERM	Indicates the feature is part of a short term (0 - 5 year) plan
TBD	To be determined
TEMPORARY	
TERMINATED	Terminated no longer used
UNDER_CONSTRUCTION	Planned or under construction
UNKNOWN	
UNOCCUPIED	
WORK_IN_PROGRESS	Construction or work in progress

5.15.52.CodeStructureType

Value	Description
APARTMENT	Apartment building
APM_STATION	Automated People Mover station
APM_TRACK	Automated People Mover tracks
ARENA	Sports Arena or facility
ARFF_STATION	Aircraft Rescue and Firefighting station
ATC_FACILITY	Combined or Single (other than the airport control tower) Air Traffic Control Facility
ATC_TOWER	Air Traffic Control Tower
BANK	Bank
BARN	barn

Value	Description
CAPITOL	Capitol
CHURCH	church/temple
CITY_HALL	City Hall
COMMUNITY_CENTER	Community Center
CONCERT_HALL	Concert Hall
CONDO	condominium
COURT_HOUSE	Court House
DRY_STORAGE_DOCK	Dry Storage Dock
DUPLEX	house, duplex
DWELLING	dwelling
EARTHWORKS	Earthworks
FBO	Fixed Base operator
GARAGE	A structure used for the maintenance, storage, and display of motor vehicles
GRAIN_ELEVATOR	Grain Elevator
HANGAR	A structure used for the maintenance, storage, and display of aircraft
HIGHRISE	A multi-story structure with at least 12 floors or 35 meters (115 feet) in height
HOSPITAL	Hospital
HOUSE	house, single family
JAIL_OR_PRISON	Jail or Prison
MEDICAL_CENTER	Medical Center
MEMORIAL	Memorial
MOBILE_HOME	Mobile home or trailer
MUSEUM	Museum.
OFFICE	office building
OFFSHORE_PLATFORM	Offshore Platform
OTHER	Other
PARKING_GARAGE	Parking garage or facility
POLICE	Police Station
POST_OFFICE	Post Office
POWER_PLANT	A facility used in the production and distribution of electrical power
PUBLIC_TRANSPORTATION	Public transportation facility (buses, taxi, etc.)
RADIO_FACILITY	Radio Facility
RAILROAD_STATION	Railroad Station
RAIN_SHED	Rain Shed
RENTAL_FACILITY	Rental Car facility
SCHOOL	Any building or structure whose primary purpose is education
SECURITY	Security Office
SKYSCRAPER	Office or housing where the building clearly stands out above its surrounding built environment and significantly changes the overall skyline of that particular city
SNOW_SHED	A structure used for the storage, maintenance of Snow removal equipment
STORAGE_FACILTIY	A structure used for any type of storage

Value	Description
TBD	to be determined
TERMINAL	Airport Terminal building
THEATER	Theater (any type)
TOWER	Tower
TOWN_HALL	Town Hall
TOWNHOUSE	townhouse
WATER_TANK	Water Tank

5.15.53.CodeSurfaceCondition

Value	Description
FAIR	Fair condition
GOOD	Good condition
POOR	Poor condition
UNSAFE	Surface is deemed unsafe for operations
OTHER	

5.15.54.CodeSurfaceMaterial

Value	Description
AG	Asphalt grooved
Ags	Asphalt and turf
ANG	Asphalt ungrooved
BE	Bare earth
CA	Concrete and asphalt
CG	Concrete grooved
CGS	Concrete and turf
CNG	Concrete ungrooved
DS	Desert/Sand
DT	Dirt
EMAS	Engineered Material Arresting System
FW	Fresh Water
GR	Gravel
GS	Turf
SI	Snow/Ice
SW	Salt Water
W	Water

5.15.55.CodeSurfaceType

Value	Description
P	Specially prepared hard surface—Paved
S	Specially prepared hard surface—Unpaved
U	Not a specially prepared hard surface

5.15.56.CodeTaxiwayType

Value	Description
AIR_TAXIWAY	Air taxiway
AIR_TLANE	Air taxilane
APRON	Apron taxiway
BYPASS	Bypass holding bay

Value	Description
CROSS_OVER	Crossover taxiway
EAT	End Around Taxiway
ENTER_EXIT_TAXIWAY	Entrance and Exit taxiway
EXIT	Exit/turnoff taxiway
FASTEXIT	Rapid exit/turnoff taxiway
GATE_TLANE	Gate/stand taxilane
GND	Ground taxiway
HOLDING	Holding bay
INLINE	Inline taxiway
OTHER	Those not listed here
PARALLEL	Parallel taxiway
STUB	Stub taxiway
TLANE	Taxilane
TURN_AROUND	Turn around taxiway

5.15.57.CodeThresholdType

Value	Description
Displaced	An indication that the landing threshold is located at a point other than the runway end
Normal	An indication that the landing threshold corresponds to the end of the runway

5.15.58.CodeUseCode

Value	Description
C	Compass Locator
H	High Altitude for VOR/VORTAC/TACAN; All Altitudes for NDB at 50–90 watts
HH	All Altitudes for NDB; 2000 watts or more
L	Low Altitude
MH	All Altitudes for NDB; Under 50 watts
T	Terminal

5.15.59.CodeUtilityType

Value	Description
COMMUNICATION_SYSTEM	Telephone, telegraph, cable, video and voice transmission lines
COMPRESSED_AIR_SYSTEM	The components of a compressed air system.
CONTROL_MONITORING_SYSTEM	The components of an electronic monitoring and control system (EMCS) including cables, devices, etc.
ELECTRICAL_EXT_LIGHT	The components of an electrical exterior lighting system including cables, switches, devices, transformers, etc. Does not include airfield, NAVAID or approach lighting.
ELECTRICAL_SYSTEM	The components of an electrical distribution system including cables, switches, devices, motors, transformers, etc.
FUEL_SYSTEM	The components of a fuel distribution system consisting of pipes, fittings, fixtures, pumps, tanks, etc.

Value	Description
GENERAL_UTILITY	The components of utility system which are universal in use and purpose and do not belong to a specific utility.
HEAT_COOL_SYSTEM	The components of a heating and cooling distribution system consisting of pipes, fittings, fixtures, etc.
INDUSTRIAL_SYSTEM	The components of an industrial waste collection system including pipes, fittings, fixtures, tanks, lagoons, etc.
NATURAL_GAS_SYSTEM	The components of a natural gas distribution system consisting of pipes, fittings, fixtures, etc.
NUCLEAR_REACTOR	The components of a nuclear system such as nuclear fuel, Nuclear research, nuclear waste, and nuclear weapons.
POWER_SYSTEM	Power transmission lines
SALTWATER_SYSTEM	The components of a salt water collection system.
STORM_SYSTEM	The components of a storm drainage collection system including pipes, fittings, fixtures, etc.
TRANSMISSION_LINE	Objects related to the long distance transmission of gas, oil, or hazardous liquid.
WASTEWATER_SYSTEM	The components of a wastewater collection system including pipes, fittings, fixtures, treatment plants, collection locations, etc.
WATER_SYSTEM	The components of a water system including pipes, fittings, fixtures, treatment plants, etc.

5.15.60. CodeVerticalStructureMaterial

Value	Description
COMPOSITION	Composition
CONCRETE	Concrete
METAL	Metal
ROCK	Rock
STONE_BRICK	Stone/brick
WOOD	Wood

5.15.61. CodeZoneType

Value	Description
5_YEAR	Areas subject to 5 year flooding.
10_YEAR	Areas subject to 10 year flooding.
15_YEAR	Areas subject to 15 year flooding.
25_YEAR	Areas subject to 25 year flooding.
50_YEAR	Areas subject to 50 year flooding.
100_YEAR	Areas subject to 100 year flooding.
500_YEAR	Areas subject to 500 year flooding.
GENERAL	Areas prone to flooding in general.
PROJECTED	Areas expected to be subject to flooding in the future.
OTHER	Other

5.15.62.CodeZoningClass

Value	Description
COMMERCIAL	Areas which are zoned for merchandising, shopping, or other commercial development. (Source SDSFIE)
INDUSTRIAL	Areas which are zoned for factory, manufacturing, or other industrial development. (Source SDSFIE)
QUASI_PUBLIC	Areas which are zoned public although under private ownership or control. (Source SDSFIE)
RESIDENTIAL	Areas which are zoned for housing or residential development. (Source SDSFIE)
OTHER	Other Zoning

Intentionally left blank.

APPENDIX A. Additional References, Glossary and Acronyms

A.1. REFERENCES AND PROJECT MATERIALS TO REVIEW

The contractor must become thoroughly familiar with each of the following documents and guidance. The most current versions of FAA ACs can be accessed by selecting the "Advisory Circulars" link on the FAA homepage (www.faa.gov).

A. The requirements in this guidance and attachments.

B. AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys - Establishment Of Geodetic Control And Submission To The National Geodetic Survey*.

C. AC 150/5300-17, *A General Specifications and guidance for Aeronautical Surveys - Airport Imagery Acquisition and Submission to the National Geodetic Survey*.

D. AC 150/5340-1, *Standards for Airport Markings*.

E. AC-150/5210-20, *Ground Vehicle Operations on Airports*.

F. AC 150/5340–18, *Standards For Airport Sign Systems*.

G. NGS Aeronautical Survey Program:

http://www.ngs.noaa.gov/AERO/aero.html.

H. FAA Web site for location identifiers:

http://www.faa.gov/airports_airtraffic/air_traffic/publications/atpubs/LID/LIDHME.HTM

I. FAA Web site for airport managers.

http://www.faa.gov/airports_airtraffic/airports/airport_safety/airportdata_5010/

J. Input Formats and Specifications of the National Geodetic Survey Data Base, The "Blue Book"

http://www.ngs.noaa.gov/FGCS/BlueBook/

K Listing of airports with PACS and SACS and the dates that they were observed is available at:

http://www.ngs.noaa.gov/cgi-bin/airports.prl?TYPE=PACSAC

L. Aeronautical Information Manual, *Official Guide to Basic Flight Information and ATC Procedures*.

http://www.faa.gov/airports_airtraffic/air_traffic/publications/atpubs/aim/

APPROPRIATE PAGES FROM U.S. TERMINAL PROCEDURES

U.S. Terminal Procedures are published in 20 loose leaf or perfect bound volumes covering the conterminous U.S., Puerto Rico, and the Virgin Islands. A Change Notice is published at the midpoint between revisions in bound volume format. The latest edition of the U.S. Terminal Procedures can be obtained from FAA Aeronautical chart agents. The Terminal Procedures Publications include:

A. Instrument Approach Procedure (IAP) Charts: IAP charts portray the aeronautical data that is required to execute instrument approaches to airports. Each chart depicts the IAP, all related navigation data, communications information, and an airport sketch. Most procedures are designated for use with a specific electronic NAVAID, such as Instrument Landing System (ILS), Very High Frequency Omnidirectional Range (VOR), Nondirectional Radio Beacon (NDB), etc.

B. Airport Diagrams: Full page airport diagrams are designed to assist in the movement of ground traffic at locations with complex runway/taxiway configurations and provide information for updating geodetic position navigational systems aboard aircraft. (**NOTE:** *Airport Diagrams are not available for all airports.*)

APPROPRIATE PAGES FROM AIRPORT/FACILITY DIRECTORY

The Airport/Facility Directory is a manual that contains data on public use and joint use airports, seaplane bases, heliports, VFR airport sketches, NAVAIDS, communications data, weather data sources, airspace, special notices, and operational procedures. The Airport/Facility Directory includes data that cannot be readily depicted in graphic form: e.g., airport hours of operation, types of fuel available, runway data, lighting codes, etc. The Airport/Facility Directory is published every 56 days by the National Aeronautical Charting Office, FAA. The latest edition of the Airport/Facility Directory can be obtained from FAA Aeronautical chart agents.

FAA NATIONAL FLIGHT DATA DIGEST (NFDD)

A daily (except weekends and Federal holidays) publication of flight information appropriate to aeronautical charts, aeronautical publications, Notices to Airmen, or other media serving the purpose of providing operational flight data essential to safe and efficient aircraft operations.

FAA FORM 5010, AIRPORT MASTER RECORD

The FAA Form 5010 is prepared for all public-use airports. This master record contains comprehensive data on airports, including obstacles. Much of the information on FAA Form 5010 comes from unverified sources. Often, obstacle heights and positions are estimates which have not been measured and verified by instruments. For these reasons, the Airport Master Record is to be consulted for informational purposes only.

A.2. GLOSSARY

Accuracy – The degree of conformity with a standard, or a value accepted as correct. Precision is the degree of uniformity of repeated measurements or events. For example, repeat measurements of the distance between two points may exhibit a high degree of precision by virtue of the relative uniformity of the measurements. However, if a "short" tape were used in the measurements, accuracy would be poor in that the measured distance would not conform to the true distance between the points. Surveying and mapping accuracy standards should include three elements: (1) a stated variation from a true value or a value accepted as correct, (2) the point to which the new value is relative, and (3) the probability that the new value will be within the stated variation. For example, "Horizontal accuracy will be 10 cm relative to the nearest Continuously Operating Reference Station (CORS) at the 95 percent confidence level."

Abeam Point – The point on a line that is nearest to an off line point (for example, a point on the runway centerline is "abeam" the Glide Slope Antenna when the distance from the centerline point to the antenna is at a minimum).

Accelerate-Stop Distance Available (ASDA) – The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.

Aeronautical Beacon – A visual navigational aid displaying flashes of white and/or colored light to indicate the location of an airport, a heliport, a landmark, a certain point of a federal airway in mountainous terrain, or an obstruction. (Refer to **Airport Rotating Beacon** under **Airport Lighting**.)

Air Navigation Facility – Any facility used in, available for use in, or designed for use in, aid of air navigation, including landing areas, lights, any apparatus or equipment for disseminating weather information, for signaling, for radio-directional finding, or for radio or other electrical communication, and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air or the landing and takeoff of aircraft. (Refer to **Navigational Aid**.)

Airport – An area on land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any.

Airport Elevation – The highest point of an airport's usable runways measured in feet from mean sea level (technically, from the vertical datum).

Airport Lighting – Various lighting aids that may be installed on an airport. Types of airport lighting include:

- ***Airport Rotating Beacon (APBN) –*** A visual navigational aid operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are differentiated from civil beacons by dual-peaked (two quick) white flashes between the green flashes.

- ***Approach Light System (ALS) –*** An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach for landing. Condenser-Discharge Sequential Flashing Lights/Sequenced Flashing Lights may be installed in conjunction with the ALS at some airports.

- ***Omnidirectional Approach Light System (ODALS)* –** Seven omnidirectional flashing lights located in the approach area of a nonprecision approach. Five lights are located on the runway centerline extended with the first light located 300 feet from the threshold and extending at equal intervals up to 1,500 feet from the threshold. The other two lights are located, one on each side of the runway threshold, at a lateral distance of 40 feet from the runway edge or 75 feet from the runway edge when installed on a runway equipped with a VASI.

- ***Precision Approach Path Indicator (PAPI)* –** A visual approach slope indicator normally consisting of light units similar to the VASI but in a single row of either two or four light units set perpendicular to the runway centerline. The row of light units is normally installed on the left side of the runway. Indications are as follows: Below glide path – all lights red; Slightly below glide path – three lights closest to runway red, other light white; On glide path – two lights closest to runway red, other two lights white; Slightly above glide path – light closest to runway red, other three lights white; Above glide path – all lights white.

- ***Pulsating Visual Approach Slope Indicator (PVASI)* –** A pulsating visual approach slope indicator normally consists of a single light unit projecting a two-color visual approach path into the final approach area of the runway upon which the indicator is installed. The on glide path indication is a steady white light. The slightly below glide path indication is a steady red light. If the aircraft descends further below the glide path, the red light starts to pulsate. The above glide path indication is a pulsating white light. The pulsating rate increases as the aircraft gets further above or below the desired glide slope.

- ***Runway Alignment Indicator Lights (RAIL)* –** Sequenced Flashing Lights (SFLs) which are installed only in combination with other light systems.

- ***Runway End Identifier Lights (REIL)* –** Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

- ***Threshold Lights* –** Fixed green lights arranged symmetrically left and right of the runway centerline identifying the runway end. When all light units are located outside the runway edge or runway edge extended, the runway end lights are considered to be “outboard.” If any light unit is located inside the runway edge or runway edge extended, the lights are considered to be “inboard.”

- ***Tri-Color Visual Approach Slope Indicator (TRVC)* –** A visual approach slope indicator normally consists of a single light unit projecting a three-color visual approach path into the final approach area of the runway upon which the indicator is installed. The below glide path indication is red; the above glide path indication is amber; and the on glide path indication is green.

- ***Visual Approach Slope Indicator (VASI)* –** An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot is "on path" if he sees red/white, "above path" if white/white, and "below path" if red/red. Some airports serving large aircraft have three-bar VASIs which provide two visual glide paths to the same runway.

Airport Reference Point (ARP) – The approximate geometric center of all usable runways. ARP is not monumented, therefore not recoverable on the ground.

Airport Surface Detection Equipment (ASDE) – Radar equipment specifically designed to detect all principal features on the surface of an airport, including aircraft and vehicular traffic, and to present the entire image on a radar indicator console in the control tower. This is used to augment visual observation by tower personnel of aircraft and/or vehicular movements on the runways and taxiways.

Airport Surveillance Radar (ASR) – Approach control radar used to detect and display an aircraft's position in the terminal area. ASR provides range and azimuth information but does not provide elevation data. Coverage of the ASR can extend up to 60 nautical miles.

Air Route Surveillance Radar (ARSR) – Air route traffic control center (ARTCC) radar used primarily to detect and display an aircraft's position while en route between terminal areas.

Air Route Traffic Control Center (ARTCC) – A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.

Apparent Runway/Stopway Surface (ARS) – The surface that approximates a runway or stopway before the surface is squared off, shortened to good pavement, or otherwise adjusted to meet the criteria of a runway or stopway.

Apron – A defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. With regard to seaplanes, a ramp is used for access to the apron from the water.

Approach Side – The side occupied by a landing aircraft before the aircraft has passed the feature.

Area Navigation – A method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigational signals or within the limits of a self-contained system capability. Area navigation systems include GPS, Inertial, and LORAN-C.

Area Navigation Approach (ANA) – An instrument approach procedure using an Area Navigation System.

Attributes or Attribute Data – Alphabetical and/or numeric information that describes particular characteristics of a geospatial feature, such as type, dimensions, usage, occupancy, etc.

Azimuth

- ***Astronomic Azimuth* –** At the point of observation, the angle measured from the vertical plane through the celestial pole and the vertical plane through the observed object. The astronomic azimuth is established directly from observations on a celestial body and is measured in the plane of the horizon. Astronomic azimuths differ from geodetic azimuths because of the deflection of the vertical which can be greater than one minute of arc in extreme cases. Astronomic azimuths may be reckoned clockwise or counter-clockwise, from either north or south, as established by convention.

- ***Geodetic* –** The angle at point A between the tangent to the meridian at A and the tangent to the geodesic from A to B whose geodetic azimuth is wanted. It may be reckoned clockwise from either geodetic north or south as established by convention. Because of earth curvature, the geodetic azimuth from A to B (forward azimuth) differs from the geodetic azimuth from

B to A (back azimuth) by other than 180 degrees, except where A and B have the same geodetic longitude or where the geodetic latitude of both points is zero. The "geodesic line"is the shortest surface distance between two points on the reference ellipsoid. A "geodetic meridian" is a line on the reference ellipsoid defined by the intersection of the reference ellipsoid and a plane containing the minor axis of that ellipsoid.

- ***Grid*** **–** The angle in the plane of projection between a straight line and the central meridian of a plane-rectangular coordinate system. Grid azimuths may be reckoned clockwise from either geodetic north or south as established by convention.

- ***Magnetic*** **–** At the point of observation, the angle between the vertical plane through the observed object and the vertical plane in which a freely suspended symmetrically magnetized needle, influenced by no transient artificial magnetic disturbance, will come to rest. Magnetic azimuths are reckoned clockwise from magnetic north.

Bench Mark – A relatively permanent natural or artificial material object bearing a marked point whose elevation above or below an adopted surface (datum) is known.

Blast Fence – A barrier that is used to divert or dissipate jet or propeller blast.

Blast Pad – A specially prepared surface placed adjacent to the ends of runways to eliminate the erosive effect of the high wind forces produced by airplanes at the beginning of their takeoff rolls.

Catenary – The curve theoretically formed by a perfectly flexible, uniformly dense and thick, inextensible cable suspended from two points. Also a cable suspended between two points having the approximate shape of a catenary.

Clearway – An area beyond the takeoff runway under the control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

Collection – Any combination of data submitted by a provider at a given time.

Compass Locator – A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). It can be used for navigation at distances of approximately 15 miles or as authorized in the approach procedure.

Control Station – A point on the ground whose position and/or elevation is used as a basis for obtaining positions and/or elevations of other points.

Continuously Operating Reference Station (CORS) – A permanent GPS facility whose GPS receiver continuously provides observables from the GPS satellites, allowing stations occupied temporarily by GPS receivers to be differentially positioned relative to it. CORS are related to the NAD83 coordinate system at the 1-3 cm level either by being collocated at VLBI sites which were used to define the coordinate system or by being differentially positioned relative to such a collocated GPS station.

Datum – In general, a point, line, surface, or set of values used as a reference. A "geodetic datum" is a set of constants specifying the coordinate system and reference used for geodetic control (refer to **Control Station**), i.e. for calculating coordinates of points on the earth. At least eight constants are needed to form a complete datum: three to specify the location of the origin of the coordinate system; three to specify the orientation of the coordinate system; and two to specify the dimensions of the reference ellipsoid. Any point has a unique X, Y, Z datum coordinate which can be transformed into latitude, longitude, and ellipsoid height (height relative to the ellipsoid). A "horizontal control datum" is a geodetic datum specified by two coordinates (latitude and longitude) on the ellipsoid surface, to which horizontal control points are referenced. A "vertical datum" is a theoretical equipotential surface with an assigned value of zero to which elevations are referenced. (Refer to **GEOID**.)

Datum Tie – The process of determining, through appropriate survey methods, a position (horizontal tie) or elevation (vertical tie) of a new point relative to a control station with established datum values such as a control station in the National Spatial Reference System (NSRS). The new point may be a permanent survey monument. This process ensures that the new point will have the proper relationship to NSRS and to all other points tied to NSRS.

Direction Finder (DF) – A radio receiver equipped with a directional sensing antenna used to take bearings on a radio transmitter.

Distance Measuring Equipment (DME) – Equipment (airborne and ground) used to measure the slant range distance of an aircraft from the DME navigational aid in nautical miles. DME is usually frequency paired with other navigational aids such as a VOR or localizer.

Displaced Threshold – A threshold that is located at a point on the runway other than the designated runway end. The displaced area is available for takeoff or rollout of aircraft, but not for landing. A displaced threshold does not mark the end of a runway.

Ellipsoid – Refer to **Reference Ellipsoid**.

Ellipsoid Height – The distance between a point and the reference ellipsoid taken along the perpendicular to the ellipsoid. Ellipsoid heights are the heights resulting from GPS observations. Ellipsoid heights are positive if the point is above the ellipsoid. Ellipsoid Height = GEOID Height + Orthometric Height.

Feature – A manmade or natural object that appears in the real world such as a building, runway, navigational aid or river.

Feature Type – A collection of all features of a given type such as all runways or all buildings. Feature Types are analogous to layers in many GIS applications and are also referred to as Entity Types and Feature Classes in other standards.

Feature Instance – A specific feature such as runway 10/28 at Baltimore Washington International Airport.

Federal Base Network (FBN) – A fundamental reference network of permanently monumented control stations in the United States at a 1 degree x 1 degree nominal spacing, established, maintained, and monitored by the National Geodetic Survey, providing precise latitude, longitude, ellipsoidal height, orthometric height, and gravity values. The FBN is a very precise subset of the National Spatial Reference System.

First Good Pavement (FGP) – The first point on a paved surface through which a perpendicular line to the surface centerline can be constructed to define a runway or stopway end. While this point need not be on the runway/stopway centerline, it must be located so that the resulting runway/stopway surface is rectilinear with full structural integrity to the end. The FGP location is a fundamental factor in establishing runway/stopway length and width.

Flight Path – A line, course, or track along which an aircraft is flying or intended to be flown.

Frangible – A type of fixture or fixture mounting designed to break at a predetermined point if accidentally struck by an aircraft, resulting in minimal damage to the aircraft.

GEOID – The theoretical surface of the earth that coincides everywhere with approximate mean sea-level. The GEOID is an equipotential surface to which, at every point, the plumb line is perpendicular. Because of local disturbances of gravity, the GEOID is irregular in shape.

GEOID Height – The distance, taken along a perpendicular to the reference ellipsoid, between the reference ellipsoid and the GEOID. The GEOID height is positive if the GEOID is above the reference ellipsoid. (GEOID height is negative for the conterminous United States). GEOID Height = Ellipsoidal Height – Orthometric Height.

Geospatial Data, Geospatially-Referenced Data or Geospatial Vector Data – Data that identifies the geographic location (2D or 3D coordinates) and characteristics (feature attributes) of natural or constructed features and boundaries on the earth. This information may be derived from remote sensing and surveying technologies. The features are represented by a point, line, or polygon. The position of a point feature is described by a single coordinate pair (or triplet for three dimensional data). The spatial extent of a line feature is described by a string of coordinates of points lying along the line, while the extent of a polygon feature is described by treating its boundary as a line feature. Vector data may be stored in a sequential, a chain node, or a topological data structure.

Global Positioning System (GPS) – A space-based radio-positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information and precise time on a continuous global basis, to an unlimited number of properly equipped users.

Ground Controlled Approach (GCA) – A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with airport surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR).

Helipad – A small designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters.

Heliport – An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters, including its buildings and facilities if any.

Heliport Reference Point (HRP) – The geographic position of the heliport expressed in latitude and longitude at (1) the center of the final approach and takeoff (FATO) area or the centroid of multiple FATOs for heliports having visual and nonprecision instrument approach procedures or (2) the center of the final approach reference area when the heliport has a precision instrument approach.

Horizontal Survey Point – A point that represents the horizontal position of a feature. This point may be located on the feature or located between feature components. For example, the horizontal survey point for a Precision Approach Path Indicator (PAPI) system is the center of the light array which falls between light units.

Inboard/Outboard Lights – Used in reference to runway end and threshold lights. The light configuration is considered "inboard" if the center of any light unit in the light array is located inside the runway edge or edge extended. The light configuration is considered "outboard" if all light centers in the light array are located outside the runway edge or edge extended. In this definition, "light array" includes the lights on both sides of the runway.

Instrument Landing System (ILS) – A precision instrument approach system which normally consists of the following electronic components and visual aids: Localizer, Middle Marker, Glide Slope, Approach Lighting, Outer Marker.

Instrument Runway – A runway equipped with electronic and visual navigational aids for which a precision or nonprecision approach procedure having straight-in landing minimums have been approved.

International Civil Aviation Organization (ICAO) – A specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

Landing Area – Any locality used or intended to be used for the landing and takeoff of aircraft. The locality may be on on land, water, or structure including airports/heliports, and intermediate landing fields whether or not facilities are provided for shelter, servicing, or for receiving or discharging passengers or cargo.

Landing Direction Indicator – A device, usually a tetrahedron, which visually indicates the direction in which landings and takeoffs should be made.

Leveling – The process of determining the difference in elevation between two points. In geodetic leveling, this process results in a vertical distance from a vertical datum.

- ***Direct*** – The determination of differences in elevation by means of a series of horizontal observations on a graduated rod. The leveling instrument maintains a horizontal line of sight through spirit leveling or a compensation mechanism. The rod is observed while it is resting on a point of known elevation (backsight) and then, without disturbing the elevation of the leveling instrument, is observed a second time while resting on the unknown point (foresight). The differential in rod readings is applied to the starting elevation to determine the elevation of the unknown.

- ***Indirect*** – The determination of differences in elevation by means other than differential leveling, such as trigonometric leveling. In trigonometric leveling, the vertical angle and distance from the instrument to the point of unknown elevation are measured, and the difference in elevation between the instrument and the unknown point is computed using trigonometry.

Local Control – A control station or network of control stations in a local area used for referencing local surveys. Local control may or may not be tied to the National Spatial Reference System. (See Control Station).

Localizer (LOC) – The component of an ILS which provides course guidance to the runway.

Localizer Back Course – The course line defined by the localizer signal along the extended centerline of the runway in the opposite direction from the normal localizer approach course (front course.)

Localizer Type Directional Aid (LDA) – A navigational aid used for nonprecision instrument approaches with utility and accuracy comparable to a localizer but which is not part of a complete ILS and is not aligned with the runway.

Long Range Navigation (LORAN) – An electronic navigation system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. LORAN A operates in the 1750 - 1950 kHz frequency band. LORAN C and D operate in the 100 - 110 kHz frequency band.

Marker Beacon – An electronic navigational facility transmitting a 75 MHz vertical fan or bone-shaped radiation pattern to be received by aircraft flying overhead. Marker beacons are identified by their modulation frequency and keying code, and when received by compatible airborne equipment, indicate to the pilot aurally and visually that he is passing over the facility.

- ***Back Course Marker (BCM)*** **–** When installed, normally indicates the localizer back course final approach fix where approach descent is commenced.

- ***Inner Marker (IM)*** – A marker beacon, used with an ILS Category II precision approach, located between the middle marker and the end of the ILS runway and normally located at the point of designated decision height (normally 100 feet above the touchdown zone elevation) on the ILS Category II approach. It also marks progress during a ILS Category III approach.

- ***Middle Marker (MM)*** **–** A marker beacon that defines a point along the glideslope of an ILS, normally located at or near the point of decision height for ILS Category I approaches.

- ***Outer Marker (OM*****)** **–** A marker beacon at or near the glideslope intercept altitude of an ILS approach. The outer marker is normally located four to seven miles from the runway threshold on the extended centerline of the runway.

Mean Sea Level (MSL) – The average location of the interface between the ocean and atmosphere, over a period of time sufficiently long so that all random and periodic variations of short duration average to zero.

Metadata – Information about the data itself such as source, accuracy, dates for which the data are valid, security classification, etc. Metadata is essential in helping users determine the extent on which they can rely on a given data item to make decisions.

Minimum Safe Altitude Warning (MSAW) – A function of the ARTS III computer that aids the controller by alerting him when a tracked Mode C equipped aircraft is below or is predicted by the computer to go below a predetermined minimum safe altitude.

Minimums – Weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight etc.

Missed Approach – A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing.

Movement Area – The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

National Airspace System (NAS) – The common network of U.S. airspace air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations, and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.

National Flight Data Center (NFDC) – A facility in Washington, D.C., established by the FAA to operate a central aeronautical information service for the collection, validation, and dissemination of aeronautical data in support of the activities of government, industry, and the aviation community. The information is published in the "National Flight Data Digest."

National Flight Data Digest (NFDD) – A daily (except weekends and Federal holidays) publication of flight information related to aeronautical charts, aeronautical publications, Notices to Airmen, or other media serving the purpose of providing operational flight data essential to safe and efficient aircraft operations.

National Spatial Reference System (NSRS) – A network of permanent survey monuments located throughout the United States with accurately determined positions (horizontal network) and/or elevations (vertical network). Gravity values, not always monumented, are also part of NSRS. Responsibility for establishing and maintaining NSRS rests with the National Geodetic Survey under the U.S. Department of Commerce. Current authority is contained in United States Code, Title 33, USC 883a as amended, and specifically defined by Executive Directive, Bureau of the Budget (now Office of Management and Budget) Circular No. A-16 Revised.

Navigable Airspace – Airspace at and above the minimum flight altitude prescribed in the FARs, including airspace needed for safe takeoff and landing.

Navigational Aid (NAVAID) – Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (Refer to Air Navigation Facility).

Nondirectional Beacon (NDB) – An L/MF or UHF radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and "home" or track to or from the station. When the NDB is installed in conjunction with an Instrument Landing System marker, it is normally called a Compass Locator.

Nonprecision Approach Procedure – A standard instrument approach procedure in which no electronic glide slope is provided; e.g., VOR, TACAN, NDB, LOC, ASR, LDS, and SDF approaches.

Notice to Airmen (NOTAM) – A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations.

Objective Evidence – The observational and computational data supporting the information being provided. This evidence is used in the verification process to prove the provided aeronautical information and substantiate the change being made.

Obstacle – Any object that has a vertical element to it and may or may not penetrate an obstruction identification surface.

Obstruction – Any object that penetrates an obstruction identification surface.

Obstruction Identification Surface (OIS) – Any imaginary surface authorized by the FAA to identify obstructions. Any object that penetrates an OIS is an obstruction, by definition.

- ***Specified OIS*** – Any OIS other than a supplemental OIS.

- ***Supplemental OIS*** – An OIS designated by appropriate FAA authorities as a supplemental OIS. A supplemental OIS, when implemented, will normally lie below a specified OIS and is intended to provide additional obstruction information. An object that penetrates a supplemental OIS only is a supplemental obstruction.

Offset NAVAID – A NAVAID used during the final approach segment of a straight in instrument approach and not located on the runway centerline or centerline extended.

Orthometric Height – The distance taken along the plumb line between a point and the GEOID. Orthometric heights are positive if the point is above the GEOID. Orthometric Height = Ellipsoid Height – GEOID Height.

Orthophoto – An aerial image that has been taken from above (either from an aircraft or a satellite) and has been spatially corrected so that features shown on the photo are displayed in their actual geographic position within a specified range of tolerance.

Outboard Lights – Refer to **Inboard/Outboard Lights.**

Photogrammetry – The process of creating vector data such as building outlines and elevation contours from stereo imagery (pairs of images taken of the same location but at different angles).

Positional Accuracy – The difference between a geospatial feature’s displayed position and its actual position. Absolute positional accuracy is the difference between a geospatial feature’s displayed position and its actual position on the face of the earth. Relative positional accuracy is the difference between a geospatial feature’s displayed position and that of other geospatial features in the same data set.

Precision – The smallest separation that can be represented by the method employed to make the positional statement which is the number of units or digits to which a measured or calculated value is expressed and used

Precision Approach Procedure – A standard instrument approach procedure in which an electronic glideslope/glidepath is provided; e.g., GPS, ILS, and PAR approaches.

Precision Approach Radar (PAR) – Radar equipment in some ATC facilities operated by FAA and/or the military services at joint use civil/military locations and separate military installations used to detect and display azimuth, elevation, and range of aircraft on the final approach course to a runway. This equipment may be used to monitor certain non-radar approaches but is primarily used to conduct a precision instrument approach wherein the controller issues guidance instructions to the pilot based on the aircraft's position in relation to the final approach course (azimuth), glidepath (elevation), and distance (range) from the touchdown point on the runway as displayed on the radar scope.

Primary Airport Control Station (PACS) – A control station established in the vicinity of, and usually on, an airport, and tied directly to the National Spatial Reference System. PACS must be declared PACS by the National Geodetic Survey and must meet the specific siting, construction, and accuracy requirements for PACS.

Progressive Taxi – Precise taxi instructions given to a pilot unfamiliar with the airport or issued in stages as the aircraft proceeds along the taxi route.

Published Data – Data officially issued for distribution to the public.

Radio Detection and Ranging (RADAR) – A device which provides information on range, azimuth, and/or elevation of objects in the path of the transmitted pulse by measuring the time interval between transmission and reception of radio pulses and correlating the angular orientation of the radiated antenna beam or beams in azimuth and/or elevation.

- ***Primary Radar*** – A radar system in which a minute portion of a radio pulse transmitted from a site is reflected by an object and then received back at the site for processing and display at an air traffic control facility.

- ***Secondary Radar/Radar Beacon (ATCRBS)*** – A radar system in which the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder). Radar pulses transmitted from the searching transmitter/receiver (interrogator) site are received in the cooperative equipment and used to trigger a distinctive transmission from the transponder. This reply transmission (rather than a reflected signal) is then received back at the transmitter/receiver site for processing and display at an air traffic control facility.

Radar Approach – An instrument approach procedure which utilizes Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR).

Radio Beacon – Refer to **Nondirectional Beacon**.

Ramp – Refer to **Apron**.

Reference Ellipsoid – A geometric figure comprising one component of a geodetic datum, usually determined by rotating an ellipse about its shorter (polar) axis, and used as a surface of reference for geodetic surveys. The reference ellipsoid closely approximates the dimensions of the GEOID. Certain ellipsoids fit the GEOID more closely for various areas of the earth. Elevations derived directly from satellite observations are relative to the ellipsoid and are called ellipsoid heights.

Relocated Threshold – A threshold located at a point on the runway other than the beginning of the full strength pavement. The area between the former threshold and the relocated threshold is not available for the landing or takeoff of aircraft. Thus, a relocated threshold marks the end of the runway. The precise end is on the landing approach edge of the relocated threshold paint bar. The abandoned runway area may or may not be available for taxiing.

Remote Communications Outlet (RCO) – An unmanned communications facility remotely controlled by air traffic personnel. RCOs serve flight service stations. Remote Transmitter/Receivers (RTR) serve terminal ATC facilities.

Resolution – The smallest spacing between two display elements expressed as dots per inch, pixels per line, or lines per millimeter.

Runway – A defined rectangular area prepared for the landing and takeoff run of aircraft along its length in a land airport. Being exactly rectangular, it excludes narrow, rounded, deteriorated, and irregular ends that are not as wide as the general or overall width of the runway. The runway width is the physical width that extends over the entire length of the rectangle. The runway length does not include blast pad, clearway, or stopway surfaces. Displaced thresholds are included in the physical length. Runways are normally numbered in relation to their magnetic direction rounded off to the nearest 10 degrees: e.g., Runway 10, Runway 25.

Runway Centerline – A line connecting the two opposite runway end points. The line may be physically marked on the surface of the runway.

Runway End Point – The point at the runway end halfway between the edges of the runway.

Runway Length – The straight line distance between runway end points. This line does not account for surface undulations between points. Official runway lengths are normally computed from runway end coordinates and elevations.

Remote Transmitter/Receiver (RTR) – Refer to **Remote Communications Outlet.**

Schema – A logical diagram that shows the structure and interrelationships between different feature types of the data standard or model.

Secondary Airport Control Station (SACS) – A control station established in the vicinity of, and usually on, an airport, and tied directly to the Primary Airport Control Station. SACS must be declared SACS by the National Geodetic Survey and must meet the specific sitting, construction, and accuracy requirements for SACS.

Simplified Directional Facility (SDF) – A navigational aid used for nonprecision instrument approaches. The final approach course is similar to that of an ILS localizer except that the SDF course may be offset from the runway, generally not more than 3 degrees, and the course may be wider than the localizer, resulting in a lower degree of accuracy.

Spatial Data – Data that depicts a real world feature such as a road, building or runway on a map. The most basic types of spatial data are points, lines and polygons but spatial data can also include orthophotos and other more complex forms of locational information.

Specially Prepared Hard Surface (SPHS) – A concrete, asphalt, or other paved surface, or an unpaved surface that has been specially treated to stabilize the surface, protect the subsurface, or provide a smoother rolling surface for aircraft. Unpaved SPHSs include compacted gravel, and gravel treated with a stabilizing bituminous material.

Stand Alone Weather Station (SAWS) – A flexible and easy to maintain aviation weather station. It can be used as ASOS backup, which measures the critical parameters of: wind speed and direction, gust, altimeter setting, dew point, air temperature, and relative humidity.

State Plane Coordinate System – A series of plane-rectangular coordinate systems established by the U.S. Coast and Geodetic Survey for the entire United States, with a separate system for each state. A mathematical relationship exists between state plane and geodetic coordinates, one being easily transformed into the other. The advantage of the State Plane Coordinate System is that it permits survey computations for small areas to be performed using plane trigonometry (as opposed to more complex spherical trigonometry), while still yielding very nearly the true angles and distances between points.

Stopway – An area beyond the takeoff runway which is able to support the airplane during an aborted takeoff without causing structural damage to the airplane. It is centered upon the extended centerline of the runway, not narrower than the runway, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

Supplemental Profile Point – A runway/stopway point selected so that a straight line between any two adjacent published runway/stopway points will be no greater than one foot from the runway/stopway surface.

Supporting Feature – A feature such as a runway number or threshold light set which does not precisely define a runway/stopway survey point, but provides evidence that the survey point was correctly selected.

Surface Model Library (SML) – An NGS provided library of functions used to create and analyze the mathematical surface models of Obstruction Identification Surfaces (OIS). The SML will be available as a Dynamic Link Library (DLL). NGS will update the SML as needed to reflect changes in the definitions of the OIS.

Survey Point Locator (SPL) – A tangible feature, such as the approach side of a threshold bar, or intangible feature (such as a Trim Line) whose intersection with the runway/stopway centerline defines a survey point.

Take-off Distance Available (TODA) – The length of the take-off run available plus the length of the clearway, if provided.

Take-off Run Available (TORA) – The length of the runway declared available and suitable for the ground run of an airplane take-off.

Tactical Air Navigation (TACAN) – An ultra-high frequency electronic rho-theta air navigational aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

Taxiway – A defined path established for the taxiing of aircraft from one part of an airport to another.

Tetrahedron – A device normally located on uncontrolled airports and used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

Threshold (THLD) – The beginning of that portion of the runway available for landing. A displaced threshold (DTHLD) is a threshold that is located at a point on the runway other than the designated beginning of the runway.

Touchdown Side – The side occupied by a landing aircraft after the aircraft has passed the feature.

Touchdown Zone (TDZ) – The first 3,000 feet of the runway beginning at the threshold.

Touchdown Zone Elevation (TDZE) – The highest elevation in the Touchdown Zone.

Traffic Pattern – The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

Transmissometer (TMOM) – An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. It is the measurement source for determining runway visual range (RVR) and runway visibility value (RVV).

Transponder Landing System (TLS) – Transponder landing system providing azimuth and elevation guidance to aircraft on approach.

Trim Line – An imaginary line constructed perpendicular to the runway/stopway centerline which establishes the location of a runway/stopway end or displaced threshold.

V_1 – The takeoff decision speed. If a system failure occurs before V_1, the takeoff is aborted. If the failure occurs at or above V_1, the pilot is committed to continue the takeoff.

Vertical Survey Point – A point that represents the elevation position of a feature. This point may be located on the top or base of the feature or located between feature components. For example, the vertical survey point for a Precision Approach Path Indicator (PAPI) system is the ground at the center of the light array which falls between light units.

Vertical Takeoff and Landing (VTOL) Aircraft – Aircraft capable of vertical climbs and/or descents and of using very short runways or small areas for takeoff and landings. These aircraft include, but are not limited to, helicopters.

Very High Frequency Omnidirectional Range Station (VOR) – A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, referenced from magnetic north.

Very High Frequency Omnidirectional Range/Tactical Air Navigation (VORTAC) – A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site.

Visual Approach – An approach conducted on an instrument flight rules (IFR) flight plan which authorizes the pilot to proceed visually to the airport. The pilot must have either the airport or preceding aircraft in sight at all times.

Visual Glideslope Indicator – A navigational aid that provides vertical visual guidance to aircraft during approach to landing by either radiating a directional pattern of high intensity light into the approach area or providing lighted or unlighted panels which can be aligned by the pilot, thereby allowing the pilot to determine if the aircraft is above, below, or on the prescribed glidepath. (See **Airport Lighting**.)

Waypoint – A predetermined geographical position used for route/instrument approach definition or progress reporting purposes. The point is defined relative to a VORTAC station or in terms of latitude/longitude coordinates.

Wide Area Augmentation System (WAAS) – The total FAA system designed and built to meet the mission needs of insuring satellite integrity for using GPS for required navigation performance (RNP) in the National Airspace System and of improving accuracy to support precision approaches using GPS augmented with the WAAS.

A.3. ACRONYMS AND WORD PHRASES

The following list presents the approved contractions for data:

WORD/ PHRASE	**ACRONYM**
A	
Abandoned	ABND
Above Ground Level	AGL
Accelerate-Stop Distance Available	ASDA
Advisory Circular	AC
Architecture, Engineering and Construction	A/E/C
Aeronautical Information Exchange Model	AIXM
Aeronautical Information Service	AIS
Agricultural	AG
Air Route Surveillance Radar	ARSR
Aircraft	ACFT
Airport	ARPT
Airport Beacon	APBN
Airport District Office	ADO
Airport Facility Directory	AFD
Airport Layout Plan or Airport Location Point	ALP
Airport Obstruction Chart	AOC
Airport Reference Point	ARP
Airport Surface Detection Equipment	ASDE
Airport Surveillance Radar	ASR
Airport Traffic Control Tower	ATCT
Airway Beacon	AWYBN
American Institute of Architects	AIA
American National Standards Institute	ANSI
American Society for Testing and Materials	ASTM
Anemometer	AMOM
Antenna	ANT
Approach	APCH
Approach Light	APP LT
Approach Light System	ALS
Area Navigation Approach	ANA
Arresting Gear	A-GEAR
Automated Flight Service Station	AFSS
Automated Surface Observing System	ASOS
Automatic Weather Observing/Reporting System	AWOS
B	
Back Course Marker	BCM
Bridge	BRDG
Building	BLDG

C

Centerline..C/L
Ceilometer..CLOM
Chimney..CHY
Closed..CLSD
Common Traffic Advisory Frequency..CTAF
Computer Aided Drafting and Design..CADD
Construction..CONST
Continuously Operating Reference Station..................................CORS

D

Design File (MicroStation)..DGN
Department of Defense (U.S.)..DOD
Department of Transportation (U.S.)..DOT
Direction Finder..DF
Displaced Threshold..DTHLD
Distance Measuring Equipment..DME
Distance to Centerline..DCLN
Distance to Runway End..DEND
Distance to Threshold..DTHR
Drawing File (AutoDesk or AutoCAD)..DWG

E

Electrical..ELEC
Elevation..EL
Elevation..ELEV
Ellipsoid..ELLIP
Engine Out Departure..EOD
Equipment..EQUIP
Estimated Maximum Elevation...EME

F

Fan Marker..FM
Federal Aviation Administration..FAA
Federal Geographic Data Committee..FGDC
Flagpole..FLGPL
Flight Service Station...FSS

G

Geographic Information System...GIS
Geographic Markup Language...GML
Glide Slope..GS

Global Positioning System .... GPS
Ground .... GRD
Ground Control Approach .... GCA

H

Hangar .... HGR
Height Above Airport .... HAA
Height Above Runway .... HAR
Height Above Touchdown .... HAT
Heliport Reference Point .... HRP
Horizontal .... HORZ
Horizontal Survey Point .... HSP

I

Inner Marker .... IM
Inoperative .... INOP
International Civil Aviation Organization .... ICAO
International Organization for Standards .... ISO
Instrument Flight Rules .... IFR
Instrument Landing System .... ILS
Instrument Meteorological Conditions .... IMC
International Civil Aviation Organization .... ICAO
International Earth Rotation Service
Terrestrial Reference Frame .... ITRF
Intersection .... INTXN

L

Lead In Lighting System .... LDIN
Light .... LT
Lighted .... LTD
Localizer .... LOC
Localizer Type Directional Aid .... LDA
Localizer Performance with Vertical Guidance .... LPV
Locator Middle Marker .... LMM
Locator Outer Marker .... LOM

M

Magnetic Variation .... VAR
Mean Sea Level .... MSL
Microwave .... MCWV
Microwave Landing System .... MLS
Microwave Landing System Azimuth Guidance .... MLSAZ
Microwave Landing System Elevation Guidance .... MLSEL

Middle Marker .... MM
Monument .... MON

N

National Airspace System .... NAS
National Flight Data Center .... NFDC
National Flight Data Digest .... NFDD
National Geodetic Survey .... NGS
National Geodetic Vertical Datum of 1929 .... NGVD 29
National Geospatial Intelligence Agency .... NGA
National Oceanic and Atmospheric Administration .... NOAA
National Ocean Service .... NOS
National Spatial Reference System .... NSRS
Nautical Mile .... NM
Navigational Aid .... NAVAID
Nondirectional Radio Beacon .... NDB
North American Datum of 1927 .... NAD27
North American Datum of 1983 .... NAD83
North American Vertical Datum of 1988 .... NAVD88
Not Commissioned .... NCM
Not to Exceed .... NTE
Notice to Airmen .... NOTAM

O

Observation .... OBS
Obstruction .... OBST
Obstruction Identification Surface .... OIS
Obstruction Lighted .... OL
Obstruction Light On .... OL ON
Omnidirectional Approach Light System .... ODALS
Orthometric .... ORTHO
Out Of Service .... OTS
Outer Marker .... OM

P

Point of Contact .... POC
Permanent Survey Mark .... PSM
Precision Approach Path Indicator .... PAPI
Precision Approach Radar .... PAR
Primary Airport Control Station .... PACS
Pulsating Visual Approach Slope Indicator .... PVASI

R

Railroad..RR
Radio Technical Commission for Aeronautics ....RTCA
Reflector...RFLTR
Relocated ....RELCTD
Remote Communications Outlet..RCO
Remote Transmitter/Receiver ....RTR
Required Navigation Performance...RNP
Road ....RD
Road (Non-interstate)...RD (N)
Road (Interstate)...RD (I)
Runway ....RWY
Runway Alignment Indicator Lights...RAIL
Runway End Identifier Lights...REIL
Runway Visual Range..RVR

S

Secondary Airport Control Station ....SACS
Sensitive Security Information ....SSI
Simplified Directional Facility...SDF
Spatial Data Standards for Facilities,
Infrastructure and Environment ....SDSFIE
Specially Prepared Hard Surface ....SPHS
Stack..STK
Stand Alone Weather Station..SAWS
Standard Instrument Departure ....SID
Standard Terminal Arrival ....STAR
Standpipe ....SPIPE
Stopway ....STWY

T

Tactical Air Navigation Aid..TACAN
Tank ....TK
Taxiway ....TWY
Temporary...TMPRY
Threshold ....THLD
Take-off Distance Available ....TODA
Take-off Run Available ....TORA
Touchdown Reflector...TDR
Touchdown Zone ....TDZ
Touchdown Zone ....Elevation TDZE
Tower ....TWR
Transmissometer ....TMOM
Transmission Tower...TRMSN TWR
Transponder Landing System ....TLS
Tri-color Visual Approach Slope Indicator ....TRCV

U

Under Construction .... UNC
United States Geological Survey .... USGS
Until Further Notice .... UFN

V

Vertical.. VERT
Vertical Navigation .... VNAV
Vertical Survey Point... VSP
Very High Frequency Omnidirectional Range .... VOR
Visual Approach Slope Indicator .... VASI
Visual Flight Rules .... VFR
Visual Meteorological Conditions .... VMC
VOR/Tactical Air Navigation .... VORTAC

W

Wide Area Augmentation System.. WAAS
Wind Direction Indicator .... WDI
Wind Tee.. WTEE
Wind Tetrahedron .... WTET
Windsock .... WSK
World Geodetic System of 1984 .... WGS 84

Z

Z Marker .... ZM

ACRONYM	WORD/ PHRASE
A	
ABND	Abandoned
AC	Advisory Circular
ACFT	Aircraft
ADO	Airport District Office
A/E/C	Architecture/Engineering/Construction
AFD	Airport Facility Directory
AFSS	Automated Flight Service Station
AG	Agricultural
A-GEAR	Arresting Gear
AGL	Above Ground Level
AIA	American Institute of Architects
AIS	Aeronautical Information Service
AIXM	Aeronautical Information Exchange Model
ALP	Airport Location Point
ALS	Approach Light System
AMOM	Anemometer
ANA	Area Navigation Approach
ANSI	American National Standards Institute
ANT	Antenna
AOC	Airport Obstruction Chart
APBN	Airport Beacon
APCH	Approach
APP LT	Approach Light
ARP	Airport Reference Point
ARPT	Airport
ARSR	Air Route Surveillance Radar
ASDA	Accelerate-Stop Distance Available
ASDE	Airport Surface Detection Equipment
ASOS	Automated Surface Observing System
ASR	Airport Surveillance Radar
ASTM	American Society for Testing and Materials
ATCT	Airport Traffic Control Tower
AWOS	Automatic Weather Observing/Reporting System
AWYBN	Airway Beacon
B	
BCM	Back Course Marker
BLDG	Building
BRDG	Bridge

C

CADD .... Computer Aided Drafting and Design
C/L .... Centerline
CHY .... Chimney
CLOM .... Ceilometer
CLSD .... Closed
CONST .... Construction
CORS .... Continuously Operating Reference Station
CTAF .... Common Traffic Advisory Frequency

D

DCLN .... Distance to Centerline
DEND .... Distance to Runway End
DF .... Direction Finder
DGN .... Microstation Design File
DME .... Distance Measuring Equipment
DoD .... Department of Defense (U.S.)
DOT .... Department of Transportation (U.S.)
DTHLD .... Displaced Threshold
DTHR .... Distance to Threshold
DWG .... AutoDesk or AutoCAD Drawing File

E

EL .... Elevation
ELEC .... Electrical
ELEV .... Elevation
ELLIP .... Ellipsoid
EME .... Estimated Maximum Elevation
EOD .... Engine Out Departure
EQUIP .... Equipment

F

FAA .... Federal Aviation Administration
FGDC .... Federal Geographic Data Committee
FLGPL .... Flagpole
FM .... Fan Marker
FSS .... Flight Service Station

G

GCA .... Ground Control Approach
GIS .... Geographic Information System
GML .... Geographic Markup Language

GPS .... Global Positioning System
GRD .... Ground
GS .... Glide Slope

H

HAA .... Height Above Airport
HAR .... Height Above Runway
HAT .... Height Above Touchdown
HGR .... Hangar
HORZ .... Horizontal
HRP .... Heliport Reference Point
HSP .... Horizontal Survey Point

I

ICAO .... International Civil Aviation Organization
IFR .... Instrument Flight Rules
ILS .... Instrument Landing System
IM .... Inner Marker
IMC .... Instrument Meteorological Conditions
INOP .... Inoperative
INTXN .... Intersection
ISO .... International Standards Organization
ITRF .... International Earth Rotation Service Terrestrial Reference Frame

L

LDIN .... Lead In Lighting System
LT .... Light
LDA .... Localizer Type Directional Aid
LMM .... Locator Middle Marker
LOC .... Localizer
LOM .... Locator Outer Marker
LPV .... Localizer Performance with Vertical Guidance
LTD .... Lighted

M

MCWV .... Microwave
MLS .... Microwave Landing System
MLSAZ .... Microwave Landing System Azimuth Guidance
MLSEL .... Microwave Landing System Elevation Guidance
MM .... Middle Marker
MON .... Monument
MSL .... Mean Sea Level

N

NAD27 .... North American Datum of 1927
NAD83 .... North American Datum of 1983
NAVD88 .... North American Vertical Datum of 1988
NAVAID .... Navigational Aid
NCM .... Not Commissioned
NDB .... Nondirectional Radio Beacon
NFDC .... National Flight Data Center
NFDD .... National Flight Data Digest
NGA .... National Geospatial Intelligence Agency
NGS .... National Geodetic Survey
NGVD29 .... National Geodetic Vertical Datum of 1929
NM .... Nautical Mile
NOAA .... National Oceanic and Atmospheric Administration
NOS .... National Ocean Service
NOTAM .... Notice to Airmen
NSRS .... National Spatial Reference System
NTE .... Not to Exceed

O

OBS .... Observation
OBST .... Obstruction
ODALS .... Omnidirectional Approach Light System
OIS .... Obstruction Identification Surface
OL .... Obstruction Lighted
OL ON .... Obstruction Light On
OM .... Outer Marker
ORTHO .... Orthometric
OTS .... Out Of Service

P

PACS .... Primary Airport Control Station
PAPI .... Precision Approach Path Indicator
PAR .... Precision Approach Radar
POC .... Point of Contact
PSM .... Permanent Survey Mark
PVASI .... Pulsating Visual Approach Slope Indicator

R

RAIL .... Runway Alignment Indicator Lights
RCO .... Remote Communications Outlet
RD .... Road
REIL .... Runway End Identifier Lights
RELCTD .... Relocated

RFLTR .... Reflector
RD (I) .... Road (Interstate)
RD (N) .... Road (Non-interstate)
RNP .... Required Navigation Performance
RR .... Railroad
RTCA .... Radio Technical Commission for Aeronautics
RTR .... Remote Transmitter/Receiver
RVR .... Runway Visual Range
RWY .... Runway

S

SACS .... Secondary Airport Control Station
SAWS .... Stand Alone Weather Station
SDF .... Simplified Directional Facility
SDSFIE .... Spatial Data Standards for Facilities,
.... Infrastructure and Environment
SID .... Standard Instrument Departure
SPHS .... Specially Prepared Hard Surface
SPIPE .... Standpipe
SSI .... Sensitive Security Information
STAR .... Standard Terminal Arrival
STK .... Stack
STWY .... Stopway

T

TACAN .... Tactical Air Navigation Aid
TDR .... Touchdown Reflector
TDZ .... Touchdown Zone
TDZE .... Touchdown Zone Elevation
THLD .... Threshold
TK .... Tank
TMOM .... Transmissometer
TMPRY .... Temporary
TODA .... Take-off Distance Available
TORA .... Take-off Run Available
TRCV .... Tri-color Visual Approach Slope Indicator
TRMSN TWR .... Transmission Tower
TRS .... Transponder Landing System
TWR .... Tower
TWY .... Taxiway

U

UFN .... Until Further Notice
UNC .... Under Construction
USGS .... United States Geological Survey

V

VAR .... Magnetic Variation
VASI .... Visual Approach Slope Indicator
VERT .... Vertical
VFR .... Visual Flight Rules
VMC .... Visual Meteorological Conditions
VNAV .... Vertical Navigation
VOR .... Very High Frequency Omnidirectional Range
VORTAC .... VOR/Tactical Air Navigation
VSP .... Vertical Survey Point

W

WAAS .... Wide Area Augmentation System
WDI .... Wind Direction Indicator
WGS 84 .... World Geodetic System of 1984
WSK .... Windsock
WTEE .... Wind Tee
WTET .... Wind Tetrahedron

Z

ZM .... Z Marker

APPENDIX B. Aeronautical Survey Guidance and Specifications

B.1. AIRPORT REFERENCE POINT (ARP) COMPUTATION

The Airport Reference Point (ARP) is the approximate geometric center of all usable runways based on the ultimate configuration for the airport. The ARP position computation is somewhat similar to a center of mass computation, except that only two dimensions are considered.

Compute the ARP using the centerline end positions of all usable runways based on the ultimate configuration of the airport. However, since runways without specially prepared hard surfaces (SPHSs) typically are not surveyed, the ARP position for these airports will be approximate. Indicate the ARP computation with the year of the most recent runway end survey used in the ARP computation, such as "ARP (1995)”. The following section identifies how to compute the ARP.

ARP Computation Methodology

The datums used in the computations are normally selected as the lowest absolute value latitude and longitude coordinates, respectively, of all runway ends used in the computation. This convention eliminates computing with negative moments.

ARP LAT = Latitude Datum + (Sum of Runway Moments about the Latitude Datum/Sum of Runway Lengths)

ARP LON = Longitude Datum + (Sum of Runway Moments about the Longitude Datum/Sum of Runway Lengths)

Runway Moment about the Latitude Datum = Runway Ground Length × the Distance in Seconds between the approximate Runway Center Point* and the Latitude Datum

Runway Moment about the Longitude Datum = Runway Ground Length × the Distance in Seconds between the approximate Runway Center Point* and the Longitude Datum

Runway Coordinates must be entered as absolute values.

Runway Lengths must be entered as Ground Length, rounded to the nearest whole foot.

* The approximate Runway Center Point is the mean of the Latitudes and Longitudes of a Runway’s Ends. This convention eliminates the need for complex geodetic formulas to compute the precise Runway Center Point, thus allowing simple and consistent ARP computations after only brief instructions.

A Sample ARP Computation follows (See Figure B - 1):

Approximate Runway Center Pts:

RWY 1/19

LAT = 39 24 57.7852

LON = 77 22 41.1951

RWY 5/23

LAT = 39 24 48.4806

LON = 77 22 34.9130

ARP LAT = 39 24 34.1979 + (4,000 FT (23.5873 SEC) + 3,799 FT (14.2827 SEC))/7,799 FT

= 39 24 34.1979 + 19.0549 SEC

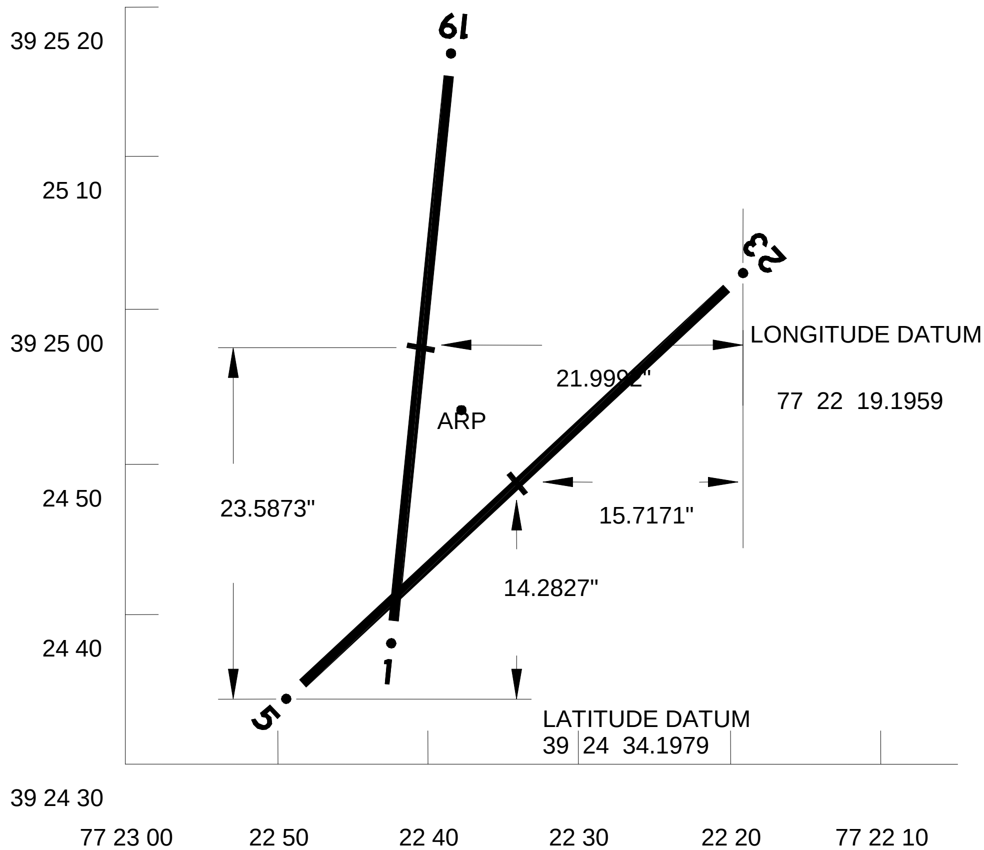
= 39 24 53.3

ARP LON = 77 22 19.1959 + (4,000 FT (21.9992 SEC) + 3,799 FT (15.7171 SEC))/7,799 FT

= 77 22 19.1959 + 18.9391 SEC

= 77 22 38.1

Figure B - 1. AIRPORT REFERENCE POINT (ARP) COMPUTATION



RUNWAY END	LATITUDE	LONGITUDE	GROUND LENGTH*
1	39 24 38.0871	077 22 43.3322	4,000 FT
19	39 25 17.4832	077 22 39.0579	
5	39 24 34.1979	077 22 50.6301	3,799 FT
23	39 25 02.7632	077 22 19.1959	

*USE GROUND, NOT GEODETIC, RUNWAY LENGTH ROUNDED TO THE NEAREST WHOLE FOOT.

NOTES:

1. DO NOT SCALE DRAWING.
2. THIS FIGURE EXPLAINS OR CLARIFIES CERTIAN DATA REQUIREMENTS - SEE TEXT FOR COMPLETE STANDARDS.

Intentionally left blank.

APPENDIX C. RUNWAY, STOPWAY, and DISPLACED THRESHOLD END IDENTIFCATION and MONUMENTATION

C.1. RUNWAY, STOPWAY, and DISPLACED THRESHOLD END IDENTIFCATION and MONUMENTATION

C.1.1. Terminology

C.1.1.1. The precise meaning of terms is always important for a clear understanding of spoken or written information. This understanding is especially critical in technical areas where safety is involved. It is important the surveyor become familiar with runway/stopway terminology and clearly understands the definitions. Certain terms and expressions used in this document have specific meanings that must not be misconstrued or applied incorrectly. Refer to the Glossary for definitions used in this document. Many of these definitions are from the “Aeronautical Information Manual” or other FAA ACs, both document types published by the FAA. Other definitions are from the “Geodetic Glossary” published by the National Geodetic Survey. When adequate definitions were not available from an official source, they were carefully developed as needed for this document.

C.1.1.2. Throughout this document, reference is made to the “approach side” or “touchdown side” of a feature. For example, “Threshold lights show green from the approach side.” Correct understanding of these terms is extremely important. The “approach side” of a feature is the side occupied by a landing aircraft before the aircraft has passed the feature. The “touchdown side” of a feature is the side occupied by a landing aircraft after the aircraft has passed the feature. These terms are always referenced to a landing aircraft and the approach end (not the stop end) of the runway.

C.1.2. Features Associated With Runway/Stopway Usage and Survey Point Location

C.1.2.1. General Information. One or more of the features existing on the airport usually indicate the runway/stopway usage or intended usage. These features include surface markings, lights, signs, navigational aids, and physical construction.

C.1.2.2. Survey Point, and Supporting Features. The runway/stopway survey point is the intersection of the runway/stopway centerline and a feature precisely defining the survey point, such as the approach side of a threshold bar. The feature precisely defining the survey point is called the survey point locator. A survey point locator may be tangible, such as the approach side of a threshold bar, or intangible, such as an imaginary line constructed relative to a tangible feature or features like outboard (refer to Glossary) runway end lights.

C.1.2.2.1 A supporting feature is a feature associated with a runway/stopway survey point but does not precisely define the point. A typical supporting feature is the threshold lights located near a displaced threshold. There may be several supporting features for each survey point. Supporting features provide confidence the survey point was correctly selected. The most useful supporting features are usually one or more of the following:

- Threshold bar and other threshold paintings
- Runway number
- Threshold and runway end lights

- Runway edge lights

Less useful features include:

- Signs
- Visual Glideslope Indicators
- Electronic Navigational Aids
- Taxiways

C.1.2.2.2 Some features are either a survey point locator or a supporting feature, depending on the situation. For example, when a threshold bar is located at a displaced threshold, the approach side of the bar defines the threshold. However, when a threshold bar is located near the end of pavement, the end of pavement usually defines the threshold and the bar is only a supporting feature providing confidence the threshold is located at the end and not at some other location on the runway. Specific features that either define a survey point or are useful in supporting survey point selection are discussed in this section. Because of the many nonstandard situations and configurations encountered in the field, selecting the correct survey point is somewhat complex. When considering the features discussed below and their applicability to survey point location, it may be useful to refer to the associated figures in this section, as well as appropriate FAA ACs.

C.1.2.3. Limit of Construction. The limit of construction is usually the survey point locator for the ends of concrete runways when there is no aligned taxiway. There is an operational benefit to the airport sponsor and aircraft operators to have the maximum runway/stopway length possible. The limit of construction, or the runway end trim line, usually provides this maximum. The limit of construction is typically indicated by a surface discontinuity. Be careful not to locate the runway end beyond this discontinuity and on a blast pad, stopway, or other non-runway surface.

C.1.2.4. Trim Line. A trim line is an imaginary line constructed perpendicular to the runway/stopway centerline establishing the location of a runway/stopway end or displaced threshold. A trim line is most frequently used to "square off" the ends of an apparent runway/stopway surface (refer to Glossary) establishing the runway/stopway ends. Most apparent runway/stopway surfaces are not concrete and their ends are not perpendicular to the runway/stopway centerline, are breaking up, or are otherwise unsuitable as a runway/stopway. Occasionally, the apparent runway/stopway surface may also narrow toward its end. This narrowing is most likely to occur on shorter runways at smaller airports. In all of these cases, a trim line must be constructed perpendicular to the runway/stopway centerline at the first good pavement. This trim line may be only a few inches or may be many feet from the apparent runway/stopway surface end. In practice, the surveyor is not qualified to accurately determine the load bearing integrity of a surface. As a practical matter, establish the trim line at a point on the apparent runway/stopway surface inside any disintegrating or otherwise questionable surface appearing to be below the full load bearing capacity of the runway/stopway.

C.1.2.4.1 <u>Other Uses Of The Trim Line Include:</u>

- Establishing a runway end at outboard runway end lights when an aligned taxiway exists and there is no threshold bar, or the approach side of the bar is located on the approach side of the runway end lights.

- Establishing a runway end at a location determined by operational requirements, such as defining a runway end short of a second runway when abutting surfaces exist.

- Defining a displaced threshold when there is no threshold bar, this may be the case with unpaved runways with outboard threshold lights.

C.1.2.5. Surface Markings

C.1.2.5.1 Threshold Bar. A threshold bar delineates the beginning of the runway available for landing (threshold) when there is pavement aligned with the runway on the approach side of the threshold. This pavement may be runway, taxiway, stopway, or a non-usable surface such as a blast pad. Threshold bars precisely delineate displaced thresholds, but in many cases do not precisely delineate runway ends even when a bar is located near the runway end. When a threshold bar does define a threshold or runway end, the approach side of the bar is the survey point locator (with the bar being entirely on the landing surface). Threshold bars define runway ends on paved runways with an aligned taxiway and no displaced threshold, provided the approach side of the bar is aligned with or is on the touchdown side of the runway end lights. In no other case does the threshold bar precisely define the runway end. The threshold bar is only a supporting feature for runway ends with no aligned taxiway since these bars are often not painted precisely at the runway end as defined by the limit of construction or a trim line. A threshold bar painted "close" to the end may be satisfactory for the painting contractor but is not sufficient for precisely defining a runway end. Occasionally, a threshold bar may even be painted on a blast pad or other non-runway surface. Because of the variability and unreliability of threshold bar locations at runway ends with no aligned taxiway, do not use the threshold bar to define the runway end survey point in these situations. It is important to remember the correct painting on runways is white, while correct painting on taxiways, stopways, or blast pads is yellow. If a displaced threshold exists on a runway with an aligned taxiway, the runway end may be marked with a yellow demarcation bar. If painted correctly, this demarcation bar is not on the runway surface.

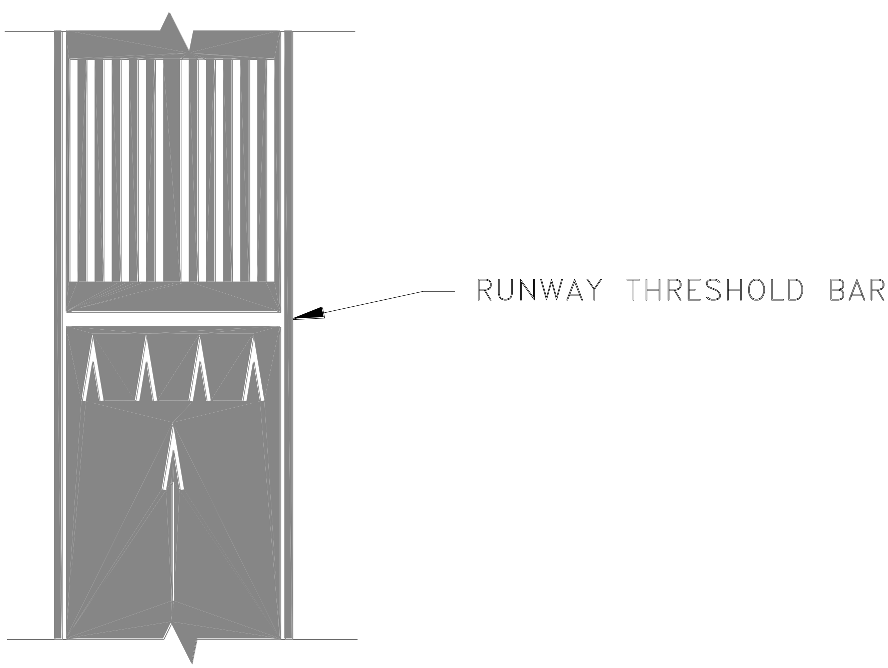


Figure C-1. Depicts the proper marking of a threshold bar.

C.1.2.6. Runway Numbers. The runway number is a supporting feature. Runway numbers are especially useful and reliable as supporting features since most paved runways, even if unlighted, are painted with runway numbers near the threshold. If a runway number is painted on the runway at a location other than near the apparent threshold, a serious conflict exists requiring resolution. Discuss this matter immediately with airport management.

C.1.2.7. Other Surface Markings. Other surface markings are supporting features. Many surface markings, such as threshold markings (specific markings other than the threshold bar), runway side stripes, displaced threshold arrows and arrowheads, the lines and arrowheads on taxiways aligned with runways, and the chevrons on stopways and blast pads are associated with runway/stopway ends and thresholds. While none of these markings precisely define runway/stopway survey points, many can be useful as supporting features providing confidence in survey point selection.

C.1.2.8. Lights. Exercise extreme caution when using lights for runway/stopway survey point identification. Be sure to verify the lights are not out-of-service. Be especially vigilant for redundant lights or lights appearing out-of-place. Occasionally, a threshold or runway end may be moved and the original lights placed out-of-service but not physically removed. If this situation is not recognized, it could lead to confusion and incorrect survey point location.

C.1.2.8.1 Threshold Lights. Threshold lights are fixed green lights arranged symmetrically left and right of the runway centerline and identify the approximate runway threshold (but not necessarily the runway end). These lights are frequently in multipurpose fixtures showing green from the approach side of the threshold and may show red, white, or amber, or may be obscured from the touchdown side of the threshold, depending on additional function. Threshold lights are usually supporting features for survey points on paved runways. However, they may define the survey point for displaced thresholds when a threshold bar is missing, such as may occur on unpaved runways. (Displaced thresholds on unpaved runways are uncommon). Light characteristics can be useful in distinguishing between a displaced threshold and a runway end with an aligned taxiway. The displaced threshold will include lights showing green from the approach side and white, amber, or obscured from the touchdown side. The runway end with an aligned taxiway will include lights showing green from the approach side and red from the touchdown side. When threshold lights are located at the runway end, they typically are combined with runway end lights into one fixture. In these cases, threshold lights show green from the approach side, while the runway end lights show red from the touchdown side. Special lens or filters are used to give the desired coverage. In the rare case where the light units define a trim line for a displaced threshold survey point (no threshold bar), the two units nearest to the runway (one on each side of the runway) are used. The trim line must always be perpendicular to the runway centerline. If the trim line connecting the lights (or markers if runway is unlighted) is not perpendicular to the runway centerline, then the line must be best fit to the defining lights or markers. When there is no displaced threshold or runway end with an aligned taxiway, threshold and runway end lights are normally located across the runway end and about 10 feet on the approach side of the runway. When there is a displaced threshold or a runway end with an aligned taxiway, these lights are normally located to the side of the runway but are often offset along the runway by 10 feet or more from the true threshold or runway end.

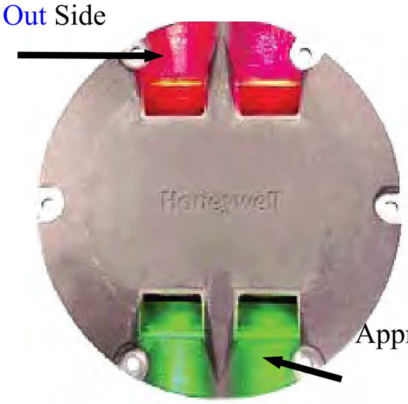


Figure C-2. Overhead view of a threshold light, which are typically flush mounted with the runway surface.

C.1.2.8.2 Runway End Lights. Runway end lights are fixed red lights arranged symmetrically left and right of the runway centerline and identify the approximate runway end, or in some cases, the precise runway end. They show red from the runway side and may also show red from the approach side, if the runway end is not the threshold. If the runway end is also a threshold, the light unit will show green from the approach side. FAA guidelines or regulations do not authorize a runway to extend to the approach side of the runway end lights. Therefore, the runway end cannot be on the approach side of the runway end lights regardless of threshold bar or runway end light location. Do not confuse these situations with that of threshold lights at a displaced threshold where the approach side of the threshold bar defines the threshold and the lights are only supporting features. In most cases where there is no aligned taxiway, limit of construction, or a trim line, the touchdown side of the lights defines the runway end and the runway end lights are supporting features only. In some cases, however, runway end lights can define a runway end survey point. For runways with an aligned taxiway, runway end lights (which can be situated either outboard or flush mounted inboard) define the runway end survey point if there is no threshold bar or if the approach side of the threshold bar is on the approach side of the lights. (If the bar is entirely on the touchdown side of the lights, the approach side of the bar defines the runway end survey point.) In the rare cases where there is no aligned taxiway but the runway end lights are outboard and on the touchdown side of an apparent runway end, the lights define the runway end. The surface on the approach side of the lights is not runway.

Figure C-3. Typical elevated runway or taxiway edge light with the blue taxiway lens installed.

C.1.2.8.3 Runway/Stopway Edge Lights. Runway edge lights are white, except on instrument runways, where amber replaces white in the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landing. Runway/stopway edge lights are supporting features and do not precisely define survey points. However, in some cases their color characteristics may identify a section of pavement as either runway or taxiway. The edge lights for taxiways are blue, while the edge lights for runways are white or amber. Stopway lighting is inconsistent and unreliable in stopway survey point identification.

C.1.2.8.4 Runway End Identifier Lights. Runway End Identifier Lights (REIL) consist of a pair of synchronized flashing lights located laterally on each side of the runway threshold but are typically not aligned precisely with the threshold. They may be omnidirectional or unidirectional facing the approach area. REILs are supporting features and do not precisely identify survey points. REILs may be useful in determining runway usage since they are located near the threshold.

Figure C-4. Typical installation of the runway end identification light (REIL) with the horizontal and VSPs identified.

C.1.2.8.5 Signs. Signs are supporting features and do not precisely identify survey points. Occasionally, signs may be useful in indicating a runway end, especially a runway end with an aligned taxiway. They can also indicate the direction to a runway end.

C.1.2.8.6 Visual Glideslope Indicators. Visual glideslope indicators are light sources which project directional light into the approach area providing pilots with visual vertical guidance in the final approach phases of flight. The locations and characteristics of visual glideslope indicators vary depending on type. However, all are located beside the runway on the touchdown side of the threshold. Visual glideslope indicators are supporting features and do not precisely define survey points. Occasionally, these indicators may be useful in determining runway usage since they indicate the approximate touchdown area for landing aircraft.

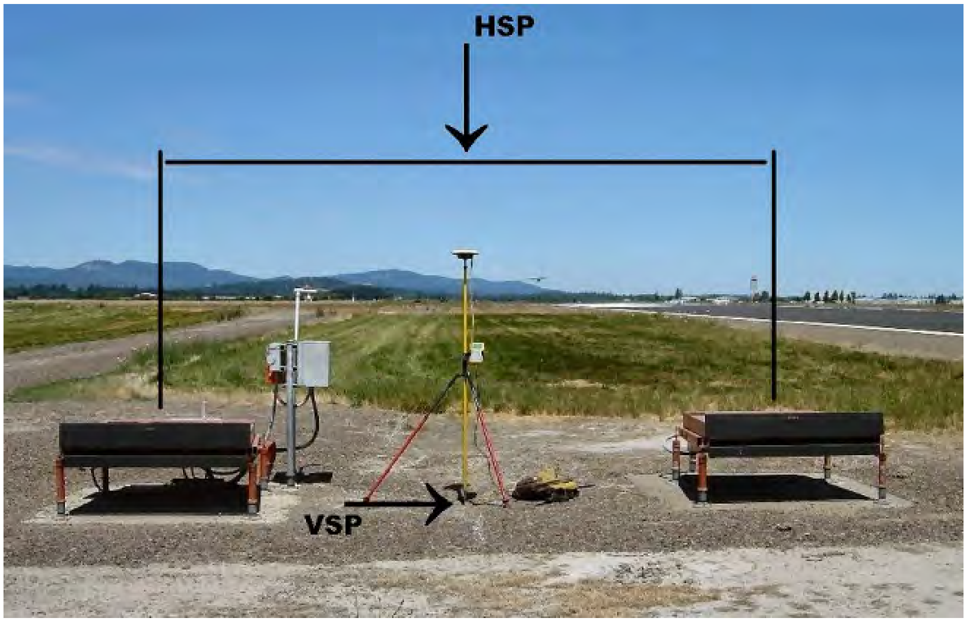


Figure C-5. Illustrates the proper location of a GPS setup to locate the HSP of a Precision Approach Path Indicator (PAPI) light system. THE PAPI is one type of VGSI.

C.1.2.8.7 Electronic Navigational Aids. The Instrument Landing System Glideslope (ILS-GS) antenna is the emission source for electronic signals, providing pilots with electronic vertical guidance in the final approach phases of flight. ILS-GS antennas are typically located at least 400 feet off the runway centerline and approximately 1,000 feet on the touchdown side of the threshold. Electronic navigational aids, including the ILS-GS, do not precisely identify survey points. Occasionally, the ILS-GS antenna may be useful in determining runway usage since most ILS-GS antennas are sited near the touchdown area for landing aircraft.

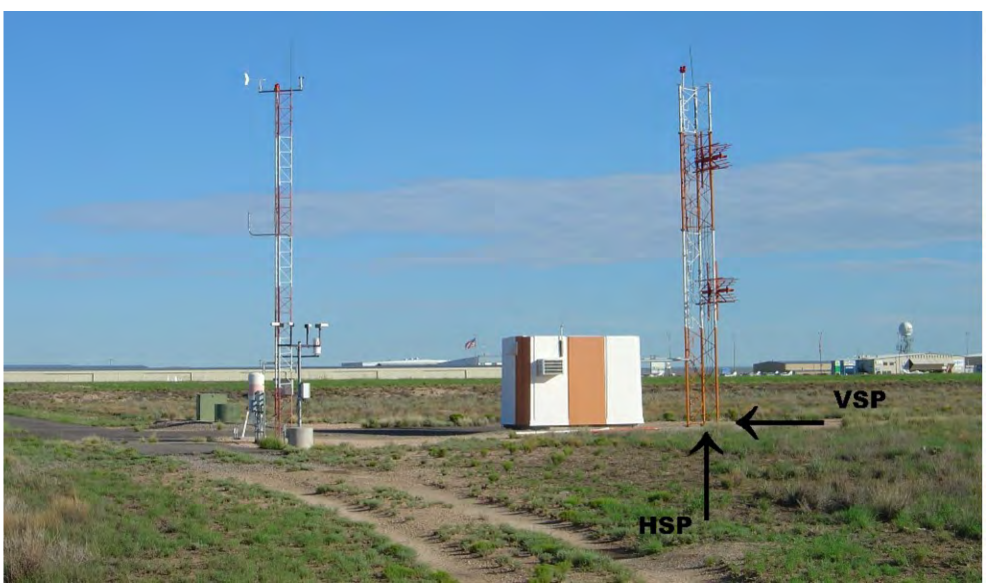


Figure C-6. Typical glideslope installation.

C.1.2.8.8 Taxiways. Taxiways are movement areas providing access to runways from aircraft parking, maintenance, and other areas on the airport. Taxiways do not precisely identify survey points. However, since runway ends are usually accessed by adjacent taxiways, the location of a taxiway may suggest the proximity of a runway end. While many runway ends coincide with the extension of the taxiway edge onto the runway, this is not always the case. Often a runway extends slightly beyond the taxiway edge, making the survey point locator for the runway end the limit of physical construction, a trim line, or a threshold bar and not the taxiway extension onto the runway. It is not uncommon to have a runway end without direct taxiway access. One common case occurs when a runway is extended, but the taxiway was not extended to the new runway end. This situation is most likely to occur at smaller airports. While taxiway/runway intersections do not define runway points, unusual taxiway/runway configurations can alert the surveyor an unusual situation may exist.

APPENDIX D. TRUNCATED ATTRIBUTE VALUES TO BE USED WITH ESRI® SHAPEFILES

NOTE: *When submitting data as ESRI® shapefiles (geodatabase is not acceptable), the truncated attribute values in the following list must be used. This list includes truncated values for all features identified in Chapter 5 of this AC.*

FeatureClass	AttributeName	Shp_Name	NewShp_Name
AircraftGateStand	name	name	
	description	feat_desc	descrip
	status	status	
	gateStandType	gate_sta	gateStType
	length	length	
	pavementClassificationNumber	pavementCl	
	width	width	
	wingspan	wingspan	
	jetwayAvailability	jetwayAvai	
	towingAvailability	towingAvai	
	dockingAvailability	dockingAva	
	groundPowerAvailability	groundPowe	
	surfaceType	surfaceT	
	surfaceCondition	surfaceC	
	userFlag	userFlag	
	alternative	alternativ	
AircraftNonMovementArea	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
AirfieldLight	name	name	
	description	feat_desc	descrip
	status	status	
	color	color	
	lightingType	lighting	
	luminescence	luminesc	
	pilotControlFrequency	pilotContr	
	userFlag	userFlag	
	alternative	alternativ	
AirOperationsArea	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
AirportBoundary	name	name	
	description	feat_desc	descrip
	status	status	
	airportFacilityType	airportF	airportFac
	faaLocationId	faaLocID	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	faaSiteNumber	faaSiteNr	
	iataCode	iataCode	
	icaoCode	icaoCode	
	operationsType	operatio	
	owner	owner	
	userFlag	userFlag	
	alternative	alternativ	
AirportControlPoint	name	name	
	description	mon_desc	descrip
	status	status	
	coordinateZone	spcszone	
	dateRecovered	date_recov	dateRecov
	epoch	epoch	
	fieldBook	fieldBook	
	globalPositionSystemSuitable	gps_suit	gpsSuit
	monumentType	mon_typ	monType
	ellipsoidHeight	ellipsoidH	
	permanentId	permanentI	
	pointType	pointType	
	recoveredCondition	recov_cond	recovCond
	runwayDesignator	rwyDesg	
	RunwayEndDesignator	RunwayEndD	
	stampedDesignation	stmpd_desg	stmpdDesg
	yearOfSurvey	yearOfSurv	
	userFlag	userFlag	
	alternative	alternativ	
AirportParcel	name	name	
	description	feat_desc	descrip
	status	status	
	parcelNumber	parcnum	
	area	area	
	authority	authority	
	previousOwner	prevowner	
	acquisitionType	acquisitio	
	acquisitionPurpose	acqPurpose	
	costToAcquire	costToAcqu	
	grantProjectNumber	grantProje	
	howAcquired	howAcquire	
	marketValue	marketValu	
	yearAssessed	yearAssess	
	yearBuilt	yearBuilt	
	useOfParcel	useParc	
	legalDescription	legalDesc	
	dateAcquired	dateAcquir	
	assessedValue	assdValue	
	deedReference	deedRef	
	passengerFacilityChargeNumber	pfcNumber	
	userFlag	userFlag	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	alternative	alternativ	
AirportSign	name	name	
	description	feat_desc	descrip
	status	status	
	height	height	
	message	message	
	signTypeCode	signType	
	userFlag	userFlag	
	alternative	alternativ	
AnchorageArea	name	name	
	description	descrip	
	status	status	
	mooringLocation	mooringLo	
	length	length	
	width	width	
	depth	depth	
	bottomConditions	bottomCond	
	restriction	restrictio	
	userFlag	userFlag	
	alternative	alternativ	
Apron	name	name	
	description	feat_desc	descrip
	status	status	
	apronType	apronType	
	pavementClassificationNumber	pavementCl	
	surfaceCondition	surfaceC	
	surfaceMaterial	surfaceM	
	surfaceType	surfaceT	
	numberOfTiedowns	numberOfTi	
	fuel	fuel	
	userFlag	userFlag	
	alternative	alternativ	
ArrestingGear	name	name	
	description	descrip	
	status	status	
	airportFacilityType	airportFac	
	owner	owner	
	alternative	alternativ	
	userFlag	userFlag	
Bridge	name	name	
	description	feat_desc	descrip
	status	status	
	surfaceMaterial	surfaceM	
	bridgeType	bridgeType	
	verticalStructureMaterial	vertical	
	directionality	direction	
	userFlag	userFlag	
	alternative	alternativ	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
Building	name	name	
	description	feat_desc	descrip
	status	status	
	buildingNumber	buildng_no	buildingNo
	structureType	str_type	strType
	numberCurrentOccupants	no_occup	noCurOcc
	areaInside	areaInside	
	structureHeight	structHght	
	areaFloor	areaFloor	
	lightingType	lighting	
	markingFeatureType	markingF	
	color	color	
	userFlag	userFlag	
	alternative	alternativ	
ConstructionArea	name	name	
	description	feat_desc	descrip
	status	status	
	projectName	projectNam	
	projectStatus	projectS	
	CoordinationContact	Coordinati	
	userFlag	userFlag	
	alternative	alternativ	
CoordinateGridArea	name	name	
	description	feat_desc	descrip
	status	status	
	gridType	gridType	
	userFlag	userFlag	
	alternative	alternativ	
County	name	name	
	description	feat_desc	descrip
	status	status	
	politicalName	polit_name	politName
	userFlag	userFlag	
	alternative	alternativ	
DeicingArea	name	name	
	description	area_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
DockArea	name	name	
	description	descrip	
	status	status	
	pier	pier	
	pierLength	pierLength	
	pierWidth	pierWidth	
	pierMaterial	pierMateri	
	hoistingCapability	hoistingCa	
	marineRailwayPlatformLength	mrpLength	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	marineRailwayPlatformWidth	mrpWidth	
	marineRailwayPlatformCapacity	mrpCapacit	
	gangway	gangway	
	gangwayLength	gangwayLen	
	gangwayWidth	gangwayWid	
	gangwayMaterial	gangwayMat	
	floatingDock	floatDock	
	floatingDockLength	floatDkLen	
	floatingDockWidth	floatDkWid	
	floatingDockMaterial	floatDkMat	
	floatingBarge	floatBarge	
	floatingBargeLength	floatBgLen	
	floatingBargeWidth	floatBgWid	
	floatingBargeMaterial	floatBgMat	
	userFlag	userFlag	
	alternative	alternativ	
DrivewayArea	name	name	
	description	feat_desc	descrip
	status	status	
	surfaceMaterial	surfaceM	
	userFlag	userFlag	
	alternative	alternativ	
DrivewayCenterline	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
EasementsAndRightsOfWay	name	name	
	description	feat_desc	descrip
	status	status	
	purpose	purpose	
	userFlag	userFlag	
	alternative	alternativ	
ElevationContour	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	
	contourValue	contourVal	
	userFlag	userFlag	
	alternative	alternativ	
EnvironmentalContamination Area	name	name	
	description	feat_desc	descrip
	status	status	
	cause	cause	
	dateFound	dateFound	
	environmentalHazardCategory	ehazcat	
	pollutantReleaseType	rel_typ	polReType
	pollutionSource	pol_src	polSource

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	remediationUrgency	rem_urg	remUrgncy
	severity	severity	
	toxicStatusOfPollutant	tox_stt	toxStatPol
	userFlag	userFlag	
	alternative	alternativ	
FAARegionArea	name	name	
	description	reg_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
FaunaHazardArea	name	name	
	description	feat_desc	descrip
	status	status	
	hazardType	hazardType	
	userFlag	userFlag	
	alternative	alternativ	
Fence	name	name	
	description	feat_desc	descrip
	status	status	
	type	type	
	height	height	
	userFlag	userFlag	
	alternative	alternativ	
FloodZone	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	zoneType	zoneType	
	alternative	alternativ	
FloraSpeciesSite	name	name	
	description	feat_desc	descrip
	status	status	
	endangeredSpeciesActSite	hab_stt	habStt
	plantHeight	plant_ht	plantHt
	plantType	plantType	
	userFlag	userFlag	
	alternative	alternativ	
ForestStandArea	name	name	
	description	feat_desc	descrip
	status	status	
	habitatCategory	habcat	
	userFlag	userFlag	
	alternative	alternativ	
FrequencyArea	name	name	
	description	feat_desc	descrip
	status	status	
	frequency	frequency	
	station	station	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
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	alternative	alternativ	
Gate	name	name	
	description	feat_desc	descrip
	status	status	
	attended	attended	
	type	type	
	height	height	
	length	length	
	userFlag	userFlag	
	alternative	alternativ	
HazardousMaterialStorageSite	name	name	
	description	feat_desc	descrip
	status	status	
	storeHazardousMaterialCategory	hsb_cat	hsbCat
	userFlag	userFlag	
	alternative	alternativ	
ImageArea	name	name	
	description	feat_desc	descrip
	status	status	
	frameId	frameId	
	photoDate	photoDate	
	userFlag	userFlag	
	alternative	alternativ	
LandmarkSegment	name	name	
	description	feat_desc	descrip
	status	status	
	landmarkType	landmark	
	userFlag	userFlag	
	alternative	alternativ	
LandUse	name	name	
	description	use_desc	descrip
	status	status	
	useType	useType	
	userFlag	userFlag	
	alternative	alternativ	
LeaseZone	name	name	
	description	feat_desc	descrip
	status	status	
	actualArea	actualArea	
	expectedLeaseExpirationDate	date_lsexp	datelsexp
	leasedArea	leasedArea	
	legalDescription	legl_desc	legalDesc
	permitUse	permitUse	
	tenantName	tenantName	
	userFlag	userFlag	
	alternative	alternativ	
MarkingArea	name	name	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
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	status	status	
	markingFeatureType	markingF	
	color	color	
	alternative	alternativ	
	userFlag	userFlag	
MarkingLine	name	name	
	description	descrip	
	status	status	
	markingFeatureType	markingF	
	color	color	
	userFlag	userFlag	
	alternative	alternativ	
MovementArea	name	name	
	description	descrip	
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
Municipality	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
NavaidCriticalArea	name	name	
	description	feat_desc	descrip
	status	status	
	dimensionX	dimensionX	
	dimensionY	dimensionY	
	userFlag	userFlag	
	alternative	alternativ	
NavaidEquipment	name	name	
	description	feat_desc	descrip
	status	status	
	faaFacilityId	faaFacilid	
	navAidEquipmentType	navaidEq	
	navigationalAidSystemType	navaidSy	
	useCode	useCode	
	antennaToThresholdDistance	antToThres	antentDist
	centerlineDistance	centerline	centlnDist
	stopEndDistance	stopEnDist	
	offsetDistance	offsetDist	
	offsetDirection	offsetDire	
	lightingType	lightConfT	
	owner	owner	
	runwayEndId	rwyEndID	
	referencePointEllipsoidHeight	refPointEH	
	referencePointThreshold	refPointTh	
	thresholdCrossingHeight	thresholdC	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
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	ellipsoidElevation	ellipsoidE	
	userFlag	userFlag	
	alternative	alternativ	
NavaidSite	name	name	
	description	facil_desc	descrip
	status	status	
	faaFacilityId	faaFacilid	
	facilityType	fac_typ	facType
	propertyCustodian	propertyCu	
	userFlag	userFlag	
	alternative	alternativ	
NavigationBuoy	name	name	
	description	feat_desc	descrip
	status	status	
	designator	designator	
	type	type	
	lightingType	lighting	
	color	color	
	owner	owner	
	userFlag	userFlag	
	alternative	alternativ	
NoiseContour	name	name	
	description	feat_desc	descrip
	status	status	
	contourValue	contourVal	
	userFlag	userFlag	
	alternative	alternativ	
NoiseIncident	name	name	
	description	incid_desc	descrip
	status	status	
	reporter	reporter	
	userFlag	userFlag	
	alternative	alternativ	
NoiseMonitoringPoint	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
Obstacle	name	name	
	description	feat_desc	descrip
	status	status	
	obstacleType	obstacle	obstacleTy
	obstacleSource	obstacleso	
	aboveGroundLevel	aboveGroun	
	distanceFromDisplacedThreshold	FromDTHLDD	
	distanceFromRunwayCenterline	FromRwyCen	
	distanceFromRunwayEnd	FromRwyEnd	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
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	heightAboveAirport	heightAbov	
	heightAboveRunway	hAbovRwy	
	heightAboveTouchdownZone	hAbovTdz	
	lightCode	lightCode	
	markingFeatureType	markingF	
	penValSpecified	penVal_Spe	penValSpe
	penValSupplemental	penVal_Sup	penValSup
	ellipsoidHeight	ellipsoidH	
	obstructionNumber	obsNumber	
	disposition	dispostn	
	oisSurfaceCondition	oisSurfa	
	frangible	frangible	
	faacoordinationcode	faaCode	
	userFlag	userFlag	
	alternative	alternativ	
ObstructionArea	name	name	
	description	feat_desc	descrip
	status	status	
	obstacleType	obstacle	obstacleTy
	obstacleSource	obstacleso	
	aboveGroundLevel	aboveGroun	
	distanceFromDisplacedThreshold	FromDTHLDD	
	distanceFromRunwayCenterline	FromRwyCen	
	distanceFromRunwayEnd	FromRwyEnd	
	groupCode	groupCode	
	heightAboveAirport	heightAbov	
	heightAboveRunway	hAbovRwy	
	heightAboveTouchdownZone	hAbovTdz	
	lightCode	lightCode	
	markingFeatureType	markingF	
	penValSpecified	penVal_Spe	penValSpe
	penValSupplemental	penVal_Sup	penValSup
	obstructionNumber	obs_number	obsNumber
	obstructionAreaType	obs_typ	obsArType
	disposition	dispostn	
	oisSurfaceCondition	oisSurfa	
	length	length	
	width	width	
	frangible	frangible	
	faaCoordinationCode	faa_d	faaCode
	ellipsoidHeight	ellipsoidH	
	userFlag	userFlag	
	alternative	alternativ	
ObstructionIdSurface	name	name	
	description	feat_desc	descrip
	status	status	
	oisSurfaceType	oisSurTy	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	oisZoneType	oisZoneT	
	oisSurfaceCondition	oisSurfa	
	runwayDesignator	rwyDesg	
	RunwayEndDesignator	RunwayEndD	
	safetyRegulation	safety_reg	safetyReg
	zoneUse	zoneUse	
	approachGuidance	approachGu	
	slope	slope	
	userFlag	userFlag	
	alternative	alternativ	
Parcel	name	name	
	description	feat_desc	descrip
	status	status	
	parcelNumber	parc_num	parcNum
	area	area	
	authority	authority	
	previousOwner	prevOwner	
	acquisitionType	acquisitio	
	acquisitionPurpose	acqPurpose	
	costToAcquire	costToAcqu	
	grantProjectNumber	grantProje	
	howAcquired	howAcquire	
	marketValue	marketValu	
	yearAssessed	yearAssess	
	yearBuilt	yearBuilt	
	useOfParcel	use_parc	useParc
	legalDescription	legl_desc	legalDesc
	dateAcquired	dateAcquir	
	assessedValue	assd_value	assdValue
	deedReference	deed_ref	deedRef
	userFlag	userFlag	
	alternative	alternativ	
ParkingLot	name	name	
	description	feat_desc	descrip
	status	status	
	numberHandicapSpaces	num_hndcp	noHndcpSp
	owner	owner	
	parkingLotUse	park_use	parcUse
	surfaceType	surfaceT	
	totalNumberSpaces	tot_spaces	totSpaces
	userFlag	userFlag	
	alternative	alternativ	
PassengerLoadingBridge	name	name	
	description	feat_desc	descrip
	status	status	
	loadingBridgeType	loadingBT	
	userFlag	userFlag	
	alternative	alternativ	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
RailroadCenterline	name	name	
	description	feat_desc	descrip
	status	status	
	isBridge	isBridge	
	numberOfTracks	numTracks	
	owner	owner	
	isTunnel	isTunnel	
	directionality	direction	
	segmentType	segmentT	
	userFlag	userFlag	
	alternative	alternativ	
RailroadYard	name	name	
	description	feat_desc	descrip
	status	status	
	owner	owner	
	userFlag	userFlag	
	alternative	alternativ	
RestrictedAccessBoundary	name	name	
	description	area_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
RoadCenterline	name	name	
	description	feat_desc	descrip
	status	status	
	color	color	
	userFlag	userFlag	
	alternative	alternativ	
RoadPoint	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
RoadSegment	name	name	
	description	feat_desc	descrip
	status	status	
	alternateName	alt_name	altName
	numberOfLanes	num_lanes	numLanes
	route1Name	route1Name	
	route1Type	route1Type	
	route2Name	route2Name	
	route2Type	route2Type	
	route3Name	route3Name	
	route3Type	route3Type	
	length	length	
	width	width	
	isBridge	isBridge	
	isTunnel	isTunnel	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	directionality	direction	
	segmentType	segmentT	
	surfaceType	surfaceT	
	surfaceMaterial	surfaceM	
	userFlag	userFlag	
	alternative	alternativ	
Roof	name	name	
	description	feat_desc	descrip
	status	status	
	buildingNumber	buildingNo	
	userFlag	userFlag	
	alternative	alternativ	
Runway	name	name	
	description	feat_desc	descrip
	status	status	
	runwayDesignator	rwyDesg	
	width	width	
	length	length	
	surfaceType	surfaceT	
	surfaceMaterial	surfaceM	
	surfaceCondition	surfaceC	
	pavementClassificationNumber	pavementCl	
	userFlag	userFlag	
	alternative	alternativ	
RunwayArrestingArea	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	
	width	width	
	surfaceMaterial	surfaceM	
	surfaceCondition	surfaceC	
	setback	setback	
	userFlag	userFlag	
	alternative	alternativ	
RunwayBlastPad	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	
	pavementClassificationNumber	pavementCl	
	RunwayEndDesignator	RunwayEndD	
	surfaceCondition	surfaceC	
	surfaceMaterial	surfaceM	
	surfaceType	surfaceT	
	userFlag	userFlag	
	alternative	alternativ	
RunwayCenterline	name	name	
	description	feat_desc	descrip
	status	status	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	isDerived	isDerived	
	runwayDesignator	rwy_desg	rwyDesg
	userFlag	userFlag	
	alternative	alternativ	
RunwayElement	name	name	
	description	feat_desc	descrip
	status	status	
	pavementClassificationNumber	pavementCl	
	runwayDesignator	rwyDesg	
	surfaceCondition	surfaceC	
	surfaceMaterial	surfaceM	
	surfaceType	surfaceT	
	userFlag	userFlag	
	alternative	alternativ	
RunwayEnd	name	name	
	description	feat_desc	descrip
	status	status	
	ellipsoidHeight	ellipsoidH	
	approachCategory	approach	appCat
	approachGuidance	approachG	
	accelerateStopDistanceAvail	acStpDAvai	
	magneticBearing	brngMagnet	
	TrueBearing	brngTrue	
	designGroup	designGr	
	displacedDistance	displacedD	
	landingDistanceAvailable	landingDis	
	RunwayEndDesignator	RunwayEndD	
	runwaySlope	rwySlope	
	takeOffDistanceAvailable	takeOffDis	
	takeOffRunwayAvailable	takeOffRun	
	thresholdType	threshol	thresholdT
	touchdownZoneElevation	tdzElevati	
	touchdownZoneSlope	tdzSlope	
	userFlag	userFlag	
	alternative	alternativ	
RunwayHelipadDesignSurface	name	name	
	description	feat_desc	descrip
	status	status	
	designSurfaceType	designSu	
	zoneUse	zoneUse	
	determination	determinat	
	determinationDate	detDate	
	zoneInnerWidth	zone_inner	zoneInner
	zoneOuterWidth	zone_outer	zoneOuter
	zoneLength	zone_lengt	zoneLength
	slope	slope	
	userFlag	userFlag	
	alternative	alternativ	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
RunwayIntersection	name	name	
	description	feat_desc	descrip
	status	status	
	runwayDesignator1	rwy1_desgn	rwy1Desgn
	runwayDesignator2	rwy2_desgn	rwy2Desgn
	runwayDesignator3	rwy3_desgn	rwy3Desgn
	pavementClassificationNumber	pavementCl	
	userFlag	userFlag	
	alternative	alternativ	
RunwayLabel	name	name	
	description	feat_desc	descrip
	status	status	
	RunwayEndDesignator	RunwayEndD	
	userFlag	userFlag	
	alternative	alternativ	
RunwayLAHSO	name	name	
	description	feat_desc	descrip
	status	status	
	color	color	
	protectedRunwayDesignator	protected	
	markingFeatureType	markingF	
	userFlag	userFlag	
	alternative	alternativ	
RunwayProtectArea	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	
	type	type	
	userFlag	userFlag	
	alternative	alternativ	
RunwaySafetyAreaBoundary	name	name	
	description	feat_desc	descrip
	RunwayEndDesignator	RunwayEndD	
	status	status	
	determinationDate	detDate	
	determination	determinat	
	userFlag	userFlag	
	alternative	alternativ	
SampleCollectionPoint	name	name	
	description	feat_desc	descrip
	status	status	
	collectionPointLocation	locdesc	
	userFlag	userFlag	
	alternative	alternativ	
SeaplaneRampCenterline	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	userFlag	userFlag	
	alternative	alternativ	
SeaplaneRampSite	name	name	
	description	feat_desc	descrip
	status	status	
	width	width	
	slope	slope	
	userFlag	userFlag	
	alternative	alternativ	
SecurityArea	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
SecurityIdDisplayArea	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
SecurityPerimeterLine	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
Shoreline	name	name	
	description	shore_desc	descrip
	status	status	
	shorelineType	shr_typ	shoreType
	userFlag	userFlag	
	alternative	alternativ	
Shoulder	name	name	
	description	feat_desc	descrip
	status	status	
	shoulderType	shl_type	sholdrType
	length	length	
	width	width	
	restricted	restricted	
	surfaceMaterial	surfaceM	
	surfaceType	surfaceT	
	surfaceCondition	surfaceC	
	sequence	sequence	
	userFlag	userFlag	
	alternative	alternativ	
Sidewalk	name	name	
	description	walk_desc	descrip
	status	status	
	walkUse	walkUse	
	AmericanDisabilitiesAct	ada_acc	adaAcc

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	length	length	
	width	width	
	surfaceMaterial	surfaceM	
	segmentType	segmentT	
	userFlag	userFlag	
	alternative	alternativ	
State	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
SterileArea	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
Stopway	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	
	width	width	
	RunwayEndDesignator	RunwayEndD	
	surfaceMaterial	surfaceM	
	surfaceType	surfaceT	
	surfaceCondition	surfaceC	
	userFlag	userFlag	
	alternative	alternativ	
TankSite	name	name	
	description	feat_desc	descrip
	status	status	
	tankType	tankType	
	topElevation	top_elv	topElev
	lightCode	lightCode	
	verticalStructureMaterial	vertical	
	lightingType	lighting	
	markingFeatureType	markingF	
	color	color	
	userFlag	userFlag	
	alternative	alternativ	
TaxiChannel	name	name	
	description	feat_desc	descrip
	status	status	
	restriction	restrictio	
	length	length	
	width	width	
	depth	depth	
	userFlag	userFlag	
	alternative	alternativ	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
TaxiwayElement	name	name	
	description	feat_desc	descrip
	status	status	
	taxiwayId	taxiwayId	
	taxiwayType	taxiwayT	
	surfaceMaterial	surfaceM	
	pavementClassificationNumber	pavementCl	
	surfaceCondition	surfaceC	
	directionality	direction	
	sequence	sequence	
	surfaceType	surfaceT	
	designGroup	designGr	
	length	length	
	width	width	
	maximumSpeed	maxSpeed	
	wingSpan	wingSpan	
	userFlag	userFlag	
	alternative	alternativ	
TaxiwayHoldingPosition	name	name	
	description	feat_desc	descrip
	status	status	
	runwayDesignator	rwy_desgn	rwyDesg
	taxiwayDesignator	taxi_desgn	taxiDesgn
	lowVisibilityCategory	low_visi	lowVisCat
	userFlag	userFlag	
	alternative	alternativ	
TaxiwayIntersection	name	name	
	description	feat_desc	descrip
	status	status	
	userFlag	userFlag	
	alternative	alternativ	
TouchDownLiftOff	name	name	
	description	feat_desc	descrip
	status	status	
	length	length	
	width	width	
	surfaceType	surfaceT	
	surfaceMaterial	surfaceM	
	surfaceCondition	surfaceC	
	designHelicopter	designHeli	
	gradient	gradient	
	userFlag	userFlag	
	alternative	alternativ	
Tower	name	name	
	description	feat_desc	descrip
	status	status	
	verticalStructureMaterial	vertical	
	structureHeight	structHght	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
	lightCode	lightCode	
	lightingType	lighting	
	markingFeatureType	markingF	
	color	color	
	userFlag	userFlag	
	alternative	alternativ	
Tunnel	name	name	
	description	feat_desc	descrip
	status	status	
	type	type	
	verticalClearance	vert_clr	vertClr
	averageHeight	avg_ht	averageHt
	averageWidth	avg_wd	averageWd
	length	length	
	directionality	direction	
	segmentType	segmentT	
	userFlag	userFlag	
	alternative	alternativ	
TurningBasin	name	name	
	description	feat_desc	descrip
	status	status	
	restriction	restrictio	
	length	length	
	width	width	
	depth	depth	
	diameter	diameter	
	compassLocation	compassLoc	
	userFlag	userFlag	
	alternative	alternativ	
UtilityLine	name	name	
	description	feat_desc	descrip
	status	status	
	utilityType	utilityT	
	directionality	direction	
	userFlag	userFlag	
	alternative	alternativ	
UtilityPoint	name	name	
	description	feat_desc	descrip
	status	status	
	utilityType	utilityT	
	userFlag	userFlag	
	alternative	alternativ	
UtilityPolygon	name	name	
	description	feat_desc	descrip
	status	status	
	utilityType	utilityT	
	userFlag	userFlag	
	alternative	alternativ	

FeatureClass	AttributeName	Shp_Name	NewShp_Name
WaterLaneEnd	name	name	
	description	feat_desc	descrip
	status	status	
	magneticBearing	brngMagnet	
	compassLocation	compassLoc	
	restriction	restrictio	
	airMarker	airMaker	
	type	type	
	color	color	
	lightingtype	lighting	
	approachGuidance	approachGu	
	length	length	
	width	width	
	depth	depth	
	centroid	centroid	
	userFlag	userFlag	
	alternative	alternativ	
WaterOperatingArea	name	name	
	description	feat_desc	descrip
	status	status	
	surfaceMaterial	surfaceM	
	length	length	
	width	width	
	currentFlowrate	currentFlo	
	compassLocation	compassLoc	
	tidalRange	tidalRange	
	coordinatedUseType	coordUseT	
	coordinatedUseActivityLevel	coordUseA	
	userFlag	userFlag	
	alternative	alternativ	
Wetland	name	name	
	description	wetln_desc	descrip
	status	status	
	featureType	feat_typ	featType
	userFlag	userFlag	
	alternative	alternativ	
Zoning	name	name	
	description	feat_desc	descrip
	status	status	
	landOwnerRestriction	restrict	
	zoningClassification	zng_cls	zngClass
	userFlag	userFlag	
	alternative	alternativ	