U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Survey and Data Standards for Submission of Aeronautical Data Using Airports GIS

Date: 9/30/2015

Initiated By: AAS-100

AC No: 150/5300-18C

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, for independent verification and validation. The primary purpose of these general guidelines and specifications is to list the technical 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). 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 sourced data, acquired by field survey and/or remote sensing methods.

2 **Cancellation.**

This AC cancels 150/5300-18B, *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*, Consolidated Change 1, dated February 24, 2014.

3 **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 14 CFR part 139, *Certification of Airports*, for the collection of geospatial airport and aeronautical data. Mandatory terms such as "will" and "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.

4 Principal Changes.

This version of the AC is a major rewrite. Users should review the entire document to ensure they understand the requirements and specifications in the document. The principal reason for this AC change is to conform to the new FAA enterprise data model and process of maintaining a single authoritative source of aeronautical data. To conform to this new enterprise data model some features had to be renamed, all features incorporated temporality by adding start and end dates, and a few additions were made to enable printing of an airport layout plan from Airports GIS data. The AC also incorporates the following principal changes:

1. Removed the requirement for submission of survey plans in portable document format. Airports GIS now supports these functions through online forms.
2. Added information and clarification regarding 14 CFR part 77, *Objects Affecting Navigable Airspace*, analyses and Airport Layout Plan data collection to the AC.
3. Updated ESRI shapefile naming conventions and included these in an appendix.
4. Added additional detail and guidance on temporality of features.
5. Updated Table 2-1, Survey Requirements Matrix.
6. Added temporality attributes to all features allowing for the management of data using time. Eliminated the alternative (previous temporality method) from all features.
7. Added Geometric Constraints defining the relationship of certain features to other features (such as a runway centerline must be contained within a runway) to ensure the topological integrity is maintained between the associated features.
8. Added Feature attribution constraint information describing the minimum required attribution for each feature required by the system.
9. Added ESRI Geodatabases as an acceptable format for input of data to Airports GIS.
10. Significant changes aligned Chapter 5 of this AC with the FAA National Airspace System (NAS) Enterprise Architecture Base Infrastructure:
    - Identified attributes common to each feature in a single paragraph rather than repeating them in each feature description.
    - Removed the Information Assurance Level description from each feature description.
    - Updated or provided clarification of data capture rules.
    - Changed the feature name of Movement Area to Airport Movement Area.
    - Deleted Obstacle feature and replaced with Object Area, Object Line, and Object Point features.

- Updated the Airport Sign feature including defining a methodology for inputting the sign inscription in a standardized manner.
- Changed the feature name of Runway End to Runway Direction.
- Deleted Lease Zone feature.
- Renamed Runway Safety Area Boundary feature to Runway Safety Area.
- Deleted Taxiway Intersection as a separate feature and required the taxiway element feature to have the intersection attribute if it is an intersection.
- Deleted Runway Label feature and added it as an attribute to the Marking Area feature.
- Deleted Runway Protect Area and combined attributes and types into Runway Helipad Design Surface.
- Deleted Obstruction Area and replaced by the use of the Object Area feature.
- Deleted County feature; the system now generates this information from official government sources.
- Deleted Municipality; the system now generates this information from official government sources.
- Deleted State feature; the system now generates this information from official government sources.
- Deleted FAA Region Area; the system now generates this information from an official FAA source.
- Deleted Landmark Segment; replaced with Landmark Area, Landmark Line and Landmark Point, providing greater detail in representing landmark features.
- Changed the feature name of Shoreline to Natural Water Body, providing a more appropriate name for the feature.
- Deleted Building, Fence, Gate, and Tower features and replaced with Structure Line, Structure Point, and Structure Polygon.
- Added the use of the CodeLandUseType to the following features providing additional standardized descriptions for these features: Object Area, Object Line, Object Point, Noise Contour, Structure Line, Structure Point, Structure Polygon, Sidewalk Segment, Tunnel, Tank Site, Utility Line, Utility Point, Utility Polygon.
- Combined NAVAID Equipment features into a single feature entry, reducing the redundancy in the standard.
- Deleted Airport Control Point and replaced with Position feature. Combined all (airport Control Point entries) into a single entry to reduce redundancy in the standard.
- Added a feature for Vegetation to clarify difference between ground cover and low lying vegetation from Forest Stand Area.
- Added feature Dimension to support airport layout plan (ALP) and electronic airport layout plan (eALP) initiatives of the agency; added to new General group.
- Added feature Label Point to support ALP and eALP initiatives of the agency; added to new General group.

- Added Runway Declared Distance feature to allowing more flexibility in defining these critical elements.
- Added Final Approach and Takeoff Area as a separate feature and removed it from the runway helipad design surface.
- Added Runway Protection Zone feature (removed from runway helipad design surface) to provide for additional attribution and flexibility in visualization.
- Easements and Right of Ways is now Right and Interest aligned with other FAA standards.
- Moved the Restricted Access Boundary feature from Airfield group to Security group.
- Moved all National computer-aided design and drafting (CADD) standard mapping information to an appendix.
- Moved FAA Std-002, *Standard Engineering Drawing Preparation and Support*, mapping information to an appendix.
- Updated and refined enumerations used in the standard.
- Moved Coordinate Zone information from within Chapter 5 to an appendix.
- Updated the information to help map features to the other related standards of Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE), Aeronautical Information Exchange Model (AIXM), and DO-272, *User Requirements for Aerodrome Mapping Information*.

11. Provided general editorial and clarifications throughout the document.
12. Updated and expanded criteria in Chapters 1, 2 and 3 to meet the needs of the government for the data this AC defines.
13. Added hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) throughout this document and identified them with underlined text. When navigating within this document, return to the previously viewed page by pressing the “ALT” and “←” keys simultaneously.

5 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the

Advisory Circular Feedback form at the end of this AC.

for Michael T. McNerney

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, verifying the appropriate collection and safety implications of the prescribed data against defined, repeatable and verifiable standards far outweighs the potential costs. The collection and maintenance of the data regarding airports is a shared responsibility of the FAA and the Airport Authority 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.

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 technical 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) 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 the action is mandatory.
- The verb “should” means the action 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.
- 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 Data Provider Requirements.

The data provider will provide all labor, equipment, supplies, material, and transportation to produce and deliver data and related products as required under this guidance. The data provider 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 of Equipment.

Provide records of instrument calibrations or certification for all surveying equipment used in the data collection process. These records can include maintenance logs showing routine preventive maintenance and repairs or independent certifications of calibration. Data providers will upload these records as part of the data submission using the Airports GIS web site (https://airports-gis.faa.gov) as supporting materials of the data collection effort. Additionally, data providers will complete the online instrumentation and software sections of the web site to identify the equipment model and serial numbers, and versions of software used in collecting the data. If a hand–held electronic distance meter instrument (EDMI) is used, compare its distance measuring accuracy to a distance measured with a calibrated EDMI and upload this information as an equipment certification.

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 and Airport Authority 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. Ensure original logs and records are legible, neat, clear, accurate, and completed in indelible black ink. Complete all available entries on the recording forms, or indicate 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 must be done on a copy of the original with all changes initialed.

1.3.4 Unusual Circumstances.

The data provider will notify the Airport Authority and the responsible FAA Regional/District Airport Office of any unusual circumstances occurring during the data collection according to these specifications. The FAA Airports Regional/District Office will then consult with the appropriate government technical representatives to determine an appropriate course of action and advise the data provider.

1.3.5 Specification Review and Familiarity.

It is the responsibility of the data provider to ensure all personnel (including any subcontractors) involved in collecting, processing, or formatting the data are thoroughly familiar with the information in this guidance and in cited associated supporting materials these specifications reference.

1.4 Data Collection Planning and Reporting.

Data collection at airports is a complex activity requiring proper planning. Data providers must use the Airports GIS web site to properly plan and document how they will complete the data collection. Airports GIS provides a series of web forms for data providers to use in planning and documenting the project. Data providers are no longer required to submit portable document format (PDF) versions of their plans; instead, they must use the functionality Airports GIS provides for planning and documenting projects.

1.4.1 Types of Plans.

Airport data collection generally requires planning in four areas; geodetic control, ground control, remote sensing and field operations. In addition, data providers must complete information regarding the quality control processes they will use in planning and executing the data collection activity.

1.4.1.1 Geodetic and Ground Control Planning.

This plan covers not only geodetic control (Primary Airport Control Station (PACS) and Secondary Airport Control Station (SACS)) but also other ground control supporting the collection of data, such as imagery control stations and checkpoints. AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey*, specifies data providers complete survey planning before any mark setting or Global Positioning System (GPS) observations begin for review by the Airport Authority and the National Geodetic Survey (NGS). After reconnaissance, data providers must complete and submit their Geodetic and Ground Control planning through Airports GIS. NGS will review this plan and respond with an approval or comment via the Airports GIS web application as soon as possible, normally within five working days. Field work may start after the data provider receives notification via the web site of the approval.

1.4.1.2 Remote Sensing Planning.

This plan identifies how the data providers will utilize remote sensing technologies (aerial imagery or LiDAR) as part of the data collection. AC 150/5300-17, *Standards for Using Remote Sensing Technologies in Airport Surveys*, provides the guidance and specifications for the use of remote sensing technologies at airports. Data providers will use Airports GIS to provide the information necessary for the review and approval of remote sensing plans. Remote sensing plans should address the following areas, but are not specifically limited to these areas:

- Flight Line Planning: Submit a diagram identifying the collection methods (flight lines) and control stations used in the remote sensing process.
- Geo-referencing: Describe in detail the plan for using geo-referenced (aero-triangulated) imagery identifying the flight lines and control stations used in the remote sensing process with acceptable accuracies. Refer to AC 150/5300-17 for additional guidance and requirements.
- Feature Extraction: Detail methods for collecting airport features, such as airport buildings, aircraft movement areas, landmark features, and object 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 and the alternative method the data provider will use.
- Object Analysis: Provide a detailed description of the remote sensing methods used to identify, locate, and observe the required objects relative to the specified object identification surfaces provided in this guidance. Describe the data collection methods and the associated horizontal and vertical accuracies expected.

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

1.4.1.3 **Survey Field Work.**

Data providers must develop and submit survey field work plans through Airports GIS for approval before beginning any field work. The FAA designated representative will review and approve the survey field work plan. Airports GIS provides the data providers with the ability to detail the methods for data collection, the tools and software they plan to use and how they will safeguard the data to ensure it is not corrupted before submission to the government. Data providers must provide insight into how they will check all data to ensure it is complete, reliable, and accurate. Ensure you identify data safeguards used to protect this sensitive and safety critical data. Once the information is entered into Airports GIS, submit the plan for review by the government. The plans must include a description of the combinations of methods used to collect the data and must 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 plan should address each of the following areas but is not 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.
- Object Analysis: Provide a detailed description of the field survey methods used to identify, locate, and observe the required objects relative to the specified object identification surfaces provided in this guidance. Describe the data collection methods and the associated horizontal and vertical accuracies expected.
- Prior Survey Data: The FAA recommends the use of prior survey data in the data collection process. 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, verify and document the data set as accurate using the techniques described in Chapter 4.
- 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, data collection and the techniques used to merge the data sets into a single comprehensive airport data set.
- Equipment and Software 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 hardware and software.

1.4.1.4 **Quality Control Planning.**

The most important step in a data collection project is ensuring the quality and usability of the data. Data providers must detail in Airports GIS the measures they will use to ensure the collection of high quality data meeting the needs of the airport and the government. Data providers should use a checklist based quality control process with definable and repeatable standards for each element ensuring consistency of work between different personnel within an organization. The 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:

- A summary of methods to be used to ensure high-quality data.
- A description of the quality control measures to be used to ensure all data is checked, complete, reliable, and meets the accuracy requirements in this AC.
- Evidence of the methods to be used to collect the various types of features to meet the desired accuracies.
- A description of the data backup and archive procedures and methods to be used to ensure the integrity of the original data.
- An explanation of the methods to be used to check all file formats and a summary of the file-naming convention for all electronic files.

1.4.2 Pre-Survey Preparation Activities.

1.4.2.1 **Contact with Airport Authorities.**

Close communication with airport management is critical throughout the entire data collection 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 meeting the requirements of AC 150/5210-5, *Painting, Marking and Lighting of Vehicles Used on an Airport*, and radios capable of communicating on Air Traffic Control frequencies. Contact with the airport traffic control tower is mandatory during data collection 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 to or near the site. When approaching landowners regarding access, be sure to 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.

1.4.2.2 **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 Authority the runway/stopway data published in the latest editions of the Airport/Facility Directory (A/FD) and U.S. Terminal Procedures (TPP), and both U.S. Government Flight Information Publications. Data providers can access these publications free of charge at the following FAA web site https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/. During the project, additional meetings may be required to discuss unusual circumstances, problems, or changes to published or given data. 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 personnel in all of these areas of expertise or they may not be located at the airport. Complete interviews with the following personnel if possible.

1.4.2.2.1 Airport Manager/Operations.

The airport manager/operations is the key individual on the airport. It is important for the data provider to contact the airport management prior to visiting the site. This allows the data provider an opportunity 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.

1.4.2.2.2 Airport Engineering.

This interview is generally only 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 (POC) in the final project submission in case questions arise after the survey.

1.4.2.2.3 Air Traffic Control.

If an Airport Traffic Control Tower (ATCT) is operational during the time of data collection, discuss the project with the Air Traffic Manager or their designated representative. This interview can provide information on operational factors and facilitate the working relationship between the data provider and the air traffic controllers. Include contact information in the final project submission.

1.4.2.2.4 FAA Technical Operations.

An interview with FAA Technical Operations 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. If necessary, 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 data provider personnel to certain facilities to let them through a gate or monitor an alarm while collecting data within critical areas of the site. Include the contact information for the assigned FAA Technical Operations POC in the final project submission in case questions arise after the survey.

1.5 Data Accuracy.

The data about airports is critical to the operation and safety of the National Airspace System (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, so it is necessary to collect them through field survey. The accuracy for geospatial vector airport features (taxiway, aprons, ramps, buildings, etc.) is typically mapping grade accuracy, usually within 3 feet horizontally and 5 feet vertically (Refer to Chapter 5 for complete accuracy requirements). The required accuracies for many airport features are not achievable using remotely sensed methods and require the use of field survey methods. Specific runway, stopway and navigational aid data accuracies are usually within 1 foot horizontally 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 National Spatial Reference System (NSRS). Derived elevations must be within 10 feet vertically. Refer to the appropriate section of this guidance for specific information on the different types of surveys typically performed on or near an airport. In all cases, the geographic coordinate and elevation accuracies of the data must meet or exceed the requirements in this AC and in the following guidance.

1.5.1 Geodetic and Ground Control Data.

The control stations established near the airport and used in the collection of the data must meet all accuracy requirements and other criteria specified in AC 150/5300-16. These control stations and their accurate connection to the NSRS ensure accurate relativity between all surveyed points on an airport and the NAS, including navigation satellites.

1.5.2 Remote Sensing.

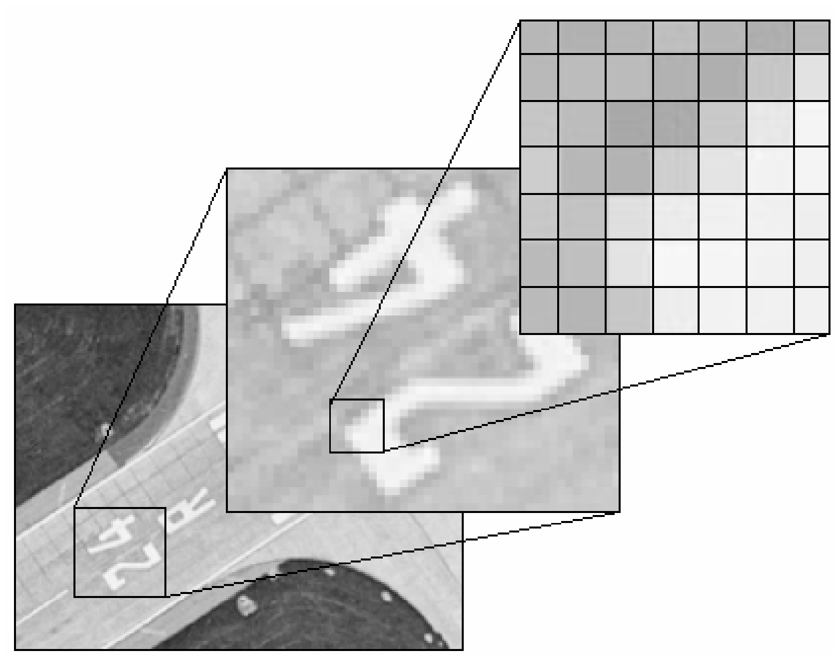
The remote sensing technologies used in the data collection process must meet or exceed the standards, specifications, and accuracy requirements specified in AC 150/5300-17. Ensure the spatial resolution and vertex spacing provides an accurate representation of features without compromising the accuracy 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 in 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 fewer 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 final project submission information the methods used in the deductive method including complete calibration tests, and describe assumptions about error propagation.

1.5.3 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 1-1 provides an example of an orthorectified raster image of an airport. Imagery requirements are specified in AC 150/5300-17.

Figure 1-1. Example of Raster Imagery.



1.6 **Final Reporting.**

Airports GIS provides users the ability to submit data supporting their collection of the data at or for an airport. The final project submission is a compilation of documentation supporting the collection of the data and provides a standardized delivery of field notes, raw survey data and project summary to facilitate the independent verification, validation, and quality assurance of the data. The final project submission addresses each of the following areas.

1.6.1 Project Summary.

Provide a written overview of the project details and conclusions. The summary describes the scope of the data collection identifying the key elements of the project (i.e., runway, object identification and analysis, mapping, and navigational aid (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.

1.6.2 Survey Data Conclusions.

Provide your conclusions regarding the following subjects as they relate to this project.

1.6.3 Control Network Survey Results/Conclusions.

Provide a description of the control network used as the basis of the data collection 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 using 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 used in data reduction.

1.6.4 Field 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, 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 planned construction at the airport that causes concern.
- 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.).

1.6.5 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 data collection by the validation team.

1.6.6 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. In this section, provide an overview of the pre-survey interviews completed as part of the project preparation.

1.7 Independent Data Validation and Verification.

Due to the critical nature of some airport features, the FAA requires independent verification and validation. Typically, these features are those associated with the airport's movement areas, navigational systems or those affecting flight, such as objects surrounding the airport. Once the independent verification, validation and quality assurance of the data is completed, the government technical representatives will, through Airports GIS, provide the data provider with a written analysis of their findings including approval or disapproval of the data. Using the functions within Airports GIS, the government technical representatives will identify and list any discrepancies discovered relating to these specifications and decide on the usability of the data. In some cases, data providers may need to provide updates to the data prior to its acceptance by the government. If updates to the data are necessary, only the data requiring updating will require resubmission. Data previously submitted and accepted will already be within the system.

1.7.1 Verification.

In this guidance, "verification" is defined as the confirmation by examination and provision of objective evidence that the requirements are fulfilled. Verification is necessary to ensure the data set accurately fulfills the specified requirements and is uncorrupted. The verification process proves the data was properly collected. The following verification techniques compose 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 data set to compare the submitted data against.
- Reasonability checks to ensure the data set does not violate known properties (such as: objects must have positive orthometric heights).

1.7.2 Validation.

In this guidance, "validation" differs from "verification" in scale. The validation process ensures the aeronautical information submission was correctly developed as an input to the system. Validation is the confirmation by examination and provision 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.

Chapter 2. SURVEY SPECIFICATIONS AND STANDARDS

2.1 Introduction.

Airports conduct surveys for many reasons. However, all survey types require the collection, classification and reporting of accurate data about the project. All geospatial data collection completed on the airport will provide the information outlined in Chapter 5 within the stated accuracies. The method selected to gather the information is up to the data provider'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 geospatial data collection conducted on the airport to tie in some way to the National Spatial Reference System (NSRS). When the project uses an engineering grid rather than a national grid, tying the local grid to the NSRS ensures accurate relativity to other NAS elements. 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 Geodetic and Ground Control.

Data providers must establish and maintain appropriate ties to the NSRS for all data collection supporting airports or instrument flight procedures. The geodetic and ground control stations established near the airport and their accurate connection to the NSRS ensure accurate relativity between all surveyed points on an airport and the NAS. Data providers must ensure this connectivity by referencing all data to appropriate ground control at the airport. Refer to AC 150/5300-16 for guidance on establishing geodetic control and the NSRS.

2.2.1 Horizontal Control.

The data provider will provide horizontal control on the airport referenced to the North American Datum of 1983 (NAD 83) for all data collection activities. Data providers must ensure they are using the most current adjustment of NAD 83. The year of adjustment for all NSRS control stations is on the NGS data sheet next to the latitude and longitude of the station. Data providers must establish and use either permanent or temporary control stations to connect to the NSRS. Establish geodetic and ground control stations according to the standards and specifications of AC 150/5300-16 and NGS. Data providers must identify in the survey plans section of Airports GIS all control stations they plan to use in collecting the data.

2.2.2 Vertical Control.

Data providers will provide on airport vertical control referenced to the North American Vertical Datum of 1988 (NAVD 88). Data providers establish and use permanent or temporary control station on the airport to ensure appropriate vertical ties to the NSRS. Data providers can find further information regarding NAVD 88 in AC 150/5300-16 and at the following internet location.

(http://www.ngs.noaa.gov/PUBS_LIB/NAVD88/navd88report.htm). Data providers will reference all ellipsoid heights to NAD 83 (GRS-80) realization.

2.2.3 Geoid Model.

The data provider must use the NGS geoid model current at the time of data collection. For further information regarding geoid models refer to the following website: http://www.ngs.noaa.gov.

2.2.4 Airports Requiring Geodetic Control Monumentation.

AC 150/5300-16 provides guidance and specifications for data providers in the establishment and submission of geodetic control data. Many airports have existing permanent geodetic control in place. However, if the airport does not, the following information is provided for reference.

2.2.4.1 **Permanent Control.**

FAA Regional Airports Divisions will determine which airports require permanent geodetic control monumentation in the form of PACS or SACS based on the activity (operational or proposed construction) at the airport. However, for all airports in the National Plan of Integrated Airport Systems (NPIAS), we strongly recommend that at least the PACS be established.

2.2.4.2 **Temporary Control.**

Where it is not reasonable from a cost perspective to establish permanent control at the airport, the FAA Regional Airports Division may allow temporary airport control to be established and tied to the NSRS through the use of the NGS Online User Positioning System (OPUS). Data providers should observe the following practices when using the OPUS to establish temporary airport control:

- Establish at least two independent but intervisible marks on an airport as a conformity check and providing for redundant observations.
- Observe each mark in two continuous and independent sessions of at least four hours and submit these observations to the NGS OPUS site at http://www.ngs.noaa.gov/OPUS/.
- Review and follow all other NGS requirements outlined for use of the OPUS.
- Include results of the OPUS sessions in the final project submission information in Airports GIS.

2.2.5 Geodetic and Ground Control Data Format.

When submitting 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.

2.2.6 Verification of Existing Survey Marks.

Where practical and available, data providers should plan to use existing geodetic and ground control stations. 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.

To verify the unmoved position and elevation of an existing control station data providers should make two independent GPS observations, 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 project submission information. 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.

Once the data provider verifies the position and elevation, they should submit a recovery report for the PACS and SACS to the NGS at the following web site: http://www.ngs.noaa.gov/cgi-bin/recvy_entry_www.prl. Verification is not required if the data provider performing the survey also established the monuments by satisfying the requirements of AC 150/5300-16 for the same airport as part of the same project.

2.3 Field Survey Operations.

2.3.1 Preparation.

Carefully evaluate the requirements in the statement of work from the Airport Authority 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 specific sourced data requirements of each survey require 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 the Airport Authority.

- Review imagery and United States Geological Survey (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 Authority 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.
- Obtain and review all data available from the FAA or the airport for its applicability to the project.
- Coordinate with airport authorities.
- Provide the appropriate planning information through the Airports GIS web site for review and approval.

2.3.2 Data.

Airport data collection projects will include identifying and observing accurate positions and elevations for many different airport features. Be sure you understand the requirements of this AC for each type of feature you may encounter during the project. Table 2-1, Survey Requirements Matrix, is a good starting point for determining the data collection requirements for different types of projects. For airport airspace analysis surveys, specific points along runways, runway vertical profiles, positions and elevations of navigational aids, positions and elevations of objects within the Object Identification Surface, and positions and elevations of certain non-obstructing objects 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.

2.4 Data Collection Supporting Documentation Requirements.

2.4.1 Digital Images from Hand-held Cameras.

Provide digital photographs taken during daylight hours to document monuments used or data collected. These photos assist in retracing the data provider's steps by providing the evaluators with a picture of what the data is describing. Take sufficient photographs to document the conditions encountered. These images 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. 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. A photograph is acceptable if it meets the requirements of this AC and is clear, in focus, and adequately represents the information. Use the highest resolution possible to ensure good clarity and detail definition.

2.4.1.1 **Types of Photos.**

Provide at least one of the following three types of photos to document a position or object. Provide a digital caption and file name as specified in paragraph 2.4.1.2.

- Photograph Type 1 is an extreme close-up of the object as shown in Figure 2-1. Typically, this type of photograph is only used to document control monuments or other defined points such as runway end or displaced threshold locations.
- Photograph Type 2 (Figure 2-2) is taken at eye-level with the station or object 5 to 6 feet in the distance and provides general information about the area immediately surrounding the station or point.
- Photograph Type 3 is taken horizontally with the station approximately 10 to 30 feet in the distance (Figure 2-3). Photograph Type 3 provides general orientation information to the user with a caption including the cardinal direction the camera is pointing in.

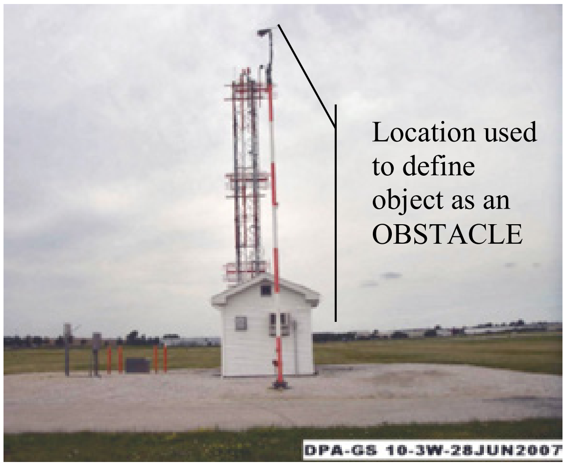
When documenting navigational aids surveyed, as in Figure 2-4, take two photographs from different cardinal directions. Take the photograph, using a tripod, over the horizontal and vertical (if practical) survey point or electronically add arrows to the photograph showing the point(s) surveyed. The independent verification and validation team uses these photos to confirm the correct point was surveyed based on the type of navigational aid.

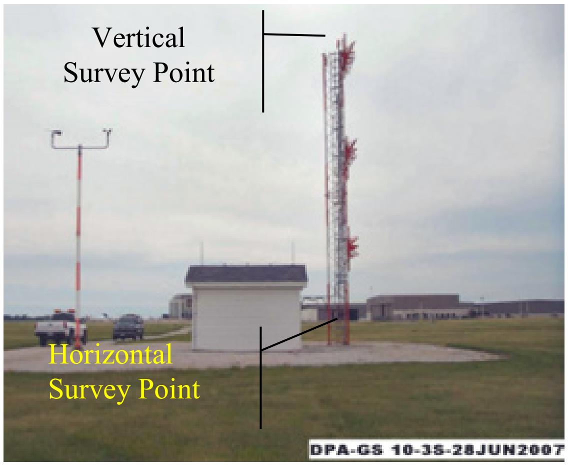
Figure 2-1. Photograph Type 1.

Figure 2-2. Photograph Type 2.

Figure 2-3. Photograph Type 3.

Figure 2-4. Illustrates Documentation of a Glideslope Antenna from Different Perspectives.





2.4.1.2 **Digital Image File Naming Convention.**

Use the following file naming convention for photograph filenames. The filename is composed 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 an underscore —except precede the photo number with a dash. For example, the filename for a runway endpoint at Los Angeles International Airport (LAX) would be LAX_CL_END_RWY_12R-3_04MAY2001.jpg. Decoding the example, "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/.

2.4.1.3 **Digital Image Electronic Caption.**

For each digital image, provide an electronic caption. The caption should include the following information separated by commas or dashes:

- Airport location identifier assigned by the FAA.
- Runway end designator.
- Photo type 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 direction (N, NE, E, SE, etc.) the camera is pointing. An example is LAX, 12R, 3NE, 23 Aug 2004.

2.4.2 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 relating the construction and the field collection together.

- All NAVAIDS located off the airport (digital photographs are sufficient).

2.4.3 Field Note Information and Data.

2.4.3.1 **Geodetic Control Data.**

Provide the raw-data files containing the observational data used for establishment or verification of the geodetic and ground control, including any data used to plot temporary points occupied. Typically, these files include the original raw GPS data files (in both the manufacturer'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.

2.4.3.2 **Survey Information and Data.**

Providing the observational data collected during the survey 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 and 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. These photographs will provide supporting information for follow-on work at the airport, and may include 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 log sheets or sketches completed during the survey.

2.4.3.3 **Project Execution Guidelines.**

The tasks completed during the data collection 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 items to assist in ensuring proper planning and execution of a successful data collection project. The FAA provides a checklist for the deliverables on the program website at https://airports-gis.faa.gov.

- Complete the necessary planning and ensure you receive the appropriate approvals. If the work deviates from the plan, identify the differences in the final project submission.
- Complete and document the Pre-Survey Preparation Activities outlined in Chapter 1 of this AC.
- Read and fully understand the standards and specifications in this AC. If something is unclear, direct questions to the responsible Airport

District or Regional Office. Having a complete understanding of the requirements and completing them appropriately will reduce the time it takes to validate and verify the data. It will also reduce the amount of rework you may need to complete.

- Get the deliverables checklist from the Airports GIS web site and use it to ensure you are providing all of the required data and supporting documentation.
- Digital Files to be delivered:
  - Provide the documentation required for each feature as defined by the descriptions in Chapter 5. 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 these specifications. 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 include, but not limited to:
    - Data collector files
    - GPS receiver files
    - Continuously Operating Reference Station (CORS) data downloaded
    - Photogrammetric observation files
    - Other field measurement devices' digital raw data (range finder, scanner, etc.)
    - 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.
    - Airport point of contact list for use by the independent verification and validation team in the final project submission information.
    - Copies of any correspondence and transmittal letters for all deliveries provided to the Airport Authority or FAA.
- Manage the project to completion including completing the Final Project submission information documenting the data collection project.

2.5 Determining the Survey Requirements.

The following matrix identifies the high level requirements for the different survey types typically encountered at an airport. The matrix is meant as a starting point to help users scope the project appropriately. Airport operators should consult with their local Airports Regional or District Office when scoping a data collection project.

Table 2-1. Survey Requirements Matrix

Row	Intended End Use of the Data ➤	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Construction		Instrument Procedure Development	Pavement	Airport Mapping Database
	Required Tasks ⮛			Non-Precision	Precision	Visual		Airside	Landside		Design, Construction, Rehabilitation or Roughness	
1	Provide Geodetic Control Plan	150/5300-16	•	•	•	•	•	•	•	•	•	•
2	Provide remote sensing plan	150/5300-17					•					
3	Provide a Survey Field Work Plan	150/5300-18					•					
4	Provide Quality Control Plan	150/5300-16/17/18					•					
5	Establish or validate Airport Geodetic Control	150/5300-16	•	•	•		•	•		•	•	•
6	Perform, document and report the tie to National Spatial Reference System (NSRS)	150/5300-16	•	•	•	•	•			•		•
7	Survey runway end(s)/threshold(s)	150/5300-18	•		•	•	•	•[1]		•	•	•
8	Monument runway end(s)/threshold(s)	150/5300-18	•		•	•	•	•[1]		•	•	
9	Document runway end(s)/threshold location(s)	150/5300-18	•		•	•	•	•[1]		•[1]	•[1]	
10	Identify and survey any displaced threshold(s)	150/5300-18	•		•	•	•	•[1]		•	•	•
11	Monument displaced threshold(s)	150/5300-18	•		•	•	•[1]	•[1]		•		
12	Document displaced threshold(s) location	150/5300-18	•		•	•	•	•[1]		•	•	•
13	Determine or validate runway length	150/5300-18	•				•	•[1]		•	•	•
14	Determine or validate runway width	150/5300-18	•				•	•[1]		•	•	•
15	Determine runway profile using 50 foot stations	150/5300-18			•		•	•[1]		•	•	
16	Determine runway profile using 10 foot stations and 10 foot offsets at Part 139 airports	150/5300-18	•		•		•	•[1]		•	•	•
17	Determine the touchdown zone elevation (TDZE)	150/5300-18	•		•		•			•	•	
18	Determine and document the intersection point of all specially prepared hard surface (SPHS) runways	150/5300-18	•				•					•
19	Determine and document the horizontal extents of any Stopways	150/5300-18	•				•			•		•
20	Determine any Stopway profiles	150/5300-18	•				•			•		•

[1] Only when runway construction is involved.

Row	Intended End Use of the Data ➤ / Required Tasks ⮟	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
				Non-Precision	Precision	Visual		Airside	Landside			
21	Determine if the runway has an associated clearway	150/5300-18	•				•					
22	Survey clearway to determine objects penetrating the slope	150/5300-18	•				•			•		•
23	Determine and document the taxiway intersection to threshold distance	150/5300-18					•					
24	Determine runway true bearing	150/5300-18	•		•		•			•		•
25	Determine or validate and document the position of navigational aids	150/5300-18	•	•	•	•	•			•		
26	Determine or validate and document the position of runway abeam points of navigational aids	150/5300-18	•		•	•				•		
27	Determine potential navigational aid screening objects	150/5300-18		•	•	•						
28	Identify, classify and provide navigational aid critical areas	AC 150/5300-13, FAA Order 6750.16		•	•	•	•					
29	Collect and document VOR receiver checkpoint location and associated data	150/5300-18		•							•	
30	Perform or validate and document an airport airspace analysis	150/5300-18	•	•	•	•	•	•[1]		•		
31	Collect and document helicopter touchdown lift off area (TLOF)	150/5300-18				•	•	•		•	•	•
32	Collect and document helicopter final approach and takeoff area (FATO)	150/5300-18				•	•	•		•	•	•
33	Collect or validate and document airport planimetric data [2]	150/5300-18					•	•	•			•
34	Determine or validate the elevation of the Air Traffic Control Tower Cab Floor (if one is on the airport)	150/5300-18	•				•	•	•			•
35	Perform or validate a topographic survey	150/5300-18	•[3]	•	•		•	•	•	•[4]		
36	Collect and document runway and taxiway lighting	150/5300-18	•				•					•

[2] In this guidance, planimetric data is defined as representing airport features that are works of man or natural features within the boundaries of the airport.
[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.

Row	Intended End Use of the Data ➤	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
	Required Tasks ⮛			Non-Precision	Precision	Visual		Airside	Landside			
37	Collect and document parking stand coordinates	150/5300-18										•
38	Collect cultural and natural features of landmark value	150/5300-18					•					•
39	Determine elevation of roadways at the intersecting point of the Runway Protection Zone (RPZ)	150/5300-18	•				•					
40	Determine elevation of roadways at the intersecting point of the 14 CFR part 77, *Approach Surfaces,* and the runway centerline extended	150/5300-18					•					
41	Determine all **Land Use** to 65 DNL contour	150/5300-18					•					
42	Document features requiring digital photographs	150/5300-18	•	•	•	•	•	•		•		
43	Document features requiring sketches	150/5300-18	•	•	•	•	•	•		•		•
44	Collect position and type of runway markings	150/5300-18	•				•					•
45	Collect position and type taxiway markings	150/5300-18					•					•
46	Locate, collect, and document photo ID points	150/5300-17					•			•		
47	Identify collect, and document wetlands or environmentally sensitive areas	150/5300-18					•					
48	Collect imagery	150/5300-17	•				•			•		•
49	Determine and provide required dimensions	150/5300-18					•					
50	Determine and provide required labels for all surfaces	150/5300-18					•					
51	Develop, analyze and provide 14 CFR part 77 surfaces	150/5300-18					•					
52	Identify and provide water and sewage facilities within lateral limits of 14 CFR part 77 surfaces	150/5300-18					•					
53	Develop, analyze, and provide Airport Design Surfaces	150/5300-18					•					
54	Identify, classify, and provide the **Airport Boundary** (existing and future) with easements (fee and simple)	150/5300-18					•					
55	Identify, classify, and provide on and off **Airport Parcels** including easements (existing, future, and ultimate)	150/5300-18					•					
56	Identify, classify, and provide all roads and railroads within the lateral limits of the 14 CFR part 77 surfaces	150/5300-18					•					

Row	Intended End Use of the Data ➢ / Required Tasks ⮟	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
				Non-Precision	Precision	Visual		Airside	Landside			
57	Identify, classify and provide all air carrier gate locations	150/5300-18					•					
58	Identify, classify and provide all fueling facilities	150/5300-18					•					
59	Identify, classify and report all major airport drainage ditches or storm sewers	150/5300-18					•					
60	Identify, classify and provide all vehicle parking areas associated with the airport	150/5300-18					•					
61	Identify, classify, and provide all special use areas (e.g., agricultural spraying, deicing, or containment, etc.)	150/5300-18					•					
62	Identify, classify and provide building restriction line	150/5300-18					•					
63	Identify, classify, and provide all security and general purpose fencing and gates (including height AGL). Provide existing and future	150/5300-18					•					
64	Identify, classify and provide the Runway Visibility Zone	150/5300-18					•					
65	Identify, classify, and provide general aviation development areas	150/5300-18					•					
66	Identify, classify, and provide Declared Distances	150/5300-18					•			•		
67	Identify, classify and provide ground elevation contours and spot elevations	150/5300-18	•				•					
68	Identify, classify and provide aircraft tie down locations	150/5300-18					•					
69	Identify, classify and provide existing and ultimate data as appropriate	150/5300-18					•					
70	Identify, classify and provide any objects of landmark value within the approach surfaces e.g., bluffs, rivers, roads, schools, churches, libraries towers, etc.)	150/5300-18					•					
71	Identify, classify and provide 50 foot elevation contours on all 14 CFR part 77 sloping surfaces	150/5300-18					•					
72	Identify, classify and provide the top elevation (MSL) and height (AGL) for all penetrating objects and representative objects	150/5300-18					•			•		

Row	Intended End Use of the Data ➢ / Required Tasks ⮟	AC Reference	Category II or III Operations	Navigational Aid Siting			Airport Layout Plan (ALP)	Construction		Instrument Procedure Development	Pavement Design, Construction, Rehabilitation or Roughness	Airport Mapping Database
				Non-Precision	Precision	Visual		Airside	Landside			
73	Identify, classify and provide all representative and penetrating obstacles	150/5300-18					•			•		
74	Identify, classify and provide all on airport building and include building numbers	150/5300-18					•					
75	Airport overlay zoning or zoning restrictions	150/5300-18					•					
76	Identify, classify and report all public use facilities (schools, churches, libraries, hospitals, parks, etc.) within the limits of the 14 CFR part 77 surfaces	150/5300-18					•					
77	Identify, classify and provide TERPS surfaces evaluated (existing and future)	150/5300-18					•					
78	Provide a final project submission information	150/5300-16/18	•	•	•	•	•	•	•	•	•	•

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2.6 **Types of Surveys.**

2.6.1 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 following National Geodetic Survey (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 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 three 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, advise the airport and the responsible FAA Airports Regional or District Office for guidance. The FAA Airport Regional or District Office will review the situation and may seek the guidance or recommendations of government technical representatives before advising the Airport Authority on a path forward.

2.6.2 Runways.

This section provides data providers 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 bearing, among other data elements. In many cases, the locations of these points are not obvious and the precise survey point selection may not be consistent among surveyors. Figure 2-5 highlights how the placement of survey equipment can result in incorrect data collection. The incorrectly placed survey equipment is located over an outdated or incorrect survey mark and is not placed directly above the actual endpoint of the runway. The correctly placed survey equipment is located within acceptable parameters of the runway end.

Figure 2-5. Photograph Highlights How Ground Evidence and Painted Marking Supporting Features may not be Consistent.

Incorrectly placed survey equipment

Correctly placed survey equipment

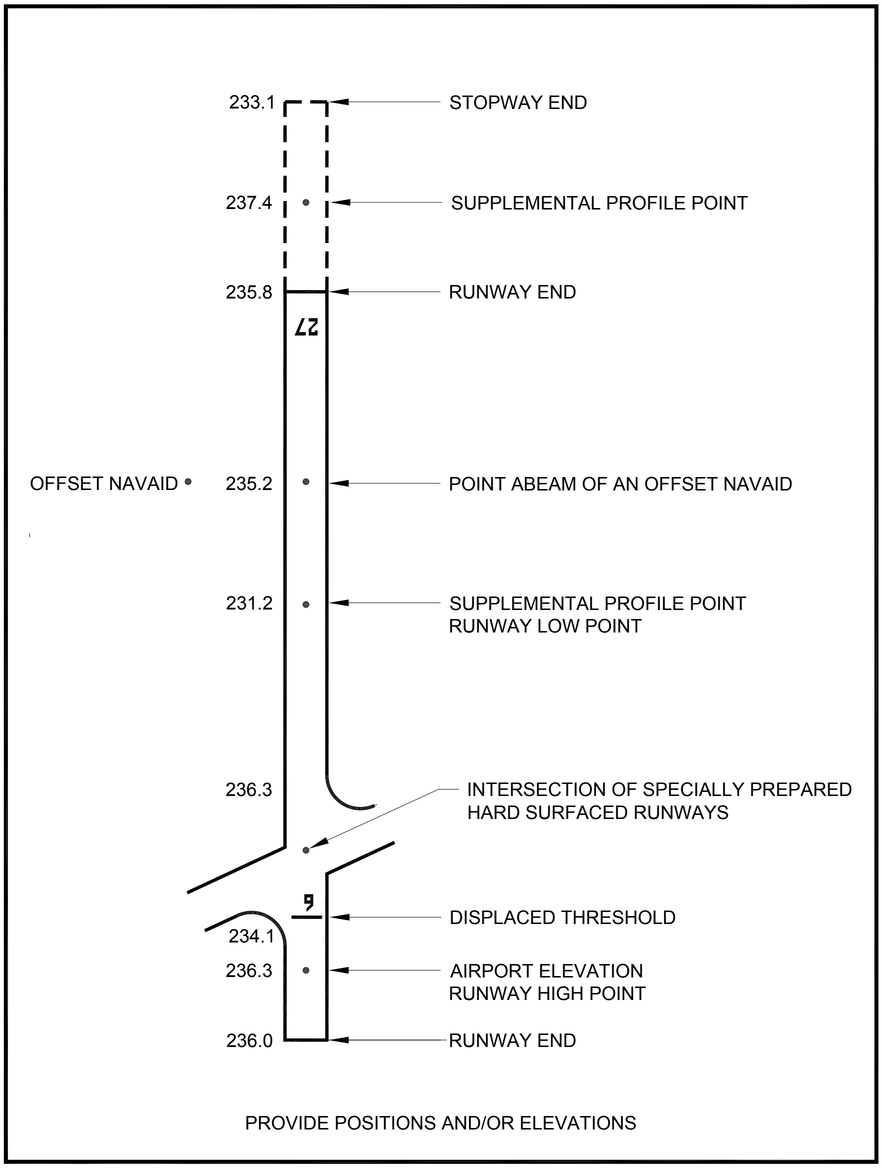
The FAA has issued a series of advisory circulars establishing standards for construction, markings (painting), lighting, signage, and other items pertaining to runways/stopways. Airports certificated under 14 CFR part 139 and Federally obligated airports must comply with the published standards. However, 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 data collection. 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 data providers correctly identify runway/stopway survey points, not only when standard markings exist, but also in the many cases where a nonstandard situation is encountered.

2.6.2.1 **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 2-6. Additionally, it provides guidance on the accurate collection of profile points along the runway. These points support many different areas of airport planning and design as well as other initiatives within the FAA such as instrument flight procedure design. Typically, the runway end, stopway, and displaced threshold positions are 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, Runway Direction, Stopway**, **Displaced Threshold** and **Position** (for 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. Use the same features to provide the data for non-specially prepared hard surface (non-SPHS) runways and stopways 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 and **Clearway** data using the feature if it is requested by appropriate authorities (FAA, Airport Authority, State Aviation authority). Data providers 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 to document published data and collected data. Download the form from the FAA Airports GIS website at https://airports-gis.faa.gov.

Figure 2-6. Depicts Some of the Required Points and Elements of a Runway or Stopway.

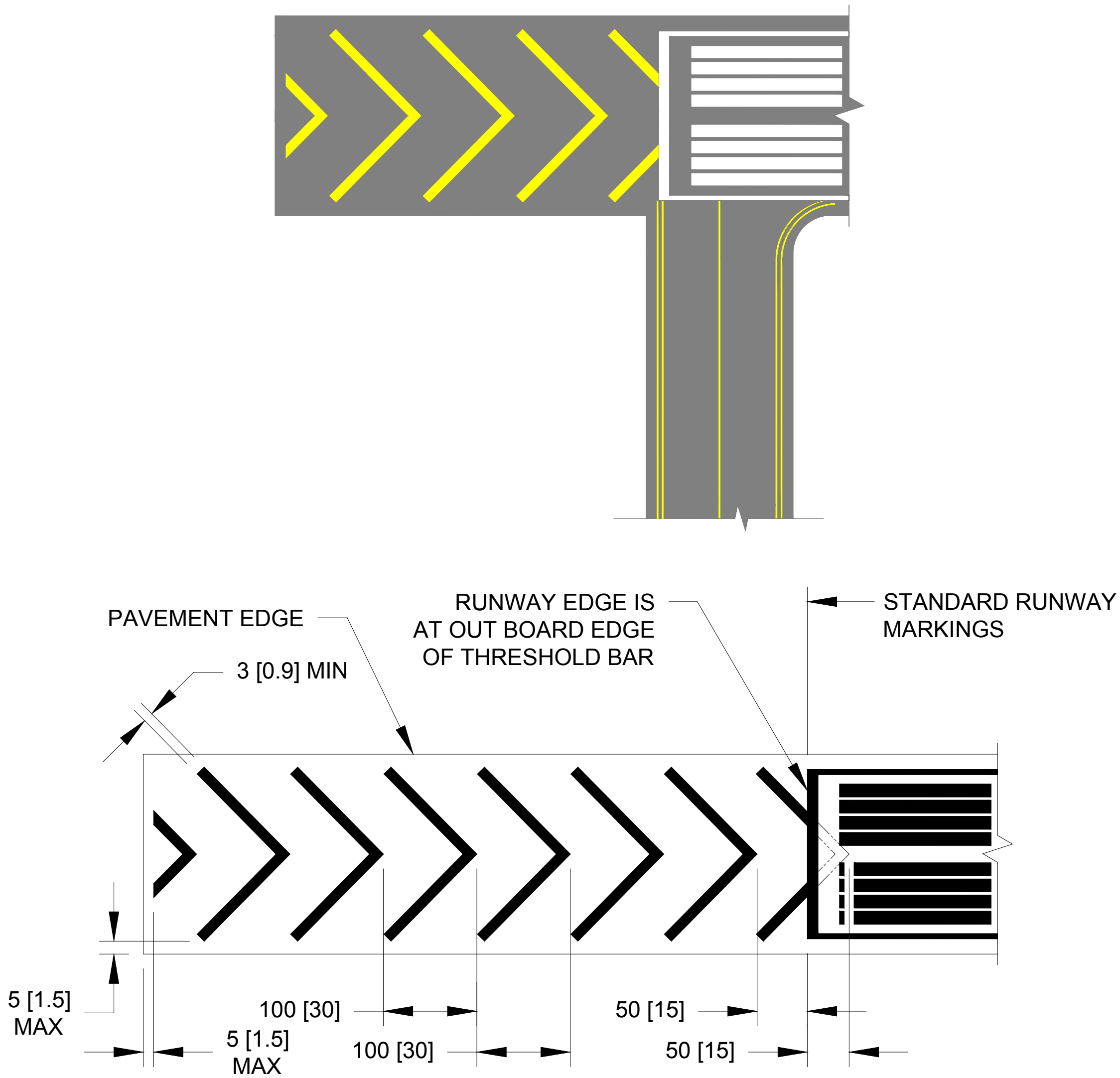


In order to be a stopway, the area must be officially designated, appropriately marked, and approved as a stopway by the Airport Authority and the FAA. The following points about stopways are important for the data provider to keep in mind:

- 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 2-7). Unless otherwise stated, capture all runway, stopway, and clearway points on the centerline of the runway, stopway, or clearway (as appropriate) being represented.

Figure 2-7. An Example of the Proper Marking for a Blast Pad or Stopway.



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].

2.6.2.2 **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 length of the pavement before a displaced threshold (if there is one) is included in the physical length of the runway. Determine runway lengths from the positions of the runway ends. Determine the runway end positions using the guidance provided in the data capture rules for the **Runway Direction** feature in Chapter 5.

The runway width is the width extending over the entire length of the rectangle defining the runway surface, or the area within the runway side stripes if the full pavement width is not available as a runway. Determine the width of the runway by measuring the width as a line perpendicular to the defined runway centerline. Where the runway has painted runway edge markings measure the width to the outer edge (shoulder side) of the markings. If the runway does not have painted runway edge markings, measure from pavement edge to pavement edge at multiple places and report the narrowest dimension. Measure and record runway widths to the nearest whole foot and include the dimension on the runway end sketch. If the runway width is less than 100 feet, report the value to the nearest 5 foot increment. If the runway width is greater than 100 feet, report the width to the nearest 10 foot increment. 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 attempt to resolve any discrepancies before departing the site. If the discrepancy cannot be resolved, note the discrepancy and document the discussions with the airport officials in the final project submission information for review by the independent data validation and verification team and resolution by the FAA with the Airport Authority.

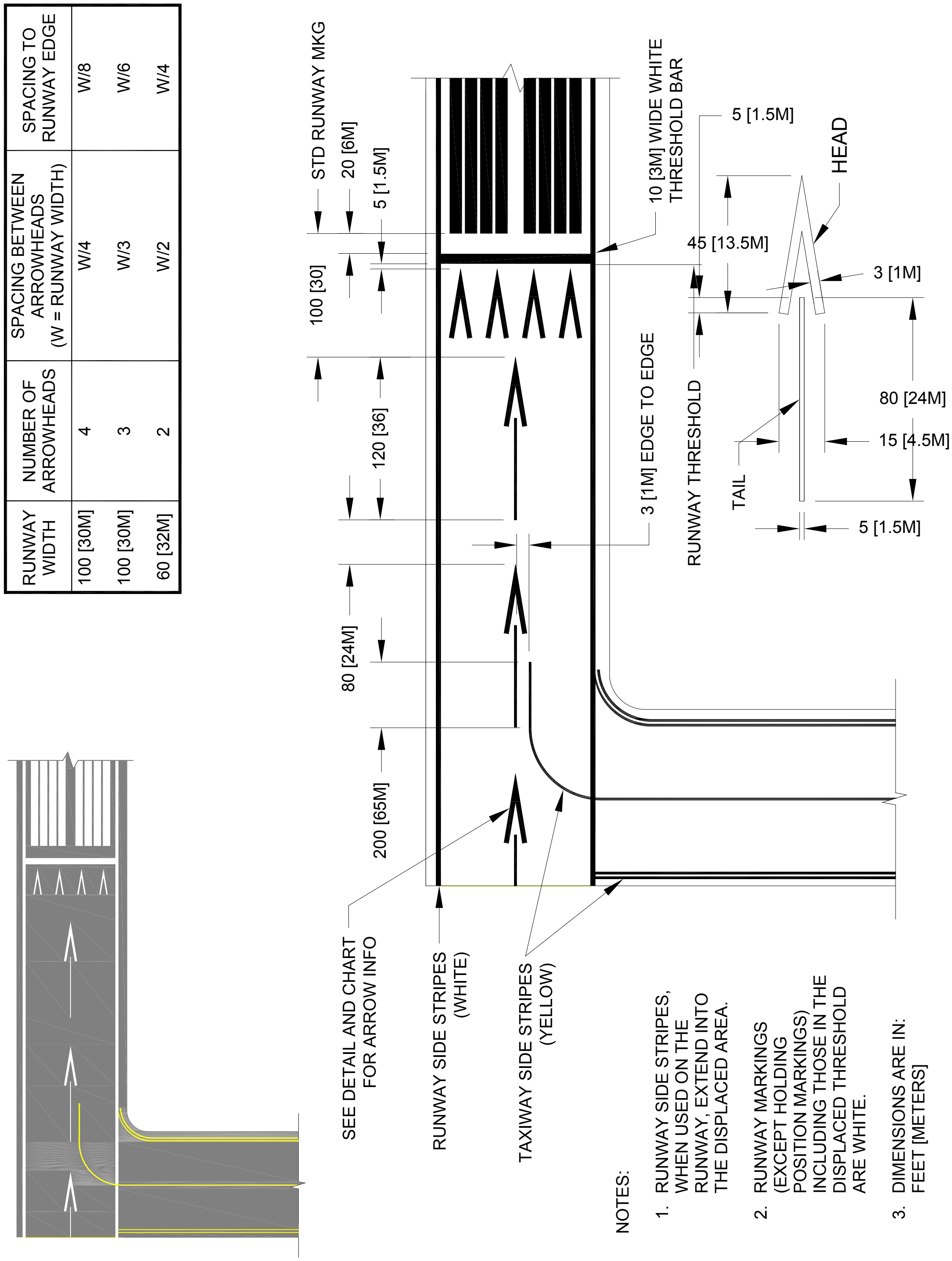
Determine and provide the runway bearing from true North to the nearest thousandth (0.001) of a degree between the physical runway ends. Compute the runway true bearing inverse using either the NGS program INVERS3D (available on the NGS website at http://www.ngs.noaa.gov/TOOLS/), the Geographic Calculator available through Airports GIS or a comparable commercial product. Document the runway true bearing in the appropriate attribute in the **Runway Direction** feature. Determine and report the true bearing for each runway direction.

2.6.2.3 **Displaced Thresholds.**

On some runways, the threshold is displaced due to objects in the approach area penetrating the threshold siting surface, for example, or to meet runway safety area length requirements where the airport is constrained. When a displaced threshold is encountered it must be identified (see Figure 2-8), classified, and documented (see Supporting Documentation information in the data capture rules in Chapter 5 for documentation requirements) similarly to a runway end. In FAA Airports GIS, a displaced threshold is modeled using the

Displaced Threshold feature with a value in the POSITIONROLECODE of **Displaced Threshold**.

Figure 2-8. Illustrates the Proper Marking of a Displaced Threshold.



RUNWAY WIDTH	NUMBER OF ARROWHEADS	SPACING BETWEEN ARROWHEADS (W = RUNWAY WIDTH)	SPACING TO RUNWAY EDGE
100 [30M]	4	W/4	W/8
100 [30M]	3	W/3	W/6
60 [32M]	2	W/2	W/4

2.6.2.4 **Establishing the Runway Endpoint.**

Use existing FAA or airport provided runway endpoint data to assist in locating the points identifying the threshold (physical or displaced) of the runway. The data capture rules for the **Runway Direction** feature provides detailed identification descriptions; additionally, Appendix B provides clarifying guidance. Recover, verify or establish and document the following points (see Figure 2-6) using the appropriate feature from Chapter 5.

- Runway endpoints – using the **Runway Direction** feature
- Displaced threshold points – using the **Displaced Threshold** feature
- Clearway endpoints – using the **Position** feature
- Stopway endpoints – using the **Position** and **Stopway** features
- Runway High and Low points – using the **Position** feature
- Touchdown Zone Elevation – using the **Position** feature
- Intersection of two runway centerlines – using the **Position** feature
- Points abeam offset navigational aids – using the **Position** feature

Figure 2-9. Illustrates the Use of Day Markers to Define the End of a Runway.

2.6.2.5 **Location of Specific Survey Points.**

The locations of the following runway and stopway survey points are defined by the intersection of the runway or stopway centerline and one of the indicated survey point locators as detailed in the data capture rules for the feature 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 appropriate FAA Airports Regional or District Office 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.

2.6.2.6 **Runway and Stopway Profiles.**

The runway profile provides information about the runway gradient, establishes the airport elevation, runway high and low points, 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 airports certificated under 14 CFR part 139 collect runway centerline profiles at 10-foot stations and two additional profiles offset 10 feet on both sides 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 **Position** feature in Chapter 5. Identify the points in the **Point Role Code** attribute as centerline_point.

2.6.2.7 **Preliminary Computations and Data Discrepancies.**

The runway end or displaced threshold position establishes the starting point and endpoint 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. Compute these lengths using a three dimensional geodetic inverse computation between the endpoints. Using a three dimensional computation corrects for the elevation of the points and difference in elevation between points. However, when reporting the official runway, stopway, or displaced threshold length report the straight-line distance between endpoints. This line does not account for surface undulations between points. Computed lengths seldom match published lengths exactly. The allowable tolerance between the computed geodetic length and the straight line distance is ± 3.00 feet. If this tolerance is exceeded, data providers should review the data and the collected locations. When this occurs, the 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 the thresholds have been moved. Differences with published data should be considered as an alert to the data provider 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 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. Though published data is often incorrect, new survey data should be reexamined when discrepancies between published and surveyed data occur. The reasons for small discrepancies are often difficult to identify. As discrepancies become larger, the reasons typically become more apparent. Although the source of the discrepancy may not be identified, the reexamination should be conducted to provide the highest level of confidence accurate runway data is being provided. Fully document and report the situation in the final project submission information for examination by the independent verification and validation team.

Stopway discrepancies pose a special problem. 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 appropriate FAA Airports Regional or District Office 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, document (including taking digital photos of the area in question) for resolution by the FAA with the Airport Authority. A stopway is an area beyond the takeoff runway centered on the extended runway centerline and designated by the airport owner for use in decelerating an aircraft during an aborted takeoff. When a stopway is provided, the stopway length and the Declared Distances must be provided in the Airport Facility Directory. If the Airport Authorities request an area be surveyed as a stopway but the stopway data are not published as required, complete the survey as requested and completely document the request and the data in the final project submission information for resolution by the FAA. Because of the importance of runway and stopway data, always discuss the location of runway, stopway and displaced thresholds with the appropriate Airport Authority. Resolve discrepancies occurring between the judgment of the data provider and the opinions, understandings, or intentions of the airport authorities before leaving the site. In some cases, 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 responsible FAA Airports Regional or District Office. In some cases, final resolution may require an FAA field visit.

2.6.2.8 **Comparison with Critical Runway Length.**

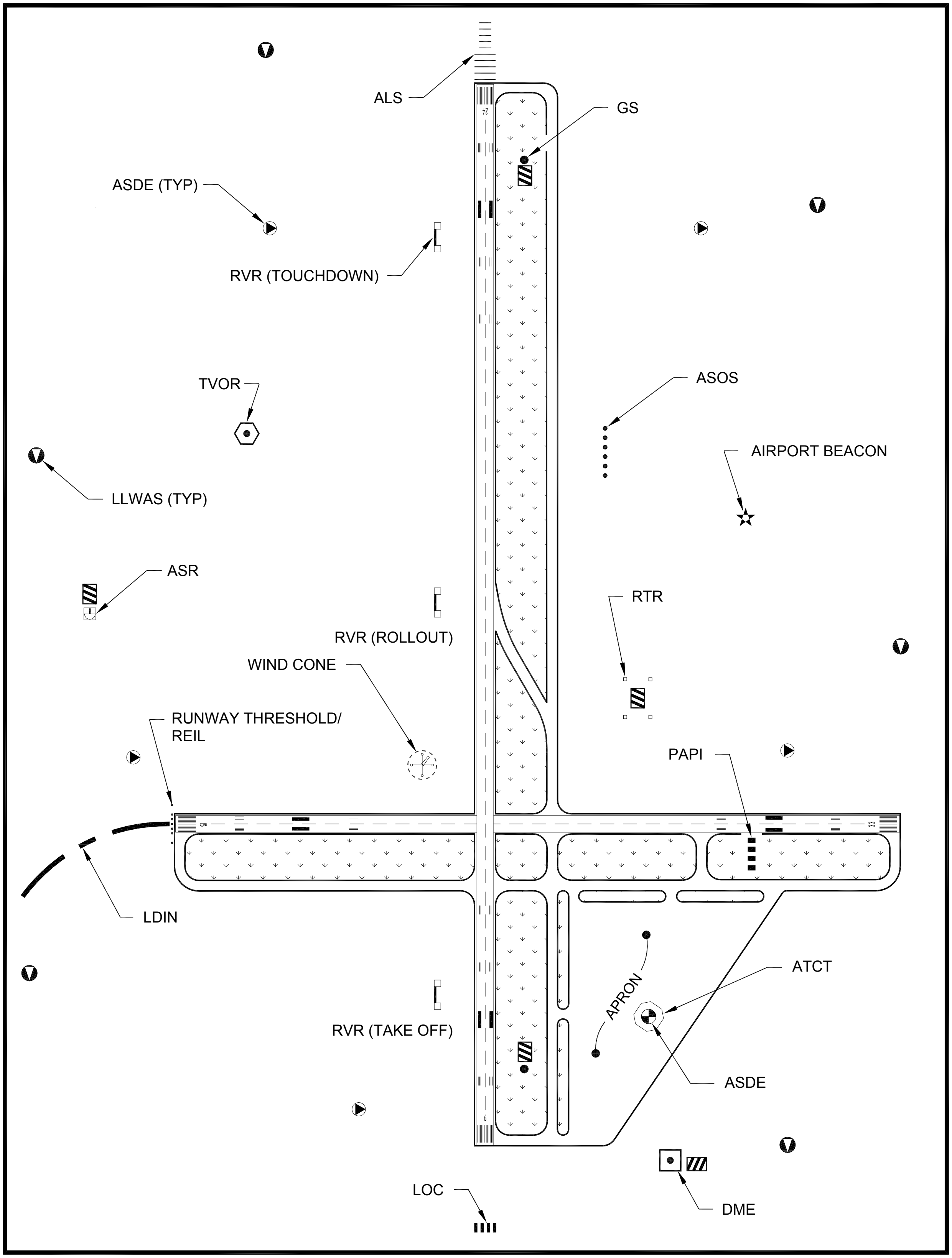
Runways with the length specified in whole thousands of feet (5,000, 8,000, etc.) or whole thousands of feet plus 500 feet (5,500, 8,500, etc.) often have special operational significance. For purposes of this document, these lengths are called critical lengths. Many aircraft operations require a minimum runway length, which is often a critical length, and many runways are built to these lengths. If a runway length is incorrectly published as shorter than a critical length, certain operations could be unnecessarily restricted. In addition to imposing unnecessary operational limitations, data for 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 the survey is correct. This reexamination should include an inspection of the runway end survey points to ensure the longest runway length possible is recorded.

2.7 Navigational Aid (NAVAID) Surveys.

2.7.1 Navigational Aids.

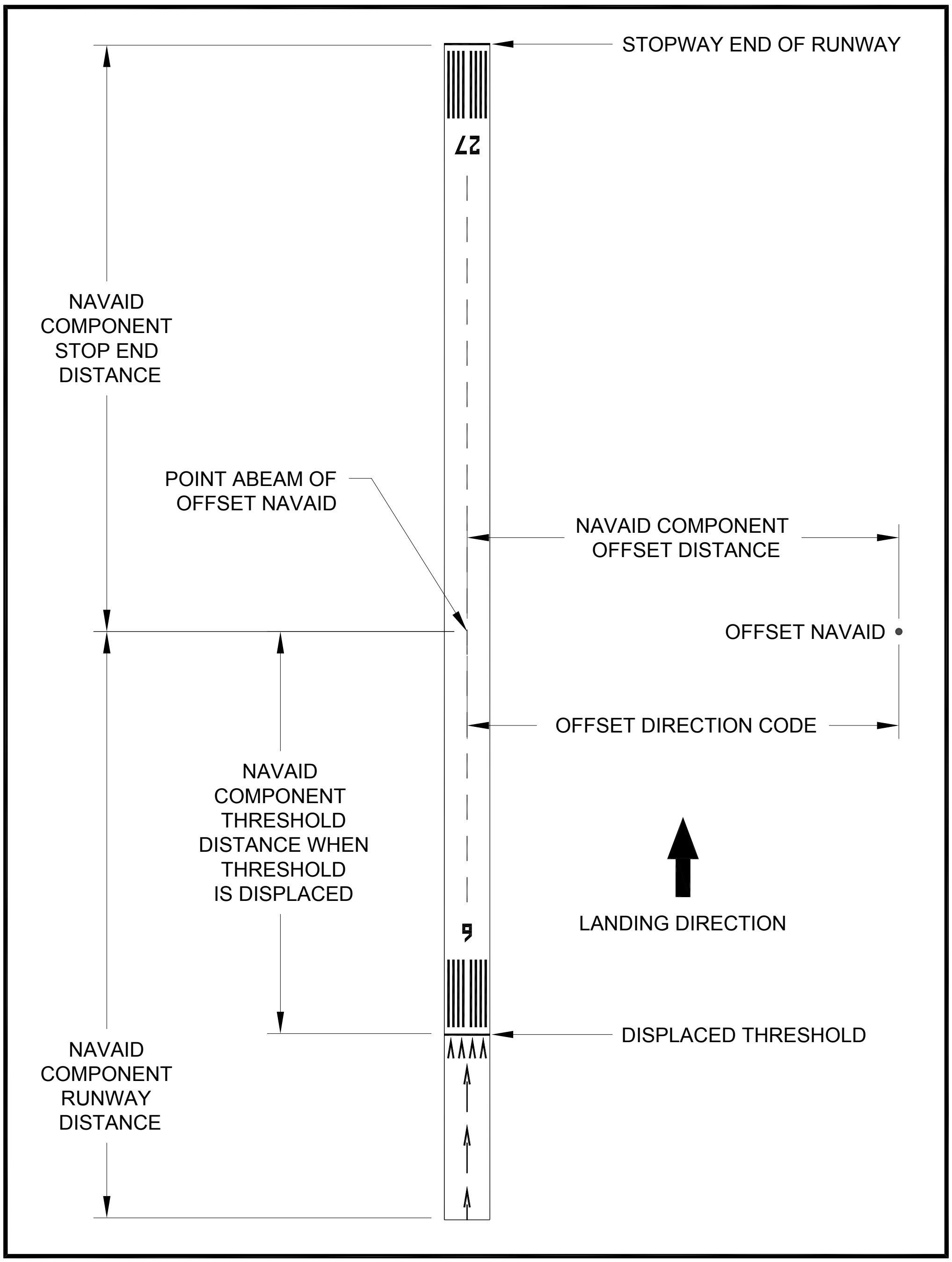
Navigational aids are vital elements of the NAS. The FAA Pilot/Controller Glossary defines a navigational aid as “any visual or electronic device, airborne or on the surface, providing point-to-point guidance information or position data to aircraft in flight.” The FAA operates over 4,000 ground-based 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 2-10).

Figure 2-10. Typical Communications, Navigation, Surveillance and Weather (CNSW).



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 independently depending on the needs of the Airport Authority.

Figure 2-11. Shows the Required Measurements for a Navigational Aid.



2.7.2 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 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 responsible FAA Airports Regional or District Office 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 (see paragraph 2.8) for the airport, but not located on a military airport.

2.7.3 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 (if any) requirements and coordinate resolution for the electronic navigational aids typically found on and around airports (Table 2-2).

Table 2-2. List of Typical Electronic NAVAIDs Associated with an Airport.

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

2.7.4 Visual Navigational Aids.

To enhance visual references 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 and elevation 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. The VSP in most cases of visual aids is the ground or base of the visual aid. Approach lights provide special consideration. At a minimum, collect the position and elevation of the center light of the first and last lights in a system. However, if the Airport Authority specifies in the statement of work or the data provider chooses, they can collect and report the center light of each light row or barrette of an approach light system. Chapter 5 provides the HSP, VSP, accuracy and resolution requirements for the visual navigational aids typically found on and around airports. 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)	Runway End Identifier Lights (REIL)
Approach Light System (ALS)	Visual Glide Slope Indicators (VGSI)

Note: Visual navigational aids are typically associated with the runway end they serve; the airport beacon is an exception.

2.7.5 Reference Measurements.

For any navigational aid, provide reference measurements to other features, identified by the Airport Manager/Operations or FAA Technical Operations personnel, with the potential to affect the system performance or the appropriate 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).

2.7.6 Navigational Aid Screening and Interference Reference Measurements.

In addition to the reference measurements above, provide the following reference measurements. Derive these measurements 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 metal structure on the airport 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 on the airport 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 power line 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 if 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. Also identify any other electronic equipment within 2500 feet of the ASR antenna or proposed location.

2.8 Airport Airspace Analysis.

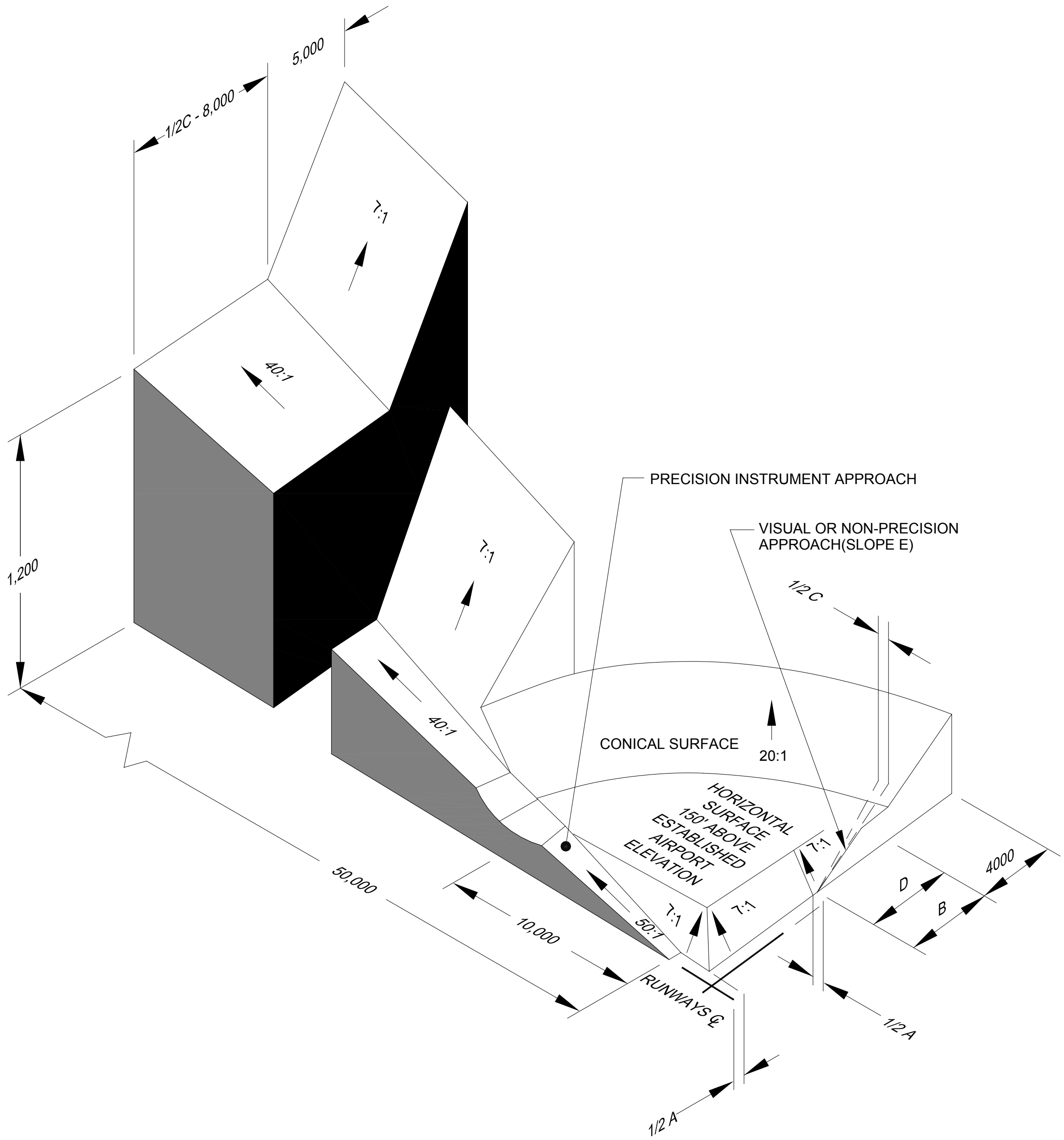
The objective of the airport airspace analysis is to define and document the objects with the potential to affect the safe and efficient landing and takeoff operations at an airport. To meet this objective, there are several different analyses required. When required, use the following specifications and associated figures to identify, collect, and analyze objects on and near airports. These specifications require extensive field and remote sensing operations, providing data to support a wide range of NAS activities such as the planning and design of airports and development of instrument flight procedures. This section is complementary to other sections on the collection of runway, navigational aid, and other airport data.

2.8.1 14 CFR Part 77 Analysis.

The role of 14 CFR part 77 in airport airspace analysis is to protect the airport from encroachment by objects with the potential to affect the efficiency and utilization of the airport. Part 77 meets this charge by identifying standards for proponents of proposed objects to notify the FAA when planning to construct an object or alter an existing structure. Safe and efficient airport operations require certain areas on and near the airport are to be clear of objects or restricted to objects with a certain function, composition, and/or height. The airport operator is not required to prevent or clear penetrations to the part 77 subpart C imaginary surfaces when the FAA determines these penetrations are not hazards. However, any existing or proposed object, whether man-made or of natural growth that penetrates these surfaces is classified as an “obstruction” and is presumed to be a hazard to air navigation. These obstructions are subject to an FAA aeronautical study, after which the FAA issues a determination stating whether the obstruction is in fact considered a hazard. The airport operator must conduct a detailed analysis considering the requirements of FAA Order 8260.3, *United States Standard for Terminal Instrument Procedures (TERPS)*, to ensure all applicable surfaces are captured.

Data providers must develop and submit through Airports GIS the data representing the analysis of part 77. Provide both the surfaces using the feature **Object Identification Surface** and the objects identified as penetrating any of the surfaces.

Figure 2-12. Isometric View of Part 77 Precision Surfaces.



2.8.2 Airport Airspace Analysis Surveys.

The objective of the surfaces this AC defines is to collect representative objects for use in the planning or design of the airport or instrument flight procedures. Unlike part 77, the data collected by this analysis requires the identification and classification of certain objects regardless of whether they are a penetration. This AC outlines specific criteria for determining and selecting these objects. The purpose is not to classify every object underlying or penetrating these surfaces but to identify, classify and report those meeting the specific criteria.

2.8.3 Determining the Type of Analysis.

Determining the type of analyses to complete is a function of the purpose of the data collection effort. If the airport is updating its Airport Layout Plan, the data provider must analyze and provide data for part 77 as well as the airport airspace analysis surfaces this AC defines. If the purpose of the data collection activity is to provide sourced data for the development of instrument approaches, then the data provider must analyze and provide the surfaces this AC defines. Table 2-1 provides the general high level requirements for different types of data collection according to the business need.

One of the major differentiating factors between the surfaces this AC defines and the surfaces part 77 defines is in the determination of the surfaces to evaluate. Part 77 analyses consider the planned use of the runway. The surfaces in this AC support analysis for either the planned use of the runway or its current operational use. For example, the airport may have a plan on file for a runway to support precision operations within the next 5 years. In this case, the part 77 analysis would be based on the plan on file. However, the data would become outdated before this if the airport was to specify completing a vertically guided analysis. In this case, the airport should specify completing an analysis supporting the current operational requirements of the airport and plan to reevaluate at a later time to support the future use of the runway. The other major difference between part 77 and the surfaces this AC defines is how each runway end is analyzed. For instance, if one end of a runway supports non-precision or visual operations under the criteria of part 77 and the other end supports precision operations, each runway end is analyzed separately based on the type of operation. Under the standards of this AC, both ends of a runway are evaluated against the standards of the most stringent runway end. In this case, the runway would be analyzed using the vertically guided airport airspace analysis surfaces. When scoping out the type of analysis to complete, airports should define the purpose of the data collection activity. Airports and data providers should work closely with their counterparts at the FAA Airports Regional or District Office in the scoping process.

2.9 Surface Definition and Analysis.

2.9.1 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 objects critical to approach/departure paths of the airport. Complete the analysis for both ends of a runway to the same criteria. Data providers must evaluate each surface independently of other surfaces. Design all appropriate airport surfaces in reference to the runway ends and not displaced thresholds.

2.9.1.1 Surface Definitions.

2.9.1.1.1 Vertically Guided Runway Primary Surface (VGRPS).

A 1,000-foot wide rectangular surface (500 feet each side of runway centerline) longitudinally centered on the runway centerline, extending 200 feet beyond each runway end. The surface elevation of any point within the VGRPS is the same as the runway centerline elevation abeam the selected point. The elevation of any point within the 200 foot VGRPS extension areas are equal to the runway end elevation on the end to which the extension applies.

2.9.1.1.2 <u>Vertically Guided Primary Connection Surface (VGPCS).</u>

The VGPCS is a set of 500 foot wide lateral extensions of the VGRPS surface (one on each side of the runway) that 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 laterally 500 feet. The VGPCS 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.

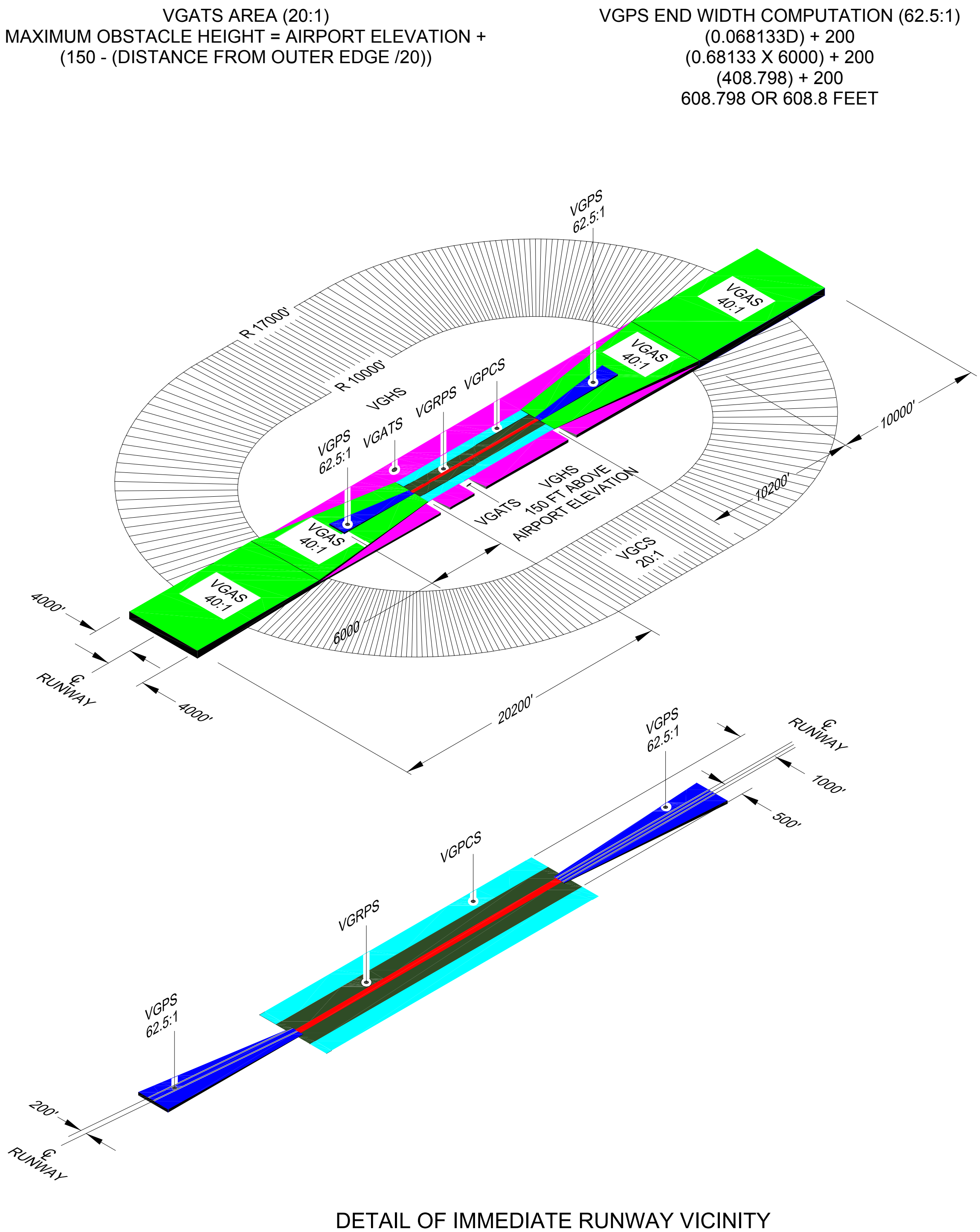
2.9.1.1.3 <u>Vertically Guided Approach Surface (VGAS).</u>

The VGAS is a 40:1 (2.5%) sloping surface longitudinally centered on the extended runway centerline. It begins at the runway end, and extends outward towards the final approach course for a horizontal distance of 20,200 feet. The surface is 2,000 feet wide (1000 feet each side of centerline) at the runway end, and expands to a width of 8,000 feet at 10,200 feet from the runway end. From the 10,200 foot point to 20,200 feet from the runway end, the surface is 8,000 feet wide (4,000 feet each side) and parallel to the runway centerline extended. The starting elevation of the surface is the elevation of the runway end. The surface rises upward and outward in the direction of the final approach course until it reaches a height of 505 feet above the runway end elevation. This surface overlaps the VGRPS and VGPCS surfaces for 200 feet.

2.9.1.1.4 <u>Vertically Guided Protection Surface (VGPS).</u>

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 each side of centerline) and expands to a final width of 1217.6 feet (608.8 feet each side of centerline) at a point 6,000 feet from the runway end. The starting elevation of the surface is the runway end elevation. The surface extends upward and outward in the direction of the final approach course until reaching a height of 96 feet above the runway end elevation. This surface overlaps the VGRPS for 200 feet.

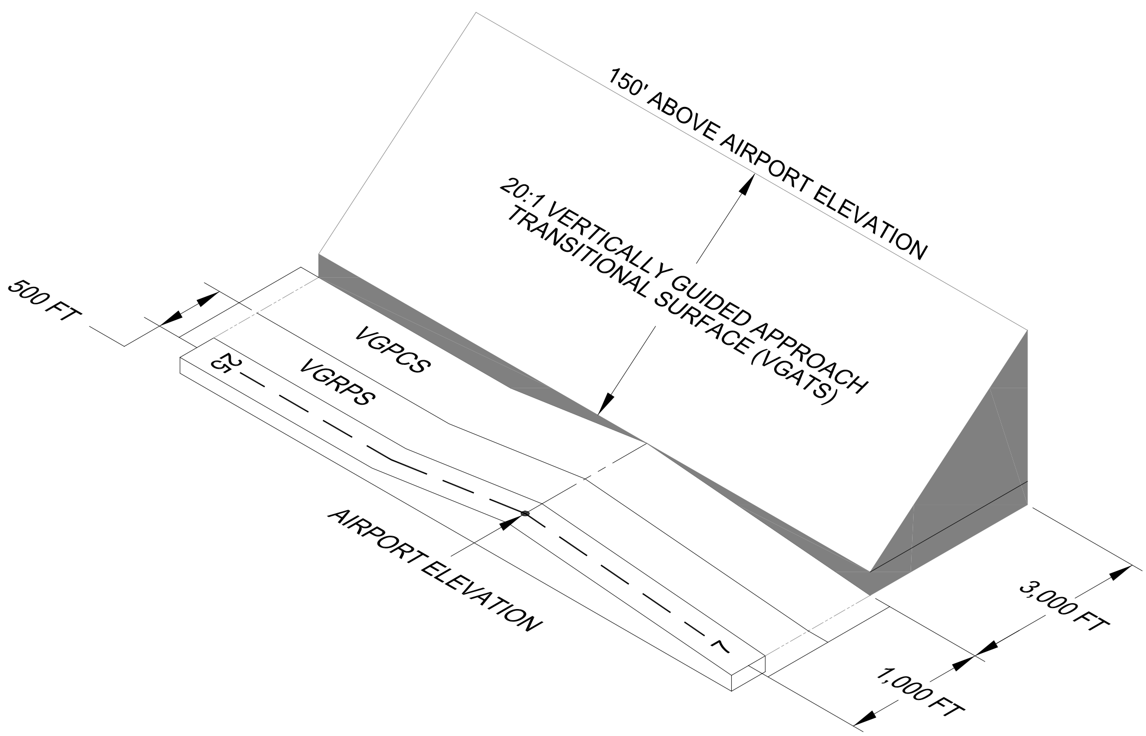
Figure 2-13. Illustrates the Areas, Dimensions, and Slopes of the VGAS and Analysis Specification Required to Support Instrument Procedure Development.



2.9.1.1.5 Vertically Guided Approach Transitional Surface (VGATS).

The VGATS is a 3,000 foot wide, 20:1 (5%) sloping surface extending upward and 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 2-14). The VGATS surface starts at the airport elevation along the VGPCS/VGATS edge (or imaginary extended edge for tapered area), and rises to 150 feet above the airport elevation abeam the runway centerline. Because the VGATS surface starts at airport elevation, the boundaries between this surface and the VGPCS and VGAS surfaces will likely not be seamless in three dimensions (see Figure 2-14).

Figure 2-14. Illustrates the Dimensional Criteria Associated with the VGATS and the Connection to the VGPCS.



2.9.1.1.6 Vertically Guided Horizontal Surface (VGHS).

The VGHS is a horizontal plane 150 feet above the 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. See Figure 2-20.

2.9.1.1.7 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%). At the outer edge of the surface, the elevation of the VGCS is 500 feet above the airport elevation. See Figure 2-20.

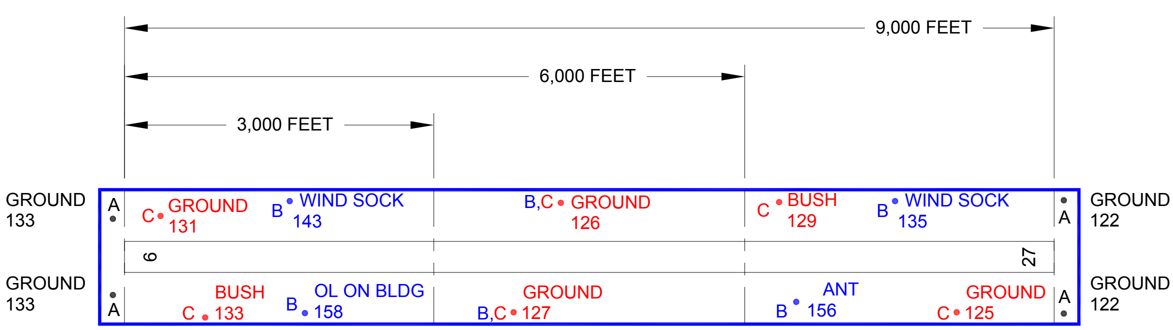
2.9.1.2 **Surface Analysis.**

Analyze the surfaces according to the following criteria for each runway end. Identify and classify the objects selected to meet the criteria using the feature **Object Area** (for polygons), **Object Line** (for line type objects such as power lines), or as an **Object Point** (point features). Where an object meets multiple requirement criteria (highest and most penetrating, highest and highest manmade, etc.) identify the object only once. In this guidance, the word "object" includes, but is not limited to, above ground structures, navigational aids, 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 surfaces the object effects and the penetration value for each surface. Provide the penetration value (positive or negative) for the surfaces the object affects in the attribute **OIS Penetration Value**. The **Object Area**, **Object Line** and **Object Point** features allow you to specify up to six surfaces the object could penetrate.

2.9.1.2.1 VGRPS Analysis.

Divide the VGRPS into three equal length zones, each representing one third of the length of the runway. Analyze all objects within the lateral confines (see Figure 2-15) of the surface to identify, classify, and report the following representative objects using either feature type **Object Area**, **Object Line** or **Object Point** in Chapter 5, as appropriate.

Figure 2-15. Object Representation in the VGRPS Area.



Note: the representation in the survey primary surface area (blue rectangle) must include the:

A highest object outward from the runway end

B highest object in each 1/3 section of runway length

C highest non-manmade object in each 1/3 section of runway length

- The highest object (manmade or naturally occurring) outward from the runway end to 200 feet from the end of the runway within the lateral limits of the VGRPS.
- In each 1/3 of the runway and on each side of the runway within that length, identify the highest manmade object and the highest natural (terrain or vegetation) object within the area.
- When meteorological apparatus (see Figure 2-16) is 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, classify them using the feature **Position** and identify in the attribute Position Role Code the type of instrument (Wind Cone, Segmented Circle, ASOS, AWOS, SAWS, etc.).

Figure 2-16. SAWS, AWOS and ASOS Station Installations.

2.9.1.2.2 VGPCS Analysis.

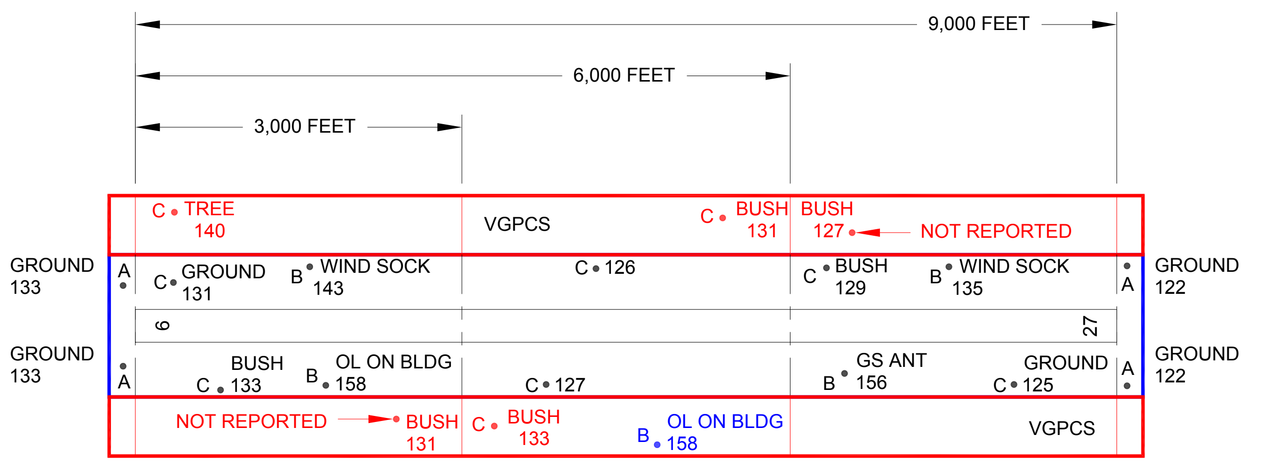
Divide the VGPCS into three equal length zones, each representing one third of the length of the runway. Analyze all objects within the lateral confines (see Figure 2-17) of the surface to identify, classify, and report the following representative objects using either feature type **Object Area**, **Object Line** or **Object Point** 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 VGPCS.

- In each 1/3 of the runway and on each side of the runway within that length, identify the highest manmade object, and the highest natural (terrain or vegetation) object within the area.
- When meteorological apparatus (see Figure 2-16) is 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, classify them using the feature **Position** and identify in the attribute Position Role Code the type of instrument (Wind Cone, Segmented Circle, ASOS, AWOS, SAWS, etc.).

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

Figure 2-17. Illustrates the VGRPS and VGPCS Object Representations.



Note: the representation in the VGPCS area (red rectangle) must include the:

A highest object outward from the runway end

B highest object in each 1/3 section of runway length

C highest non-manmade object in each 1/3 section of runway length

2.9.1.2.3 VGAS Analysis.

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., Structure Line, Structure Point, or Structure Polygon, ForestStandArea, etc.) even if the objects does not penetrate the surface.

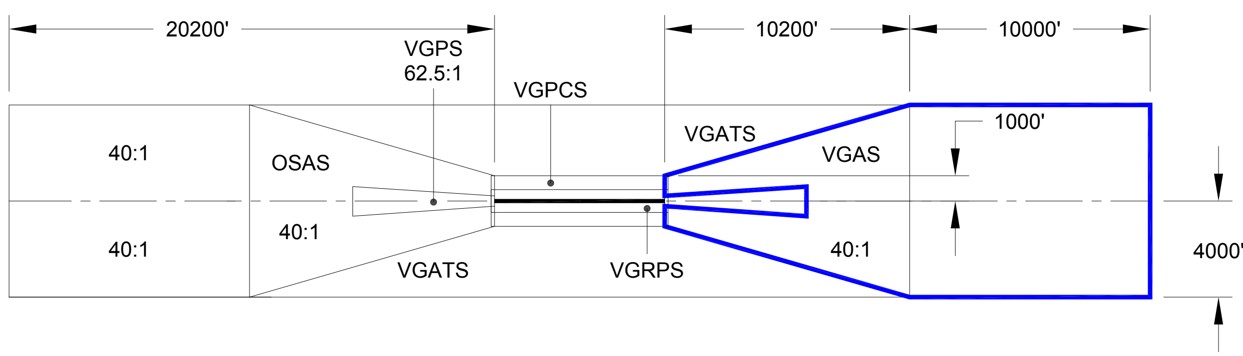
Note: Do not report them using the **Object Area**, **Object Point**, or **Object Line** features unless they are selected as representative objects according to the surface selection criteria.

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, housing subdivisions, industrial complexes, built up areas of cities, and nearby airports underlying the airport airspace analysis surfaces.

Identify, classify, and report the following representative objects using the feature type **Object Area**, **Object Line** or **Object Point** according to the following criteria. The VGPS area, illustrated in Figure 2-18, is evaluated separately from the VGAS.

- 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 2-18. The Area Outlined in Blue Illustrates the Limits of the VGAS.



2.9.1.2.4 VGPS Analysis.

In the VGPS, identify, classify and report all significant objects of landmark value underlying the surface using the respective feature type in Chapter 5 even if the objects does not penetrate the surface.

Note: Do not report them using the **Object Area**, **Object Point**, or **Object Line** features unless they are selected as representative objects according to the surface selection criteria.

Also, identify, classify, and report the following representative objects using the feature type **Object Area**, **Object Line** or **Object Point** 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.

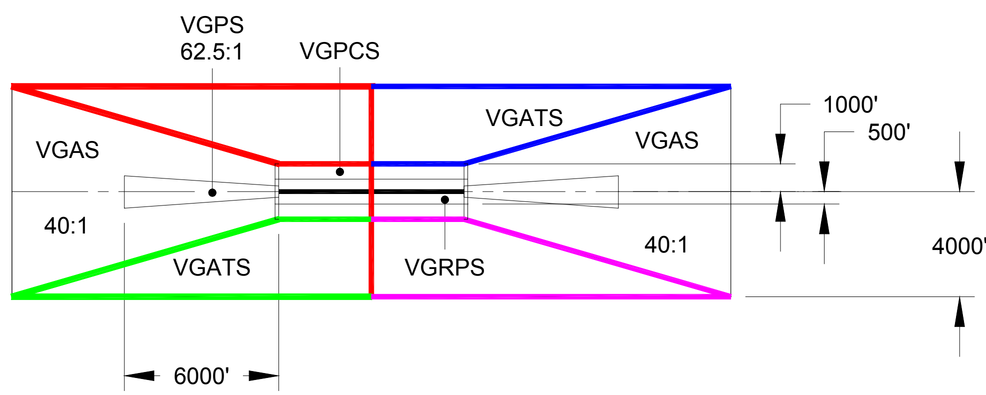
2.9.1.2.5 VGATS Analysis.

Divide the VGATS into four sections by drawing a line perpendicular to the runway centerline on each side of the centerline, as illustrated in Figure 2-19. Analyze the sections beginning with the northeasternmost section and analyze subsequent sections in a counterclockwise direction.

In the VGATS, identify, classify, and report the following representative objects using feature type **Object Area**, **Object Line** or **Object Point** according to the following criteria:

- the highest manmade object,
- the highest naturally occurring object, and
- the most penetrating object in each section of the VGATS.

Figure 2-19. Illustrates the VGATS Divided into Four (4) Sections for Analysis.

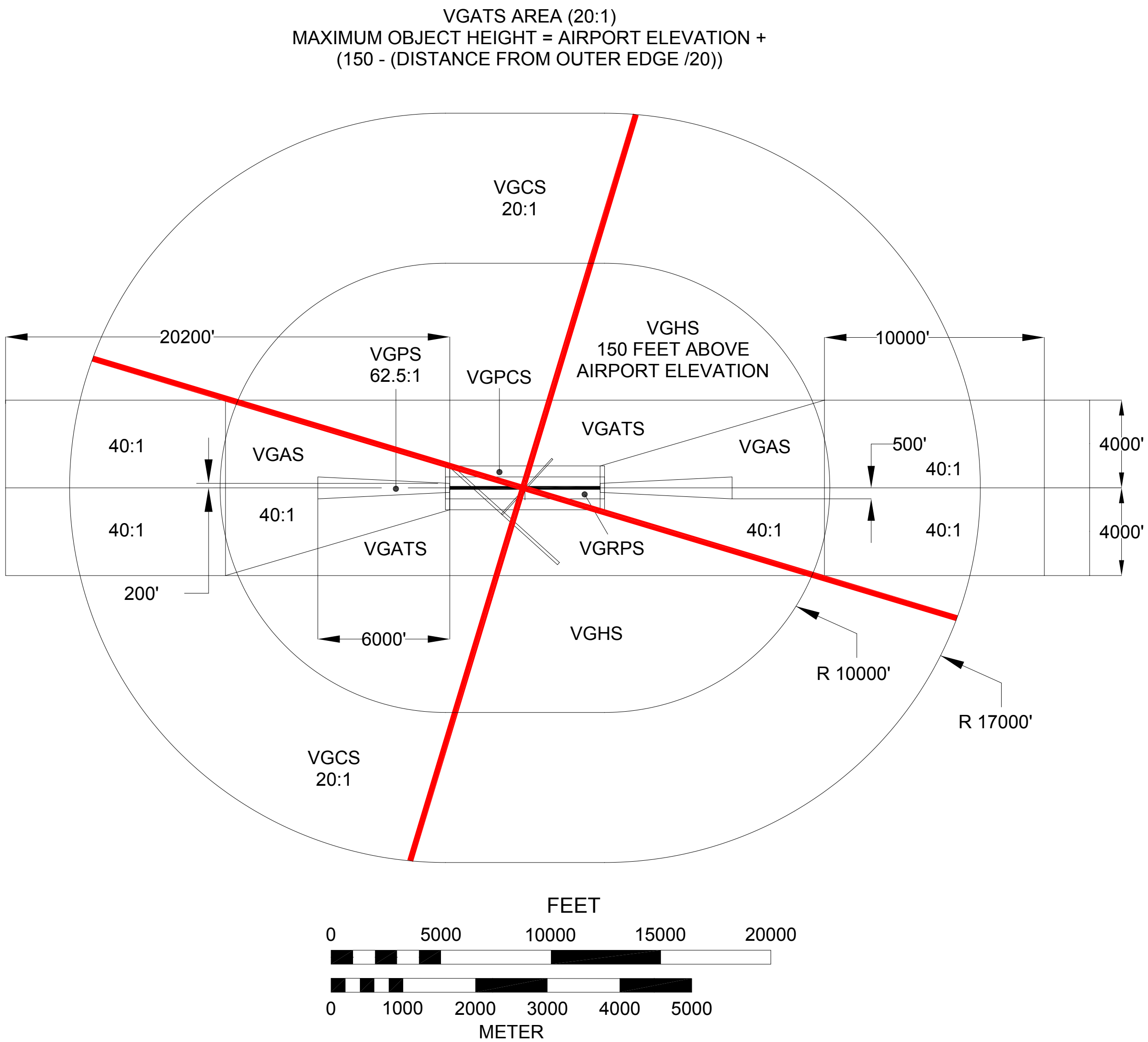


2.9.1.2.6 VGHS Analysis.

Divide the VGHS into quadrants (as depicted by the red lines in Figure 2-20) centered on the meridian and parallel, intersecting the Airport Reference Point (ARP). Analyze all objects to identify, classify and report (using feature type **Object Area**, **Object Line** or **Object Point** as appropriate). Analyze the sections beginning with the northeastern most section and analyze subsequent sections in a counterclockwise direction:

- the two highest objects in each quadrant.
- the most penetrating object in each quadrant.

Figure 2-20. Illustrates Dividing the VGHS into Quadrants through the ARP.



2.9.1.2.7 VGCS Analysis.

Divide the VGCS into quadrants (as depicted by the red lines in Figure 2-20, 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 **Object Area**, **Object Line** or **Object Point,** as appropriate). Analyze the sections beginning with the northeastern most section and analyze subsequent sections in a counterclockwise direction.

- the highest object in each quadrant.
- the most penetrating object in each quadrant.

2.9.2 Runways without Vertical Guidance.

These specifications and associated figures support 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 near the airport. Evaluate each surface independently of all other surfaces.

2.9.2.1 **Surface Definition.**

2.9.2.1.1 NVG Primary Surface (NVGPS).

A 1,000-foot wide rectangular surface (500 feet each side of runway centerline) longitudinally centered on the runway centerline and extending from runway end to runway end. For runways that have, or are planned to have, a Specially Prepared Hard Surface (SPHS), the NVGPS extends 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 (following the runway centerline contour). The elevation of any point within the 200 foot SPHS runway type extension areas is equal to the runway end elevation on the side to which the extension applies.

2.9.2.1.2 NVG Approach Surface (NVGAS).

(This surface must be analyzed 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 airport elevation will have a standard NVGAS length of 10,000 feet from the NVGPS. Runway ends with elevations lower than the airport 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 dividing the total by 0.05 (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 each side of runway centerline) at the NVGPS and expands to a width of 4,000 feet (2,000 feet each 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 feet above the airport elevation (End Elevation = Airport Elevation + 500 feet).

2.9.2.1.3 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 three types of transitional surfaces for runways with a SPHS (Type 1, Type 2, Type 3), and two types for runways without a SPHS (Type 1, Type 3 only).

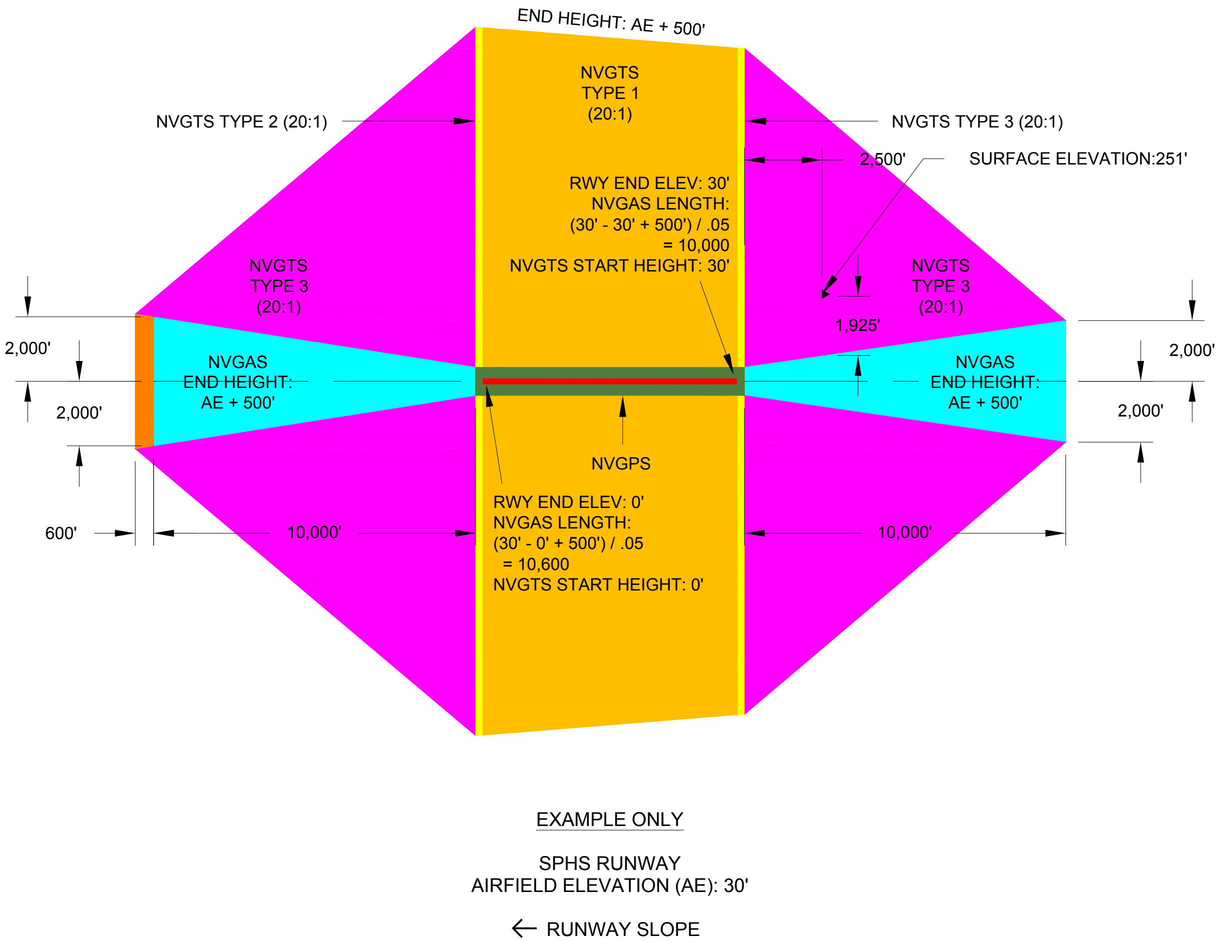
- **NVGTS Type 1.** A multi-sloped polygonal surface located directly between and abeam the runway end points. This surface starts at the edge of the NVGPS (at the straight line elevation slope created when joining runway end to runway end) and slopes upward and outward from the NVGPS at a 20:1 (5.0%) 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.

$$Distance\ NVGPS\ to\ Outer\ Edge = \frac{(Airport\ Elevation - Runway\ End\ Elevation) + 500\ ft}{0.05}$$

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 is 500 feet above the airport elevation. See Figure 2-21.

Figure 2-21. NVGPS, NVGAS, and NVGTS Types 1/2/3 for Non-Vertically Guided (NVG) Airport Surfaces.

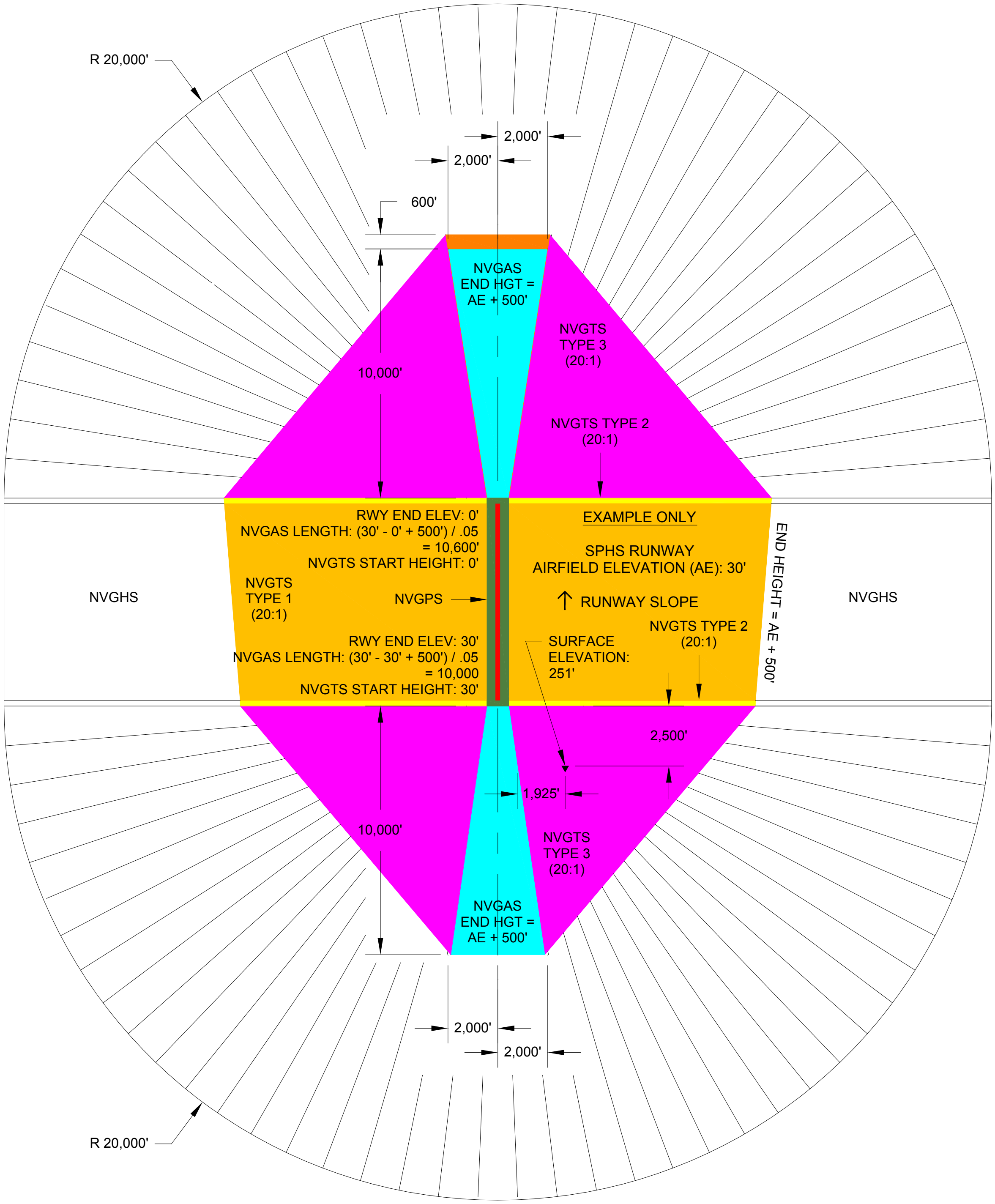


- **NVGTS Type 3.** A single-sloped triangular surface that connects either the NVGTS Type 1 surface (for non-SPHS runways) or the NVGTS Type 2 (for SPHS runways) surface to the NVGAS. The slope of this surface is measured from the edge of the NVGAS perpendicular to the runway centerline extended. To 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 are 500 feet above the airport elevation.

2.9.2.1.4 NVG Horizontal Surface (NVGHS).

A horizontal plane 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. See Figure 2-22.

Figure 2-22. Horizontal Surface (NVGHS) for Non-Vertically Guided (NVG) Airport Surfaces.



2.9.2.2 **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.

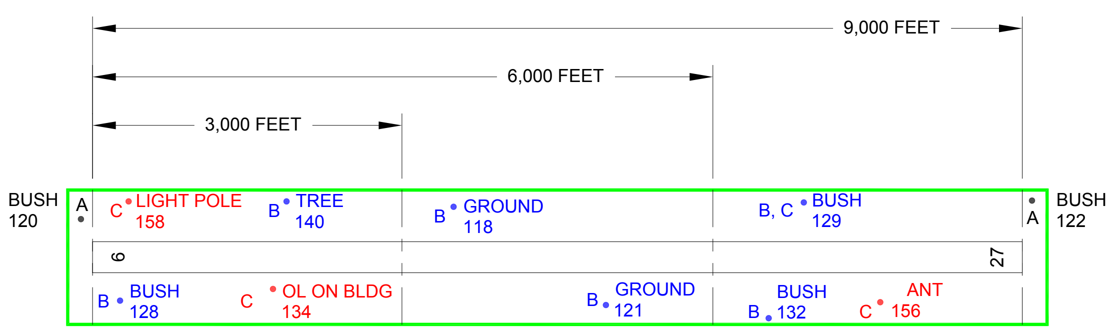
2.9.2.2.1 Divide the NVG Primary Surface (NVGPS) into three equal length zones, each representing one third of the length of the runway (see Figure 2-23). Analyze all objects within the lateral confines of the surface to identify, classify, and report the following representative objects using feature type Object Area, Object Line, or Object Point (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 Object Area, Object Line, or Object Point).

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

When meteorological apparatus (see Figure 2-16) is 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, classify them using the feature Position and identify in the attribute Position Role Code the type of instrument (Wind Cone, Segmented Circle, ASOS, AWOS, SAWS, etc.).

Figure 2-23. Object Representation in the Non-Vertically Guided Operations Primary Surface Area.



Note: the representation in the survey primary surface area (green rectangle) must include the:

A highest object outward from the runway end

B highest natural object in each 1/3 section of runway length

C highest manmade object in each 1/3 section of runway length

2.9.2.2.2 For the NVG Approach Surface (NVGAS), identify, classify and report all significant objects of landmark value underlying the NVGAS using the respective feature type in Chapter 5 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 Object Area, Object Line, or Object Point according to the following criteria:

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

2.9.2.2.3 NVG Transitional Surface (NVGTS). Divide the transitional surface into three sections (as illustrated in Figure 2-21 and Figure 2-22) 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 Object Area, Object Line, or Object Point (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 counterclockwise manner.

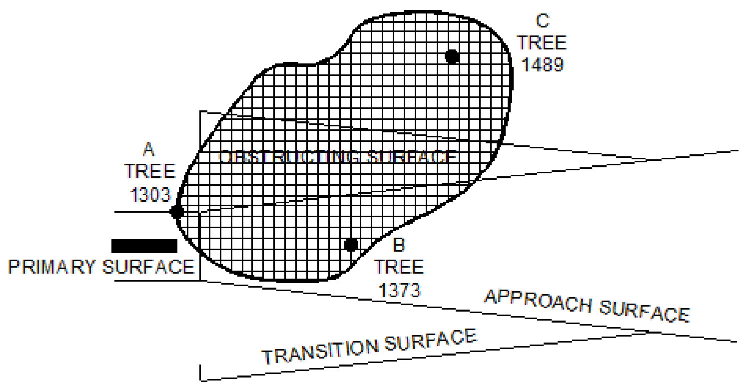
2.9.2.2.4 NVG Horizontal Surface (NVGHS). In the NVG horizontal surface analyze all objects to identify, classify and report using feature type Object Area, Object Line, or Object Point (as appropriate) all manmade and natural objects exceeding 500 feet above the established airport elevation.

2.9.3 Airport Airspace Analysis Special Cases and Exemptions.

2.9.3.1 **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. For obstacles of the same height on vertically guided approaches, select the one nearest to the runway when measured perpendicular to the runway end on runway centerline. Overlay the area lateral limits with a grid established parallel and perpendicular to the extended centerline of the runway associated with the surface (see Figure 2-24). 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, analyze, identify and report the highest manmade or natural object within the area limits (see Figure 2-24). If two objects with the 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.

Figure 2-24. Reporting Highest Object(s) within Object Area Limits.



2.9.3.2 **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 object identification surface (OIS), the catenary itself may become a significant object (see Figure 2-25).

Figure 2-25. This Picture Illustrates the Importance of Appropriately Identifying Catenaries.

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).

2.9.3.3 **Guyed Structures.**

The guys of a 2,000-foot skeletal tower are anchored 1,600 feet from the base of the structure, for example. This places a portion of the guy wires 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 structure, identify them as separate point objects where they penetrate the surface.

2.9.3.4 **Vehicular Traverse Ways.**

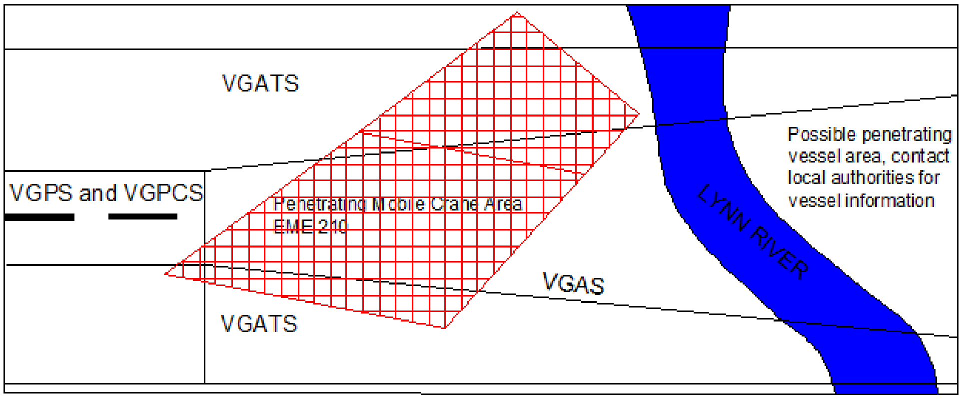
Treat a vehicular traverse way as any other object, except include an appropriate vehicle height allowance in the elevation. Measure the clearance for roads and highways from the crown and edges of the road. Make measurements for railroads from the top of the rail. Make measurements for vehicle parking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

Private or controlled road	10 feet above the highest mobile object to traverse the road
Non-Interstate Roads	15 feet
Interstate Roads	17 feet
Railroads	23 feet

2.9.3.5 **Mobile Objects.**

Determine and capture the travel limits of mobile representative objects within a defined area (except vehicles on roads and railroads, and vessels, which are treated under separate headings). Furnish an estimated maximum elevation (EME) for each of these mobile object areas penetrating the OIS (see Figure 2-26). If a non-penetrating mobile object located outward from the runway end, is the highest object in the VGRPS or VGPS, and is higher than the runway end, provide an EME at a point where it may be nearest to the runway centerline at the runway 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 2-26. Illustrates the Collection of Penetrating Vessel and Mobile Object Areas.



2.9.3.6 **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 **Construction Area** feature and associated accuracies and collection requirements.

2.9.3.7 **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 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 of a vertically guided or non-vertically guided airport airspace analysis.
- Have a height equal to or greater than 200 feet AGL.

2.9.3.8 **Exceptions.**

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 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 exception 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, that 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 exception does not apply to craft of design and mooring arrangement such that they do not have a practical capability for use as transportation on water.

2.9.3.9 **Object Density Selection Criteria.**

In some cases, strict adherence to the object selection criteria of an airport airspace analysis might result in congestion or inadequate representation of objects. To minimize these situations, data providers must apply the following guidelines in object selection:

- If multiple objects meeting the criteria for selection as representative objects in the primary surface or first 10,000 feet of an approach surface are located within 100 feet of each other, the lower obstacle may be omitted.
- If multiple objects meeting the criteria for selection as representative objects outside the primary surface or first 10,000 of an approach surface 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 object is omitted because of congestion, a replacement object meeting the spacing criteria must be selected if possible.

2.10 Airport Layout Plan Surveys.

Airport Layout Plan Surveys provide comprehensive data supporting the visualization of the airport in the existing and future states of the airport. The individual sheets composing the Airport Layout Plan drawing set will vary with each planning effort. During the project scoping activities, planners must determine and define the necessary sheets. Users should refer to the latest versions of ARP Standard Operating Procedure (ARP SOP), Standard Procedure for FAA Review and Approval of Airport Layout Plans

(ALPs), and ARP SOP, Standard Operating Procedure (SOP) for FAA Review of Exhibit 'A' Airport Property Inventory Maps, for guidance (http://www.faa.gov/airports/resources/sops/).

2.10.1 Electronic Airport Layout Plans.

The data necessary to develop an Airport Layout Plan is extensive and will generally encompass collection and representation of data from all the survey types in this AC. The FAA is moving toward the development and implementation of electronic Airport Layout Plans using the data from Airports GIS. Once implemented, this capability will give the airport the ability to develop a standardized Airport Layout Plan meeting the standards of the FAA. The system will also allow the airport and the FAA to electronically comment, markup (also known as red-lining), coordinate, and print the Airport Layout Plan. Once implemented, this should dramatically reduce the time spent reviewing and analyzing Airport Layout Plans. In time, the system will provide the capability to check the Airport Layout Plan against criteria to ensure compliance, reducing the workload on the airport and FAA personnel responsible for reviewing the plans. The FAA envisions providing airports the ability to supplement the standardized drawings with additional airport specific drawings as necessary.

2.11 Topographic Surveying.

Airports and data providers should 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, and navigational aid installation and support instrument flight operations. At locations where there is (or is planned) 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 data provider to determine the equipment and methodologies to use 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 **Elevation Contour** to classify the terrain in topographic surveys. When performing topographic surveys of the airside of these manmade features, ensure the collection and modeling includes:

- Documenting the location of permanent structures including bridges, piers, culverts and docks using the appropriate features from Chapter 5.
- Documenting the location of street or road paving entrance drives, openings, and sidewalks using the appropriate features from Chapter 5.
- Classifying the elevations on the top of curbs, gutters and sidewalks using the appropriate features from Chapter 5.

- Providing 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 **Position** feature with a **Point Role Code** attribute value of SPOT_ELEVATION.
- Providing the location and elevation of lakes, rivers, streams or drainage courses on or near the airport or design area using the **Natural Water Body** feature.
- Providing the location, diameter, and species of all trees over a 6-inch diameter using the appropriate features from Chapter 5.
- Outlining the perimeter outline of thickly wooded areas, unless otherwise specified in the SOW, using the appropriate features from Chapter 5.
- The location of electric utilities (power poles, guy wires, anchors, vaults, etc.) using the appropriate features from Chapter 5.

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 and Table 2-5).

Table 2-4. Topographic Survey Accuracy Requirements (Sample).

Contour Interval	Vertical Position Accuracy (in feet)	Horizontal Position Accuracy (in feet)
1 foot	± 0.50	± 1.0
2 feet	± 1.5	± 2.0
4 feet	± 2.6	± 4.0
5 feet	± 3.2	± 5.0
10 feet	± 6.5	± 8.0
Spot ground elevations	± 0.20	± 2.0
Spot paving elevations	± 0.05	± 1.0
Well-defined planimetric features [5]	± 0.10	± 1.0

[5] In this guidance, planimetric data is defined as representing airport features that are works of man or natural features within the boundaries of the airport.

Table 2-5. Sample 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	[illegible]	0.66
100	800	[illegible]	[illegible]	1.32
200	[illegible]	[illegible]	[illegible]	2.64
250	[illegible]	[illegible]	[illegible]	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 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.

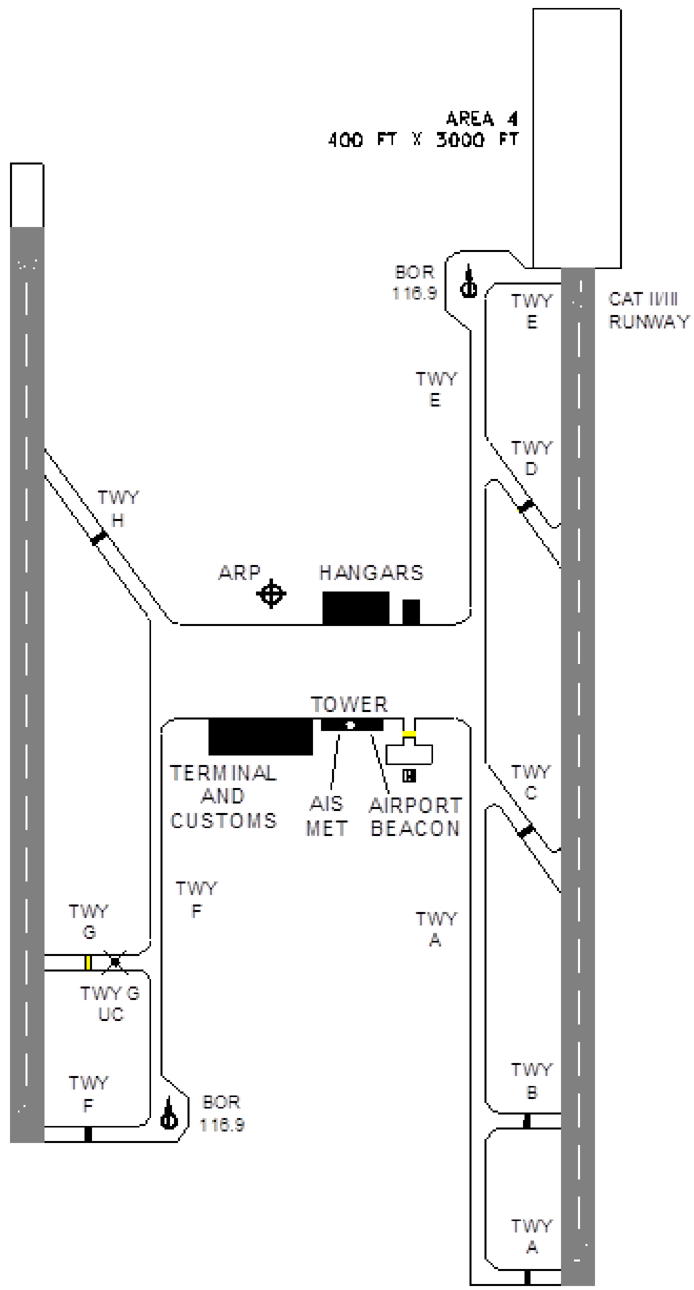
2.11.1 Category II and III Operation Area Topographic Survey.

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 and objects within the area, that could cause false radar altimeter readings. The collection of this information meets the requirements of the International Civil Aviation Organization (ICAO), Annex 15 regarding Area 4.

2.11.1.1 **Surface Definition.**

The area of consideration is an area 3000 feet long by 400 feet wide centered on the runway centerline extended (see Figure 2-27). Where the terrain at a distance greater than 3,000 ft from the runway threshold is mountainous or otherwise significant, the length of Area 4 should be extended to a distance not exceeding 6,500 ft from the runway threshold.

Figure 2-27. Terrain Data Collection Surface, Area 4, CAT II and III Operations Area.



2.11.1.2 **Surface Analysis.**

Identify, collect and classify the terrain using the features **Elevation Contour** and **Position** with a Position Role Code attribute value of Spot_Elevation as appropriate. Represent any manmade structures within the area using the features **Object Area**, **Object Line**, and **Object Point**. Provide the features to the accuracy requirements in Table 2-6.

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

Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.0 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

2.12 Airport Mapping Database (AMBD) 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 2-28) 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 2-29) to the destination while avoiding other surface traffic (airplanes or vehicles).

Figure 2-28. Paper Chart.

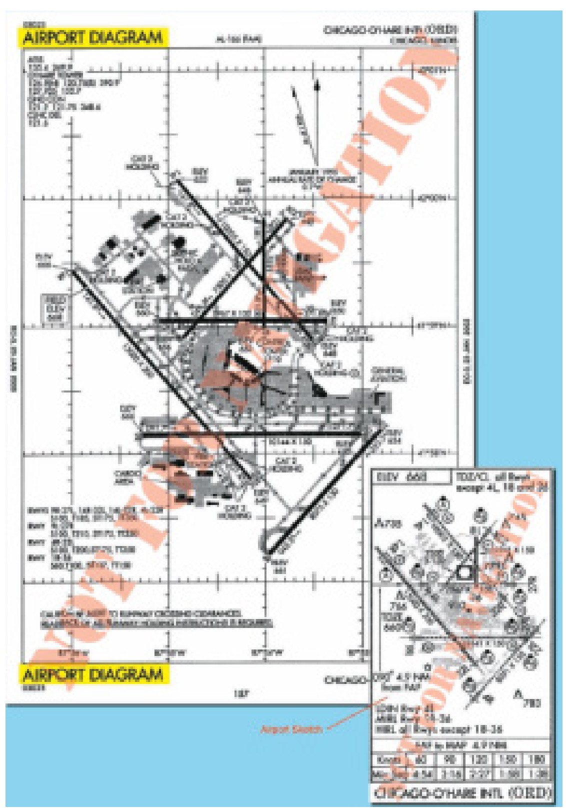
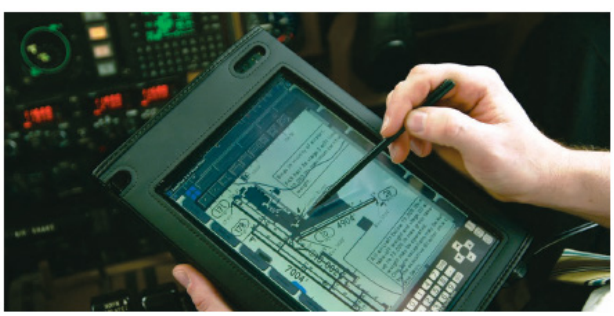


Figure 2-29. The Development of Highly Accurate Digital Representations of the Airport Environment Will Enhance the Operational Safety Systems at the Airport.

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 (see Figure 2-30). For further information regarding Airport Mapping Databases, refer to RTCA Document DO-272 User Requirements for Aerodrome Information.

Figure 2-30. Highly Accurate Digital Representations of the Airport Environment.



Surveys supporting the development of airport mapping databases are mapping activities. The express purpose of collecting this data is to provide data for the development of the AMDB in the aircraft. There are two areas of consideration: the collection and classification of vertical objects and the collection and classification of the data about the movement area including the runways, taxiways, parking areas, signs, and markings.

- Collect and classify all data supporting airport mapping databases using the relevant features in this AC. For example, Runway, Runway Centerline, Taxiway Centerline, Aircraft Gate Stand, etc.
- Collect and classify all vertical objects exceeding 1.65 feet above the nearest movement area surface within 165 feet of the edge of the movement area, excluding the runways (see Figure 2-31).
- For all runways; identify, classify and report all vertical objects exceeding 1.65 feet above the elevation of the nearest runway surface. The lateral area of consideration begins at the edge of the runway and extends outward to 300 feet from the centerline.
- Use the accuracies within this AC or a horizontal and vertical accuracy of 1.65 feet, whichever is greater. The resolution of all values is to the nearest 0.25 foot. 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 (see Figure 2-32).

Figure 2-31. Areas of Collection for Vertical Objects Surrounding the Movement Areas.

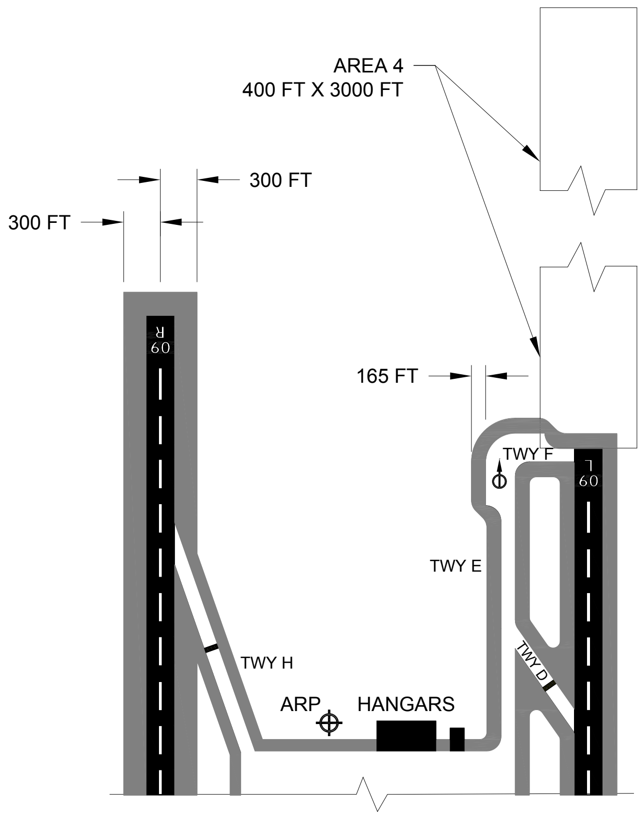
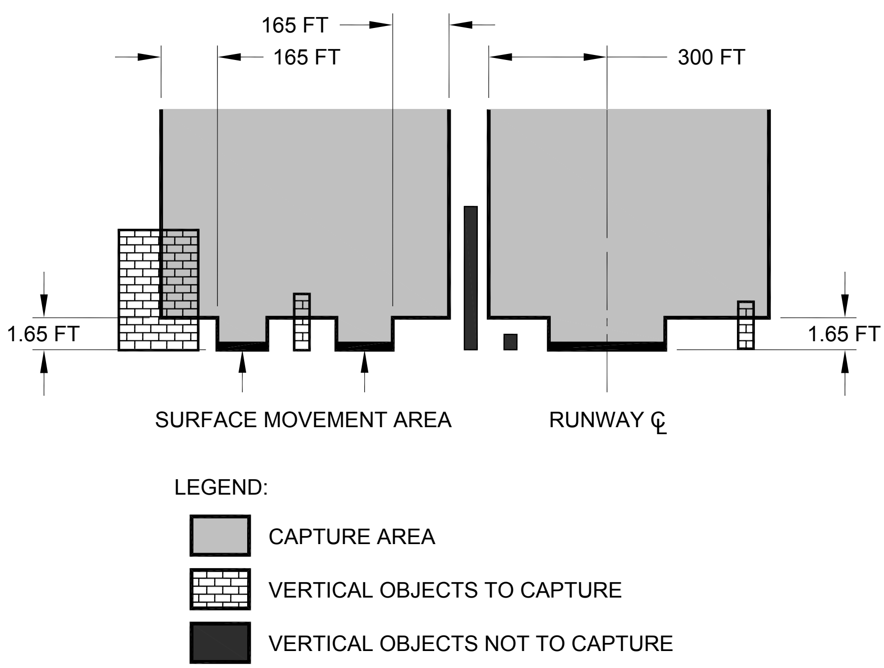


Figure 2-32. Airport Mapping Database Collection of Vertical Objects Meeting the Requirements of ICAO Area 3.



2.13 Engineering (Construction) Surveys.

Typically, the engineering surveys an airport performs relate to the planning and construction of runways and taxiways. Data providers must tie all Airport Operating Area (AOA) planning and construction activities to the NSRS by using PACS and SACS located on the airport or temporary control tied through the use of OPUS. When using an engineering grid or local coordinate systems, these control networks must tie to the NSRS. Ensure engineering grids or local coordinate systems tie to the NSRS by incorporating on-airport PACS and SACS into the network. This ensures the relative connection of the engineering grid or local coordinate system to the NSRS and 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 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 generally fall within 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 partial checklist of features required on a typical as-built survey. Define each of these elements according to the features in this guidance.

- Define the boundaries of the project area using the feature **Construction Area**. In a phased construction project, there would be several instances of the feature defining the timing of the different phases.
- Depict the original lot boundaries using the feature **Airport Parcel**.
- Depict the existing roads, alleys and easements with their widths, using the features **Road Segment**, **Road Centerline**, and **Right and Interest**.
- Depict the final terrain contours using the feature **Elevation Contour**, and sufficient spot elevations using the feature **Position** with a Position Role Code of

Spot_Elevation defining the surface drainage on the project site and within 50 feet outside the boundary. Show existing contours on 0.50-foot intervals if existing site elevations vary by greater than 1.5 feet.

- Identify and represent control benchmark(s) through using the feature **Position** with a **Point Role Code** attribute value of PACS, SACS or Temporary_Survey_Mark.
- 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 **Utility Polygon**, **Utility Line**, **Utility Point**.
- Depict 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 and direction of flow can all be modeled with features **Utility Polygon**, **Utility Line**, **Utility Point**. Depict spot elevations using the feature **Position** as necessary.
- Depict sidewalks using the feature **Sidewalk Segment**, street parking using the feature **Parking Lot**, loading areas, driveway width(s) along with the edge(s) of existing paved areas using **Driveway Area** and **Driveway Centerline** features.
- Classify power poles, guy wires, overhead power lines using the **Utility Polygon**, **Utility Line**, **Utility Point** features.
- Depict trees, tree groupings and shrubs using the **Flora Species Site**, **Forest Stand Area**, and **Vegetation Area** features.
- Model existing building structures, fences or walls on site and others within the property line using the features **Structure Line**, **Structure Point**, and **Structure Polygon**.
- Model existing natural features such as high points, water courses, depressions, ponds, marshes, swamps, wooded areas and flood elevations (if available) using the appropriate features in Chapter 5.
- Depict the location of any protected species habitat or environmentally sensitive lands or vegetation, using the appropriate features in Chapter 5.
- Depict any known historical or archaeological resources using the **Landmark Area**, **Landmark Point**, **Landmark Line** feature.

2.14 Airport Pavement.

2.14.1 Construction/Roughness.

The current standard is to collect runway centerline elevations at 10-foot intervals. Airports collecting this centerline elevation data using real-time kinematic (RTK) or dynamic surveying rather than fixed points, should submit an ASCII file of elevation and distance allowing the transformation of the data as an input into a program for aircraft response to roughness. Examples of these programs are FAAPRO and APR Consultants' TAKEOFF. Input this file separately with sufficient documentation for analysis.

2.14.2 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 due 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 its 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 Advisory 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.
- AC 150/5380-7, *Airport Pavement Management Program (PMP)*, 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.

2.15 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 removed or abandoned; and
- avoid added construction costs because of unexpected utility adjustments that are no longer needed (if we survey the utilities we don’t have to adjust schedules to account for unknown utilities in construction). Additionally, contractor claims based on utility delays will be reduced 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, and the strength of the supporting network 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 for the airport to NAD 1983. 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 data provider 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 38), 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 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 testholes 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 attribute deemed unimportant.

2.15.1 Utility Research.

Prior to beginning the designation work, the data provider should contact the owners of utilities 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 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 affect the number and phasing of personnel assigned to the project.
- Local geology/soil conditions 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.

2.15.2 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 performed. 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 2-33:

Figure 2-33. Uniform Color Codes.

	RED – Electric power lines, cables, conduit and Lighting cables
	YELLOW – Gas, Oil, Steam, Petroleum or Gaseous Materials
	ORANGE – Communications, Alarm or Signal lines, cables or conduits
	BLUE – Potable Water
	PURPLE – Reclaimed Water, Irrigation, or Slurry lines
	GREEN – Sewers and Drain lines
	PINK – Temporary Survey Markings

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. Mark these utility locations in pink and record as an 'unknown' utility line.

2.15.3 Utility Field Collection.

After the designating crew indicates it is finished and satisfied with the markings on the ground, the survey crew will survey those marks in a timely fashion before mark deterioration.

Optional SUE Quality Level A Testholes. If the Airport Authority determines additional information is needed about specific utilities, 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:

- the horizontal and vertical location of the top and/or bottom of utility referenced to project datum,
- the elevation of existing grade over the utility at the testhole referenced to the project datum,
- the outside diameter of the utility and the configuration of non-encased, multi-conduit systems,
- the utility structure material composition, when reasonably ascertainable,
- the benchmarks and/or project control used to determine elevations,

- the paving thickness and type, where applicable,
- the general soil type and site conditions, and
- the other pertinent information as is reasonably ascertainable from each testhole site. References to the project datum will maintain vertical tolerances to 0.05 inches (15mm) based on benchmarks used or established with the base mapping deliverables and horizontal tolerances to applicable surveying standards.

2.16 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.

2.16.1 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.

2.16.2 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 station will be physically monumented. When it is 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 30 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, then establish alternative monumentation for the particular situation. This alternative monumentation must be durable and identifiable (e.g., chiseled "X" in concrete, drillhole, etc.).

2.16.3 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.

2.16.4 Plat of Survey.

The surveyor will prepare a scale drawing of every survey, retracing 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.
- A north arrow depicting a clear reference to the basis direction used.
- The control station(s) or line cited in the deed description and the relationship of the property to this control.

- A notation at each corner of the property stating the boundary monument type as found or set. In addition, include 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 that will clearly reproduce on any copies that may be made of the original drawing).

Chapter 3. GEOGRAPHIC INFORMATION SYSTEM (GIS) SPECIFICATIONS AND STANDARDS

3.1 Overview.

Geographic Information Systems (GIS) allow users to visualize, query, analyze, interpret, and understand data to reveal relationships, patterns, and trends. The airport or the data provider may use GIS for a number of purposes, including the inventory and maintenance of airport facilities, preparation for emergency services, planning for airport improvements, the inventory of airport property, and the inventory of environmentally sensitive areas. Geographic Information Systems provide geospatial data consisting of airport features such as navigational aids, taxiways, and aprons, as well as objects with the potential to affect the navigable airspace and features of landmark value used for general orientation, including natural water bodies, roads, and railroads. The collection of the features must adhere to the topological and cartographic rules to ensure quality. These geospatial data features, when entered into the FAA Airport Surveying – GIS Program database, provide a foundation for GIS analysis, airport design and construction, instrument flight procedure design, and content to create electronic or paper based Airport Layout Plans (eALPs) and aeronautical charts.

3.2 Advantages of Data Compliance.

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:

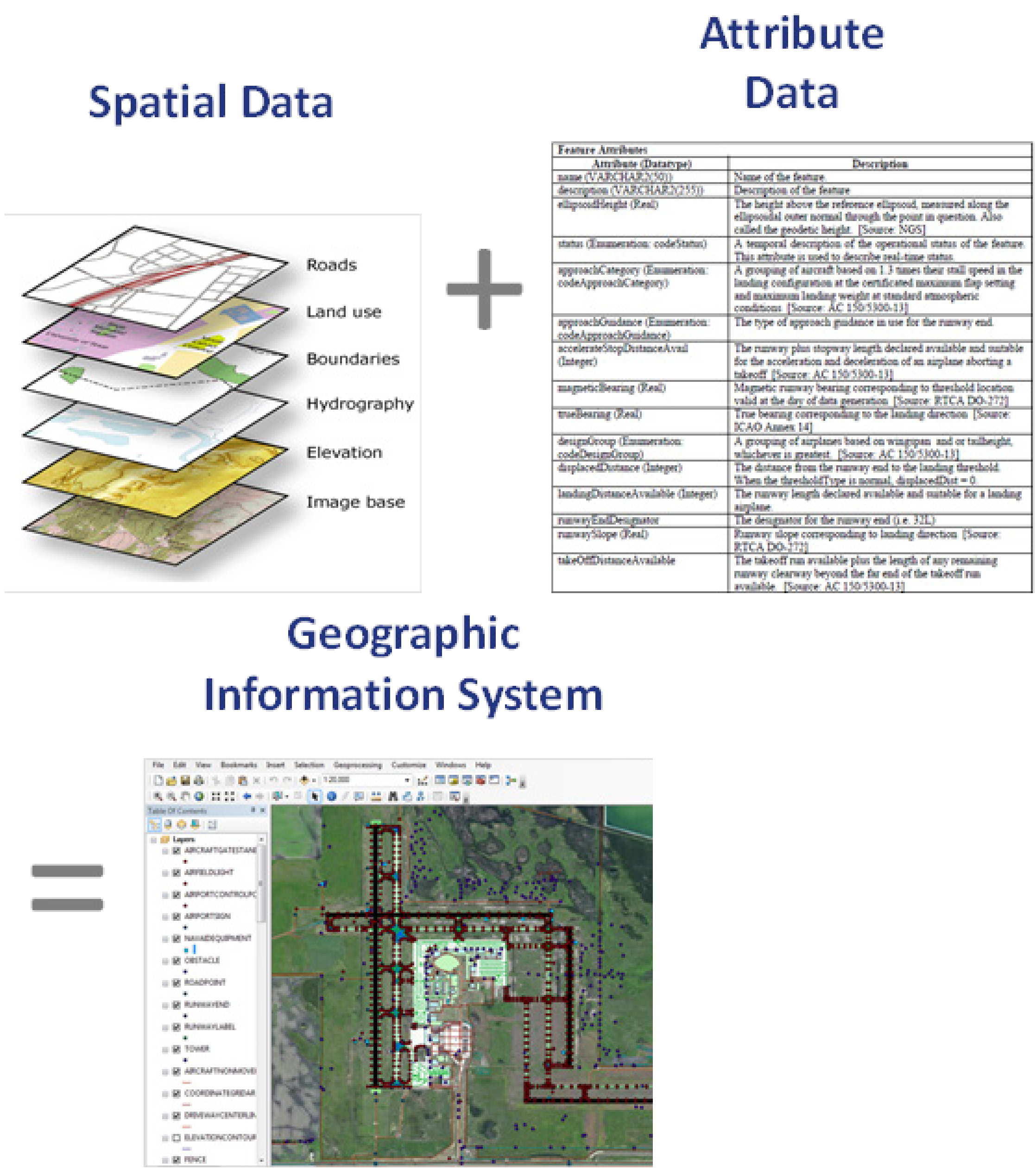
- Improved coordination among the FAA, the airport, and data providers will improve the efficiency and time it takes to complete airfield projects.
- Quality data available during planning and early design phases will help identify the best project alternatives.
- Increased awareness and availability of verified data will reduce the need for FAA lines of business and airport departments to recollect data.
- GIS software tools and other analytic resources will become more accessible to a broader range of airports.

3.3 Relationship of GIS Features to Computer Aided Drafting and Design (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.



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]

3.3.2 Feature Type Layering in GIS Software.

GIS software provides a great deal of flexibility when distinguishing, rendering, and annotating different features within a single layer (i.e., feature type) of a map. The result is fewer GIS layers are needed to meet the wide range of visualization requirements.

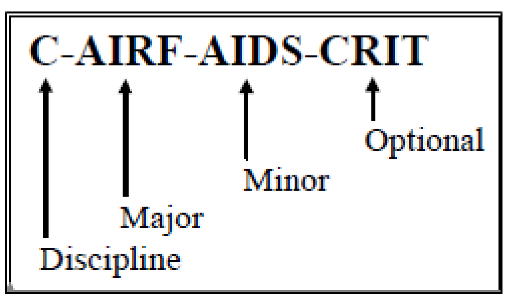
3.3.3 Relationship of GIS and CADD Layers.

Traditionally, geometric objects or features on CADD layers did not carry attributes for analysis or map rendering. To accommodate these needs, similar features and objects were separated onto multiple layers to distinguish between different types, statuses, or other varying characteristics. For example, roads may appear on one GIS layer with attributes to distinguish between paved and unpaved roads or existing and planned construction. In a CADD drawing, these different types and statuses are typically shown on different layers. Distinguishing similar features across multiple layers allows symbology such as color and line weights to be applied consistently to all features on a given layer. This use of CADD layering versus GIS attributes to distinguish features results in a many-to-one relationship between CADD layers and their GIS equivalents. This can be seen in Appendix D where there are one or more CADD layers associated with each GIS feature class defined.

3.3.4 Feature Type Layering in CADD Software.

The CADD layers in Appendix D follow the guidelines in the National CADD Standard recommended by the American Institute of Architects CAD Layer Guidelines (AIA 2001). These layers are names in a hierarchy of characters starting with a discipline code followed by major and then minor categories and, in some cases, optional characters to provide further distinction. This format is shown below in Figure 3-2 and described further below.

Figure 3-2. Format of CADD Layer Names.



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

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	ESMT	Easement	PLTS	Plants
AIDS	Navigational Aids	FAAR	FAA Region	PROP	Property
AIRS	Airspace	FENC	Fencing	SAFT	Safety Areas
AXIS	Axis	FLZN	Flood Zone	SAMP	Sampling station
ANON	Area non-movement	HAZM	Hazardous Materials	SECR	Security
AUZN	Auditory Zone	IDEN	Markings	SHLD	Shoulder
BLST	Blast Pad	LINE	Line	SHOR	Shoreline
BNDY	Boundary	LNDM	Landmark	SIGN	Signs
CLRW	Clearway	LUSE	Land use	SPEC	Special
CNTY	County	LEAS	Leased	TLOF	Touchdown Lift Off
DEIC	Deicing	MAJR	Major	TOWR	Tower
DISP	Displaced Threshold	MUNI	Municipality	WETL	Wetland(s)

ACPK	Aircraft Parking	ESMT	Easement	PLTS	Plants
DIST	Distance	OTLN	Outline	VEGE	Vegetation
DSRF	Design Surfaces	OBSC	Object Identification Surface	ZONG	Zoning
EDGE	Edge Markings	OBJT	Object		
ENDP	Endpoint	PART	14 CFR part 77 Surfaces		

The fourth part of the layer name is similar to the third but it is optional and used to distinguish features further. An example is the breakdown of COMM for communications, WTHR for weather and ILS_ for instrument landing system navigational aids within the Discipline Surveying/Mapping, Major group AIRF and the minor group AIDS would look like this: V-AIRF-AIDS-ILS_.

Each feature class defined in Chapter 5 has one or many equivalent CADD layers as shown in Appendix D that can be used to hold geometric objects representing features of particular type.

3.4 Acceptable Data Formats for Airports GIS.

Submit digital files of airport data within this standard in one of the following formats.

- Autodesk DWG format (version 2010 or later) with attributes defined as object data.
- Microstation DGN format (version 8 or later)
- ESRI Geodatabases or Shapefiles with attributes and metadata provided as attributes within each shapefile.

3.5 ESRI Shapefile Nuances for Dealing With FAA Attribute Names.

When submitting data according to this AC 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 its 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. To solve this problem, data providers should refer to Appendix C to avoid the duplication of names and for use in quality assurance of the data before submission. Although 10 characters is the maximum field name size for shape files, feature classes in geodatabases can have more.

3.6 Geometric Requirements.

3.6.1 Feature Types.

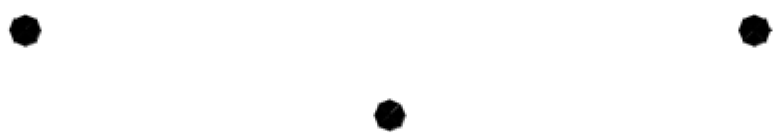
These specifications focus on the definition of geographic features required to depict an airport and its surrounding environment. These include features unique to airports, such as runways and taxiways, as well as features of a more general nature such as roads and buildings. Each of these types of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

3.6.2 Geometry.

This specification allows the three basic geometry types; point, line, and polygon. One geometry type is specified for each feature class defined in Chapter 5.

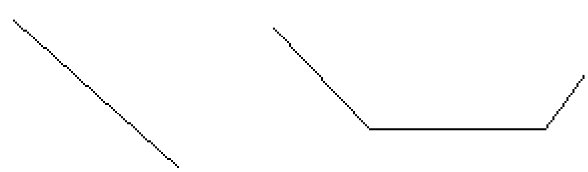
A "point" is the smallest unit of geometry and has no spatial extent (see Figure 3-3). Describe points in three-dimensional (3D) coordinates. Collect all point feature types except the ARP in 3D coordinates.

Figure 3-3. Typical Depiction of a Series of Points.



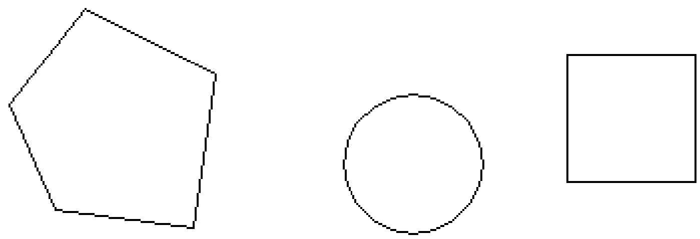
A "line" or polyline consists of a connected sequence of points. Start and endpoints of a line are referred to as start and end nodes (see Figure 3-4). A vertex is the name for the connecting points in between start and end nodes and define the line structure, curvature, or shape. A start-node and an end-node define a line's directionality. A line can only change direction at vertices. Each vertex in a line should be placed at the correct X, Y, and Z (orthometric elevation) coordinate within the accuracy tolerances specified in Chapter 5.

Figure 3-4. Illustrates Examples of a Line.



A "polygon" is a closed figure, or surface, bounded by lines (i.e., a line whose start-node is coincident with its end-node). These lines form the outer edge of the polygon (see Figure 3-5). Each vertex in a line should be placed at the correct X, Y, and Z (orthometric elevation) coordinate within the accuracy tolerances specified in Chapter 5.

Figure 3-5. Depicts Some Typical Polygon Examples.



Complex Geometry Types, such as arcs, circles, donuts, and ellipses, are not included in this standard. These shapes can be represented by lines and polygons, as defined above. This standard's intended use is to facilitate data exchange between software that handles 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 as described in the next section, Topological Integrity.

3.6.3 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:

3.6.3.1 **Lines.**

- Start-nodes and end-nodes of connected line segments within 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. Two intersecting **Runway Centerlines** is a good example.
- 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 3-6.
- 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.

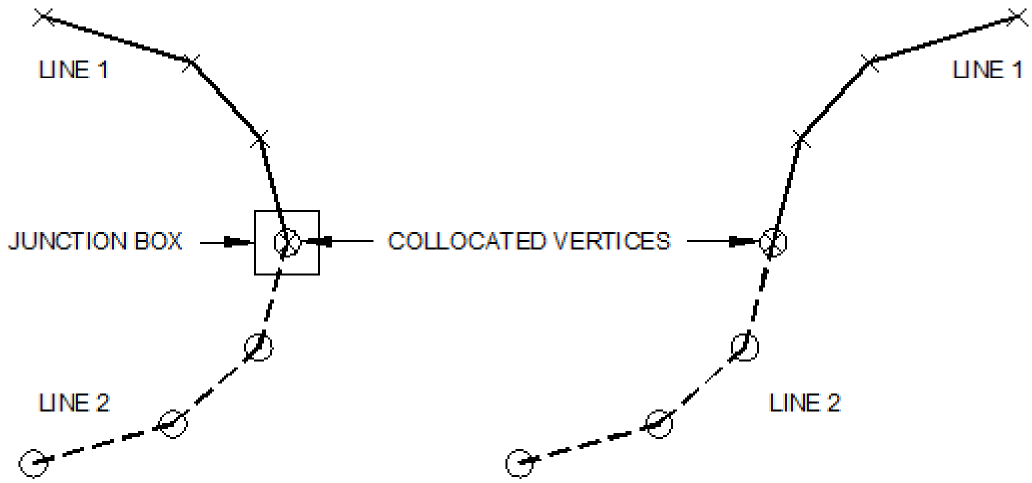
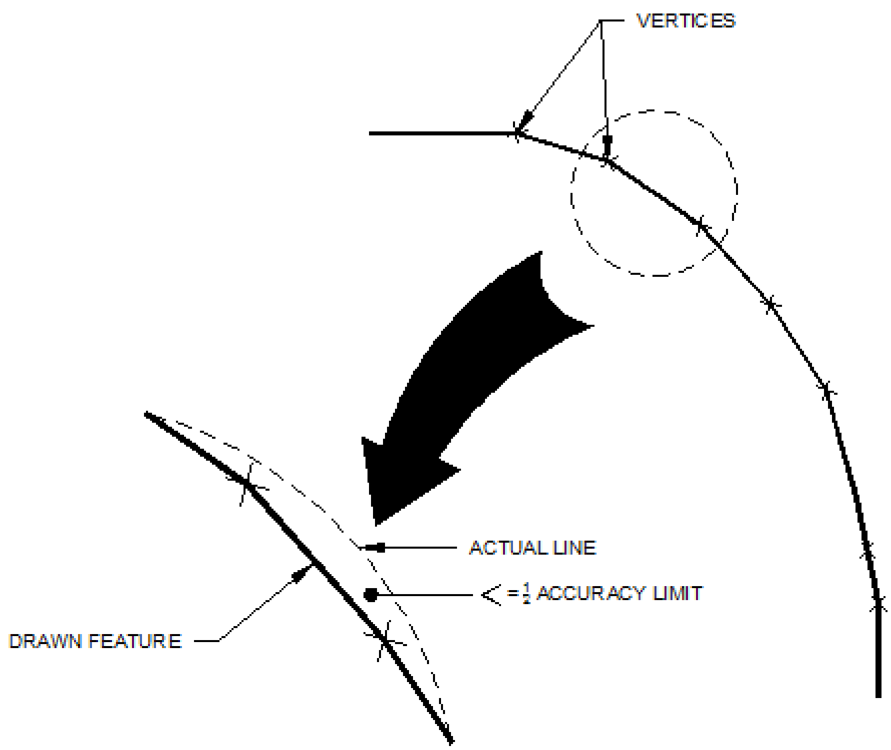


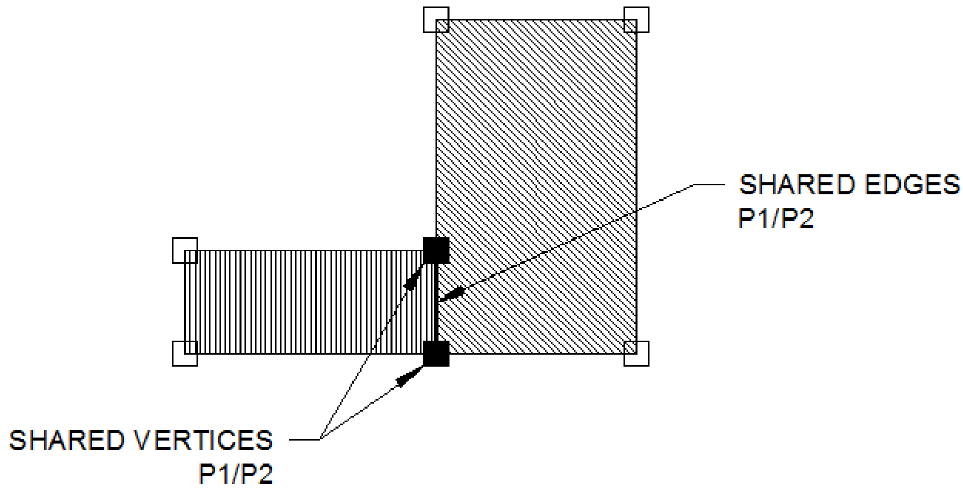
Figure 3-7. Depicting the Placement of Vertices along a Curve.



3.6.3.2 **Polygons.**

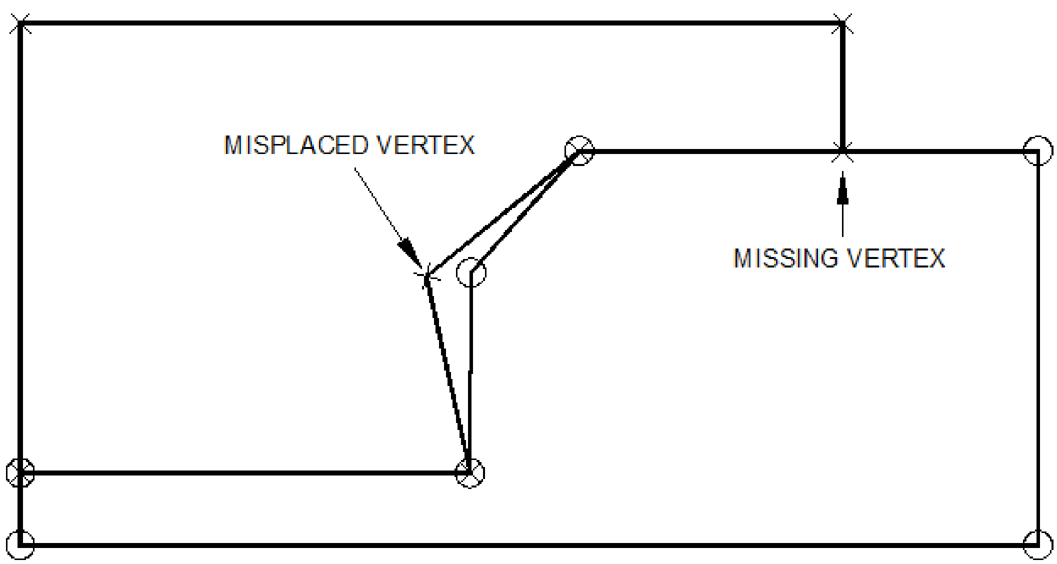
- Geospatial locations of the start-node and end-node of any line forming the edge of a polygon must be identical (coincident) as in Figure 3-8.

Figure 3-8. Illustrates the Shared Edges and Shared Vertices Topological Rule.



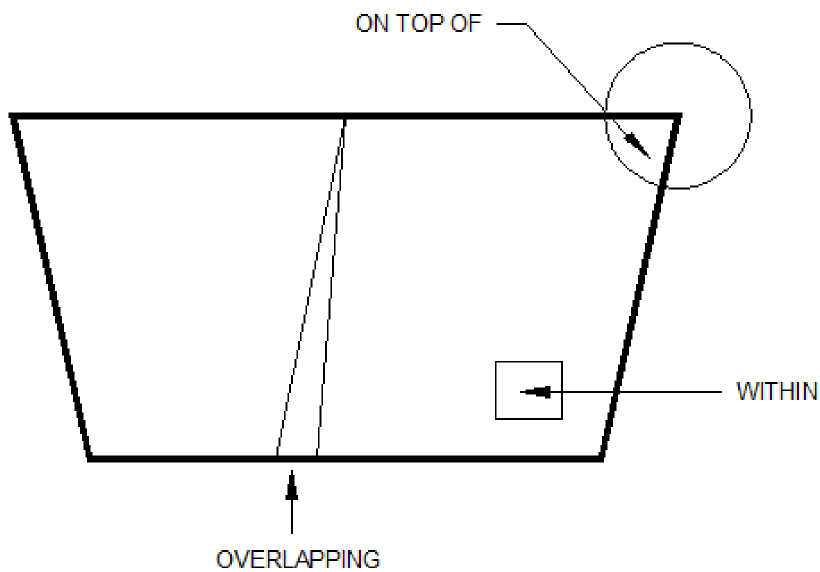
- Polygons sharing an edge (see Figure 3-8 and Figure 3-9) must share all vertices along this edge. This rule applies to features of the same type and for features of different feature types.

Figure 3-9. Depicts an Example of the Placement of Vertices of Adjacent Polygons with Misplaced Vertices.



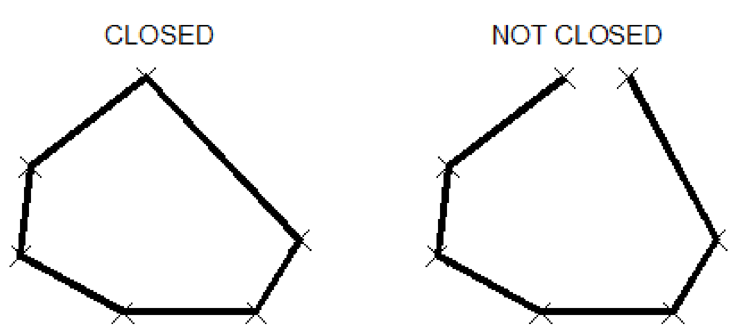
- No polygon will overlap, intersect or fall within another polygon of the same type (see Figure 3-10). Where two runways intersect, capture the portions before and after the intersection using the feature **Runway Element** rather than using the **Runway** feature which would require the polygons to overlap. Connect the Runway Elements together using the feature **Runway Intersection**. Ensure shared edges share all vertices along the shared edge.

Figure 3-10. Illustrates the Topological Rule of Overlapping Polygons of the Same Feature Type.



- Any single polygon should not overlap itself or contain duplicate vertices or nodes (with the exception of the start and end nodes which must be coincident).
- Close all polygons (see Figure 3-11). The start-node and end-node of the multi-segment line that forms the polygon must be collocated, meaning that they meet at the same coordinate in three dimensions.

Figure 3-11. Illustrates the Difference between Closed and Unclosed Polygons.



3.7 Attributes.

Attributes provide characteristics about the 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 all capital letters and there are no spaces or underlines between words; OPERATIONALSTATUSCODE is an example. Figure 3-12 shows a typical list of attributes associated with a feature type. Airport Authorities should work closely with data providers to attribute features completely before submitting the data to Airports GIS.

Figure 3-12. Example of a Feature and its Attributes.

RUNWAY
+AIRCRAFTCLASSIFICATIONNUMBER
+EFFECTIVEENDDATE
+EFFECTIVESTARTDATE
+OPERATIONALSTATUSCODE
+PAVEMENTCLASSIFICATIONNUMBER
+RUNWAYLENGTH
+RUNWAYLINEOSIGHTINDICATOR
+RUNWAYUUID (PK)
+RUNWAYWIDTH
+SURFACECOMPOSITIONTYPECODE
+SURFACECONDITIONCODE
+SURFACETYPECODE
+USERNOTETEXT

The top line of the example (Figure 3-12) is the Feature Name. Underneath the feature name each attribute (characteristic) is listed. This is a generic view for illustration purposes. The RUNWAYUUID (PK) attribute is a special attribute called the primary key. The primary key is a unique identifier referring to a single instance of a feature. Each feature must have a primary key and each feature instance will have a different value in the primary key attribute to uniquely identify it.

3.7.1 Enumeration Values.

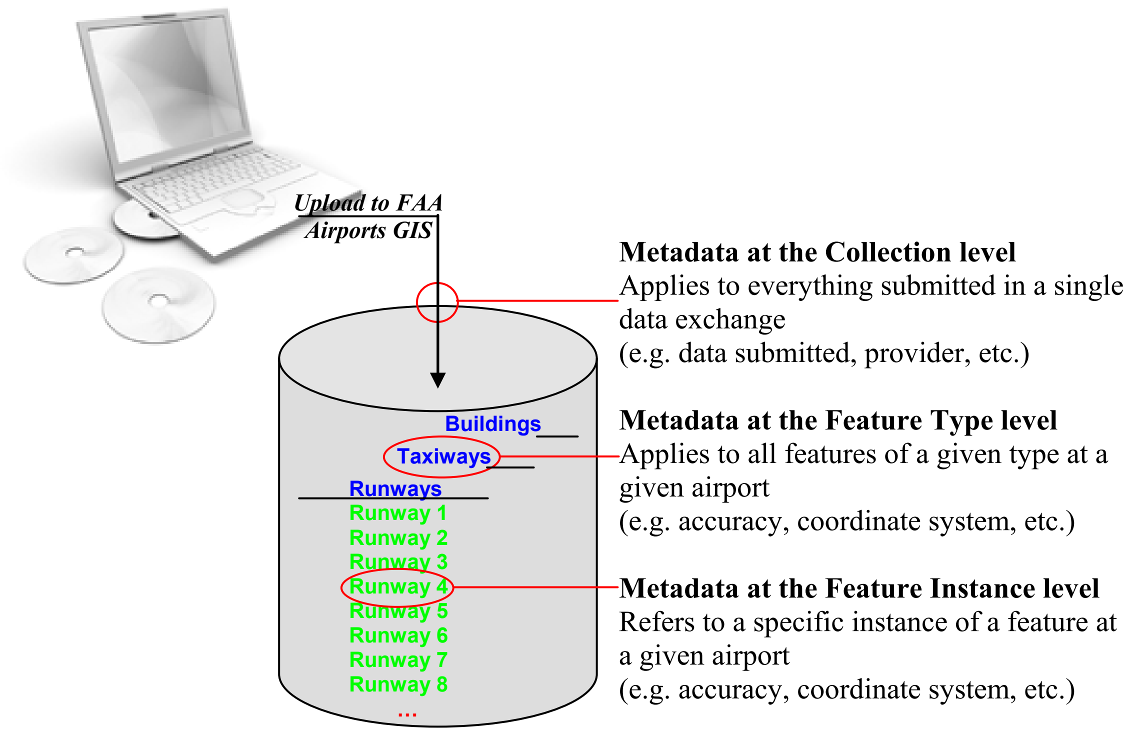
Sometimes it is necessary to limit the range of values for an attribute. This AC uses the enumeration for an attribute to list the acceptable values. Enumerations limit the attribute values to a range of acceptable values. When an attribute name has the word “CODE”, it is an enumeration and will have an associated list of acceptable values. For each such attribute, there is an associated table in Chapter 5 listing the acceptable values and their definitions.

3.8 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, metadata descriptors are referred to in this standard as metadata elements and not as attributes.

Metadata elements can be applied at various levels in a data set. They can describe a collection of data submitted at one time. All data uploaded into a specific FAA Airports GIS project for example, carries metadata in the form of project details saved on the site, technical details in the plans and final project submission information, and notes that can be added at the time of upload. Metadata elements can also describe all geometry and attributes on a given layer or feature type, as is the case with metadata that complies with the FGDC Content Standard for Digital Geospatial Metadata (CSDGM). This level of metadata is implied in this standard by the requirements and definitions defined at the feature class level in Chapter 5. Next, metadata elements can describe data about a specific feature. This level applies when individual features or groups of features within a layer have different metadata. Specific attributes or metadata elements, defined in Chapter 5, provide metadata further describes each feature. Examples include the status, effective start and effective end date attributes indicating the temporality for each feature. Finally, they can describe each attribute of a given feature instance separately. Data providers can record such metadata in the USERNOTETEXT attribute, if desired. For this standard, metadata is required at the collection level (see Figure 3-13) 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 3-13. 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.

3.8.1 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. This standard defines the beginning and ending date and the time for which each feature instance is valid. Temporality is discussed in more detail later in this chapter.

3.8.2 Accuracy.

One metadata element particularly important to Airports GIS applications is accuracy. This is stored at the project level when the Airport Authority or data provider uploads a data set and is asked to confirm that the data meets the accuracy limits defined for each feature class in Chapter 5. If the data does not meet the accuracy tolerances specified, a comment can be added indicating what accuracy level was achieved. "Accuracy" is broadly defined as nearness to the true value. Specifically, this standard provides limits for the relative 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.

Additional 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).

3.9 **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 consistently defined and indicated in the metadata provided with a given data set. The coordinate system is specified upon upload of the data. The following sections describe the acceptable coordinate systems and related datums.

3.9.1 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. Appendix G lists the coordinate systems contained within Airports GIS. If a data provider plans to us a coordinate system not listed in Appendix G, they must identify it and the necessary parameters in their project plans. Provide latitude/longitude data in decimal degrees with positive latitude values in the Northern hemisphere and negative longitude values in the Western hemisphere. 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.

3.9.2 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:

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

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

3.10 Temporality.

3.10.1 Overview.

In order for the FAA to provide accurate information, the FAA must have the ability to look into the past, present and future. The ability to select data in different time frames gives the FAA enhanced capabilities such as analyzing the impact of changing the present and future data. Temporality gives the FAA the ability to share correct and consistent data across its lines of business and with the airports as well as access to historical data, current data and planning data for use at a later time.

Data temporality is the relationship of data to a point in time or a time span. Temporality is accomplished by adding time based properties to data. Temporality models provide a standardized framework and terminology enabling consistent and accurate sharing of temporal data among FAA systems. Within this AC we use two temporality models: transactional and time slice. Temporality provides the capability to align different versions of data from different domains at any point in time.

3.10.2 Properties of Temporality.

The following properties enable data temporality.

Property	Purpose
Effective Start Date/Time	Sets the date and time at which a feature or version of data becomes relevant or appropriate for use.
Effective End Date/Time	Sets the date and time at which a feature of version of data is no longer relevant or appropriate for use.
Version Number	Provides a reference to a specific version of data when used in conjunction with a UUID[6].
Status[7]	Indicates the lifecycle stage of a feature. Data progresses through the stages of being planned, becoming active, and being retained as history.

[6] The universally unique identifier (UUID) is not a property of temporality, but it is used in conjunction with the version number to identify a data element.

[7] Though the status is technically optional, it is a required attribute within Airports GIS and must always be defined by the data provider. The exception to this rule is for features describing naturally occurring features such as those in the **Flora Species Site**, **Vegetation Area**, **Forest Stand Area**, **Landmark Area**, **Line**, and **Point** when describing a naturally occurring feature.

Property	Purpose
Context (optional)	This is a complex concept described later in this section.

3.10.3 Temporality Models.

For airport data there are two temporal models: transactional and time slice. Each serves a different purpose.

3.10.3.1 **Transactional Model.**

The purpose of the transactional model is to define data during a period of time. This model uses the effective start and end date/time to define the beginning and end of a feature's life. There are two ways to implement this model.

Transactional Implementation	To update data …
Save previous values	Set the end date on the original feature. Create a new feature with the original value and apply the updates.
Do not save previous values	Update data, except for temporal properties, unless the data is in history, in which case it cannot be updated.

3.10.3.1.1 How the Transactional Model Will Work.

The following is a simple scenario describing how the transactional model works. The airport logs into Airports GIS and indicates it needs to make a change to its Airport contact information. The user makes the appropriate changes to the Airport Manager name and email address. A new version of the airport record is made with the new information and the effective start date is set to the current date. Transactional temporality supports information in an "on" or "off" state.

		Effective Start Date	Effective End Date
Timeline	**Before Effective Start Date**	**After Effective Start Date**	**After Effective End Date**
Status Business Rules	Planned Data is created and can be modified or deleted	Active Only effective End Date can be modified	History Data cannot be modified

3.10.3.2 **Time Slice Model.**

The purpose of the time slice model is to support data changing over time. Data may have multiple versions across its life span. Changes to feature data are made by creating new versions of data. This allows Airports GIS to have different versions of the same feature planned where each version becomes operational at different times and where versions no longer operational remain accessible. Only one version of a feature is operational at any given time. Airports will use this model extensively, especially in construction and project phasing.

3.10.3.2.1 How the Time Slice Model will Work.

In the time slice model, data evolves by the user creating a new version of the same feature. Each version goes through the same three phases of lifecycle: planned, active, and history. Multiple versions can exist at the same time, but only one version is allowed to be active at a time. There is no time gap between versions; the effective end date of one version must be the effective start date of the next version. Consider the following example.

The airport is completing a runway extension project. The project is planned for three phases. The current data describes the airport in its as-built condition today and it is the active data. The data supporting the three construction phases are all planned. Until the date any of the planned data becomes active it is editable and changeable. When the first phase of construction begins, the data for phase 1 (version 1) becomes active and the state of the as-built (version 0) data becomes history. At this point no changes to the Version 1 data are allowed except for the effective end date. The other two planned phases are still changeable. When Phase 2 (version 2) construction begins, the data from Phase 1 is moved to history and the Phase 2 (version 2) data becomes active with no changes allowed except for the effective end date. When Phase 3 (version 3) construction begins the data supporting it becomes active and the Phase 2 (version 2) data goes to history.

Timeline					
Data	Version 0	Active	History		
	Version 1	Planned	Active	History	
	Version 2	Planned	Planned	Active	History
	Version 3	Planned	Planned	Planned	Active

From this example, you can see how the project and its supporting data will proceed. It also provides the airport and the FAA the ability to go back and review the previous versions of data if necessary because they are in history.

3.10.4 Connecting Temporal Data.

No airport, or the data describing it, stands alone. Any change to an airport's data has a ripple effect across the NAS. In our example above, the construction would require the adjustment of instrument flight procedures and moving of navigational aids to support each phase. So the data supporting each phase has a direct effect on the data of other systems within the FAA and the products or services they provide. The use of time based properties ensures the alignment of data across the NAS as changes are made. Through the implementation and use of temporality, the other NAS systems and services can retrieve and act accordingly on the data based on time.

3.10.5 Data Context.

The context property is an optional property storing the context of how the data is used. There is only one context of the data at any time. The purpose of contexts is to allow the use of the same data structure in achieving different goals. The following is a list of contexts:

- Publication – a feature developed for the purpose of being put into operational use. This is the most commonly used context. Changes to a feature are made by creating new versions of the data.
- Future – A feature developed for the goal of protecting an area for future development. A future feature is not used for publication, it is a placeholder. Since multiple versions of a feature may exist in the same time frame and the data is not versioned, the data stored in this context is often an approximation. An example is a new runway is planned at an airport in the distant future, and a “plan on file” is put in place to protect airspace and the future efficiency and utilization of the runway.
- Research and Development - a feature developed for the goal of creating “what if” scenarios. Research and development features are not used for publication, and so only one version is created. Multiple “what if” scenarios may exist at the same time to allow for testing and comparison in order to select the best solution. Airports will most often use this context when developing and analyzing reviewing alternatives in master planning.
- Predictive – a feature developed to predict future behavior, such as weather, and to anticipate the consequences of change. In the airport environment the use of this context would support efforts to determine how a change in the aircraft using the airport would affect the airport or conversely how a change in the airport would affect the aircraft using the airport.

3.10.6 Temporary Feature Changes.

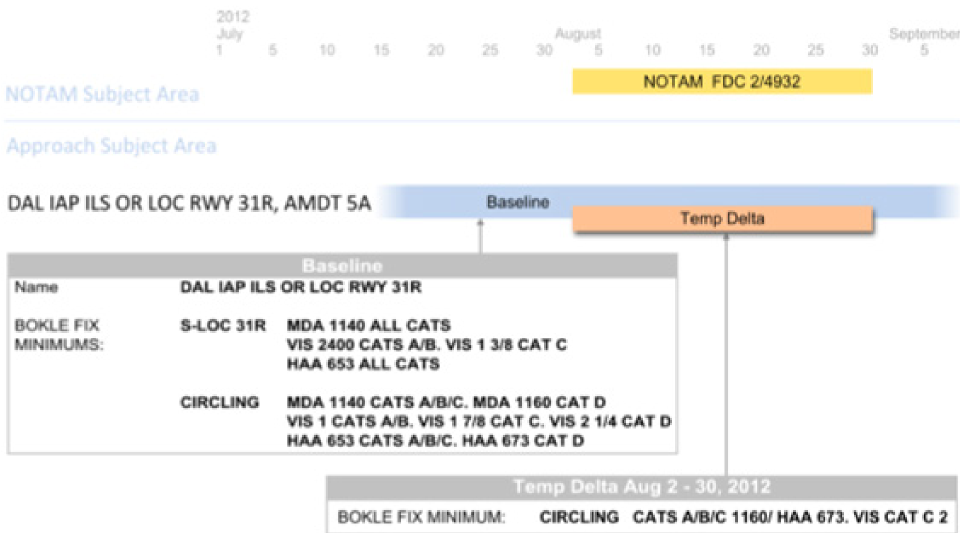
Most airports are not static environments; they change over time. In some cases, the change may be only temporary such as in our discussion of transactional temporality. When discussing temporary changes to data Airports GIS provides the following capabilities.

- Baseline – the original digital representation of a feature before the application of any changes.
- Temp Delta – a temporary change to the digital representation of a feature.
- Snapshot – the result of applying the temp delta to the baseline to produce the digital representation of the feature at a specific point in time.

3.10.7 Temp Delta.

A temp delta defines a temporary change to a feature. Within the airport subject area temporary changes are stored in the database but in a separate table, ensuring no data is lost. This provides the ability to retrieve the features original data independently.

Figure 3-14. NOTAM Temp Delta Example.

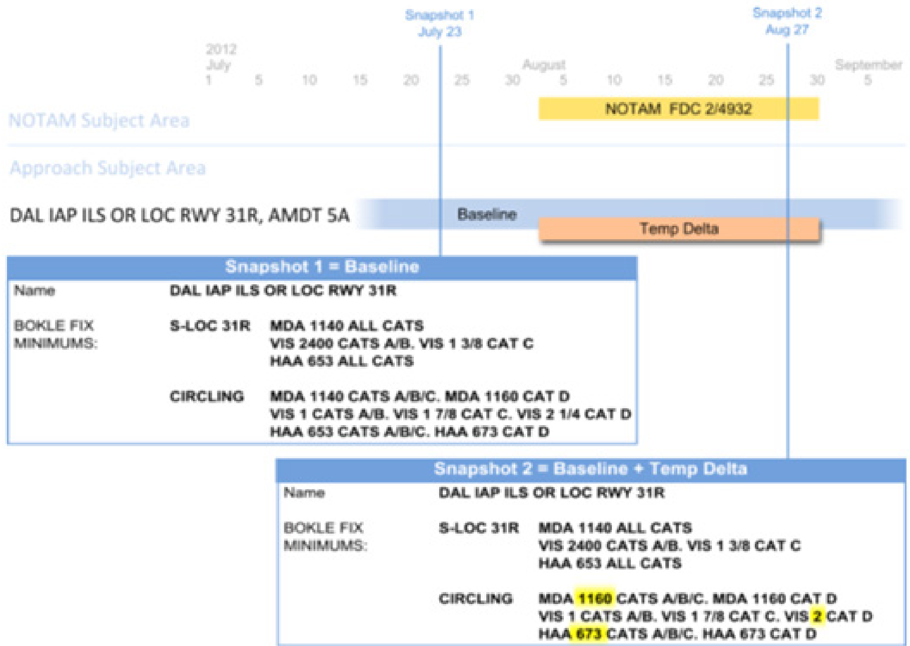


In the example above, the blue bar indicates the baseline data and it remains unchanged. The orange bar represents a temporary change and is stored independently from the baseline features. Once the data within the temporary change moves to history, it no longer applies to the baseline data. This is a NOTAM example, but the example from transactional temporality could apply. In the example, there was a temporary change to the declared distances for the runway directions to support the project. In this example, the data could be modeled using transactional temporality or using a temp delta. The difference is in the transactional model a new version of the data was made, but using a temp delta, the original data remains and only temporary changes apply during the lifecycle of the change without affecting the baseline data.

3.10.8 Snapshot.

A snapshot is a digital representation of a feature in a specific point in time with all the temporary changes applied. Continuing from the previous example, we find the following.

Figure 3-15. NOTAM Temp Delta Example with Snapshots.



To create snapshot 1, data is read from the baseline. To create snapshot 2, data is read from the baseline and the changes the temp delta describes are applied. The data from the temp delta are highlighted in yellow in snapshot 2.

3.10.9 <u>Temporality within Airports GIS.</u>

There are two considerations for temporality in Airports GIS; is whether the data provider is uploading survey data or requesting changes to the baseline data for an airport. In the case of survey data, Airports GIS will provide the temporality for the user based on when the data is accepted by the system. For example, if a data provider uploads a survey containing 100 features and 95 of those features are accepted by the system immediately, Airports GIS will establish the effective start date of the features as the date they were accepted. The five features which were rejected and require updates and resubmission have a later effective start date for when they are accepted by the system. In some cases, such as data requiring independent review verification, the system will set the effective start date as the date the data is reviewed and accepted by the independent reviewing authority. In other cases, where the data is only validated by the system, the effective start date will be the date the system accepts the data after validation.

The exception to this is when the data provider is submitting design data supporting a future change to the airport. In these cases, it is the responsibility of the data provider to submit the effective start and effective end (if appropriate) dates for each feature they submit.

3.10.10 Temporality Date/Time Reference.

Data providers must use the Gregorian calendar and Coordinated Universal Time (UTC) when defining the effective start and end dates for features. Generally, specifying the date alone is sufficient as the system will assume all changes to occur at 12:00 AM (midnight) local time on the defined date and will make the appropriate UTC time offset.

3.11 Geometric Constraints.

The following rules identify geometric constraints data providers must ensure are met before submitting them to Airports GIS. Many features at the airport are connected to other features geometrically and these connections must be maintained to ensure the topological integrity of the data. The system checks against these constraints in the automated validation and will return an error if they are not met. The following rules apply to the geometries of features within Airports GIS:

- Any feature submitted must comply with the geometry in Chapter 5 for the specific feature.
- A runway intersection feature must be attached to all adjacent runway elements.
- A displaced threshold must correspond to a runway or runway element.
- A position feature defining the displaced threshold location must be contained within a runway or runway element feature.
- A marking feature defining a displaced threshold must cross a runway or runway element.
- A shoulder feature must correspond to a runway, runway element, taxiway element, stopway, or apron.
- A stopway feature must correspond to a specific runway direction.
- A taxiway element must correspond and be attached to another taxiway element, a runway, runway element, or apron.
- A Land and Hold Short feature must be contained within a runway or runway element feature.
- The runway centerline must be a line connecting the two runway direction points.
- An **Arresting Gear** must cross a runway or runway element feature.
- A runway direction feature must be located at the edge of a runway, runway element, blast pad, or stopway feature.
- A Runway Blast Pad must correspond and be attached to a runway, runway element and a runway direction feature.
- An **Apron** feature must correspond and be attached to a taxiway element or another apron.
- An **Aircraft Gate Stand** must be contained within an apron feature.

- A **Deicing Area** feature must be within an apron or taxiway element.
- A taxiway intersection feature must correspond and be attached to adjacent taxiway element features.
- A taxiway holding position feature must cross a taxiway element feature.
- A taxiway centerline feature must be connected to at least two other taxiway centerline features unless it is the start or endpoint of the taxiway centerline.
- A **Marking Area** feature defining the runway designation must be contained within a runway or runway element feature.
- A touchdown liftoff (TLOF) feature must be contained within a Final Approach Takeoff Area (FATO)
- A helipad reference point must be contained within the FATO.
- A **Deicing Area** feature should be attached to a taxiway centerline feature.
- A position feature defining a point on the runway centerline must be located on the runway centerline feature.
- A position feature defining a perpendicular point abeam a NAVAID must form a 90° angle with the runway centerline.
- A position feature defining a runway high point must be contained within a runway or runway element feature.
- A position feature defining a runway low point must be contained within a runway or runway element feature.
- A position feature defining the ARP must be within the airport boundary.
- A position defining the airport elevation must be contained within a runway or runway element feature.

3.12 Feature Attribution Constraints.

The following rules provide constraints for the data submitted or managed through Airports GIS.

- **Air Operations Area** feature must have an operational status code.
- **Aircraft Gate Stand** must have an aircraft classification number, aircraft gate stand length, aircraft gate stand width, aircraft gate stand name, aircraft gate stand maximum width, aircraft gate stand type, operational status code, and pavement classification number.
- **Airfield Light** must have a light system type code, light color code, and operational status code.
- **Airport Boundary** must have an airport facility type, airport name, NFDC airport identifier, operational status code, operations type, and owner code.

- **Airport Movement Area** must have an operational status code.
- **Airport Parcel** must have how acquired type code, operational status code, parcel acquisition type code, parcel area type, and parcel area size.
- **Airport Sign** must have airport sign direction, airport sign height value, airport sign message front, airport sign type code, and operational status code.
- **Anchorage Area** must have anchorage area depth value, anchorage area name, anchorage area length, anchorage area restriction type (if any or none identified), anchorage area width value, and operational status code.
- **Apron** must have aircraft classification number, apron element type code, apron length, apron width, operational status code, pavement classification number, and tie down count.
- **Arresting Gear** must have airport type code, arresting gear distance, arresting gear distance reference, arresting gear type, directionality code, operational status code, and owner code.
- **Bridge** must have bridge type code, operational status code, and directionality code.
- **Construction Area** must have construction area project name, construction area type code, operational status code, and project status code.
- **Deicing Area** must have deicing area type code and operational status code.
- **Dimension** feature must have dimension type code, dimension value and operational status code.
- **Docking Area** must have docking area name, floating bridge indicator, floating dock indicator, gangway available indicator, marine railway available indicator, pier available indicator, and operational status code. Plus any of the following as required:
    - If the floating bridge indicator is set to “yes”, then floating barge length value, floating barge width value, floating barge structure material are required;
    - If the floating dock available indicator is set to “yes”, then floating dock length, floating dock structure material, floating dock width value are required;
    - If gangway available indicator is set to “yes”, then gangway length, gangway structure material, and gangway width are required;
    - If marine railway available indicator is set to “yes” then marine railway platform capacity, marine railway platform length, and marine railway platform width value are required;
    - If pier available indicator is set to “yes”, then pier length value, pier structure material, and pier width value are required.
- **Driveway Area** must have operational status code.

- **Driveway Centerline** must have operational status code.
- **Elevation Contour** must have elevation contour value.
- **Environmental Contamination Area** must have environmental area type code, pollution found date, remediation urgency code, and operational status code.
- **Fauna Hazard Area** must have environmental area type code, wildlife hazard type code, and operational status code.
- **Final Approach and Takeoff** area must have aircraft classification number, FATO safety net indicator, FATO designator identifier, FATO height, FATO length, FATO load bearing indicator, FATO marked indicator, FATO perimeter lights indicator, FATO primary magnetic bearing, FATO primary true bearing, FATO width, operational status code, and pavement classification number; plus the following may be required.
    - If FATO perimeter Lights is set to "yes" the light color code is required.
    - If FATO safety net indicator is set to "yes," then FATO safety net height and FATO safety net width are required.
    - If FATO elevated indicator is set to "yes" and FATO height is greater than 4 feet, the FATO safety net indicator must be "yes"
- **Flood Zone** must have environmental area type code, flood zone and flood zone classification type code.
- **Flora Species Site** must have endangered species act site indicator, flora type code, plant purpose code, and plant height length.
- **Forest Stand Area** must have stand height AGL.
- **Frequency Area** must have operational status code, primary frequency assigned service, and primary frequency number.
- **Hazardous Material Storage Site** must have hazardous material category type and operational status code.
- **Label Point** must have label type code, label value, and operational status code.
- **Land Use** must have land use location code, land use type code, and operational status code.
- **Landmark Area** must have landmark type code.
- **Landmark Line** must have landmark type code.
- **Landmark Point** must have landmark type code.
- **Lease Area** must have lease area name, lease area size, lease area unit of measurement, and operational status code.
- **Marking Area** must have **Marking Line** feature type, color code, and operational status code.

- **Marking Line** must have **Marking Area** feature type, color code, and operational status code.
- **NAVAID Critical Area** must have **NAVAID Equipment** type code, NAVAID critical area X dimension, NAVAID critical area Y dimension, and operational status code.
- **NAVAID Equipment** must have NAVAID component antenna height, ellipsoid elevation measurement, NAVAID component type code, operational status code, and NAVAID system identifier. Plus, the following may apply:
    - If NAVAID component type code is Visual with a lighting system type code of APBN or REIL, then NAVAID component runway distance and NAVAID component offset distance are required.
    - If NAVAID component type code is airport surveillance radar, then NAVAID component runway distance and NAVAID component offset distance are required.
    - If NAVAID component type code is air route surveillance radar is on airport, then NAVAID component runway distance and NAVAID component offset distance are required, otherwise nothing is required.
    - If NAVAID component type code is visual with a lighting system type code of ALSF-1, ALSF-2, MALS, MALSF, MALSR, SALS, SSALF, SSALR, then high angle measurement, runway direction number and if applicable runway direction designator are required.
    - If NAVAID component type code is back course marker then, NAVAID component runway distance, NAVAID component stop end distance, offset direction code, NAVAID component offset distance, runway direction number, and if applicable runway direction designator are required.
    - If NAVAID component distance is DME, then then NAVAID component runway distance and NAVAID component offset distance are required.
    - If NAVAID component type code is Glideslope End Fire, then, ellipsoid elevation measurement, height above ellipsoid measurement, NAVAID component runway distance, NAVAID component stop end distance, NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number, and if applicable runway direction designator. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
    - If NAVAID component type code is fan marker, then NAVAID component runway distance, NAVAID component stop end distance, offset direction code, NAVAID component marker beacon role code, runway direction number, and if applicable runway direction designator are required.

- If NAVAID component type code is glideslope then ellipsoid elevation measurement, height above ellipsoid measurement, NAVAID component runway distance, NAVAID component stop end distance, NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number, and if applicable runway direction designator. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is ground controlled approach touchdown reflector, then ellipsoid elevation measurement, height above ellipsoid measurement, NAVAID component runway distance, NAVAID component stop end distance, NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number, and if applicable runway direction designator. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is inner marker, then NAVAID component runway distance, NAVAID component stop end distance, offset direction code, NAVAID component marker beacon role code, runway direction number, and if applicable runway direction designator are required.
- If NAVAID component type code is a localizer, then NAVAID component offset distance, NAVAID component runway distance. NAVAID component stop end distance NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number and if applicable, runway direction designator are required. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is localizer directional aid then, NAVAID component offset distance, NAVAID component runway distance. NAVAID component stop end distance NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number and if applicable, runway direction designator are required.
- If NAVAID component type code is middle marker, then NAVAID component runway distance, NAVAID component stop end distance, offset direction code, NAVAID component marker beacon role code, runway direction number, and if applicable runway direction designator are required.

- If NAVAID component type code is microwave landing system –azimuth, then NAVAID component offset distance, NAVAID component runway distance. NAVAID component stop end distance NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number and if applicable, runway direction designator are required. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is MLS elevation antenna, then NAVAID component offset distance, NAVAID component runway distance. NAVAID component stop end distance NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number and if applicable, runway direction designator are required. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is non-directional beacon, then NAVAID component runway distance, NAVAID component offset distance, and NAVAID airspace use code are required.
- If NAVAID component type code is outer marker then NAVAID component runway distance, NAVAID component stop end distance, offset direction code, NAVAID component marker beacon role code, runway direction number, and if applicable runway direction designator are required.
- If NAVAID component type code is Visual with a lighting system type code of APAPI, PAPI2, PAPI4, PLASI, VASI-12, VASI-16, VASI-2, VASI-2-2, VASI-3, then NAVAID component offset distance, NAVAID component runway distance. NAVAID component stop end distance NAVAID component threshold distance, offset direction code, runway reference point distance, runway **Point Role Code**, runway direction number and if applicable, runway direction designator are required. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is precision approach radar touchdown reflector, then then ellipsoid elevation measurement, height above ellipsoid measurement, NAVAID component runway distance, NAVAID component stop end distance, NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number, and if applicable runway direction designator. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.
- If NAVAID component type code is precision approach radar, then then ellipsoid elevation measurement, height above ellipsoid measurement,

NAVAID component runway distance, NAVAID component stop end distance, NAVAID component threshold distance, offset direction code, runway **Point Role Code**, runway direction number and, if applicable, runway direction designator. Additionally, if the runway does not have a displaced threshold, then NAVAID component runway distance will equal NAVAID component threshold distance.

  - If NAVAID component type code is simplified direction finding, then NAVAID component runway distance and NAVAID component offset distance are required.
  - If NAVAID component type code is, tactical air navigation (TACAN), VHF omnidirectional Range (VOR), or VORTAC, then NAVAID component runway distance, NAVAID component offset distance, and NAVAID airspace use code are required.

- **Natural Water Body** must have a natural water body type code.
- **Navigation Buoy** must have navigation buoy color code, navigation buoy designation ID, navigation buoy type code, lighting configuration type code, and operational status code.
- **Noise Contour** must have land use type code, and noise contour line measurement.
- **Noise Incident** must have noise incident number and noise source type code.
- **Noise Monitoring Point** must have noise monitoring point name and operational status code.
- **Object Area** must have direction location code, distance from threshold to object, distance from runway centerline to object, height above airport value, height above runway end, height above TDZE value, object group code, object lighted indicator, object marked indicator, object lighted indicator, object type code, OIS penetration value 1, OIS surface condition, OIS surface type code 1, operational status code, and runway direction number.
- **Object Identification Surface** must have approach guidance code and OIS Surface Type and Runway Direction Number or Landing Strip Designator Identifier.
- **Object Line** must have direction location code, distance from threshold to object, distance from runway centerline to object, height above airport value, height above runway end, height above TDZE value, object group code, object lighted indicator, object marked indicator, object lighted indicator, Object type code, OIS penetration value 1, OIS surface condition, OIS surface type code 1, operational status code, and runway direction number.
- **Object Point** must have direction location code, Distance from threshold to object, distance from runway centerline to object, height above airport value, height above runway end, height above TDZE value, object group code, object lighted indicator, object marked indicator, object lighted indicator, Object type

code, OIS penetration value 1, OIS surface condition, OIS surface type code 1, operational status code, and runway direction number.

- **Parcel** must have how acquired type code, operational status code, parcel acquisition type code, parcel area type, and parcel area size.
- **Parking Lot** must have an operational status code and a parking lot name.
- **Passenger Loading Bridge** must have passenger boarding equipment type and operational status code.
- **Position** must have position role code and operational status code.
- **Restricted Access Boundary** must have Security Name and Operational Status Code.
- **Right and Interest** must have easement type code, easement acquisition purpose code, right estate type code, right of way type code and operational status code.
- **Railroad Centerline** must have railroad centerline name, operational status code and segment type code.
- **Railroad Yard** must have an operational status code and a railroad yard name.
- **Road Centerline** must have an operational status code and a road centerline name.
- **Road Point** must have road point name and operational status code.
- **Road Segment** must have road route name 1, operational status code, road route type 1, road segment name, and segment type code.
- **Roof** must have operational status code, roof height, and structure identifier.
- **Runway** must have aircraft classification number, operational status code, pavement classification number, runway designator identifier, runway length, and runway width.
- **Runway Arresting Area** must have arresting area length, arresting area set back length, arresting area width, operational status code, and runway direction number.
- **Runway Blast Pad** must have aircraft classification number, operational status code, pavement classification number, runway direction blast pad length, runway direction blast pad width, and runway direction number.
- **Runway Centerline** must have operational status code and runway designation identifier.
- **Runway Declared Distance** must have declared distance type, declared distance value, declared distance segment type, operational status code, and runway direction number.
- **Runway Direction** must have aircraft approach category 1, airplane design group 1, approach guidance code, magnetic bearing, Ellipsoid height, operational status

code, Runway direction number, runway marking type, runway direction visibility 1, threshold type code, touchdown zone elevation, and true bearing.

- **Runway Element** must have aircraft classification number, marking feature type code, operational status code, pavement classification number, and runway designator identifier.
- **Runway Helipad Design Surface** must have design surface type and operational status code.
- **Runway Intersection** must have aircraft classification number, operational status code, pavement classification number, runway designator identifier 1, and runway designator identifier 2.
- **Runway LAHSO** must have available landing distance, color code, marking feature type, operational status code, protected runway designator, and available landing distance (ALD) Reference Point.
- **Runway Protection Zone** must have aircraft approach category, airplane design group, RPZ Area Code, RPZ type code, and runway direction number.
- **Runway Safety Area** must have operational status code, RSA Width, and Runway Direction Number.
- **Sample Collection Point** must have operational status code and sample collection point type code.
- **Seaplane Ramp Centerline** must have operational status code.
- **Seaplane Ramp Site** must have operational status code and seaplane ramp site name.
- **Security Area** must have an operational status code and security area name.
- **Security Identification Display Area** must have operational status code and security area name.
- **Security Perimeter Line** must have operational status code and security area name.
- **Shoulder** must have restricted indicator, shoulder designation reference, shoulder type code, shoulder width, and operational status code.
- **Sidewalk Segment** must have an American Disabilities Act (ADA) indicator and segment type code.
- **Sterile Area** must have operational status code and security area name.
- **Stopway** must have marking feature type, operational status code, and runway direction number.
- **Structure Lin**e must have object lighted indicator, operational status code, structure type code, and structure use code.

- **Structure Point** must have object lighted indicator, operational status code, structure type code and structure use code.
- **Tank Site** must have object lighted indicator, tank hazard category code, operational status code and tank use code.
- **Taxiway Element** must have directionality code, operational status code, taxiway designator, taxiway restriction, and taxiway type code.
- **Taxi Channel** must have operational status code, taxi channel depth, and taxi channel name.
- **Taxiway Holding Position** must have low visibility category code, operational status code, Runway Designator Identifier, and Taxiway Designator.
- **Touchdown Liftoff Area** must have light color code, operational status code, TLOF designator identifier, TLOF Marked, TLOF Perimeter lights, and TLOF Elevated Indicator.
- **Tunnel** must have operational status code, segment type code, and tunnel name.
- **Turning Basin** must have operational status code, turning basin depth value, turning basin diameter value, turning basin direction code, and turning basin name.
- **Utility Line** must have Obstruction Lighting Indicator, Utility Confidence Code, operational status code, and Utility type code.
- **Utility Point** must have Obstruction Lighting Indicator, Utility Confidence Code, operational status code, and Utility type code.
- **Utility Polygon** must have Obstruction Lighting Indicator, Utility Confidence Code, operational status code, and Utility type code.
- **Vegetation Area** must have Vegetation Area Type Code.
- **Water Lane End** must have air marker color code, navigation buoy lighting type code, operational status code, standard air marker indicator, water lane direction code, water lane length, water lane width, and water lane end type code.
- **Water Lane Operating Area** must have Current Flow Direction Code, Operational Status code, Water Operating Area Length, and Water Operating Area Width Length.
- **Wetland** has no required attribution.
- **Zoning** must have operational status code and parcel zoning classification code.

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Chapter 4. DATA TRANSLATION AND USE OF EXISTING DATA

4.1 Use of Existing Data.

Over the years, many airports have developed and collected geospatial data to support a variety of planning, design, and construction projects, as well as on-going operational and maintenance needs. This data exists in many forms, ranging from CADD drawings to individual records in databases or through a hardcopy management system. Since the 1980s, the form of the data has evolved from a totally paper-based product to where many airports have some, if not all, of the data available electronically. Over the last several years, an increasing number of airports have developed data adhering to this AC and other Airports GIS-related requirements of the FAA. Some airports have also developed Airport Mapping Databases (AMDBs), which also adhere to broadly accepted Airports GIS data requirements. Existing data includes all of these sources. Specifically in the context of this document existing data is any geospatial data (vector or raster) or related supporting evidence collected outside of the effort described in the Statement of Work, Geodetic Control Plan, Imagery Plan, and Survey & Quality Control Plan associated with the FAA Airports GIS project under which the data will be submitted. In some cases, it may be possible to use this existing data to support the requirements of an FAA Airports GIS Project. Previously submitted data for planned construction can be updated to as-built data by changing the attribute if the location has been verified. The question that the data provider and ultimately the airport must answer (and substantiate in written documentation submitted with the data) is whether the existing data meets the specifications and standards of this AC as well as AC 150/5300-16 and AC 150/5300-17 to a sufficient level of quality.

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."[8] Existing data must meet the following requirements for submission to the FAA through Airports GIS.

- Geospatial data is referenced to the NSRS via survey control meeting the requirements of AC 150/5300-16.
- Geospatial vector data must meet or exceed the accuracy requirements defined in this document. When uploading data, the data provider is certifying the data meets these accuracy requirements when they check the box identifying the data being uploaded meets these accuracy requirements at a 95% confidence level. The accuracy level of existing data can be established by existing metadata proving the data meets the requirements and/or through field verification establishing the accuracy of the existing data (as described in the next paragraph). Again, it is the airport's responsibility to confirm and certify the accuracy of the data.

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

- Existing geospatial data must be confirmed to reflect current conditions on the date of survey indicated for the data set being submitted. The currency of the data can be established through adequate records and/or field verification (as described in paragraph 4.1.1). By uploading existing data as a part of an FAA Airports GIS data submittal, the data provider certifies the data reflects conditions as of the date of survey recorded for the project.
- Include in the final project submission information data providers must describe the use, verification, and inclusion of existing data.

If existing data does not meet the requirements above, it can still be submitted to FAA Airports GIS. If the accuracy requirements of this document are not met, the check box indicating that they have been met should not be checked and an explanation of the accuracy level achieved should be provided. Existing data can also be uploaded to FAA Airports GIS for inclusion and use the by Airports GIS, via an Existing Data Project. Data providers must delineate the accuracy and other quality measures during the upload process and in the final project submission information. Existing data not meeting the specification and standards of this AC will be evaluated and a determination made as to the acceptability of the data for the project.

4.1.1 Verifying the Quality of Existing Data.

When verifying existing data, check a statistically valid number of features to confirm the data meets or exceeds the requirements of this document as well as AC 150/5300-16 and AC 150/5300-17 as appropriate. The minimum number of check features necessary is dependent on the size and complexity (volume of air traffic) of each airport, and is defined in Table 4-1 and Table 4-2.

Table 4-1. 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

Table 4-2. Examples of Field Verification Points Required of Various Airports.

Sample Airport	Acres	Operations per year	Value From Chart	Sample Airport	Acres	Operations per year	Value From Chart
1	600	409,000	80	9	3300	384,000	120
2	700	83,000	40	10	3500	651,000	120
3	800	211,000	80	11	4200	121,000	120
4	1400	310,000	80	12	4700	980,000	120
5	2000	71,000	40	13	5200	352,000	120
6	2400	409,000	80	14	6100	411,000	120
7	2500	340,000	120	15	7300	972,000	150
8	2800	139,000	120	16	18,100	699,000	200

4.2 Maintenance of Data.

Airports are constantly changing due to infrastructure development, land acquisition, or natural causes such as tree growth. The geospatial data describing airports and their surrounding environment must also change to remain useful. Airports may choose to maintain their geospatial data in a variety of ways to suit their own purposes. To remain compliant with FAA requirements, however, airports must submit data adhering to the specifications in this document for:

- Any project proposing to make, or currently making, changes to safety-critical data as identified in paragraph 4.3 including runway end position, profiles, and navigational aids. Table 2-1 lists specific data submittal guidelines.
- Design, construction, or planning activities requiring the development of new, or revision of existing, instrument approaches.
- Projects modifying the non-safety-critical data in the Airport Layout Plan (ALP). Continue to follow the guidance in AC 150/5070-6, *Airport Master Plans*, for ALP development and changes. Additionally, collect and provide the modified non-safety-critical data according to the standards of this AC and submit to Airports GIS as design or as-built data projects.
- Projects involving only non-safety-critical data. Unless the airport falls into the transition period specified in the Airports GIS Transition Policy, the Airports GIS Transition Policy can be found at http://www.faa.gov/airports/planning_capacity/airports_gis_electronic_alp/.

4.3 Safety Critical Data.

Ensuring safety is a key responsibility of the FAA. While all feature classes and attributes in this document are important for various FAA and airport needs, a subset of this data is critical for safe flight operations encompassing the approach, landing, takeoff, and departure of aircraft. Categorization of data as safety-critical depends on the expected use of the data. For example, taxiway centerline lights are not generally considered safety critical. However, if the lights support low visibility operation of an airport's Low Visibility Operations/Surface Movement and Guidance Control System (LVO/SMGCS) plan, their categorization would change to being safety critical to support the LVO/SMGCS plan. The following list of feature classes, as defined in Chapter 5, are generally considered the safety critical data supporting instrument flight operations. All aspects of these feature classes, including geometry, accuracy requirements, data capture rules, and attributes are considered safety critical data.

- NAVAIDs
- Representative and penetrating objects within the defining surface areas (14 CFR part 77, Airport Design surfaces, TERPS surfaces, or surfaces this AC defines).
- Runways and their associated Runway Directions.
- Final Approach and Take Off and Touchdown Lift Off areas of heliports or helipads.
- Significant points on the airport (modeled using the feature Position) such as Airport Elevation, Touchdown Zone Elevation, Displaced Threshold, point of intersection of runways, and Stopway End.
- Stopway.
- Taxiways.
- Visual Aids.

4.4 Preparing Your Data for Submission to the FAA.

Upload data to the FAA Airports GIS in one of the following formats:

- ESRI Shape Files – Provide one shape file for each feature class you submit. The shape file should have the same name as the feature class name in Chapter 5. Include all attributes listed in the shape file and name them as defined in Appendix C. Compress all shape files you upload into a single ZIP file.
- ESRI Geodatabases – provide a single geodatabase containing the data and attribution for the airport. Layers within the geodatabase must match the feature names in Chapter 5. Compress the file into a ZIP file for submission.
- Autodesk DWG files – Submit one DWG with a separate layer for each feature class. Name layers with the same name as the feature class name in Chapter 5. Define all attributes in object data tables and attach them to features as appropriate.

- MicroStation DGN files – Submit one DGN with a separate layer for each feature class.

After you upload the geospatial vector data file formats listed above, complete the final project submission information supporting the data collection. Make sure the final project information details the processes, procedures methodologies, and supporting files used in collecting and processing the data submission.

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Chapter 5. AIRPORT DATA FEATURES

5.1 Feature Specifications.

In this standard, reference is made to alignment with other standards to assist users in transforming data to these standards. Every attempt was made to ensure the best fit for each identified feature, but there is not always an exact relationship. Users must validate the correctness of the information before beginning a data transformation. The following standards and versions are referenced:

- Aeronautical Exchange Model Version 5.1
- Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) Gold 3.1
- DO-272, User Requirements for Aerodrome Information

The accuracies in this section are defined in feet relative to the nearest PACS, SACS, HRP, or TSM. 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 testing 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. If less than twenty checkpoints are available for testing, 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.

The following tables identify the datatypes for each feature and attribute within the system. Users should use this information when building their files to remain compliant with the system.

5.1.1 Common Feature Attributes.

Each feature in this standard has the following common attributes. To reduce redundancy in the document we are identifying them here; however, they apply to all features except as noted.

Attribute Name **Datatype**	**Description**
EFFECTIVEENDDATE *DATE*	Provide the date the data ceases to be effective.
EFFECTIVESTARTDATE *DATE*	Provide the date the data becomes effective.
OPERATIONALSTATUSCODE *VARCHAR2(20)*	A code from **CodeStatus** describing the realtime temporal operational status of the feature.
USERNOTETEXT *VARCHAR2(255)*	An area for the user to add additional or clarifying information about the feature instance. Do not use this field to store data. The use of this field does not affect the features data integrity.

Exceptions:

- For naturally occurring features such as Forest Stand Area, Vegetation, Wetlands, Natural Water Body or Position defining spot elevations, the Operational Status Code attribute is not required.
- The Effective Start Date and Effective End Date attributes are newly added attributes in the 150/5300-18C data schema and are optional at data submission. Airports GIS will provide these dates as necessary using the date the data is accepted by the FAA. However, if the data provider is submitting design data, the effective start and effective end dates are required. Once change in status, such as construction, is complete users will need to update the data in Airports GIS with the new status and effective start date.
- The Label and Dimension features are only used for preparing the electronic airport layout plan printed copy, do not have an Effective Start Date, Effective End Date, or Operational Status Code attributes.

5.2 Group: AIRFIELD.

5.2.1 Air Operations Area.

Air Operations Area		
Definition: Air Operations Area is the area where security measures are in force according to the airports 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	
Equivalent Standards	**AIXM**	AirOperationsArea
	FGDC	AirOperationArea
	SDSFIE	NA
	DO-272	None
Related Features	NA	

Data Capture Rule

Capture the **Air Operations Area** as a closed polygon encompassing the entire area the airports security plan defines. At some airports, multiple instances of the feature may be necessary to capture entire **Air Operations Area**.

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

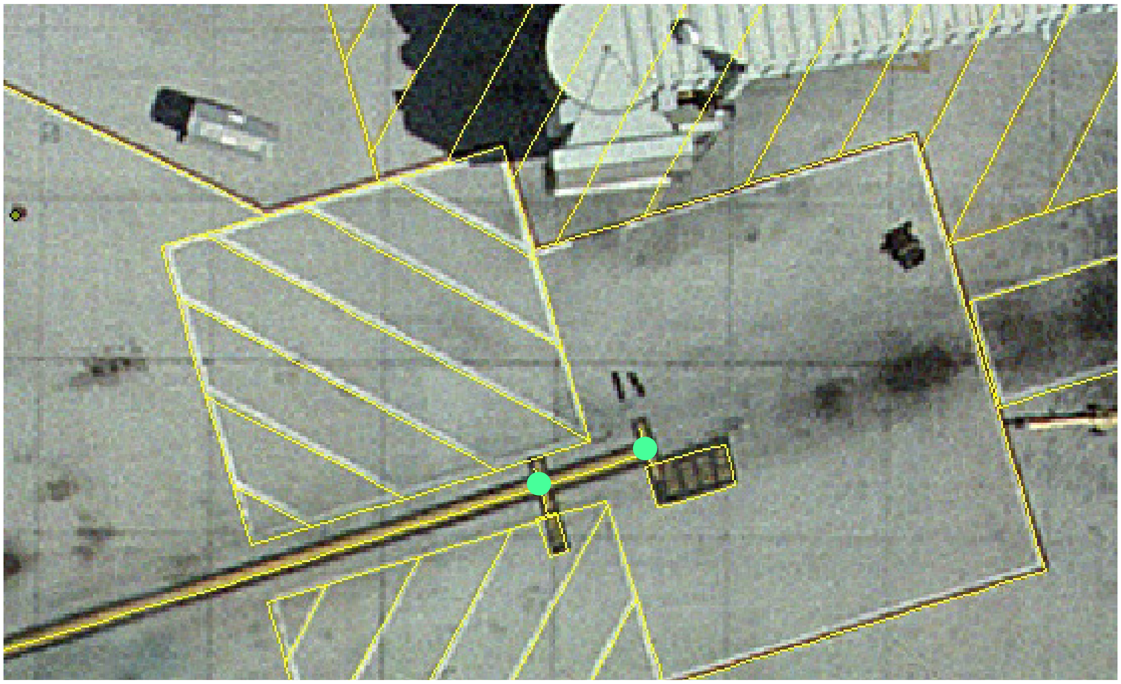
Air Operations Area	
Attribute Name ***Datatype***	**Description**
SECURITYDESCRIPTIONTEXT *VARCHAR2(255)*	A brief (255 character) description of the Air Operations area.

5.2.2 Aircraft Gate Stand.

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	
Equivalent Standards	**AIXM**	AircraftStands
	FGDC	AircraftGateStand
	SDSFIE	AirfieldSurfaceArea
	DO-272	Parking Stand Location
Related Features	APRON	
	MARKING LINE	
	MARKING AREA	
	DEICING AREA	
Data Capture Rule Collect the **Aircraft Gate Stand** as individual points for each stand position (Figure 5-1). If you define the location in a generic manner (e.g., same position for all aircraft using the gate stand), ensure the length and wingspan attributes cover all the appropriate aircraft using the location.		

Aircraft Gate Stand

Figure 5-1. Illustrates the Collection of the Aircraft Gate Stand Feature (the Green Circles Represent Individual Instances of the Feature).



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
AIRCRAFTGATESTANDLENGTH *NUMBER*	The maximum length available for use at the aircraft gate stand location.
AIRCRAFTGATESTANDNAME *VARCHAR2(50)*	The commonly used name for the aircraft gate stand such as Gate A1 or C6.
AIRCRAFTGATESTANDTYPECODE *VARCHAR2(6)*	A code from **CodeGateStandType** identifying the type of aircraft gate stand
AIRCRAFTGATESTANDWIDTH *NUMBER*	The maximum overall width available for use at the aircraft gate stand location.
AIRCRAFTMAXIMUMWINGSPAN *NUMBER*	A value indicating the maximum aircraft wingspan the aircraft gate stand can accommodate.

Aircraft Gate Stand	
AIRCRAFTTYPE *VARCHAR2(30)*	The type(s) of aircraft the location is designed to accommodate. Separate multiple aircraft types using a forward slash (B747/A380)
DOCKINGLIGHTSYSTEMAVAILABILITY *VARCHAR2(1)*	An indicator designating if a docking light system is available at the designated location.
GROUNDPOWERAVAILABILITY *VARCHAR2(1)*	An indicator designating if ground power is available at the designated location.
JETWAYAVAILABILITY *VARCHAR2(1)*	An indicator designating if a jetway or passenger loading bridge is available for use at the designated location.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the aircraft gate stand.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the aircraft gate stands pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
TOWINGAVAILABILITY *VARCHAR2(1)*	An indicator designating if towing is available for the aircraft gate stand location.

5.2.3 Airfield Light.

Airfield Light		
Definition: Various lighting features installed at an airport [Source: FAA Pilot Controller Glossary]		
Feature Group	Airfield	
Feature Class Name	AIRFIELDLIGHT	
Feature Type	Point	
Equivalent Standards	**AIXM**	GroundLightSystem
	FGDC	AirfieldLight
	SDSFIE	airfield_light_point
	DO-272	Aerodrome Surface Light
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	TAXIWAY ELEMENT	
	APRON	

Data Capture Rule

Collect a point in the center of the feature at the highest point of the fixture. Collect lights for general illumination such as roof mounted lights and apron lights using the Utility Point feature and delineate using the appropriate type.

Airfield Light	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
LIGHTCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** defined by the Federal Aviation Administration (FAA) to identify a color used in aviation.
LIGHTSYSTEMTYPECODE *VARCHAR2(40)*	A code from **CodeLightingConfigurationType** describing the type and use of the airfield light.
PILOTCONTROLFREQUENCY *NUMBER*	The frequency pilots use to initiate airborne control of lights by keying the aircraft's microphone. Control of lighting systems is often available at locations without specified hours for lighting; where there is no control tower or FSS, or when the tower or FSS is closed (locations with a part-time tower or FSS) for specified hours. [Source: FAA AIM Chapter 2]

5.2.4 Airport Movement Area.

Airport Movement Area		
Definition: The runways, taxiways, and other areas of an airport/heliport which are used 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. [Source: FAA Pilot Controller Glossary]		
Feature Group	Airfield	
Feature Class Name	AIRPORTMOVEMENTAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	
	FGDC	None
	SDSFIE	None
	DO-272	None
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	TAXIWAY ELEMENT	
Data Capture Rule Capture the **Airport Movement Area** using a single or multiple closed polygons. Where necessary, use multiple non-overlapping polygons to model the entire area.		

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Airport Movement Area	
Attribute Name ***Datatype***	**Description**
AIRPORTMOVEMENTAREANAME *VARCHAR2(50)*	A commonly used name for the defined movement area.

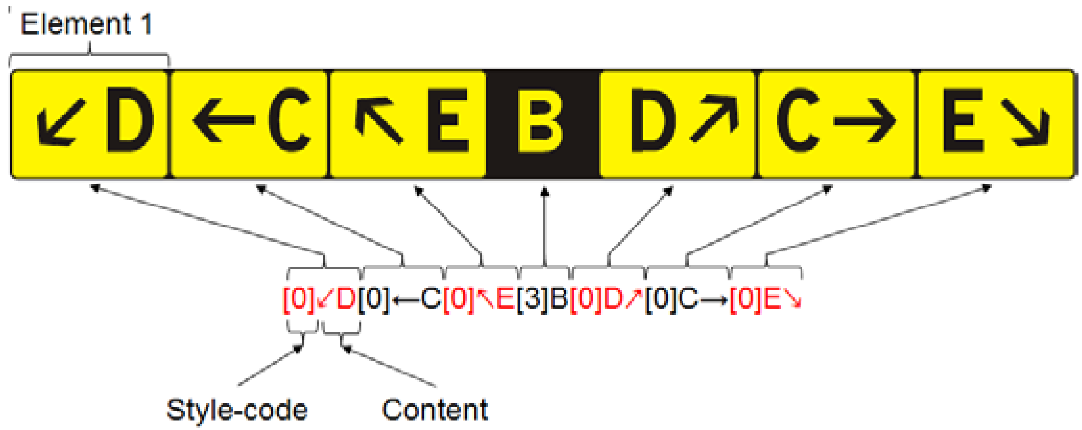
5.2.5 Airport Sign.

Airport Sign		
Definition: Signs at an airport other than surface painted signs, presenting messages relating to aircraft and vehicle movement.		
Feature Group	Airfield	
Feature Class Name	AIRPORTSIGN	
Feature Type	Point	
Equivalent Standards	**AIXM**	
	FGDC	AirportSign
	SDSFIE	None
	DO-272	Aerodrome Sign
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY LAHSO	
	ARRESTING GEAR	
	APRON	
	NAVAID CRITICAL AREA	
	ROAD SEGMENT	
	TAXIWAY ELEMENT	
Data Capture Rule Collect a point at the highest point on the center of the sign structure (Figure 5-2). Provide the information the sign displays on each side of a sign in the attributes AIRPORTSIGNMSGFRONT and AIRPORTSIGNMSGBACK using a UTF-8[9] string as a style-code and associated content pair. The style-code defines the characteristics of a sign element (type of sign). The content string defines the inscription (text or symbol) of a sign element. Provide a single style-code within each style-code and content pair. Define a style-code and content pair for each individual element of a sign.		

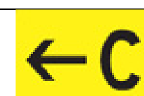
[9] UTF-8 is actually a carryover from older terminology meaning Unicode (or UCS) Transformation Format. For detailed information, refer to www.unicode.org.

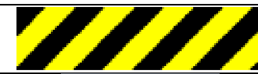
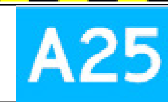
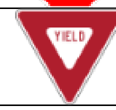
Airport Sign

Figure 5-2. Illustrates the Coding for a Multiple Element Airport Sign.



When entering information into the AIRPORTSIGNMSGFRONT or AIRPORTSIGNMSGBACK attribute define the style-code by enclosing it within square brackets [ ]. If a sign is graphical only in nature, such as a No Entry sign, provide the style-code with no content data, for example, [5] in the AIRPORTSIGNFRONTMESSAGE would indicate a NO ENTRY sign. The following table identifies the valid style codes.

Style Name	Style Code	Description	Example
DIRECTION	0	A direction sign having black text on a yellow background.	
INFO_ACFT	1	A generic sign providing information to aircraft.	
INFO_VEH	2	A generic sign providing information to vehicle operators.	
LOCATION	3	A location sign with yellow text on a black background.	
MANDATORY	4	A mandatory sign with white text on a red background.	
NO_ENTRY	5	No entry sign (graphic only).	
RWY_CRITICAL	6	A sign marking the location of the precision approach critical area (graphic only).	
RWY_DIST_REMAIN	7	A sign providing information regarding the remaining distance available on a runway.	

Airport Sign			
RWY_SAFETY	8	A sign marking the location of the runway safety area boundary (graphic only).	
TAXIWAY_END	9	A sign identifying the end of a taxiway (graphic only).	
TERMINAL	10	A sign identifying the location of a Gate or parking stand.	
VEH_STOP	11	A sign indicating the location for vehicles to stop (graphic only).	
VEH_YIELD	12	A sign used to inform vehicle operators to yield to traffic.	

Enter the content information after the style code as a string. When the use of an arrow is required for a sign, use the Unicode values specified in the table to define the type of arrow.

Unicode Value	Character	Description
U+2190	←	Left Arrow
U+2191	↑	Up Arrow
U+2912	→	Right Arrow
U+2193	↓	Down Arrow
U+2196	↖	Diagonal Up Left Arrow
U+2197	↗	Diagonal Up Right Arrow
U+2198	↘	Diagonal Down Right Arrow
U+2199	↙	Diagonal Down Left Arrow
U+0387	·	Center Dot
U+26AB	●	Filled yellow circle. Used for Arresting Gear location sign.

	Use the Unicode carriage return code “&#000D” to start a new line of a multiple line sign, followed by a semicolon. In the INFO_ACFT sign is entered as “[1]BGR-VORTAC&#000D;114.8 (CH95) 153/333&#000D;DME 3.8 NM. Ensure you put spaces in as required.

For the Arresting Gear Marker Sign, use sign style code 3 with U+26AB with a color of yellow for the content.

Airport Sign	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name ***Datatype***	**Description**
AIRPORTSIGNDIRECTION *NUMBER*	The bearing from true north which the front of the sign faces.
AIRPORTSIGNHEIGHTVALUE *NUMBER*	The height (in feet) of the sign measured from above grade in the area of the sign.
AIRPORTSIGNMSGBACK *VARCHAR2(255)*	The text and graphics appearing on the second side of the sign (if any). Identify the text and graphics from left to right as a UTF-8 string of style-code/ content pair.
AIRPORTSIGNMSGFRONT *VARCHAR2(255)*	The text and graphics appearing on the sign. Identify the text and graphics from left to right as a UTF-8 string of style-code/ content pair.
AIRPORTSIGNPURPOSECODE *VARCHAR2(32)*	A code from **CodeSignPurpose** indicating the general purpose of the sign.
AIRPORTSIGNTYPECODE *VARCHAR2(20)*	A code from **CodeSignType** identifying the applicability of the associated sign instance.

5.2.6 Apron.

Apron		
Definition: 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.		
Feature Group	Airfield	
Feature Class Name	APRON	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	Apron
	FGDC	Apron
	SDSFIE	airfield_surface_type
	DO-272	Apron
Related Features	AIRCRAFT GATE STAND	
	AIRFIELD LIGHT	
	AIRPORT SIGN	
	DEICING AREA	
	MARKING AREA	
	MARKING LINE	
	TAXIWAYELEMENT	

Apron	
Data Capture Rule Collects **Aprons** as a closed polygons to the greatest horizontal extent of the area being represented. Multiple polygons may be necessary. Provide each polygon as a separate feature instance.	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
APRONELEMENTTYPECODE *VARCHAR2(15)*	A code from **CodeApronType** identifying the primary use of the apron.
APRONLENGTH *NUMBER*	The overall length of the apron being represented.
APRONWIDTHVALUE *NUMBER*	The overall width of the apron being represented.
FUELTYPECODE *VARCHAR2(12)*	A code or set of codes from **CodeFuel** identifying the different types of fuel available.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the apron.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the apron pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
TIEDOWNCOUNT *NUMBER*	The number of aircraft tiedowns located on the apron.

5.2.7 Arresting Gear.

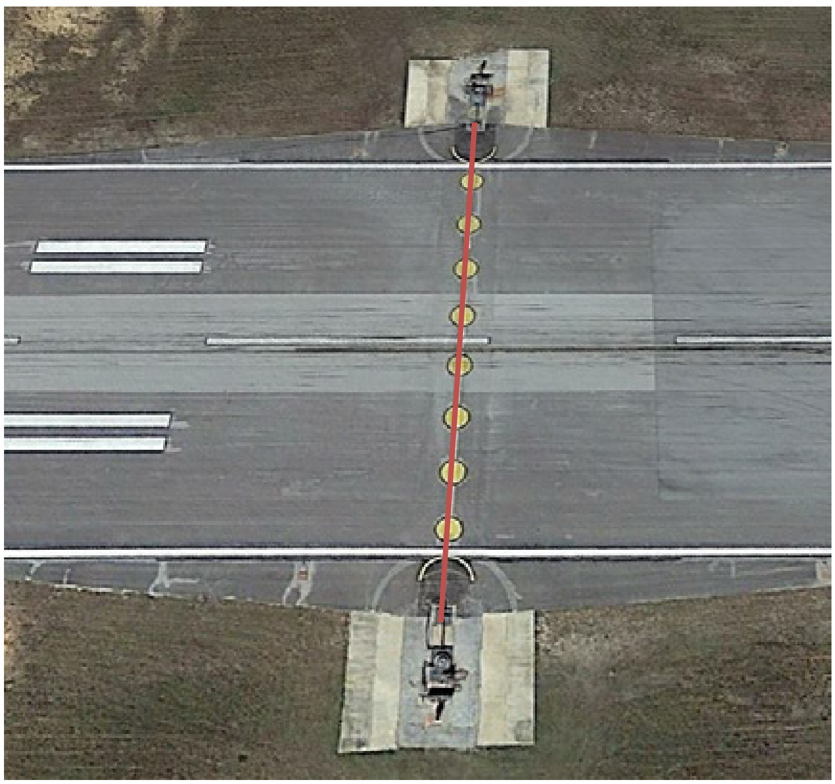
Arresting Gear		
Definition: Location of the arresting gear cable across the runway. [Source DO-272]		
Feature Group	Airfield	
Feature Class Name	ARRESTINGGEAR	
Feature Type	Line	
Equivalent Standards	**AIXM**	ArrestingGear
	FGDC	ArrestingGear
	SDSFIE	None

Arresting Gear		
	DO-272	Arrest Gear Location
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	AIRPORT SIGN	

Data Capture Rule

Capture the **Arresting Gear** feature as a line connecting the two fixed points of the arresting gear on each side of the runway (Figure 5-3).

Figure 5-3. Illustrates the Collection of the Arresting Gear Feature as a Line.



Additionally, capture the arresting gear runway markings (yellow circles) as individual instances using the **MarkingArea** feature.

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
AIRPORTTYPECODE *VARCHAR2(40)*	A code from **CodeOperationsType** indicating the type of airport.

Arresting Gear	
ARRESTINGGEARDISTANCE *NUMBER*	The distance the arresting gear is from a reference point such as the end of a runway.
ARRESTINGGEARDISTANCEREFERENCE *VARCHAR2(7)*	The reference point the arresting gear distance is measured from, such as Runway 12.
ARRESTINGGEARTYPECODE *VARCHAR2(7)*	A code from **CodeArrestingSystem** identifying the type of arresting gear or system.
ARRESTINGSYSTEMNAME *VARCHAR2(50)*	The operational name of the arresting gear such as Runway 17 BAK-12.
DIRECTIONALITYCODE *VARCHAR2(2)*	A code from **CodeDirectionality** indicating the operational directionality of the system.
OWNERCODE *VARCHAR2(4)*	A code from **CodeOwner** indicating the owner of the system.

5.2.8 Deicing Area.

Deicing Area		
Definition: An aircraft deicing facility is a facility where frost, ice, slush, or snow is removed (deicing) from the aircraft to provide clean surfaces, and/or 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 (referred to as the "holdover time"). A centralized aircraft deicing facility is an aircraft deicing facility located along taxiways leading to the departure runway or on an apron away from the terminal gates where aircraft receive deicing/anti-icing treatment. An aircraft deicing pad, where aircraft receive treatment, consists of two areas: the inner area for the parking of aircraft to receive deicing/anti-icing treatment, and an outer area for maneuvering two or more mobile deicing vehicles. [Source AC 150/5300-14, *Design of Aircraft Deicing Facilities*]		
Feature Group	Airfield	
Feature Class Name	DEICINGAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	DeicingArea
	FGDC	DeicingArea
	SDSFIE	None
	DO-272	Deicing Areas
Related Features	APRON	
	AIRCRAFT GATE STAND	
	MARKING LINE	
	STRUCTURE POLYGON	
	TAXIWAY ELEMENT	
Data Capture Rule Capture individual polygons representing different areas used for deicing (Figure 5-4). Collect the vehicle maneuvering area (if appropriate as a separate polygon from the area for the aircraft. Differentiate the areas using the Deicing Area Type Code attribute.		

Deicing Area	
Figure 5-4. Deicing Area.	

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
DEICINGAREANAME *VARCHAR2(50)*	A name given to the deicing area the feature instance is describing.
DEICINGAREATYPECODE *VARCHAR2(16)*	A code from **CodeDeicingArea** identifying an area used for deicing of aircraft.

5.2.9 Displaced Threshold.

Displaced Threshold		
Definition: A threshold that is located at a point on the runway beyond the beginning of the runway		
Feature Group	Airfield	
Feature Class Name	DISPLACEDTHRESHOLD	
Feature Type	Point	
Equivalent Standards	**AIXM**	RunwayCenterlinePoint
	FGDC	AirportControlPoint
	SDSFIE	NA
	DO-272	RunwayThreshold
Related Features	Marking Area	

Displaced Threshold	
	Marking Line
	NAVAID Equipment
	Runway
	Runway Centerline
	Runway Direction
	Runway Element
	Taxiway Element

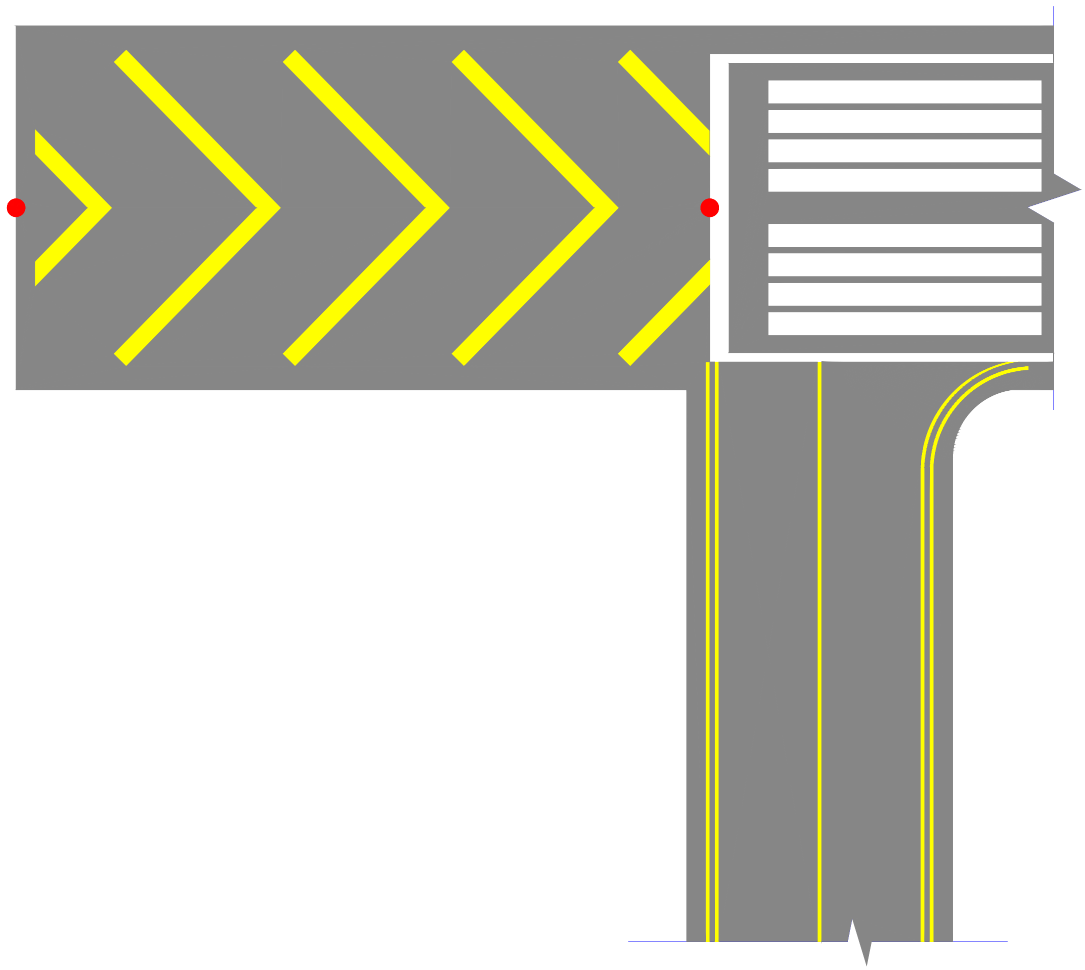
Data Capture Rule

Establish the runway direction on the runway centerline at the physical end, or specified location based on other supporting features. If the runway has a **displaced threshold**, the area between the runway end and the displaced threshold should be marked with white arrows.

- If the runway is a Concrete Runway with No Aligned Taxiway:
  - Define the survey point at the limit of construction (Figure 5-5) or a trim line at the first good pavement (Figure 5-6), unless these lines place the survey point on the approach side of the runway end lights.
  - 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 Figure 5-6 for an example of this scenario.

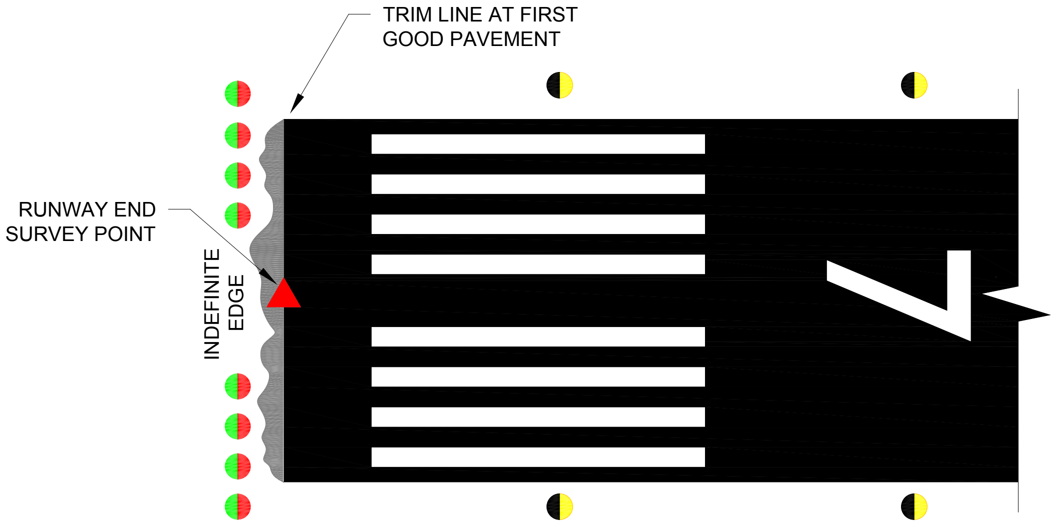
Displaced Threshold

Figure 5-5. Survey Point Locater.



Displaced Threshold

Figure 5-6. Runway End Survey Point.



- Use the following supporting features to assist you in determining the proper location of the survey location for a runway end:
  - 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
- If the runway is a Paved/Non-concrete Runway and No Aligned Taxiway:
  - Define the survey point at the limit of construction (Figure 5-7) or a trim line at the first good pavement (Figure 5-6), unless these lines place the survey point on the approach side of the runway end lights.
  - 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 usually uneven and not orthogonal to the runway centerline.

Displaced Threshold

Figure 5-7. Surveying Equipment.

- Use the following supporting features to assist you in determining the proper survey location for a runway end:
  - 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)
- If the runway is an Unpaved Runway with no Aligned Taxiway, any of the following methods may be used:
  - Define the survey point using (see Figure 5-8, Figure 5-9, Figure 5-10):
  - A 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,
  - A trim line connecting outboard runway end day markers.
  - 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.

Displaced Threshold

Figure 5-8. Paved Runway and Aligned Taxiway.

Figure 5-9. Shows the Location of the Runway Direction Point 10 Feet Inside the End Markers.

Displaced Threshold

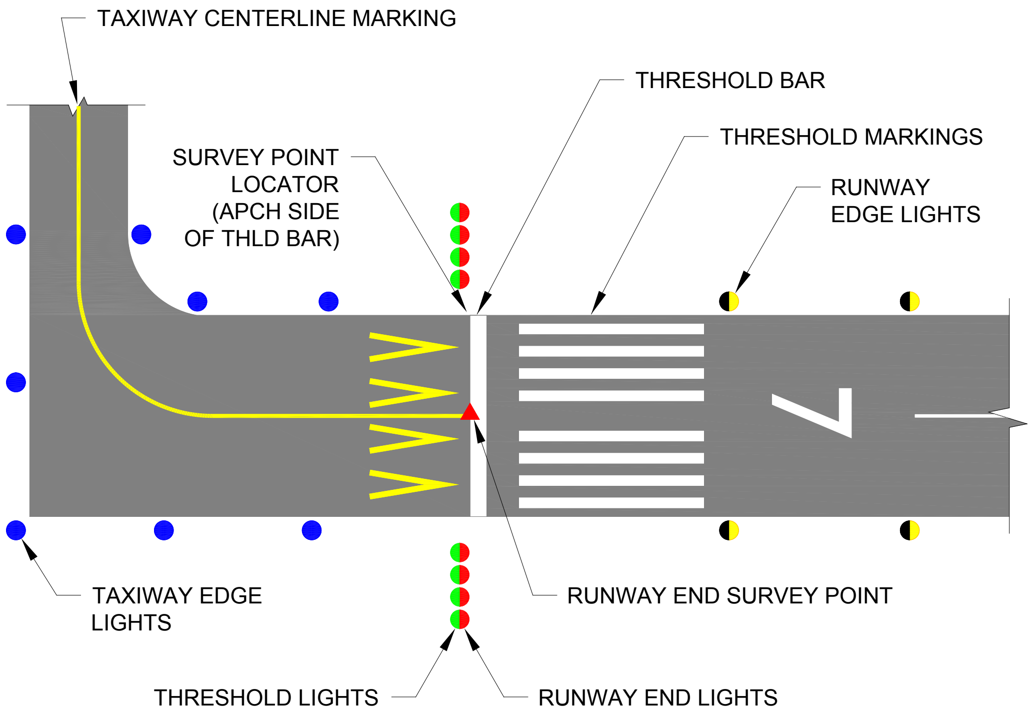
Figure 5-10. Paved Runway and Aligned Taxiway Details.

Use the threshold lights near threshold if runway is lighted and the threshold is not displaced, or day markers, if present, to assist you in identifying the runway end.

- If the runway is Paved Runway with Aligned Taxiway (Figure 5-11):
  - Define the survey point on the approach side of threshold bar unless this line is on the approach side of runway end lights and the runway does not have a displaced threshold. 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 the 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.).
  - Use caution, especially on smaller, poorly marked airports, not to confuse a displaced threshold as a runway with an aligned taxiway.

Displaced Threshold

Figure 5-11. Paved Runway and Aligned Taxiway.



NOTES:

1. THIS GRAPHIC IS NOT TO SCALE. FEATURES ARE SYMBOLIZED AND INTENDED FOR 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 ON APPROACH SIDE OF RUNWAY END LIFGHTS.
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 EXTEND TO APPROACH SIDE OF RUNWAY END LIGHTS.
   - RUNWAY CANNOT EXTEND TO APPROACH SIDE OF RUNWAY END LIGHTS.

- Use the following supporting features to assist you in identifying the runway end of a Paved Runway with an aligned taxiway.
  - Threshold lights near runway end and usually in same fixture as runway end

Displaced Threshold
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 • If the runway is an Unpaved Runway and Aligned Taxiway: ○ Define the survey point using a trim line connecting outboard runway end lights or the trim line connecting outboard runway end day markers, as shown in Figure 5-9. ○ Unpaved runways with aligned taxiways are unusual. If you suspect you are encountering this scenario, 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. ○ Use the threshold lights near threshold (if threshold not displaced) or runway/taxiway edge lights (if runway is lighted). • Monumentation: After determining the location of the runway end, mark the position using a nail and washer with the setting company's name and year inscribed, a chiseled square, or by using paint if possible with a distinctive inscription to ensure future identification. • Documentation: Provide documentation supporting the location of the Runway Direction point through the Airports GIS web site. • Digital Photographs: Provide four digital photographs each from a different perspective.
• Photograph one – take this photograph from eye level looking down at the selected runway direction location monument or mark (Figure 5-12). Frame the photograph to depict an area of approximately three feet (one meter) around the mark.

Figure 5-12. Photograph One.

Displaced Threshold
• Photograph two – taken from a point approximately 100 feet from the end of the runway with a tripod located over the mark. This photograph should look out into the approach for the runway end. The arrow in Figure 5-13 indicates the location of the tripod over the mark. Adding the arrow to the photograph is optional.   **Figure 5-13. Photograph Two.**   
• Photograph Three – Photo taken from the side of the runway looking across the end of the runway, using a tripod, or arrow indicating the runway end (Figure 5-14). If you are using supporting features to identify the runway end, include them in the photograph, such as the runway end lights in this photograph.   **Figure 5-14. Photograph Three.**   

Displaced Threshold

- Photograph Four – provides a close-up view of the runway end mark or monument (Figure 5-15). Take this photograph from above the monument or mark clearly showing the details of the monument or mark; in this case the nail, washer and washer inscription.

Figure 5-15. Provides a Close-up of the Nail and Washer Marking the Runway Direction Feature Location.

Survey Accuracies	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

Attribute Name *Datatype*	**Description**
ELLIPSOIDHEIGHTMEASUREMENT *NUMBER*	The height above the reference ellipsoid measured along the ellipsoidal outer normal though the point in question. Also called the geodetic height.
GPSSUITABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if the position is suitable for use of GPS surveying techniques.
MONUMENTTYPECODE *VARCHAR2(11)*	A code from **CodeMonumentType** identifying the type of monumentation for the point.
POSITIONROLECODE *VARCHAR2(25)*	A code from **CodePositionRoleCode** identifying the type of point the feature instance describes.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.

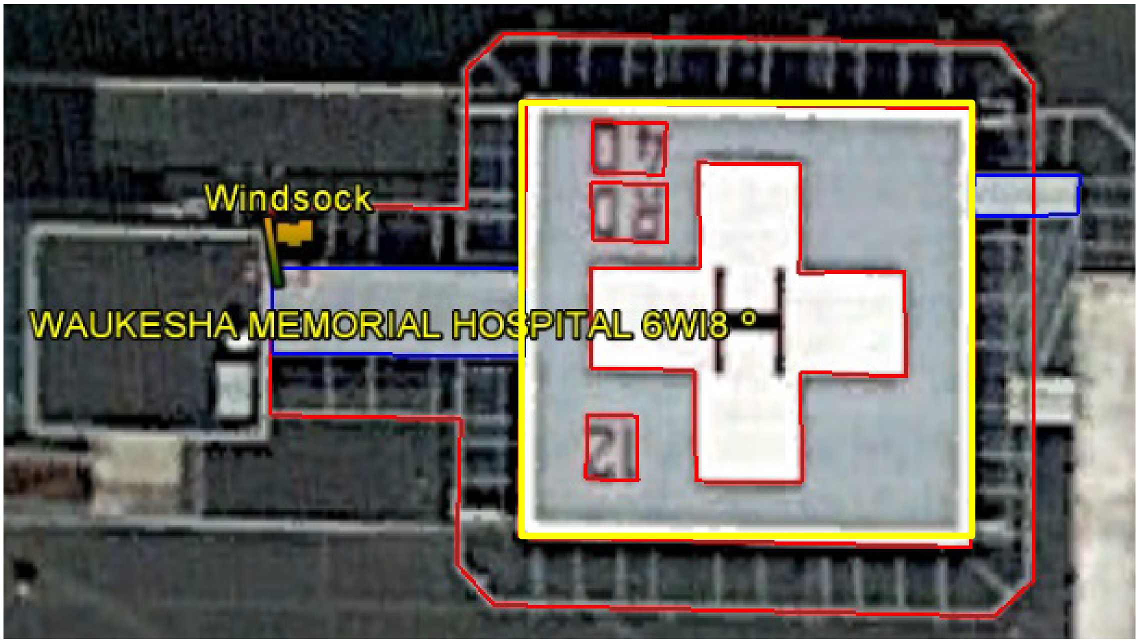
Displaced Threshold	
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.

5.2.10 Final Approach and Takeoff Area (FATO).

Final Approach and Takeoff Area (FATO)		
Definition: A defined area over which the pilot completes the final phase of the approach to a hover or a landing and from which the pilot initiates takeoff. The FATO elevation is the lowest elevation of the edge of the TLOF. [Source AC 150/5390-2, *Heliport Design*]		
Feature Group	Airfield	
Feature Class Name	FINALAPPROACHTAKEOFFAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	PavementBranch
	DO-272	Final Approach Takeoff Area
Related Features	TOUCHDOWNLIFTOFF	
	OBJECTIDENTIFICATIONSURFACE	
	RUNWAY	
	RUNWAY ELEMENT	
	TAXIWAY ELEMENT	
	OBJECTAREA	
	OBJECTLINE	
	OBJECTPOINT	
	POSITION (HELIPAD REFERENCE POINT)	
	RUNWAYHELIPADDESIGNSURFACE	
	AIRFIELDLIGHT	
Data Capture Rule Capture the Final Approach and Takeoff Area (FATO) using a closed polygon limited by the edges of the paint marking surrounding the FATO (Figure 5-16). If the FATO does not have an outer edge markings capture the limits of the FATO at the edge of the pavement surface.		

Final Approach and Takeoff Area (FATO)

Figure 5-16. The Yellow Polygon in this Figure Illustrates the FATO of a Rooftop Helipad.



Survey Accuracies	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.01)

Attribute Name *Datatype*	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
FATOAFETYNETINDICATOR *VARCHAR2(1)*	An indicator designating if an elevated FATO has appropriate safety netting installed.
FATODESIGNATORIDENTIFER *VARCHAR2(20)*	Designation of the FATO when a heliport has multiple FATO's available. If there is only a single FATO then the designator must be H1. This attribute only applies to design surface types of HSA, HPZ, HELI, and VGSI.
FATOELEVATEDINDICATORCODE *VARCHAR2(1)*	A code from **CodeElevated** indicating if the FATO is elevated or at ground level.
FATOELONGATEDINDICATOR *VARCHAR2(1)*	An indicator designating if the TLOF is elongated.

Final Approach and Takeoff Area (FATO)	
FATOGRADIENT *NUMBER*	The gradient of the FATO as a percentage.
FATOHEIGHT *NUMBER*	A value indicating the height of an elevated FATO above the ground or roof in inches.
FATOLENGTH *NUMBER*	The length of the FATO in feet. If the FATO is circular provide the length as a diameter value in feet.
FATOLOADBEARINGINDICATOR *VARCHAR2(1)*	An indicator designating if the FATO surface is load bearing.
FATOMARKEDINDICATOR *VARCHAR2(1)*	An indicator designating if the FATO is marked.
FATONAME *VARCHAR2(50)*	The official or locally used name for the facility or the name of the associated facility such as ABC Hospital Helipad.
FATOPERIMETERLIGHTSINDICATOR *VARCHAR2(1)*	An indicator if the FATO has perimeter lighting.
FATOPRIMARYMAGNETICBEARING *NUMBER*	The magnetic bearing corresponding to the landing direction of the primary approach path to the FATO.
FATOPRIMARYTRUEBEARING *NUMBER*	The true bearing corresponding to the landing direction of the primary approach path to the FATO.
FATOSECONDARYMAGNETICBEARING *NUMBER*	The magnetic bearing corresponding to the landing direction of the secondary approach path to the helipad.
FATOSECONDARYTRUEBEARING *NUMBER*	The true bearing corresponding to the landing direction of the secondary approach path to the FATO.
FATOWIDTH *NUMBER*	The width of the FATO in feet. If the FATO is circular, this attribute is not used and the diameter is listed in the FATO Length attribute.
LIGHTCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** defined by the Federal Aviation Administration (FAA) to identify a color used in aviation.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
SURFACECOMPOSITIONCODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the FATO.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the FATO pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
FATOSAFETYNETHEIGHT *NUMBER*	The height of the safety net above the ground in inches.
FATOSAFETYNETWIDTH *NUMBER*	The width the safety net extends from the edge of the FATO.

Final Approach and Takeoff Area (FATO)	
TLOFTOFATOSEPARATION *NUMBER*	A value (in feet) indicating the separation between the TLOF and FATO perimeters.

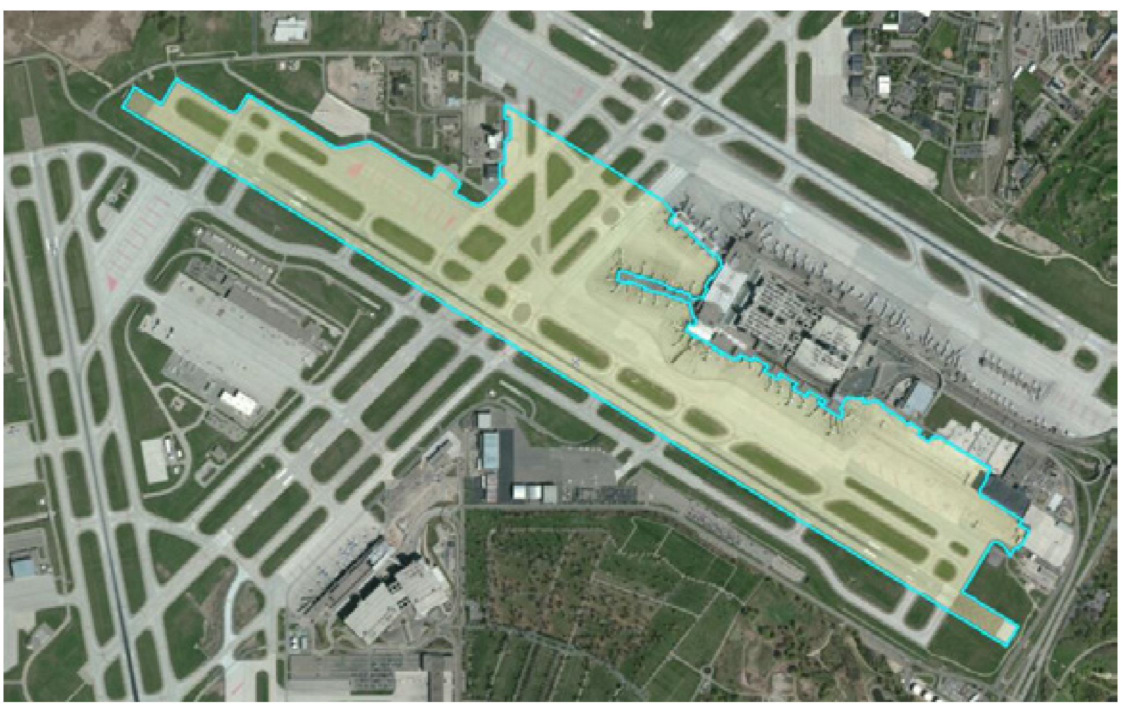
5.2.11 Frequency Area.

Frequency Area		
Definition: Designated part of the surface movement area where a specific frequency is required by air traffic control or ground control. [Source DO-272]		
Feature Group	Airfield	
Feature Class Name	FREQUENCYAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RadioFrequencyArea
	FGDC	FrequencyArea
	SDSFIE	None
	DO-272	None
Related Features	NAVAIDEQUIPMENT	

Data Capture Rule

Collect a closed polygon encompassing the horizontal extents of the frequency area (Figure 5-17).

Figure 5-17. The Area Depicted by the Cyan Polygon Indicates the Extents of a Frequency Area for a Specific Area of an Airport.



Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable

Frequency Area	
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name ***Datatype***	**Description**
FREQUENCYAREANAME *VARCHAR2(50)*	The operational name of the frequency area.
PRIMARYFREQUENCYASSIGNEDSERVICE *VARCHAR2(30)*	The call sign of the service or station assigned to the primary frequency.
PRIMARYFREQUENCYNUMBER *NUMBER*	Primary frequency used in the frequency area (in MHz).

5.2.12 Marking Area.

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.		
Feature Group	Airfield	
Feature Class Name	MARKINGAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	AirportHotSpot AirportProtectionAreaMarking ApronMarking DeicingAreaMarking GuidanceLineMarking MarkingElement Marking Extent NonMovementArea RunwayMarking StandMarking TaxiHoldPositionMarking TaxiwayMarking
	FGDC	None
	SDSFIE	None
	DO-272	Painted Centerline Runway Marking Taxiway Guidance Line Hot Spots Stand Guidance Line
Related Features	APRON	
	MARKING LINE	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT POINT	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAYLAHSO	

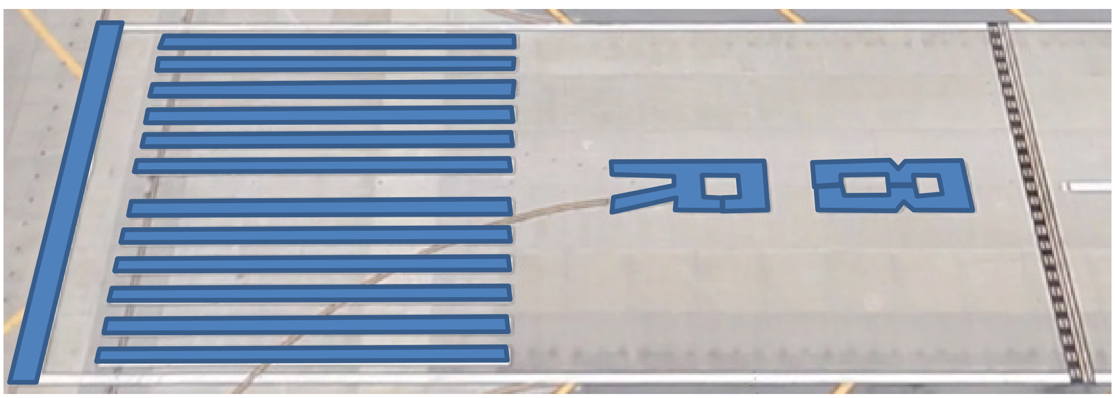
Marking Area

	RUNWAY INTERSECTION
	STRUCTURE POLYGON
	STRUCTURE LINE
	STRUCTURE POINT
	TANK SITE
	TAXIWAY ELEMENT
	TAXIWAY CENTERLINE

Data Capture Rule

Capture a closed polygon representing the markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, et cetera. When collecting the runway designation, it is acceptable to capture the inner area of the numbers and letters through the use of extra lines to tie the open area into the polygon, as shown in Figure 5-18 below.

Figure 5-18. The Individual Blue Polygons in this Figure Illustrate the Capture of Runway Markings.



Survey Accuracies

Horizontal Accuracy	± 2.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two hundredths of an arc second (± 0.02)

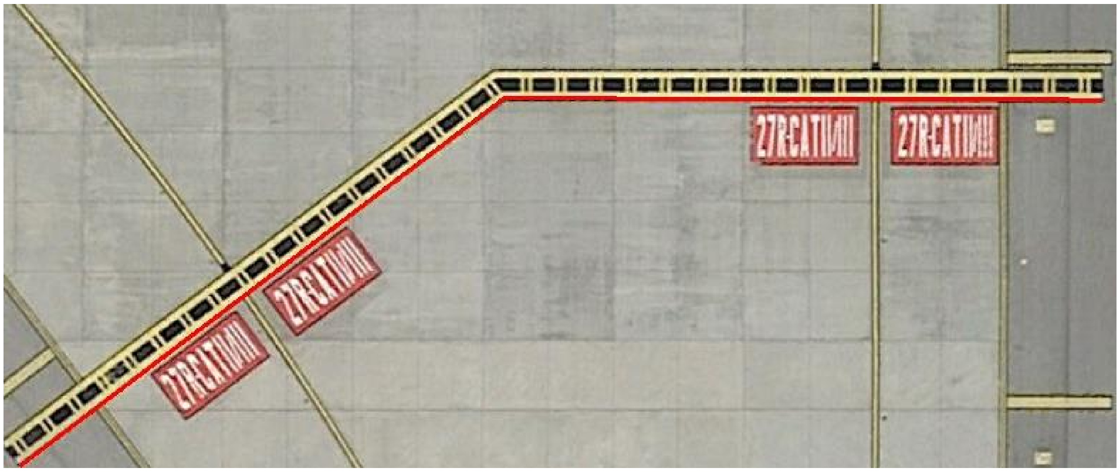
Attribute Name ***Datatype***	**Description**
COLORCODE *VARCHAR2(15)*	A code from **CodeColor** defined by the Federal Aviation Administration (FAA) to identify a color used in aviation.
MARKINGCONDITIONCODE *VARCHAR2(8)*	A code from **CodeMarkingCondition** identifying the condition of the markings.
MARKINGFEATURETYPECODE *VARCHAR2(18)*	A code from **CodeMarkingFeatureType** identifying the type of marking the feature instance describes.

5.2.13 Marking Line.

<table>
<tr><th colspan="3">Marking Line</th></tr>
<tr><td colspan="3">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.</td></tr>
<tr><td>Feature Group</td><td colspan="2">Airfield</td></tr>
<tr><td>Feature Class Name</td><td colspan="2">MARKINGLINE</td></tr>
<tr><td>Feature Type</td><td colspan="2">Line</td></tr>
<tr><td rowspan="4">Equivalent Standards</td><td>AIXM</td><td>AirportHotSpot
AirportProtectionAreaMarking
ApronMarking
DeicingAreaMarking
GuidanceLineMarking
MarkingElement
Marking Extent
NonMovementArea
RunwayMarking
StandMarking
TaxiHoldPositionMarking
TaxiwayMarking</td></tr>
<tr><td>FGDC</td><td>None</td></tr>
<tr><td>SDSFIE</td><td>None</td></tr>
<tr><td>DO-272</td><td>Stand Guidance Line
Taxiway Guidance Line
Runway Markings</td></tr>
<tr><td rowspan="16">Related Features</td><td colspan="2">APRON</td></tr>
<tr><td colspan="2">MARKING AREA</td></tr>
<tr><td colspan="2">OBJECT AREA</td></tr>
<tr><td colspan="2">OBJECT LINE</td></tr>
<tr><td colspan="2">OBJECT POINT</td></tr>
<tr><td colspan="2">RESTRICTED AREA BOUNDARY</td></tr>
<tr><td colspan="2">RUNWAY</td></tr>
<tr><td colspan="2">RUNWAY ELEMENT</td></tr>
<tr><td colspan="2">RUNWAYLAHSO</td></tr>
<tr><td colspan="2">RUNWAY INTERSECTION</td></tr>
<tr><td colspan="2">STRUCTURE POLYGON</td></tr>
<tr><td colspan="2">STRUCTURE LINE</td></tr>
<tr><td colspan="2">STRUCTURE POINT</td></tr>
<tr><td colspan="2">TANK SITE</td></tr>
<tr><td colspan="2">TAXIWAY ELEMENT</td></tr>
<tr><td colspan="2">TAXIWAY CENTERLINE</td></tr>
<tr><td colspan="3">Data Capture Rule
Capture marking lines centered in the painted marking. Some marking lines may identify and precede an area requiring protection, such as an ILS critical area (Figure 5-19). In these cases the collect the line on the holding side.</td></tr>
</table>

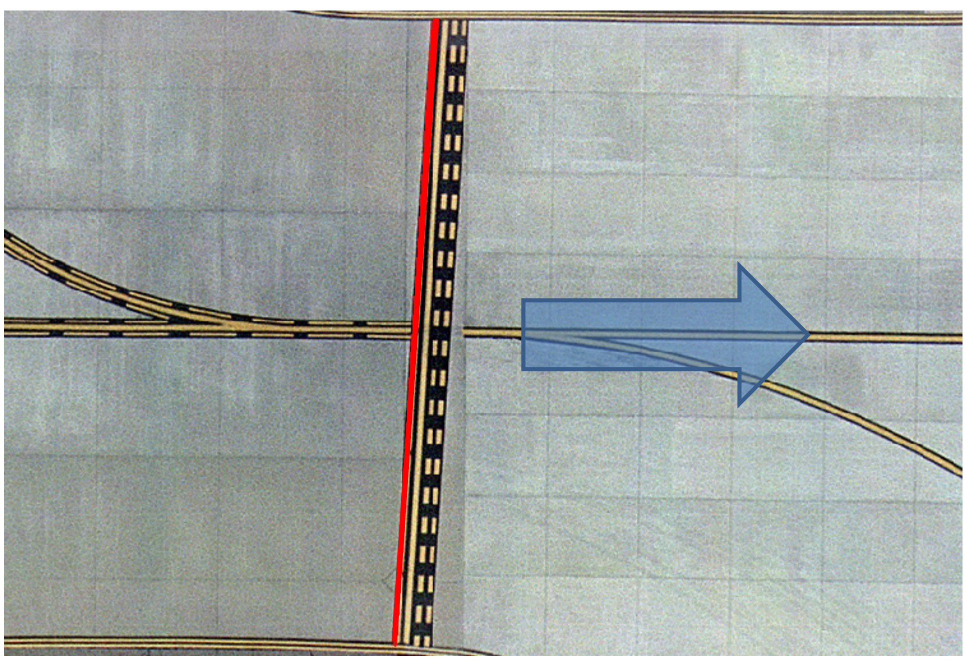
Marking Line

Figure 5-19. The Red Line in this Figure Demonstrates the Proper Way to Collect a Marking Line Feature on the Side Away from the Area it is Protecting.



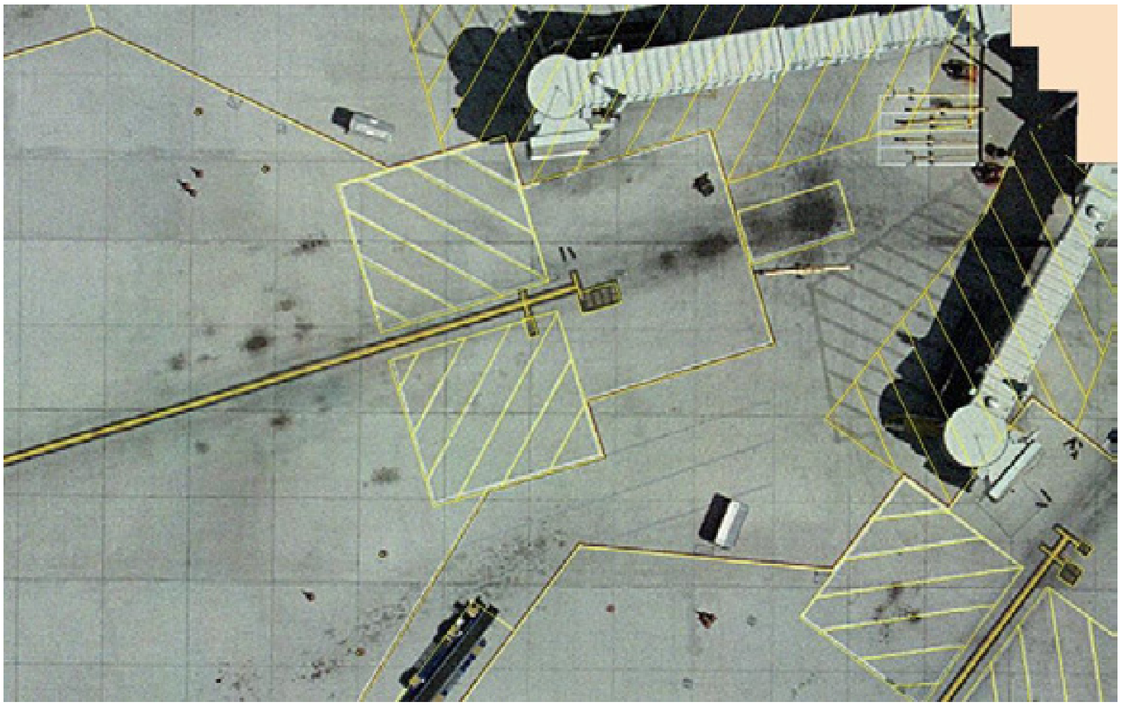
In the following example (Figure 5-20), the hold line is protecting the runway. The red line in the figure illustrates the proper method on the side away from the runway. Capture these lines from edge to edge, even when the marking extends into the shoulder.

Figure 5-20. Demonstrates the Appropriate Way to Collect a Taxiway Holding Position. Capture the Line on the Holding Side of the Marking Away from the Area Being Protected. The Blue Arrow Indicates the Direction of Travel.



Marking Line
Where the marking lines do not provide protection but general awareness, such as shown in Figure 5-21, capture the line in the center of the painted line being represented.

Figure 5-21. Depicts the Capture of Marking Lines on the Apron around an Aircraft Parking Stand.



Survey Accuracies	
Horizontal Accuracy	± 2.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two hundredths of an arc second (± 0.02)

Attribute Name *Datatype*	**Description**
COLORCODE *VARCHAR2(15)*	A code from **CodeColor** defined by the Federal Aviation Administration (FAA) to identify a color used in aviation.
MARKINGCONDITIONCODE *VARCHAR2(8)*	A code from **CodeMarkingCondition** identifying the condition of the markings.
MARKINGFEATURETYPECODE *VARCHAR2(18)*	A code from **CodeMarkingFeatureType** identifying the type of marking the feature instance describes.

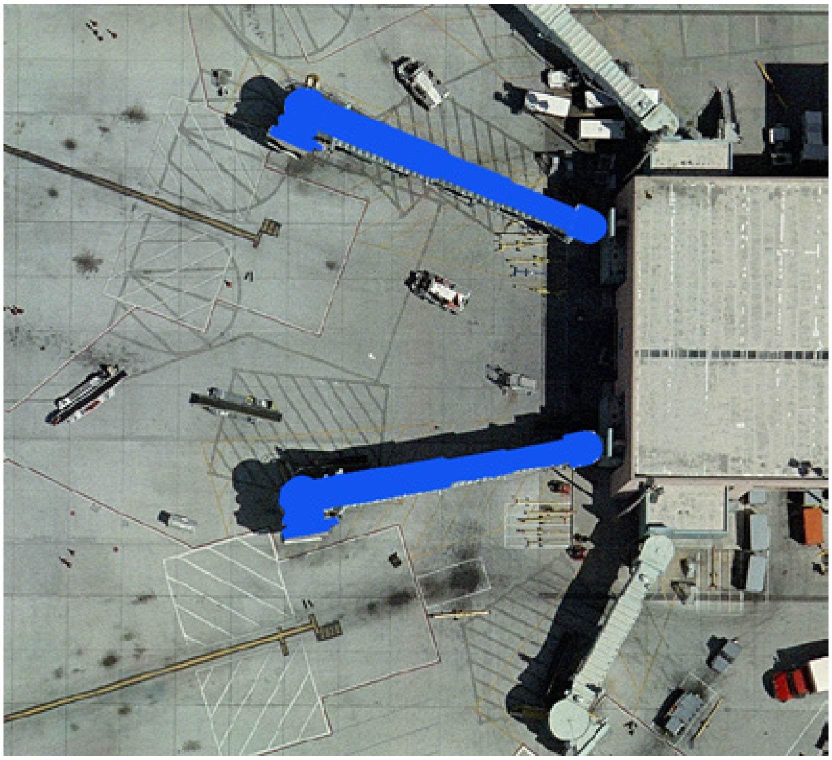
5.2.14 Passenger Loading Bridge.

Passenger Loading Bridge		
Definition: Equipment used to enplane or deplane passengers and crew from an aircraft to the access the terminal.		
Feature Group	Airfield	
Feature Class Name	PASSENGERLOADINGBRIDGE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	PassengerLoadingBridge
	FGDC	PassengerLoadingBridge
	SDSFIE	None
	DO-272	Apron
Related Features	APRON	
	AIRCRAFT GATE STAND	
	STRUCTURE POLYGON	
	MARKINGAREA	
	MARKING LINE	

Data Capture Rule

Capture a closed polygon capturing the horizontal extents of the feature (Figure 5-22). In some cases, this may be a **passenger loading** bridge or it may be an area where portable ramps or stairs are located when not in use.

Figure 5-22. Illustrates Capturing a Passenger Loading Bridge Feature with a Passenger Loading Bridge Type Attribute Value of Passenger Loading Bridge.



Passenger Loading Bridge	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
PASSENGERLOADINGBRIDGENAME *VARCHAR2(50)*	A name for the passenger loading bridge such as Gate 16A or Stair 22.
PASSENGERLOADINGBRIDGETYPE *VARCHAR2(15)*	A code from **CodePassengerLoadingBridgeType** indicating the type of loading equipment.

5.2.15 Runway.

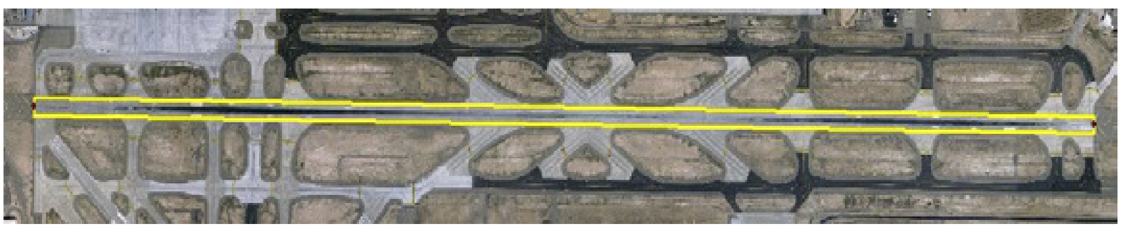
Runway		
Definition: A defined rectangular area on an airport prepared or suitable for the landing or takeoff of aircraft. [Source: AC 150/5300-13]		
Feature Group	Airfield	
Feature Class Name	RUNWAY	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	Runway
	FGDC	Runway
	SDSFIE	PavementBranch
	DO-272	Runway
Related Features	AIRFIELD LIGHT	
	AIRPORT SIGN	
	ARRESTING GEAR	
	FINALAPPROACH AND TAKEOFF	
	FREQUENCY AREA	
	MARKING AREA	
	MARKING LINE	
	NAVAID EQUIPMENT	
	OBJECT AREA	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT LINE	
	OBJECT POINT	
	POSITION	
	RUNWAY ARRESTING AREA	
	RUNWAY BLAST PAD	
	RUNWAY CENTERLINE	
	RUNWAY DECLARED DISTANCE	
	RUNWAY DIRECTION	
	RUNWAY ELEMENT	
	RUNWAY HELIPAD DESIGN SURFACE	

Runway	
	RUNWAY INTERSECTION
	RUNWAY LAHSO
	RUNWAY PROTECTION ZONE
	RUNWAY SAFETY AREA
	SHOULDER
	STOPWAY
	TAXIWAY CENTERLINE
	TAXIWAY ELEMENT
	TOUCHDOWN LIFTOFF AREA

Data Capture Rule

In addition to the requirements for **runway** 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 (Figure 5-23). 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.

Figure 5-23. Runway Collection.



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name *Datatype*	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
RUNWAYDESIGNATORIDENTIFIER *VARCHAR2(7)*	Designator of the first intersecting runway based on the magnetic heading and position in relation to parallel runways (15L/33R).
RUNWAYLENGTH *NUMBER*	The straight line distance between runway endpoints. This line does not account for surface undulations between points. Official runway lengths are normally computed from runway end coordinates and elevations.

Runway	
RUNWAYLINEOFSIGHTINDICATOR *VARCHAR2(1)*	An indicator identifying if the runway meets line of sight requirements.
RUNWAYWIDTH *NUMBER*	The total width of the runway as measured as a line perpendicular to the defined runway centerline. Where the runway has painted runway edge markings measure the width to the outer edge (shoulder side) of the markings. If the runway does not have painted runway edge markings, measure from pavement edge to pavement edge at multiple places and report the narrowest dimension. If the runway width is less than 100 feet, report the value to the nearest 5 foot increment. If the runway width is greater than 100 feet report the width to the nearest 10 foot increment.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the aircraft gate stands pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.

5.2.16 Runway Arresting Area.

Runway Arresting Area		
Definition: Any FAA approved high energy absorbing material of a specific strength to reliably and predictably bring an aircraft to a stop without imposing loads exceeding the aircraft's design limits, cause major structural damage, or impose excessive force on its occupants.		
Feature Group	Airfield	
Feature Class Name	RUNWAYARRESTINGAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	ArrestingGear
	FGDC	RunwayArrestingArea
	SDSFIE	None
	DO-272	Arresting System Locations
Related Features	RUNWAY	
	RUNWAY DIRECTION	
	MARKING AREA	
Data Capture Rule Collect a closed polygon limited by the chevron markings located on the **arresting area** surface (Figure 5-24) and including the setback value for the EMAS.		

Runway Arresting Area

Figure 5-24. Runway 4L/22R EMAS at Chicago Midway Airport. Note the collection includes the setback value for the EMAS.

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
ARRESTINGAREALENGTH *NUMBER*	The total length of the arresting area including any sloping surface.
ARRESTINGAREASETBACKLENGTH *NUMBER*	The distance the arresting system begins beyond the physical end of a runway.
ARRESTINGAREAWIDTH *NUMBER*	The Total width of the arresting area including any sloping surface.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the current condition of the arresting area surface.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** identifying the type of material comprising the arresting area.

5.2.17 Runway Blast Pad.

Runway Blast Pad		
Definition: A surface, adjacent to the end of runways provided to reduce the erosive effect of jet blast and propeller wash. A blast pad is not a stopway.		
Feature Group	Airfield	
Feature Class Name	RUNWAYBLASTPAD	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayBlastPad
	FGDC	RunwayBlastPad
	SDSFIE	None
	DO-272	Blast pad
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY DIRECTION	
	MARKING AREA	
	MARKING LINE	

Data Capture Rule

Collect a closed polygon to the extents of the chevrons marking the **blast pad** (Figure 5-25).

Figure 5-25. Runway Blast Pad.

Runway Blast Pad	
Survey Accuracies	
Horizontal Accuracy	± 2.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two hundredths of an arc second (± 0.02)
Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
RUNWAYDIRECTIONBLASTPADLENGTH *NUMBER*	The total length of the blastpad.
RUNWAYDIRECTIONBLASTPADWIDTH *NUMBER*	The total width of the blast pad surface.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the current condition of the runway blast pad.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.

5.2.18 Runway Centerline.

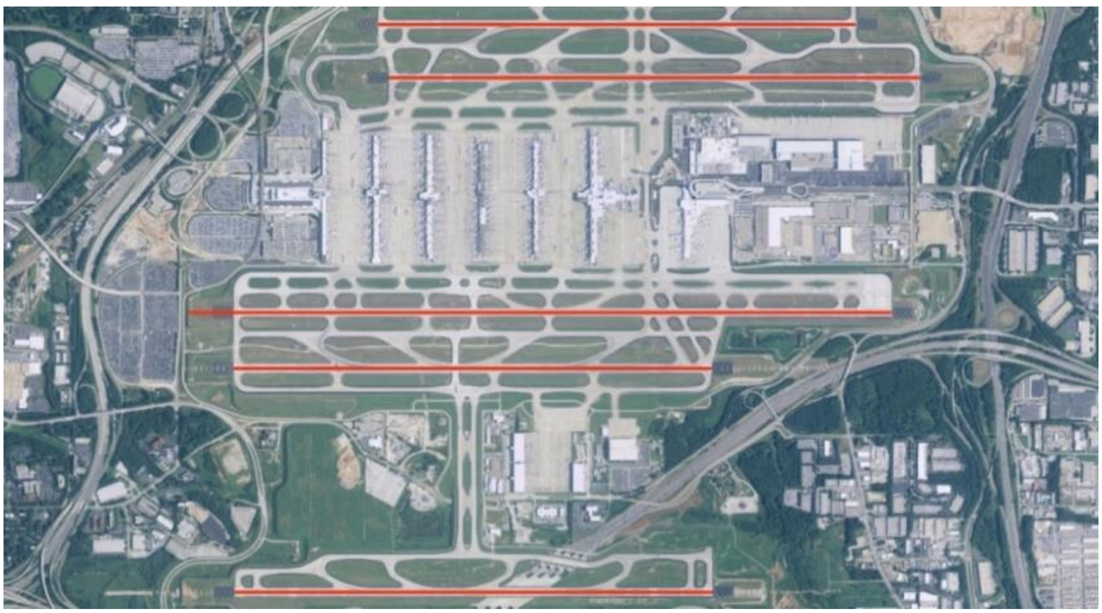
Runway Centerline		
Definition: A continuous line connecting the two ends of a runway.		
Feature Group	Airfield	
Feature Class Name	RUNWAYCENTERLINE	
Feature Type	Line	
Equivalent Standards	**AIXM**	RunwayMarking
	FGDC	RunwayCenterline
	SDSFIE	PavementMarkings
	DO-272	PaintedCenterline
Related Features	NAVAID EQUIPMENT	
	POSITION	

Runway Centerline	
	RUNWAY
	RUNWAY DIRECTION
	RUNWAY ELEMENT

Data Capture Rule

Capture the **runway centerline** as a continuous line connecting the two runway direction features (Figure 5-26).

Figure 5-26. Shows the Capture of Runway Centerlines Connecting Each Runway Direction Point.



Survey Accuracies	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.03)

Attribute Name *Datatype*	**Description**
ISDERIVEDINDICATOR *VARCHAR2(1)*	Indicates whether the centerline is derived or photo determined. Y indicates the centerline is derived and N indicates it was photo determined.
RUNWAYDESIGNATORIDENTIFIER *VARCHAR2(7)*	Designation of the runway based on the magnetic heading and position in relation to parallel runways. For example 15L/33R.

5.2.19 Runway Declared Distance.

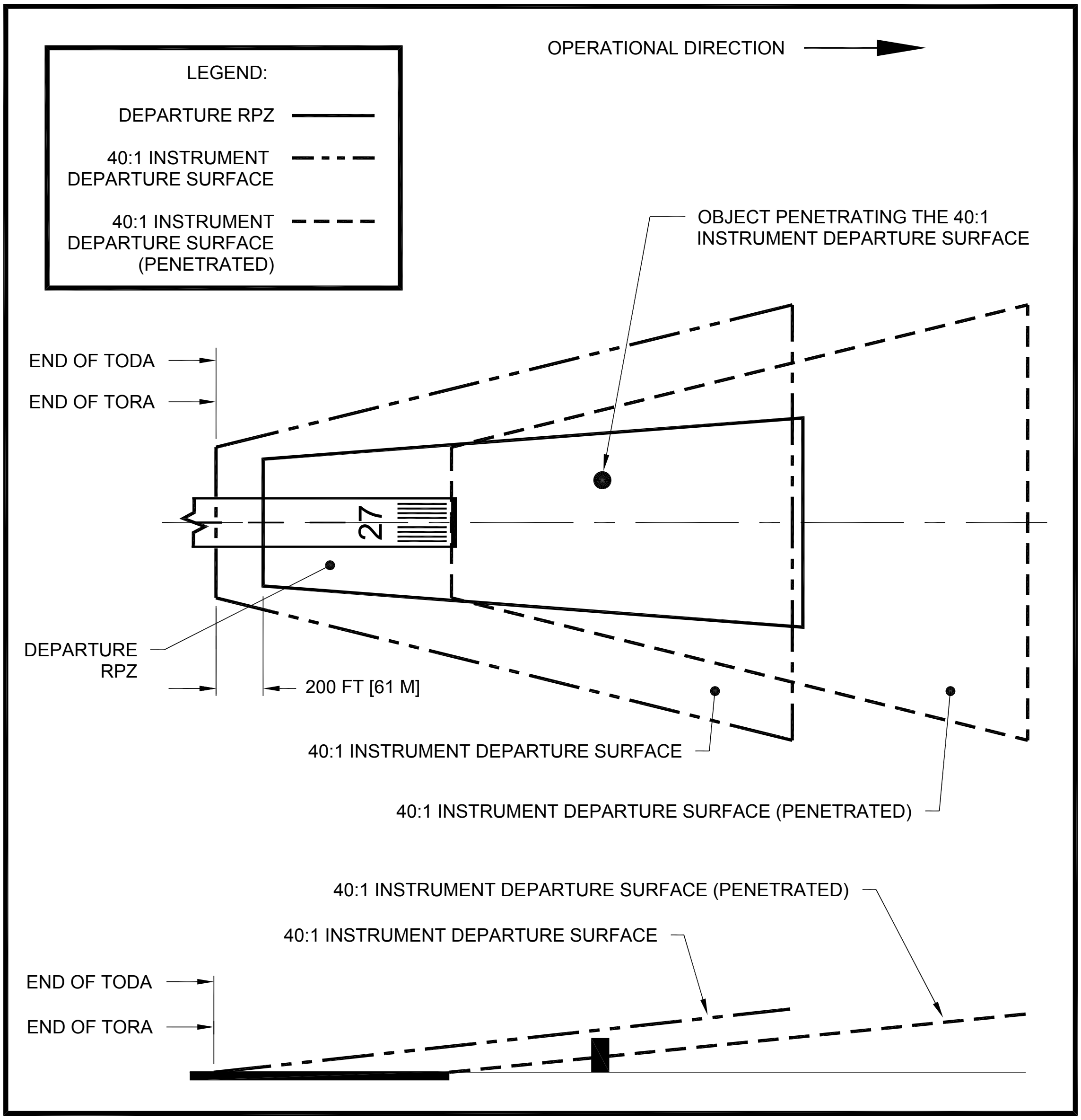
Runway Declared Distance		
Definition: The distances the airport owner declares available for a turbine powered aircraft's takeoff run, takeoff distance, accelerate stop distance, and landing distance requirements. For more information regarding declared distances, see AC 150/5300-13.		
Feature Group	Airfield	
Feature Class Name	RUNWAYDECLAREDDISTANCE	
Feature Type	Point	
Equivalent Standards	**AIXM**	RunwayDeclaredDistance
	FGDC	None
	SDSFIE	None
	DO-272	None
Related Features	OBJECT IDENTIFICATION SURFACE	
	POSITION	
	RUNWAY	
	RUNWAY ARRESTING AREA	
	RUNWAY DIRECTION	
	RUNWAY ELEMENT	
	RUNWAY PROTECTION ZONE	
	RUNWAY SAFETY AREA	
	RUNWAY HELIPAD DESIGN SURFACE	

Data Capture Rule

For any runway with Declared Distances, collect the start and stop point of the declared distance using the **Runway Declared Distance** feature. Complete the DECLAREDDISTANCETYPE attribute by selecting which of the four distances the feature instance is reporting. Complete the DECLAREDDISTANCEPOINTTYPE attribute by selecting if the point is the starting or stopping point for the distance being declared. When a runway uses declared distances, you need to specify a value for each of the four types (ASDA, LDA, TODA, and TORA) which requires eight instances (one start and one stop) for each of the distances (Figure 5-27, Figure 5-28, Figure 5-29). For more information and illustrations of the different implementations of Declared Distances, refer to AC 150/5300-13. This use of this feature is not required unless the airport has, or plans to have, declared distances.

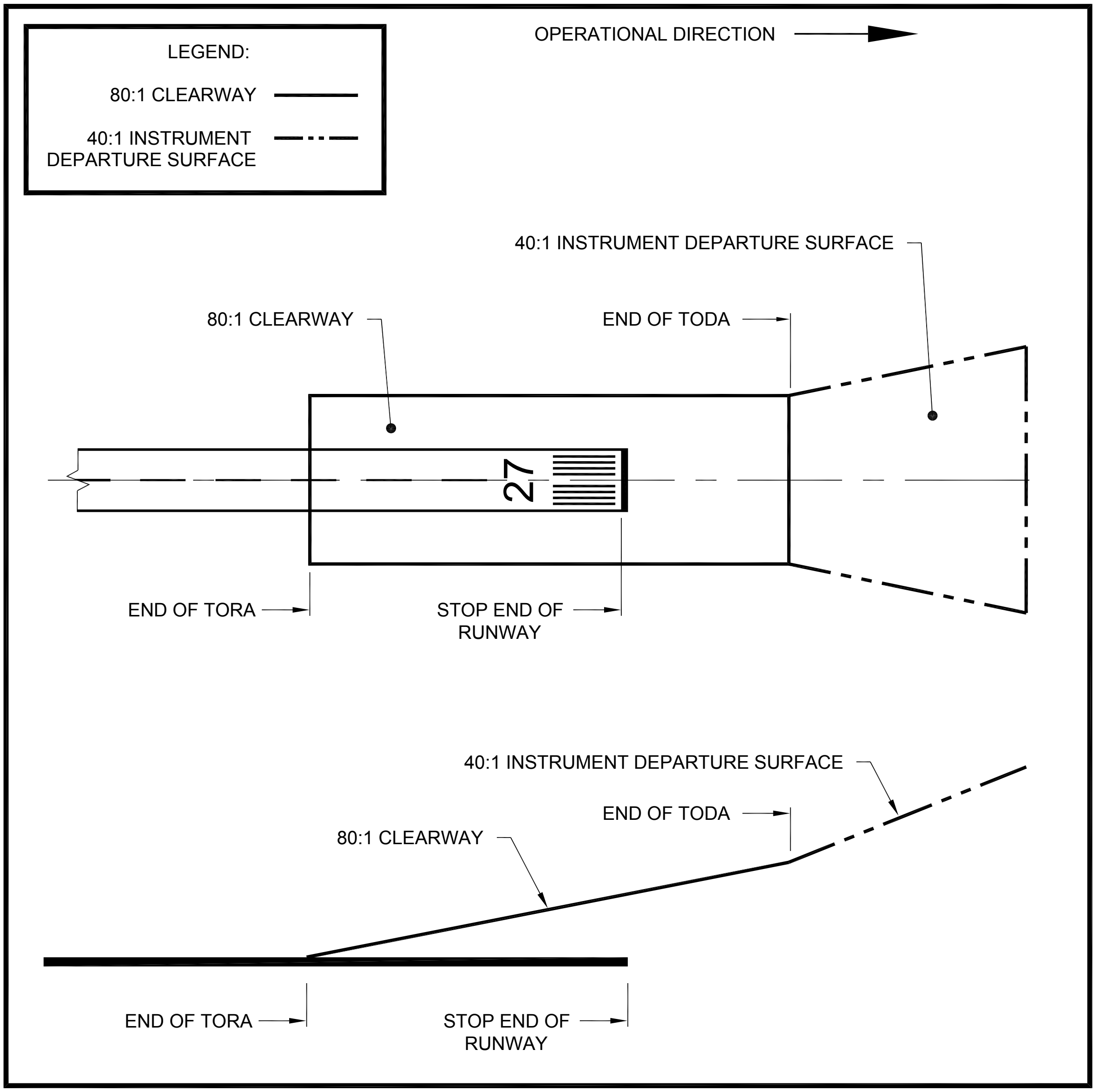
Runway Declared Distance

Figure 5-27. TODA Shortened to Mitigate Penetration to the Departure Surface Resulting in Shortened TORA.



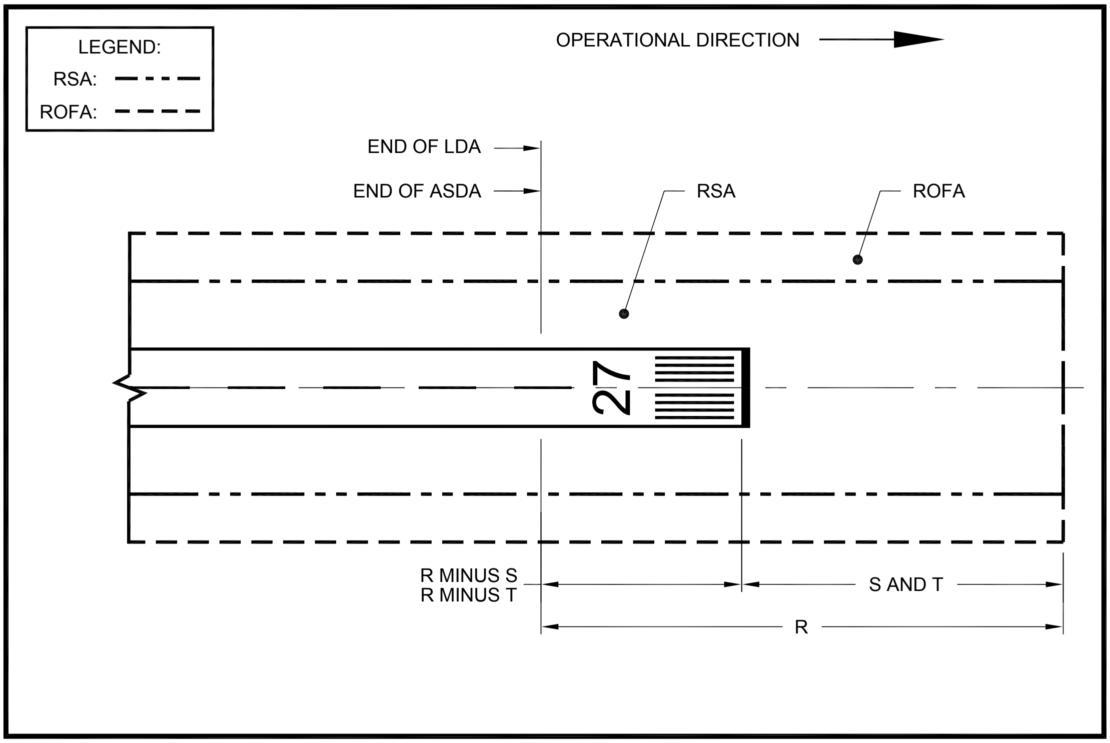
Runway Declared Distance

Figure 5-28. TODA Extended by use of a Clearway, Normal TORA.



Runway Declared Distance

Figure 5-29. Stop End of ASDA and LDA Located to Provide Additional RSA.



Notes:

R = required length of the RSA and ROFA beyond the runway departure end.
S = existing or proposed RSA length beyond the runway end.
T = existing or proposed length of the ROFA beyond the runway end.

Survey Accuracies	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Tens of feet
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.1)

Attribute Name ***Datatype***	**Description**
DECLAREDDISTANCETYPE *VARCHAR2(4)*	A code from **CodeDeclaredDistance** identifying the type of distance being declared.
DECLAREDDISTANCEVALUE *NUMBER*	The value of the declared distance being provided.
DECLAREDDISTANCESEGMENTTYPE *VARCHAR2(5)*	A code from **CodeSegmentType** used to define if the feature instance identified the beginning or ending position.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.

Runway Declared Distance	
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.

5.2.20 Runway Direction.

Runway Direction		
Definition: The runway direction identifies the point the runway is suitable for landing or takeoff runs of aircraft. A runway direction may operationally support more than one Approach Reference Code (APRC) or Departure Reference Code (DPRC). For more information on APRC and DPRC see AC 150/5300-13. Airports GIS supports each runway direction having up to three APRC and three DPRC values.		
Feature Group	Airfield	
Feature Class Name	RUNWAYDIRECTION	
Feature Type	Point	
Equivalent Standards	**AIXM**	RunwayDirection
	FGDC	RunwayEnd
	SDSFIE	None
	DO-272	Runway Threshold
Related Features	MARKING AREA	
	MARKING LINE	
	NAVAID EQUIPMENT	
	OBJECT IDENTIFICATION SURFACE	
	POSITION	
	RUNWAY	
	RUNWAY BLAST PAD	
	RUNWAY CENTERLINE	
	RUNWAY DECLARED DISTANCE	
	RUNWAY HELIPAD DESIGN SURFACE	

Data Capture Rule

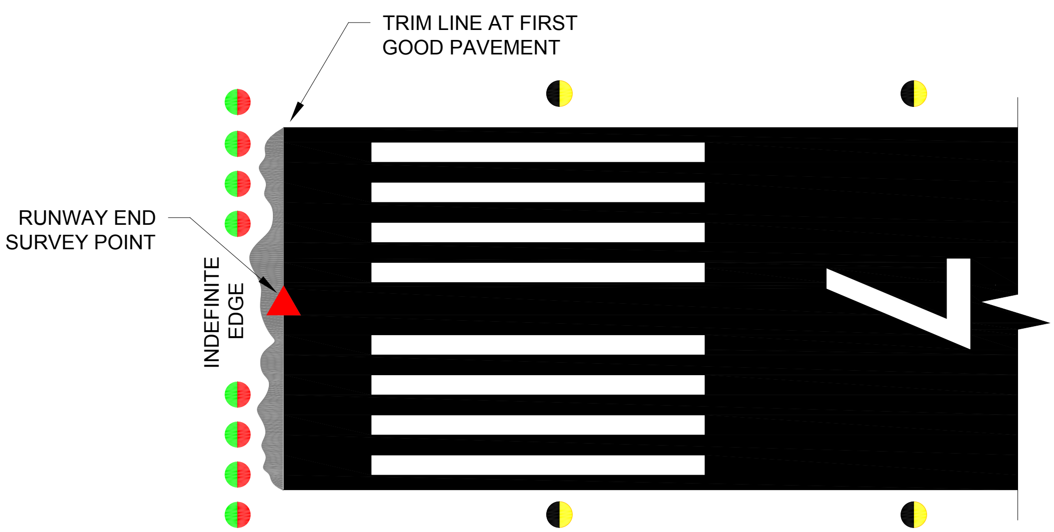
Establish the **runway direction** on the runway centerline at the physical end, or specified location based on other supporting features. If the runway has a displaced threshold, the area between the runway end and the displaced threshold should be marked with white arrows (see the requirements for a Displaced Threshold under the Airport Control Point feature).

- If the runway is a Concrete Runway with No Aligned Taxiway:
  - Define the survey point at the limit of construction (Figure 5-30) or a trim line at the first good pavement (Figure 5-31), unless these lines place the survey point on the approach side of the runway end lights.
  - 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 Figure 5-31 for an example of this scenario.

Runway Direction

Figure 5-30. Survey Point Locater.

Figure 5-31. Runway End Survey Point.



- Use the following supporting features to assist you in determining the proper location of the survey location for a runway end:
  - 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 Direction

  - Runway number near runway end (if threshold not displaced)
  - Runway edge lights (white or amber) extending to runway end
- If the runway is a Paved/Non-concrete Runway and No Aligned Taxiway:
  - Define the survey point at the limit of construction (Figure 5-32) or a trim line at the first good pavement (Figure 5-31), unless these lines place the survey point on the approach side of the runway end lights.
  - 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 usually uneven and not orthogonal to the runway centerline. Refer to the figures above and below as examples.

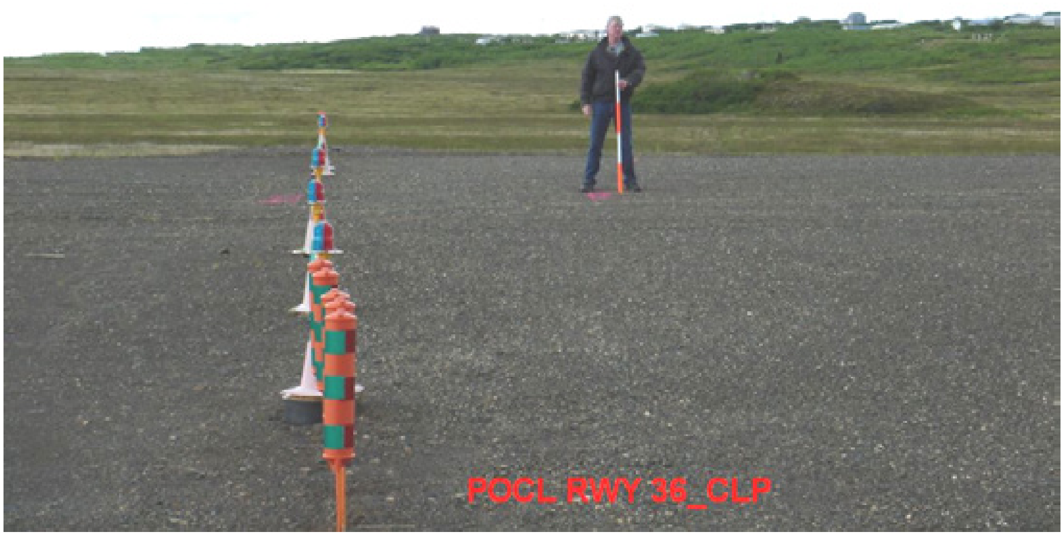
Figure 5-32. Surveying Equipment.

- Use the following supporting features to assist you in determining the proper location for a runway end:
  - 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)
- If the runway is an Unpaved Runway with no Aligned Taxiway, any of the following methods may be used:
  - Define the survey point using (see Figure 5-33, Figure 5-34, Figure 5-35):
  - A 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,
  - A trim line connecting outboard runway end day markers.
  - If no lights or markers exist, the existence of a runway is in question since by

Runway Direction
FAA definition, a runway is a defined area. Not all areas used for takeoff/landings are runways.

Figure 5-33. Paved Runway and Aligned Taxiway.

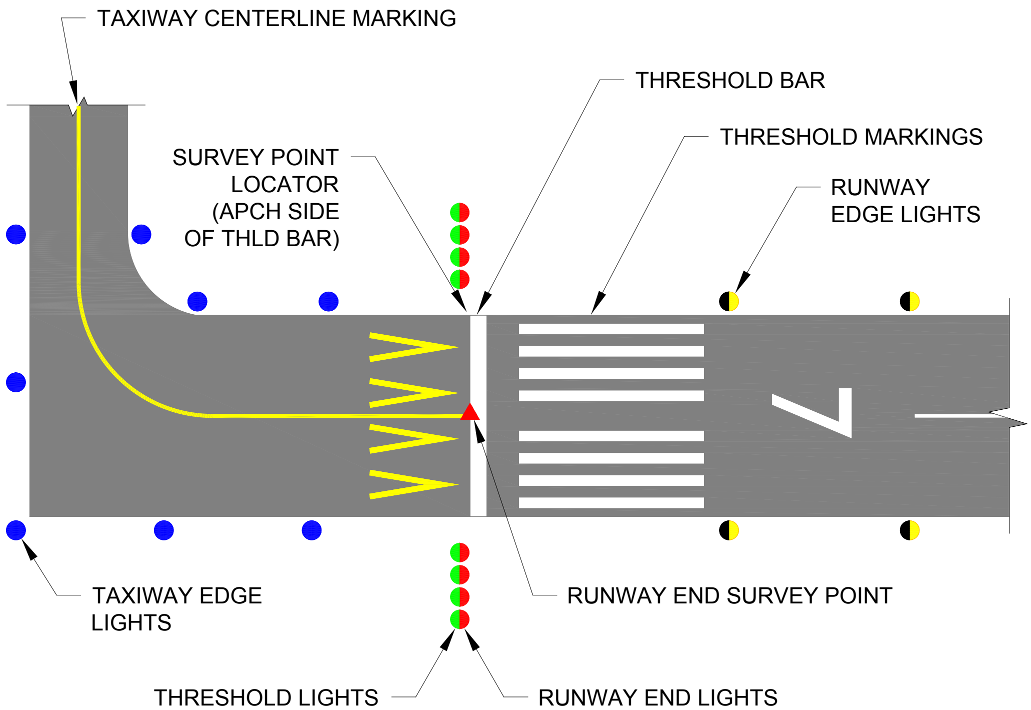
Figure 5-34. Shows the Location of the Runway Direction Point 10 Feet Inside the End Markers.



Runway Direction
Figure 5-35. Paved Runway and Aligned Taxiway Details. 
Use the threshold lights near threshold (if runway lighted and threshold not displaced) or day markers (Figure 5-34) if present to assist you in identifying the runway end. • If the runway is Paved Runway with Aligned Taxiway (Figure 5-36): o Define the survey point of the approach side of threshold bar unless this line is on the approach side of runway end lights and the runway does not have a displaced threshold. 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.). o 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.

Runway Direction

Figure 5-36. Paved Runway and Aligned Taxiway.



NOTES:

1. THIS GRAPHIC IS NOT TO SCALE. FEATURES ARE SYMBOLIZED AND INTENDED FOR 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 ON APPROACH SIDE OF RUNWAY END LIFGHTS.
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 EXTEND TO APPROACH SIDE OF RUNWAY END LIGHTS.
   - RUNWAY CANNOT EXTEND TO APPROACH SIDE OF RUNWAY END LIGHTS.

- Use the following supporting features to assist you in identifying the runway end of a Paved Runway with an aligned taxiway.
  - Threshold lights near runway end and usually in same fixture as runway end

Runway Direction

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
- If the runway is an Unpaved Runway with an Aligned Taxiway:
  - Define the survey point using a trim line connecting outboard runway end lights or the trim line connecting outboard runway end day markers.
  - Use the threshold lights near threshold (if threshold not displaced) or runway/taxiway edge lights (if runway is lighted).
  - Unpaved runways with aligned taxiways are unusual. If you suspect such a scenario, 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.
- Monumentation: After determining the location of the runway end, mark the position using a nail and washer with the setting company's name and year inscribed, a chiseled square, or by using paint if possible with a distinctive inscription to ensure future identification.
- Documentation: Provide documentation supporting the location of the location of the Runway Direction point through the Airports GIS web site.
- Digital Photographs: Provide four digital photographs each from a different perspective.

- Photograph one – take this photograph from eye level looking down at the selected runway direction location monument or mark (Figure 5-37). Frame the photograph to depict an area of approximately three feet (one meter) around the mark.

Figure 5-37. Photograph One.

Runway Direction

- Photograph two – taken from a point approximately 100 feet from the end of the runway with a tripod located over the mark. This photograph should look out into the approach for the runway end. The arrow in Figure 5-38 indicates the location of the tripod over the mark. Adding the arrow to the photograph is optional.

Figure 5-38. Photograph Two.

- Photograph Three – Photo taken from the side of the runway looking across the end of the runway, with a tripod or arrow indicating the runway end (Figure 5-39). If you are using supporting features to identify the runway end, be sure to include them in the photograph, such as the runway end lights in this photograph.

Figure 5-39. Photograph Three.

Runway Direction	
• Photograph Four – provides a close-up view of the runway end mark or monument (Figure 5-40). Take this photograph from above the monument or mark clearly showing the details of the monument or mark; in this case the nail, washer and washer inscription.	

Figure 5-40. Provides a Close-up of the Nail and Washer Marking the Runway Direction Feature Location.

Survey Accuracies	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Hundredths of an arc second

Attribute Name ***Datatype***	**Description**
AIRCRAFTAPPROACHCATEGORYCODE1 *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Use this attribute for the primary APRC COMPONENT value.
AIRCRAFTAPPROACHCATEGORYCODE2 *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Use this attribute for the secondary APRC COMPONENT value.
AIRCRAFTAPPROACHCATEGORYCODE3 *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing

Runway Direction	
	configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Use this attribute for the tertiary declared APRC.
AIRCRAFTAPPROACHCATEGORYCODE4 *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Use this attribute for the primary declared DPRC.
AIRCRAFTAPPROACHCATEGORYCODE5 *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Use this attribute for the secondary declared DPRC.
AIRCRAFTAPPROACHCATEGORYCODE6 *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions. Use this attribute for the tertiary declared DPRC.
AIRPLANEDESIGNGROUPCODE1 *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Use this attribute for the primary declared APRC.
AIRPLANEDESIGNGROUPCODE2 *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Use this attribute for the secondary declared APRC.
AIRPLANEDESIGNGROUPCODE3 *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Use this attribute for the tertiary declared APRC.
AIRPLANEDESIGNGROUPCODE4 *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Use this attribute for the primary

Runway Direction	
	declared DPRC.
AIRPLANEDESIGNGROUPCODE5 *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Use this attribute for the secondary declared DPRC.
AIRPLANEDESIGNGROUPCODE6 *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Use this attribute for the tertiary declared DPRC.
APPROACHGUIDANCECODE *VARCHAR2(23)*	A code from **CodeApproachGuidance** identifying the type of approach guidance serving or planned to serve the runway direction.
ELLIPSOIDHEIGHT *NUMBER*	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height.
MAGNETICBEARING *NUMBER*	Magnetic runway bearing corresponding to the runway direction.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYMARKINGTYPECODE *VARCHAR2(5)*	A code from **CodeRunwayMarkingType** identifying the type of runway markings for the runway direction.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.
RUNWAYDIRECTIONVISIBILITY1 *NUMBER*	The current operational visibility the runway direction supports. Use this attribute for the primary declared APRC.
RUNWAYDIRECTIONVISIBILITY2 *NUMBER*	The current operational visibility the runway direction supports. Use this attribute for the secondary declared APRC.
RUNWAYDIRECTIONVISIBILITY3 *NUMBER*	The current operational visibility the runway direction supports. Use this attribute for the tertiary declared APRC.
RUNWAYDIRECTIONVISIBILITY4 *NUMBER*	The current operational visibility the runway direction supports. Use this attribute for the primary declared DPRC.
RUNWAYDIRECTIONVISIBILITY5 *NUMBER*	The current operational visibility the runway direction supports. Use this attribute for the secondary declared DPRC
RUNWAYDIRECTIONVISIBILITY6	The current operational visibility the runway

Runway Direction	
NUMBER	direction supports. Use this attribute for the tertiary declared DPRC.
THRESHOLDDISPLACEDDISTANCE *NUMBER*	The distance the runway threshold is displaced (if any) from the physical runway end.
THRESHOLDTYPECODE *VARCHAR2(9)*	A code from **CodeThresholdType** identifying the location of the threshold as being at the end of the runway or at a displaced location.
TOUCHDOWNZONELEVATION *NUMBER*	The highest elevation in the touchdown zone. The touchdown zone is the first 3000 feet of the runway beginning at threshold.
TOUCHDOWNZONESLOPE *NUMBER*	The longitudinal slope of the first 3000 feet of the runway beginning at threshold.
TRUEBEARING *NUMBER*	True bearing corresponding to the runway direction specified to the nearest thousandth (0.001) of a degree.

5.2.21 Runway Element.

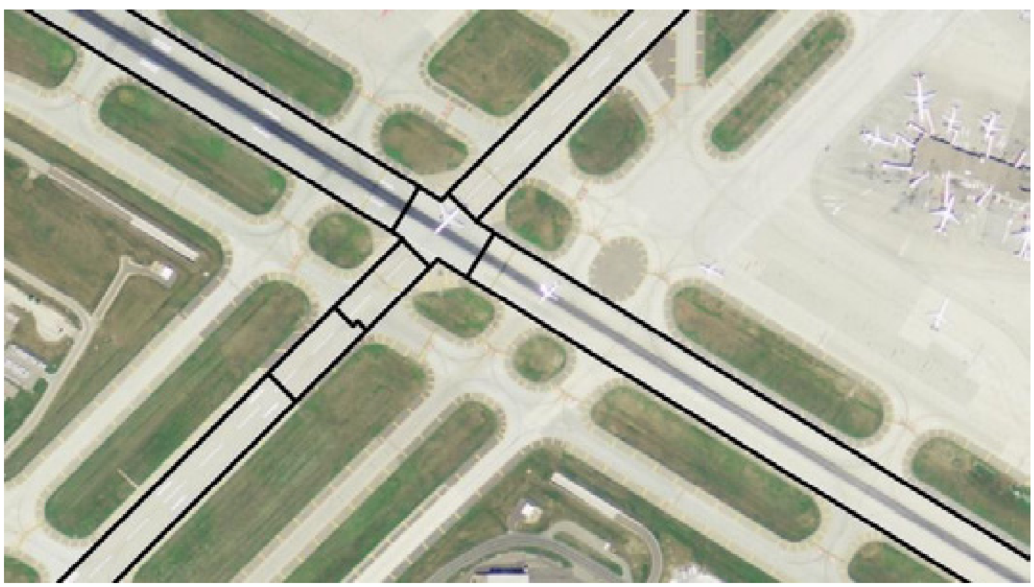
Runway Element		
Definition: A section of the runway surface. The runway surface can be defined by a set of non-overlapping RunwaySegment polygons for pavement management purposes. RunwayElements may overlap Runway and RunwayIntersection features. Use RunwayElement to model the physical runway pavement in terms of surface, material, strength and condition in greater detail than just as a single piece of pavement. [Source: AC 150/5335-5, *Standardized Method of Reporting Airport Pavement Strength - PCN*, AC 150/5320-12, *Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces*, AC 150/5320-17, *Airfield Pavement Surface Evaluation and Rating Manuals*, AC 150/5320-6, *Airport Pavement Design and Evaluation*]		
Feature Group	Airfield	
Feature Class Name	RUNWAYELEMENT	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayElement
	FGDC	RunwayElement
	SDSFIE	PavementBranch
	DO-272	Runway Element
Related Features	AIRFIELD LIGHT	
	AIRPORT SIGN	
	ARRESTING GEAR	
	FREQUENCY AREA	
	MARKING AREA	
	MARKING LINE	
	NAVAID EQUIPMENT	
	OBJECT AREA	
	OBJECT POINT	
	OBJECT LINE	
	OBJECT IDENTIFICATION SURFACE	
	POSITION	

Runway Element	
	RUNWAY ARRESTING AREA
	RUNWAY BLAST PAD
	RUNWAY CENTERLINE
	RUNWAY DECLARED DISTANCE
	RUINWAY DIRECTION
	RUNWAY HELIPAD DESIGN SURFACE
	RUNWAY INTERSECTION
	RUNWAY LHASO
	RUNWAY PROTECTION ZONE
	RUNWAY SAFETY AREA
	SHOULDER
	STOPWAY
	TAXIWAY CENTERLINE
	TAXIWAY ELEMENT

Data Capture Rule

Collect **Runway Elements** as individual polygon objects. Where two or more runways intersect, identify, classify, and report runway intersections only once using the feature runway intersection (Figure 5-41).

Figure 5-41. Illustrates the Method of Capturing Runway Elements.



Note: Refer to Figure 5-43 for details.

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Runway Element	
Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** indicating the type of marking used to identify the land and hold short line.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
RUNWAYDESIGNATORIDENTIFIER *VARCHAR2(7)*	Designation of the runway based on the magnetic heading and position in relation to parallel runways. For example 15L/33R.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being classified by the feature.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the runway element pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.

5.2.22 Runway Helipad Design Surface.

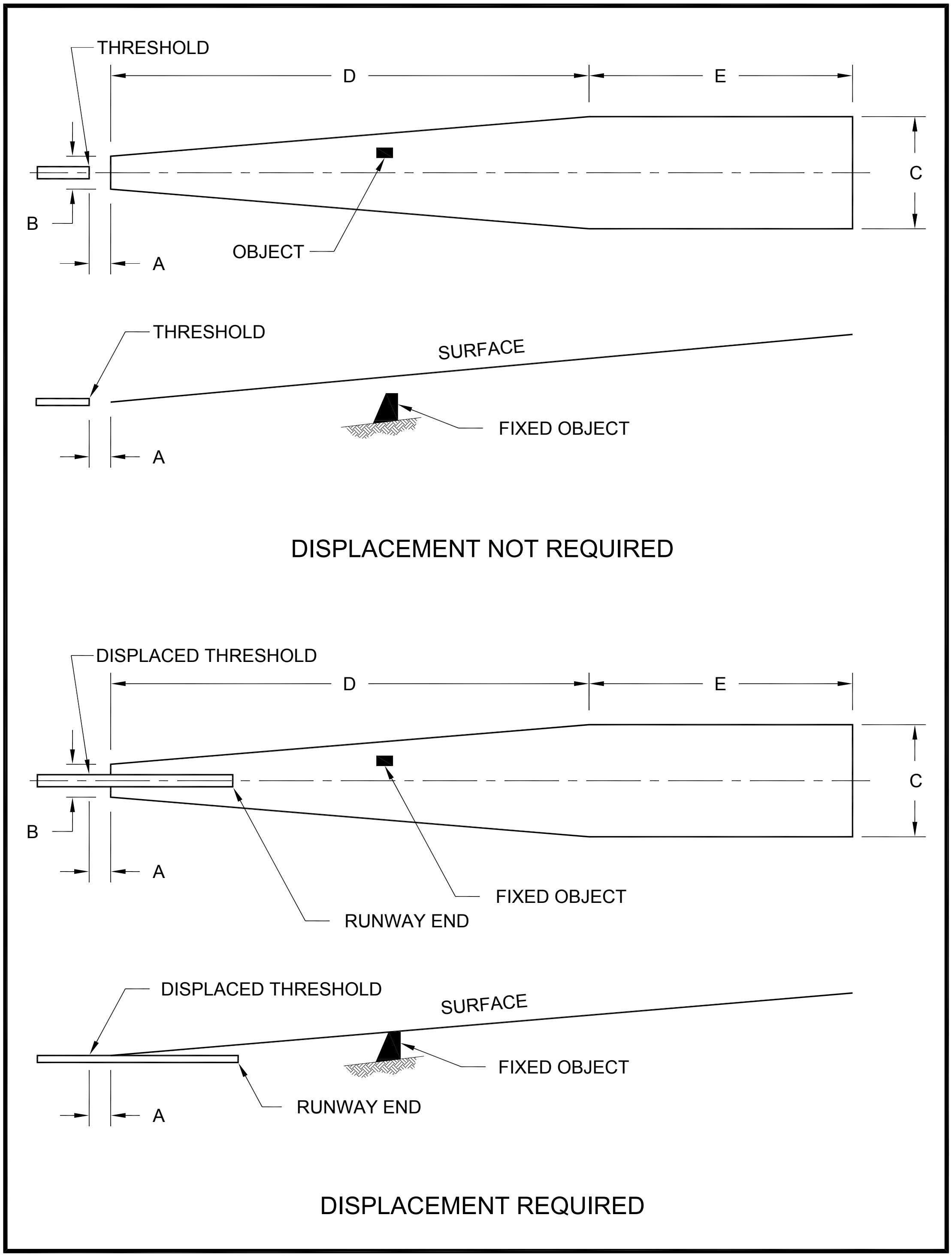
Runway Helipad Design Surface		
Definition: a three-dimensional surface used in runway or helipad design.		
Feature Group	Airfield	
Feature Class Name	RUNWAYHELIPADDESIGNSURFACE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayProtectArea
	FGDC	RunwayHelipadDesignSurface
	SDSFIE	AirfieldImaginarySurface
	DO-272	None
Related Features	OBJECT AREA	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT LINE	
	OBJECT POINT	
	RUNWAY DIRECTION	

Data Capture Rule

Provide the **runway and helipad design surfaces** for the airport according to the criteria in AC 150/5300-13, *Airport Design,* and AC 150/5390-2, *Heliport Design*. Figure 5-42 shows an example of one design surface to provide.

Runway Helipad Design Surface

Figure 5-42. Threshold Siting Based on Approach Slope.



Runway Helipad Design Surface	
Survey Accuracies	
Horizontal Accuracy	Not Applicable
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	Not Applicable
Distance and Elevation Resolution	Not Applicable
Geographic Coordinate Resolution	Not Applicable
Attribute Name *Datatype*	**Description**
DESIGNSURFACETYPECODE *VARCHAR2(8)*	A code from **CodeDesignSurfaceType** identifying the type of surface the feature instance portrays.
FATODESIGNATORIDENTIFER *VARCHAR2(20)*	Designation of the FATO the design surface is associated with.
RUNWAYDESIGNATORIDENTIFER *VARCHAR2(7)*	Designation of the runway based on the magnetic heading and position in relation to parallel runways. For example 15L/33R. This attribute applies to the following design surface types BRL, ROFA, ROFZ, and RVZ.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways. This attribute is only required if a value is given for RUNWAYDIRECTIONNUMBER.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation, based on the first two digits of the runway magnetic heading. This attribute only applies to the following Design Surface Types: CWY, IAOFZ, ITOFZ, LIGHT, POFZ, TSS, and VGSI.
SLOPEVALUE *NUMBER*	The slope (gradient) of the surface as a number. For example, 34:1 is shown as 34.
TAXIWAYDESIGNATOR *VARCHAR2(3)*	The taxiway designator the design surface is associated with. This attribute only applies to design surface types of TXSA and TESM.
ZONEINNERWIDTHVALUE *NUMBER*	The width of the inner edge of the surface. This is the end of the surface closest to the runway.
ZONELENGTH *NUMBER*	The length of the surface from the inner edge to the outer edge.
ZONEOUTERWIDTHVALUE *NUMBER*	The width of the outer edge of the surface. This is the end of the surface furthest from the runway.

5.2.23 Runway Intersection.

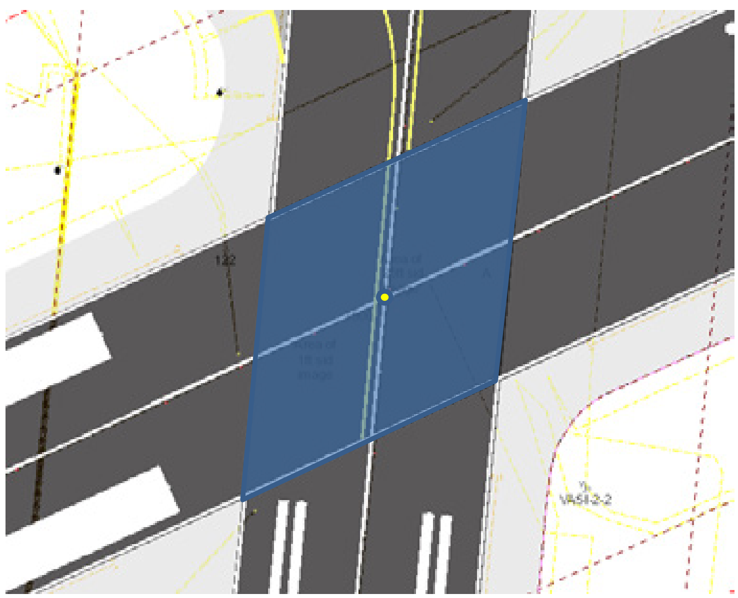
Runway Intersection	
Definition: The area of intersection between two or more runways.	
Feature Group	Airfield
Feature Class Name	RUNWAYINTERSECTION

Runway Intersection		
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayElement
	FGDC	RunwayElement
	SDSFIE	PavementBranch
	DO-272	Runway Intersection
Related Features	MARKING AREA	
	MARKING LINE	
	POSITION	
	RUNWAY CENTERLINE	
	RUNWAY ELEMENT	

Data Capture Rule

When two or more runways intersect, collection of the runway(s) requires the use of the runway element features and the **runway intersection** feature(s). Collect the area of overlap as an individual runway intersection polygon attached to the corresponding runway elements polygons by way of shared edges (Figure 5-43). Define the intersection by the outer edge of the white runway edge marking or surface edge if no marking is present. Additionally, collect a point using the Position feature with a position role code attribute value of **Runway_Intersection** at the intersection of the runway centerlines.

Figure 5-43. The Blue Polygon Illustrates the Collection of a Runway Intersection Feature. The Yellow Circle in the Middle of the Polygon Identifies the Intersection Point of the Two Runway Centerlines.



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

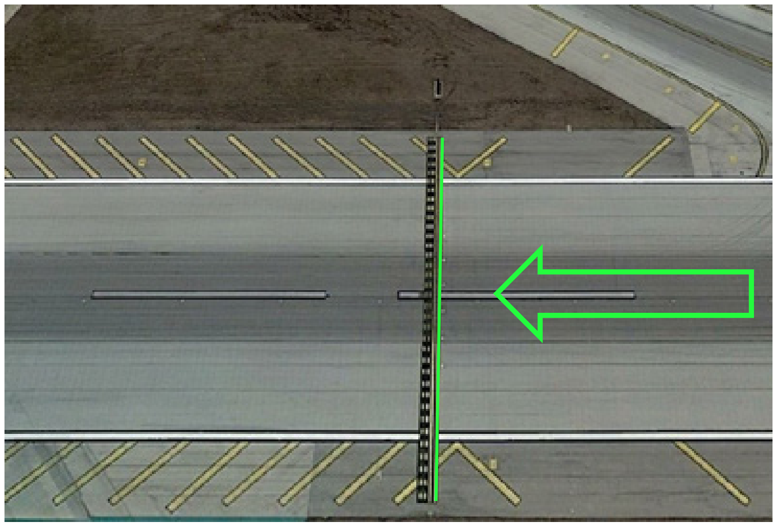
Runway Intersection	
Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
RUNWAYDESIGNATORIDENTIFIER1 *VARCHAR2(7)*	Designator of the first intersecting runway based on the magnetic heading and position in relation to parallel runways (15L/33R).
RUNWAYDESIGNATORIDENTIFIER2 *VARCHAR2(7)*	Designator of the second intersecting runway based on the magnetic heading and position in relation to parallel runways (15L/33R).
RUNWAYDESIGNATORIDENTIFIER3 *VARCHAR2(7)*	Designator of the third intersecting runway based on the magnetic heading and position in relation to parallel runways (15L/33R).
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the runway intersection pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.

5.2.24 Runway LAHSO.

Runway LAHSO		
Definition: The area of intersection between two or more runways.		
Feature Group	Airfield	
Feature Class Name	RUNWAYLAHSO	
Feature Type	Line	
Equivalent Standards	**AIXM**	RunwayMarking
	FGDC	RunwayLAHSO
	SDSFIE	None
	DO-272	LAHSO
Related Features	AIRFIELD LIGHT	
	MARKING LINE	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY INTERSECTION	
Data Capture Rule Collect the LAHSO line delineated by the outer edge of the second painted line farthest from the intersecting runway (Figure 5-44).		

Runway LAHSO

Figure 5-44. The Green Line in this Photo Illustrates the Capture of the Runway LAHSO Marking. The Protected Runway is to the Left of the Marking. The Aircraft are Landing Right to Left in this Instance (Green Arrow). We have Exaggerated the Line to Illustrate the Concept.



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name / ***Datatype***	**Description**
AVAILABLELANDINGDISTANCE *NUMBER*	The distance from the landing threshold to the LAHSO location in feet.
COLORCODE *VARCHAR2(15)*	A code for the LAHSO runway marking from **CodeColor** defined by the Federal Aviation Administration (FAA) to identify a color used in aviation.
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** indicating the type of marking used to identify the land and hold short line.
PROTECTEDRUNWAYDESIGNATOR *VARCHAR2(7)*	The runway designation based on magnetic heading and relation to parallel runways of the runway the LAHSO line is protecting such as 06R/24L.

5.2.25 Runway Protection Zone.

Runway Protection Zone
Definition: An area at ground level prior to the threshold or beyond the runway end to enhance

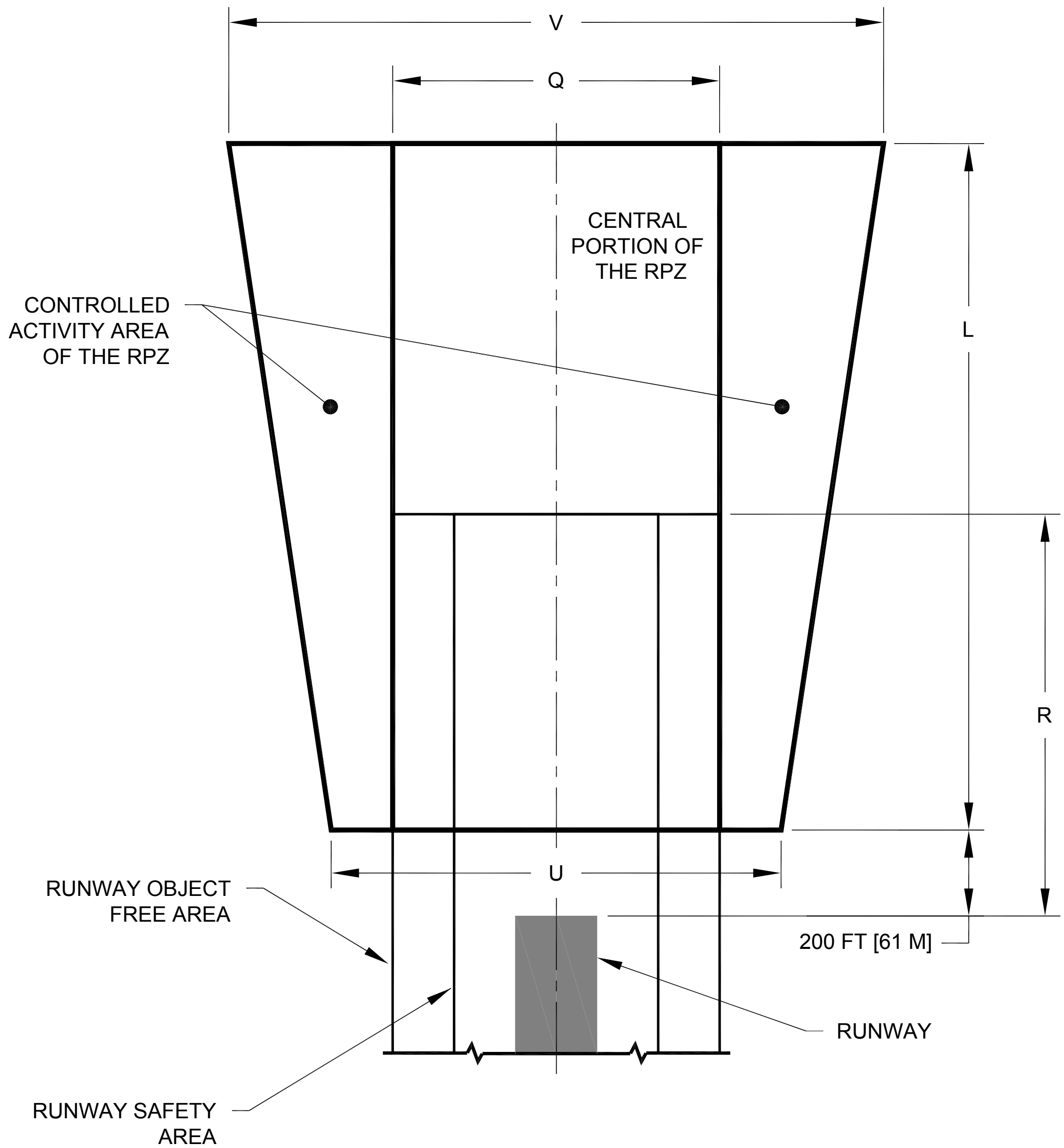
Runway Protection Zone		
the safety and protection of people and property on the ground.		
Feature Group	Airfield	
Feature Class Name	RUNWAYPROTECTIONZONE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayProtectArea
	FGDC	RunwayHelipadDesignSurface
	SDSFIE	AirfieldImaginarySurface
	DO-272	None
Related Features	LAND USE	
	MARKING AREA	
	MARKING LINE	
	RUNWAY	
	RUNWAY CENTERLINE	
	RUNWAY DECLARED DISTANCE	
	RUNWAY DIRECTION	
	RUNWAY ELEMENT	
	RUNWAY HELIPAD DESIGN SURFACE	
	TAXIWAY CENTERLINE	
	TAXIWAY ELEMENT	

Data Capture Rule

Capture the **runway protection zone** (RPZ) as two instances of the Runway Protection Zone feature. Collect one instance for the Central portion of the RPZ and collect the Controlled Activity Area as a separate feature instance (Figure 5-45). Use the **CodeRpzType** attribute to define if the feature instance describes the approach or departure RPZ. Use the **CodeRpzArea** attribute to define if the feature instance describes the central portion of the RPZ or the Controlled Activity Area. See AC 150/5300-13, *Airport Design*, for additional information.

Runway Protection Zone

Figure 5-45. Runway Protection Zone (RPZ), Runway Object Free Area (ROFA) and Runway Safety Area (RSA).



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Runway Protection Zone	
Attribute Name ***Datatype***	**Description**
AIRCRAFTAPPROACHCATEGORYCODE *VARCHAR2(1)*	A code from **CodeApproachCategory** defining a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions.
AIRPLANEDESIGNGROUPCODE *VARCHAR2(5)*	A code from **CodeDesignGroup** describing the classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used.
ALDREFERENCEPOINT *VARCHAR2(3)*	Identify the Runway Number and Runway Designator (if required) for the landing threshold for the available landing distance value.
RPZACREAGE *NUMBER*	The total land acreage within the boundaries of the runway protection zone.
RPZAREACODE *VARCHAR2(3)*	A code from **CodeRpzArea** indicating the area of the RPZ the feature instance depicts.
RPZINNERWIDTH *NUMBER*	The width of the inner edge of the runway protection zone nearest the runway.
RPZLENGTH *NUMBER*	The length of the runway protection zone the feature instance depicts.
RPZOUTERWIDTH *NUMBER*	The width of the outer edge of the runway protection zone the feature instance depicts.
RPZTYPECODE *VARCHAR2(4)*	A code from **CodeRpzType** designating the use of this instance of the RPZ.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.

5.2.26 Runway Safety Area.

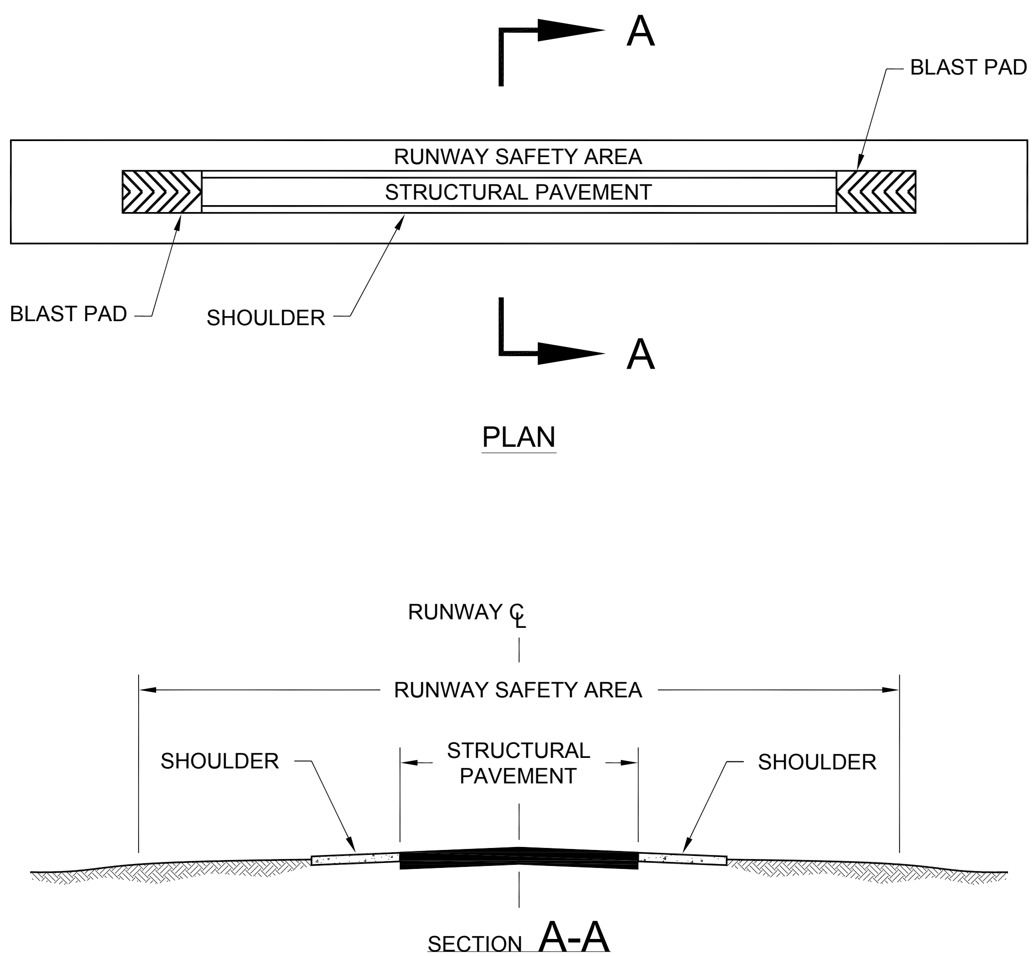
Runway Safety Area		
Definition: A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.		
Feature Group	Airfield	
Feature Class Name	RUNWAYSAFETYAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayProtectArea
	FGDC	RunwayHelipadDesignSurface
	SDSFIE	AirfieldImaginarySurface
	DO-272	None
Related Features	AIRPORT SIGN	

Runway Safety Area	
	MARKING AREA
	MARKING LINE
	POSITION (DISPLACED THRESHOLD)
	RUNWAYDIRECTION
	RUNWAYDECLAREDDISTANCE
	RUNWAY
	TAXIWAY ELEMENT

Data Capture Rule

Collect a closed polygon encompassing the entire **Runway Safety Area**. If necessary, use multiple instances of the feature to capture the area being represented under unique circumstances. See Figure 5-46. See AC 150/5300-13, *Airport Design*, for additional information.

Figure 5-46. Runway Safety Area (RSA).



Runway Safety Area	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
RSADETERMINATION *VARCHAR2(255)*	The Runway Safety Area (RSA) determination for the runway end the surface protects. [AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*, and FAA Order 5200.8]
RSADETERMINATIONDATE *DATE*	The date the Runway Safety Area (RSA) determination was approved. [AC 150/5220-22 and FAA Order 5200.8]
RSALENGTHAFTERDEPARTUREEND *NUMBER*	The length of the runway safety area beyond the departure end for the runway direction.
RSALENGTHPRIORTOTHRESHOLD *NUMBER*	The length of the runway safety area prior to the threshold for the runway direction.
RSAWIDTH *NUMBER*	The width of the runway safety area for the runway direction.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.

5.2.27 Shoulder.

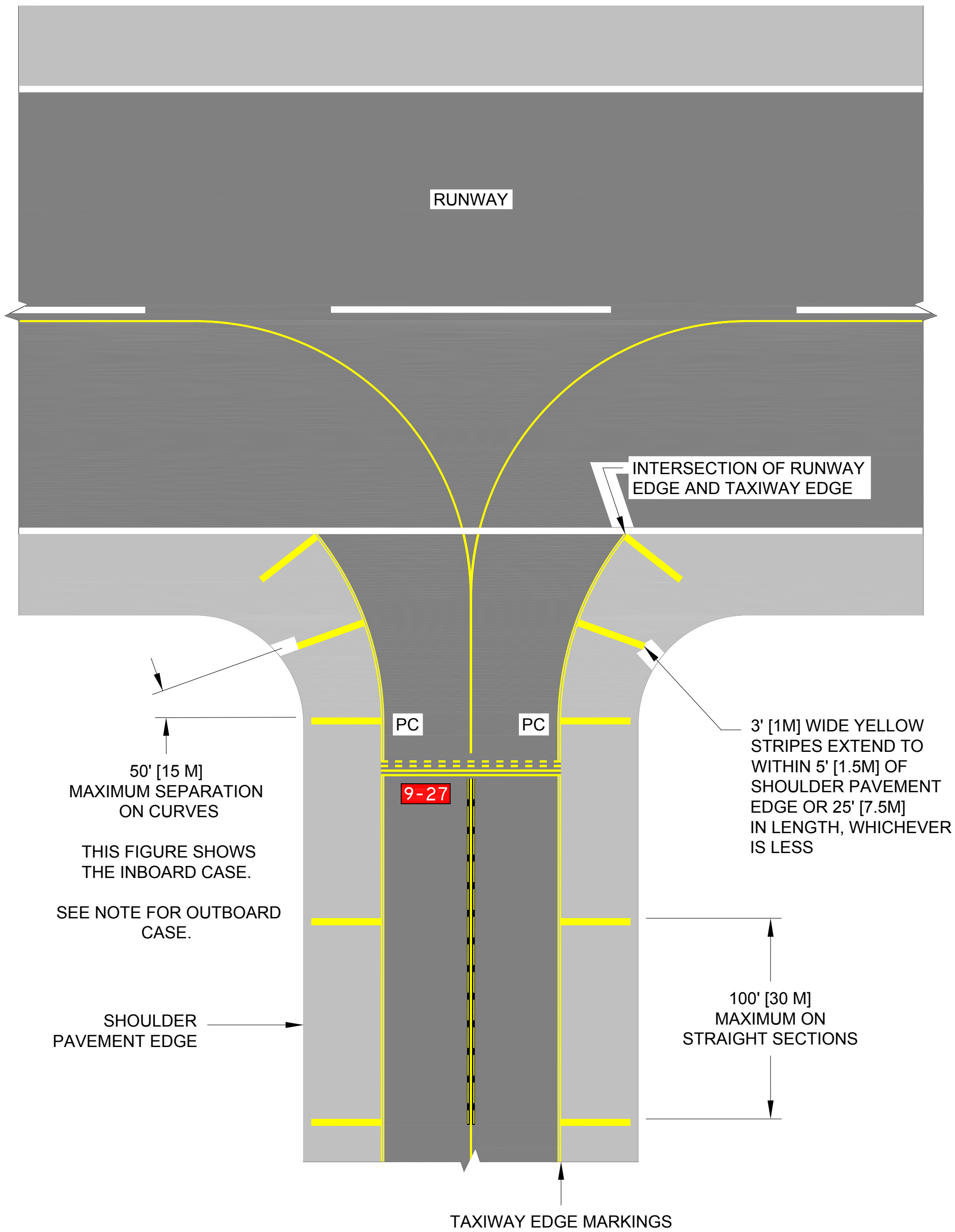
Shoulder		
Definition: An area adjacent to the defined edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft and emergency vehicles deviating from the full-strength pavement; enhanced drainage; and/or blast protection.		
Feature Group	Airfield	
Feature Class Name	SHOULDER	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	Runway Taxiway
	FGDC	Shoulder
	SDSFIE	PavementBranch
	DO-272	Runway Shoulder Taxiway Shoulder
Related Features	APRON	
	RUNWAY	
	RUNWAYELEMENT	

Shoulder	
	RUNWAY INTERSECTION
	TAXIWAY ELEMENT

Data Capture Rule

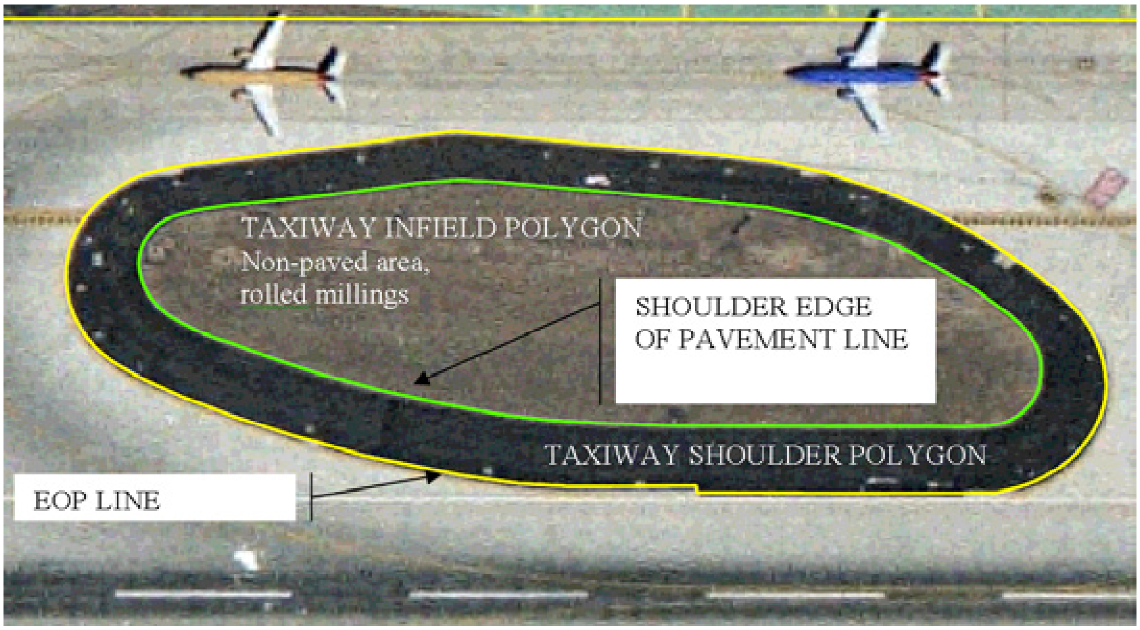
Collect non-intersecting **shoulders** as individual polygons. Collect intersecting shoulders as multiple polygons when intersected by taxiways, intersecting runways, or stopway/clearway. See Figure 5-47 and Figure 5-48.

Figure 5-47. Shoulders.



Shoulder

Figure 5-48. Taxiway Shoulder Polygon.



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
AIRPLANEDESIGNGROUPCODE *VARCHAR2(5)*	A code from **CodeDesignGroup** defining a classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
RESTRICTEDINDICATOR *VARCHAR2(1)*	An indicator identifying if the shoulder segment the feature instance depicts has a restriction to its use.
SHOULDERDESIGNATIONREFERENCE *VARCHAR2(7)*	Identify the runway or taxiway designation the shoulder is associated with.
SHOULDERLENGTH *NUMBER*	The length of the shoulder segment the feature instance is depicting.
SHOULDERRESTRICTION *VARCHAR2(255)*	A free text field providing the user to identify any restrictions for use of the shoulder segment feature instance being depicted.

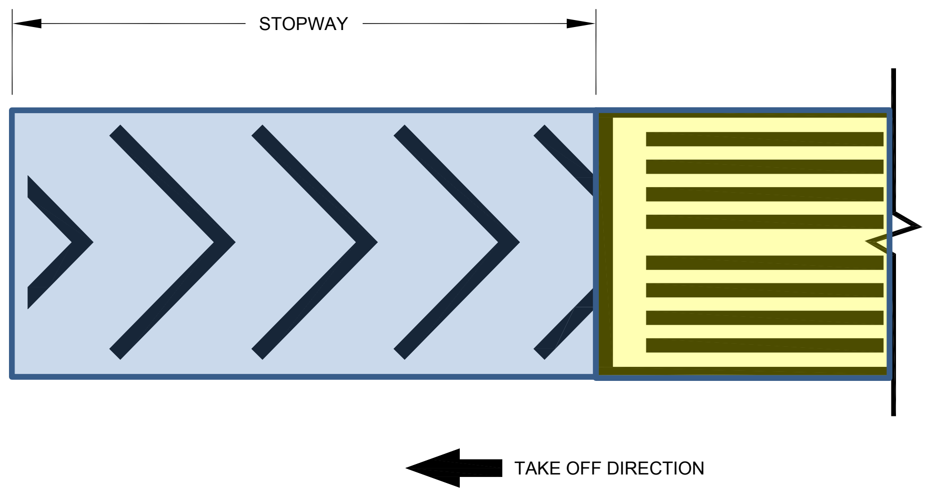
Shoulder	
SHOULDERTYPECODE *VARCHAR2(1)*	A code from **CodeShoulderType** identifying the type of shoulder the feature instance depicts.
SHOULDERWIDTH *NUMBER*	The width of the shoulder segment the feature instance is depicting.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the shoulder.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the shoulder pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
TAXIWAYDESIGNGROUPCODE *NUMBER*	A code from **CodeTaxiwayDesignGroup** group identifying a classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear Distance (CMG).

5.2.28 Stopway.

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, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff. A blast pad is not a stopway. [Source: FAA Pilot Controller Glossary and AC 150/5300-13]		
Feature Group	Airfield	
Feature Class Name	STOPWAY	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	RunwayProtectAreaType
	FGDC	Stopway
	SDSFIE	PavementBranch
	DO-272	Stopway
Related Features	RUNWAY	
	RUNWAY DIRECTION	
	RUNWAY DECLARED DISTANCE	
	RUNWAY ELEMENT	

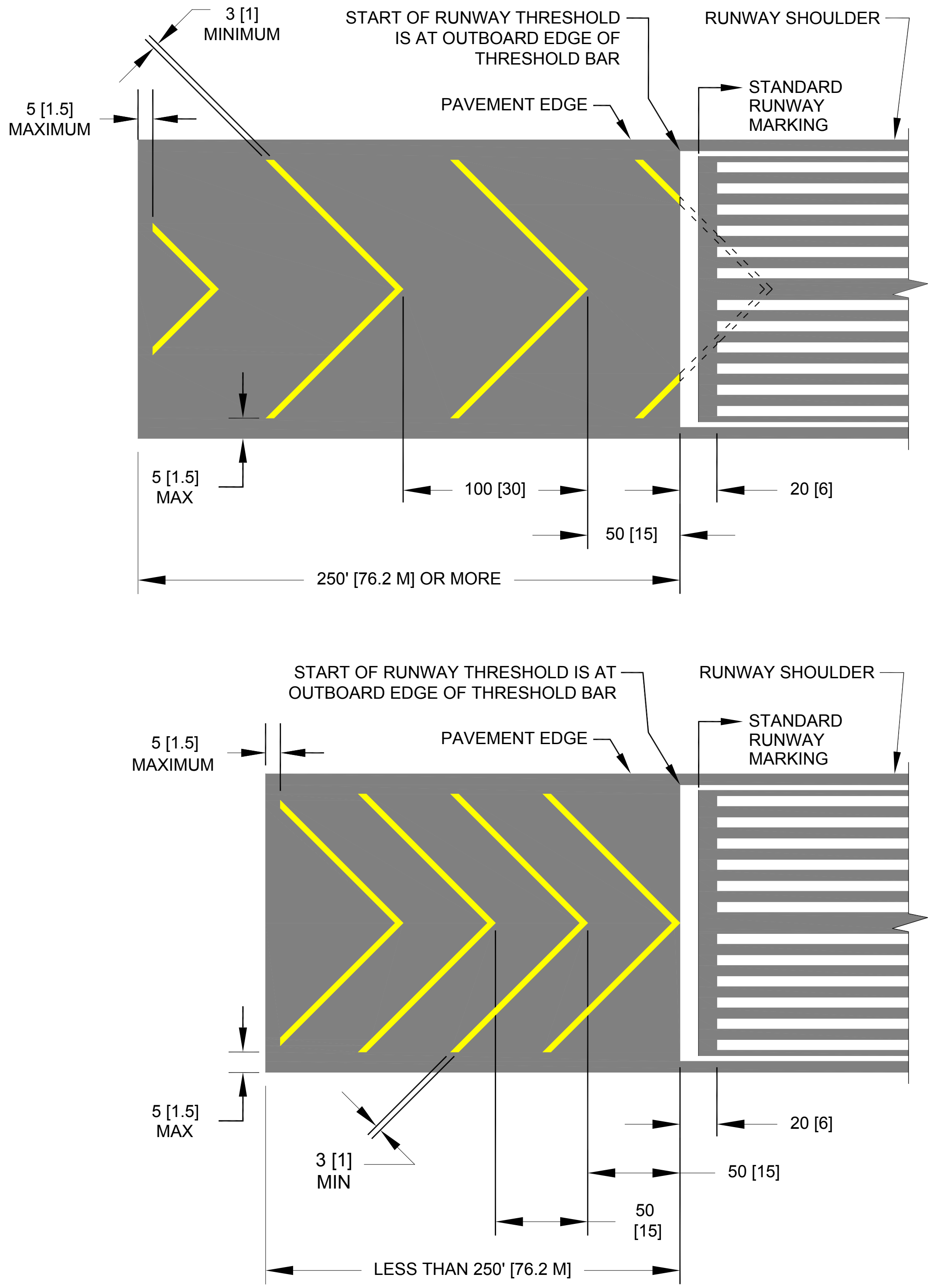
Data Capture Rule

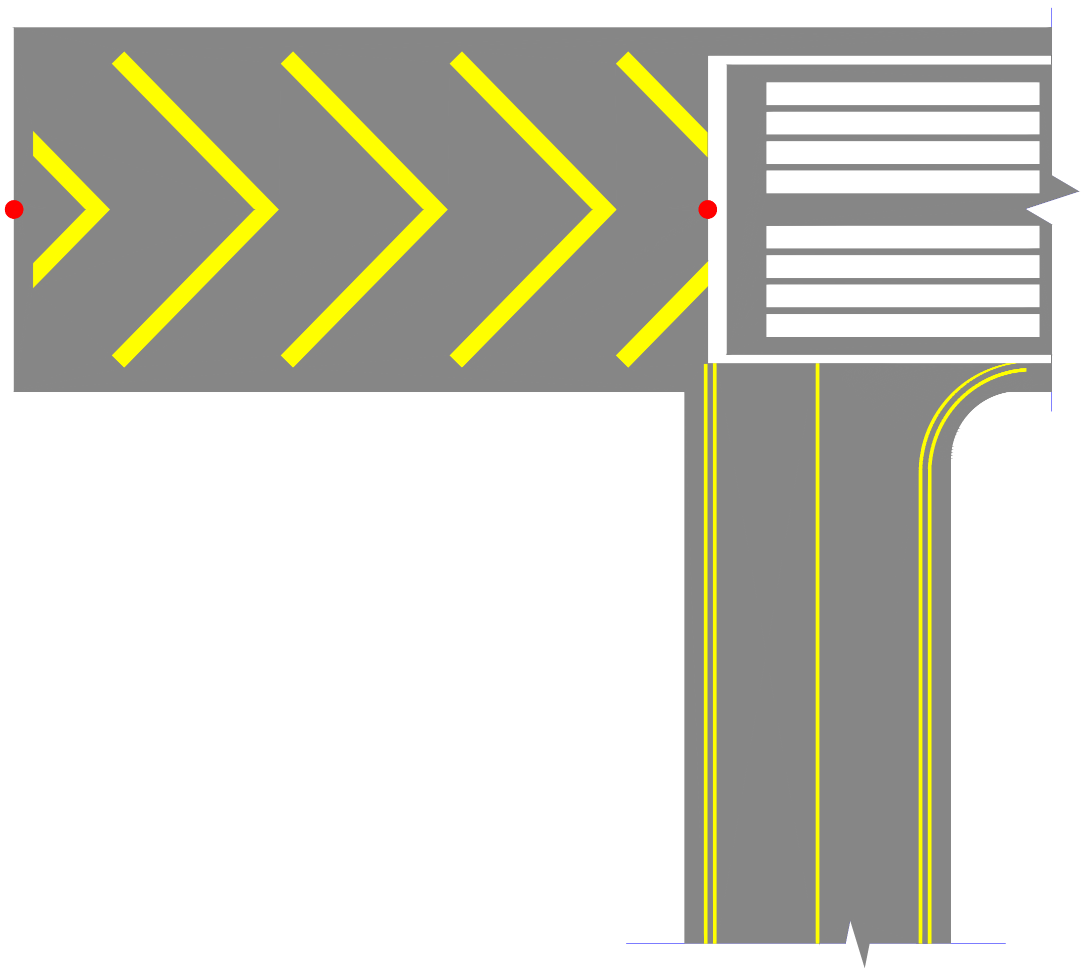
Collect a **stopway** as a closed polygon encompassing the entire area designated as stopway and connect it to the associated runway by means of a shared edge (Figure 5-49). Stopways do not have shoulders and can be wider than the associated runway. Additionally, be sure to profile the stopway using the appropriate stationing for the airport. Ensure you identify, monument, and document the end of the stopway furthest from the runway end. Pay special attention to the guidance on Runway End, Stopway End, and Displaced Threshold identification for the proper location of a stopway. See AC 150/5300-13, *Airport Design*, for additional information.

Stopway
Figure 5-49. The Blue Polygon Illustrates how to Capture the Stopway. The Yellow Polygon is the Runway Polygon. They Share a Common Edge Ensuring They Meet the Data Geometric Constraint Rules. 
• If the Stopway is concrete, the end (furthest from the runway end) is generally the limit of construction. Supporting features include the stopway chevrons. Remember, a stopway must be as wide as a runway but may be wider. See Figure 5-50. • If the stopway is a paved, non-asphalt/concrete stopway, the end (furthest from the runway end) is the limit of construction or a trim line at first good pavement. • If the stopway is unpaved, determine a trim line at an apparent stopway surface end. • Stopway ends must be on the runway centerline extended.

Stopway

Figure 5-50. Shows the Criteria for Properly Marking a Stopway.



Stopway
• Monumentation: After determining the location of the runway end, identify and mark the stopway end position 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. See Figure 5-51.
Figure 5-51. Illustrates the Stopway Start and Ends. 
• Documentation: Provide documentation supporting the selection of the stopway end (furthest from the runway end) through the Airports GIS web site. ○ Digital Photographs: Provide four digital photographs each from a different perspective. ▪ Photograph One – take this photograph from eye level (Figure 5-52) looking down at the selected runway end monument or mark. Frame the photograph to depict an area of approximately three feet (one meter) around the mark.

Stopway
Figure 5-52. Photograph Type 1 (Eye Level). 
▪ Photograph Two – taken from a point approximately 100 feet from the end of the runway with a tripod located over the mark. This photograph should look out into the approach for the runway end. The arrow in Figure 5-53 indicates the location of the tripod over the mark. Adding the arrow to the photograph is optional.
Figure 5-53. Photograph Type 2. 

Stopway

- Photograph Three - Photo taken from the side of the runway looking across the end of the runway (Figure 5-54), with a tripod or arrow indicating the runway end. If you are using supporting features to identify the runway end, be sure to include them in the photograph, such as the runway end lights in this photograph.

Figure 5-54. Photograph Type 3.

- Photograph Four – provides a close-up view of the runway end mark or monument (Figure 5-55). Take this photograph from above the monument or mark clearly showing the details of the monument or mark; in this case the nail, washer and washer inscription.

Figure 5-55. Close-up View of the Nail and Washer, Properly Inscribed.

Stopway	
Survey Accuracies	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of feet
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.01)
Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** indicating the type of marking used to identify the land and hold short line.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
PROTECTIONAREALENGTH *NUMBER*	The overall length of the stopway.
PROTECTIONAREAWIDTH *NUMBER*	The edge to edge width of the stopway surface.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the stopway pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.

5.2.29 Taxiway Element.

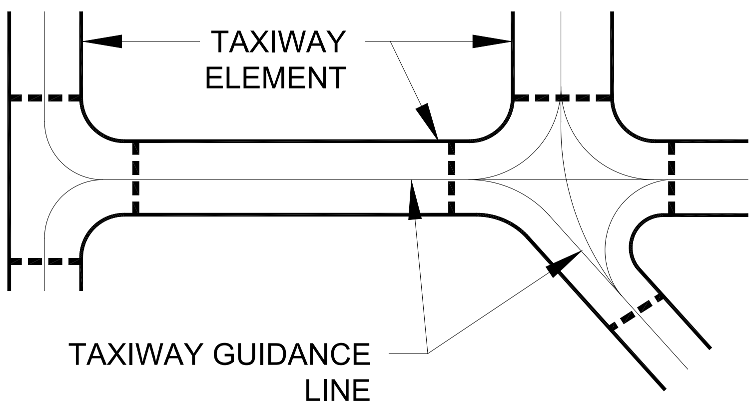
Taxiway Element		
Definition: A segment of a taxiway defining the paths for taxiing of aircraft from one part of an airport to another.		
Feature Group	Airfield	
Feature Class Name	TAXIWAYELEMENT	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	TaxiwayElement
	FGDC	TaxiwayElement
	SDSFIE	PavementBranch
	DO-272	Taxiway Element

Taxiway Element	
Related Features	AIRFIELD
	APRON
	DEICING AREA
	MARKING AREA
	MARKING LINE
	RUNWAY
	RUNWAY ELEMENT

Data Capture Rule

Collect all **taxiway elements** (Figure 5-56) 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 overlapping polygon rule.

Figure 5-56. Taxiway Element.



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest Foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name *Datatype*	**Description**
AIRCRAFTCLASSIFICATIONNUMBER VARCHAR2(12)	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
DIRECTIONALITYCODE *VARCHAR2(2)*	A code from **CodeDirectionality** defining the directionality usage of the taxiway.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being

Taxiway Element	
	classified by the feature.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the aircraft gate stands pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
TAXIWAYDESIGNATOR *VARCHAR2(3)*	The taxiway designator the taxiway feature instance of taxiway element is describing.
TAXIWAYDESIGNGROUPCODE *NUMBER*	A code from **CodeTaxiwayDesignGroup** identifying a classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear Distance (CMG).
TAXIWAYELEMENTLENGTH *NUMBER*	The length of the taxiway element the feature instance is describing.
TAXIWAYELEMENTMAXIMUMSPEED *NUMBER*	Identifies the maximum speed allowed for the taxiway element the feature instance is describing.
TAXIWAYRESTRICTION *VARCHAR2(255)*	Text describing any restrictions to the use of the taxiway.
TAXIWAYELEMENTWIDTH *NUMBER*	The width of the taxiway element the feature instance is describing.
TAXIWAYTYPECODE *VARCHAR2(18)*	A code from **CodeTaxiwayType** identifying the type of taxiway the feature instance of taxiway element is describing.

5.2.30 Taxiway Holding Position.

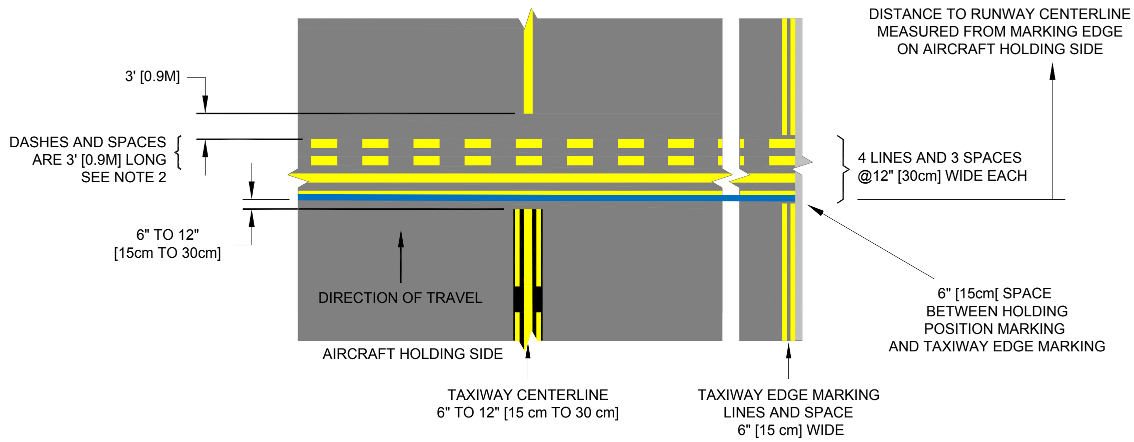
Taxiway Holding Position		
Definition: A designated position at which taxiing aircraft and vehicles will stop and hold position, unless otherwise authorized by the airport control tower. [Source DO-272]		
Feature Group	Airfield	
Feature Class Name	TAXIWAYHOLDINGPOSITION	
Feature Type	Line	
Equivalent Standards	**AIXM**	TaxiwayMarking
	FGDC	TaxiwayHoldingPosition
	SDSFIE	None
	DO-272	Taxiway Holding Position
Related Features	AIRFIELD LIGHT	
	AIRPORT SIGN	
	APRON	
	MARKING AREA	
	MARKING LINE	
	TAXIWAY ELEMENT	

Taxiway Holding Position

Data Capture Rule

Capture the **taxiway holding position** marking as a single line at the back edge of the second line on the holding side of the marking (Figure 5-57). The holding side is the side with the two solid lines. See AC 150/5340-1 for additional information.

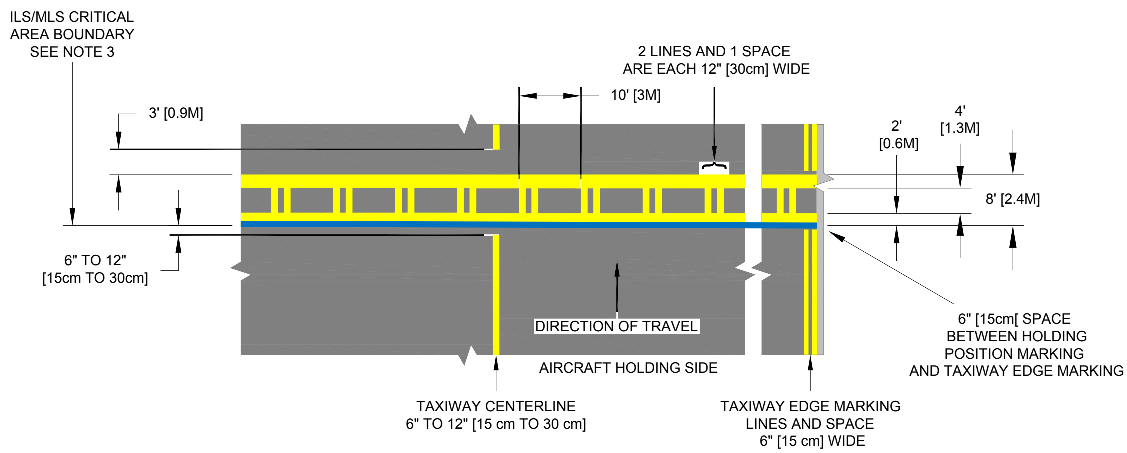
Figure 5-57. The Blue Line in this Figure Illustrates the Proper Location for Collecting the Holding Position Marking.



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

Collect taxiway holding position line as a line at the outer edge of the painted marking (stop bar) farthest away from the corresponding runway. See Figure 5-58.

Figure 5-58. Uses a Blue Line Extracted at the Outer Edge of the ILS/MLS holding Marking to Illustrate the Proper Collection Method.



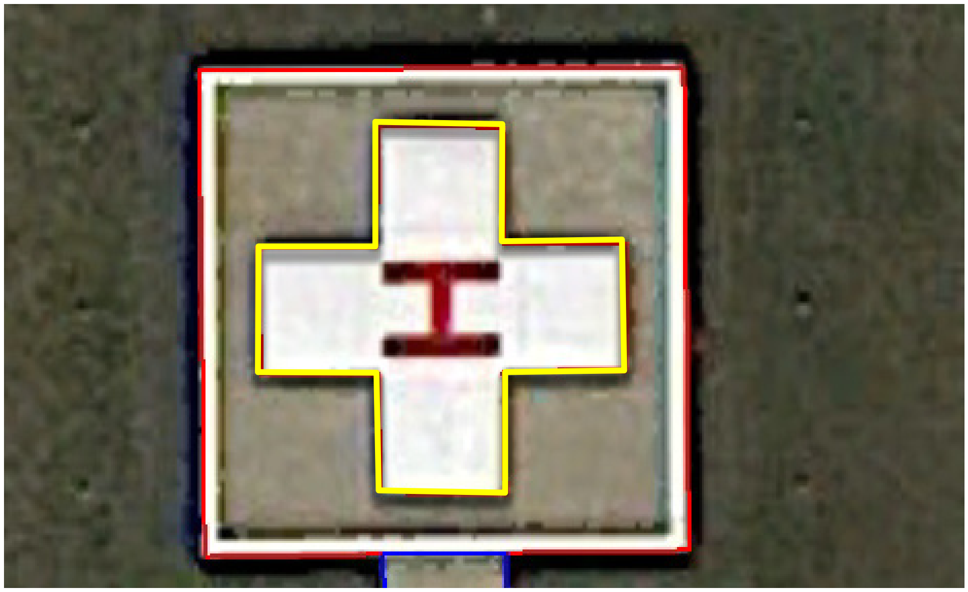
Taxiway Holding Position	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
LOWVISIBILITYCATEGORYCODE *NUMBER*	A code from **CodeLowVisibilityCategory** designating the low visibility operation category for the taxiway holding position.
RUNWAYDESIGNATORIDENTIFIER *VARCHAR2(7)*	The designator of the runway the holding position is protecting.
TAXIWAYDESIGNATOR *VARCHAR2(4)*	Designation of the taxiway.

5.2.31 Touchdown Liftoff Area.

Touchdown Liftoff Area		
Definition: A load-bearing, generally paved area, normally centered in the FATO, on which the helicopter lands and/or takes off. [Source AC 150/5390-2]		
Feature Group	Airfield	
Feature Class Name	TOUCHDOWNLIFTOFFAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	TouchdownLiftOff
	FGDC	None
	SDSFIE	TouchdownLiftOff
	DO-272	Touchdown Lift Off Areas
Related Features	AIRFIELD LIGHT	
	AIRPORT SIGN	
	APRON	
	FINALAPPROACHTAKEOFFAREA	
	MARKING AREA	
	MARKING LINE	
	POSITION	
	TAXIWAY	
Data Capture Rule Collect a closed polygon at the outer edge of the white paint stripes of the **TLOF** (Figure 5-59). 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.		

Touchdown Liftoff Area	

Figure 5-59. The Red Square Illustrates Capturing the TLOF of a Ground Level Helipad.



Survey Accuracies	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.
DESIGNHELICOPTERDESCRIPTIONTEXT *VARCHAR2(20)*	A single or composite helicopter that reflects the maximum weight, maximum contact load/minimum contact area, overall length (D), rotor diameter (RD), tail rotor arc radius, undercarriage dimensions, and pilot's eye height of all helicopters expected to operate at the heliport.
LIGHTCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** defined by the Federal Aviation Administration (FAA) to identify a color used in aviation.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations.

Touchdown Liftoff Area	
SURFACECOMPOSITIONCODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the TLOF.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the TLOF pavement serviceability.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
TLOFDESIGNATORIDENTIFER *VARCHAR2(20)*	Designation of the TLOF when a heliport has multiple TLOF's available. If there is only a single TLOF is must be designated H1.
TLOFELEVATEDINDICATOR *VARCHAR2(1)*	A code from **CodeElevated** indicating if the TLOF is elevated or at ground level.
TLOFELONGATED *VARCHAR2(1)*	An indicator designating if the TLOF is elongated.
TLOFGRADIENT *NUMBER*	The gradient of the TLOF as a percentage.
TLOFHEIGHT *NUMBER*	A value indicating the height of an elevated TLOF above the ground in inches.
TLOFLENGTH *NUMBER*	The length of the TLOF in feet. If the TLOF is circular, provide the length as a diameter value in feet.
TLOFMARKED *VARCHAR2(1)*	An indicator designating if the TLOF is marked.
TLOFPERIMETERLIGHTS *VARCHAR2(1)*	An indicator if the TLOF has perimeter lighting
TLOFSAFETYNETHEIGHT *NUMBER*	The height of the safety net above the ground in inches.
TLOFSAFETYNETINDICATOR *VARCHAR2(1)*	An indicator designating if an elevated TLOF has appropriate safety netting installed.
TLOFSAFETYNETWIDTH *NUMBER*	The width the TLOF safety net extends from the edge of the TLOF.
TLOFWIDTH *NUMBER*	The width of the TLOF in feet. If the TLOF is circular, this attribute is not used and the diameter is listed in the TLOF Length attribute.

5.3 Group: AIRSPACE.

5.3.1 Landmark Area.

<table>
<tr><th colspan="3">Landmark Area</th></tr>
<tr><td colspan="3">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 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. Natural Water Body (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. Generally, these are places of public assembly or serving a public purpose such as churches, schools, libraries, government offices et cetera.
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="2">Airspace</td></tr>
<tr><td>Feature Class Name</td><td colspan="2">LANDMARKAREA</td></tr>
<tr><td>Feature Type</td><td colspan="2">Polygon</td></tr>
<tr><td rowspan="4">Equivalent Standards</td><td>AIXM</td><td>VerticalStructure</td></tr>
<tr><td>FGDC</td><td>LandmarkSegment</td></tr>
<tr><td>SDSFIE</td><td>None</td></tr>
<tr><td>DO-272</td><td>Vertical Structure</td></tr>
<tr><td rowspan="8">Related Features</td><td colspan="2">OBJECT AREA</td></tr>
<tr><td colspan="2">OBJECT LINE</td></tr>
<tr><td colspan="2">OBJECT POINT</td></tr>
<tr><td colspan="2">ROAD POINT</td></tr>
<tr><td colspan="2">ROAD CENTERLINE</td></tr>
<tr><td colspan="2">ROAD SEGMENT</td></tr>
<tr><td colspan="2">STRUCTURE POLYGON</td></tr>
<tr><td colspan="2">STRUCTURE POINT</td></tr>
<tr><td colspan="3">Data Capture Rule
Capture features providing geographic orientation near the airport vicinity modeled using a polygon at their greatest horizontal extent (Figure 5-60). The features may or may not have obstruction value. Collect physical objects 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.
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.</td></tr>
</table>

Landmark Area
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.

Figure 5-60. Depicts the Landmark Segment Features being Extracted from Imagery.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
LANDMARKAREANAME *VARCHAR2(50)*	A name for the landmark feature instance is describing.
LANDMARKTYPECODE *VARCHAR2(20)*	A code from **CodeLandmarkType** identifying the type of landmark the feature instance is describing.

5.3.2 Landmark Line.

<table>
<tr><th colspan="3">Landmark Line</th></tr>
<tr><td colspan="3">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 objects. These features include, but are not limited to, the following:
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.
Natural Water Body (i.e., coastlines, lakes, rivers, etc.) of landmark value that aid in geographic orientation.
Utility lines (i.e., transmission lines), levees, fence lines, or other linear features having obstruction or landmark value.
Buildings or other features of landmark value that aid in geographic orientation. Generally, these are places of public assembly or serving a public purpose such as churches, schools, libraries, government offices et cetera.
Runways with specially prepared hard surfaces that are not located on the airport being surveyed, but fall within the survey limits.
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="2">Airspace</td></tr>
<tr><td>Feature Class Name</td><td colspan="2">LANDMARKLINE</td></tr>
<tr><td>Feature Type</td><td colspan="2">Line</td></tr>
<tr><td rowspan="4">Equivalent Standards</td><td>AIXM</td><td>VerticalStructure</td></tr>
<tr><td>FGDC</td><td>LandmarkSegment</td></tr>
<tr><td>SDSFIE</td><td>None</td></tr>
<tr><td>DO-272</td><td>Vertical Structure
Water</td></tr>
<tr><td rowspan="8">Related Features</td><td colspan="2">OBJECT AREA</td></tr>
<tr><td colspan="2">OBJECT LINE</td></tr>
<tr><td colspan="2">OBJECT POINT</td></tr>
<tr><td colspan="2">ROAD POINT</td></tr>
<tr><td colspan="2">ROAD CENTERLINE</td></tr>
<tr><td colspan="2">ROAD SEGMENT</td></tr>
<tr><td colspan="2">STRUCTURE POLYGON</td></tr>
<tr><td colspan="2">STRUCTURE POINT</td></tr>
<tr><td colspan="3">Data Capture Rule
Collect features of landmark value modeled as a line, such as the roads intersecting and crossing the airport airspace analysis surfaces.

The features may or may not have obstruction value. Collect physical objects of landmark value aiding in geographic orientation as individual polyline objects. These features include, but are not limited to, the following:
A selection of roads (i.e., major highways, primary roads, etc.) and railroads, especially in the airport vicinity.
Natural Water Body (i.e., coastlines, lakes, rivers, etc.) of landmark value that aid in geographic orientation.
Utility lines (i.e., transmission lines), levees, fence lines, or other linear features having obstruction or landmark value.
Buildings or other features of landmark value that aid in geographic orientation.</td></tr>
</table>

Landmark Line	
• Runways with specially prepared hard surfaces that are not located on the airport being surveyed, but fall within the survey limits. • Closed runways if they are sufficiently prominent to be of value to a pilot in airport identification.	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name ***Datatype***	**Description**
LANDMARKLINENAME *VARCHAR2(50)*	A name for the landmark feature instance described.
LANDMARKTYPECODE *VARCHAR2(20)*	A code from **CodeLandmarkType** identifying the type of landmark the feature instance is describing.

5.3.3 Landmark Point.

Landmark Point		
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 objects. These features include, but are not limited to, the following: • 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. • Natural Water Body (i.e., coastlines, lakes, rivers, etc.) of landmark value that aid in geographic orientation. • Utility lines (i.e., transmission lines), levees, fence lines, or other linear features having obstruction or landmark value. • Buildings or other features of landmark value that aid in geographic orientation. Generally, these are places of public assembly or serving a public purpose such as churches, schools, libraries, government offices et cetera. • Runways with specially prepared hard surfaces that are not located on the airport being surveyed, but fall within the survey limits. • Closed runways if they are sufficiently prominent to be of value to a pilot in airport identification.		
Feature Group	Airspace	
Feature Class Name	LANDMARKPOINT	
Feature Type	Point	
Effective Start Date	Provide the date the data becomes effective.	
Effective End Date	Provide the date the data ceases to be effective.	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	LandmarkSegment
	SDSFIE	None
	DO-272	Vertical Structure Water

Landmark Point	
Related Features	OBJECT AREA OBJECT LINE OBJECT POINT ROAD POINT ROAD CENTERLINE ROAD SEGMENT STRUCTURE POLYGON STRUCTURE POINT

Data Capture Rule

Capture features best modeled with as a point type feature.

The features may or may not have obstruction value. Collect physical objects of landmark value aiding in geographic orientation as individual polyline objects. These features include, but are not limited to, the following:

- A selection of roads (i.e., major highways, primary roads, etc.) and railroads, especially in the airport vicinity.
- Shoreline (i.e., coastlines, lakes, rivers, etc.) of landmark value that aid in geographic orientation.
- Utility lines (i.e., transmission lines), levees, fence lines, or other linear features having obstruction or landmark value.
- Buildings or other features of landmark value that aid in geographic orientation.
- Runways with specially prepared hard surfaces that are not located on the airport being surveyed, but fall within the survey limits.
- Closed runways if they are sufficiently prominent to be of value to a pilot in airport identification.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
LANDMARKPOINTNAME *VARCHAR2(50)*	A name for the landmark feature instance described.
LANDMARKTYPECODE *VARCHAR2(20)*	A code from **CodeLandmarkType** identifying the type of landmark the feature instance is describing.

5.3.4 Object Area.

Object Area		
Definition: Objects include, but are not limited to, above ground structures, navigational aids, equipment, vehicles, natural growth, terrain, and parked or taxiing aircraft defined as an area (polygon).		
Feature Group	Airspace	
Feature Class Name	OBJECTAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	VerticalStructure

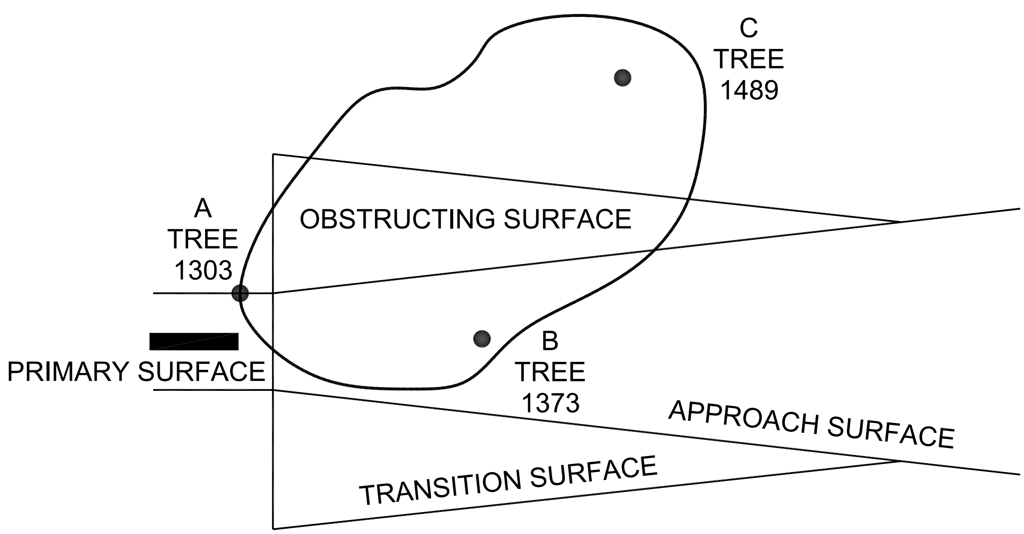
Object Area		
	FGDC	Obstacle
	SDSFIE	None
	DO-272	Vertical Structure
Related Features	OBJECTLINE	
	OBJECT POINT	
	OBJECT IDENTIFICATION SURFACE	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY HELIPAD DESIGN SURFACE	

Data Capture Rule

Use the **Object Area** feature type to model features penetrating an OIS or 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 5-61). Establish the grid beginning at the runway end using the appropriate spacing until reaching the **Object Area**. Within 10,200 feet of the runway threshold, use a 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 5-61). 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.

Figure 5-61. Object Area.



Object Area	
Survey Accuracies – Object Area	
Runway Supporting Vertically Guided Operations	
Vertically Guided Runway Primary Surface (VGRPS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area	
Runway Supporting Vertically Guided Operations	
Vertically Guided Primary Connection Surface (VGPCS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area	
Runway Supporting Vertically Guided Operations	
Vertically Guided Protection Surface (VGPS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area	
Runway Supporting Vertically Guided Operations	
Vertically Guided Approach Surface (VGAS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area	
Runway Supporting Vertically Guided Operations	
Vertically Guided Approach Transitional Surface (VGATS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Object Area	
Survey Accuracies – Object Area *Runway Supporting Vertically Guided Operations* **Vertically Guided Horizontal Surface (VGHS)**	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area *Runway Supporting Vertically Guided Operations* **Vertically Guided Conical Surface (VGCS)**	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area *Runway Supporting Non-vertically Guided Operations* **Non-vertically Guided Primary Surface (NVGPS)**	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area *Runway Supporting Non-vertically Guided Operations* **Non-vertically Guided Approach Surface (NVGAS)**	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Area *Runway Supporting Non-vertically Guided Operations* **Non-vertically Guided Transitional Surface (NVGTS)**	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Object Area	
Survey Accuracies – Object Area	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Horizontal Surface (NVGHS)	
Horizontal Accuracy	± 50.00 ft
Vertical Accuracy (Ellipsoid)	± 20.00 ft
Vertical Accuracy (Orthometric)	± 20.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five tenths of an arc second (± 0.50)

Attribute Name ***Datatype***	**Description**
ABOVEGROUNDLEVEL *NUMBER*	The height of an object above the surface of the ground at the base of the object.
DIRECTIONLOCATIONCODE *VARCHAR2(9)*	A code from **CodeDirectionLocation** identifying the direction, referenced to true north, the object is located from the perpendicular point on runway centerline or runway centerline extended.
DISTANCEFROMTHRESHOLDTOOBJECT *NUMBER*	The distance along the runway centerline or centerline extended from the threshold (or displaced threshold) to a point perpendicular to the object on centerline.
DISTANCERUNWAYCENTERLINETOOBJECT *NUMBER*	The perpendicular distance from the runway centerline or centerline extended to the object.
FAACOORDINATIONREVIEWINDICATOR *VARCHAR2(1)*	An indicator identifying the object was previously studied by the FAA.
FRANGIBLITYINDICATOR *VARCHAR2(1)*	An indicator identifying if the object meets the frangibility requirements of AC 150/5220-23, *Frangible Connections*.
HEIGHTABOVEAIRPORTVALUE *NUMBER*	A value expressing the height of the top of the object above the defined airport elevation.
HEIGHTABOVEELLIPSOIDVALUE *NUMBER*	The height of the object above the reference ellipsoid along the outer normal at the top of the object.
HEIGHTABOVERUNWAYENDVALUE *NUMBER*	A value expressing the height of the top of the object above the runway elevation. This attribute is only required for objects within a defined approach surface.
HEIGHTABOVETDZEVALUE *NUMBER*	A value expressing the height of the top of the object above the reference runway touchdown zone elevation (TDZE). This attribute is only required for objects within a defined approach surface.
MARKINGFEATURETYPECODE *VARCHAR2(18)*	A code from **CodeMarkingFeatureType** identifying the type of marking used on the object.

Object Area	
OBJECTAERONAUTICALSTUDYNUMBER *VARCHAR2(15)*	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.
OBJECTDISPOSITIONCODE *VARCHAR2(17)*	A code from **CodeDisposition** identifying the actual or planned disposition of an object the feature instance depicts.
OBJECTGROUPCODE *VARCHAR2(5)*	A code from **CodeObjectGroup** identifying if an object is a single object or part of a group of objects.
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying the object is lit according to AC 70/7460-1, *Obstruction Marking and Lighting,* standards.
OBJECTLIGHTINGTYPE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstacle lighting**.**
OBJECTMARKEDINDICATOR *VARCHAR2(1)*	An indicator identifying the object is marked according to AC 70/7460-1 standards.
OBJECTSOURCECODE *VARCHAR2(3)*	A code from **CodeObjectSource** identifying the source used in defining the object the feature instance describes.
OBJECTTYPECODE *VARCHAR2(25)*	A code from **CodeObjectType** identifying the type of object the feature instance depicts.
OBJECTUSECODE *NUMBER*	A code from **CodeLandUseType** describing the primary use of the object.
OISPENETRATIONVALUE1 *NUMBER*	The amount the object penetrates OISSURFACETYPE1.
OISPENETRATIONVALUE2 *NUMBER*	The amount the object penetrates OISSURFACETYPE2.
OISPENETRATIONVALUE3 *NUMBER*	The amount the object penetrates OISSURFACETYPE3.
OISPENETRATIONVALUE4 *NUMBER*	The amount the object penetrates OISSURFACETYPE4.
OISPENETRATIONVALUE5 *NUMBER*	The amount the object penetrates OISSURFACETYPE5.
OISPENETRATIONVALUE6 *NUMBER*	The amount the object penetrates OISSURFACETYPE6.

Object Area	
OISSURFACECONDITIONCODE *VARCHAR2(13)*	A code from **CodeOisSurfaceCondition** identifying if the object penetrates a single or multiple surfaces.
OISSURFACETYPECODE1 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE2 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE3 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE4 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE5 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE6 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways. This attribute is only required for objects within a defined approach surface.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading. This attribute is only required for objects within a defined approach surface.

5.3.5 Object Identification Surface.

Object Identification Surface		
Definition: An evaluation surface used to define representative objects with the potential to affect airport operations or instrument flight procedures.		
Feature Group	Airspace	
Feature Class Name	OBJECTIDENTIFICATIONSURFACE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	ObstacleAssessmentArea
	FGDC	ObstructionIdentificationSurface
	SDSFIE	AirfieldImaginarySurface
	DO-272	None
Related Features	OBJECT AREA	
	OBJECT LINE	
	OBJECT POINT	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY HELIPAD DESIGN SURFACE	
Data Capture Rule Provide the **object identification surface** being represented as defined by the appropriate standard, AC 150/5300-18, TERPS, 14 CFR part 77, or AC 150/5300-13.		

Object Identification Surface	
Survey Accuracies	
Horizontal Accuracy	Not Applicable
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	Not Applicable
Distance and Elevation Resolution	Not Applicable
Geographic Coordinate Resolution	Not Applicable
Attribute Name ***Datatype***	**Description**
APPROACHGUIDANCECODE *VARCHAR2(22)*	A code from **CodeApproachGuidance** defining the type of approach guidance the surface supports.
LANDINGSTRIPDESIGNATORIDENTIFIER *VARCHAR2(7)*	Specify runway designator for primary, transitional, horizontal, and conical type surfaces (i.e., 07/25).
OISSURFACETYPECODE *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying the surface the feature instance describes.
PRIMARYSLOPEVALUE *NUMBER*	The primary slope ratio of the surface the feature instance is describing.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways. Provide this information when the feature instance describes approach or departure type surfaces.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading. Provide this information when the feature instance describes approach or departure type surfaces.
SECONDARYSLOPEVALUE *NUMBER*	The secondary slope value of the surface the features instance is describing.

5.3.6 Object Line.

Object Line		
Definition: Includes but is not limited to, above ground structures, navigational aids, equipment, vehicles, natural growth, terrain, and parked or taxiing aircraft defined using a line.		
Feature Group	Airspace	
Feature Class Name	OBJECTLINE	
Feature Type	Line	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	Obstacle
	SDSFIE	None
	DO-272	Vertical Structure
Related Features	OBJECT AREA	
	OBJECT POINT	
	OBJECT IDENTIFICATION SURFACE	
	RUNWAY	

Object Line	
	RUNWAY ELEMENT
	RUNWAY HELIPAD DESIGN SURFACE

Data Capture Rule

Capture objects penetrating a surface or meeting the criteria as a representative object best modeled using a **line**.

Survey Accuracies – Object Line

Runway Supporting Vertically Guided Operations

Vertically Guided Runway Primary Surface (VGRPS)

Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Survey Accuracies – Object Line

Runway Supporting Vertically Guided Operations

Vertically Guided Primary Connection Surface (VGPCS)

Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Survey Accuracies – Object Line

Runway Supporting Vertically Guided Operations

Vertically Guided Protection Surface (VGPS)

Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Survey Accuracies – Object Line

Runway Supporting Vertically Guided Operations

Vertically Guided Approach Surface (VGAS)

Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Object Line	
Survey Accuracies – Object Line	
Runway Supporting Vertically Guided Operations	
Vertically Guided Approach Transitional Surface (VGATS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Line	
Runway Supporting Vertically Guided Operations	
Vertically Guided Horizontal Surface (VGHS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Line	
Runway Supporting Vertically Guided Operations	
Vertically Guided Conical Surface (VGCS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Line	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Primary Surface (NVGPS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Line	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Approach Surface (NVGAS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Object Line	
Survey Accuracies – Object Line	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Transitional Surface (NVGTS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Line	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Horizontal Surface (NVGHS)	
Horizontal Accuracy	± 50.00 ft
Vertical Accuracy (Ellipsoid)	± 20.00 ft
Vertical Accuracy (Orthometric)	± 20.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five tenths of an arc second (± 0.50)

Attribute Name *Datatype*	**Description**
ABOVEGROUNDLEVEL *NUMBER*	The height of an object above the surface of the ground at the base of the object.
DIRECTIONLOCATIONCODE *VARCHAR2(9)*	A code from **CodeDirectionLocation** identifying the direction referenced to true north the object is located from the perpendicular point on centerline or centerline extended.
DISTANCEFROMTHRESHOLDTOOBJECT *NUMBER*	The distance along the runway centerline or centerline extended from the threshold (or displaced threshold) to a point perpendicular to the object on centerline.
DISTANCERUNWAYCENTERLINETOOBJECT *NUMBER*	The perpendicular distance from the runway centerline or centerline extended to the object.
FAACOORDINATIONREVIEWINDICATOR *VARCHAR2(1)*	An indicator identifying the object was previously studied by the FAA.
FRANGIBLITYINDICATOR *VARCHAR2(1)*	An indicator identifying if the object meets the frangibility requirements of AC 150/5220-23.
HEIGHTABOVEAIRPORTVALUE *NUMBER*	A value expressing the height of the top of the object above the defined airport elevation.
HEIGHTABOVEELLIPSOIDVALUE *NUMBER*	The height of the object above the reference ellipsoid along the outer normal at the top of the object.
HEIGHTABOVERUNWAYENDVALUE *NUMBER*	A value expressing the height of the top of the object above the runway elevation. This

Object Line	
	attribute is only required for objects within a defined approach surface.
HEIGHTABOVETDZEVALUE *NUMBER*	A value expressing the height of the top of the object above the reference runway touchdown zone elevation (TDZE). This attribute is only required for objects within a defined approach surface.
MARKINGFEATURETYPECODE *VARCHAR2(18)*	A code from **CodeMarkingFeatureType** identifying the type of marking used on the object.
OBJECTAERONAUTICALSTUDYNUMBER *VARCHAR2(20)*	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.
OBJECTDISPOSITIONCODE *VARCHAR2(17)*	A code from **CodeDisposition** identifying the actual or planned disposition of an object the feature instance depicts.
OBJECTGROUPCODE *VARCHAR2(5)*	A code from **CodeObjectGroup** identifying if an object is a single object or part of a group of objects.
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying the object is lit according to AC 70/7460-1 standards.
OBJECTLIGHTINGTYPE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstacle lighting.
OBJECTMARKEDINDICATOR *VARCHAR2(1)*	An indicator identifying the object is marked according to AC 70/7460-1 standards.
OBJECTSOURCECODE *VARCHAR2(3)*	A code from **CodeObjectSource** identifying the source used in defining the object the feature instance describes.
OBJECTTYPECODE *VARCHAR2(25)*	A code from **CodeObjectType** identifying the type of object the feature instance depicts.
OBJECTUSECODE *NUMBER*	A code from **CodeLandUseType** describing the primary use of the object.
OISPENETRATIONVALUE1 *NUMBER*	The amount the object penetrates OISSURFACETYPECODE1.
OISPENETRATIONVALUE2	The amount the object penetrates

Object Line	
NUMBER	OISSURFACETYPECODE2.
OISPENETRATIONVALUE3 *NUMBER*	The amount the object penetrates OISSURFACETYPECODE3.
OISPENETRATIONVALUE4 *NUMBER*	The amount the object penetrates OISSURFACETYPECODE4.
OISPENETRATIONVALUE5 *NUMBER*	The amount the object penetrates OISSURFACETYPECODE5.
OISPENETRATIONVALUE6 *NUMBER*	The amount the object penetrates OISSURFACETYPECODE6.
OISSURFACECONDITIONCODE *VARCHAR2(6)*	A code from **CodeOisSurfaceCondition** identifying if the object penetrates a single or multiple surfaces.
OISSURFACETYPECODE1 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE2 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE3 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE4 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE5 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE6 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways. This attribute is only required for objects within a defined approach surface.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading. This attribute is only required for objects within a defined approach surface.

5.3.7 Object Point.

Object Point		
Definition: Includes but is not limited to, above ground structures, navigational aids, equipment, vehicles, natural growth, terrain, and parked or taxiing aircraft defined as a point.		
Feature Group	Airspace	
Feature Class Name	OBJECTPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	Obstacle
	SDSFIE	None
	DO-272	Vertical Structure
Related Features	OBJECT AREA	

Object Point	
	OBJECT POINT
	OBJECT IDENTIFICATION SURFACE
	RUNWAY
	RUNWAY ELEMENT
	RUNWAY HELIPAD DESIGN SURFACE

Data Capture Rule

Capture objects penetrating a surface or meeting the criteria as a representative object best modeled using a **point**.

Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Runway Primary Surface (VGRPS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Primary Connection Surface (VGPCS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Protection Surface (VGPS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Approach Surface (VGAS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Object Point	
Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Approach Transitional Surface (VGATS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Horizontal Surface (VGHS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Point	
Runway Supporting Vertically Guided Operations	
Vertically Guided Conical Surface (VGCS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Point	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Primary Surface (NVGPS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 3.00 ft
Vertical Accuracy (Orthometric)	± 3.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Point	
Runway Supporting Non-vertically Guided Operations	
Non-vertically Guided Approach Surface (NVGAS)	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)

Object Point	
Survey Accuracies – Object Point *Runway Supporting Non-vertically Guided Operations* **Non-vertically Guided Transitional Surface (NVGTS)**	
Horizontal Accuracy	± 20.00 ft
Vertical Accuracy (Ellipsoid)	± 10.00 ft
Vertical Accuracy (Orthometric)	± 10.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest two tenths of an arc second (± 0.20)
Survey Accuracies – Object Point *Runway Supporting Non-vertically Guided Operations* **Non-vertically Guided Horizontal Surface (NVGHS)**	
Horizontal Accuracy	± 50.00 ft
Vertical Accuracy (Ellipsoid)	± 20.00 ft
Vertical Accuracy (Orthometric)	± 20.00 ft
Vertical Accuracy (AGL)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five tenths of an arc second (± 0.50)

Attribute Name ***Datatype***	**Description**
ABOVEGROUNDLEVEL *NUMBER*	The height of an object above the surface of the ground at the base of the object.
DIRECTIONLOCATIONCODE *VARCHAR2(9)*	A code from **CodeDirectionLocation** identifying the direction referenced to true north the object is located from the perpendicular point on centerline or centerline extended.
DISTANCEFROMTHRESHOLDTOOBJECT *NUMBER*	The distance along the runway centerline or centerline extended from the threshold (or displaced threshold) to a point perpendicular to the object on centerline.
DISTANCERUNWAYCENTERLINETOOBJECT *NUMBER*	The perpendicular distance from the runway centerline or centerline extended to the object.
FAACOORDINATIONREVIEWINDICATOR *VARCHAR2(1)*	An indicator identifying the object was previously studied by the FAA.
FRANGIBLITYINDICATOR *VARCHAR2(1)*	An indicator identifying if the object meets the frangibility requirements of AC 150/5220-23.
HEIGHTABOVEAIRPORTVALUE *NUMBER*	A value expressing the height of the top of the object above the defined airport elevation.
HEIGHTABOVEELLIPSOIDVALUE *NUMBER*	The height of the object above the reference ellipsoid along the outer normal at the top of the object.
HEIGHTABOVERUNWAYENDVALUE *NUMBER*	A value expressing the height of the top of the object above the runway elevation. This

Object Point	
	attribute is only required for objects within a defined approach surface.
HEIGHTABOVETDZEVALUE *NUMBER*	A value expressing the height of the top of the object above the reference runway touchdown zone elevation (TDZE). This attribute is only required for objects within a defined approach surface.
MARKINGFEATURETYPECODE *VARCHAR2(18)*	A code from **CodeMarkingFeatureType** identifying the type of marking used on the object.
OBJECTAERONAUTICALSTUDYNUMBER *VARCHAR2(15)*	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.
OBJECTDISPOSITIONCODE *VARCHAR2(17)*	A code from **CodeDisposition** identifying the actual or planned disposition of an object the feature instance depicts.
OBJECTGROUPCODE *VARCHAR2(5)*	A code from **CodeObjectGroup** identifying if an object is a single object or part of a group of objects.
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying the object is lit according to AC 70/7460-1 standards.
OBJECTLIGHTINGTYPE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstacle lighting.
OBJECTMARKEDINDICATOR *VARCHAR2(1)*	An indicator identifying the object is marked according to AC 70/7460-1 standards.
OBJECTSOURCECODE *VARCHAR2(3)*	A code from **CodeObjectSource** identifying the source used in defining the object the feature instance describes.
OBJECTTYPECODE *VARCHAR2(25)*	A code from **CodeObjectType** identifying the type of object the feature instance depicts.
OBJECTUSECODE *NUMBER*	A code from **CodeLandUseType** describing the primary use of the object.
OISPENETRATIONVALUE1 *NUMBER*	The amount the object penetrates OISSURFACETYPE1.
OISPENETRATIONVALUE2	The amount the object penetrates

Object Point	
NUMBER	OISSURFACETYPE2.
OISPENETRATIONVALUE3 *NUMBER*	The amount the object penetrates OISSURFACETYPE3.
OISPENETRATIONVALUE4 *NUMBER*	The amount the object penetrates OISSURFACETYPE4.
OISPENETRATIONVALUE5 *NUMBER*	The amount the object penetrates OISSURFACETYPE5.
OISPENETRATIONVALUE6 *NUMBER*	The amount the object penetrates OISSURFACETYPE6.
OISSURFACECONDITIONCODE *VARCHAR2(13)*	A code from **CodeOisSurfaceCondition** identifying if the object penetrates a single or multiple surfaces.
OISSURFACETYPECODE1 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE2 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE3 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE4 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE5 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
OISSURFACETYPECODE6 *VARCHAR2(6)*	A code from **CodeOisSurfaceType** identifying a surface the object penetrates.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways. This attribute is only required for objects within a defined approach surface.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading. This attribute is only required for objects within a defined approach surface.

5.4 Group: CADASTRAL.

5.4.1 Airport Boundary.

Airport Boundary		
Definition: A polygon or a set of polygons, encompassing all property owned or controlled by the airport for aviation purposes.		
Feature Group	Cadastral	
Feature Class Name	AIRPORTBOUNDARY	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	AirportHeliport
	FGDC	AirportBoundary

Airport Boundary		
	SDSFIE	None
	DO-272	None
Related Features	AIRPORT PARCEL	
	PARCEL	
	LEASE AREA	

Data Capture Rule

Generally, users should develop the **Airport Boundary** using the platted drawings for an airport. However, in some circumstances users may want to collect the **Airport Boundary** as a new survey. When surveying the **Airport Boundary**, all State and Local jurisdiction rules govern the collection of the data.

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
AIRPORTFACILITYTYPE *VARCHAR2(5)*	A code from **CodeAirportFacilityType** identifying the type of landing facility the feature instance describes.
AIRPORTNAME *VARCHAR2(50)*	The official name for the airport as shown in FAA records.
AIRPORTSITENUMBER *VARCHAR2(10)*	A number assigned to the airport uniquely identifying the airport. The FAA assigned Site Number is assigned to airports in ascending order depending on the state and associated city and contains a one letter suffix defining the type of landing facility.
IATAAIRPORTIDENTIFIER *VARCHAR2(4)*	The location identifier assigned to the airport by the International Air Transport Association (IATA).
ICAOAIRPORTIDENTIFIER *VARCHAR2(4)*	The identifier assigned to the airport by the Internal Civil Aviation Organization (ICAO).
NFDCAIRPORTIDENTIFIER *VARCHAR2(4)*	The location identifier as assigned and used by the FAA National Flight Data Center (NFDC).
OPERATIONSTYPE *VARCHAR2(5)*	A code from **CodeOperationsType** identifying the primary type of operations the airport supports.
OWNERCODE *VARCHAR2(4)*	A code from **CodeOwner** identifying the type of entity owning the airport.

5.4.2 Airport Parcel.

Airport Parcel	
Definition: A tract of land within the airport boundary acquired from surplus property, federal funds, local funds et cetera. Where the airport owns property outside the defined airport boundary use the generic Parcel feature. This distinction is made to identify the difference between land that constitutes airport property (actual airport site) and land the airport owns, which may include other property not adjacent to the airport. [Source: FAA Order 5190.6B, Chapter 21]	
Feature Group	Cadastral

Airport Parcel		
Feature Class Name	AIRPORTPARCEL	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	Airport Parcel
	FGDC	Airport Parcel (Extension)
	SDSFIE	None
	DO-272	None
Related Features	AIRPORT BOUNDARY	
	PARCEL	
	LEASE AREA	

Data Capture Rule

Collect and provide this data according to local or state requirements.

Survey Accuracies	
Horizontal Accuracy	As required by local or state requirements
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	As required by local or state requirements
Distance and Elevation Resolution	As required by local or state requirements
Geographic Coordinate Resolution	As required by local or state requirements

Attribute Name *Datatype*	**Description**
ASSESSEDMARKETVALUEAMOUNT *NUMBER*	The assessed market value of the parcel when it was acquired.
ASSESSEDMARKETVALUEDATE *DATE*	The year in which the most recent market value assessment was made.
HOWACQUIREDTYPECODE *VARCHAR2(24)*	A code from **CodeHowAcquired** identifying the means by which the parcel was acquired.
MOSTRECENTSTRUCTUREBUILDDATE *DATE*	The year in which the most recent structure(s) were built on the parcel.
PARCELACQUISITIONTYPECODE *VARCHAR2(14)*	A code from **CodeAcquisitionType** identifying the acquisition method used to acquire the property.
PARCELAREASIZE *NUMBER*	The area of the land the Airport Parcel feature instance identifies.
PARCELAREATYPE *VARCHAR2(9)*	A code from **CodeParcelAreaType** identifying the two dimensional surface being quantified.
PARCELAREAUOMCODE *VARCHAR2(13)*	A code from **CodeUnitOfMeasurement** identifying the unit of measurement for the ParcelAreaSize attribute.
PARCELCOSTTOACQUIREAMOUNT *NUMBER*	The amount paid to acquire the parcel in U.S. Dollars.
PARCELDEEDRECORDEDLOCATIONTEXT *VARCHAR2(50)*	Reference to where the deed to the airport parcel is recorded in such information as Plat Book and Page.
PARCELLEGALDESCRIPTIONTEXT *VARCHAR2(500)*	The complete legal description for the parcel as it appears in the deed.
PARCELLOCALIDENTIFIER *VARCHAR2(15)*	Any locally used number to identify the parcel.

Airport Parcel	
PARCELOWNERNAME *VARCHAR2(50)*	The name of the person or organization owning the airport parcel.
PARCELPREVIOUSOWNERNAME *VARCHAR2(50)*	The previous owner of the parcel.
PARCELPROJECTAIPGRANTIDENTIFIER *VARCHAR2(15)*	The grant number associated with the property acquisition through the use of AIP federal funds.
PARCELUSECODE *NUMBER*	A code from **CodeLandUseType** describing the primary use of the airport parcel.
PASSENGERFACILTYCHARGENUMBER *VARCHAR2(15)*	The PFC number associated with the property acquisition using PFC funds.
RECENTASSESSEDVALUEAMOUNT *NUMBER*	The most recent assessed value of the airport parcel.
RECORDEDDATE *DATE*	The date the parcel was acquired, format for the date is YYYYMMDD. For example, September 15, 2014 is input as 20140915.

5.4.3 Land Use.

Land Use		
Definition: A description of the human use of land and water.		
Feature Group	Cadastral	
Feature Class Name	LANDUSE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	LandUse
	SDSFIE	LandUse
	DO-272	None
Related Features	AIRPORT PARCEL	
	PARCEL	
	RIGHT AND INTEREST	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT POINT	
	STRUCTURE POLYGON	
	STRUCTURE POINT	
	STRUCTURE LINE	

Data Capture Rule

Collect and provide the **land use** information from state/county/local zoning or other appropriate office.

Survey Accuracies	
Horizontal Accuracy	According to local or state requirements
Vertical Accuracy (Ellipsoid)	According to local or state requirements
Vertical Accuracy (Orthometric)	According to local or state requirements
Distance and Elevation Resolution	According to local or state requirements
Geographic Coordinate Resolution	According to local or state requirements

Land Use	
Attribute Name ***Datatype***	**Description**
LANDUSETYPECODE *NUMBER*	A code from **CodeLandUseType** identifying the human use the feature instance describes.
LANDUSELOCATIONCODE *VARCHAR2(3)*	A code from **CodeLandUseLocation** identifying if the land is on-airport or off-airport.

5.4.4 Lease Area.

Lease Area		
Definition: A parcel or parcels of land leased by an individual, agency, or organization for their use.		
Feature Group	Cadastral	
Feature Class Name	LEASEAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	LeaseZone
	SDSFIE	None
	DO-272	None
Related Features	AIRPORT PARCEL	
	LAND USE	
	PARCEL	
	STRUCTURE AREA	
	STRUCTURE LINE	
	STRUCTURE POINT	
	ZONING	
Data Capture Rule Provide as reported from the organization responsible for lease management at the airport.		

Survey Accuracies	
Horizontal Accuracy	As Provided
Vertical Accuracy (Ellipsoid)	As Provided
Vertical Accuracy (Orthometric)	As Provided
Distance and Elevation Resolution	As Provided
Geographic Coordinate Resolution	As Provided

Attribute Name ***Datatype***	**Description**
EXPECTEDLEASEEXPIRATIONDATE *DATE*	The date the lease expires. Format the date as YYYYMMDD, where YYYY is the year, MM is the two digit month, and DD is the two digit day.
LEASEAREALEGALDESCRIPTIONTEXT *VARCHAR2(500)*	The complete legal description of the lease area as it appears in the deed.
LEASEAREASIZE *NUMBER*	The size of the leased area.
LEASEAREAUOMCODE *VARCHAR2(13)*	A code from **CodeUnitOfMeasurement** identifying the unit of measurement for the LeaseAreaSize attribute.

Lease Area	
LEASEAREANAME *VARCHAR2(50)*	A commonly used name for the leased area.
PERMITUSETEXT *VARCHAR2(50)*	Permitted use of the lease area.
TENANTNAME *VARCHAR2(50)*	The name of the individual, agency, or organization leasing the area for their use.

5.4.5 Parcel.

Parcel		
Definition: Boundary line of the land and water under the right, power, or authority of the owner. The standard distinguishes parcels the airport owns using separate features to identify the difference between land that constitutes airport property (actual airport site) and land the airport owns, which may include other property not adjacent to the airport. [Source: FAA Order 5190.6B, Chapter 21]		
Feature Group	Cadastral	
Feature Class Name	PARCEL	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	GeographicArea
	SDSFIE	LandParcel
	DO-272	None
Related Features	AIRPORT PARCEL	
	LEASE AREA	
	RIGHT AND INTEREST	
	ZONING	

Data Capture Rule

Provide **parcel** information according to local or state requirements.

Survey Accuracies	
Horizontal Accuracy	As required by local or state regulations
Vertical Accuracy (Ellipsoid)	As required by local or state regulations
Vertical Accuracy (Orthometric)	As required by local or state regulations
Distance and Elevation Resolution	As required by local or state regulations
Geographic Coordinate Resolution	As required by local or state regulations

Attribute Name ***Datatype***	**Description**
ASSESSEDMARKETVALUEAMOUNT *NUMBER*	The assessed market value of the parcel when it was acquired.
ASSESSEDMARKETVALUEDATE *DATE*	The year in which the most recent market value assessment was made.
HOWACQUIREDTYPECODE *VARCHAR2(24)*	A code from **CodeHowAcquired** identifying the means by which the parcel was acquired.
MOSTRECENTSTRUCTUREBUILDDATE *DATE*	The year in which the most recent structure(s) were built on the parcel.
PARCELACQUISITIONTYPECODE *VARCHAR2(14)*	A code from **CodeAcquisitionType** identifying the acquisition method used to acquire the property.

Parcel	
PARCELAREASIZE *NUMBER*	The area within the boundary of the parcel the feature instance describes.
PARCELAREATYPE *VARCHAR2(9)*	A code from **CodeParcelAreaType** identifying the two dimensional surface being quantified.
PARCELAREAUOMCODE *VARCHAR2(13)*	A code from **CodeUnitOfMeasurement** identifying the unit of measurement for the ParcelAreaSize attribute.
PARCELCOSTTOACQUIREAMOUNT *NUMBER*	The amount paid to acquire the parcel in U.S. Dollars.
PARCELDEEDRECORDEDLOCATIONTEXT *VARCHAR2(50)*	Reference to where the deed to the parcel is recorded in such information as Plat Book and Page.
PARCELLEGALDESCRIPTIONTEXT *VARCHAR2(500)*	The complete legal description for the parcel as it appears in the deed.
PARCELLOCALIDENTIFIER *VARCHAR2(15)*	Any locally used number to identify the parcel.
PARCELOWNERNAME *VARCHAR2(50)*	The name of the person or organization owning the airport parcel.
PARCELPREVIOUSOWNERNAME *VARCHAR2(50)*	The previous owner of the parcel.
PARCELPROJECTAIPGRANTIDENTIFIER *VARCHAR2(15)*	The grant number associated with the property acquisition through the use of AIP federal funds.
PARCELUSECODE *NUMBER*	A code from **CodeLandUseType** describing the primary use of the airport parcel.
PASSENGERFACILTYCHARGENUMBER *VARCHAR2(15)*	The PFC number associated with the property acquisition using PFC funds.
RECENTASSESSEDVALUEAMOUNT *NUMBER*	The most recent assessed value of the parcel.
RECORDEDDATE *DATE*	The date the parcel was acquired, format for the date is YYYYMMDD. For example, September 15, 2014 is input as 20140915.

5.4.6 Right and Interest.

Right and Interest		
Definition: The Right and Interest feature describes easements and right of way of a parcel. An Easement is a document describing the non-possessing interest held by one person in the land of another whereby the first person is accorded partial use of such land for a specific purpose. FAA Order 5190.6 states an Aviation Easement is a grant of a property interest in land over which a right of unobstructed flight in the airspace is established. A Right of Way describes the right or interest being defined.		
Feature Group	Cadastral	
Feature Class Name	RIGHTANDINTEREST	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	
	FGDC	EasementandRightsofWay

Right and Interest		
	SDSFIE	ExternalPropertyInterest
	DO-272	None
Related Features	AIRPORT PARCEL	
	PARCEL	
	ZONING	

Data Capture Rule

Capture the right and interest data using record drawings or by obtaining the information from official local or state sources (Figure 5-62).

Figure 5-62. Illustrates Areas Where the Airport has Right and Interest Data.

Survey Accuracies	
Horizontal Accuracy	As required by local or state regulation
Vertical Accuracy (Ellipsoid)	As required by local or state regulation
Vertical Accuracy (Orthometric)	As required by local or state regulation
Distance and Elevation Resolution	As required by local or state regulation
Geographic Coordinate Resolution	As required by local or state regulation

Attribute Name ***Datatype***	**Description**
EASEMENTTYPECODE *VARCHAR2(9)*	A code from **CodeEasementType** identifying the purpose of the easement.
EASEMENTACQUISITIONPURPOSECODE *VARCHAR2(15)*	A code from **CodeAcquisitionType** identifying the purpose of the easement.
ENCUMBRANCETYPECODE *VARCHAR2(16)*	A code from **CodeEncumbranceType** identifying the type of encumbrance.
RIGHTANDINTERESTTYPECODE *VARCHAR2(25)*	A code from **CodeRightAndInterest** identifying the type of right or interest the feature instance describes.
RIGHTESTATETYPECODE *VARCHAR2(13)*	A code from **CodeRightEstate** identifying whether the right is for a subsurface, surface, or above surface estate.
RIGHTOFWAYTYPECODE *VARCHAR2(25)*	A code from **CodeRightOrInterest** identifying the specific rights given.

5.4.7 Zoning.

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	
Equivalent Standards	**AIXM**	None
	FGDC	Zoning
	SDSFIE	None
	DO-272	None
Related Features	AIRPORT BOUNDARY	
	AIRPORT PARCEL	
	LEASE AREA	
	PARCEL	
	RIGHTS AND INTEREST	

Data Capture Rule

Obtain and provide **zoning** information from local, county or state governments.

Survey Accuracies	
Horizontal Accuracy	As provided
Vertical Accuracy (Ellipsoid)	As provided
Vertical Accuracy (Orthometric)	As provided
Distance and Elevation Resolution	As provided
Geographic Coordinate Resolution	As provided

Attribute Name *Datatype*	**Description**
LANDOWNERRESTRICTION *VARCHAR2(255)*	A free text field identifying specific zoning restrictions of the land owner.
PARCELZONINGCLASSIFICATIONCODE *VARCHAR2(12)*	A code from **CodeZoningClass** identifying the type of zoning the feature instance describes.
RESTRICTIONDESCRIPTIONTEXT *VARCHAR2(255)*	A text description of any zoning restrictions.
RESTRICTIONNAME *VARCHAR2(50)*	A commonly used name for the zoning restriction the feature instance describes.

5.5 Group: ENVIRONMENT.

5.5.1 Environmental Contamination Area.

Environmental Contamination Area		
Definition: A facility or other locational entity, the Environmental Protection Agency designated that is regulated or monitored because of environmental concerns.		
Feature Group	Environment	
Feature Class Name	ENVIRONMENTALCONTAMINATIONAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None

Environmental Contamination Area		
	FGDC	EnvironmentalContaminationArea
	SDSFIE	PotentialEnvironmentalSite
	DO-272	None
Related Features	FAUNAHAZARDSITE	
	HAZARDOUSMATRIALSTORAGESITE	
	SAMPLECOLLECTIONPOINT	

Data Capture Rule
Collect a closed polygon encompassing the area of poetical or actual contamination.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
ENVIRONMENTALAREANAME *VARCHAR2(50)*	A commonly used name or reference for the environmental area.
ENVIRONMENTALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
ENVIRONMENTALHAZARDCATEGORYTEXT *VARCHAR2(255)*	Indicates the broad category or type of the most prevalent or serious environmental hazard present at the site.
POLLUTANTRELEASETYPETEXT *VARCHAR2(255)*	A free text field to describe the type of pollutant release experienced.
POLLUTANTSOURCETEXT *VARCHAR2(255)*	The actual or suspected source of the pollutant.
POLLUTANTTOXICSTATUSDESCRIPTION *VARCHAR2(255)*	A free text field allowing the user to define the toxic status of the pollutant.
POLLUTIONCAUSECODE *VARCHAR2(13)*	A code from **CodePollutionCause** identifying the potential or specific cause of pollution the feature instance describes.
POLLUTIONFOUNDDATE *DATE*	The date the pollution was found or designated for this feature instance.
REMEDIATIONURGENCYCODE *VARCHAR2(9)*	A code from **CodeRemediationUrgency** identifying the urgency of the environmental mediation activities for the feature instance.

5.5.2 Fauna Hazard Area.

Fauna Hazard Area	
Definition: An area where there are hazards due to wildlife activities. This includes bird aircraft strike hazard (BASH) and animal strike areas.	
Feature Group	Environment

Fauna Hazard Area		
Feature Class Name	FAUNAHAZARDAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	FaunaHazardArea
	SDSFIE	None
	DO-272	None
Related Features	FORESTSTANDAREA	
	ENVIRONMENTALCONTAMINATIONAREA	
	RUNWAY	
	RUNWAY ELEMENT	
	TAXIWAYELEMENT	
	VEGETATIONAREA	

Data Capture Rule

Collect a closed polygon encompassing the area of fauna hazard concern.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name *Datatype*	**Description**
ENVIRONMENTALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
WILDLIFEHAZARDTYPECODE *VARCHAR2(20)*	A code from **CodeWildlifeHazardType** identifying the type of wildlife hazard the feature instance describes.

5.5.3 Flood Zone.

Flood Zone		
Definition: Areas subject to 100 year, 500 year and minimal flooding. The 100 year or base flood indicates an area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. Areas subject to flooding between the limits of the base flood and the 0.2-percent-annual-chance are defined as the 500 year flood. Other areas outside these are defined as minimal flooding areas.		
Feature Group	Environment	
Feature Class Name	FLOODAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	FloodZone
	SDSFIE	None
	DO-272	None
Related Features	WETLAND	
	FLORASPECIESITE	
	SHORELINE	

Flood Zone	
	FORESTSTANDAREA
	VEGETATIONAREA

Data Capture Rule

Collect a closed polygon encompassing the area of representation. Multiple polygons of this feature may be necessary to represent the area appropriately.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name *Datatype*	**Description**
ENVIRONMENTALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
FLOODZONECLASSIFICATIONTYPECODE *VARCHAR2(8)*	A code from **CodeFloodZoneClassificationType** identifying the type of flood zone the feature instance describes.

5.5.4 Flora Species Site.

Flora Species Site		
Definition: A specific location where an individual flora species or an aggregate of flora species is identified.		
Feature Group	Environment	
Feature Class Name	FLORASPECIESSITE	
Feature Type	Point	
Equivalent Standards	**AIXM**	None
	FGDC	FloraSpeciesSite
	SDSFIE	FloraPlantingOrSeeding
	DO-272	None
Related Features	FORESTSTANDAREA	
	VEGETATIONAREA	

Data Capture Rule

Collect a point indicating the individual location or center of a group.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Flora Species Site	
Attribute Name ***Datatype***	**Description**
ENDANGEREDSPECIESACTSITEINDICATOR *VARCHAR2(1)*	An indicator if the habitat has been designated as a critical habitat under (C) the Endangered Species Act or has not been so designated (N).
ENVIRONMENTALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
FLORASPECIESDESCRIPTION *VARCHAR2(50)*	A description identifying the type of flora the feature represents.
FLORATYPECODE *VARCHAR2(15)*	A code from **CodeFloraType** identifying the general type of flora the feature instance describes.
PLANTHEIGHTLENGTH *NUMBER*	The average height of the flora species.
PLANTPURPOSECODE *VARCHAR2(17)*	A code from **CodePlantPurpose** identifying the primary purpose of the planting or seeding

5.5.5 Forest Stand Area.

Forest Stand Area		
Definition: A group of trees occupying a given area and sufficiently uniform in species composition, age, structure, site quality, and condition so as to be distinguishable from the forest on adjoining areas. [Source: SDSFIE]		
Feature Group	Environment	
Feature Class Name	FORESTSTANDAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	ForestStandArea
	SDSFIE	ForestStand
	DO-272	None
Related Features	FLORASPECIESSITE	
	VEGETATIONAREA	
Data Capture Rule Capture a closed polygon representing the limits of the forest stand area. In capturing the limits of the tree outline, create the graphical representation in a right hand direction so patterning of the element will form the scallops on the correct side of the forest outline.		

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Forest Stand Area	
Attribute Name ***Datatype***	**Description**
FORESTSTANDAREACATEGORYTYPECODE *VARCHAR2(50)*	A code from **CodeForestStandAreaType** indicating the category of forest as defined by its dominant tree species, vegetation and/or locality factor the feature instance describes. [SDSFIE]
STANDHEIGHTAGL *NUMBER*	The above ground height of the forest stand as measured from the ground to the average top height of the trees within the area.
SPECIALWILDLIFEHABITATCATEGORY *VARCHAR2(255)*	A free text field to describe the designation or type of special wildlife habitat.

5.5.6 Hazardous Material Storage Site.

Hazardous Material Storage Site		
Definition: A defined or geographical area designated and used for the storage of contained hazardous materials.		
Feature Group	Environment	
Feature Class Name	HAZARDOUSMATERIALSTORAGESITE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	None
	DO_272	None
Related Features	STRUCTUREAREA	
	STRUCTUREPOINT	
	LANDUSE	
Data Capture Rule Collect a closed polygon encompassing the **hazardous material storage site** being represented at its greatest horizontal extents.		

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
HAZARDOUSMATERIALCATEGORYTYPE *NUMBER*	A code from **CodeHazardCategory** identifying the type of hazardous material the feature instance describes.
HAZARDOUSMATERIALSTORAGESITENAME *VARCHAR2(50)*	A commonly used name for a hazardous material storage site.

5.5.7 Natural Water Body.

Natural Water Body		
Definition: An accumulation of water, such as oceans, seas, and lakes, but also includes smaller pools of water such as ponds, swamps, or wetlands.		
Feature Group	Environment	
Feature Class Name	NATURALWATERBODY	
Feature Type	Polygon	
Effective Start Date	Provide the date the data becomes effective.	
Effective End Date	Provide the date the data ceases to be effective.	
Equivalent Standards	**AIXM**	
	FGDC	Shoreline
	SDSFIE	NaturalWaterBody
	DO-272	Water
Related Features	ANCHORAGE AREA	
	DOCKING AREA	
	ELEVATION CONTOUR	
	FLORA SPECIES SITE	
	NAVIGATION BUOY	
	SEAPLANCE RAMP CENTERLINE	
	SEAPLANE RAMP SITE	
	TAXI CHANNEL	
	TURNING BASIN	
	VEGETATION AREA	
	WETLAND	
	WATER OPERATING AREA	
	WATER LANE END	

Data Capture Rule

Capture a closed polygon or multiple polygons encompassing the horizontal extents of the **natural water body** within the limits of imaginary surfaces of the airport.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
NATURALWATERBODYNAME *VARCHAR2(50)*	A commonly used name for the natural water body the features instance describes.
NATURALWATERBODYTYPECODE *VARCHAR2(10)*	A code from **CodeNaturalWaterBody** identifying the type of natural water body the feature instance describes.

5.5.8 Noise Contour.

Noise Contour		
Definition: An area describing the noise attributed to operations. For aircraft operations, the Day/Night average sound level (L_{dn}) descriptor is typically used to categorize noise levels.		
Feature Group	Environment	
Feature Class Name	NOISECONTOUR	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	NoiseContour
	SDSFIE	NoiseZone
	DO-272	None
Related Features	NOISEINCIDENT	
	NOISEMONITORINGPOINT	

Data Capture Rule
Acquire this information from the Integrated Noise Model software and Part 150 studies.

Survey Accuracies	
Horizontal Accuracy	Not Applicable
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	Not Applicable
Distance and Elevation Resolution	Not Applicable
Geographic Coordinate Resolution	Not Applicable

Attribute Name *Datatype*	**Description**
ENVIRONMETALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
LANDUSETYPECODE *NUMBER*	A code from **CodeLandUseType** identifying the primary human use within the feature instance being described.
NOISECONTOURLINEMEASUREMENT *NUMBER*	The decibel value for the contour line the feature instance is describing.

5.5.9 Noise Incident.

Noise Incident		
Definition: A formal complaint by an individual or group regarding excessive noise resulting from airport operations.		
Feature Group	Environment	
Feature Class Name	NOISEINCIDENT	
Feature Type	Point	
Equivalent Standards	**AIXM**	
	FGDC	NoiseIncident
	SDSFIE	NoiseReceiver
	DO-272	None
Related Features	NOISECONTOUR	
	NOISEMONITORINGPOINT	

Noise Incident	
Data Capture Rule Capture a point at the site of the noise complaint.	
Survey Accuracies	
Horizontal Accuracy	± 50.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	Not Applicable
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five tenths of an arc second (± 0.50)
Attribute Name ***Datatype***	**Description**
ENVIRONMETALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
NOISEINCIDENTNUMBER *NUMBER*	A locally generated number for the noise incident.
NOISEINCIDENTREPORTERNAME *VARCHAR2(50)*	The name of the person or group reporting the noise incident.
NOISESOURCETYPECODE *VARCHAR2(10)*	A code from **CodeNoiseSourceType** identifying the type of noise source.

5.5.10 Noise Monitoring Point.

Noise Monitoring Point		
Definition: The location of noise sensing equipment or where a noise sample is taken.		
Feature Group	Environment	
Feature Class Name	NOISEMONITORINGPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	None
	FGDC	NoiseMonitoringPoint
	SDSFIE	None
	DO-272	None
Related Features	NOISECONTOUR	
	NOISEINCIDENT	
Data Capture Rule Collect a point at the top and center of the noise monitoring station.		
Survey Accuracies		
Horizontal Accuracy	± 5.00 ft	
Vertical Accuracy (Ellipsoid)	Not Applicable	
Vertical Accuracy (Orthometric)	± 20.00 ft	
Distance and Elevation Resolution	Nearest foot	
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)	
Attribute Name ***Datatype***	**Description**	
NOISEMONITORINGPOINTNAME *VARCHAR2(50)*	A locally defined name for the location of a noise monitoring point the feature instance describes.	

5.5.11 Sample Collection Point.

Sample Collection Point		
Definition: The physical location at which one or more environmental hazard field samples are collected.		
Feature Group	Environment	
Feature Class Name	SAMPLECOLLECTIONPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	
	FGDC	SampleCollectionPoint
	SDSFIE	EnvironmentalSampleLocation
	DO-272	None
Related Features	ENVIRONMENTAL CONTAMINATION AREA	
	HAZARDOUS MATERIAL STORAGE SITE	
	NOISE INCIDENT	
	NOISE MONITORING POINT	
	SHORELINE	
	WETLAND	

Data Capture Rule
Collect a point at the center of the **sample collection point** or as near the center as possible.

Survey Accuracies	
Horizontal Accuracy	± 10.00 ft.
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft.
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.1)

Attribute Name ***Datatype***	**Description**
ENVIRONMETALAREATYPECODE *VARCHAR2(18)*	A code from **CodeEnvironmentalAreaType** identifying the type of environmental area the feature instance describes.
SAMPLECOLLECTIONPOINTNAME *VARCHAR2(50)*	A locally defined name for the sample collection point the feature instance describes.
SAMPLECOLLECTIONPOINTTYPECODE *VARCHAR2(5)*	A code from **CodeSampleCollectionPointLocation** describing the type of location undergoing sampling, for example borehole or well.

5.5.12 Vegetation Area.

Vegetation Area		
Definition: An area of low lying vegetation or ground cover with similar characteristics.		
Feature Group	Environment	
Feature Class Name	VEGETATIONAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	
	FGDC	FloraSpeciesSite

Vegetation Area		
	SDSFIE	Vegetation
	DO-272	None
Related Features	FLORASPECIESSITE	
	FORESTSTANDAREA	

Data Capture Rule Capture a closed polygon or multiple polygons representing the area(s) being depicted by the feature. **Note:** If a structure penetrates an OIS or is selected as a representative object, additionally identify, classify and document the building as an **Object Area** with associated accuracy.	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name ***Datatype***	**Description**
VEGETATIONAREATYPECODE *VARCHAR12*	A code from **CodeVegetationAreaType** identifying the type of vegetation or ground cover the feature instance describes.
SPECIALWILDLIFEHABITATCATEGORY *VARCHAR2(255)*	A free text field to describe the designation or type of special wildlife habitat.

5.5.13 Wetland.

Wetland		
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 predominately saturated with water and the plants and animals that live there are specialized for the ecosystem.		
Feature Group	Environment	
Feature Class Name	WETLAND	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	Wetland
	SDSFIE	Wetland
	DO_272	None
Related Features	NATURAL WATER BODY	

Data Capture Rule 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.	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft

Wetland	
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name *Datatype*	**Description**
ENVIRONMENTALAREADESCRIPTIONTEXT *VARCHAR2(255)*	A description of the environmental area (wetland) the feature instance depicts.
ENVIRONMENTALAREANAME *VARCHAR2(50)*	A commonly used or local name for the wetland area the feature instance is describing.

5.6 Group: GENERAL.

5.6.1 Dimension.

Dimension		
Definition: A measure in one direction; specifically one of three coordinates determining a position in space.		
Feature Group	General	
Feature Class Name	DIMENSION	
Feature Type	Line	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	None
	DO_272	None
Related Features	RUNWAY	
	RUNWAY CENTERLINE	
	TAXIWAY CENTERLINE	
	APRON	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT POLYGON	
	RUNWAY ELEMENT	
	TAXIWAY ELEMENT	
Data Capture Rule The **dimension** feature provides information regarding specific dimensions required for an airport layout plan or electronic airport layout plan. Provide a line presenting the best cartographic representation.		
Survey Accuracies		
Horizontal Accuracy	Not Applicable	
Vertical Accuracy (Ellipsoid)	Not Applicable	
Vertical Accuracy (Orthometric)	Not Applicable	
Distance and Elevation Resolution	Not Applicable	
Geographic Coordinate Resolution	Not Applicable	

Dimension	
Attribute Name ***Datatype***	**Description**
DIMENSIONTYPECODE *VARCHAR2(13)*	A code from **CodeDimensionType** identifying the type of dimension the feature instance describes.
DIMENSIONVALUE *VARCHAR2(9)*	The value for the dimension being described by the feature instance.

5.6.2 Label Point.

Label Point		
Definition: A defined point indicating the best cartographic placement of a label on or near another entity providing identification of the entity without obscuring other labels, entities, or dimensions.		
Feature Group	General	
Feature Class Name	LABELPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	Not Applicable
	FGDC	Not Applicable
	SDSFIE	Not Applicable
	DO-272	Not Applicable
Related Features	DIMENSION	
Data Capture Rule Used to provide the best cartographic representation of labels for airport layout plans and electronic airport layout planes. Identify the location providing the best cartographic representation of the label so it is not obscured or obscures other features.		

Survey Accuracies	
Horizontal Accuracy	Not Applicable
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	Not Applicable
Distance and Elevation Resolution	Not Applicable
Geographic Coordinate Resolution	Not Applicable

Attribute Name ***Datatype***	**Description**
LABELTYPECODE *VARCHAR2(20)*	A code from **CodeLabelType** specifying the value for the label.
LABELVALUE *VARCHAR2(50)*	The text of the label to be displayed (i.e., RW 17 RPZ)

5.7 Group: GEOSPATIAL.

5.7.1 Elevation Contour.

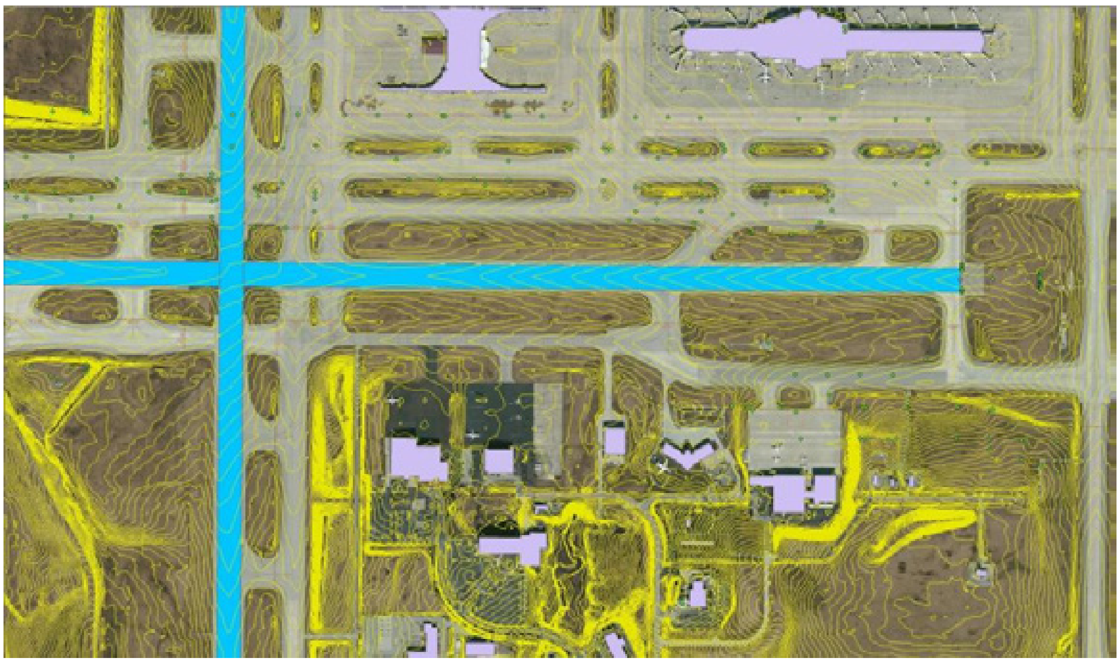
Elevation Contour	
Definition: Connecting points on the surface of the earth of equal vertical elevation representing some fixed elevation interval.	
Feature Group	Geospatial

Elevation Contour		
Feature Class Name	ELEVATIONCONTOUR	
Feature Type	Line	
Equivalent Standards	**AIXM**	None
	FGDC	ElevationContour
	SDSFIE	ElevationContour
	DO-272	None
Related Features	POSITION (Spot Elevation)	

Data Capture Rule

Capture a line connecting points on the surface of the earth of equal vertical elevation at the appropriate contour interval (Figure 5-63).

Figure 5-63. Elevation Contour.



Survey Accuracies	
Horizontal Accuracy	One-half the contour interval
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	One half the contour interval
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Not applicable

Attribute Name ***Datatype***	**Description**
ELEVATIONCONTOURVALUE *NUMBER*	The elevation of a line on a map, chart or display connecting points of equal elevation.

5.7.2 Position.

Position		
Definition: A point on the airport with special operational significance or characteristics. **Note:** some of the attributes defined in this feature are optional based on the type of point.		
Feature Group	Geospatial	
Feature Class Name	POSITION	
Feature Type	Point	
Equivalent Standards	**AIXM**	RunwayCentrelinePoint
	FGDC	AirportControlPoint
	SDSFIE	ControlMonumentPoint SpotElevation SurveyPoint
	DO-272	Runway Displaced Area Runway Threshold Runway Centerline Points
Related Features	RUNWAY INTERSECTION	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY DIRECTION	
	RUNWAY CENTERLINE	

Data Capture Rule

Collect a point at the location of the airport feature of significant value such as the displaced threshold, stopway ends, runway centerline intersection point, airport elevation, airport or heliport reference point, Runway centerline abeam NAVAID locations, touchdown zone elevation location, runway centerline profile points, primary and secondary airport control stations, temporary survey marks, photo control points, wind cone, RVR transmissometer locations, SAWS, ASOS, AWOS, center of segmented circle et cetera.

Survey Accuracies - Airport Elevation	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

Survey Accuracies - Centerline Perpendicular Points	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

Survey Accuracies - Displaced Threshold Point	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

Position	
Survey Accuracies - Primary and Secondary Airport Control Stations	
Horizontal Accuracy	Refer to AC 150/5300-16 for accuracy requirements
Vertical Accuracy (Ellipsoid)	Refer to AC 150/5300-16 for accuracy requirements
Vertical Accuracy (Orthometric)	Refer to AC 150/5300-16 for accuracy requirements
Distance and Elevation Resolution	Nearest hundredths of feet
Geographic Coordinate Resolution	Nearest one thousandth of an arc second (± 0.001)
Survey Accuracies - Profile Points	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)
Survey Accuracies - Runway Intersection Point	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Survey Accuracies - Stopway Ends	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

Attribute Name *Datatype*	**Description**
CONTROLPOINTIDENTIFIER *VARCHAR2(10)*	The permanent point identifier assigned within the National Spatial Reference System. This attribute is only required when the monument position indicator is set to “Yes”.
CONTROLPOINTNAME *VARCHAR2(50)*	The name of the point as inscribed on the monument or its cover. This attribute is only required when the monument position indicator is set to “Yes”.
CONTROLPOINTSURVEYEPOCHDATE *DATE*	The survey epoch used in establishing the control point. This attribute is only required when the monument position indicator is set to “Yes”.
ELLIPSOIDHEIGHTMEASUREMENT *NUMBER*	The height above the reference ellipsoid measured along the ellipsoidal outer normal though the point in question. Also called the geodetic height.
GPSSUITABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if the position is suitable for use of GPS surveying techniques.

Position	
MONUMENTLASTRECOVEREDDATE *DATE*	The date of the latest recovery of the monument as shown in the official records. This attribute is only required when the MONUMENTPOSITIONINDICATOR is set to "Yes"
MONUMENTPOSITIONINDICATOR *VARCHAR2(1)*	An indicator to identify if the point the feature instance describes is a monumented position.
MONUMENTRECOVEREDCONDITION *VARCHAR2(1)*	A code from **CodeRecoveredCondition** indicating the condition or status of the mark (monument) each time it is recovered. This attribute is required only when the MONUMENTPOSITIONINDICATOR is set to "Yes".
MONUMENTSTAMPEDDESIGNATIONTEXT *VARCHAR2(15)*	The designation stamped on the monument or cover. This attribute is only required when the MONUMENTPOSITIONINDICATOR is set to "Yes".
MONUMENTTYPECODE *VARCHAR2(11)*	A code from **CodeMonumentType** identifying the type of monumentation for the point.
POSITIONROLECODE *VARCHAR2(25)*	A code from **CodePositionRoleCode** identifying the type of point the feature instance describes.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading. The completion of this attribute is required for this feature if the RUNWAYPOSITIONINDICATOR is set to "Yes".
RUNWAYPOSITIONINDICATOR *VARCHAR2(1)*	An indicator to identify if the point the feature instance describes is located on or off the surface of a runway.
SURVEYDATE *DATE*	The year of the most recent runway end survey used to compute the current ARP. This attribute is only required when the POSITIONROLECODE is set to "ARP".

5.8 Group: MANMADE STRUCTURES.

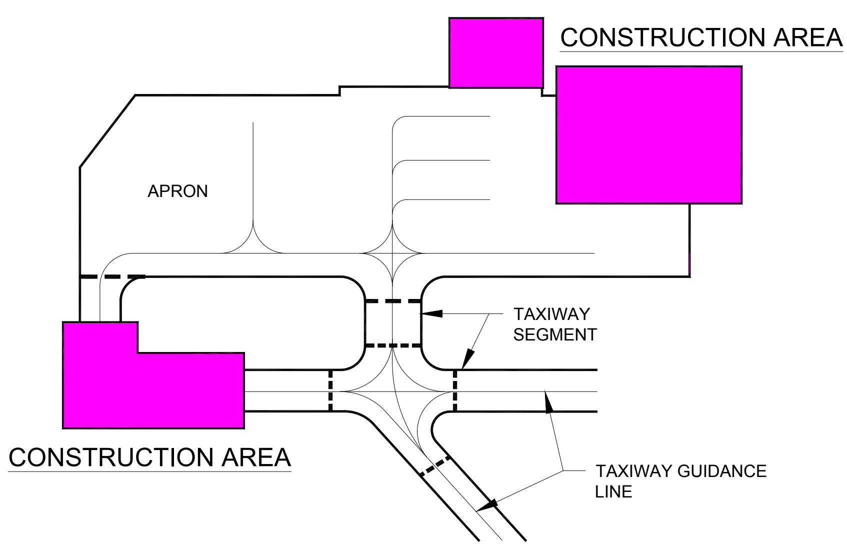
5.8.1 Construction Area.

Construction Area		
Definition: A defined area either under or planned to be under construction or supporting construction activities such as a concrete recycling area or fill dirt area. The area defines a boundary for personnel, material, and equipment engaged in activities supporting construction.		
Feature Group	Manmade Structure	
Feature Class Name	CONSTRUCTIONAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	ConstructionArea
	SDSFIE	FutureProjects_Boundary
	DO_272	None
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	TAXIWAY ELEMENT	
	TAXIWAI INTERSECTION	
	RUNWAY INTERESECTION	
	APRON	

Data Capture Rule

Define the outer limits of the construction area using a polygon (Figure 5-64). Multiple instances of the feature may be necessary to capture the entire area. The limits could be a combination of building lines, construction fence lines, or natural features such as streams or rivers.

Figure 5-64. Illustrates the Collection of an Airport Construction Area.



Construction Area	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
CONSTRUCTIONAREANAME *VARCHAR2(50)*	A locally defined or used name for the construction area.
CONSTRUCTIONPROJECTNAME *VARCHAR2(50)*	The name of the construction project.
CONSTRUCTIONAREATYPECODE *VARCHAR2(10)*	A code from **CodeConstructionAreaType** identifying the type of construction activity being represented.
COORDINATIONCONTACTNAME *VARCHAR2(50)*	Airport, emergency, airline, tenant or contractor personnel who are responsible for coordinating on airport construction work.
PROJECTSTATUSCODE *VARCHAR2(13)*	A code from **CodeProjectStatus** identifying the timeframe for construction activity.

5.8.2 Roof.

Roof		
Definition: The external upper covering of a structure.		
Feature Group	Manmade Structures	
Feature Class Name	ROOF	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	None
	DO-272	None
Related Features	STRUCTURE POLYGON	
	OBJECT AREA	
	OBJECT POINT	
	OBJECT IDENTIFICATION SURFACE	
	RUNWAY HELIPORT DESIGN SURFACE	

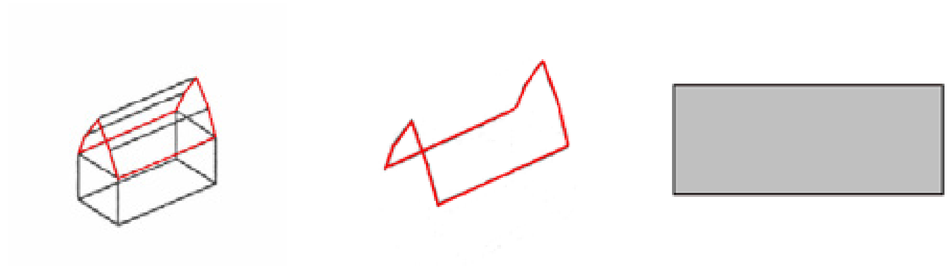
Data Capture Rule

Collect the **roof** outline to represent the outer edge of the roof as well as the break line or ridge lines of a sloped (Figure 5-65) or multiple level roof. On flat roofs (Figure 5-66) with elevator shafts or large HVAC units on the roof, collect these items at the top of the units and show as a structure polygon within a roof feature.

Note: If the roof penetrates an OIS or is selected as a representative object, also identify, classify and document the roof as an **Object Area** and associated accuracy.

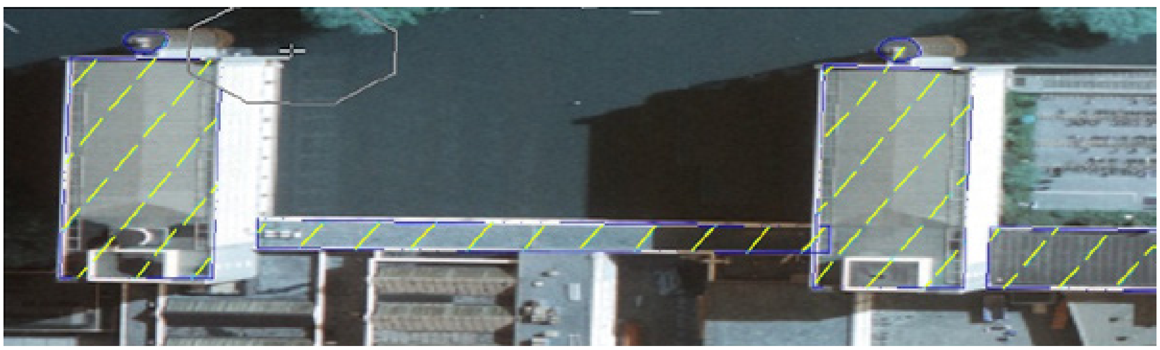
Roof

Figure 5-65. Sloped Roof.



Triangle Roof **Actual 3-D Polygon** **Planimetric View**

Figure 5-66. Flat Roof.



Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name ***Datatype***	**Description**
ROOFHEIGHT *NUMBER*	The height of the roof measured from the ground (AGL height).
STRUCTUREIDENTIFIER *VARCHAR2(10)*	Any locally defined or used identifier uniquely identifying the structure the roof is associated with.

5.8.3 Structure Line.

Structure Line	
Definition: A three dimensional structure modeled using as a line such as fences, gates and walls.	
Feature Group	Manmade Structures
Feature Class Name	STRUCTURELINE

Structure Line		
Feature Type	Line	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	None
	SDSFIE	None
	DO-272	Vertical Structure
Related Features	AIRPORT BOUNDARY	
	NAVAID SITE	
	OBJECT LINE	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT POINT	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAY HELIPAD DESIGN SURFACE	
	SECURITY AREA	

Data Capture Rule

Capture manmade features best represented by a **line** geometry such as fences and gates. Provide an elevation at each vertices. For fences and gates, include the height AGL.

Note: If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an Object Line with associated accuracy.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name *Datatype*	**Description**
MARKINGCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color of aviation required obstruction markings on the structure.
MARKINGTYPECODE *VARCHAR2(19)*	A code from **CodeRunwayMarkingType** identifying the type of aviation required obstruction markings on the structure.
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying if the tank has obstruction lighting.
OBJECTLIGHTINGTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstruction lighting on the structure.
STRUCTUREHEIGHTABOVEGROUNDLEVEL *NUMBER*	The height of the structure above the surface of the ground at the base of the structure.
STRUCTUREIDENTIFIER *VARCHAR2(10)*	Any locally defined or used identifier uniquely identifying the structure.
STRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** identifying the predominant surface material

Structure Line	
	of the structure.
STRUCTURENAME *VARCHAR2(50)*	A locally defined or commonly used name for the structure.
STRUCTURETYPECODE *VARCHAR2(25)*	A code from **CodeStructureType** classifying the type of structure the feature instance is describing.
STRUCTUREUSECODE *NUMBER*	A code from **CodeLandUseType** identifying the primary use of the structure.

5.8.4 Structure Point.

Structure Point		
Definition: A three dimensional structure modeled using a point, such as towers, antennas or poles.		
Feature Group	Manmade Structures	
Feature Class Name	STRUCTUREPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	None
	SDSFIE	None
	DO-272	VerticalStructure
Related Features	APRON	
	NAVAID SITE	
	OBJECT AREA	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT POINT	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAYHELIPAD DESIGN SURFACE	

Data Capture Rule

Collect features such as towers, antennas, poles et cetera best represented using a point type geometry.

Note: If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an **Object Area** and associated accuracy.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
MARKINGCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color of aviation required obstruction markings on the structure.

Structure Point	
MARKINGTYPECODE *VARCHAR2(19)*	The type of aviation required obstruction markings on the structure.
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying if the structure has obstruction lighting.
OBJECTLIGHTINGTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstruction lighting on the structure.
STRUCTUREHEIGHTABOVEGROUNDLEVEL *NUMBER*	The height of the structure above the surface of the ground at the base of the structure.
STRUCTUREIDENTIFIER *VARCHAR2(10)*	Any locally defined or used identifier uniquely identifying the structure.
STRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** identifying the predominant surface material of the structure.
STRUCTURENAME *VARCHAR2(50)*	A locally defined or commonly used name for the structure.
STRUCTURERADIUSVALUE *NUMBER*	Radius of circle around the center of the object encompassing associated elements such as guy wires.
STRUCTURETYPECODE *VARCHAR2(25)*	A code from **CodeStructureType** classifying the type of structure the feature instance is describing.
STRUCTUREUSECODE *NUMBER*	A code from **CodeLandUseType** identifying the primary use of the structure.

5.8.5 Structure Polygon.

Structure Polygon		
Definition: A three dimensional structure (i.e., hangars, terminals, office buildings, schools, libraries, water towers, et cetera) modeled with a bounding polygon.		
Feature Group	Manmade Structures	
Feature Class Name	STRUCTUREPOLYGON	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	None
	SDSFIE	None
	DO-272	VerticalStructure
Related Features	APRON	
	NAVAID SITE	
	OBJECT AREA	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT POINT	
	RUNWAY	
	RUNWAY ELEMENT	
	RUNWAYHELIPAD DESIGN SURFACE	

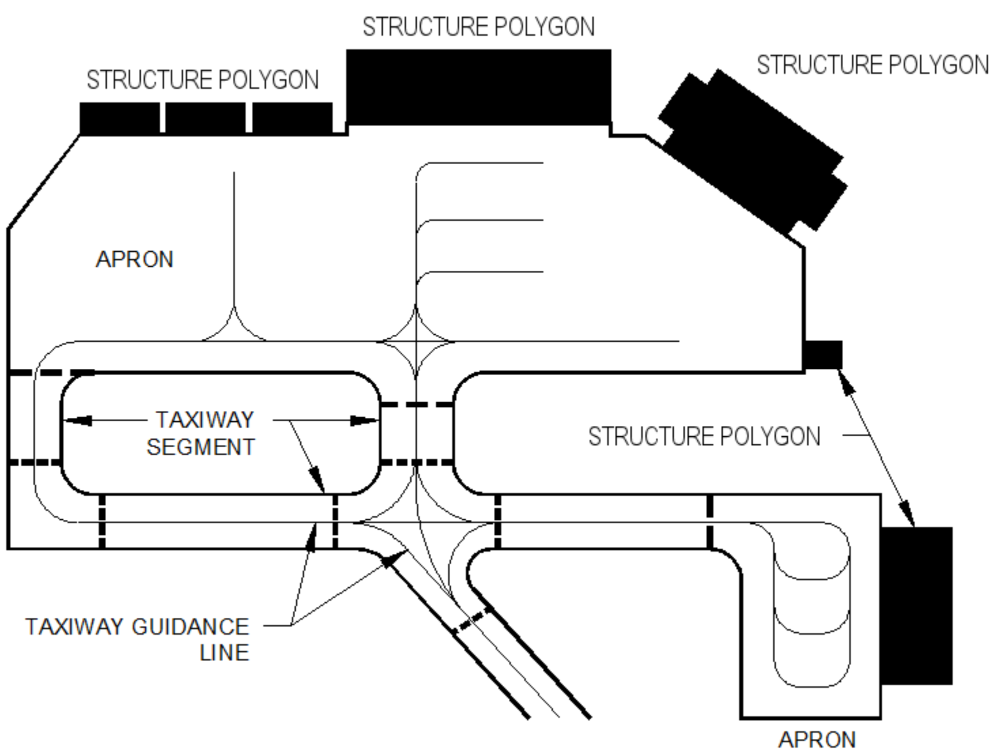
Structure Polygon

Data Capture Rule

Determine the terminal building complex, hangars, maintenance facilities, and other prominent structures directly associated with aircraft operations and directly connected to the apron as individual **polygon** objects (Figure 5-67). Collect by field survey methods recently constructed and/or completed structures not visible on imagery and meeting the above criteria. Extract the structure outline feature as the footprint of the structure at ground level. Determine the height at the highest point of the corresponding structure. The AGL height of the polygon is determined as the difference between the base elevation and top elevation on the roof.

Note: If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an **Object Area** with associated accuracy.

Figure 5-67. Illustrates the Collection of Airport Buildings



Survey Accuracies

Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Structure Polygon	
Attribute Name ***Datatype***	**Description**
MARKINGCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color of aviation required obstruction markings on the structure.
MARKINGTYPECODE *VARCHAR2(19)*	The type of aviation required obstruction markings on the structure.
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying if the structure has obstruction lighting.
OBJECTLIGHTINGTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstruction lighting on the structure.
STRUCTUREHEIGHTABOVEGROUNDLEVEL *NUMBER*	The height of the structure above the surface of the ground at the base of the structure.
STRUCTUREIDENTIFIER *VARCHAR2(10)*	Any locally defined or used identifier uniquely identifying the structure.
STRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** identifying the predominant surface material of the structure.
STRUCTURENAME *VARCHAR2(50)*	A locally defined or commonly used name for the structure.
STRUCTUREOCCUPANTCOUNT *NUMBER*	The maximum number of occupants a structure can accommodate. This attribute is only required when the STRUCTURETYPECODE is set to a structure type intended to house or be occupied by people.
STRUCTURETYPECODE *VARCHAR2(25)*	A code from **CodeStructureType** classifying the type of structure the feature instance is describing.
STRUCTUREUSECODE *NUMBER*	A code from **CodeLandUseType** identifying the primary use of the structure.
TOTALINSIDEAREASIZE *NUMBER*	The usable square footage of a floor or within the structure. This attribute is only required when the STRUCTURETYPECODE is set to a structure type intended to house or be occupied by people.
TOTALINSIDEFLOORAREASIZE *NUMBER*	The square footage of a floor within the structure. This attribute is only required when the STRUCTURETYPECODE is set to a structure type intended to house or be occupied by people.

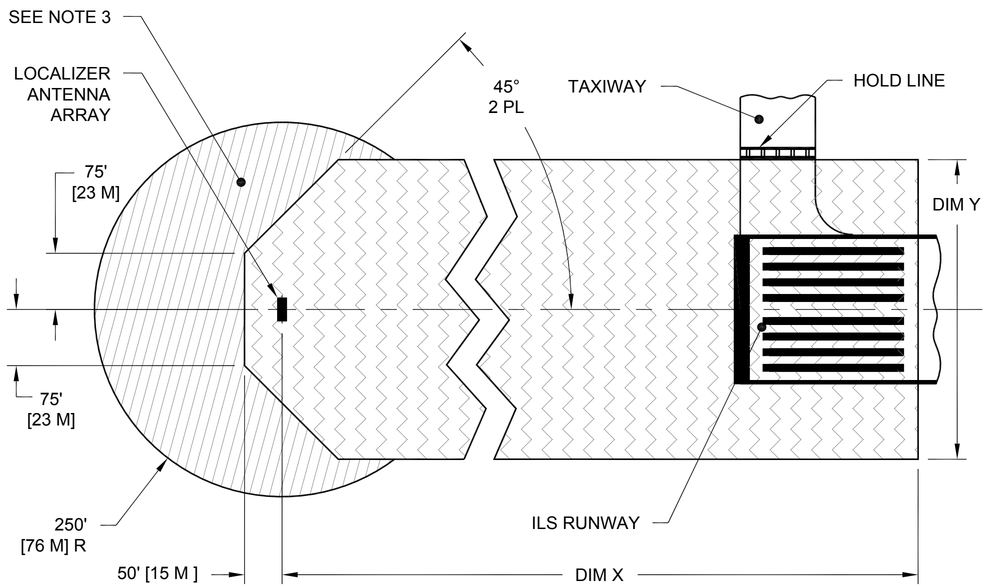
5.9 Group: NAVIGATIONAL AIDS.

5.9.1 NAVAID Critical Area.

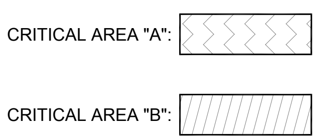
NAVAID Critical Area		
Definition: A zone encompassing a specific ground area in the vicinity of a radiating antenna array which requires protection from parking and unlimited movement of surface and air traffic.		
Feature Group	Navigational Aids	
Feature Class Name	NAVAIDCRITICALAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	NavigationalAidCriticalArea
	SDSFIE	None
	DO-272	None
Related Features	NAVAIDEQUIPMENT	
	NAVAIDSITE	
	TAXIWAYELEMENT	
	RUNWAY	
	RUNWAYELEMENT	
	BLAST PAD	
	ROAD SEGMENT	
	ROADCENTLERINE	
	STOPWAY	
	MARKING AREA	
	MARKING LINE	
	AIRPORT SIGN	
Data Capture Rule Capture a closed polygon encompassing the area requiring protection. When there are multiple areas requiring protection, such as a snow removal area, provide multiple instances of the feature depicting the different areas (Figure 5-68). Clearly identify the area being protected in the NavaidCriticalAreaName attribute. For an End Fire Glideslope, the attribute NavaidCriticalAreaXDimension applies to the sides connecting points AB and CD in Figure 5-69. The NavaidCriticalAreaYDimension applies to sides connecting AD and BC in Figure 5-70. Where the critical area or area requiring protection is circular in nature such as for a VORTAC or ASR, provide the radius of the circle in the NavaidCriticalAreaXDimension attribute and leave the NavaidCriticalAreaYDimension attribute blank.		

NAVAID Critical Area

Figure 5-68. NAVAID Critical Areas.



LEGEND:



CRITICAL AREA DIMENSIONS			
CATEGORY	DIM "X"	DIM "Y"	REMARKS
I	2000' [609 M]	400' [122 M]	SEE NOTE 4
II / III	2000' [609 M]	400' [122 M]	SEE NOTE 5
II	4000' [1219 M]	500' [152 M]	
III	7000' [2133 M]	500' [152 M]	

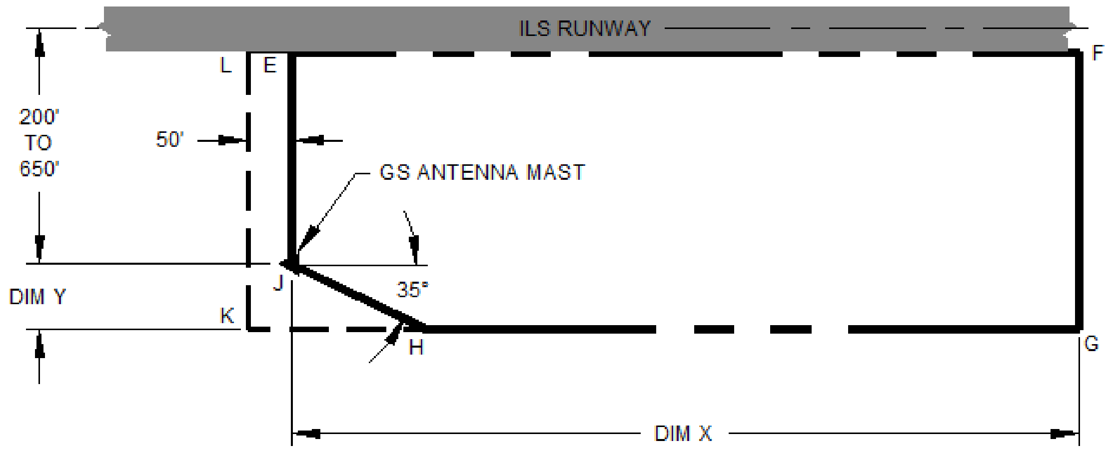
NOTES:

1. CRITICAL AREA IS INDICATED BY SHADED ZONES.
2. HOLD LINES/SIGNS INDICATE THE POSITION BEYOND WHICH AIRCRAFT/VEHICLES WILL REQUIRE ATCT AUTHORIZATION BEFORE PROCEEDING ON OR ACROSS RUNWAY.
3. AREA B IS DELETED FROM THE CRITICAL AREA WHEN A UNIDIRECTIONAL LOCALIZER ANTENNA IS INSTALLED. THE STANDARD LOG-PERIODIC DIPOLE ANTENNA IS IN THIS CATEGORY.
4. FOR 8-ELEMENT LOCALIZER ARRAY WITH COURSE WIDTHS LESS THEN 4° AND RUNWAYS WHICH OPERATE B-747 SIZE AND LARGER AIRCRAFT THE "Y' DIMENSION IS 600' [183 M].
5. THESE DIMENSIONS APPLY WHERE AIRCRAFT SIZE IS EQUAL TO OR LESS THAN 135' [41 M] IN LENGTH OR 42' [13 M] IN HEIGHT; E.G. B-737.
6. CRITICAL AREA FOR LDA, SDF, AND OFFSET LOCALIZER FACILITIES ARE THE SAME AS FOR CATEGORY I, BUT ARE CENTERED ABOUT THE COURSE LINE.

INSTRUMENT LANDING SYSTEM (ILS) LOCALIZER (LOC) CRITICAL AREA

NAVAID Critical Area

Figure 5-69. NAVAID Critical Area Polygon.



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.

● 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.

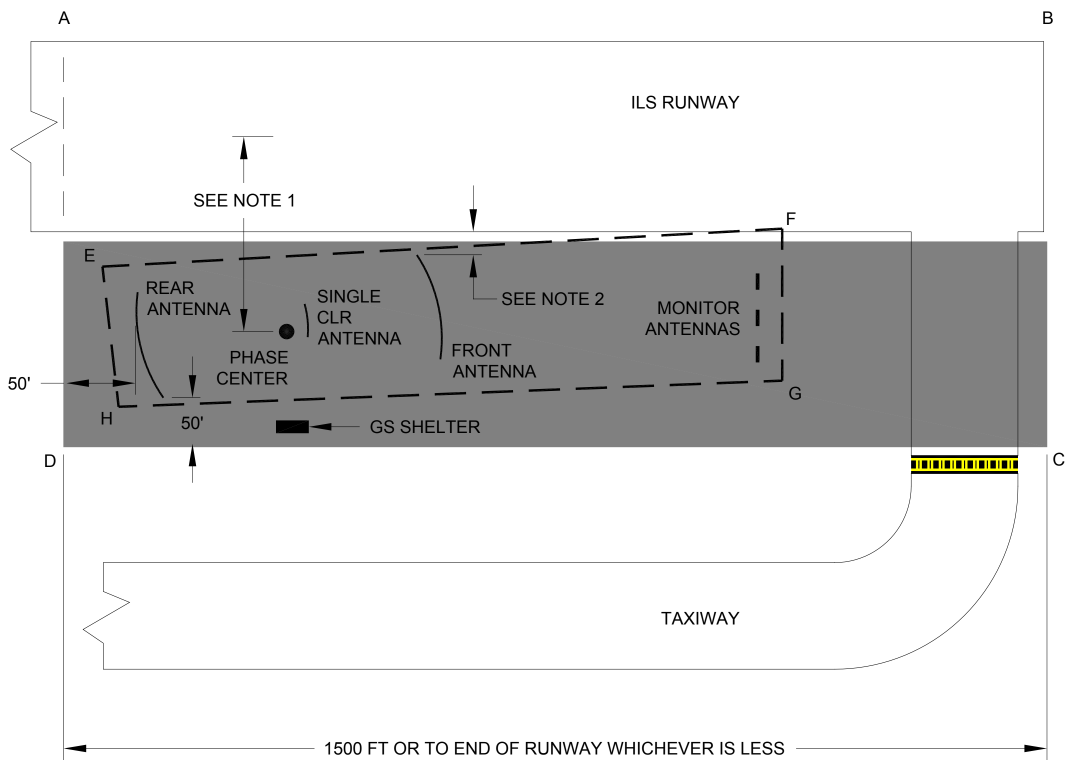
●● MEDIUM AIRCRAFT ARE DEFINED AS AIRCRAFT WITH DIMENSIONS LESS THAN 160' IN LENGTH AND 38' IN TAIL HEIGHT (I.E. B-737, MD-80).

●●● 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.

NAVAID Critical Area

Figure 5-70. NAVAID Critical Area Example.



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 is not less than 25 feet.
3. The critical area is defined by the area "ABCD". Unrestricted taxiing or holding aircraft is permitted in unshaded area.
4. Snow removal area is defined as "EFGH".

Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

Attribute Name *Datatype*	**Description**
LOCALIZERAREABREQUIRED *VARCHAR2(1)*	An indicator identifying localizer being described requires an Area B critical area. This attribute is only required for localizers, see FAA Order 6750.16 for more information.

NAVAID Critical Area	
NAVAIDCRITICALAREANAME *VARCHAR2(50)*	A locally used or defined name for the critical area.
NAVAIDCRITICALAREAXDIMENSION *NUMBER*	The linear dimension of the critical area in the X axis.
NAVAIDCRITICALAREAYDIMENSION *NUMBER*	The linear dimension of the critical area in the Y axis.
NAVAIDEQUIPMENTTYPECODE *VARCHAR2(10)*	A code from **CodeNavaidEquipmentType** identifying the type of navigational aid the critical area protects.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways.
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading.

5.9.2 NAVAID Equipment.

NAVAID Equipment		
Definition: Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight.		
Feature Group	Navigational Aids	
Feature Class Name	NAVAIDEQUIPMENT	
Feature Type	Point	
Equivalent Standards	**AIXM**	AeronauticalGroundLight Navaid NavaidComponent NavaidEquipment NavaidEquipmentDistance PrecisionApproachRadar PrimarySurveillanceRadar RadarSystem RadarComponent RadarEquipment Reflector SurveillanceRadar VisualGlideslopeIndicator
	FGDC	NavaidEquipment
	SDSFIE	AirNavigationAid
	DO-272	None
Related Features	NAVAIDEQUIPMENT	
	NAVAIDSITE	
	TAXIWAYELEMENT	
	POSITION (CENTERLINE POINT)	
	RUNWAY	
	RUNWAYELEMENT	
	BLAST PAD	
	ROAD SEGMENT	

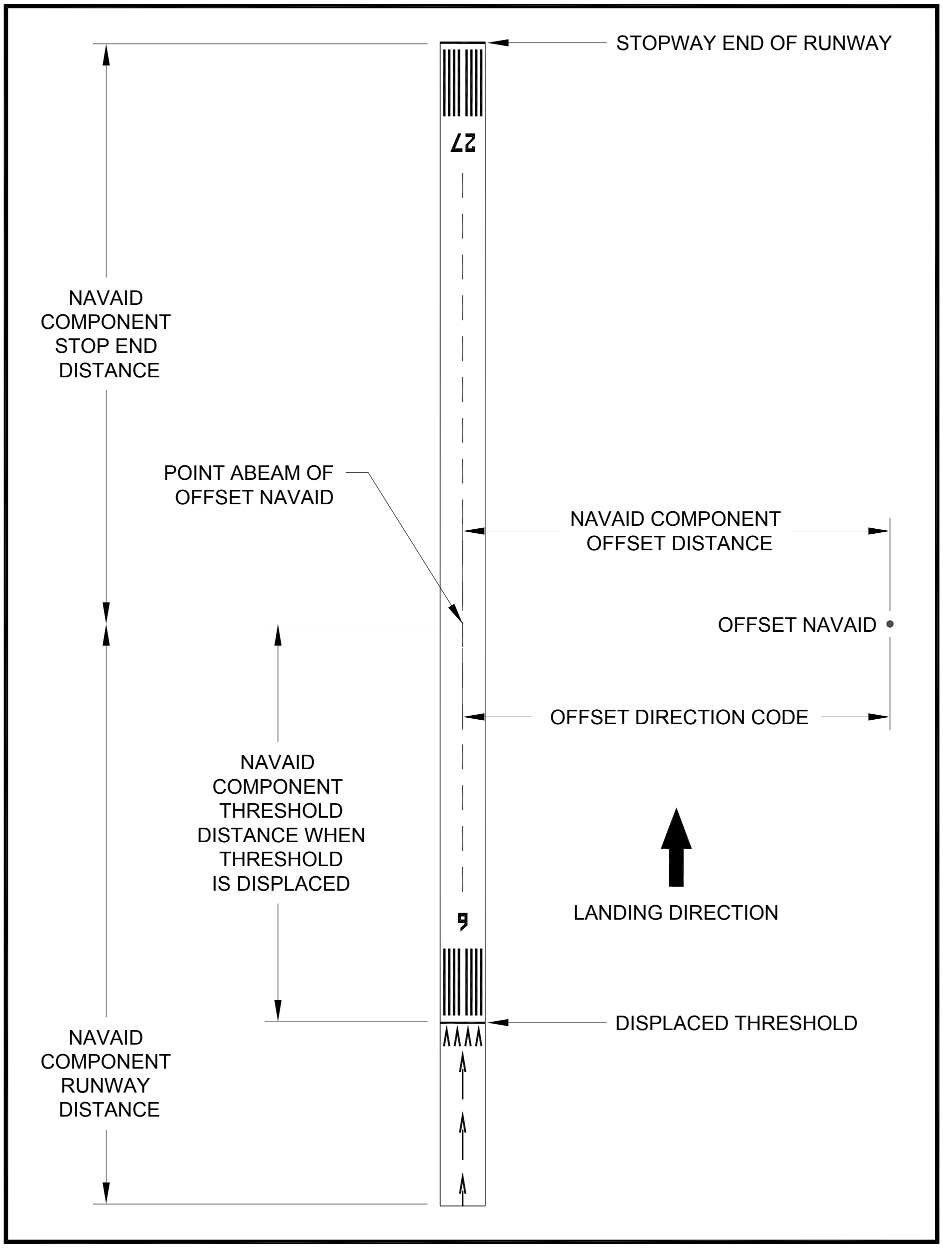
NAVAID Equipment	
	ROADCENTLERINE
	STOPWAY
	MARKING AREA
	MARKING LINE
	AIRPORT SIGN

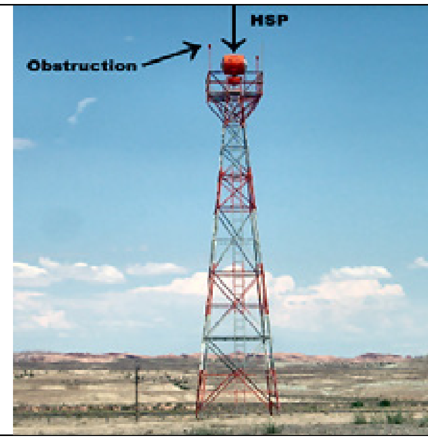
Data Capture Rule

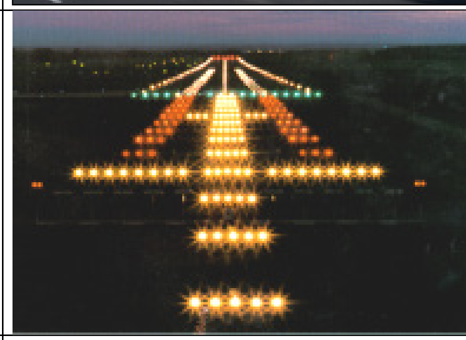
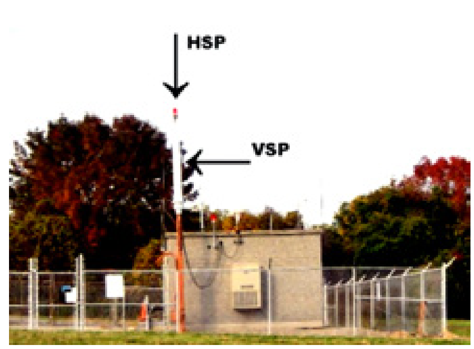
Capture the navigational aid (Figure 5-71) using the defined horizontal and vertical survey locations identified in Table 5-1. Refer to paragraph 2.7.2 for collocation information.

NAVAID Equipment

Figure 5-71. Illustrates the Different Measurements Required for Navigational Aids.

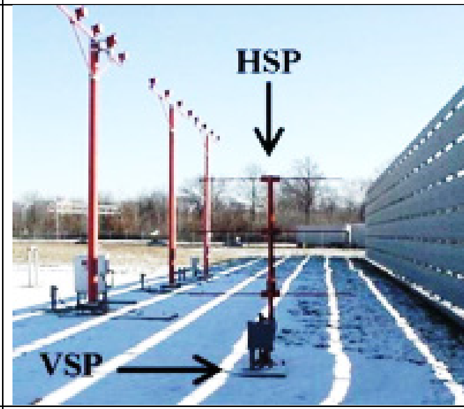
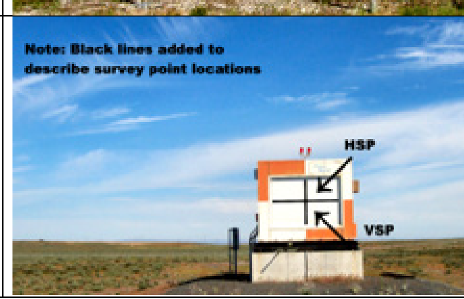


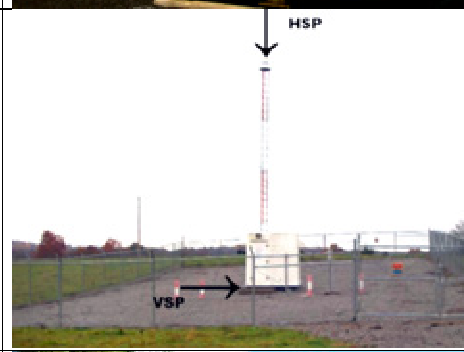
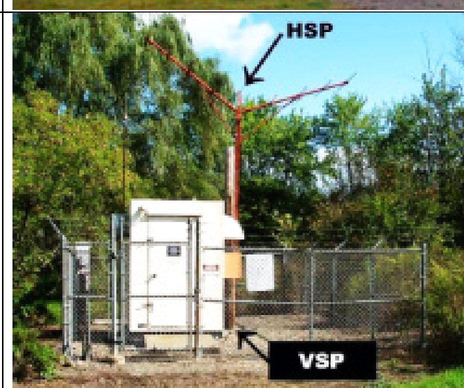
NAVAID Equipment			
Table 5-1. NAVAID Equipment Documentation and Submission Requirements.			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
Airport Beacon	Center of cover or axis of rotation	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point (HSP).	
Airport Surveillance Radar (ASR)	Axis of rotation	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Air Route Surveillance Radar (ARSR)	Axis of Rotation	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	

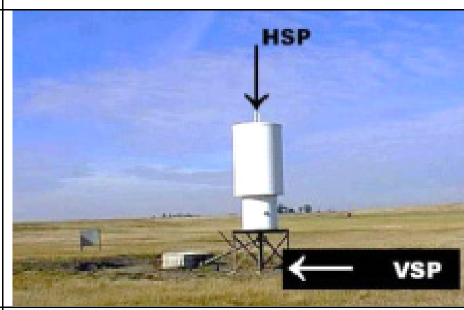
NAVAID Equipment			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
Air Traffic Control Tower (ATCT)	Center of the tower cab	Highest point on tower cab.[10]	
Approach Light System	Horizontal center of the center light of the first and last light rows.	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Back Course Marker	Center of antenna array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	No Image Available
Distance Measuring Equipment (DME) or DME paired with a localizer, Microwave Landing System (MLS) Azimuth antenna, NDB, or VOR	Center of antenna cover	Center of antenna cover	
Glide Slope – End Fire	Phase center reference point	Phase Center Reference Point	

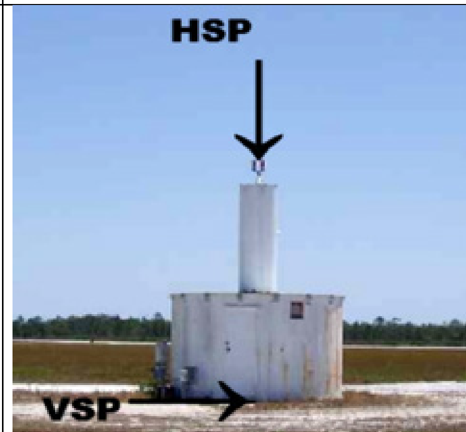
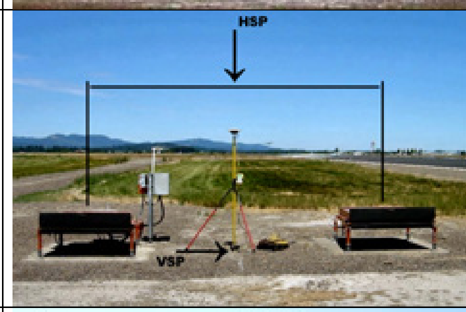
[10] Though technically not a navigational aid, we identify it here for convenience. Capture and note in the UserNoteText attribute the height of the tower cab floor.

NAVAID Equipment			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
Fan Marker	Center of antenna array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	No Image Available
Glide Slope	Center of antenna supporting structure	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Ground Controlled Approach (GCA) Touchdown Reflectors	Center of reflector	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	

NAVAID Equipment			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
Inner Marker	Center of the antenna array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Localizer	Center of antenna supporting structure	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Localizer Directional Aid (LDA)	Center of the antenna supporting structure	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Middle Marker	Center of antenna array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Microwave Landing System – Azimuth Antenna (MLSAZ)	Phase Center Reference Point	Phase Center Reference Point	

NAVAID Equipment			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
MLS Elevation Antenna (MLSEL)	Phase Center Reference Point	Phase Center Reference Point	
Non-Directional Beacon (NDB)	Center of antenna array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Outer Marker	Center of antenna array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Precision Approach Path Indicator (PAPI)	Center of light array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Precision Approach Radar (PAR) Touchdown Reflectors	Center of reflector	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	No Image Available

NAVAID Equipment			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
Pulse Light Slope Indicator (PLASI)	Center of light array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Runway End Identifier Lights (REIL)	Center of Light	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Simplified Directional Finding (SDF)	Center of antenna supporting structure	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	No Image Available
Tactical Air Navigation (TACAN)	Center of Antenna cover	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
T-Visual Approach Slope Indicator (T-VASI)	Center of light array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	No Image Available

NAVAID Equipment			
Navigational Aid	**Horizontal Survey Location**	**Vertical Survey Location**	**Image**
VHF Omnidirectional Range (VOR)	Center of antenna cover	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
Visual Approach Slope Indicator (VASI)	Center of light array	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	
VORTAC	Center of antenna cover	The intersection of the ground, gravel, concrete pad or other base and a plumb line through the horizontal survey point.	

Survey Accuracies – Airport Beacon (APBN)	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Survey Accuracies – Air Route or Airport Surveillance Radar (ASR)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)

NAVAID Equipment	
Survey Accuracies – Approach Light System (ALS)	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Survey Accuracies – Air Traffic Control Tower (ATCT)	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Back Course Marker (BCM)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Distance Measuring Equipment (DME)	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 1 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredths of an arc second (± 0.01)
Survey Accuracies – End Fire Glide Slope	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth foot
Geographic Coordinate Resolution	Nearest one hundredths of an arc second (± 0.01)
Survey Accuracies – Fan Marker (FM)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Glide Slope (GS)	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	±0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredths of an arc second (± 0.01)

NAVAID Equipment	
Survey Accuracies – Ground Controlled Approach Touchdown Reflectors	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	± 20.00 ft
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Inner Marker (IM)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Localizer (LOC)	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)
Survey Accuracies – Localizer Directional Aid (LDA)	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 1.00 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)
Survey Accuracies – Middle Marker (MM)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – MLS Azimuth Antenna	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 1 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)
Survey Accuracies – MLS Elevation Antenna	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	± 0.20 ft
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

NAVAID Equipment	
Survey Accuracies – Non-Directional Beacon (NDB)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Outer Marker (OM)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Precision Approach Path Indicator (PAPI) System	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Precision Approach Radar (PAR) Touchdown Reflectors	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Pulse Light Approach Slope Indicator (PLASI) System	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Runway End Identifier Light (REIL)	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Survey Accuracies – Simplified Directional Facility (SDF)	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 1.00 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest one hundredth of an arc second (± 0.01)

NAVAID Equipment	
Survey Accuracies – Tactical Air Navigation (TACAN)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – T-Visual Approach Slope Indicator (T-VASI)	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – VHF Omnidirectional Range (VOR)	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Survey Accuracies – Visual Approach Slope Indicator (VASI) System	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – VORTAC	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)

Attribute Name ***Datatype***	**Description**
ELLIPSOIDELEVATIONMEASUREMENT *NUMBER*	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.
HEIGHTABOVEELLIPSOIDMEASUREMENT *NUMBER*	The height above the ellipsoid value for the runway reference point being represented.
HIGHANGLEMEASUREMENTCODE *NUMBER*	The maximum approach light vertical angle. This attribute is only required when the **CodeNavaidEquipmentType** is set to “VISUAL”.

NAVAID Equipment	
LIGHTINGSYSTEMTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type visual navigational aid the feature instance represents. This attribute is only required when the **CodeNavaidEquipmentType** is set to "VISUAL".
NAVAIDAIRSPACEUSECODE *VARCHAR2(5)*	A code from **CodeUseCode** identifying the airspace structure the navigational aid services.
NAVAIDCOMPONENTOFFSETDISTANCE *NUMBER*	The distance the navigational aid is offset from the runway centerline.
NAVAIDCOMPONENTANTENNAHEIGHT *NUMBER*	The above ground height of the NAVAID component antenna from the ground to the top of the antenna.
NAVAIDCOMPONENTMARKERROLECODE *VARCHAR2(3)*	A code from **CodeMarkerRole** identifying the role a fan marker or non-directional beacon provides to an instrument approach.
NAVAIDCOMPONENTRUNWAYDISTANCE *NUMBER*	The distance the navigational aid antenna is from the physical runway end. This distance should equal the NAVAID Component Threshold Distance when the serviced runways threshold is not displaced. Provide this distance to the nearest tenth of a foot.
NAVAIDCOMPONENTSTOPENDDISTANCE *NUMBER*	The distance the navigational aid is from the stop end of the runway. The stop end of the runway is the end opposite the landing direction.
NAVAIDCOMPONENTTHRESHOLDDISTANCE *NUMBER*	The distance the navigational aid antenna is from the runway threshold. Measure this distance from a point abeam the navigational aid antenna on the runway centerline to the threshold location (physical runway end or displaced threshold). Provide this distance to at least the nearest tenth of a foot
NAVAIDCOMPONENTTYPECODE *VARCHAR2(10)*	A code from **CodeNavaidEquipmentType** identifying the type of navigational aid the feature instance represents.
NAVAIDSYSTEMIDENTIFIER *VARCHAR2(6)*	The identifier assigned to the facility[11].

[11] 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

NAVAID Equipment	
NAVAIDSYSTEMNAME *VARCHAR2(50)*	The name given to the NAVAID component.
NAVAIDSYSTEMTYPE *VARCHAR2(7)*	A code from **CodeNavaidSystemType** identifying the NAVAID system the NAVAID equipment is a part of.
OFFSETDIRECTIONCODE *VARCHAR2(5)*	A code from **CodeOffsetDirection** identifying which side of the serviced runway the navigational aid is located on (Left, Right or On Centerline). Determine the appropriate direction from the approach threshold down the runway toward the navigational aid.
OWNERCODE *VARCHAR2(4)*	A code from **CodeOwner** identifying the organization owning and responsible for maintaining the navigational aid.
RUNWAYDIRECTIONDESIGNATORCODE *VARCHAR2(1)*	A code from **CodeRunwayDirection** designating the relationship of the runway direction in relation to parallel runways. This attribute is only required for the following types of navigational aids[12].
RUNWAYDIRECTIONNUMBER *NUMBER*	The number portion of a runway designation based on the first two digits of the runway magnetic heading. This attribute is only required for certain types of navigational aids[11].
RUNWAYPOINTROLECODE *VARCHAR2(24)*	A code from **CodePositionRoleCode** identifying the use of the point being described.
RUNWAYREFERENCEPOINTDISTANCE *NUMBER*	The distance the runway reference point is from the threshold. Provide this distance to the nearest tenth of a foot. This attribute is only required for instances of VGSI facilities.
VGSITHRESHOLDCROSSINGHEIGHT *NUMBER*	The computed threshold crossing height for the visual glideslope indicator serving the runway being represented. This attribute is only required for instances of VGSI facilities.

associated location, the equipment 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 8240-52]

[12] The following navigational aids require completing the RunwayDirectionDesignatorCode and RunwayDirectionNumber attributes: glideslope, localizer, visual glideslope indicators, runway end identifier lights (REILs), Precision Approach Radar (PAR), Microwave Landing System Elevation and Azimuth, Fan Marker, Back Course Marker, Localizer Directional Aid (LDA), PAR or GCA Touchdown reflectors, and approach light systems.

5.9.3 NAVAID Site.

NAVAID Site		
Definition: The parcel, lease, right of way boundary for a NAVAID or facility located off airport property.		
Feature Group	Navigational Aids	
Feature Class Name	NAVAIDSITE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	NavaidEquipment
	FGDC	NavigationalAidSite
	SDSFIE	None
	DO-272	None
Related Features	NAVAIDEQUIPMENT	
	NAVAIDCRITICALAREA	
	AIRPORTPARCEL	
	PARCEL	
	RIGHTANDINTEREST	
Data Capture Rule Capture a closed polygon encompassing the site of the **navigational aid**.		
Survey Accuracies		
Horizontal Accuracy	± 5.00 ft	
Vertical Accuracy (Ellipsoid)	Not Applicable	
Vertical Accuracy (Orthometric)	± 10.00 ft	
Distance and Elevation Resolution	Nearest foot	
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)	

Attribute Name ***Datatype***	**Description**
NAVAIDSYSTEMIDENTIFIER *VARCHAR2(6)*	The identifier assigned to the facility[13].
NAVAIDSYSTEMNAME *VARCHAR2(50)*	The name given to the NAVAID component.
PROPERTYCUSTODIANNAME *VARCHAR2(50)*	The name of the individual or organization responsible for the land the NAVAID site encompasses.

[13] 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, the equipment 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 8240-52]

5.10 Group: SEAPLANE.

5.10.1 Anchorage Area.

Anchorage Area		
Definition: A defined area designated specifically for the parking of seaplanes.		
Feature Group	Seaplane	
Feature Class Name	ANCHORAGEAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	FloatingDockSite
	FGDC	None
	SDSFIE	VesselHoldingArea
	DO-272	None
Related Features	DOCKING AREA	
	NAVIGATION BUOY	
	SEAPLANE RAMP SITE	
	SEAPLANE RAMP CENTERLINE	
	TAXI CHANNEL	
	TURNING BASIN	
	WATER LANE	
	WATER LANE END	
	WATER OPERATING AREA	

Data Capture Rule

Collect the **Anchorage Area** as a closed polygon or set of polygons encompassing the entire area being represented.

Survey Accuracies

Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)

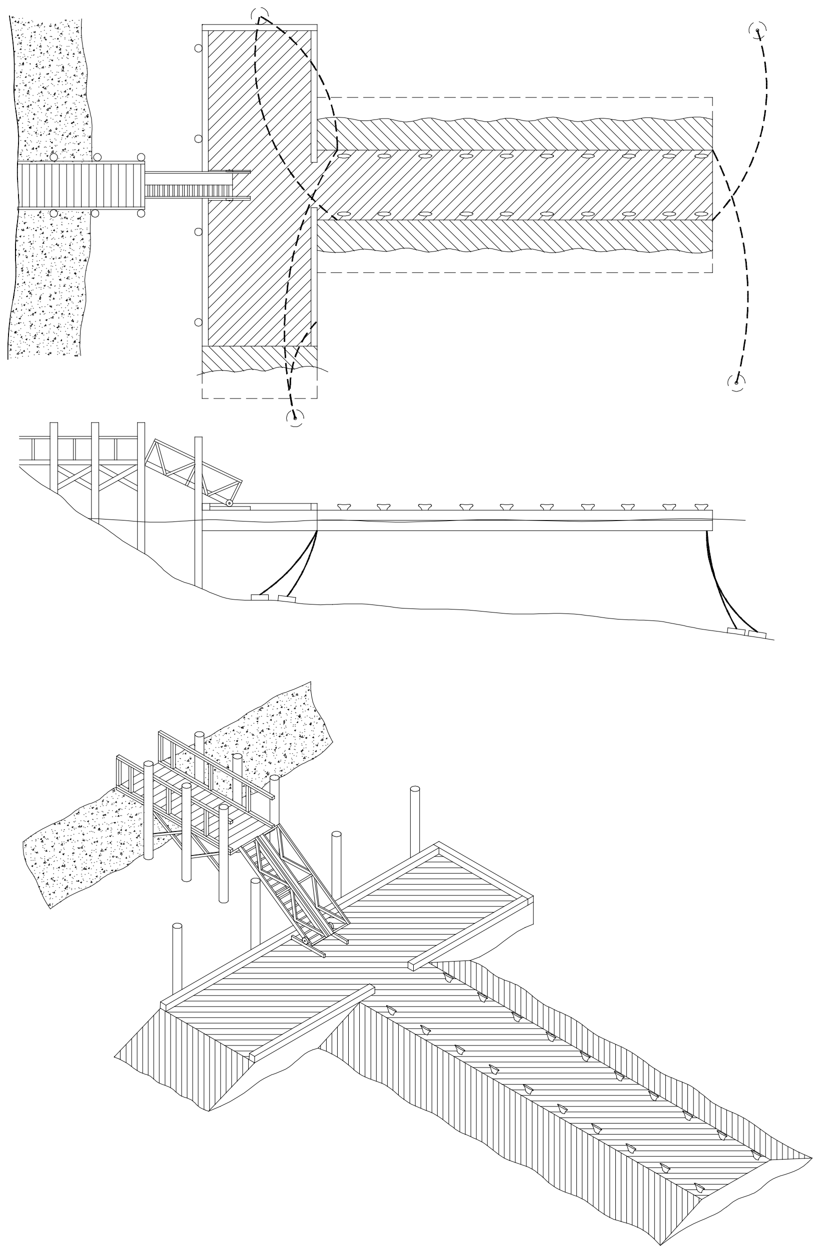
Attribute Name *Datatype*	**Description**
ANCHORAGEAREABOTTOMCONDITIONTEXT *VARCHAR2(50)*	Identify the type of bottom conditions within the anchorage area.
ANCHORAGEAREADEPTHVALUE *NUMBER*	Specify the depth of the anchorage area with respect to lowest low tide.
ANCHORAGEAREALENGTH *NUMBER*	The overall length of the anchorage area available.
ANCHORAGEAREAMOORINGLOCATIONS *NUMBER*	Specify the number of mooring locations available within the anchorage area.
ANCHORAGEAREANAME *VARCHAR2(50)*	The official or commonly used name for the anchorage area.
ANCHORAGEAREARESTRICTIONTEXT *VARCHAR2(255)*	Any restrictions or cautions associated with the anchorage area.
ANCHORAGEAREAWIDTHVALUE *NUMBER*	The overall width of the anchorage area available.

5.10.2 Docking Area.

Docking Area		
Definition: A defined area on a seaplane base either fixed or floating, intended to accommodate aircraft loading or unloading passengers, cargo, refueling, maintenance, or parking.		
Feature Group	Seaplane	
Feature Class Name	DOCKINGAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	FloatingDockSite
	FGDC	FloatingDockSite
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	NAVIGATION BUOY	
	WATER OPERATING AREA	
	TAXI CHANNEL	
	TURNING BASIN	
	WATER LANE END	
	SEAPLANE RAMP SITE	
	SEAPLANE RAMP CENTERLINE	
Data Capture Rule Collect the **docking area** (Figure 5-72) as a polygon at the lateral limits of the dock structure.		

Docking Area

Figure 5-72. Docking Area.



Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Docking Area	
Attribute Name ***Datatype***	**Description**
DOCKINGAREANAME *VARCHAR2(50)*	The official or commonly used name for the docking area.
FLOATINGBARGEAVAILABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if a floating barge is available as part of the docking area.
FLOATINGBARGELENGTHVALUE *NUMBER*	Specify the overall length of the floating barge.
FLOATINGBARGESTRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** defining the material used in constructing the floating barge.
FLOATINGBARGEWIDTHVALUE *NUMBER*	Specify the overall width of the floating barge.
FLOATINGDOCKAVAILABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if a floating dock is available at the docking area.
FLOATINGDOCKLENGTH *NUMBER*	The overall length of the floating dock available at the docking area.
FLOATINGDOCKSTRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** defining the material used in constructing the floating dock.
FLOATINGDOCKWIDTHVALUE *NUMBER*	The overall width of the floating dock available at the docking area.
GANGWAYAVAILABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if a gangway is available at the docking area.
GANGWAYLENGTH *NUMBER*	The length of the gangway available at the docking area.
GANGWAYSTRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** defining the material used in constructing the gangway.
GANGWAYWIDTHVALUE *NUMBER*	The overall width of the gangway available at the docking area.
HOISTINGCAPABILITYVALUE *NUMBER*	Specify the hoisting capability in pounds.
MARINERAILWAYAVAILABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if a marine railway is available at the location.
MARINERAILWAYPLATFORMCAPACITY *NUMBER*	Specify the marine railway platform capacity in pounds.
MARINERAILWAYPLATFORMLENGTH *NUMBER*	Specify the length of the marine railway platform.
MARINERAILWAYPLATFORMWIDTHVALUE *NUMBER*	Specify the overall width of the marine railway platform.
PIERAVAILABLEINDICATOR *VARCHAR2(1)*	An indicator identifying if a pier is available at the docking area.
PIERLENGTHVALUE *NUMBER*	The length of the pier available at the docking area.

Docking Area	
PIERVERTICALSTRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** defining the material used in constructing the pier.
PIERWIDTHVALUE *NUMBER*	The width of the pier at the docking area.

5.10.3 Navigation Buoy.

Navigation Buoy		
Definition: A floating marker, moored to the bottom at a specific known location, used as an aid to navigation or other special purpose.		
Feature Group	Seaplane	
Feature Class Name	NAVIGATIONBUOY	
Feature Type	Point	
Equivalent Standards	**AIXM**	MarkingBuoy
	FGDC	NavigationBuoy
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	NAVIGATION BUOY	
	WATER OPERATING AREA	
	TAXI CHANNEL	
	TURNING BASIN	
	WATER LANE END	
	SEAPLANE RAMP SITE	
	SEAPLANE RAMP CENTERLINE	
Data Capture Rule Collect a point at the top center of the **buoy** regardless of water level at the time of data collection.		

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.10)

Attribute Name ***Datatype***	**Description**
LIGHTINGCONFIGURATIONTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of lighting associated with the navigation buoy.
NAVIGATIONBUOYCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color of a navigation buoy.
NAVIGATIONBUOYDESIGNATIONID *VARCHAR2(20)*	The official number of the buoy.

Navigation Buoy	
NAVIGATIONBUOYNAME *VARCHAR2(50)*	The official or commonly used name for the navigation buoy.
NAVIGATIONBUOYOWNERCODE *VARCHAR2(50)*	A code from **CodeOwner** identifying the owner or responsible party of the navigation buoy.
NAVIGATIONBUOYTYPECODE *VARCHAR2(13)*	A code from **CodeBuoyType** identifying the type of navigation buoy.

5.10.4 Seaplane Ramp Centerline.

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	
Equivalent Standards	**AIXM**	SeaplaneRampSite
	FGDC	SeaplaneRampCenterline
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	APRON	
	DOCKING AREA	
	SEAPLANE RAMP SITE	
	TAXI CHANNEL	
	TAXIWAY ELEMENT	
	WATER OPERATING AREA	

Data Capture Rule

Collect the centerline of the ramp form the edge of pavement or other surface type used for entering and exiting water. Extend the line from the water line to apron or taxiway whichever is encountered first. The vertical accuracy of the feature will account for any differences between high and low tide.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
SEAPLANERAMPCENTERLINELENGTH *NUMBER*	Specify the length of the seaplane ramp centerline from the water to the shoreline.

5.10.5 Seaplane Ramp Site.

Seaplane Ramp Site	
Definition: Ramps specifically designed to transit seaplanes to or from water or land.	
Feature Group	Seaplane

Seaplane Ramp Site		
Feature Class Name	SEAPLANERAMPSITE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	SeaplaneRampSite
	FGDC	SeaplaneRampSite
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	APRON	
	DOCKING AREA	
	SEAPLANE RAMP CENTERLINE	
	TAXI CHANNEL	
	TAXIWAY ELEMENT	
	WATER OPERATING AREA	

Data Capture Rule

Collect a closed polygon encompassing the horizontal limits of the ramp from the water line to the taxiway or apron whichever is encountered first.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
SEAPLANERAMPSITELENGTH *NUMBER*	The length of the ramp from the water line to the shoreline.
SEAPLANERAMPSITENAME *VARCHAR2(50)*	The official or commonly used name for the seaplane ramp.
SEAPLANERAMPSITESLOPEVALUE *NUMBER*	The first term of the slope ratio of the ramp specified as an integer.
SEAPLANERAMPSTRUCTUREMATERIAL *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** identifying the predominant surface material of the structure.
SEAPLANERAMPWIDTH *NUMBER*	The overall width of the seaplane ramp.

5.10.6 Taxi Channel.

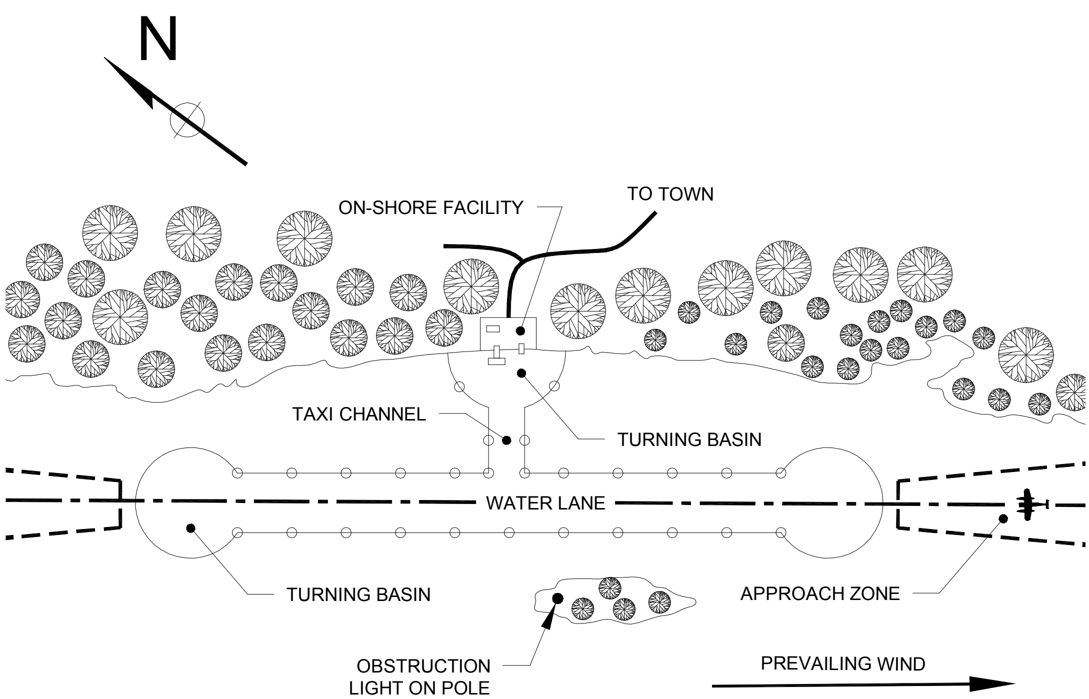
Taxi Channel		
Definition: A water channel used for the movement of seaplanes between on-shore facilities and the water lane.		
Feature Group	Seaplane	
Feature Class Name	TAXICHANNEL	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	None

Taxi Channel		
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	DOCKING AREA	
	NAVIGATION BUOY	
	SEAPLANE RAMP CENTERLINE	
	SEAPLANE RAMP SITE	
	TURNING BASIN	
	WATER LANE END	
	WATER OPERATING AREA	

Data Capture Rule

Collect the **taxi channel** (Figure 5-73) at its greatest horizontal extents. Existing markers or buoys may define the width. If the taxi channel is not marked for width, refer to width published by FAA in the U.S. Terminal Procedures.

Figure 5-73. Taxi Channel.



Survey Accuracies

Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest Foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Taxi Channel	
Attribute Name ***Datatype***	**Description**
TAXICHANNELDEPTHVALUE *NUMBER*	Specify the depth of the taxi channel with respect to mean lowest low tide.
TAXICHANNELLENGTH *NUMBER*	Specify the overall length of the taxi channel.
TAXICHANNELNAME *VARCHAR2(50)*	The given or commonly used name for the taxi channel.
TAXICHANNELRESTRICTIONTEXT *VARCHAR2(255)*	Identify any restrictions or cautions associated with the taxi channel.
TAXICHANNELWIDTH *NUMBER*	Specify the overall width of the taxi channel.

5.10.7 Turning Basin.

Turning Basin		
Definition: A water area used for the maneuvering of seaplanes where use of the water surface is restricted. Turning basins should be located adjacent to shoreline facilities and at the end of water operating area.		
Feature Group	Seaplane	
Feature Class Name	TURNINGBASIN	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	DOCKING AREA	
	NAVIGATION BUOY	
	SEAPLANE RAMP CENTERLINE	
	SEAPLANE RAMP SITE	
	TAXI CHANNEL	
	WATER LANE END	
	WATER OPERATING AREA	

Data Capture Rule

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.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest Foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
TURNINGBASINDEPTHVALUE *NUMBER*	Specify the depth of the turning basin with respect to lowest low tide.

Turning Basin	
TURNINGBASINDIAMETERVALUE *NUMBER*	The diameter of the turning basin available for use by aircraft.
TURNINGBASINDIRECTIONCODE *VARCHAR2(3)*	A code from **CodeCompassDirection** indicating the compass direction of the turning basin from the centroid of the water lane end.
TURNINGBASINLENGTH *NUMBER*	Specify the overall length of the turning basin.
TURNINGBASINNAME *VARCHAR2(50)*	The given or commonly used name for the turning basin.
TURNINGBASINRESTRICTIONTEXT *VARCHAR2(255)*	Any restrictions or cautions associated with the turning basin.
TURNINGBASINWIDTH *NUMBER*	Specify the overall width of the turning basin.

5.10.8 Water Lane End.

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 seaplanes. Water Lane Ends define the water lane and describe the approach and departure procedure characteristics of a water lane.		
Feature Group	Seaplane	
Feature Class Name	WATERLANEEND	
Feature Type	Point	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	DOCKING AREA	
	NAVIGATION BUOY	
	SEAPLANE RAMP CENTERLINE	
	SEAPLANE RAMP SITE	
	TAXI CHANNEL	
	TURNING BASIN	
	WATER LANE END	

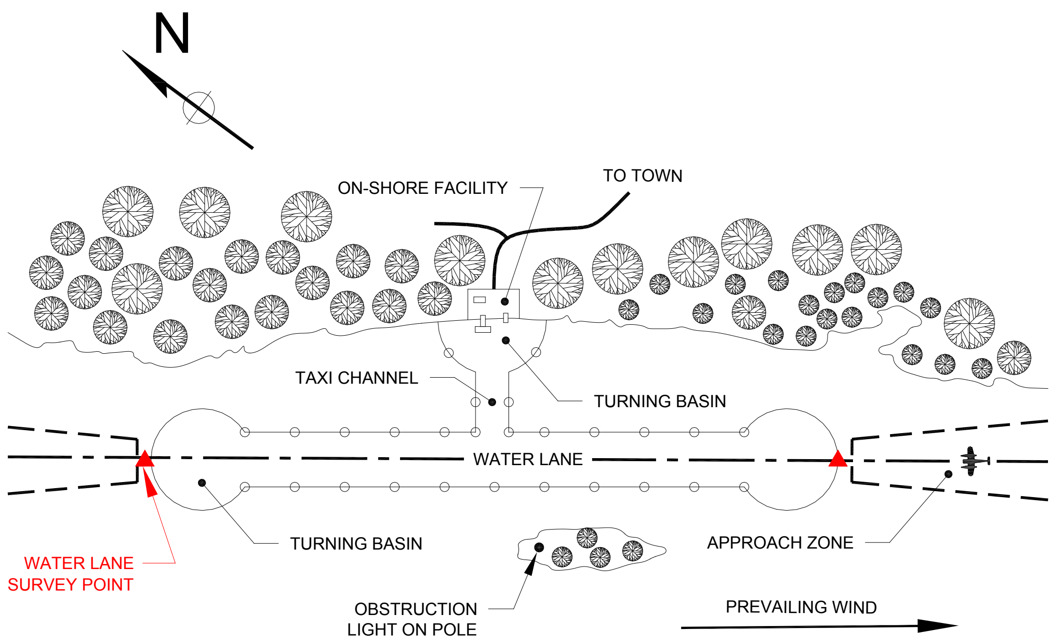
Data Capture Rule

Collect a point on the turning basin boundary identifying the point where aeronautical activity is expected to occur (Figure 5-74). Typically, markers or buoys define the area; locate the **Water Lane End** at least 10 feet inside the markers or buoys.

Provide separate instances of the feature for each water lane end.

Water Lane End

Figure 5-74. Water Lane End.



Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
AIRMARKERCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color of the air marker at the waterway end, if one is present.
APPROACHGUIDANCECODE *VARCHAR2(22)*	A code from **CodeApproachGuidance** identifying the type of approach guidance in use or planned for the water operating area.
NAVIGATIONBUOYLIGHTINGTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type (if any) of lighting at the location.
PRIMARYWATERCENTROIDLOCATIONTEXT *VARCHAR2(22)*	The geographic location of the primary water centroid, used to determine the primary and alternate water lanes within the water operating area.

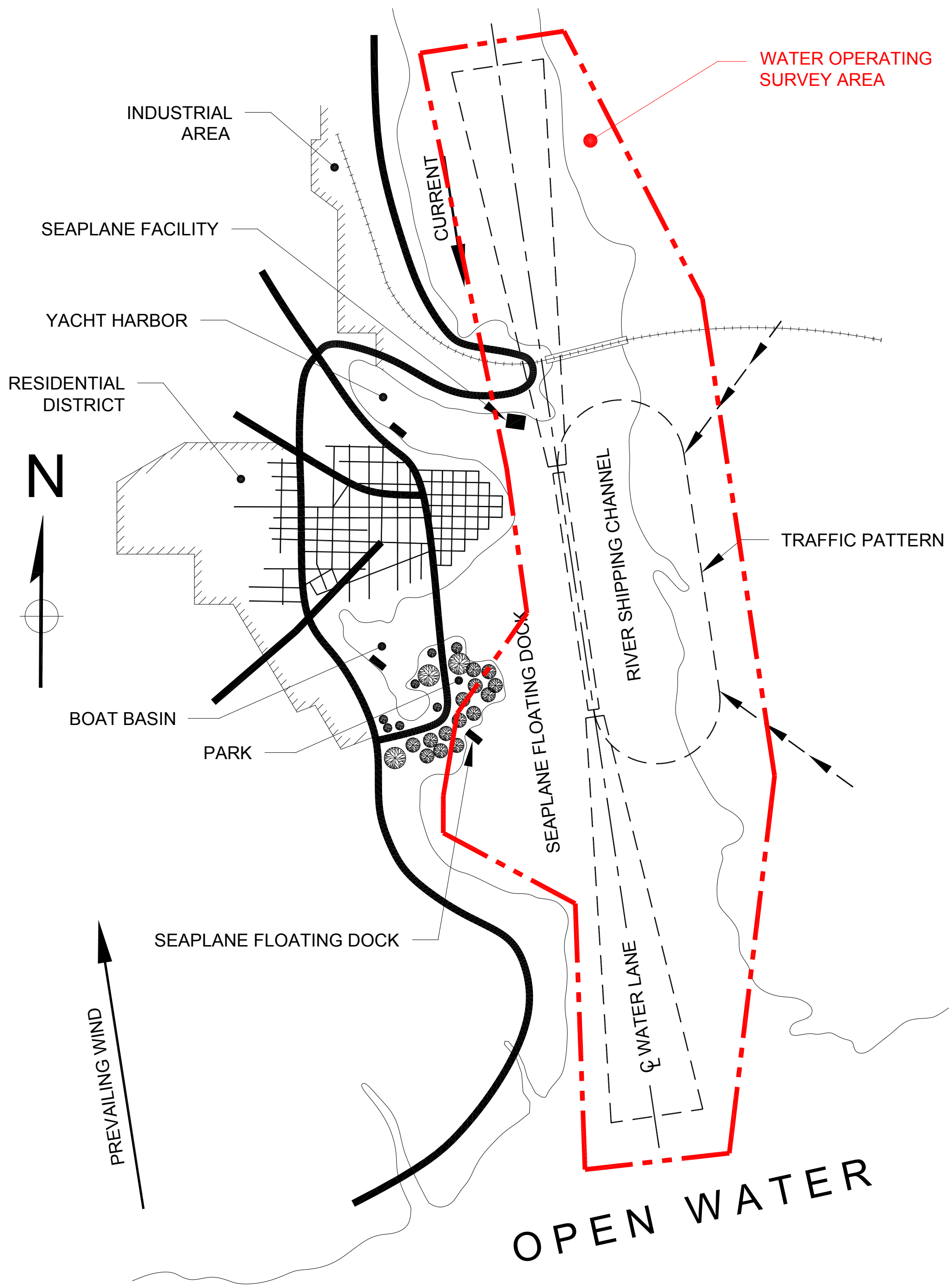
Water Lane End	
STANDARDAIRMARKERINDICATOR VARCHAR2(1)	An indicator identifying if a standard air marker is used at the location.
WATERLANEENDDEPTHVALUE *NUMBER*	Specify the depth of the primary water lane with respect to mean lowest low tide.
WATERLANEENDDIRECTIONCODE *VARCHAR2(3)*	A code from **CodeCompassDirection** identifying the compass direction of the turning basin from the centroid of the water lane end. This feature is similar to the land based airport runway direction feature.
WATERLANEENDLENGTH *NUMBER*	Specify the overall length of the water lane.
WATERLANEENDNAME *VARCHAR2(50)*	The given or commonly used name for the water lane end.
WATERLANEENDRESTRICTIONTEXT *VARCHAR2(255)*	Identify any restrictions or cautions associated with the sea plane landing area.
WATERLANEENDTYPECODE *VARCHAR2(9)*	A code from **CodeWaterLaneType** identifies the water lane end as the Primary or Alternate water lane
WATERLANEENDWIDTH *NUMBER*	Specify the overall width of the water lane.

5.10.9 Water Operating Area.

Water Operating Area		
Definition: An area designated and marked for the takeoff and landing of seaplanes. This is equivalent to the Airport Operating Area of a land based airport.		
Feature Group	Seaplane	
Feature Class Name	WATEROPERATINGAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	None
	SDSFIE	None
	DO-272	None
Related Features	ANCHORAGE AREA	
	DOCKING AREA	
	NAVIGATION BUOY	
	SEAPLANE RAMP CENTERLINE	
	SEAPLANE RAMP SITE	
	TAXI CHANNEL	
	TURNING BASIN	
	WATER LANE END	
Data Capture Rule Collect the **Water Operating Area** (Figure 5-75) using a bounding polygon or multiple polygons to capture the area at its greatest extents.		

Water Operating Area

Figure 5-75. Water Operating Area.



Water Operating Area	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
COORDINATEDUSEACTIVITYLEVELVALUE *NUMBER*	Specify the amount of activity based on a percentage of daily use of the primary coordinated use type. If the area is used for multiple uses provide the value for the activity having the largest single use level of activity.
COORDINATEDUSETYPECODE *VARCHAR2(1)*	A code from **CodeCoordinatedUseType** identifying the primary coordinated use of the waterway. If no single activity comprises the majority of the coordinated use, then specify multiple.
CURRENTFLOWDIRECTIONCODE *VARCHAR2(3)*	A code from **CodeCompassDirection** specifying the magnetic bearing of the current flow direction.
CURRENTFLOWRATE *NUMBER*	Measure and specify the rate of the current flow in the WATEROPERATINGAREA in miles per hour.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the water operating area.
WATEROPERATINGAREALENGTH *NUMBER*	Specify the overall length of the WATEROPERATINGAREA intended for use.
WATEROPERATINGAREANAME *VARCHAR2(50)*	Provide a name of the water operating area. If the area does not have a specific or commonly used name, provide the name of the river or lake where the water operating area is located.
WATEROPERATINGAREATIDALRANGE *NUMBER*	Specify (in feet) the height difference from mean low to mean high tide.
WATEROPERATINGAREAWIDTH *NUMBER*	Specify the overall width of the WATEROPERATINGAREA available and intended for use.

5.11 Group: SECURITY.

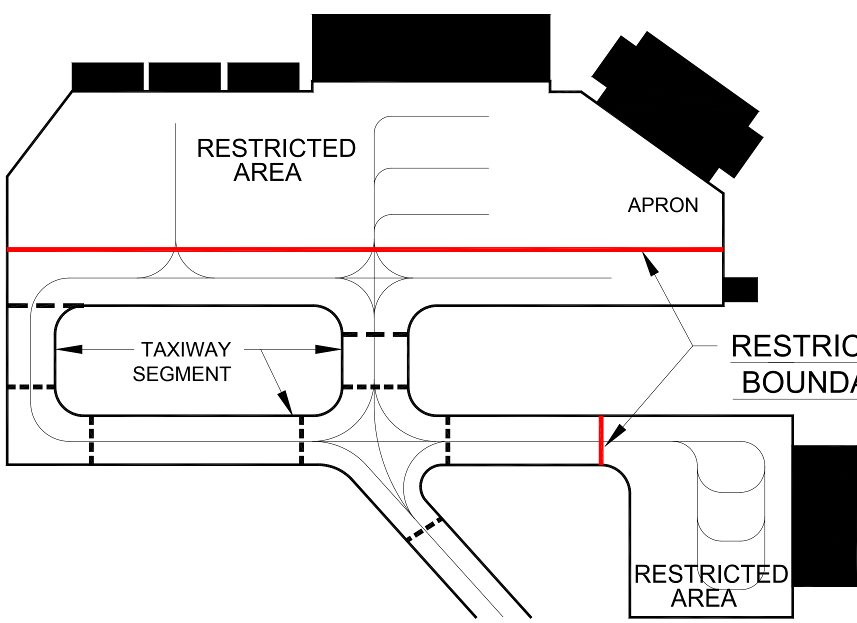
5.11.1 Restricted Access Boundary.

Restricted Access Boundary		
Definition: A restricted access boundary line delineates areas strictly reserved for use by authorized personnel only.		
Feature Group	Security	
Feature Class Name	RESTRICTEDACCESSBOUNDARY	
Feature Type	Line	
Equivalent Standards	**AIXM**	
	FGDC	RestrictedAccessBoundary
	SDSFIE	RestrictedArea
	DO-272	None
Related Features	APRON	
	TAXIWAY ELEMENT	

Data Capture Rule

Collect a line through the center of each marking to its greatest extents (Figure 5-76). **Restricted access** paint lines are either dashed white lines or alternating white/red/white solid lines.

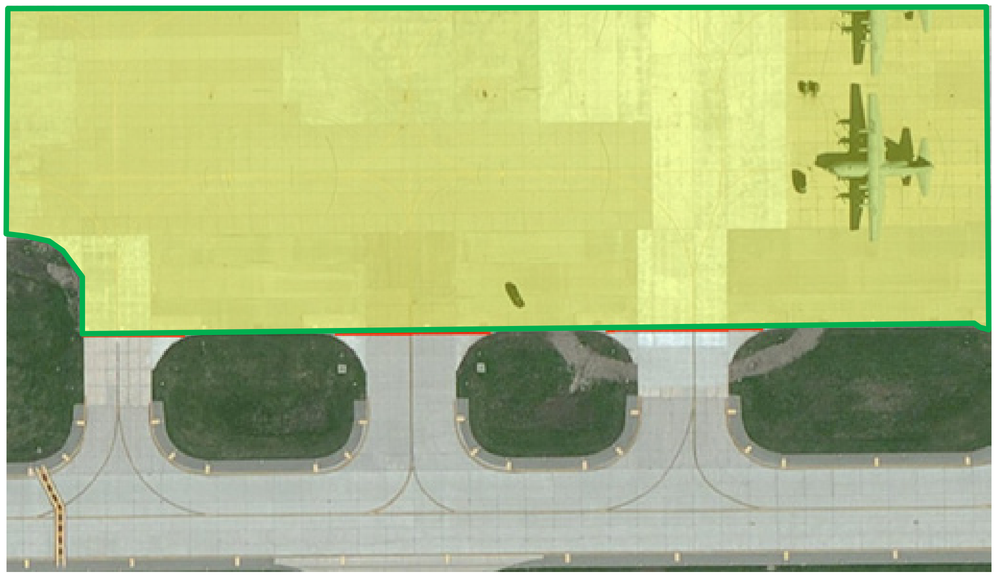
Figure 5-76. Illustrates the Capture of a Restricted Access Boundary Protecting Restricted Areas of an Airport.



Restricted Access Boundary	
Survey Accuracies	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
SECURITYNAME *VARCHAR2(50)*	A commonly used or defined name for the restricted area.

5.11.2 Security Area.

Security Area		
Definition: A defined area on the airport where security measures required by 49 CFR 1542.201 are carried out.		
Feature Group	Security	
Feature Class Name	SECURITYAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	SecurityArea
	SDSFIE	RestrictedArea
	DO-272	None
Related Features	APRON	
	MARKING LINE	
	RESTRICTED ACCESS BOUNDARY	
	SECURITY IDENTIFCATION DISPLAY AREA	
	SECURITY PERIMETER LINE	
	STERILE AREA	
	STRUCTURE LINE (FENCES AND GATES)	
	TAXIWAY ELEMENT	
Data Capture Rule Capture the **security area** using a closed polygon or multiple polygons encompassing the entire area the airport defines (Figure 5-77). The horizontal extents may be fence lines, paint lines, physical barriers such as doors or gates, et cetera.		

Security Area	
Figure 5-77. Security Area. 	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name ***Datatype***	**Description**
SECURITYAREANAME *VARCHAR2(50)*	The official or commonly used name for an area where security measures are carried out.

5.11.3 Security Identification Display Area.

Security Identification Display Area (SIDA)		
Definition: Portions of an airport, specified in the airport security program, where security measures required by regulation are necessary. This area includes the security area and may include other areas of the airport.		
Feature Group	Security	
Feature Class Name	SECURITYIDDISPLAYAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	SecurityIdentificationDisplayArea
	SDSFIE	RestrictedArea
	DO-272	None
Related Features	APRON	
	MARKING LINE	
	RESTRICTED ACCESS BOUNDARY	

Security Identification Display Area (SIDA)	
	SECURITY AREA
	SECURITY PERIMETER LINE
	STERILE AREA
	STRUCTURE LINE (FENCES AND GATES)
	TAXIWAY ELEMENT

Data Capture Rule

Collect the **security identification area** as a polygon or multiple polygons encompassing the entire area. Fences, paint lines or other specific limits define the horizontal extent of the airport SIDA.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
SECURITYAREANAME *VARCHAR2(50)*	The official or commonly used name for an area where security measures are carried out.

5.11.4 Security Perimeter Line.

Security Perimeter Line		
Definition: Any type of perimeter such as barbed wire, high fences, motion detectors, and armed guards at gates, designed to prevent unauthorized access.		
Feature Group	Security	
Feature Class Name	SECURITYPERIMETERLINE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	SecurityPerimeterLine
	SDSFIE	RestrictedArea
	DO-272	None
Related Features	APRON	
	MARKING LINE	
	RESTRICTED ACCESS BOUNDARY	
	SECURITY AREA	
	SECURITY IDENTIFCATION DISPLAY AREA	
	STERILE AREA	
	STRUCTURE LINE (FENCES AND GATES)	
	TAXIWAY ELEMENT	

Data Capture Rule

Collect the **security perimeter lines** to represent areas requiring specific permission to enter. In general, these lines will follow a fence line or other boundary and will include controlled areas of ingress and egress.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft

Security Perimeter Line	
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name *Datatype*	**Description**
SECURITYAREANAME *VARCHAR2(50)*	The official or commonly used name for an area where security measures are carried out.

5.11.5 Sterile Area.

Sterile Area		
Definition: Portions of an airport defined in the airport security program providing passengers access to boarding aircraft and is generally controlled by TSA, an aircraft operator, or a foreign carrier.		
Feature Group	Security	
Feature Class Name	STERILEAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	SterileArea
	SDSFIE	RestrictedArea
	DO-272	None
Related Features	APRON	
	MARKING LINE	
	RESTRICTED ACCESS BOUNDARY	
	SECURITY AREA	
	SECURITY IDENTIFCATION DISPLAY AREA	
	SECURITY PERIMETER LINE	
	STRUCTURE LINE (FENCES AND GATES)	
	TAXIWAY ELEMENT	
Data Capture Rule 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.		
Survey Accuracies		
Horizontal Accuracy	± 5.00 ft	
Vertical Accuracy (Ellipsoid)	Not Applicable	
Vertical Accuracy (Orthometric)	± 5.00 ft	
Distance and Elevation Resolution	Nearest foot	
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)	
Attribute Name *Datatype*	**Description**	
SECURITYAREANAME *VARCHAR2(50)*	The official or commonly used name for an area where security measures are carried out.	

5.12 Group: SURFACE TRANSPORTATION.

5.12.1 Bridge.

Bridge		
Definition: A structure used by vehicles including aircraft allowing passage over or under an object such as a river, chasm, mountain, road, or railroad.		
Feature Group	Surface Transportation	
Feature Class Name	BRIDGE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	Bridge
	SDSFIE	Bridge
	DO_272	Vertical Structure
Related Features	RUNWAY	
	RUNWAY ELEMENT	
	TAXIWAY ELEMENT	
	ROAD SEGMENT	
	ROAD CENTERLINE	

Data Capture Rule

Capture the **bridge** as a polygon at its greatest horizontal extents. If the bridge is a runway or taxiway bridge (Figure 5-78), collect the portion used by the aircraft (within the side stripes) separately using the runway element or taxiway element features.

Figure 5-78. Bridge.

Bridge	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Attribute Name ***Datatype***	**Description**
AIRCRAFTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength. *This is only required where BRIDGETYPECODE is Runway or Taxiway.*
BRIDGENAME *VARCHAR2(50)*	The official or commonly used name for the bridge.
BRIDGETYPECODE *VARCHAR2(4)*	A code from **CodeBridgeType** identifying the use of the bridge.
DIRECTIONALITYCODE *VARCHAR2(2)*	A code from **CodeDirectionality** indicating the traffic flow of the bridge being defined.
PAVEMENTCLASSIFICATIONNUMBER *VARCHAR2(12)*	A value expressing the load carrying capacity of a pavement for unrestricted operations. *This is only required where BRIDGETYPECODE is Runway or Taxiway.*
SURFACECOMPOSITIONCODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the bridge.
SURFACECONDITIONCODE *VARCHAR2(8)*	A code from **CodeSurfaceCondition** describing the bridge pavement serviceability. *This is only required where BRIDGETYPE is Runway or Taxiway.*
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
VERTICALSTRUCTUREMATERIALCODE *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** identifying the primary material used in construction of the bridge.

5.12.2 Driveway Area.

Driveway Area		
Definition: A object providing access to a building, vehicle parking lot or storage area.		
Feature Group	Surface Transportation	
Feature Class Name	DRIVEWAYAREA	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	DrivewayArea
	SDSFIE	None
	DO-272	None

Driveway Area	
Related Features	ROAD SEGMENT
	ROAD CENTERLINE
	ROAD POINT
	DRIVEWAY CENTERLINE
	PARKING LOT

Data Capture Rule

Capture **driveway areas** as polygons at the greatest horizontal extent.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
DRIVEWAYAREANAME *VARCHAR2(50)*	An official or commonly used name for the driveway area.
SURFACECOMPOSITIONCODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the driveway.

5.12.3 Driveway Centerline.

Driveway Centerline		
Definition: The centerline of a driveway as measured from the edges of the paved surface.		
Feature Group	Surface Transportation	
Feature Class Name	DRIVEWAYCENTERLINE	
Feature Type	Line	
Equivalent Standards	**AIXM**	None
	FGDC	DrivewayCenterline
	SDSFIE	None
	DO-272	None
Related Features	PARKING LOT	
	DRIVEWAY AREA	
	ROAD POINT	
	ROAD SEGMENT	
	ROAD CENTERLINE	

Data Capture Rule

Capture the horizontal plane at the center of the driveway and intersect with the centerline of road.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Driveway Centerline	
Attribute Name *Datatype*	**Description**
DRIVEWAYCENTERLINENAME *VARCHAR2(50)*	An official or commonly used name for the driveway centerline.

5.12.4 Parking Lot.

Parking Lot		
Definition: A ground surface area of the airport used for parking of automobiles, buses, and other vehicles, but not airplanes.		
Feature Group	Surface Transportation	
Feature Class Name	PARKINGLOT	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	ParkingLot
	SDSFIE	VehicleParking
	DO-272	None
Related Features	DRIVEWAY AREA	
	OBJECT AREA	
	ROADSEGMENT	
	STRUCTUREPOLYGON	
Data Capture Rule Capture a polygon encompassing the horizontal limits of the **parking lot** being represented (Figure 5-79). Use this feature for surface lots. Use Structure Polygon to model parking garages.		

Parking Lot

Figure 5-79. Parking Lot.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
OWNERCODE *VARCHAR2(50)*	A code from **CodeOwner** identifying the owner or operator of the parking lot.
PARKINGLOTNAME *VARCHAR2(50)*	The official or commonly used name for the parking lot
PARKINGLOTUSETEXT *VARCHAR2(255)*	A description of the primary use of the parking lot.
SURFACETYPECODE *VARCHAR2(1)*	A code from **CodeSurfaceType** describing the type of pavement surface.
TOTALHANDICAPSPACESCOUNT *NUMBER*	The total number of parking spaces available for use by people with disabilities in the parking lot

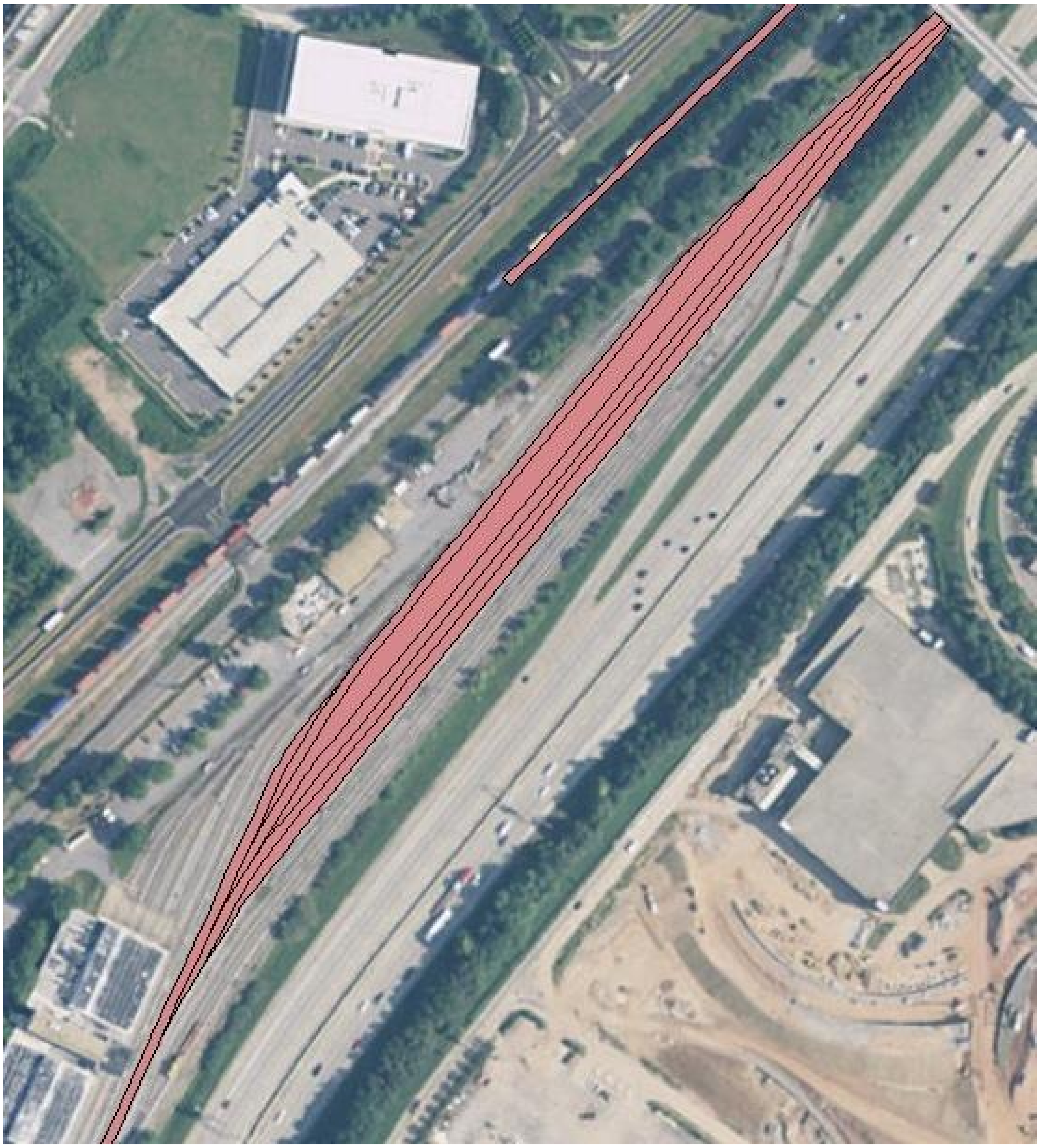
Parking Lot	
TOTALPARKINGSPACESCOUNT *NUMBER*	The total number of spaces available for use in the parking lot.

5.12.5 Railroad Centerline.

Railroad Centerline		
Definition: The centerline of each pair of rails used for railroad operations.		
Feature Group	Surface Transportation	
Feature Class Name	RAILROADCENTERLINE	
Feature Type	Line	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	RailroadCenterline
	SDSFIE	RailTrack
	DO-272	None
Related Features	RAILROAD YARD	
	STRUCTURE LINE	
	STRUCTURE POLYGON	
Data Capture Rule In the horizontal plane, capture the **centerline** of each rail pair (Figure 5-80). In the vertical plane provide the elevation of the top of the rail at each vertex.		

Railroad Centerline

Figure 5-80. Railroad Centerline.



Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Railroad Centerline	
Attribute Name ***Datatype***	**Description**
BRIDGEINDICATOR *VARCHAR2(1)*	An indicator identifying if the given segment is a bridge.
DIRECTIONALITYCODE *VARCHAR2(2)*	A code from **CodeDirectionality** identifying the traffic flow of the railroad centerline being defined.
OWNERCODE *VARCHAR2(50)*	A code from **CodeOwner** identifying the owner of the railroad centerline being described.
RAILROADCENTERLINENAME *VARCHAR2(50)*	The official or commonly used name for the railroad centerline.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being classified by the feature.
TUNNELINDICATOR *VARCHAR2(1)*	An indicator identifying if the given segment is a tunnel.

5.12.6 Railroad Yard.

Railroad Yard		
Definition: An area having a network or series of railroad tracks and sidings for storage and maintenance of cars and engines.		
Feature Group	Surface Transportation	
Feature Class Name	RAILROADYARD	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	RailroadYard
	SDSFIE	RailroadYard
	DO-272	None
Related Features	RAILROAD CENTERLINE	
	STRUCTURE POLYGON	
	STRUCTURE LINE	
Data Capture Rule Capture a **railroad yard** using a polygon encompassing the extents of the yard represented by fences, road or change in ground surfaces (Figure 5-81). Multiple instance of the feature may be necessary to capture very large or widely disbursed railroad yards. This feature does not document the tracks, only extents of the yard.		

Railroad Yard

Figure 5-81. Railroad Yard.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
OWNERCODE *VARCHAR2(4)*	A code from **CodeOwner** identifying the owner of the railroad centerline being described.
RAILROADYARDNAME *VARCHAR2(50)*	The official or commonly used name for the railroad yard.

5.12.7 Road Centerline.

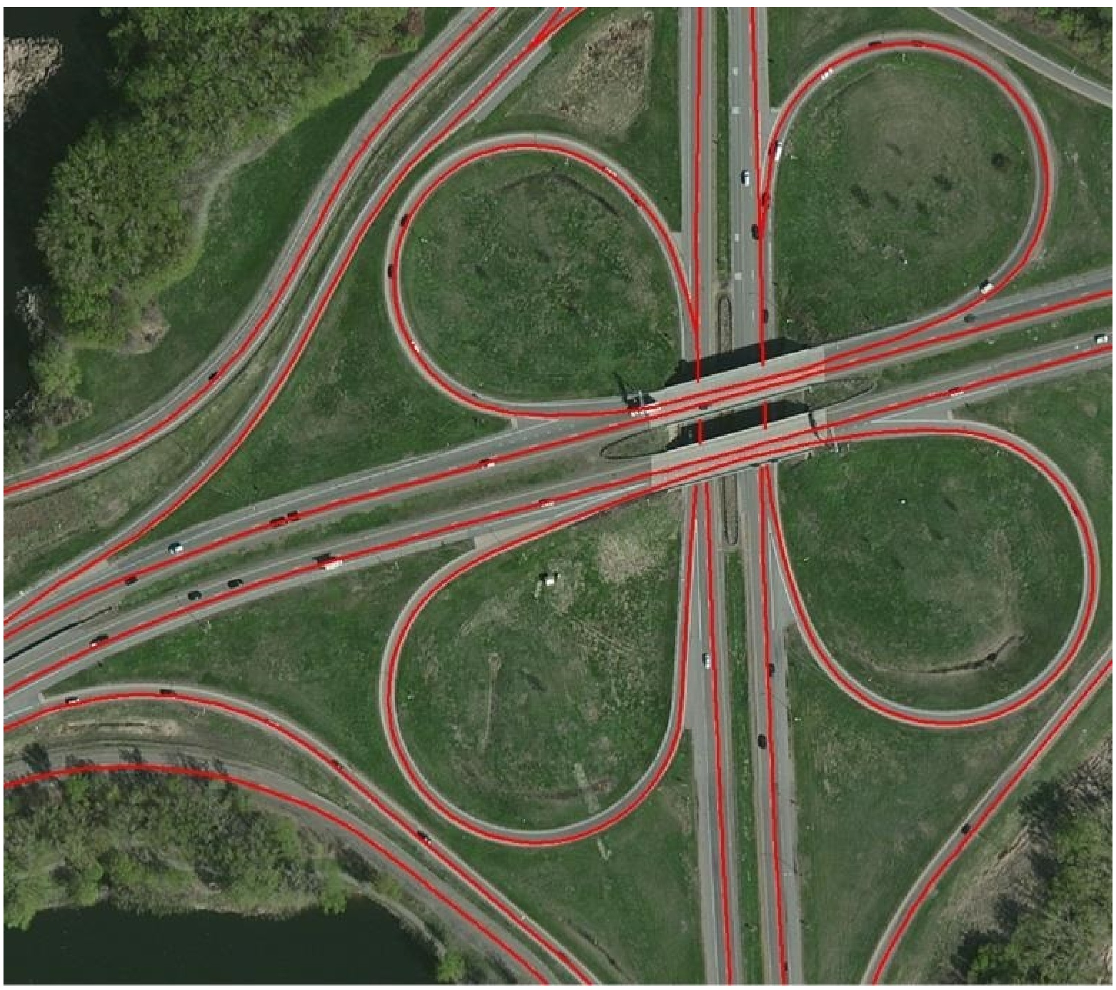
Road Centerline		
Definition: The center of a roadway as measured from the edges of the paved surface.		
Feature Group	Surface Transportation	
Feature Class Name	ROADCENTERLINE	
Feature Type	Line	
Equivalent Standards	**AIXM**	Road
	FGDC	RoadCenterline
	SDSFIE	RoadPath
	DO-272	Service Roads
Related Features	ROAD POINT	
	ROADSEGMENT	
	DRIVEWAY AREA	

Road Centerline	
	DRIVEWAY CENTERLINE
	OBJECT IDENTIFICATION SURFACE
	OBJECT LINE
	OBJECT POINT
	RUNWAY HELIPAD DESIGN SURFACE
	UTILITY LINE
	UTILITY POINT
	STRUCTURE POLYGON
	PARKING LOT

Data Capture Rule

Collect the centerline of road by either splitting the edge of pavement or through the use of the painted centerline, whichever is better defined (Figure 5-82).

Figure 5-82. Shows the Collection of Road Centerlines.



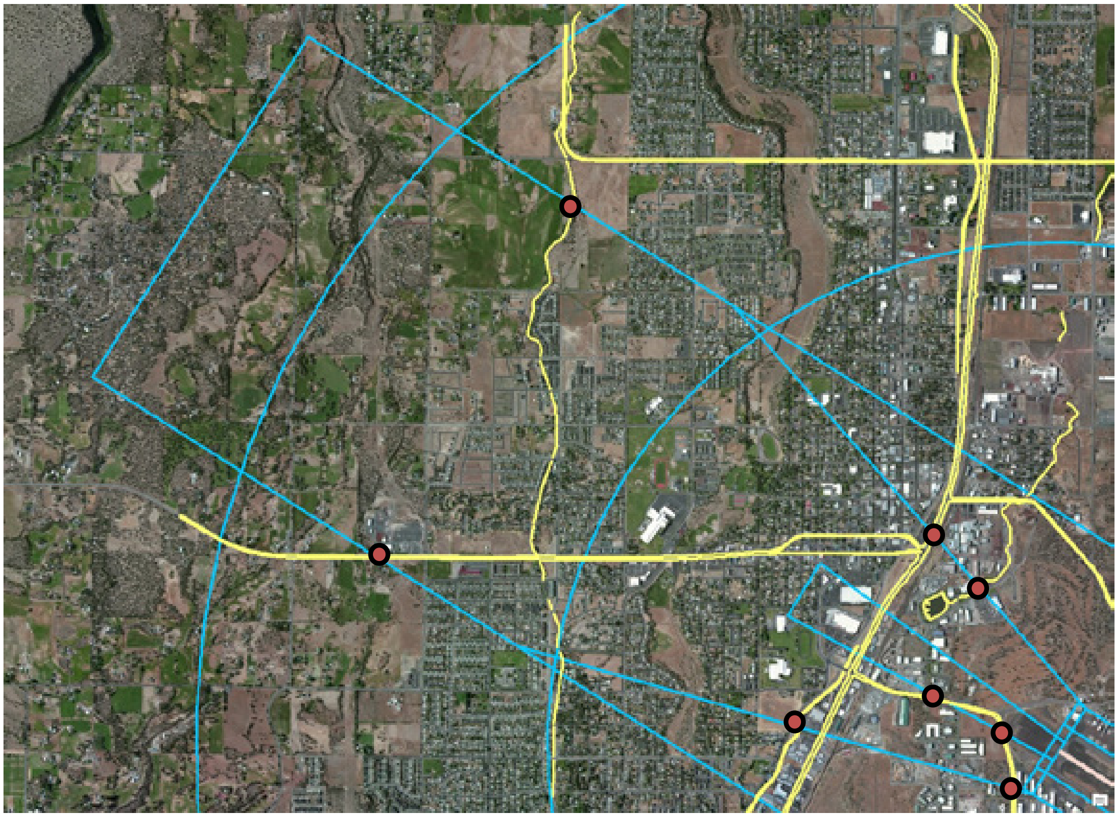
Road Centerline	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Attribute Name ***Datatype***	**Description**
COLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color of the painted roadway centerline.
ROADCENTERLINENAME *VARCHAR2(50)*	The official name for the road the centerline depicts.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being classified by the feature.

5.12.8 Road Point.

Road Point		
Definition: A point along the roadway being represented because of its special significance such as the start or endpoint a road segment, center of a bridge, or representing a significant position along the roadway in relation to the airport such as where the roadway intersects an airport surface.		
Feature Group	Surface Transportation	
Feature Class Name	ROADPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	Road
	FGDC	RoadPoint
	SDSFIE	RoadPoint
	DO-272	Service Roads
Related Features	ROAD CENTERLINE	
	ROADSEGMENT	
	DRIVEWAY AREA	
	DRIVEWAY CENTERLINE	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT LINE	
	OBJECT POINT	
	RUNWAY HELIPAD DESIGN SURFACE	
	UTILITY LINE	
	UTILITY POINT	
	STRUCTURE POLYGON	
	PARKING LOT	
Data Capture Rule Capture **road points** at locations identifying special operational significance in relation to the airport such as where the road intersects the runway protection zone or a 14 CFR part 77 approach surface for the airport (Figure 5-83).		

Road Point

Figure 5-83. Uses Orange Circles to Represent Road Point Locations Where Roads Intersect the Object Identification Surface.



Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
ROADPOINTNAME *VARCHAR2(50)*	A name describing the road point the feature instance describes. For example, US77 intersection with Runway 13 14 CFR 77 Surface or Intersection of Mayfair Road with Runway 22 extended runway centerline.

5.12.9 Road Segment.

Road Segment
Definition: A representation of a portion of a physical road system supporting human or vehicular movement.

Road Segment		
Feature Group	Surface Transportation	
Feature Class Name	ROADSEGMENT	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	Road
	FGDC	RoadSegment
	SDSFIE	RoadSeg
	DO-272	Service Roads
Related Features	ROAD CENTERLINE	
	ROAD POINT	
	DRIVEWAY AREA	
	DRIVEWAY CENTERLINE	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT LINE	
	OBJECT POINT	
	RUNWAY HELIPAD DESIGN SURFACE	
	UTILITY LINE	
	UTILITY POINT	
	STRUCTURE POLYGON	
	PARKING LOT	

Data Capture Rule

Capture 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).

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	NA
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
BRIDGEINDICATOR *VARCHAR2(1)*	An indicator identifying if the given segment is a bridge.
DIRECTIONALITYCODE *VARCHAR2(2)*	A code **CodeDirectionality** defining the traffic flow of a road segment.
ROADROUTENAME1 *VARCHAR2(25)*	The first (primary) route number for the road segment
ROADROUTENAME2 *VARCHAR2(25)*	The secondary (if any) route number for the road segment
ROADROUTENAME3 *VARCHAR2(25)*	The tertiary route number for the road segment
ROADROUTETYPECODE1 *VARCHAR2(12)*	A code from **CodeRouteType** identifying the type of road (interstate, US, State etc.) the road segment represents.

Road Segment	
ROADROUTETYPECODE2 *VARCHAR2(12)*	A code from **CodeRouteType** identifying the type of road (interstate, US, State etc.) the road segment represents.
ROADROUTETYPECODE3 *VARCHAR2(12)*	A code from **CodeRouteType** identifying the type of road (interstate, US, State etc.) the road segment represents.
ROADSEGMENTAVERAGEWIDTHVALUE *NUMBER*	The average width of the road segment measured from edge to edge.
ROADSEGMENTLENGTH *NUMBER*	The length of the road segment as measured along the centerline of the segment.
ROADSEGMENTNAME *VARCHAR2(50)*	The official or commonly used name for the road.
ROADSEGMENTTOTALLANECOUNT *NUMBER*	The total number of lanes of traffic the road segment provides in both directions, excluding turning lanes.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being classified by the feature.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the road segment.
TUNNELINDICATOR *VARCHAR2(1)*	An indicator identifying if the given segment is a tunnel.

5.12.10 Sidewalk Segment.

Sidewalk Segment		
Definition: A generally paved surface used as a pedestrian walkway.		
Feature Group	Surface Transportation	
Feature Class Name	SIDEWALKSEGMENT	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	Sidewalk
	SDSFIE	PavementBranch
	DO-272	None
Related Features	STRUCTURE POLYGON	

Data Capture Rule

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.

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Sidewalk Segment	
Attribute Name ***Datatype***	**Description**
AMERICANDISABILITIESACTINDICATOR *VARCHAR2(1)*	An indicator identifying if the sidewalk segment complies with the American Disabilities Act.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being classified by the feature.
SIDEWALKSEGMENTAVAERAGEWIDTH *NUMBER*	The average width of the sidewalk as measured between the edges.
SIDEWALKSEGMENTLENGTH *NUMBER*	The length of the sidewalk segment.
SIDEWALKSEGMENTUSECODE *NUMBER*	A code from **CodeLandUseType** identifying the primary use of the sidewalk segment.
SURFACECOMPOSITIONTYPECODE *VARCHAR2(14)*	A code from **CodeSurfaceMaterial** defining the type of material used in construction of the runway element.

5.12.11 Tunnel.

Tunnel		
Definition: The area of a transportation passage, open at both ends, used to provide access through or under a natural object.		
Feature Group	Surface Transportation	
Feature Class Name	TUNNEL	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	None
	FGDC	Tunnel
	SDSFIE	TransportationTunnel
	DO-272	None
Related Features	RAILROAD CENTERLINE	
	RAILROAD YARD	
	ROAD CENTERLINE	
	ROAD SEGMENT	
Data Capture Rule Collect the **tunnel** extending between the entrance points with a width defined by edge of pavement at either entrance.		

Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 5.00 ft
Distance and Elevation Resolution	Nearest Foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Tunnel	
Attribute Name ***Datatype***	**Description**
DIRECTIONALITYCODE *VARCHAR2(2)*	A code from **CodeDirectionality** indicating the traffic flow of the tunnel being defined.
SEGMENTTYPECODE *VARCHAR2(12)*	A code from **CodeSegmentType** identifying the sequence or position of the segment being classified by the feature.
TUNNELAVERAGEHEIGHTVALUE *NUMBER*	The average height of the tunnel.
TUNNELAVERAGEWIDTHVALUE *NUMBER*	The average width of the tunnel.
TUNNELLENGTH *NUMBER*	The overall length of the tunnel.
TUNNELNAME *VARCHAR2(50)*	The official or commonly used name for the tunnel.
TUNNELUSECODE *NUMBER*	A code from **CodeLandUseType** defining the type of vehicles using the tunnel.
VERTICALCLEARANCEVALUE *NUMBER*	Specify the actual vertical clearance to the top of the tunnel imposed by any restrictions.

5.13 Group: UTILITIES.

5.13.1 Tank Site.

Tank Site		
Definition: An above or below grade receptacle or chamber for holding anything (fuels, water, waste etc.) on a temporary basis prior to transfer, use or disposal.		
Feature Group	Utilities	
Feature Class Name	TANKSITE	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	TankSite
	SDSFIE	AboveGroundStorageTank
	DO-272	VerticalStructure
Related Features	APRON	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT POINT	
	OBJECT IDENTIFICATION SURFACE	
	RUNWAY HELIPAD DESIGN SURFACE	

Tank Site	
Data Capture Rule Capture **tank sites** directly associated within the horizontal limits of the airport's imaginary surfaces as individual polygons. Collect by field survey methods recently constructed and/or completed structures not visible on imagery and meeting the above criteria. Extract the tank site outline feature as the footprint of the tank at ground level. Determine the height at the highest point of the corresponding structure. The AGL height of the polygon is determined as the difference between the base elevation and top elevation on the roof. Collected other objects attached to the tank such as antennas, using the feature object point. **Note:** If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an **Object Area** and associated accuracy.	
Survey Accuracies	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 3.00 ft
Distance and Elevation Resolution	Tenths of feet
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)

Attribute Name ***Datatype***	**Description**
LIGHTINGCONFIGURATIONTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of lighting associated with the tank site.
MARKINGCOLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color(s) of the markings on the tank(s).
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** identifying the type of markings on the tank(s).
OBJECTLIGHTEDINDICATOR *VARCHAR2(1)*	An indicator identifying if the tank has obstruction lighting.
OBJECTLIGHTINGTYPE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstacle lighting.
TANKHAZARDCATEGORYCODE *NUMBER*	A code from **CodeHazardCategory** identifying the hazard category of the material in the tank(s).
TANKSITENAME *VARCHAR2(50)*	The official or commonly used name for the tank site.
TANKTOPELEVATIONVALUE *NUMBER*	The dimension indicating the elevation (AMSL) of exterior top surface of the tank's lid, hatch, rim, or roof.
TANKTOPHEIGHTVALUE *NUMBER*	The dimension indicating the height (AGL) elevation of exterior top surface of the tank's lid, hatch, rim, or roof.
TANKTYPEDESCRIPTIONTEXT *VARCHAR2(255)*	A brief description of the type of tank(s) the feature represents.

Tank Site	
TANKUSECODE *NUMBER*	A code from **CodeLandUseType** identifying the use of the tank.
VERTICALSTRUCTUREMATERIALCODE *VARCHAR2(20)*	A code from **CodeVerticalStructureMaterial** defining the primary material used in constructing the tank(s).

5.13.2 Utility Line.

Utility Line		
Definition: Any utility feature typically represented as a line.		
Feature Group	Utilities	
Feature Class Name	UTILITYLINE	
Feature Type	Line	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	Utility
	SDSFIE	UtilityFeature
	DO-272	Vertical Structure
Related Features	AIRCRAFT GATE STAND	
	AIRFIELD LIGHT	
	AIRPORT PARCEL	
	AIRPORT SIGN	
	APRON	
	ARRESTING GEAR	
	CONSTRUCTION AREA	
	DEICING AREA	
	NAVAID EQUIPMENT	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT POINT	
	PARCEL	
	PARKING LOT	
	RAILROAD CENTERLINE	
	RAILROAD YARD	
	ROAD SEGMENT	
	ROAD CENTERLINE	
	RUNWAY HELIPAD DESIGN SURFACE	
	SECURITY AREA	
	STRUCTURE LINE	
	STRUCTURE POLYGON	
	STRUCTURE POINT	
	TANK SITE	
	UTILITY POINT	
	UTILITY POLYGON	

Utility Line	
Data Capture Rule Capture **line** segments representing the feature using the most appropriate method based on the project. For example, utilities mapped for an airspace analysis may be extracted using remote sensing methods, while utilities being collected for construction or sub surface engineering would require higher accuracies. For above ground utilities capture an elevation at each vertex of the line. **Note:** If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an **Object Area** and associated accuracy.	
Survey Accuracies – Level A	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.01)
Survey Accuracies – Level B	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Survey Accuracies – Level C	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Level D	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)
Attribute Name ***Datatype***	**Description**
COLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color(s) of markings used on structures associated with the utility line.
DIRECTIONALITYCODE *VARCHAR2(2)*	A code from **CodeDirectionality** identifying the flow of the utility being represented.
LIGHTINGCONFIGURATIONTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstruction lighting used on the utility line.

Utility Line	
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** identifying the type of markings on structures associated with the utility line.
OBSTRUCTIONLIGHTINGINDICATOR *VARCHAR2(1)*	An indicator identifying if the utility line has obstruction lighting.
UTILITYCONFIDENCECODE *VARCHAR2(1)*	A code from **CodeUtilityConfidence** identifying the confidence on the location mapping of the utility.
UTILITYHEIGHTVALUE *NUMBER*	The above ground level (AGL) height at the top of the utility being represented
UTILITYNAME *VARCHAR2(50)*	The official or commonly used name for the utility or the party responsible for the utility.
UTILITYTYPECODE *NUMBER*	A code from **CodeLandUseType** identifying the service the utility provides.

5.13.3 Utility Point.

Utility Point		
Definition: Any utility feature typically represented as a point. See data capture rules below.		
Feature Group	Utilities	
Feature Class Name	UTILITYPOINT	
Feature Type	Point	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	Utility
	SDSFIE	UtilityFeature
	DO-272	Vertical Structure
Related Features	AIRCRAFT GATE STAND	
	AIRFIELD LIGHT	
	AIRPORT PARCEL	
	AIRPORT SIGN	
	APRON	
	ARRESTING GEAR	
	CONSTRUCTION AREA	
	DEICING AREA	
	NAVAID EQUIPMENT	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT POINT	
	PARCEL	
	PARKING LOT	
	RAILROAD CENTERLINE	
	RAILROAD YARD	
	ROAD SEGMENT	
	ROAD CENTERLINE	
	RUNWAY HELIPAD DESIGN SURFACE	
	SECURITY AREA	
	STRUCTURE LINE	

Utility Point	
	STRUCTURE POLYGON
	STRUCTURE POINT
	TANK SITE
	UTILITY POINT
	UTILITY POLYGON

Data Capture Rule

Capture a **point** at the location representing a utility best modeled using a point geometry.

Note: If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an **Object Area** and associated accuracy.

Survey Accuracies – Level A	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.01)
Survey Accuracies – Level B	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Survey Accuracies – Level C	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Level D	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)

Attribute Name *Datatype*	**Description**
COLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color(s) of markings used on a structure associated with the utility point.
LIGHTINGCONFIGURATIONTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstruction lighting used on the utility point.
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** identifying the type of markings on structure associated with the utility point.

Utility Point	
OBSTRUCTIONLIGHTINGINDICATOR *VARCHAR2(1)*	An indicator identifying if the utility point has obstruction lighting.
UTILITYCONFIDENCECODE *VARCHAR2(1)*	A code from **CodeUtilityConfidence** identifying the confidence on the location mapping of the utility.
UTILITYHEIGHTVALUE *NUMBER*	The above ground level (AGL) height at the top of the utility being represented
UTILITYNAME *VARCHAR2(50)*	The official or commonly used name for the utility or the party responsible for the utility.
UTILITYPOINTRADIUS *NUMBER*	Radius of circle around the center of the object encompassing associated elements such as guy wires.
UTILITYTYPECODE *NUMBER*	A code from **CodeLandUseType** identifying the service the utility provides.

5.13.4 Utility Polygon.

Utility Polygon		
Definition: Any utility feature typically represented as a polygon. See data capture rules below.		
Feature Group	Utilities	
Feature Class Name	UTILITYPOLYGON	
Feature Type	Polygon	
Equivalent Standards	**AIXM**	VerticalStructure
	FGDC	Utility
	SDSFIE	UtilityFeature
	DO-272	Vertical Structure
Related Features	AIRCRAFT GATE STAND	
	AIRFIELD LIGHT	
	AIRPORT PARCEL	
	AIRPORT SIGN	
	APRON	
	ARRESTING GEAR	
	CONSTRUCTION AREA	
	DEICING AREA	
	NAVAID EQUIPMENT	
	OBJECT AREA	
	OBJECT LINE	
	OBJECT IDENTIFICATION SURFACE	
	OBJECT POINT	
	PARCEL	
	PARKING LOT	
	RAILROAD CENTERLINE	
	RAILROAD YARD	
	ROAD SEGMENT	
	ROAD CENTERLINE	
	RUNWAY HELIPAD DESIGN SURFACE	
	SECURITY AREA	
	STRUCTURE LINE	

Utility Polygon	
	STRUCTURE POLYGON
	STRUCTURE POINT
	TANK SITE
	UTILITY POINT
	UTILITY POLYGON

Data Capture Rule

Capture a **polygon** encompassing the horizontal extent of the feature being represented.

Note: If a structure penetrates an OIS or is selected as a representative object, also identify, classify and document the building as an **Object Area** and associated accuracy.

Survey Accuracies – Level A	
Horizontal Accuracy	± 1.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 0.25 ft
Distance and Elevation Resolution	Nearest tenth of a foot
Geographic Coordinate Resolution	Nearest hundredth of an arc second (± 0.01)
Survey Accuracies – Level B	
Horizontal Accuracy	± 3.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest three hundredths of an arc second (± 0.03)
Survey Accuracies – Level C	
Horizontal Accuracy	± 5.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 10.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest five hundredths of an arc second (± 0.05)
Survey Accuracies – Level D	
Horizontal Accuracy	± 10.00 ft
Vertical Accuracy (Ellipsoid)	Not Applicable
Vertical Accuracy (Orthometric)	± 20.00 ft
Distance and Elevation Resolution	Nearest foot
Geographic Coordinate Resolution	Nearest tenth of an arc second (± 0.10)

Attribute Name *Datatype*	**Description**
COLORCODE *VARCHAR2(15)*	A code from **CodeColor** identifying the color(s) of markings used on a structure associated with the utility polygon.
LIGHTINGCONFIGURATIONTYPECODE *VARCHAR2(12)*	A code from **CodeLightingConfigurationType** identifying the type of obstruction lighting used on the utility polygon.
MARKINGFEATURETYPECODE *VARCHAR2(19)*	A code from **CodeMarkingFeatureType** identifying the type of markings on structure associated with the utility polygon.

Utility Polygon	
OBSTRUCTIONLIGHTINGINDICATOR *VARCHAR2(1)*	An indicator identifying if the utility polygon has obstruction lighting.
UTILITYCONFIDENCECODE *VARCHAR2(1)*	A code from **CodeUtilityConfidence** identifying the confidence on the location mapping of the utility.
UTILITYHEIGHTVALUE *NUMBER*	The above ground level (AGL) height at the top of the utility being represented
UTILITYNAME *VARCHAR2(50)*	The official or commonly used name for the utility or the party responsible for the utility.
UTILITYTYPECODE *NUMBER*	A code from **CodeLandUseType** identifying the service the utility provides.

5.14 Attribute Enumerations.

The following tables contain acceptable values for attributes of type enumeration, as defined in previous sections of this chapter. In some cases, the source of the value description is indicated in brackets, so further information can be researched if desired. In some cases, OTHER, UNKNOWN, and TBD are listed as valid options. These should only be used if none of the other values listed can be applied.

5.14.1 CodeAcquisitionType.

Value	Description
COMPATIBILITY	For compatible land use purposes
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
PART77	Provide protection of 14 CFR part 77 imaginary surfaces
RPZ	Provide RPZ protection

5.14.2 CodeAirportFacilityType.

Value	**Description**
AD	Airport only
AH	Airport with helicopter landing area
BP	Ballonport
G	Gliderport
HP	Heliport only
LS	Landing Site
Other	Other
SPB	Seaplane Base
SP	STOLPort
SPC	Spaceport
U	Ultralight Flightpark

5.14.3 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

5.14.4 CodeApproachGuidance.

Value	Description
NON_VERTICAL	Runway is used for or planned use is for Non-Vertically Guided operations. Non-precision approach runway
ILS_PRECISION_CAT_I	Runway is used or planned use is for Precision Category I operations
ILS_PRECISION_CAT_II	Runway is used for or planned use is for Precision Category II operations
ILS_PRECISION_CAT_IIIA	Runway is used for or planned use is for Precision Category IIIA operations
ILS_PRECISION_CAT_IIIB	Runway is used for or planned use is for Precision Category IIIB operations
ILS_PRECISION_CAT_IIIC	Runway is used for or planned use is for Precision Category IIIC operations
ILS_PRECISION_CAT_IIID	Runway is used for or planned use is for Precision Category III D operations
VERTICAL	Runway is used for or planned use is for Vertically Guided (other than precision) operations microwave landing system precision approach
VISUAL	Runway is used for or planned use is for visual operations only
OTHER	Runway is used for other types of approach guidance not listed above

5.14.5 CodeApronType.

Value	Description
AGRICULTURE	Cargo loading area for agricultural activities
CARGO	Cargo loading area used for loading and unloading cargo
DEICING	Area used for deicing of aircraft
FUEL	Area used for aircraft fueling
HARDSTAND	Area used for parking a single aircraft. More temporary than PARKING, as defined below.
LOADING	Passenger loading area used for loading and unloading passengers
MAINT	Area used for aircraft maintenance.
MILITARY	Area used by military
NORMAL	The default type
OTHER	Other
PARKING	Area used to park aircraft
PARACHUTE_AREA	An area supporting parachute activities.

Value	Description
RAMP	Access pavement between maintenance hangars opening to the apron and the apron edge
SNOW_COLLECTION	Apron area where snow collection from other parts of the airport is acceptable.
STAIRS	Stairs
TAXILANE	Area where aircraft are under terminal control (airline dispatched) as opposed to tower control.
TEMPORARY	Temporary
TURNAROUND	Area used for aircraft to turn around

5.14.6 CodeArrestingSystem.

Value	Description
BAK–9	Rotary friction brake. (Bi-directional cable)
BAK–12A	Standard BAK–12 with 950 foot run out, 1–inch cable and 40,000 pound weight setting. Rotary friction brake. (Bi-directional cable)
BAK–12B	Extended BAK–12 with 1200 foot run, 1¼ inch Cable and 50,000 pounds weight setting. Rotary friction brake. (Bi-directional cable)
E28	Rotary Hydraulic (Water Brake). (Bi-directional cable)
M21	Rotary Hydraulic (Water Brake) Mobile. (Bi-directional Cable)
BAK–14	A device that raises a hook cable out of a slot in the runway surface and is remotely positioned for engagement by the tower on request. (In addition to personnel reaction time, the system requires up to five seconds to fully raise the cable. (Bi-directional cable)
H	This device is used in conjunction with some aircraft arresting systems: A device that raises a hook cable out of a slot in the runway surface and is remotely positioned for engagement by the tower on request. (In addition to personnel reaction time, the system requires up to one and one–half seconds to fully raise the cable.) (Bi-directional cable)
MB60	Textile brake—an emergency one–time use, modular braking system employing the tearing of specially woven textile straps to absorb the kinetic energy. (Unidirectional cable)
E5	Chain Type. At USN/USMC stations E–5 A–GEAR systems are rated, e.g., E–5 RATING–13R–1100 HW (DRY), 31L/R–1200 STD (WET). This rating is a function of the A–GEAR chain weight and length and is used to determine the maximum aircraft engaging speed. A dry rating applies to a stabilized surface (dry or wet) while a wet rating takes into account the amount (if any) of wet overrun that is not capable of withstanding the aircraft weight. These ratings are published under Military Service.(Unidirectional cable)
E5-1	Variants of E5 system
E5-3	Variants of E5 system
44B–3H	Rotary Hydraulic (Water Brake) (Foreign Type)
CHAG	Chain (Foreign type) – US equivalent E–5
MA–1A	Web barrier between stanchions attached to a chain energy absorber. (Unidirectional barrier)
BAK–15	Web barrier between stanchions attached to an energy absorber (water squeezer, rotary friction, chain). Designed for wing engagement. (Unidirectional barrier)

5.14.7 CodeBridgeType.

Value	Description
APM	Automated People Mover, Tram, or Monorail bridge
PED	Pedestrian bridge
ROAD	Road or highway bridge
RR	Railroad
RWY	Runway Bridge
TWY	Taxiway Bridge

5.14.8 CodeBuoyType.

Value	Description
BLACK_RED_FL2	Danger - Black and red alternating horizontal stripes indicates position of isolated danger [AIXM 5.1]
GREEN	Lateral buoy - Marks port side of the channel when sailing toward the sea [AIXM 5.1]
GREEN_RED_GFL	Lateral buoy - Preferred channel is to port when a red horizontal stripe is sandwiched between two green horizontal stripes [AIXM 5.1]
Q3_VQ3	Cardinal buoy - Yellow stripe sandwiched between two black stripes and/or two triangles, apex on one pointing up and apex of other pointing down indicates safe water is to the east [AIXM 5.1]
Q6_VQ6	Cardinal buoy - Yellow stripe is atop a black stripe and/or two triangles, apex of both pointing down indicates safe water is to the south [AIXM 5.1]
Q9_VQ9	Cardinal buoy - Black stripe sandwiched between two yellow stripes and/or two triangles apex of both point toward each other indicates safe water is to the west [AIXM 5.1]
Q_VQ	Cardinal buoy - Black stripe atop a yellow stripe and/or two triangles apex of both point up indicates safe water is to the north [AIXM 5.1]
RED	Lateral buoy - Marks port side of the channel when returning from the sea [AIXM 5.1]
RED_GREEN_RFL	Lateral buoy - Preferred channel to starboard when a green horizontal strips is sandwiched between two red horizontal stripes [AIXM 5.1]
RED_WHITE	Safe water buoy - Alternating red and white vertical stripes indicates safe water [AIXM 5.1]
WHITE	No color is stated on the chart [AIXM 5.1]
YELLOW	Special buoy - Area used by navies, pipelines, surfing [AIXM 5.1]
OTHER	Other

5.14.9 CodeColor.

Value	Description
AMBER	Amber
BLACK	Black
BLUE	Blue
BROWN	Brown
GREEN	Green
GREEN-GREEN	Bidirectional [AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures*]

Value	Description
GREEN-RED	Bidirectional [AC 150/5345-46]
GREEN-YELLOW	Bidirectional [AC 150/5345-46]
GREY	Grey
LIGHT_GREY	Light Grey
MAGENTA	Magenta
ORANGE	Orange
OTHER	Other
PINK	Pink
PURPLE	Purple
RED	Red]
RED-GREEN	Bidirectional [AC 150/5345-46]
RED-RED	Bidirectional [AC 150/5345-46]
RED-WHITE	Bidirectional [AC 150/5345-46]
TBD	To be determined
VIOLET	Violet
WHITE	White
WHITE-RED	Bidirectional [AC 150/5345-46]
WHITE-WHITE	Bidirectional [AC 150/5345-46]
WHITE-YELLOW	Bidirectional [AC 150/5345-46]
YELLOW	Yellow
YELLOW-GREEN	Bidirectional [AC 150/5345-46]
YELLOW-RED	Bidirectional [AC 150/5345-46]
YELLOW-WHITE	Bidirectional [AC 150/5345-46]
YELLOW-YELLOW	Bidirectional [AC 150/5345-46]

5.14.10 CodeCompassDirection.

Value	Description
N	North (350° to 011° magnetic)
NNE	North Northeast (012° to 034° magnetic)
NE	Northeast (035° to 056° magnetic)
ENE	East North East (057° to 079° magnetic)
E	East (080° to 101° magnetic)
ESE	East Southeast (102° to 124° magnetic)
SE	Southeast (125° to 146° magnetic)
SSE	South Southeast (147° to 169° magnetic)
S	South (170 to 191° magnetic)
SSW	South Southwest (192° to 214° magnetic)
SW	Southwest (215° to 236° magnetic)
WSW	West Southwest (237° to 259° magnetic)
W	West (260° to 281° magnetic)
WNW	West Northwest (282° to 304° magnetic)
NW	Northwest (305 to 326° magnetic)
NNW	North Northwest (327° to 349° magnetic)

5.14.11 CodeConstructionAreaType.

Value	Description
Concrete	Concrete recycling area
Demolition	Demolition work
Dirt	Fill dirt area
Future	A future construction area
New	New work
Staging	Construction staging area
Temporary	Temporary work area

5.14.12 CodeCoordinatedUseType.

Value	Description
A	Aeronautical
M	Multiple
R	Recreational boating/fishing
S	Commercial shipping/fishing

5.14.13 CodeDeclaredDistance.

Value	Description
ASDA	Accelerate Stop Distance Available
LDA	Landing Distance Available
TODA	Takeoff Distance Available
TORA	Takeoff Run Available

5.14.14 CodeDeicingArea.

Value	Description
CENTRALIZED	Centralized deicing facility
DEICING_FACILITY	A deicing facility
DEICING_PAD	A deicing pad
VEHICLE	Deicing vehicle maneuvering area

5.14.15 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
OTHER	Other	Other

5.14.16 CodeDesignSurfaceType.

Value	Description
BRL	Building restriction line (not a standard)
CWY	Clearway

Value	Description
HELI	VFR Heliport Approach/Departure Surface
HSA	Heliport Safety Area
HPZ	Heliport Protection Zone
IAOFZ	Inner Approach Obstacle Free Zone
ITOFZ	Inner Transitional Obstacle Free Zone
LIGHT	Light Plane Surface
OTHER	Another design surface not identified here
POFZ	Precision obstacle free zone [AC 150/5300-13]
ROFA	Runway Object Free Area
ROFZ	Runway Obstacle Free Zone
RVZ	Runway Visibility Zone
SNOW	An area requiring protection from snow accumulation
TESM	Taxiway Edge Safety Margin
TOFA	Taxiway and taxilane object free area [AC 150/5300-13]
TSS	Threshold Siting Surface [AC 150/5300-13]
TXSA	Taxiway safety area [AC 150/5300-13]
VGSI	Visual Glide Slope Indicator (VGSI) protection area. Protects VGSI signal coverage by forbidding objects in the area. [AIXM 5.1]
WILDLIFE	Wildlife attractants boundary. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports.*

5.14.17 CodeDimensionType.

Value	Description
RWYTOPTWY	Runway to parallel taxiway/taxilane separation
RWYRWY	Runway centerline to runway centerline separation
RWYTOHOLDPOSN	Runway centerline to holding position distance
RWYTOPARKING	Runway centerline to aircraft parking area distances
RWYSHOULDER	Runway shoulder dimensions
RWYTOTLOF	Runway centerline to TLOF separation
TWYTOOBJECT	Taxiway centerline to object distance
TWYTOTWY	Taxiway centerline to taxiway centerline distance
TWYWIDTH	Taxiway width dimension
TESM	Taxiway Edge Safety Margin distance
TOFA	Taxiway object free area dimension
TXSA	Taxiway safety area dimension
TWYTOPARKING	Taxiway centerline to aircraft parking or tiedown locations distance
TWYSHOULDER	Taxiway shoulder dimension

5.14.18 CodeDirectionality.

Value	Description
BI	Bidirectional
ES	One way from end-to-startpoint
SE	One way from start-to-endpoint

5.14.19 CodeDirectionLocation.

Value	Description
NORTH	338° to 022° True
NORTHEAST	023° to 067° True
EAST	068° to 112° True
SOUTHEAST	113° to 157° True
SOUTH	158° to 202° True
SOUTHWEST	203° to 247° True
WEST	248° to 292° True
NORTHWEST	293° to 337° True

5.14.20 CodeDisposition.

Value	Description
REMOVED	The object has been removed
DEMOLISHED	The object has been demolished
FUTURE_DEMOLITION	The object will be demolished in the future
FUTURE_RELOCATE	The object will be relocated in the future
FUTURE_REMOVAL	The object will be removed in the future
LOWERED	The object has been lowered
LOWER	The object will be lowered in the future
RELOCATED	The object has been relocated
TOPPED	Vegetation has been topped
OTHER	Other disposition not classified elsewhere

5.14.21 CodeEasementType.

Value	Description
AVIGATION	Provides the right of overflight in the airspace in the vicinity of a particular property. The rights also extend to the amount of noise allowable in the area and to cut and restrict the height of objects within the area or remove trees to protect aircraft operations into and out of the airport.
FUTURE_TOP	Vegetation that will be topped in the future
NOISE	Rights convened regarding the amount of noise allowable in the area
OTHER	Other easement
TBD	To Be Determined
UTILITY	Provides rights for use and access to utilities on someone else property.

5.14.22 CodeElevated.

Value	Description
ELEVATED	Indicates if a TLOF or FATO is elevated above the ground or other surface.
GROUND	Indicates a ground level FATO or TLOF

5.14.23 CodeEncumbranceType.

Value	Description
EASEMENT	Provides the holder the right to cross or otherwise use someone else’s land.

Value	Description
RIGHTORINTEREST	A share, right, or title in the ownership of property, in a commercial or financial undertaking, or the like

5.14.24 CodeEnvironmentalAreaType.

Value	Description
CRITICAL_HABITAT	An area defined as a critical habitat
ESSENTIAL_HABITAT	An area defined as an essential habitat
FAUNA	The animals of a particular region, habitat, or geological period.
FLOODZONE	Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. Each zone reflects the severity or type of flooding in the area.
FLORA	The plants of a particular region, habitat, or geological period.
MANAGED_HABITAT	An area defined as managed habitat
OTHER	Other areas not classified elsewhere
TBD	To be determined
UNMANAGED_HABITAT	An area defined as an unmanaged habitat
WETLAND	Land consisting of marshes or swamps; saturated land.
WILDLIFE	A wildlife habitat area

5.14.25 CodeFloodZoneClassificationType.

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

5.14.26 CodeFloraType.

Value	Description
TREE_DECIDUOUS	A deciduous tree
TREE_EVERGREEN	An evergreen tree
ORNAMENTAL	Ornamental plants or flowers
BUSHES	Bushes or shrubs
PLANTING_BED	An area of planting beds

5.14.27 CodeForestStandAreaType.

Value	Description
1	Jack Pine
5	Balsam Fir
12	Black Spruce-Boreal

Value	Description
13	Black Spruce
14	Northern Pine Oak
15	Red Pine
16	Aspen
17	Pine Cherry
18	Paper Birch
19	Gray Birch-Red Maple
20	White Pine-Hemlock
21	Eastern White Pine
22	White Pine-Chestnut Oak
23	Eastern Hemlock
24	Hemlock-Yellow Birch
25	Sugar Maple-Basswood
26	Sugar Maple
27	Sugarberry-American Elm-Green Ash
28	Black Cherry-Maple
30	Red Spruce-Yellow Birch
31	Red Spruce-Sugar Maple-Beech
32	Red Spruce
33	Red Spruce-Balsam Fir
34	Red Spruce-Fraser Fir
35	Paper Birch-Red Spruce-Balsam Fir
37	Northern White-Cedar
38	Tamarack
39	Black Ash-American Elm-Red Maple
40	Post Oak-Blackjack Oak
42	Bur Oak
43	Bear Oak
44	Chestnut Oak
45	Pitch Pine
46	Eastern Red Cedar
50	Yellow Poplar
51	White Oak
52	White Fir
53	Black Oak
55	Black Locust
57	Yellow-Poplar-Eastern Hemlock
58	Yellow-Poplar-White Oak-Northern Red Oak
59	River Birch-Sycamore
60	Beech-Sugar Maple
61	Silver Maple-American Elm
62	Sassafras-Persimmon
63	Cottonwood
64	Pine Oak-Sweet Gum
66	Ashe Juniper-Redberry Juniper
67	Mohrs Oak
68	Mesquite

Value	Description
69	Sand Pine
70	Longleaf Pine
71	Longleaf Pine-Scrub Oak
72	South Florida Slash Pine
73	Southern Scrub Oak
74	Cabbage Palmetto
75	Short Leaf Pine
76	Short Leaf Pine-Oak
78	Virginia Pine-Oak
79	Virginia Pine
80	Loblolly Pine- Short Leaf Pine
81	Loblolly Pine
82	Loblolly Pine-Hardwood
83	Longleaf Pine-Slash Pine
84	Slash Pine
85	Slash Pine-Hardwood
87	Sweet Gum-Willow Oak
88	Willow Oak-Water Oak-Diamond Leaf Oak
89	Live Oak
91	Swamp Chestnut Oak-Cherry Bark Oak
92	Sweetbay-Swamp Tupelo-Red Bay
93	Sugar Maple-Beech-Yellow Birch
94	Sycamore-Sweet Gum-American Elm
95	Black Willow
96	Overcup Oak-Water Hickory
97	Atlantic White Cedar
98	Pond Pine
100	Pond Cypress
101	Bald Cypress
102	Bald Cypress-Tupelo
103	Water Tupelo-Swamp Tupelo
104	Sweet Gum-Yellow Poplar
105	Tropical Hardwoods
106	Mangrove
107	White Pine-Northern Red Oak-Red Maple
108	Red Maple
109	Hawthorn
110	Northern Red Oak
111	Southern Red Cedar
201	White Spruce-Aspen
202	White Spruce-Boreal
203	Balsam-Poplar
204	Black Spruce-Paper Birch
205	Mountain Hemlock
206	Englemann Spruce
207	Red Fir
208	White Spruce-Paper Birch

Value	Description
209	Bristlecone Pine
210	Interior Douglas Fir
211	White Bark Pine
212	Western Larch
213	Grand Fir
215	Western White Pine
216	Blue Spruce
217	Aspen Interior
218	Lodgepole Pine
219	Limber Pine
220	Rocky Mountain Juniper
221	Red Adler
222	Black Cottonwood-Willow
223	Sitka Spruce
224	Western Hemlock
225	Western Hemlock-Sitka Spruce
226	Coastal True Fir-Hemlock
227	Western Red Cedar-Western Hemlock
228	Western Red Cedar
229	Pacific Douglas Fir
230	Douglas Fir-Tanoak Pacific Mandrone
231	Port Orford-Cedar
232	Redwood
233	Oregon White Oak
234	Douglas Fir Western Hemlock
235	Cottonwood-Willow
237	Interior Ponderosa Pine
238	Western Juniper
239	Pinyon-Juniper
240	Arizona Cypress
241	Western Live Oak
242	Mesquite-Interior
243	Sierra Nevada Mixed Conifer
244	Pacific Ponderosa Pine-Douglas Fir
245	Pacific Ponderosa Pine
246	California Black Oak
247	Jeffrey Pine
248	Knobcone Pine
249	Canyon Live Oak
250	Blue Oak-Digger Pine
251	White Spruce
252	Paper Birch-Boreal
253	Black Spruce-White Spruce
254	Black Spruce Tamarack
255	California Coast Live Oak
256	California Mixed Subalpine
998	Not Applicable

Value	Description
999	To Be Determined

5.14.28 CodeFuel.

Value	Description
AVGAS	Octane 100 aviation gasoline. [derived from AIXM 5.1]
AVGAS_LL	Octane 100 Low Lead aviation gasoline. [derived from AIXM 5.1]
OCT73	Octane 73 aviation gasoline. [derived from AIXM 5.1]
OCT80	Octane 80 aviation gasoline. [derived from AIXM 5.1]
OCT82UL	Octane 82 low-octane unleaded aviation gasoline. [derived from AIXM 5.1]
OCT80_87	Octane 80-87 aviation gasoline. [derived from AIXM 5.1]
OCT91_98	Octane 91-98 aviation gasoline. [derived from AIXM 5.1]
OCT100_130	Octane 100-130 aviation gasoline. [derived from AIXM 5.1]
OCT108_135	Octane 108-135 aviation gasoline. [derived from AIXM 5.1]
OCT115_145	Octane 115-145 aviation gasoline. [derived from AIXM 5.1]
MOGAS	MOGAS aviation gasoline. [AIXM 5.1]
JET	Jet aviation fuel. [AIXM 5.1]
A	Jet A Aviation fuel. [AIXM 5.1]
A+	Jet A, Kerosene, with FS-II*, FP** minus 40°C
A1	Jet A1 aviation fuel. [AIXM 5.1]
A1_PLUS	Jet A1-plus FSII aviation fuel. [AIXM 5.1]
B	Jet B aviation fuel. [AIXM 5.1]
B+	Jet B, Wide-cut, turbine fuel with FS-II*, FP** minus 50°C
JP1	Jet JP-1 aviation fuel. [AIXM 5.1]
JP2	Jet JP-2 aviation fuel. [AIXM 5.1]
JP3	Jet JP-3 aviation fuel. [AIXM 5.1]
JP4	Jet JP-4 aviation fuel. [AIXM 5.1]
JP5	Jet JP-5 aviation fuel. [AIXM 5.1]
JP6	Jet JP-6 aviation fuel. [AIXM 5.1]
JPTS	Jet JP fuel with higher thermal stability. [AIXM 5.1]
JP7	Jet JP-7 aviation fuel. [AIXM 5.1]
JP8	Jet JP-8 aviation fuel. [AIXM 5.1]
JP8_HIGHER	Jet JP-8 with higher thermal stability. [AIXM 5.1]
JP9	Jet JP-9 aviation fuel - missiles. [AIXM 5.1]
JP10	Jet JP-10 aviation fuel - missiles. [AIXM 5.1]
F18	NATO aviation gasoline low lead - equivalent AVGAS 100LL. [derived from AIXM 5.1]
F34	NATO jet aviation fuel with FSII - equivalent JP-8. [derived from AIXM 5.1]
F35	NATO jet aviation fuel - equivalent JET A-1. [derived from AIXM 5.1]
F40	NATO jet aviation fuel with FSII - equivalent JP-4. [derived from AIXM 5.1]
F44	NATO jet aviation fuel with FSII - equivalent JP-5. [derived from AIXM 5.1]
TR0	Jet TR0 aviation fuel (France). [derived from AIXM 5.1]
TR4	Jet TR4 aviation fuel (France). [derived from AIXM 5.1]
TS1	Jet TS-1 aviation fuel (Russia). [derived from AIXM 5.1]
RT	Jet RT aviation fuel (Russia). [derived from AIXM 5.1]
ALL	All regular fuel types. [derived from AIXM 5.1]
OTHER	Other

5.14.29 CodeGateStandType.

Value	Description
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
PARL	Parallel (to building) parking position
PR	Portable ramp
RMT	Remote parking position.
SR	Stairs
TM	Temporary
UNK	unknown

5.14.30 CodeHazardCategory.

Value	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 49 CFR).
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 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.

Value	Description
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.
2.2	Non-Flammable, Non-Poisonous 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 psi) 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 101.3 kPa (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/m^3. See 49 CFR 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 - 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, 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)
6	HazMat Class 6 is Toxic and Infectious Substances.

Value	Description
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, 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 49 CFR 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).
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 49 CFR 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.

5.14.31 CodeHowAcquired.

Value	Description
AIP_DEVELOPMENT	Using AIP funds for airport development
AIP_APPROACH_PROTECTION	Using AIP funds for approach protection
AIP_NOISE	AIP funds for noise
DONATION	Donated
PFC_DEVELOPMENT	Using PFC funds for airport development
PFC_APPROACH_PROTECTION	Using PFC funds for approach protection
PFC_NOISE	Using PFC funds for noise
SURPLUS_PROPERTY	Land obtained as surplus property

5.14.32 CodeLabelType.

Value	Description
BRL	Building Restriction Line
CWY	Clearway
DEICING	Deicing area
DEPT	Departure Surface
FATO	Final Approach and Takeoff area
GQS	TERPS Glidepath Qualification Surface (GQS)
HPZ	Helicopter Protection Zone
HSA	Helicopter Safety Area
IAOFZ	Inner Approach Obstacle Free Zone
ILS	ILS Protection Area
ITOFZ	Inner Transitional Obstacle Free Zone
LIGHT	Light Plane Surface
PART_77_APPROACH	Part 77 Approach Surface

Value	Description
PART_77_ CONICAL	Part 77 Conical Surface
PART_77_ HORIZONTAL	Part 77 Horizontal Surface
PART_77_PRIMARY	Part 77 Primary Surface
PART_77_TRANSITIONAL	Part 77 Transitional Surface
POFZ	Precision Obstacle Free Zone
ROFA	Runway Object Free Area
ROFZ	Runway Obstacle Free Zone
RPZ	Runway Protection Zone
RSA	Runway Safety Area
SNOW	Snow protection surface
TESM	Taxiway Edge Safety Margin
TLOF	Touchdown Liftoff area
TOFA	Taxiway Object Free Area
TXSA	Taxiway Safety Area
TSS	Threshold Siting Surface
VGSI	Visual Glide Slope Indicator (any type) Protection area

5.14.33 CodeLandmarkType.

Value	Description
AERIAL_CABLEWAY	Aerial Cableway
AGRICULTURE_AREA	Agriculture Area
AIRPORT	Airport
ATHLETIC_FIELD	Athletic Field
BOAT_RAMP	Boat Ramp
BREAKWATER	Breakwater
BLUFF	Bluff
CANAL	Canal
CEMETERY	Cemetery
CHIMNEY_SMOKESTACK	A chimney or smokestack
CLIFF	Cliff
CREEK	Creek
DAM	Dam
DOME	Dome
FENCE	Fence
GOLF_COURSE	Golf Course
GOVERNMENT_OFFICE	Generic for any type of government office
HOSPITAL	Hospital
HOUSE_OF_WORSHIP	Generic for any type of religious facility
HOUSING_AREA	Generic for a housing areas, subdivisions or complexes.
LIBRARY	Library
LIGHTHOUSE	Lighthouse

Value	Description
LEVEE	Levee
MILITARY_AREA	Military area
MOUNTAIN_PASS	Mountain pass
OTHER	Other
PIER	Pier
POWERPLANT	Power plant
QUARRY	Quarry
QUAY	Quay
RACECOURSE_TRACK	Racecourse or track
RAILROAD	Railroad
RIVER	River
ROAD	Road
SCHOOL	Generic for any type of educational facilities.
SHORELINE	Shoreline
SKI JUMP	Ski jump
SKI LIFT	Ski lift
SKYSCRAPER	Skyscraper
STADIUM	Stadium
STREAM	Stream
TANK TRAP	Tank trap
TRENCH	Trench
URBAN_AREA	Urban area
UTILITY_LINE	Utility line
WALL	Wall
WHARF	Wharf
WINDMILL	Windmill or wind farm

5.14.34 CodeLandUseLocation.

Value	Description
ON	Identified land use locations are on airport
OFF	Identified land use locations are off airport

5.14.35 CodeLandUseType.

Value	Description
1000	Residential activities [APA LBCS]
1100	Household activities [APA LBCS]
1200	Transient living [APA LBCS]
1300	Institutional living [APA LBCS]
2000	Shopping, business, or trade activities [APA LBCS]
2100	Shopping [APA LBCS]
2110	Goods-oriented shopping [APA LBCS]
2120	Service-oriented shopping [APA LBCS]

Value	Description
2200	Restaurant-type activity [APA LBCS]
2210	Restaurant-type activity with drive-through [APA LBCS]
2300	Office activities [APA LBCS]
2310	Office activities with high turnover of people [APA LBCS]
2320	Office activities with high turnover of automobiles [APA LBCS]
3000	Industrial, manufacturing, and waste-related activities [APA LBCS]
3100	Plant, factory, or heavy goods storage or handling activities [APA LBCS]
3110	Primarily plant or factory-type activities [APA LBCS]
3120	Primarily goods storage or handling activities [APA LBCS]
3200	Solid waste management activities [APA LBCS]
3210	Solid waste collection and storage [APA LBCS]
3220	Landfilling or dumping [APA LBCS]
3230	Waste processing or recycling [APA LBCS]
3300	Construction activities (grading, digging, etc.) [APA LBCS]
4000	Social, institutional, or infrastructure-related activities [APA LBCS]
4100	School or library activities [APA LBCS]
4110	Classroom-type activities [APA LBCS]
4120	Training or instructional activities outside classrooms [APA LBCS]
4130	Other instructional activities including those that occur in libraries [APA LBCS]
4200	Emergency response or public-safety-related activities [APA LBCS]
4210	Fire and rescue-related activities [APA LBCS]
4220	Police, security, and protection-related activities [APA LBCS]
4230	Emergency or disaster-response-related activities [APA LBCS]
4300	Activities associated with utilities (water, sewer, power, etc.) [APA LBCS]
4310	Water-supply-related activities [APA LBCS]
4311	Water storing, pumping, or piping [APA LBCS]
4312	Water purification and filtration activities [APA LBCS]
4313	Irrigation water storage and distribution activities [APA LBCS]
4314	Flood control, dams, and other large irrigation activities [APA LBCS]
4320	Sewer-related control, monitor, or distribution activities [APA LBCS]
4321	Sewage storing, pumping, or piping [APA LBCS]
4322	Sewer treatment and processing [APA LBCS]
4330	Power generation, control, monitor, or distribution activities [APA LBCS]
4331	Power transmission lines or control activities [APA LBCS]
4332	Power generation, storage, or processing activities [APA LBCS]
4340	Telecommunications-related control, monitor, or distribution activities [APA LBCS]
4350	Natural gas or fuels-related control, monitor, or distribution activities [APA LBCS]
4400	Mass storage, inactive [APA LBCS]
4410	Water storage [APA LBCS]
4420	Storage of natural gas, fuels, etc. [APA LBCS]
4430	Storage of chemical, nuclear, or other materials [APA LBCS]
4500	Health care, medical, or treatment activities [APA LBCS]
4600	Interment, cremation, or grave digging activities [APA LBCS]
4700	Military base activities [APA LBCS]
4710	Ordnance storage [APA LBCS]
4720	Range and test activities [APA LBCS]
5000	Travel or movement activities [APA LBCS]

Value	Description
5100	Pedestrian movement [APA LBCS]
5200	Vehicular movement [APA LBCS]
5210	Vehicular parking, storage, etc. [APA LBCS]
5220	Drive-in, drive through, stop-n-go, etc. [APA LBCS]
5400	Trains or other rail movement [APA LBCS]
5410	Rail maintenance, storage, or related activities [APA LBCS]
5500	Sailing, boating, and other port, marine and water-based activities [APA LBCS]
5510	Boat mooring, docking, or servicing [APA LBCS]
5520	Port, ship-building, and related activities [APA LBCS]
5600	Aircraft takeoff, landing, taxiing, and parking [APA LBCS]
5700	Spacecraft launching and related activities [APA LBCS]
6000	Mass assembly of people [APA LBCS]
6100	Passenger assembly [APA LBCS]
6200	Spectator sports assembly [APA LBCS]
6300	Movies, concerts, or entertainment shows [APA LBCS]
6400	Gatherings at fairs and exhibitions [APA LBCS]
6500	Mass training, drills, etc. [APA LBCS]
6600	Social, cultural, or religious assembly [APA LBCS]
6700	Gatherings at galleries, museums, aquariums, zoological parks, etc. [APA LBCS]
6800	Historical or cultural celebrations, parades, reenactments, etc. [APA LBCS]
7000	Leisure activities [APA LBCS]
7100	Active leisure sports and related activities [APA LBCS]
7110	Running, jogging, bicycling, aerobics, exercising, etc. (Source: APA)
7120	Equestrian sporting activities [APA LBCS]
7130	Hockey, ice skating, etc. [APA LBCS]
7140	Skiing, snowboarding, etc. [APA LBCS]
7150	Automobile and motorbike racing [APA LBCS]
7160	Golf [APA LBCS]
7180	Tennis [APA LBCS]
7190	Track and field, team sports (baseball, basketball, etc.), or other sports [APA LBCS]
7200	Passive leisure activity [APA LBCS]
7210	Camping [APA LBCS]
7220	Gambling [APA LBCS]
7230	Hunting [APA LBCS]
7240	Promenading and other activities in parks [APA LBCS]
7250	Shooting [APA LBCS]
7260	Trapping [APA LBCS]
7300	Flying or air-related sports [APA LBCS]
7400	Water sports and related leisure activities [APA LBCS]
7410	Boating, sailing, etc. [APA LBCS]
7420	Canoeing, kayaking, etc. [APA LBCS]
7430	Swimming, diving, etc. [APA LBCS]
7440	Fishing, angling, etc. [APA LBCS]
7450	Scuba diving, snorkeling, etc. [APA LBCS]
7460	Water-skiing [APA LBCS]
8000	Natural resources-related activities [APA LBCS]
8100	Farming, tilling, plowing, harvesting, or related activities (Source: APA)

Value	Description
8200	Livestock related activities [APA LBCS]
8300	Pasturing, grazing, etc. [APA LBCS]
8400	Logging [APA LBCS]
8500	Quarrying or stone cutting [APA LBCS]
8600	Mining including surface and subsurface strip mining [APA LBCS]
8700	Drilling, dredging, etc. [APA LBCS]
9100	Not applicable [APA LBCS]
9200	Unclassifiable activity [APA LBCS]
9300	Subsurface activity [APA LBCS]
9900	To be determined [APA LBCS]

5.14.36 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
APAPI	Abbreviated Precision Approach Path Indicator
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)
HPIL	Helipad Perimeter Inset Light
HPPEL	Helipad Perimeter Light (Elevated)
HPPLSF	Helipad Perimeter Light (Semiflush)
INCAND	Incandescent
ISO	Isophase (Sea Plane Navigation Buoy use only)
L-804	Unidirectional elevated runway guard lights
L-850A	Bidirectional 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 (MALS) applications.
L-850C	Bidirectional runway in pavement light used for runway edge lights and displaced threshold applications.
L-850D	Bidirectional 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(MALS) applications
L-850F	Unidirectional runway in pavement lights white flashing lights used for Land and Hold Short Operations (LAHSO)
L-850T	Unidirectional in pavement light used for Runway Status Lights (RWSL) Takeoff Hold Light (THL) or Runway Intersection Light (RIL)

Value	Description
L-852A	Bidirectional 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	Bidirectional or unidirectional taxiway centerline in pavement lights for curved sections of taxiways where operations are permitted when the RVR is greater than or equal to 1200 feet.
L-852C	Bidirectional or unidirectional taxiway centerline in pavement lights for straight portions of taxiways where operations are permitted when the RVR is less than 1200 feet.
L-852D	Bidirectional or unidirectional taxiway centerline in pavement lights used for curved portions of taxiways where operations are permitted when the RVR is less than 1200 feet.
L-852E	Omni-directional taxiway intersection in pavement lights where operations are permitted when the RVR is greater than or equal to 1200 feet.
L-852F	Omni-directional taxiway intersection in pavement lights where operations are permitted when the RVR is less than 1200 feet.
L-852G	Unidirectional Runway Guard in pavement lights
L-852J	Bidirectional or unidirectional taxiway centerline in-pavement lights for the curved portions of taxiways where operations are permitted when the RVR is greater than or equal to 1200 feet.
L-852K	Bidirectional or unidirectional taxiway centerline in-pavement lights for the curved portions of taxiway where operations are permitted when the RVR is less than 1200 feet.
L-852S	Unidirectional in pavement stop bar or RWSL Runway Entrance Light (REL)
L-852T	Omni directional in pavement taxiway edge and apron edge lights
L-853	Reflective Marker
L-854	Radio Controller for pilot controlled and air traffic control tower controlled airfield lights
L-860	Omnidirectional elevated runway edge lights for Visual Flight Rules (VFR) runways
L-860E	Bidirectional or unidirectional elevated runway threshold or runway end lights for VFR runways
L-861	Omnidirectional or bidirectional elevated runway edge or displaced threshold lights for non-precision Instrument Flight Rules (IFR) Runways.
L-861E	Bidirectional or unidirectional elevated runway threshold or runway end lights for non-precision IFR operations.
L-861SE	Bidirectional and unidirectional elevated runway threshold, runway end, and displaced threshold lights for non-precision IFR operations
L-861T	Omnidirectional elevated taxiway and apron edge lights.
L-862	Bidirectional elevated runway edge, threshold, and displaced threshold lights for precision IFR operations.
L-862E	Bidirectional or unidirectional elevated runway threshold, runway end, and displaced threshold lights for precision IFR operations.
L-862S	Unidirectional elevated stop bar lights
L-880/L881	Precision Approach Path Indicator (PAPI)
LED	Light Emitting Diode
LDIN	Lead In Lighting System

Value	Description
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	ICAO red obstruction lights
OBSWHITE	Flashing White Obstruction Lights
OC	Occulting or Flashing (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
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	Simplified Short Approach Light System with Sequenced Flashing Lights
SSALR	Simplified Short Approach Lighting System with Runway Alignment Indicator
TRCV	Tri-Color VASI
TWYON_OFFLGT	Taxiway Lead On/Off lights
VASI-2	Visual Approach Slope Indicator with 2 bars with 1 light unit in each bar
VASI-4	Consists of four light units, two light units in each bar. This is the basic FAA standard.
VASI-6	Consists of six light units, two light units in each bar. This is the basic FAA standard.
VASI-12	Visual Approach Slope Indicator with 2 bars and 12 light units
VASI-16	Consists of 16 light units; 6 light units in the downwind and middle bars, and 4 light units in the upwind bar. This is the basic international standard for ICAO designated airports serving scheduled foreign flag air carrier aircraft.

5.14.37 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

5.14.38 CodeMarkerRole.

Value	Description
IM	Inner Marker
LMM	Locator Middle Marker
MM	Middle Marker
OM	Outer Marker
LOM	Locator Outer Marker

5.14.39 CodeMarkingCondition.

Value	Description
EXCELLENT	Markings are in excellent condition
FAILED	Markings are in a failed condition
FAIR	Markings are in fair condition
GOOD	Markings are in good condition
POOR	Markings are in poor condition

5.14.40 CodeMarkingFeatureType.

Value	Description
AIMING_POINT	Runway Aiming Point (Geometry Type: Polygon) [Source: AC 150/5340-1, *Standards for Airport Markings*]
ALTBAND	Alternating bands of aviation orange and white [Source AC 70/7460-1]
APRON_SIGN	Surface painted apron position/entrance sign (Geometry Type: Polygon) [Source: AC 150/5340-1]
ARREST_CIRC	Arresting system circles [AC 150/5220-9, *Aircraft Arresting Systems*]
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]
CHECKERBOARD	Checkerboard obstruction marking pattern [Source AC 70/7460-1]
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. (Geometry Type: Line)
FATO _PERIMETER	FATO perimeter marking
FLT_PATH	Heliport or helipad flight path alignment marking [AC 150/5390-2]

Value	Description
GATE_SIGN	Surface painted gate position signs (Geometry Type: Polygon) [Source: AC 150/5340-1]
HELI_ID	The helipad or heliport identification marking.
HELI_SHD	Helipad or Heliport shoulder marking [AC 150/5390-2]
HOLD_SIGN	Surface painted holding position signs (Geometry Type: Polygon) [AC 150/5340-1]
HOTSPOT	A hot spot is defined as a location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.
ILS_HOLD	Holding position markings for Instrument Landing Systems (Geometry Type: Line) [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 (Geometry Type: Line)
LOCATION_SIGN	Surface painted taxiway location signs (Geometry Type: Polygon) [Source: AC 150/5340-1]
MAX_LENGTH	Marking defining the maximum length of a helicopter the helipad or heliport will accommodate.
NON_MOVE_AREA	Non-movement area marking (Geometry Type: Line) [Source: AC 150/5340-1]
OTHER	Other markings not listed
PARK_POSN	Helipad or Heliport parking position marking [AC 150/5390-2]
PARK_POSN_WGT_LMT	Helipad parking position weight limit marking [AC 150/5390-2]
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]
RAISED_EDGE	Helipad or Heliport raised edge markings [AC 150/5390-2]
ROTOR	Rotor Diameter circle marking [AC 150/5390-2]
RWY_CL	Runway Centerline (Geometry Type: Line) [Source: AC150/5340-1]
RWY_HOLD	Runway holding position markings on Runways (Geometry Type: Line) [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 (Geometry Type: Polygon)[Source AC 70/7460-1]
TDZ_MARK	Runway Touchdown Zone Marking (Geometry Type: Polygon) [Source: AC 150/5340-1]
TEMP_CLOSED	Markings for temporarily closed runways and taxiways (Geometry Type: Line) [Source: AC 150/5340-1]

Value	Description
THRSH_BAR	Runway Threshold Bar (Geometry Type: Polygon) [Source: AC 150/5340-1]
TIEDOWN	Aircraft tiedown (Geometry Type: Line)
TLOF_PERIMETER	TLOF Perimeter marking [AC 150/5390-2]
TLOF_SIZE_WGT	TLOF Size and weight limitation marking [AC 150/5390-2]
TPDC	Touchdown Positioning Circle marking
TWY_CL	Taxiway Centerline (Geometry Type: Line) [Source: AC 150/5340-1]
TWY_CLE	Enhanced 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: Line) [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]
WALKWAY	A walkaway associated with a helipad or heliport

5.14.41 CodeMonumentType.

Value	Description
A	Deep Rod – Aluminum with Finned Section
B	Deep Rod – Stainless Steel with Slee
C	Disk in bedrock or concrete structures
D	Deep Rod – Frost Resistant anchored in permafrost
E	Deep Rod – Frost Resistant anchored below permafrost
F	Shallow Rod – Finned and no casing
G	Disk in ¾ inch pipe or on rebar
CHISELED	A chiseled mark
NAIL_WASHER	A Nail and washer
OTHER	Other type of monument not classified elsewhere

5.14.42 CodeNaturalWaterBody.

Value	Description
BAY	A body of water forming an indentation of the shoreline, larger than a cove but smaller than a gulf.
CHANNEL	A wide strait, as between a continent and an island
COVE	A small indentation or recess in the shoreline of a sea, lake, or river.
CREEK	A stream smaller than a river.
DELTA	A nearly flat plain of alluvial deposit between diverging branches of the mouth of a river, often, though not necessarily, triangular
HARBOR	A part of a body of water along the shore deep enough for anchoring a ship and situated with respect to coastal features, whether natural or artificial, to provide protection from winds, waves, and currents.
LAKE	A large body of water surrounded by land.

Value	Description
MARSH	A tract of low wet land, often treeless and periodically inundated, generally characterized by a growth of grasses, sedges, cattails, and rushes.
OCEAN	A vast body of salt water
OTHER	Another natural water body not classified elsewhere
POND	A body of water smaller than a lake, sometimes artificially formed, as by damming a stream.
RIVER	A natural stream of water of fairly large size flowing in a definite course or channel or series of diverging and converging channels.
SEA	A division of waters, of considerable extent, more or less definitely marked off by land boundaries:
SOUND	A relatively narrow passage of water between larger bodies of water or between the mainland and an island
STRAIT	A narrow passage of water connecting two large bodies of water.
STREAM	A body of water flowing in a channel or watercourse, as a river, rivulet, or brook.
SWAMP	A tract of wet, spongy land, often having a growth of certain types of trees and other vegetation, but unfit for cultivation.
TIDAL FLAT	A nearly flat coastal area that is alternately covered and exposed by tides and consisting of unconsolidated sediments and precipitated salts. A tidal flat is the middle part of a tidal basin, below the vegetation-supporting salt marsh and the low-tide mark.
TRIBUTARY	A stream that flows to a larger stream or other body of water.

5.14.43 CodeNavaidEquipmentType.

Value	Description
ALS	Approach Lighting System
APBN	Airport Beacon
ARSR	Air Route Surveillance Radar
ASDE	Airport Surface Detection Equipment
ASR	Airport Surveillance Radar
BCM	Back Course Marker
DF	Direction Finding Equipment
DME	Distance Measuring Equipment
FM	Fan Marker
FMH	Fan Marker located with a radio beacon
GCA	Ground Controlled Approach touchdown reflectors
GS CE	Glide Slope Capture Effect
GS EF	Glide Slope End Fire
GS NR	Glide Slope Null Reference
GS SB	Glide Slope Side Band
LDA	Localizer type Directional Aide
LOC	Localizer
LOC_DME	Localizer collocated with DME
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 antenna
MSBLS-DME	Microwave scan beam Landing System Distance Measuring Equipment

Value	Description
MSBLS-EL	Microwave scan beam Landing System ELevation antenna
MTI	Moving Target Indicator reflector
NDB/C	Non-directional Radio Beacon - Compass Locator
NDB/H	Non-directional Radio Beacon - High Frequency
NDB/M	Non-directional Radio Beacons - Medium HF
NDB/U	Non-directional Radio Beacons - Ultra HF
NDB_DME	NDB collocated with DME
OTHER	Other
PAR	Precision Approach Radar
PRM	Precision Runway Monitor
REIL	Runway End Indicator Lights
SDF	Simplified Directional Facility
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	VHF Omnidirectional Range
VOR_DME[14]	VOR and collocated DME [AIXM 5.1]
VORTAC	VOR and collocated TACAN
VOT	VOR Test Facility

5.14.44 CodeNavaidSystemType.

Value	Description
ILS	Instrument Landing System
MLS	Microwave Landing System
MSBLS	Microwave Scan Beam Landing System
TLS	Transponder Landing System
VOR_DME[15]	VHF Omnidirectional Range collocated with Distance Measuring Equipment

5.14.45 CodeNoiseSourceType.

Value	Description
AIRCRAFT	Aircraft related noise
ENGINE_RUN	Noise sources related to engine runups
GENERATOR	Noise attributable to an operating generator
OTHER	Noise attributable to a source other than classified elsewhere
TBD	To be determined

[14] For information about collocating the DME and VOR, see paragraph 2.7.2.
[15] For information about collocating the DME and VOR, see paragraph 2.7.2.

5.14.46 CodeObjectGroup.

Value	Description
YES	Feature instance is comprised of more than a single object such as a group of trees, buildings, windmills, poles, et cetera.
NO	Feature is not a part of a group.

5.14.47 CodeObjectSource.

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	Remotely Sensed
SE	Spot Elevations
SR	Shuttle Radar Terrain Model
ST	State Coded
SV	Field Survey
TE	TERPS Analysis
VG	Vertically Guided Airport Airspace Analysis
WW	Worldwide DoD

5.14.48 CodeObjectType.

Value	Description
AERIAL CABLEWAY	Generic for any type of aerial cableway
AERIAL CABLEWAY PYLON	Generic for any type of aerial cableway pylon
AG_EQUIP	Agricultural equipment [AIXM 5.1]
AIRCRAFT	Generic for a parked or moving aircraft
AMUSEMENT_PARK_STRUCTURE	Generic for structures at amusement parks
ANTENNA	Antenna [AIXM 5.1]
AQUEDUCT	Generic for aqueduct
ARCH	Arch [AIXM 5.1]
ATHLETIC_FIELD	Generic for any type of athletic field or stadium
BILLBOARD	Generic for any type of billboard
BLAST_FURNACE	Generic for any type of blast furnace
BLEACHERS	Generic for any type of bleachers
BRIDGE_SUPERSTRUCTURE	Generic for larger bridges such as cable stayed bridges etc.
BRIDGE_TOWER	Bridge tower [AIXM 5.1]
BRIDGE	Generic for any type of bridge

Value	Description
BUILDING	Buildings (not elsewhere classified in this list)
BUSH	Generic for bushes and other low growing vegetation
CABLE_CAR	Cable car [AIXM 5.1]
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	Generic for any type of chimney/smokestack
COMMUNICATION_BUILDING	Generic for any type of communication building
COMMUNICATION_TOWER	Generic for any type of communication tower
CONTROL_TOWER	Control tower [AIXM 5.1]
CONVEYOR	Generic for any type of 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	Crane [AIXM 5.1]
DAM	Dam [AIXM 5.1]
DEBRIS_RUINS	Generic for any type of debris
DIRT_PILE	Generic for any type of dirt pile
DOME	Dome [AIXM 5.1]
DREDGE_POWERSHOVEL_/DRAG	Dredge, power shovel or dragline
EARTHEN_WORKS	Formations of solid, rock and other natural material
ELEVATOR	Elevator [AIXM 5.1]
FENCE	Fence [AIXM 5.1]
FLAGPOLE	Generic for flag pole
FLARE_PIPE	Generic for flare pipe
FORTIFICATION_OR_FORT	Generic for any type of fortification or fort
GATE	Gate [AIXM 5.1]
GRAIN_BIN_SILO	Generic for grain bin/silo
GRAIN_ELEVATOR	Grain elevator [AIXM 5.1]
HANGAR	Aircraft hangar
HOPPER	Generic for any type of hopper
HORIZONTAL_POINT	Point of known horizontal position
HOUSE_OF_WORSHIP	Generic for places where people go to worship
HOUSING_AREA	Housing Subdivisions or complexes
HOSPITAL	Generic for medical facilities
INTERSTATE	Interstate highways with 17 foot vehicle allowance added to the features elevation
LAUNCHPAD	Generic for launchpad
LIBRARY	Libraries
LIGHT_RAILWAY	Generic for people mover systems serving airports
LIGHT_SUPPORT_STRUCTURE	Generic for any type of light support structure
LIGHT_VESSEL_LIGHTSHIP	Generic for any type of light vessel/lightship
LIGHTHOUSE	Lighthouse [AIXM 5.1]
MOBILE_CRANE	Mobile crane
MONUMENT	Generic for historical or cultural monuments
NATURAL_HIGHPOINT	Natural high point [AIXM 5.1]

Value	Description
NAVAID	Navigation aid (used when defined as an obstacle)
NUCLEAR_REACTOR	Nuclear reactor [AIXM 5.1]
OFFSHORE_PLATFORM	Generic for any type of off-shore platform
PARKING_LOT	Generic for any type of parking lot
PLANT	Generic for manufacturing facilities
POLE	Generic for utility or light poles providing local service
POWER_PLANT	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
PROCESSING_TREATMENT_PLANT	Processing treatment plant
RAILROAD	Railroad track with 23 foot vehicle allowance added to the features elevation.
REFINERY	Refinery
RIG	Rig
ROAD_SIGN	Interstate highway overhead signs
SCHOOL	Generic for any educational facility
SCRUB	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	Generic for any type of ski jump
SKI_LIFT	Generic for any type of ski lift
SKI_PYLON	Generic for any type of ski pylon
SKYSCRAPER	Generic for skyscrapper
SPIRE	Spire [AIXM 5.1]
STACK	Stack [AIXM 5.1]
STADIUM	Stadium [AIXM 5.1]
STEEPLE	Generic for steeple
STORAGE_DEPOT	Generic for storage depot
STREET_SIGN	Signs used to control traffic or provide direction information other than interstate signs
SUBSTATION_TRANSFORMER	Generic for transformer
TANK	Generic for other types of tanks
TELEPHONE_LINE	Generic for any type of telephone line
TELEPHONE_PYLON_POLE	Generic for any type of pylon/pole
TERMINAL_BUILDING	Airport terminal building
TERRAIN	Terrain specifically hilly or mountainous
TETHERED_BALLOON	Tethered balloon [AIXM 5.1]
TOWER	Tower (non-communication)
TRAFFIC_LIGHT_SIGNAL	Generic for any type of traffic light/signal
TRAMWAY	Tramway [AIXM 5.1]
TREE	Generic for a single or small group of trees

Value	Description
TREE_OUTLINE	Dense area of trees
URBAN_AREA	An urban area
UTILITY_LINE	Generic for local utility service
VEGETATION	Vegetation [AIXM 5.1]
VEHICLE	Generic for any type of vehicle
VERTICAL_POINT	Point of known elevation
VERTICAL_STRUCTURE	Generic for items not classified otherwise in this list
VESSEL	Vessel
WALL	Wall [AIXM 5.1]
WATER_TOWER	Generic for water towers
WIND MOTOR	Generic for any type of wind motor
WINDMILL	Single windmill
WINDMILL_FARMS	Multiple Windmills located close together
WINDSOCK	Windsock
OTHER	Other

5.14.49 CodeOffsetDirection.

Value	Description
BOTH	Distributed on both sides of the axis [AIXM 5.1]
CL	On centerline
LEFT	Offset to the left
RIGHT	Offset to the right

5.14.50 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.
NA	Not Applicable

5.14.51 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
CWY	Clearway
DEPT	Departure Analysis
GQS	TERPS Glidepath Qualification Surface (GQS)
HORZ 77	14 CFR part 77 Horizontal Surface
IAOFZ	Inner Approach Obstacle Free Zone
ITOFZ	Inner Transitional Obstacle free Zone

Value	Description
POFZ	Precision Obstacle Free Zone
PRIM77	14 CFR part 77 Primary Surface
ROFA	Runway Object Free Area
ROFZ	Runway Obstacle Free Zone
RPZ	Runway Protection Zone
RSA	Runway Safety Area
TERPS	TERPS Surfaces
TOFA	Taxiway or Taxilane Object Free Area
TSS	Threshold Siting Surface
TRNS77	14 CFR part 77 Transitional Surfaces
TXSA	Taxiway Safety Area
VGSI	Visual Glideslope Indicator Surface

5.14.52 CodeOperationsType.

Value	Description
CIVIL	Civil operations only
JOINT	Joint military and civil operations
MIL	Military operations only
OTHER	Other

5.14.53 CodeOwner.

Value	Description
A	US Air Force
AA	Airport Authority, Management, Owner, or Operator
B	Public
CG	Coast Guard
DHS	Dept. of Homeland Security
DOI	Dept. of the Interior
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
NATO	North Atlantic Treaty Organization
NASA	National Aeronautics and Space Administration
O	Other (External Office)
P	Private
R	US Army
S	State
VM	Marine Corps
VV	US Navy
X	Special

5.14.54 CodeParcelAreaType.

Value	Description
COMPUTED	Computed values
FROM_DEED	Deeded values
OFFICIAL	Official records
SURVEYED	Surveyed values

5.14.55 CodePassengerLoadingBridgeType.

Value	Description
ARM	Movable Arm
PORTABLE_RAMP	Portable Ramp
PORTABLE_STAIRS	Portable Stairs
OTHER	Other

5.14.56 CodePlantPurpose.

Value	Description
EROSION	Erosion control
MITIGATION	Mitigation
OTHER	Other not classified elsewhere
REFORESTATION	Reforestation
RESTORATION	Restoration of native species
SPECIFIC_HABITAT	Species specific habitat

5.14.57 CodePollutionCause.

Value	Description
BIOLOGICAL	Pollution from a biological source
CHEMICAL	Pollution from a chemical source
INDUSTRIAL	Pollution from an industrial source
OTHER	Other cause not classified elsewhere
MEDICALWASTE	Pollution from medical waste
NOISE	Pollution from a noise source
RADIOLOGICAL	Pollution from a radiological source
PETROLEUM	Pollution from a petroleum source
TBD	To be determined

5.14.58 CodePositionRoleCode.

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

Value	Description
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.
CENTERLINE_OFFSET_POINT	A point collected at an offset to the runway centerline
DGPS	Differential Global Positioning System Reference Point
DISPLACED_THRESHOLD	Point provides the location of the displaced threshold for a runway
HELIPAD_REFERENCE_POINT	The point defined as the HelipadReferencePoint
HELIPAD_THLD	The threshold of a helipad
LS	Lighting System
IMAGERY	Imagery Control Point
MON	Monitor
OBJECT	Object
OTHER	Other types of points not otherwise described
PACS	Point referenced is the airport's Primary Airport Control Station
RWY_HIGH	Runway High point
RWY_INT	Runway Intersection
RWY_LOW	Runway Low point
RVRM	Runway Visual Range Midpoint Transmissometer
RVRR	Runway Visual Range Rollout Transmissometer
RVRT	Runway Visual Range Touchdown Transmissometer
RWY	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

5.14.59 CodeProjectStatus.

Value	Description
CANCELLED	Project has been cancelled
COMPLETE	Project has been completed
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

Value	Description
PROPOSED	Indicates a project that is part of a midterm (6 - 10 year) plan

5.14.60 CodeRecoveredCondition.

Value	Description
G	Recovered in good condition
N	Not recovered or not found
O	Other (see recovery description for details)
P	Poor, disturbed, or mutilated
S	Original setting (mark set on this date)
X	Surface mark known destroyed
Y	Underground mark destroyed

5.14.61 CodeRemediationUrgency.

Value	Description
HIGH	Remediation urgency is high
MEDIUM	Remediation urgency is medium
LOW	Remediation urgency is low
IMMEDIATE	Remediation required immediately
TBD	To be determined

5.14.62 CodeRightAndInterest.

Value	Description
SEPARATED_RIGHT	Separated right
ENCUMBRANCE	Encumbrance
TRIBAL_INTEREST	Tribal interest

5.14.63 CodeRightEstate.

Value	Description
SUBSURFACE	Rights are for subsurface
SURFACE	Rights are for surface
ABOVESURFACE	Rights are for above surface

5.14.64 CodeRightOrInterest.

Value	Description
AIR_RIGHTS	Air rights
RIGHT_OF_WAY	Right of way
INGRESS_EGRESS	Ingress/egress
GRAZING	Grazing
HUNTING	Hunting
OIL_MINERAL	Oil mineral
GAS_MINERAL	Gas mineral
OIL_GAS_MINERAL	Oil/gas mineral
COAL_MINERAL	Coal mineral

Value	Description
OTHER_MINERAL	Other mineral
TRANSFERABLE_DEVELOPMENT	Transferable development
FLOODPLAIN	Floodplain

5.14.65 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
FOURWHEELDRIVEROAD	Unimproved roads passable only with 4-wheel-drive vehicles are considered very primitive and are intended for use only by 4-wheel drive high clearance vehicles. The road may appear to be two tracks. Generally, the width of the road will be 6 to 12 feet. The surface is rough and irregular with very rocky sections and/or deep ruts.
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
LIGHTDUTYROAD	Includes roads of unknown surface composition, hard-surface roads not included in a higher class, and improved, loose-surface roads (such as gravel or dirt) that are 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.
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
PRIMARYHIGHWAY	Hard-surface highways, including Interstate and U.S. numbered highways (including alternates), primary State routes, and all controlled access highways. Medians are shown on primary highways where they exist and are not wide enough to cause separate instances of roads.

Value	Description
SECONDARYHIGHWAY	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. Medians are shown on secondary highways where they exist and are not wide enough to cause separate instances of roads.
STATE	Hard-surface State routes under the control and jurisdiction of State authorities
TRAIL	Unimproved roads passable only with 4-wheel-drive vehicles, snowmobiles, motocross bikes, and so forth
UNIMPROVEDROAD	Unimproved roads which are generally passable only in fair weather and used mostly for local traffic. Also included in this road class are driveways, regardless of their construction. In National Forests, these roads are considered to be forest development roads. These roads are probably not passable for most types of vehicles in inclement weather conditions and mud holes are frequently encountered during most of the season of use. They are frequently used for snowmobile travel when closed to wheeled traffic by snow

5.14.66 CodeRpzArea.

Value	Description
CAA	Feature instance represents the Controlled Activity Area of a RPZ
CP	Feature instance represents the Central Portion of a RPZ

5.14.67 CodeRpzType.

Value	Description
APCH	Feature instance represents an approach RPZ
DEPT	Feature instance represents a departure RPZ

5.14.68 CodeRunwayDirectionDesignator.

Value	Description
C	Center
L	Left
R	Right

5.14.69 CodeRunwayMarkingType.

Value	Description
BSC	Basic markings (Runway designation (number) and centerline
BUOY	Buoys (for waterways and seaplane bases)
NP	Non-precision runway markings
NRS	Runway designation (numbers) only
NSTD	Non-standard markings
P	Precision runway markings
V	Visual runway markings

5.14.70 CodeSampleCollectionPointLocation.

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

5.14.71 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

5.14.72 CodeShoulderType.

Value	Description
A	Apron
O	Other airfield pavement with a shoulder
R	Runway
T	Taxiway

5.14.73 CodeSignPurpose.

Value	Description
ARRESTING_GEAR	Sign indicating the location of arresting gear on a runway
CARGO	Inbound destination sign – area set aside for cargo handling
FBO	Inbound destination sign – fixed base operator
FUEL	Inbound destination sign area where aircraft are fueled or serviced.
HOLD_CAT2CAT3	Holding position sign for Category II and III critical areas
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 signs for runway/runway intersections

Value	Description
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
RAMP	Inbound destination sign – areas set aside for aircraft apron/ramp use (not classified elsewhere)
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	Signs designating 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 sign
TAXIWAY_LOCATION	Taxiway location sign
TERMINAL	Inbound destination sign – gate positons at which aircraft are loaded or unloaded
UNKNOWN	Unknown sign (not classified elsewhere)

5.14.74 CodeSignType.

Value	Style Code	Description
DIRECTION	0	Direction sign – Black text on a yellow background
INFO_ACFT	1	Generic sign for aircraft – Black text on a yellow background
INFO_VEH	2	Generic for vehicles – black text on a white background
LOCATION	3	Location sign – Yellow text on a black background
MANDATORY	4	Mandatory sign – White text on a red background
NO_ENTRY	5	No entry graphical sign
RWY_CRITICAL	6	Precision approach critical area graphical sign
RWY_DIST_REMAIN	7	Distance remaining marker – White text on a black background
RWY_SAFETY	8	Runway safety area graphical sign
TAXIWAY_END	9	Taxiway ending graphical sign
TERMINAL	10	Gate/parking stand sign – White text on a black background
VEH_STOP	11	Surface vehicle stop graphical sign
VEH_YIELD	12	Surface vehicle yield graphical sign

5.14.75 CodeStatus.

Value	Description
ABANDONED	Abandoned
ACTIVE	Active surface
AIRSPACED	A favorable airspace determination has been issued
AS_BUILT	Feature instance depicts the as built condition
BROKEN	Broken or rough surface
CLOSED	Closed surface
CONDEMNED	Area has been condemned by an appropriate authority
DEMOLISHED	Feature has been 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	Feature is not currently being used
LIMITED	Limited operations
NON_OPERATIONAL	Feature or entity is non-operational
OCCUPIED	Indicates a feature or entity is generally occupied
OPERATIONAL	Operational (fully)
OTHER	Other status (not classified elsewhere)
PARKED	Parked or disabled aircraft
PERMANENT	Feature or entity is permanent in nature
PORTABLE	Feature or entity is portable in nature
RELEASED	Used to track land released by the airport
REMOVED	Removed, no longer there.
S_POWER	Secondary power supply in operation
SEMI_PERMANENT	Feature or entity is semi-permanent in nature
TBD	To be determined
TEMPORARY	Feature or entity is temporary in nature
TERMINATED	Terminated no longer used
UNDER_CONSTRUCTION	Planned or under construction
UNKNOWN	Unknown or not classified elsewhere
UNOCCUPIED	Feature or entity is generally unoccupied
WORK_IN_PROGRESS	Construction or work in progress

5.14.76 CodeStructureType.

Value	Description
AIR_COURIER	Air courier operations or storage
AOA_FENCE	Airport Operating Area fence
AOA_GATE	Airport Operating Area gate
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

Value	Description
ATC_TOWER	Air Traffic Control Tower
BANK	Bank
BARN	barn
BLAST_FENCE	Structure for deflecting jet engine blast
CAPITOL	Capitol
CAR_WASH	A car washing facility
CARGO_FACILITY	Building or other structure used for cargo operations
CITY_HALL	City Hall
COMMUNITY_CENTER	Community Center
CONCERT_HALL	Concert Hall
CONCOURSE	Passenger terminal or concourse
CONDO	condominium
CONST_TRAILER	A construction trailer
COURT_HOUSE	Court House
DRY_STORAGE_DOCK	Dry storage dock
DUPLEX	House, duplex
DWELLING	Dwelling
EARTHWORKS	Earthworks
FBO	Fixed base operator
FOD_FENCE	FOD fencing
FOOD_SERVICES	Food preparation
GARAGE	A structure used for the maintenance, storage, and display of motor vehicles
GAS_STATION	A Gas station or fueling facility (vehicles)
GRAIN_ELEVATOR	Grain Elevator
GUARDRAIL	A guardrail
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
HOUSE_OF_WORSHIP	Generic for all places of worship
JAIL_OR_PRISON	Jail or Prison
MAINTENANCE_AIRCRAFT	Aircraft maintenance
MAINTENANCE_GSE	Ground Service Equipment maintenance
MAINTENANCE_OTHER	Maintenance purposes not elsewhere classified
MEDICAL_CENTER	Medical Center
MEMORIAL	Memorial
MOBILE_HOME	Mobile home or trailer
MUSEUM	Museum.
NAVAID	Shed or building associated with navigational aid equipment
NON_AOA_FENCE	A fence associated with the airport but not the AOA.
NON_AOA_GATE	A gate associated with the airport but not the AOA
NUCLEAR_REACTOR	Nuclear reactor [AIXM 5.1]
OFFICE	Office building
OFFSHORE_PLATFORM	Offshore Platform

Value	Description
OTHER	Other
PARKING_GARAGE	Parking garage or facility
PERIMETER_FENCE	Fences marking a perimeter
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
REFINERY	Refinery [AIXM 5.1]
RENTAL_FACILITY	Rental car facility
RIG	Rig [AIXM 5.1]
SCHOOL	Any building or structure whose primary purpose is education
SECURITY	Security office
SECURITY_FENCE	Security fencing
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
STADIUM	Stadium [AIXM 5.1]
STORAGE_FACILITY	A structure used for any type of storage
TBD	To Be Determined
TERMINAL	Airport terminal building/Concourse/air passenger building
THEATER	Theater (any type)
TOLL_BOOTH	A toll booth facility
TOWER	Tower
TOWN_HALL	Town Hall
TOWNHOUSE	Townhouse
UTILITY_COMM	A communication facility
WATER_TANK	Water tank

5.14.77 CodeSurfaceCondition.

Value	Description
DEFORMED	Presenting deformations [AIXM 5.1]
FAILED	Markings are in a failed condition
FAIR	Fair condition
GOOD	Good condition
POOR	Poor condition
UNSAFE	Surface is deemed unsafe for operations
OTHER	Other

5.14.78 CodeSurfaceMaterial.

Value	Description
AG	Asphalt grooved
AGS	Asphalt and turf
ANG	Asphalt non-grooved
ASPH	Surface is comprised of asphalt or bituminous concrete
ASPH_CONC	Surface is a combination of asphalt and concrete
ASPH_GRASS	Asphalt and grass [AIXM 5.1]
BITUM	Bituminous tar or asphalt and/or oil or bitumen bound, mix-in-place surfaces (often referred to as "earth cement"). [**Note:** A bituminous tar or asphalt surface is prepared by digging up the surface, mixing the material with bitumen or oil binder, and surfacing the surface with the resulting mixture. Bitumen is the family name for tar, which is derived from coal, or asphalt, which is derived from oil.] [AIXM 5.1]
BRICK	Brick [AIXM 5.1]
CG	Concrete grooved
CLAY	Clay [AIXM 5.1]
CNG	Concrete non-grooved
COMPOSITION	Multiple materials
CONC	Surface is comprised of Portland cement concrete
CONC_GRS	Concrete and grass [AIXM 5.1]
CORAL	Coral [AIXM 5.1]
DIRT	Surface is comprised of prepared/compacted natural soil, sand, or caliche
EARTH	Bare Earth
EMAS	Engineered Material Arresting System
GR	Gravel
GRASS	Grass including portions of turf or bare earth [AIXM 5.1]
GRVL	Surface is comprised of gravel, crushed rock, coral, shells, cinders, brick, or slag
GS	Turf
ICE	Ice [AIXM 5.1]
LATERITE	Laterite - a high iron clay formed in tropical areas [AIXM 5.1]
MACADAM	A macadam or tarmac surface consisting of water-bound crushed rock. [AIXM 5.1]
MATS	Surface is comprised of steel, aluminum, metal decking or matting, landing mats or membranes
MEMBRANE	A protective laminate usually made of rubber [AIXM 5.1]
METAL	Metal - steel, aluminum [AIXM 5.1]
NON_BITUM_MIX	Non Bituminous mix [AIXM 5.1]
OTHER	Other [AIXM 5.1]
OTHER_ASPH_DIRT	Surface is a combination of asphalt and dirt
OTHER_ASPH_GRVL	Surface is a combination of asphalt and gravel
OTHER_ASPH_TURF	Surface is a combination of asphalt and turf
OTHER_CONC_TURF	Surface is a combination of concrete and turf
OTHER_GRVL_DIRT	Surface is a combination of gravel and dirt
OTHER_GRVL_TURF	Surface is a combination of gravel and turf
OTHER_ICE	Surface is ice all year long

Value	Description
OTHER_MISC	Surface is comprised of a material other than previously specified
OTHER_SNOW	Surface is snow all year long
PIERCED_STEEL	Pierced steel planking [AIXM 5.1]
SAND	Sand [AIXM 5.1]
SNOW	Snow [AIXM 5.1]
STONE	Stone [AIXM 5.1]
TREATED	Surface is comprised of oil or cement treated dirt or gravel, soli cement or lime stabilized
TURF	Surface is comprised of turf, grass, or sod
WATER	Surface is comprised of water
WOOD	Wood [AIXM 5.1]

5.14.79 CodeSurfaceType.

Value	Description
P	Specially prepared hard surface—Paved
S	Specially prepared hard surface—Unpaved
U	Not a specially prepared hard surface

5.14.80 CodeTaxiwayDesignGroup.

Value	Description
1	Aircraft in taxiway design group 1
2	Aircraft in taxiway design group 2
3	Aircraft in taxiway design group 3
4	Aircraft in taxiway design group 4
5	Aircraft in taxiway design group 5
6	Aircraft in taxiway design group 6
7	Aircraft in taxiway design group 7

5.14.81 CodeTaxiwayType.

Value	Description
AIR_TAXIWAY	Air taxiway
AIR_TLANE	Air taxilane
APRON	Apron taxiway
BYPASS	Bypass holding bay
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 BAY	Holding bay
INLINE	Inline taxiway
INTERSECTION	Taxiway intersection element
OTHER	Other not listed elsewhere

Value	Description
PARALLEL	Parallel taxiway
STUB	Stub taxiway
TLANE	Taxilane
TURN_AROUND	Turn around taxiway

5.14.82 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

5.14.83 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

5.14.84 CodeUnitOfMeasurement.

Value	Description
ACRES	Measurements provides in acres
FEET	Measurements provided in feet
HECTACRES	Measurements provided in hectacres
METERS	Measurements provided in meters
SQUARE_FEET	Measurements provided in square feet
SQUARE_METERS	Measurements provided in square meters
SQUARE_YARDS	Measurements provided in square yards

5.14.85 CodeUtilityConfidence.

Value	Description
A	Locating
B	Designating
C	Surface Visible Feature Survey
D	Existing Records

5.14.86 CodeVegetationAreaType.

Value	Description
BUSHES	An area of bushes or shrubs
DIRT	An area lacking vegetation or mostly bare earth
GRASS	An area covered in grass or sod
GROUNDCOVER	An area of ground cover or vines
MULCH	An area of inorganic or organic mulch

Value	Description
PLANTS	A planting bed area
SPRIGS	An area of sprigs, twigs, or leaves

5.14.87 CodeVerticalStructureMaterial.

Value	Description
ADOBE_BRICK	Brick made of adobe clay and straw, dried in the sun rather than by oven firing (as are standard bricks). Larger than standard bricks, adobe bricks require a type of clay that contains between 25 and 45 percent aluminum salts. [AIXM 5.1]
ALUMINIUM	A light silvery ductile and malleable metal, not readily tarnished by air, which is a chemical element, atomic number 13. (Symbol Al) [AIXM 5.1]
BRICK	Clay kneaded, molded, and baked or sun-dried, used as a building material. [AIXM 5.1]
COMPOSITION	Multiple materials
CONCRETE	A heavy-duty building material made from a mixture of broken stone or gravel, sand, cement and water that forms a stone like mass on hardening. [AIXM 5.1]
FIBREGLASS	Any material consisting of glass filaments woven into a textile or paper, or embedded in plastic, for use as a construction or insulation material. [AIXM 5.1]
GLASS	A substance made by fusing soda and/or potash with other ingredients. Usually transparent, lustrous, hard, and brittle. [AIXM 5.1]
IRON	A malleable, magnetic, readily oxidizable metal, which is a chemical element of the transition series, atomic number 26. (Symbol Fe) occurs abundantly in certain ores and in meteorites, and is widely used, chiefly in alloys such as steel. [AIXM 5.1]
MASONRY	Building materials (for example: stone, brick, concrete, hollow-tile, concrete block, gypsum block, or other similar building units or materials and/or combination of the same) bonded together with mortar to form a structure (for example: a wall, a pier). [AIXM 5.1]
METAL	Any of the class of substances that are characteristically lustrous, ductile, fusible, malleable solids and are good conductors of heat and electricity. For example, gold, silver, copper, iron, lead, tin, and certain alloys (as brass and bronze). [AIXM 5.1]
MUD	Constructed principally from mud applied to a structural scaffold of plant material (for example: wooden posts). Effective only in extremely dry climates and usually must be resurfaced on a regular basis (for example: yearly) otherwise the structure steadily disintegrates under the effect of weather. [AIXM 5.1]
OTHER	Other [AIXM 5.1]
PLANT	Plant material (for example: straw and/or tall coarse grass), possibly also containing the slices of soil to which the plant material is attached. For example, used in thatching or sodding a roof. [AIXM 5.1]

Value	Description
PRESTRESSED_CONCRETE	Reinforced concrete in which internal stresses have been introduced to reduce potential tensile stress in the concrete resulting from loads. [AIXM 5.1]
REINFORCED_CONCRETE	Poured concrete containing steel bars or metal fabric to increase its tensile strength. [AIXM 5.1]
SOD	A usually square or oblong piece or slice of earth together with the grass growing on it. [AIXM 5.1]
STEEL	Any of numerous artificially produced alloys of iron containing up to 3 per cent of other elements (including less than about 2.2 per cent carbon) and having great strength and malleability. Able to be tempered to many different degrees of hardness. Used for making tools, weapons, and/or machinery. [AIXM 5.1]
STONE	Pieces of rock or mineral substance (other than metal) of definite form and size, usually artificially shaped, and used for some special purpose. Used, for example, for building, for paving, or in the form of a block, slab, or pillar set up as a memorial and/or a boundary-mark. [AIXM 5.1]
TREATED_TIMBER	A timber that has been impregnated with chemicals to reduce damage from wood rot and/or insects. Often used for the portions of a structure that are likely to be in ongoing contact with soil and/or water. [AIXM 5.1]
WOOD	The hard, compact, fibrous substance of which the roots, trunks, and branches of trees and shrubs consist. Consists largely of secondary xylem, which forms the strengthening and water-transporting tissue of the plant. [AIXM 5.1]

5.14.88 CodeWaterLaneType.

Value	Description
ALTERNATE	A feature describing an alternate water lane
PRIMARY	The primary water lane

5.14.89 CodeWildlifeHazardType.

Value	Description
ANIMALSTRIKE	Strike related to an animal other than a bird or deer
BIRDSTRIKE	Strike related to a bird
DEERSTRIKE	Strike related to a deer

5.14.90 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)

Value	Description
RESIDENTIAL	Areas, which are zoned for housing or residential development. (Source SDSFIE)
OTHER	Other Zoning

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 ACs can be accessed by selecting the "Advisory Circulars" link on the FAA homepage (www.faa.gov).

1. The requirements in this guidance and attachments.
2. AC 70/7460-1, *Obstruction Marking and Lighting*.
3. AC 150/5070-6, *Airport Master Plans*.
4. AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*.
5. AC 150/5210-5, *Painting, Marking and Lighting of Vehicles Used on an Airport*.
6. AC 150/5220-9, *Aircraft Arresting Systems*.
7. AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns*.
8. AC 150/5220-23, *Frangible Connections*.
9. AC 150/5300-13, *Airport Design*.
10. AC 150/5300-14, *Design of Aircraft Deicing Facilities*.
11. AC 150/5300-16, *General Guidance and Specifications for Aeronautical Surveys - Establishment of Geodetic Control and Submission to the National Geodetic Survey*.
12. AC 150/5300-17, *Standards for Using Remote Sensing Technologies in Airport Surveys*.
13. AC 150/5320-6, *Airport Pavement Design and Evaluation*.
14. AC 150/5320-12, *Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces*.
15. AC 150/5320-17, *Airfield Pavement Surface Evaluation and Rating Manuals*.
16. AC 150/5335-5, *Standardized Method of Reporting Airport Pavement Strength - PCN*.
17. AC 150/5340-1, *Standards for Airport Markings*.
18. AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures*.
19. AC 150/5370-2, *Operational Safety during Construction on Airports*.
20. AC 150/5380-6, *Guidelines and Procedures for Maintenance of Airport Pavements*.
21. AC 150/5380-7, *Airport Pavement Management Program (PMP)*.
22. AC 150/5390-2, *Heliport Design*.
23. NGS Aeronautical Survey Program: http://www.ngs.noaa.gov/AERO/aero.html.

24. FAA Web site for location identifiers (JO 7350.9): http://www.faa.gov/documentLibrary/media/Order/LOC_ID.pdf .
25. FAA Web site for airport managers. http://www.faa.gov/airports/airport_safety/airportdata_5010/.
26. Input Formats and Specifications of the National Geodetic Survey Data Base, The "Blue Book" http://www.ngs.noaa.gov/FGCS/BlueBook/.
27. 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.
28. Aeronautical Information Manual, Official Guide to Basic Flight Information and ATC Procedures. http://www.faa.gov/air_traffic/publications/media/aim.pdf.

A.1.1 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:

- 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), Non-directional Radio Beacon (NDB), etc.
- 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.)

A.1.2 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.

A.1.3 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.

A.1.4 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.

1. **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."
2. **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).
3. **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.
4. **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.)
5. **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.)
6. **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.

7. **Airport Elevation** – The highest point of an airport's usable runways measured in feet from mean sea level (technically, from the vertical datum).
8. **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 non-precision 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.

9. **Airport Reference Point (ARP)** – The approximate geometric center of all usable runways. ARP is not monumented, and not recoverable on the ground.
10. **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.
11. **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.
12. **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.
13. **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.

14. **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.
15. **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.
16. **Approach Side** – The side occupied by a landing aircraft before the aircraft has passed the feature.
17. **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.
18. **Area Navigation Approach (ANA)** – An instrument approach procedure using an Area Navigation System.
19. **Attributes or Attribute Data** – Alphabetical and/or numeric information that describes particular characteristics of a geospatial feature, such as type, dimensions, usage, occupancy, etc.
20. **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.

21. **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.
22. **Blast Fence** – A barrier that is used to divert or dissipate jet or propeller blast.
23. **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.
24. **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.
25. **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.
26. **Collection** – Any combination of data submitted by a provider at a given time.
27. **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.
28. **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.
29. **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.
30. **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.)

31. **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.
32. **Direction Finder (DF)** – A radio receiver equipped with a directional sensing antenna used to take bearings on a radio transmitter.
33. **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.
34. **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.
35. **Ellipsoid** – Refer to Reference Ellipsoid.
36. **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.
37. **Feature** – A manmade or natural object that appears in the real world such as a building, runway, navigational aid or river.
38. **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.
39. **Feature Instance** – A specific feature such as runway 10/28 at Baltimore Washington International Airport.
40. **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.
41. **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.

42. **Flight Path** – A line, course, or track along which an aircraft is flying or intended to be flown.
43. **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.
44. **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.
45. **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.
46. **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.
47. **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.
48. **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).
49. **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.
50. **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.
51. **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 non-

precision instrument approach procedures or (2) the center of the final approach reference area when the heliport has a precision instrument approach.

52. **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.
53. **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.
54. **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.
55. **Instrument Runway** – A runway equipped with electronic and visual navigational aids for which a precision or non-precision approach procedure having straight-in landing minimums have been approved.
56. **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.
57. **Landing Area** – Any locality used or intended to be used for the landing and takeoff of aircraft. The locality may be 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.
58. **Landing Direction Indicator** – A device, usually a tetrahedron, which visually indicates the direction in which landings and takeoffs should be made.
59. **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.

60. **Light Detection and Ranging (LiDAR)** - A remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth.
61. **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).
62. **Localizer (LOC)** – The component of an ILS which provides course guidance to the runway.
63. **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.)
64. **Localizer Type Directional Aid (LDA)** – A navigational aid used for non-precision 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.
65. **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.
66. **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 begins.
    - **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.

67. **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.
68. **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.
69. **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.
70. **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.
71. **Missed Approach** – A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing.
72. **Movement Area** – The runways, taxiways, and other areas of an airport/heliport which are used 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.
73. **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.
74. **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."
75. **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.
76. **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.

77. **Navigable Airspace** – Airspace at and above the minimum flight altitude prescribed in the FARs, including airspace needed for safe takeoff and landing.
78. **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).
79. **Non-Directional Beacon (NDB)** – An L/MF or UHF radio beacon transmitting non-directional 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.
80. **Non-precision 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.
81. **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.
82. **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.
83. **Obstacle** – Any object that has a vertical element to it and may or may not penetrate an obstruction identification surface.
84. **Obstruction** – Any object that penetrates an obstruction identification surface.
85. **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.
86. **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.

87. **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.

88. **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.

89. **Outboard Lights** – Refer to Inboard/Outboard Lights.

90. **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).

91. **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.

92. **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

93. **Precision Approach Procedure** – A standard instrument approach procedure in which an electronic glideslope/glidepath is provided; e.g., GPS, ILS, and PAR approaches.

94. **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 where 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.

95. **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.

96. **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.

97. **Published Data** – Data officially issued for distribution to the public.

98. **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.

99. **Radar Approach** – An instrument approach procedure which utilizes Precision Approach Radar (PAR) or Airport Surveillance Radar (ASR).
100. **Radio Beacon** – Refer to Non-directional Beacon.
101. **Ramp** – Refer to Apron.
102. **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.
103. **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.
104. **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.
105. **Resolution** – The smallest spacing between two display elements expressed as dots per inch, pixels per line, or lines per millimeter.
106. **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.

107. **Runway Centerline** – A line connecting the two opposite runway end points. The line may be physically marked on the surface of the runway.

108. **Runway End Point** – The point at the runway end halfway between the edges of the runway.

109. **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.

110. **Remote Transmitter/Receiver (RTR)** – Refer to Remote Communications Outlet.

111. **Schema** – A logical diagram that shows the structure and interrelationships between different feature types of the data standard or model.

112. **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.

113. **Simplified Directional Facility (SDF)** – A navigational aid used for non-precision 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.

114. **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.

115. **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.

116. **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.

117. **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.

118. **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.

119. **Structure** – Something (such as a house, tower, bridge, etc.) that is built by putting parts together and that usually stands on its own.

120. **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.

121. **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.

122. **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.

123. **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.

124. **Take-off Distance Available (TODA)** – The length of the take-off run available plus the length of the clearway, if provided.

125. **Take-off Run Available (TORA)** – The length of the runway declared available and suitable for the ground run of an airplane take-off.

126. **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.

127. **Taxiway** – A defined path established for the taxiing of aircraft from one part of an airport to another.

128. **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.

129. **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.

130. **Touchdown Side** – The side occupied by a landing aircraft after the aircraft has passed the feature.

131. **Touchdown Zone (TDZ)** – The first 3,000 feet of the runway beginning at the threshold.

132. **Touchdown Zone Elevation (TDZE)** – The highest elevation in the Touchdown Zone.

133. **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.

134. **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).

135. **Transponder Landing System (TLS)** – Transponder landing system providing azimuth and elevation guidance to aircraft on approach.

136. **Trim Line** – An imaginary line constructed perpendicular to the runway/stopway centerline which establishes the location of a runway/stopway end or displaced threshold.

137. **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.

138. **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.

139. **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.

140. **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.

141. **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.

142. **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.

143. **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.)

144. **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.

145. **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
Aeronautical Information Exchange Model	AIXM
Aeronautical Information Service	AIS
Agricultural	AG
Air Route Surveillance Radar	ARSR
Aircraft	ACFT
Airport Beacon	APBN
Airport District Office	ADO
Airport Facility Directory	AFD
Airport Layout Plan	ALP
Airport Obstruction Chart	AOC
Airport Reference Point	ARP
Airport Surface Detection Equipment	ASDE
Airport Surveillance Radar	ASR
Airport Traffic Control Tower	ATCT
Airport	ARPT
Airway Beacon	AWYBN
American Institute of Architects	AIA
American National Standards Institute	ANSI
Anemometer	AMOM
Antenna	ANT
Approach Light System	ALS
Approach Light	APP LT
Approach	APCH
Architecture, Engineering and Construction	A/E/C

Area Navigation Approach ....ANA
Arresting Gear..A-GEAR
ASTM International ....ASTM
Automated Flight Service Station..............................AFSS
Automated Surface Observing System ....ASOS
Automatic Weather Observing/Reporting System.....AWOS
Available Landing Distance......................................ALD

B

Back Course Marker ....BCM
Barometric Vertical Navigation.................................Baro VNAV
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

Electronic Distance Meter Instrument ....EDMI
Electrical ....ELEC
Electronic Airport Layout Plan.................................eALP
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 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 Detection and Ranging....................LiDAR
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

Low Visibility Operations..LVO

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
Non-Directional 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
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
Sub-Surface Utilities Engineering ....SUE
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 Aids ....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
ALD ....Available Landing Distance
ALP ....Airport Layout Plan

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 ....ASTM International
ATCT ....Airport Traffic Control Tower
AWOS........................Automatic Weather Observing/Reporting System
AWYBN ....Airway Beacon

B

Baro VNAV ....Barometric Vertical Navigation
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

eALP ....Electronic Airport Layout Plan
EDMI ....Electronic Distance Meter Instrument
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

LDA ....Localizer Type Directional Aid
LDIN ....Lead In Lighting System
LiDAR ....Light Detection and Ranging
LMM ....Locator Middle Marker
LOC............................Localizer
LOM...........................Locator Outer Marker
LPV ....Localizer Performance with Vertical Guidance
LT...............................Light
LTD............................Lighted
LVO ....Low Visibility Operations

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 ....Non-directional 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
STAR ....Standard Terminal Arrival
STK............................Stack
STWY ....Stopway
SUE ....Sub-Surface Utilities Engineering

T

TACAN......................Tactical Air Navigation Aid
TDR............................Touchdown Reflector
TDZ............................Touchdown Zone

TDZE ....Touchdown Zone Elevation
THLD.........................Threshold
TK ....Tank
TLS ....Transponder Landing System
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 Navigational Aids
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

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APPENDIX B. AIRPORT REFERENCE POINT COMPUTATION

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. 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.

B.1.1 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. Refer to the follow website for additional information: www.ngs.noaa.gov/AERO/arpcomp/arpframe.html

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

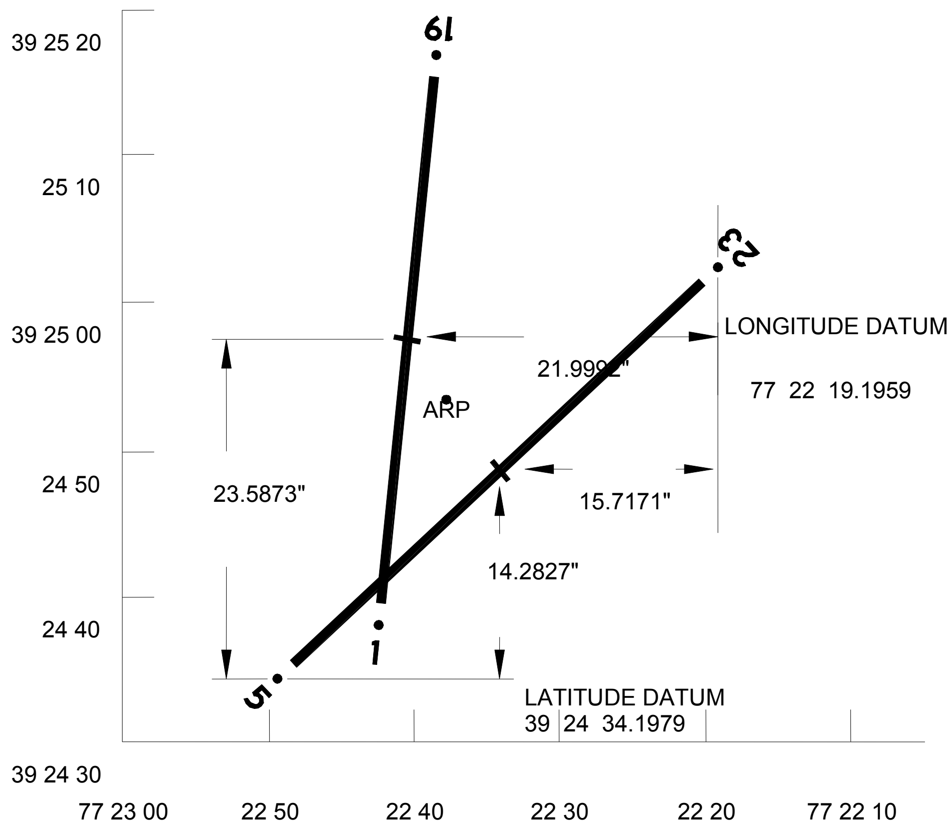
= 39 24 53.3

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.

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APPENDIX C. RUNWAY, STOPWAY AND DISPLACED THRESHOLD END IDENTIFICATION AND MONUMENTATION

C.1 Terminology.

Refer to the Glossary for definitions used in this document. 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. When adequate definitions were not available from an official source, such as the AIM, other ACs, or the NGS Geodetic Glossary, they were carefully developed as needed for this document.

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.” 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.2 Features Associated With Runway/Stopway Usage and Survey Point Location.

C.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.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.

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

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 ACs.

C.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. The limit of construction is typically indicated by a surface discontinuity. Do not locate the runway end beyond this discontinuity and on a blast pad, stopway, or other non-runway surface.

C.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. 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 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. Establish the trim line at a point on the apparent runway/stopway surface inside any disintegrating or otherwise questionable pavement.

C.2.5 Other Uses Of The Trim Line Include:

- 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, such as unpaved runways with outboard threshold lights.

C.2.6 Surface Markings

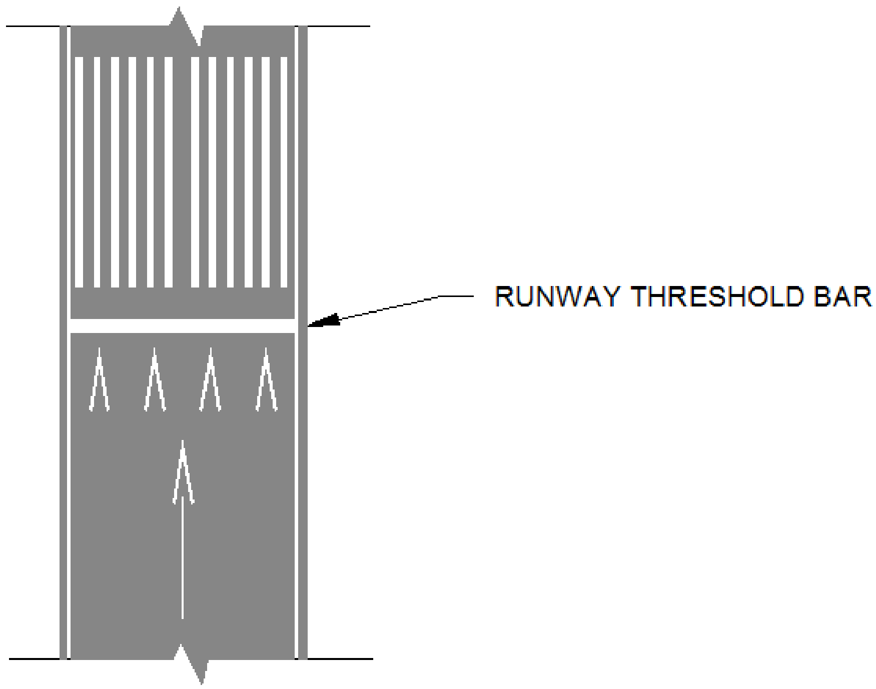
C.2.6.1 **Threshold Bar.**

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 defines 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. Occasionally, a threshold bar may 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. Remember the correct paint color for runway markings is white. The correct paint color 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.2.6.2 **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, discuss this matter immediately with airport management.

C.2.6.3 **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.2.7 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 which can lead to confusion and incorrect survey point location.

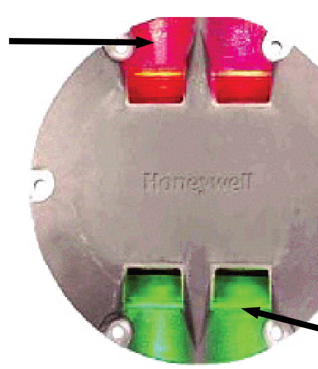
C.2.7.1 **Threshold Lights.**

Threshold lights are fixed green lights arranged symmetrically left and right of the runway centerline, identifying 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 in one fixture. In this case, threshold lights show green from the approach side, while the runway end lights show red from the touchdown side. If 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 the runway is unlighted) is not perpendicular to the runway centerline, then the line must be the 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 often flush mounted with the runway surface.



C.2.7.2 **Runway End Lights.**

Runway end lights are fixed red lights arranged symmetrically left and right of the runway centerline, identifying 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 a threshold, the light unit will show green from the approach side. 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 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, 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.2.7.3 **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.2.7.4 **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.

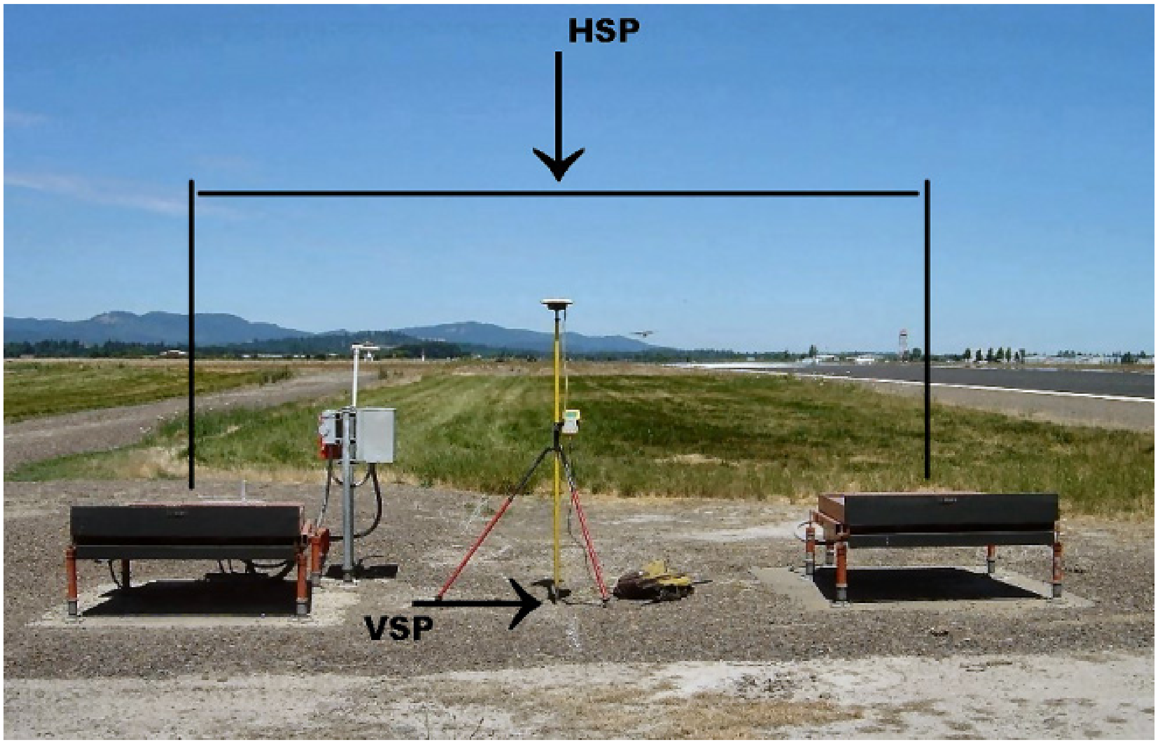
C.2.8 Signs.

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.2.9 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.

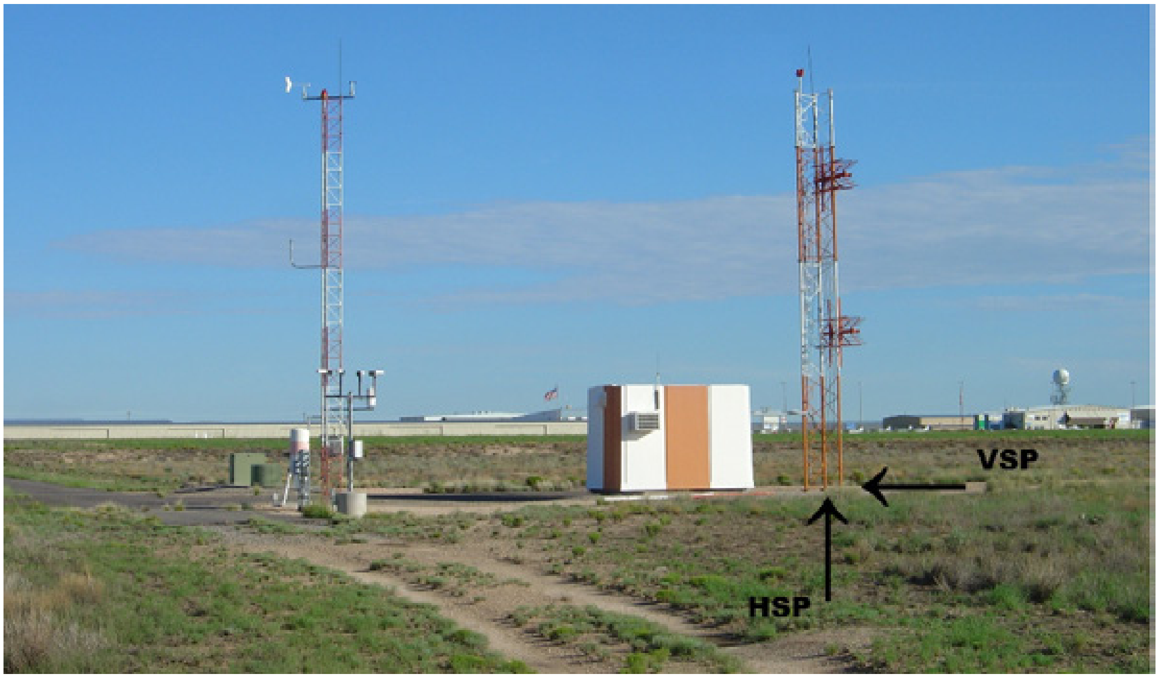
Figure C-5. Illustrates the Proper Location of a GPS Setup to Locate the HSP of a Precision Approach Path Indicator (PAPI) light System. The PAPI is One Type of VGSI.



C.2.10 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.2.11 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, such as when a runway is extended, but the taxiway was not extended to the new runway end. This is more likely to occur at smaller airports. While taxiway/runway intersections do not define runway points, unusual taxiway/runway configurations can alert the surveyor that an unusual situation exists.

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APPENDIX D. TRUNCATED ATTRIBUTE VALUES TO BE USED WITH ESRI® SHAPEFILES

D.1 ESRI® Shapefiles Truncated Attribute Values.

When submitting data as ESRI® shapefiles, the truncated attribute values in the following tables must be used. This list includes appropriate values for all features and attributes identified in Chapter 5 of this AC.

D.2 Common Attributes.

Each feature in the following tables has the following common attributes. To reduce redundancy in the document we are identifying them here.

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
EFFECTIVEENDDATE	EFFENDDATE
EFFECTIVESTARTDATE	EFFSTDATE
OPERATIONALSTATUSCODE	STATUSCODE
USERNOTETEXT	NOTETEXT

D.2.1 AIROPERATIONSAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SECURITYDESCRIPTIONTEXT	SECDESCTXT

D.2.2 AIRCRAFTGATESTAND

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
AIRCRAFTGATESTANDLENGTH	ACSTNDLEN
AIRCRAFTGATESTANDNAME	ACSTNDNAME
AIRCRAFTGATESTANDTYPECODE	ACSTNDTYPE
AIRCRAFTGATESTANDWIDTH	ACSTNDWID
AIRCRAFTMAXIMUMWINGSPAN	ACMXWNGSPN
AIRCRAFTTYPE	ACFTTYPE
DOCKINGLIGHTSYSTEMAVAILABILITY	DOCKLIGHTS
GROUNDPOWERAVAILABILITY	GNDPWRAVAL
JETWAYAVAILABILITY	JETWAYAVAL
PAVEMENTCLASSIFICATIONNUMBER	PCN
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE
TOWINGAVAILABILITY	TOWINGAVAL

D.2.3 AIRFIELDLIGHT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LIGHTCOLORCODE	LGTCOLOR

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LIGHTSYSTEMTYPECODE	LGTSYSTEM
PILOTCONTROLFREQUENCY	PLTCTLFREQ

D.2.4 AIRPORTBOUNDARY

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRPORTFACILITYTYPE	APTFACTYPE
AIRPORTNAME	APTNAME
AIRPORTSITENUMBER	SITENUMBER
IATAAIRPORTIDENTIFIER	IATAAPTID
ICAOAIRPORTIDENTIFIER	ICAOAPTID
NFDCAIRPORTIDENTIFIER	NFDCAPTID
OPERATIONSTYPE	OPSTYPE
OWNERCODE	OWNERCODE

D.2.5 AIRPORTMOVEMENTAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRPORTMOVEMENTAREANAME	APTMVENAME

D.2.6 AIRPORTPARCEL

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ASSESSEDMARKETVALUEAMOUNT	MKTVALAMT
ASSESSEDMARKETVALUEDATE	MKTVALDATE
HOWACQUIREDTYPECODE	HOWACQTYPE
MOSTRECENTSTRUCTUREBUILDDATE	STRBLDDATE
PARCELACQUISITIONTYPECODE	ACQTYPE
PARCELAREASIZE	PARCELAREA
PARCELAREATYPE	PARCELTYPE
PARCELAREAUOMCODE	AREAUOM
PARCELCOSTTOACQUIREAMOUNT	COSTACQAMT
PARCELDEEDRECORDEDLOCATIONTEXT	DEEDLOCATE
PARCELLEGALDESCRIPTIONTEXT	LEGALDESC
PARCELLOCALIDENTIFIER	LOCALID
PARCELOWNERNAME	OWNERNAME
PARCELPREVIOUSOWNERNAME	POWNERNAME
PARCELPROJECTAIPGRANTIDENTIFIER	AIPGRANTID
PARCELUSECODE	PARUSECODE
PASSENGERFACILTYCHARGENUMBER	PFCNUMBER
RECENTASSESSEDVALUEAMOUNT	RECENTAMT
RECORDEDDATE	RECORDDATE

D.2.7 AIRPORTSIGN

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRPORTSIGNDIRECTION	APTSIGNDIR

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRPORTSIGNHEIGHTVALUE	APTSIGNHGT
AIRPORTSIGNMSGBACK	SIGNMSGBK
AIRPORTSIGNMSGFRONT	SIGNMSGFR
AIRPORTSIGNPURPOSECODE	APTSIGNPRP
AIRPORTSIGNTYPECODE	APTSIGNTYP

D.2.8 ANCHORAGEAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ANCHORAGEAREABOTTOMCONDITIONTEXT	BOTTOMCND
ANCHORAGEAREADEPTHVALUE	AREADEPTH
ANCHORAGEAREALENGTH	AREALEN
ANCHORAGEAREAMOORINGLOCATIONS	AREAMORNUM
ANCHORAGEAREANAME	AREANAME
ANCHORAGEAREARESTRICTIONTEXT	AREARESTRC
ANCHORAGEAREAWIDTHVALUE	AREAWIDTH

D.2.9 APRON

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
APRONELEMENTTYPECODE	APRONTYPE
APRONLENGTH	APRONLEN
APRONWIDTHVALUE	APRONWIDTH
FUELTYPECODE	FUELTYPE
PAVEMENTCLASSIFICATIONNUMBER	PCN
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCNDCODE
SURFACETYPECODE	SFCTYPCODE
TIEDOWNCOUNT	TIEDOWNCNT

D.2.10 ARRESTINGGEAR

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRPORTTYPECODE	APTTYPE
ARRESTINGGEARDISTANCE	AGEARDIST
ARRESTINGGEARDISTANCE REFERENCE	AGEARREF
ARRESTINGGEARTYPECODE	AGEARTYPE
ARRESTINGSYSTEMNAME	ASYSNAME
DIRECTIONALITYCODE	DIRECTION
OWNERCODE	OWNERCODE

D.2.11 BRIDGE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
BRIDGENAME	BRIDGENAME

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
BRIDGETYPECODE	BRIDGETYPE
DIRECTIONALITYCODE	DIRECTION
PAVEMENTCLASSIFICATIONNUMBER	PCN
SURFACECOMPOSITIONCODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE
VERTICALSTRUCTUREMATERIAL	VERTSTRMAT

D.2.12 CONSTRUCTIONAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
CONSTRUCTIONAREANAME	CNAREANAME
CONSTRUCTIONPROJECTNAME	PROJECTNAME
CONSTRUCTIONAREATYPECODE	CNAREATYPE
COORDINATIONCONTACTNAME	CONTACTNAME
PROJECTSTATUSCODE	PRJSTATUS

D.2.13 DEICINGAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DEICINGAREANAME	DEICNAME
DEICINGAREATYPECODE	DEICTYPE

D.2.14 DIMENSION

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DIMENSIONTYPECODE	DIMNTYPE
DIMENSIONVALUE	DIMNVALUE

D.2.15 DOCKINGAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DOCKINGAREANAME	DOCKNAME
FLOATINGBARGEAVAILABLEINDICATOR	FLTBARAVAL
FLOATINGBARGELENGTHVALUE	FLTBARLEN
FLOATINGBARGESTRUCTUREMATERIAL	FLBARMAT
FLOATINGBARGEWIDTHVALUE	FLBARWIDTH
FLOATINGDOCKAVAILABLEINDICATOR	FLDOCKAVAL
FLOATINGDOCKLENGTH	FLDOCKLEN
FLOATINGDOCKSTRUCTUREMATERIAL	FLDOCKMAT
FLOATINGDOCKWIDTHVALUE	FLDOCKWID
GANGWAYAVAILABLEINDICATOR	GWAYAVAL
GANGWAYLENGTH	GWAYLEN
GANGWAYSTRUCTUREMATERIAL	GWAYMAT
GANGWAYWIDTHVALUE	GWAYWIDTH
HOSITINGCAPABILITYVALUE	HOISTCAPB
MARINERAILWAYAVAILABLEINDICATOR	MRAILAVAL

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
MARINERAILWAYPLATFORMCAPACITY	MRAILCAP
MARINERAILWAYPLATFORMLENGTH	MRAILLEN
MARINERAILWAYPLATFORMWIDTHVALUE	MRAILWIDTH
PIERAVAILABLEINDICATOR	PIERAVAL
PIERLENGTHVALUE	PIERLEN
PIERVERTICALSTRUCTUREMATERIAL	PIERVSMAT
PIERWIDTHVALUE	PIERWIDTH

D.2.16 DRIVEWAYAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DRIVEWAYAREANAME	DWAREANAME
SURFACECOMPOSITIONCODE	SFCCMPTYPE

D.2.17 DRIVEWAYCENTERLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DRIVEWAYCENTERLINENAME	DWCLNAME

D.2.18 ELEVATIONCONTOUR

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ELEVATIONCONTOURVALUE	CONTOURVAL

D.2.19 ENVIRONMENTALCONTAMINATIONAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMENTALAREANAME	ENVAREANME
ENVIRONMENTALAREATYPECODE	ENVAREATYP
ENVIRONMENTALHAZARDCATEGORYTEXT	ENVHZDCAT
POLLUTANTRELEASETYPETEXT	POLRLSTEXT
POLLUTANTSOURCETEXT	POLSRCTEXT
POLLUTANTTOXICSTATUSDESCRIPTION	POLTOXDESC
POLLUTIONCAUSECODE	POLCAUSE
POLLUTIONFOUNDDATE	FOUNDDATE
REMEDIATIONURGENCYCODE	REMDURGCY

D.2.20 FAUNAHAZARDAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMENTALAREATYPECODE	ENVAREATYP
WILDLIFEHAZARDTYPECODE	WLDHZDTYPE

D.2.21 FINALAPPROACHTAKEOFFAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
FATOAFETYNETINDICATOR	FATONET

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
FATODESIGNATORIDENTIFER	FATODESG
FATOELEVATEDINDICATORCODE	FATOELEVTD
FATOELONGATEDINDICATOR	FATOELONG
FATOGRADIENT	FATOGRADNT
FATOHEIGHT	FATOHEIGHT
FATOLENGTH	FATOLENGTH
FATOLOADBEARINGINDICATOR	FATOLODBRG
FATOMARKEDINDICATOR	FATOMARKD
FATONAME	FATONAME
FATOPERIMETERLIGHTSINDICATOR	FATOPERLGT
FATOPRIMARYMAGNETICBEARING	PRIMAGBRG
FATOPRIMARYTRUEBEARING	PRITRUEBRG
FATOSECONDARYMAGNETICBEARING	SECMAGBRG
FATOSECONDARYTRUEBEARING	SECTRUEBRG
FATOWIDTH	FATOWIDTH
LIGHTCOLORCODE	LGTCOLOR
PAVEMENTCLASSIFICATIONNUMBER	PCN
SURFACECOMPOSITIONCODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE
FATOSAFETYNETHEIGHT	FATONETHGT
FATOSAFETYNETWIDTH	FATONETWID
TLOFTOFATOSEPARATION	TLOFTOFATO

D.2.22 FLOODZONE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMENTALAREATYPECODE	ENVAREATYP
FLOODZONECLASSIFICATIONTYPECODE	FLZONETYPE

D.2.23 FLORASPECIESSITE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENDANGEREDSPECIESACTSITEINDICATOR	ENDNGRACT
ENVIRONMENTALAREATYPECODE	ENVAREATYP
FLORASPECIESDESCRIPTION	SPECIESDESC
FLORATYPECODE	FLORATYPE
PLANTHEIGHTLENGTH	PLANTHGT
PLANTPURPOSECODE	PLANTPURP

D.2.24 FORESTSTANDAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
FORESTSTANDAREACATEGORYTYPECODE	FRSTSTDTYP
STANDHEIGHTAGL	STANDHGT
SPECIALWILDLIFEHABITATCATEGORY	SPCHABCAT

D.2.25 FREQUENCYAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
FREQUENCYAREANAME	FQAREANAME
PRIMARYFREQUENCYASSIGNEDSERVICE	FQASGNSVC
PRIMARYFREQUENCYNUMBER	FREQNUMB

D.2.26 HAZARDOUSMATERIALSTORAGESITE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
HAZARDOUSMATERIALCATEGORYTYPE	HAZMATTYPE
HAZARDOUSMATERIALSTORAGESITENAME	SITENAME

D.2.27 LABELPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LABELTYPECODE	LABELTYPE
LABELVALUE	LABELVALUE

D.2.28 LANDUSE

STANDARD ATTRIBUTE NAME +	ESRI SHP NAME
LANDUSETYPECODE	LNDUSETYPE
LANDUSELOCATIONCODE	LNDUSELOC

D.2.29 LANDMARKAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LANDMARKAREANAME	AREANAME
LANDMARKTYPECODE	LNDMRKTYPE

D.2.30 LANDMARKLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LANDMARKAREANAME	LINENAME
LANDMARKTYPECODE	LNDMRKTYPE

D.2.31 LANDMARKPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LANDMARKAREANAME	POINTNAME
LANDMARKTYPECODE	LNDMRKTYPE

D.2.32 LEASEAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
EXPECTEDLEASEEXPIRATIONDATE	LEASEEND
LEASEAREALEGALDESCRIPTIONTEXT	AREADESC

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LEASEAREASIZE	AREASIZE
LEASEAREAUOMCODE	AREAUOM
LEASEAREANAME	AREANAME
PERMITUSETEXT	PERMITUSE
TENANTNAME	TENANTNAME

D.2.33 MARKINGAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
MARKINGCONDITIONCODE	MARKCOND
MARKINGFEATURETYPECODE	MARKTYPE

D.2.34 MARKINGLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
MARKINGCONDITIONCODE	MARKCOND
MARKINGFEATURETYPECODE	MARKTYPE

D.2.35 NATURALWATERBODY

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
NATURALWATERBODYNAME	WTRBDYNAME
NATURALWATERBODYTYPECODE	WTRBDYTYPE

D.2.36 NAVAIDCRITICALAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LOCALIZERAREABREQUIRED	LOCBREQ
NAVAIDCRITICALAREANAME	NCAREANAME
NAVAIDCRITICALAREAXDIMENSION	NCAREADIMX
NAVAIDCRITICALAREAYDIMENSION	NCAREADIMY
NAVAIDEQUIPMENTTYPECODE	EQUIPTYPE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWYDIRNUMB

D.2.37 NAVAIDEQUIPMENT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ELLIPSOIDELEVATIONMEASUREMENT	ELLIPELEV
HEIGHTABOVEELLIPSOIDMEASUREMENT	HTABVELLIP
HIGHANGLEMEASUREMENTCODE	HIGHANGLE
LIGHTINGSYSTEMTYPECODE	LIGHTSYS
NAVAIDAIRSPACEUSECODE	ARSPCUSE
NAVAIDCOMPONENTOFFSETDISTANCE	OFFSETDIST
NAVAIDCOMPONENTANTENNAHEIGHT	ANTENNAHGT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
NAVAIDCOMPONENTMARKERROLECODE	MARKERROLE
NAVAIDCOMPONENTRUNWAYDISTANCE	RUNWAYDIST
NAVAIDCOMPONENTSTOPENDDISTANCE	STOPENDDIS
NAVAIDCOMPONENTTHRESHOLDDISTANCE	THLDDIST
NAVAIDCOMPONENTTYPECODE	EQUIPTYPE
NAVAIDSYSTEMIDENTIFIER	NAVAIDID
NAVAIDSYSTEMNAME	NAVAIDNAME
NAVAIDSYSTEMTYPE	NAVSYSTYPE
OFFSETDIRECTIONCODE	OFFSETDIR
OWNERCODE	OWNERCODE
RUNWAYDIRECTIONDESIGNATORCODE	RWDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB
RUNWAYPOINTROLECODE	RWYPTROLE
RUNWAYREFERENCEPOINTDISTANCE	RRPDIST
VGSITHRESHOLDCROSSINGHEIGHT	VGSITCH

D.2.38 NAVAIDSITE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
NAVAIDSYSTEMIDENTIFIER	NAVAIDID
NAVAIDSYSTEMNAME	NAVAIDNAME
PROPERTYCUSTODIANNAME	PRPTYCUST

D.2.39 NAVIGATIONBUOY

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LIGHTINGCONFIGURATIONTYPECODE	LIGHTTYPE
NAVIGATIONBUOYCOLORCODE	BUOYCOLOR
NAVIGATIONBUOYDESIGNATIONID	BUOYDESGID
NAVIGATIONBUOYNAME	BUOYNAME
NAVIGATIONBUOYOWNERCODE	BUOYOWNER
NAVIGATIONBUOYTYPECODE	BUOYTYPE

D.2.40 NOISECONTOUR

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMETALAREATYPECODE	ENVAREATYP
LANDUSETYPECODE	LANDUSETYP
NOISECONTOURLINEMEASUREMENT	CONTRLINE

D.2.41 NOISEINCIDENT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMETALAREATYPECODE	ENVAREATYP
NOISEINCIDENTNUMBER	NSEINCNUM
NOISEINCIDENTREPORTERNAME	REPORTNAME
NOISESOURCETYPECODE	NSESRCTYPE

D.2.42 NOISEMONITORINGPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
NOISEMONITORINGPOINTNAME	POINTNAME

D.2.43 OBJECTAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ABOVEGROUNDLEVEL	AGL
DIRECTIONLOCATIONCODE	DIRECTLOC
DISTANCEFROMTHRESHOLDTOOBJECT	DISTTOTHLD
DISTANCERUNWAYCENTERLINETOOBJECT	DISTTOCL
FAACOORDINATIONREVIEWINDICATOR	FAAREVIEWD
FRANGIBLITYINDICATOR	FRANGIBLE
HEIGHTABOVEAIRPORTVALUE	HAA
HEIGHTABOVEELLIPSOIDVALUE	HAE
HEIGHTABOVERUNWAYENDVALUE	HARWEND
HEIGHTABOVETDZEVALUE	HATDZE
MARKINGFEATURETYPECODE	MARKTYPE
OBJECTAERONAUTICALSTUDYNUMBER	ASN
OBJECTDISPOSITIONCODE	DISPOSITIN
OBJECTGROUPCODE	GROUPCODE
OBJECTLIGHTEDINDICATOR	LIGHTED
OBJECTLIGHTINGTYPE	LIGHTTYPE
OBJECTMARKEDINDICATOR	MARKED
OBJECTSOURCECODE	SOURCE
OBJECTTYPECODE	OBJECTTYPE
OISPENETRATIONVALUE1	OISPEN1
OISPENETRATIONVALUE2	OISPEN2
OISPENETRATIONVALUE3	OISPEN3
OISPENETRATIONVALUE4	OISPEN4
OISPENETRATIONVALUE5	OISPEN5
OISPENETRATIONVALUE6	OISPEN6
OISSURFACECONDITIONCODE	OISSFCCOND
OISSURFACETYPECODE1	OISSFCTYP1
OISSURFACETYPECODE2	OISSFCTYP2
OISSURFACETYPECODE3	OISSFCTYP3
OISSURFACETYPECODE4	OISSFCTYP4
OISSURFACETYPECODE5	OISSFCTYP5
OISSURFACETYPECODE6	OISSFCTYP6
OBJECTUSECODE	OBJECTUSE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB

D.2.44 OBJECTIDENTIFICATIONSURFACE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
APPROACHGUIDANCECODE	APCHGUIDE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LANDINGSTRIPDESIGNATORIDENTIFIER	LANDSTRIPID
OISSURFACETYPECODE	OISSFCTYPE
PRIMARYSLOPEVALUE	PRIMSLOPE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB
SECONDARYSLOPEVALUE	SECDSLOPE

D.2.45 OBJECTLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ABOVEGROUNDLEVEL	AGL
DIRECTIONLOCATIONCODE	DIRECTLOC
DISTANCEFROMTHRESHOLDTOOBJECT	DISTTOTHLD
DISTANCERUNWAYCENTERLINETOOBJECT	DISTTOCL
FAACOORDINATIONREVIEWINDICATOR	FAAREVIEWD
FRANGIBLITYINDICATOR	FRANGIBLE
HEIGHTABOVEAIRPORTVALUE	HAA
HEIGHTABOVEELLIPSOIDVALUE	HAE
HEIGHTABOVERUNWAYENDVALUE	HARWEND
HEIGHTABOVETDZEVALUE	HATDZE
MARKINGFEATURETYPECODE	MARKTYPE
OBJECTAERONAUTICALSTUDYNUMBER	ASN
OBJECTDISPOSITIONCODE	DISPOSITIN
OBJECTGROUPCODE	GROUPCODE
OBJECTLIGHTEDINDICATOR	LIGHTED
OBJECTLIGHTINGTYPE	LIGHTTYPE
OBJECTMARKEDINDICATOR	MARKED
OBJECTSOURCECODE	SOURCE
OBJECTTYPECODE	OBJECTTYPE
OISPENETRATIONVALUE1	OISPEN1
OISPENETRATIONVALUE2	OISPEN2
OISPENETRATIONVALUE3	OISPEN3
OISPENETRATIONVALUE4	OISPEN4
OISPENETRATIONVALUE5	OISPEN5
OISPENETRATIONVALUE6	OISPEN6
OISSURFACECONDITIONCODE	OISSFCCOND
OISSURFACETYPECODE1	OISSFCTYP1
OISSURFACETYPECODE2	OISSFCTYP2
OISSURFACETYPECODE3	OISSFCTYP3
OISSURFACETYPECODE4	OISSFCTYP4
OISSURFACETYPECODE5	OISSFCTYP5
OISSURFACETYPECODE6	OISSFCTYP6
OBJECTUSECODE	OBJECTUSE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB

D.2.46 OBJECTPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ABOVEGROUNDLEVEL	AGL
DIRECTIONLOCATIONCODE	DIRECTLOC
DISTANCEFROMTHRESHOLDTOOBJECT	DISTTOTHLD
DISTANCERUNWAYCENTERLINETOOBJECT	DISTTOCL
FAACOORDINATIONREVIEWINDICATOR	FAAREVIEWD
FRANGIBLITYINDICATOR	FRANGIBLE
HEIGHTABOVEAIRPORTVALUE	HAA
HEIGHTABOVEELLIPSOIDVALUE	HAE
HEIGHTABOVERUNWAYENDVALUE	HARWEND
HEIGHTABOVETDZEVALUE	HATDZE
MARKINGFEATURETYPECODE	MARKTYPE
OBJECTAERONAUTICALSTUDYNUMBER	ASN
OBJECTDISPOSITIONCODE	DISPOSITIN
OBJECTGROUPCODE	GROUPCODE
OBJECTLIGHTEDINDICATOR	LIGHTED
OBJECTLIGHTINGTYPE	LIGHTTYPE
OBJECTMARKEDINDICATOR	MARKED
OBJECTSOURCECODE	SOURCE
OBJECTTYPECODE	OBJECTTYPE
OISPENETRATIONVALUE1	OISPEN1
OISPENETRATIONVALUE2	OISPEN2
OISPENETRATIONVALUE3	OISPEN3
OISPENETRATIONVALUE4	OISPEN4
OISPENETRATIONVALUE5	OISPEN5
OISPENETRATIONVALUE6	OISPEN6
OISSURFACECONDITIONCODE	OISSFCCOND
OISSURFACETYPECODE1	OISSFCTYP1
OISSURFACETYPECODE2	OISSFCTYP2
OISSURFACETYPECODE3	OISSFCTYP3
OISSURFACETYPECODE4	OISSFCTYP4
OISSURFACETYPECODE5	OISSFCTYP5
OISSURFACETYPECODE6	OISSFCTYP6
OBJECTUSECODE	OBJECTUSE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB

D.2.47 PARCEL

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ASSESSEDMARKETVALUEAMOUNT	MKTVALAMT
ASSESSEDMARKETVALUEDATE	MKTVALDATE
HOWACQUIREDTYPECODE	HOWACQTYPE
MOSTRECENTSTRUCTUREBUILDDATE	STRBLDDATE
PARCELACQUISITIONTYPECODE	ACQTYPE
PARCELAREASIZE	PARCELAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
PARCELAREATYPE	PARCELTYPE
PARCELAREAUOMCODE	AREAUOM
PARCELCOSTTOACQUIREAMOUNT	COSTACQAMT
PARCELDEEDRECORDEDLOCATIONTEXT	DEEDLOCATE
PARCELLEGALDESCRIPTIONTEXT	LEGALDESC
PARCELLOCALIDENTIFIER	LOCALID
PARCELOWNERNAME	OWNERNAME
PARCELPREVIOUSOWNERNAME	POWNERNAME
PARCELPROJECTAIPGRANTIDENTIFIER	AIPGRANTID
PARCELUSECODE	PARUSECODE
PASSENGERFACILTYCHARGENUMBER	PFCNUMBER
RECENTASSESSEDVALUEAMOUNT	RECENTAMT
RECORDEDDATE	RECORDDATE

D.2.48 PARKINGLOT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
OWNERCODE	OWNERCODE
PARKINGLOTNAME	PRKLOTNAME
PARKINGLOTUSETEXT	PRKLOTUSE
SURFACETYPECODE	SFCTYPE
TOTALHANDICAPSPACESCOUNT	TOTHANDICAP
TOTALPARKINGSPACESCOUNT	TOTPRKSPOT

D.2.49 PASSENGERLOADINGBRIDGE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
PASSENGERLOADINGBRIDGENAME	PBEEQPNAME
PASSENGERLOADINGBRIDGETYPE	PBEEQPTYPE

D.2.50 POSITION

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
CONTROLPOINTIDENTIFIER	CTRLPTID
CONTROLPOINTNAME	CTRLPTNAME
CONTROLPOINTSURVEYEPOCHDATE	CTRLPTDATE
ELLIPSOIDHEIGHTMEASUREMENT	ELLIPHGT
GPSSUITABLEINDICATOR	GPSSUITABL
MONUMENTLASTRECOVEREDDATE	LASTRECDTE
MONUMENTPOSITIONINDICATOR	POSNIND
MONUMENTRECOVEREDCONDITION	RECOVERCND
MONUMENTSTAMPEDDESIGNATIONTEXT	STAMPDDESG
MONUMENTTYPECODE	MOMNTTYPE
POSITIONROLECODE	POSNROLE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB
RUNWAYPOSITIONINDICATOR	RWPOSNIND

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SURVEYDATE	SURVEYDATE

D.2.51 RAILROADCENTERLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
BRIDGEINDICATOR	BRIDGEIND
DIRECTIONALITYCODE	DIRECTION
OWNERCODE	OWNERCODE
RAILROADCENTERLINENAME	RRCLNAME
SEGMENTTYPECODE	SEGMNTTYPE
TUNNELINDICATOR	TUNNELIND

D.2.52 RAILROADYARD

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
OWNERCODE	OWNERCODE
RAILROADYARDNAME	RRYARDNAME

D.2.53 RESTRICTEDACCESSBOUNDARY

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SECURITYNAME	SECRTYNAME

D.2.54 RIGHTANDINTEREST

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
EASEMENTTYPECODE	EASMNTTYPE
EASMENTACQUISITIONPURPOSECODE	ESMNTACQPRP
ENCUMBRANCETYPECODE	ENCUMBTYPE
RIGHTANDINTERESTTYPECODE	RGHTINTTYP
RIGHTESTATETYPECODE	RGHTESTTYP
RIGHTOFWAYTYPECODE	ROWTYPE

D.2.55 ROADCENTERLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
ROADCENTERLINENAME	ROADCLNAME

D.2.56 ROADPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ROADPOINTNAME	ROADPTNAME

D.2.57 ROADSEGMENT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
BRIDGEINDICATOR	BRIDGEIND

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DIRECTIONALITYCODE	DIRECTION
ROADROUTENAME1	RDRTNAME1
ROADROUTENAME2	RDRTNAME2
ROADROUTENAME3	RDRTNAME3
ROADROUTETYPECODE1	RDRTTYPE1
ROADROUTETYPECODE2	RDRTTYPE2
ROADROUTETYPECODE3	RDRTTYPE3
ROADSEGMENTAVERAGEWIDTHVALUE	RDAVGWIDTH
ROADSEGMENTLENGTH	RDSEGLEN
ROADSEGMENTNAME	RDSEGNAME
ROADSEGMENTTOTALLANECOUNT	RDLANECNT
SEGMENTTYPECODE	SEGMNTTYPE
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
TUNNELINDICATOR	TUNNELIND

D.2.58 ROOF

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ROOFHEIGHT	ROOFHEIGHT
STRUCTUREIDENTIFIER	STRCTID

D.2.59 RUNWAY

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
PAVEMENTCLASSIFICATIONNUMBER	PCN
RUNWAYLENGTH	RWLENGTH
RUNWAYLINEOFSIGHTINDICATOR	RWLOSIND
RUNWAYWIDTH	RWWIDTH
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE

D.2.60 RUNWAYARRESTINGAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ARRESTINGAREALENGTH	ARSTAREALN
ARRESTINGAREASETBACKLENGTH	SETBACK
ARRESTINGAREAWIDTH	ARSTAREAWD
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB
SURFACECONDITIONCODE	SFCCOND
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE

D.2.61 RUNWAYBLASTPAD

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
PAVEMENTCLASSIFICATIONNUMBER	PCN
RUNWAYDIRECTIONBLAST PADLENGTH	RWDIRBPLEN
RUNWAYDIRECTIONBLASTPADWIDTH	RWDIRBPWD
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWDIRNUMB
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE

D.2.62 RUNWAYCENTERLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ISDERIVEDINDICATOR	ISDERVIED
RUNWAYDESIGNATORIDENTIFER	RWYDESGID

D.2.63 RUNWAYDIRECTION

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTAPPROACHCATEGORYCODE1	ACAPCHCAT1
AIRCRAFTAPPROACHCATEGORYCODE2	ACAPCHCAT2
AIRCRAFTAPPROACHCATEGORYCODE3	ACAPCHCAT3
AIRCRAFTAPPROACHCATEGORYCODE4	ACAPCHCAT4
AIRCRAFTAPPROACHCATEGORYCODE5	ACAPCHCAT5
AIRCRAFTAPPROACHCATEGORYCODE6	ACAPCHCAT6
AIRPLANEDESIGNGROUPCODE1	ADG1
AIRPLANEDESIGNGROUPCODE2	ADG2
AIRPLANEDESIGNGROUPCODE3	ADG3
AIRPLANEDESIGNGROUPCODE4	ADG4
AIRPLANEDESIGNGROUPCODE5	ADG5
AIRPLANEDESIGNGROUPCODE6	ADG6
APPROACHGUIDANCECODE	APCHGUIDE
ELLIPSOIDHEIGHT	ELLIPHGT
MAGNETICBEARING	MAGBRG
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYMARKINGTYPECODE	RWMARKTYPE
RUNWAYDIRECTIONNUMBER	RWYDIRNUMB
RUNWAYDIRECTIONVISIBILITY1	RWDIRVIS1
RUNWAYDIRECTIONVISIBILITY2	RWDIRVIS2
RUNWAYDIRECTIONVISIBILITY3	RWDIRVIS3
RUNWAYDIRECTIONVISIBILITY4	RWDIRVIS4
RUNWAYDIRECTIONVISIBILITY5	RWDIRVIS5
RUNWAYDIRECTIONVISIBILITY6	RWDIRVIS6
THRESHOLDDISPLACEDDISTANCE	THDDISDIST
THRESHOLDTYPECODE	THLDTYPE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
TOUCHDOWNZONELEVATION	TDZE
TOUCHDOWNZONESLOPE	TDZESLOPE
TRUEBEARING	TRUEBRG

D.2.64 RUNWAYDECLAREDDISTANCE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DECLAREDDISTANCETYPE	DDISTTYPE
DECLAREDDISTANCEVALUE	DDISVAL
DECLAREDDISTANCESEGMENTTYPE	DDISSEGTYP
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWYDIRNUMB

D.2.65 RUNWAYELEMENT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
MARKINGFEATURETYPECODE	MARKTYPE
PAVEMENTCLASSIFICATIONNUMBER	PCN
RUNWAYDESIGNATORIDENTIFIER	RWYDESGID
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE

D.2.66 RUNWAYHELIPADDESIGNSURFACE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DESIGNSURFACETYPECODE	DSGNSFCTYP
SLOPEVALUE	SLOPEVALUE
ZONEINNERWIDTHVALUE	ZINNERWDTH
ZONELENGTH	ZONELENGTH
ZONEOUTERWIDTHVALUE	ZOUTERWDTH

D.2.67 RUNWAYINTERSECTION

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
PAVEMENTCLASSIFICATIONNUMBER	PCN
RUNWAYDESIGNATORIDENTIFIER1	RWDESGID1
RUNWAYDESIGNATORIDENTIFIER2	RWDESGID2
RUNWAYDESIGNATORIDENTIFIER3	RWDESGID3
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE

D.2.68 RUNWAYLAHSO

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
MARKINGFEATURETYPECODE	MARKTYPE
PROTECTEDRUNWAYDESIGNATOR	PROTRWDESG

D.2.69 RUNWAYPROTECTIONZONE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTAPPROACHCATEGORYCODE	ACAPCHCAT
AIRPLANEDESIGNGROUPCODE	ADG
RPZACREAGE	RPZACREAGE
RPZAREACODE	RPZAREA
RPZINNERWIDTH	RPZINERWTH
RPZLENGTH	RPZLEN
RPZOUTERLENGTH	RPZOUTLEN
RPZTYPECODE	RPZTYPE
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWYDIRNUMB

D.2.70 RUNWAYSAFETYAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
RSADETERMINATION	RSADETRM
RSADETERMINATIONDATE	RSADTRMDTE
RSALENGTHAFTERDEPARTUREEND	RSALENDEPT
RSALENGTHPRIORTOTHRESHOLD	RSALENTHLD
RSAWIDTH	RSAWIDTH
RUNWAYDIRECTIONDESIGNATORCODE	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWYDIRNUMB

D.2.71 SMAPLECOLLECTIONPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMETALAREATYPECODE	ENVAREATYP
SAMPLECOLLECTIONPOINTNAME	SMPLPTNAME
SAMPLECOLLECTIONPOINTTYPECODE	SMPLPTTYPE

D.2.72 SEAPLANERAMPCENTERLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SEAPLANERAMPCENTERLINELENGTH	SPRAMPLEN

D.2.73 SEAPLANERAMPSITE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SEAPLANERAMPSITELENGTH	RAMPSTLEN
SEAPLANERAMPSITENAME	RAMPSTNAME

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SEAPLANERAMPSITESLOPEVALUE	RAMPSTSLOP
SEAPLANERAMPSTRUCTUREMATERIAL	RAMPSTMAT
SEAPLANERAMPWIDTH	RAMPSTWDTH

D.2.74 SECURITYAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SECURITYAREANAME	SCRTYNAME

D.2.75 SECURITYIDDISPLAYAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SECURITYAREANAME	SCRTYNAME

D.2.76 SECURITYPERIMETERLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SECURITYAREANAME	SCRTYNAME

D.2.77 SHOULDER

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
AIRPLANEDESIGNGROUPCODE	ADG
PAVEMENTCLASSIFICATIONNUMBER	PCN
RESTRICTEDINDICATOR	RSTRCDIND
SHOULDERDESIGNATIONREFERENCE	SHLDDSGREF
SHOULDERLENGTH	SHLDLEN
SHOULDERRESTRICTION	SHDRSTRCT
SHOULDERTYPECODE	SHLDTYPE
SHOULDERWIDTH	SHLDWIDTH
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE
TAXIWAYDESIGNGROUPCODE	TDG

D.2.78 SIDEWALKSEGMENT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AMERICANDISABILITIESACTINDICATOR	ADAIND
SEGMENTTYPECODE	SGMNTTYPE
SIDEWALKSEGMENTAVAERAGEWIDTH	SGMTAVGWTH
SIDEWALKSEGMENTLENGTH	SWSGMTLEN
SIDEWALKSEGMENTUSECODE	SWSGMTUSE
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE

D.2.79 STERILEAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
SECURITYAREANAME	SCRTYNAME

D.2.80 STOPWAY

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
MARKINGFEATURETYPECODE	MARKTYPE
PAVEMENTCLASSIFICATIONNUMBER	PCN
PROTECTIONAREALENGTH	PRTAREALEN
PROTECTIONAREAWIDTH	PRTAREAWD
RUNWAYDESIGNATORIDENTIFIER	RWYDESGID
RUNWAYDIRECTIONDESIGNATOR	RWYDIRDESG
RUNWAYDIRECTIONNUMBER	RWYDIRNUMB
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE

D.2.81 STRUCTURELINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
MARKINGCOLORCODE	MARKCOLOR
MARKINGTYPECODE	MARKTYPE
OBJECTLIGHTEDINDICATOR	LIGHTED
OBJECTLIGHTINGTYPECODE	LIGHTTYPE
STRUCTUREHEIGHTABOVEGROUNDLEVEL	STRCTAGL
STRUCTUREIDENTIFIER	STRCTID
STRUCTUREMATERIAL	STRCTMAT
STRUCTURENAME	STRCTNAME
STRUCTURETYPECODE	STRCTTYPE
STRUCTUREUSECODE	STRCTUSE

D.2.82 STRUCTUREPOLYGON

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
MARKINGCOLORCODE	MARKCOLOR
MARKINGTYPECODE	MARKTYPE
OBJECTLIGHTEDINDICATOR	LIGHTED
OBJECTLIGHTINGTYPECODE	LIGHTTYPE
STRUCTUREHEIGHTABOVEGROUNDLEVEL	STRCTAGL
STRUCTUREIDENTIFIER	STRCTID
STRUCTUREMATERIAL	STRCTMAT
STRUCTURENAME	STRCTNAME
STRUCTUREOCCUPANTCOUNT	OCCUPNUMB
STRUCTURETYPECODE	STRCTTYPE
STRUCTUREUSECODE	STRCTUSE
TOTALINSIDEAREASIZE	INSIDEAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
TOTALINSIDEFLOORAREASIZE	FLOORAREA

D.2.83 STRUCTUREPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
MARKINGCOLORCODE	MARKCOLOR
MARKINGTYPECODE	MARKTYPE
OBJECTLIGHTEDINDICATOR	LIGHTED
OBJECTLIGHTINGTYPECODE	LIGHTTYPE
STRUCTUREHEIGHTABOVEGROUNDLEVEL	STRCTAGL
STRUCTUREIDENTIFIER	STRCTID
STRUCTUREMATERIAL	STRCTMAT
STRUCTURENAME	STRCTNAME
STRUCTURERADIUSVALUE	STRCRADIUS
STRUCTURETYPECODE	STRCTTYPE
STRUCTUREUSECODE	STRCTUSE

D.2.84 TANKSITE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LIGHTINGCONFIGURATIONTYPECODE	LIGHTTYPE
MARKINGCOLORCODE	MARKCOLOR
MARKINGFEATURETYPECODE	MARKTYPE
OBJECTLIGHTEDINDICATOR	OBJLGHTIND
OBJECTLIGHTINGTYPE	LIGHTTYPE
TANKHAZARDCATEGORYCODE	TNKHAZCAT
TANKSITENAME	TANKNAME
TANKTOPELEVATIONVALUE	TNKTOPELEV
TANKTOPHEIGHTVALUE	TNKTOPAGL
TANKTYPEDESCRIPTIONTEXT	TNKTYPDESC
TANKUSECODE	TANKUSE
VERTICALSTRUCTUREMATERIALCODE	VERTSTRMAT

D.2.85 TAXICHANNEL

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
TAXICHANNELDEPTHVALUE	TXCHNLDPTH
TAXICHANNELLENGTH	TXCHNLLEN
TAXICHANNELNAME	TXCHNLNAME
TAXICHANNELRESTRICTIONTEXT	TXCHNLRSTR
TAXICHANNELWIDTH	TXCHNLWDTH

D.2.86 TAXIWAYELEMENT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
DIRECTIONALITYCODE	DIRECTION

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
PAVEMENTCLASSIFICATIONNUMBER	PCN
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE
TAXIWAYDESIGNATOR	TXWYDESG
TAXIWAYDESIGNGROUPCODE	TDG
TAXIWAYELEMENTLENGTH	TXWYELELEN
TAXIWAYELEMENTMAXIMUMSPEED	TXWYMAXSPD
TAXIWAYRESTRICTION	TXWYRSTRT
TAXIWAYELEMENTWIDTH	TXWYELEWTH
TAXIWAYTYPECODE	TXWYTYPE

D.2.87 TAXIWAYHOLDINGPOSITION

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LOWVISIBILITYCATEGORYCODE	LOWVISCAT
RUNWAYDESIGNATORIDENTIFIER	RWYDESGID
TAXIWAYDESIGNATOR	TXWYDESG

D.2.88 TOUCHDOWNLIFTOFFAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRCRAFTCLASSIFICATIONNUMBER	ACN
DESIGNHELICOPTERDESCRIPTIONTEXT	DSGHELIDSC
LIGHTCOLORCODE	LGTCOLOR
PAVEMENTCLASSIFICATIONNUMBER	PCN
SURFACECOMPOSITIONCODE	SFCCMPTYPE
SURFACECONDITIONCODE	SFCCOND
SURFACETYPECODE	SFCTYPE
TLOFDESIGNATORIDENTIFER	TLOFDESGID
TLOFELEVATEDINDICATOR	TLOFELEV
TLOFELONGATED	TLOFELONG
TLOFGRADIENT	TLOFGRADNT
TLOFHEIGHT	TLOFHGT
TLOFLENGTH	TLOFLEN
TLOFMARKED	TLOFMARKED
TLOFPERIMETERLIGHTS	TLOFPERLGT
TLOFSAFETYNETHEIGHT	TLOFNETHGT
TLOFSAFETYNETINDICATOR	TLOFNETIND
TLOFSAFETYNETWIDTH	TLOFNETWTH
TLOFWIDTH	TLOFWIDTH

D.2.89 TUNNEL

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
DIRECTIONALITYCODE	DIRECTION
SEGMENTTYPECODE	SGMNTTYPE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
TUNNELAVERAGEHEIGHTVALUE	TUNNELHGT
TUNNELAVERAGEWIDTHVALUE	TUNNELWTH
TUNNELLENGTH	TUNNELLEN
TUNNELNAME	TUNNELNAME
TUNNELUSECODE	TUNNELUSE
VERTICALCLEARANCEVALUE	VERTCLNC

D.2.90 TURNINGBASIN

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
TURNINGBASINDEPTHVALUE	BASINDPTH
TURNINGBASINDIAMETERVALUE	BASINDIAM
TURNINGBASINDIRECTIONCODE	BASINDIR
TURNINGBASINLENGTH	BASINLEN
TURNINGBASINNAME	BASINNAME
TURNINGBASINRESTRICTIONTEXT	BASINRSTRC
TURNINGBASINWIDTH	BASINWIDTH

D.2.91 UTILITYLINE

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
DIRECTIONALITYCODE	DIRECTION
LIGHTINGCONFIGURATIONTYPECODE	LIGHTTYPE
MARKINGFEATURETYPECODE	MARKTYPE
OBSTRUCTIONLIGHTINGINDICATOR	LIGHTED
UTILITYCONFIDENCECODE	UTILCONFID
UTILITYHEIGHTVALUE	UTILHGT
UTILITYNAME	UTILNAME
UTILITYTYPECODE	UTILTYPE

D.2.92 UTILITYPOINT

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
LIGHTINGCONFIGURATIONTYPECODE	LIGHTTYPE
MARKINGFEATURETYPECODE	MARKTYPE
OBSTRUCTIONLIGHTINGINDICATOR	LIGHTED
UTILITYCONFIDENCECODE	UTILCONFID
UTILITYHEIGHTVALUE	UTILHGT
UTILITYNAME	UTILNAME
UTILITYPOINTRADIUS	UTILPTRAD
UTILITYTYPECODE	UTILTYPE

D.2.93 UTILITYPOLYGON

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COLORCODE	COLORCODE
LIGHTINGCONFIGURATIONTYPECODE	LIGHTTYPE
MARKINGFEATURETYPECODE	MARKTYPE
OBSTRUCTIONLIGHTINGINDICATOR	LIGHTED
UTILITYCONFIDENCECODE	UTILCONFID
UTILITYHEIGHTVALUE	UTILHGT
UTILITYNAME	UTILNAME
UTILITYTYPECODE	UTILTYPE

D.2.94 VEGETATIONAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMENTALAREATYPECODE	ENVAREATYP
SPECIALWILDLIFEHABITATCATEGORY	SPCHABCAT

D.2.95 WATEROPERATINGAREA

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
COORDINATEDUSEACTIVITYLEVELVALUE	COORDUSELV
COORDINATEDUSETYPECODE	COORDUSETY
CURRENTFLOWDIRECTIONCODE	FLOWDIRECT
CURRENTFLOWRATE	FLOWRATE
SURFACECOMPOSITIONTYPECODE	SFCCMPTYPE
WATEROPERATINGAREALENGTH	WOALEN
WATEROPERATINGAREANAME	WOANAME
WATEROPERATINGAREATIDALRANGE	WOATIDERNG
WATEROPERATINGAREAWIDTH	WOAWIDTH

D.2.96 WATERLANEEND

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
AIRMARKERCOLORCODE	AIRMARKCOL
APPROACHGUIDANCECODE	APCHGUIDE
NAVIGATIONBUOYLIGHTINGTYPECODE	BUOYLGTTYP
PRIMARYWATERCENTROIDLOCATIONTEXT	PRIWTRLOC
STANDARDAIRMARKERINDICATOR	STDAIRMARK
WATERLANEENDDEPTHVALUE	WLEDEPTH
WATERLANEENDDIRECTIONCODE	WLEDIRECT
WATERLANEENDLENGTH	WLELEN
WATERLANEENDNAME	WLENAME
WATERLANEENDRESTRICTIONTEXT	WLERSTRC
WATERLANEENDTYPECODE	WLETYPE
WATERLANEENDWIDTH	WLEWIDTH

D.2.97 WETLAND

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
ENVIRONMENTALAREADESCRIPTIONTEXT	ENVAREADSC
ENVIRONMENTALAREANAME	ENVAREANME

D.2.98 ZONING

STANDARD ATTRIBUTE NAME	ESRI SHP NAME
LANDOWNERRESTRICTION	OWNERRSTRC
PARCELZONINGCLASSIFICATIONCODE	PARZONCLAS
RESTRICTIONDESCRIPTIONTEXT	RSTRCTEXT
RESTRICTIONNAME	RSTRCNAME

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APPENDIX E. CADD STANDARD LAYERS

E.1 CADD Standard Layers.

The following tables map the Airports GIS features to their associated CADD standard layers. These are general in nature and may not be all inclusive but are provided as a means of supporting data transformation.

E.1.1 Air Operations Area.

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

E.1.2 Aircraft Gate Stand.

Layer/Level	Description
C-APRN-ACPK	Aircraft gate/stand parking area

E.1.3 Airfield Light.

Layer/Level	Description
E-LITE-APPR-	Approach lights
E-LITE-DIST-	Distance and arresting gear markers and lights
E-LITE-LANE-	Hoverlane, taxilane, and helipad lights
E-LITE-OBST-	Obstruction lights
E-LITE-RNWY-GARD	Runway guard lights
E-LITE-RUNW-CNTR	Runway centerline lights
E-LITE-RUNW-DTGS1	Runway distance to go lights
E-LITE-RUNW-EDGE	Runway edge lights
E-LITE-RUNW-TDZN	Runway touchdown zone lights
E-LITE-SIGN-	Taxiway guidance signs
E-LITE-TAXI-CNTL	Taxiway centerline lights
E-LITE-TAXI-EDGE	Taxiway edge lights
E-LITE-THRS-	Threshold lights
V-LITE-APPR-	Approach lights
V-LITE-LANE-	Hoverlane, taxilane, and helipad lights
V-LITE-OBST-	Obstruction lights
V-LITE-RUNW-	Runway lights
V-LITE-RUNW-CNTL	Runway centerline lights
V-LITE-RUNW-TDZN	Runway touchdown zone lights
V-LITE-TAXI-	Taxiway lights
V-LITE-THRS-	Threshold lights

E.1.4 Airport Boundary.

Layer/Level	Description
C-PROP-PROP-	Airport property

E.1.5 Airport Movement Area.

Layer/Level	Description
C-AIRF-DSRF-NMOV	Aircraft non-movement area
C-APRN-ANOM-	Aircraft non-movement area

E.1.6 Airport Parcel.

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)

E.1.7 Airport Sign.

Layer/Level	Description
A-ELEV-SIGN-	Signage
A-FLOR-SIGN-	Signage
C-PVMT-SIGN-	Other signs

E.1.8 Anchorage Area.

Layer/Level	Description
C-SEAP-ANCH-	Seaplane dock

E.1.9 Apron.

Layer/Level	Description
C-APRN-OTLN	Apron outline

E.1.10 Arresting Gear.

Layer/Level	Description
C-RUNW-ARST-	Runway arresting gear location

E.1.11 Bridge.

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

E.1.12 Construction Area.

Layer/Level	Description
A-STAT-DEMO-	Demolition
A-STAT-DEMO-PHS1	Demolition - phase 1

Layer/Level	Description
A-STAT-DEMO-PHS2	Demolition - phase 2
A-STAT-DEMO-PHS3	Demolition - phase 3
A-STAT-FUTR-	Future work
A-STAT-NEWW-	New work
A-STAT-TEMP-	Temporary work
C-PROP-CONS-	Construction limits/controls, staging area
C-STAT-DEMO-	Demolition
C-STAT-DEMO-PHS1	Demolition - phase 1
C-STAT-DEMO-PHS2	Demolition - phase 2
C-STAT-DEMO-PHS3	Demolition - phase 3
C-STAT-FUTR-	Future work
C-STAT-NEWW-	New work
C-STAT-TEMP-	Temporary work
E-STAT-DEMO-PHS1	Demolition - phase 1
E-STAT-DEMO-PHS2	Demolition - phase 2
E-STAT-DEMO-PHS3	Demolition - phase 3
F-STAT-DEMO-	Demolition (**Note:** comprehensive demolition is handled in Model File Type: Demolition Plan)
F-STAT-DEMO-PHS1	Demolition - phase 1
F-STAT-DEMO-PHS2	Demolition - phase 2
F-STAT-DEMO-PHS3	Demolition - phase 3
F-STAT-FUTR-	Future work
F-STAT-NEWW-	New work
F-STAT-TEMP-	Temporary work
G-SITE-OTLN-	Site plan - key map
H-STAT-DEMO-PHS1	Demolition - phase 1
H-STAT-DEMO-PHS2	Demolition - phase 2
H-STAT-DEMO-PHS3	Demolition - phase 3
L-STAT-DEMO-	Demolition (**Note:** comprehensive demolition is handled in Model File Type: Demolition Plan)
L-STAT-DEMO-PHS1	Demolition - phase 1
L-STAT-DEMO-PHS2	Demolition - phase 2
L-STAT-DEMO-PHS3	Demolition - phase 3
L-STAT-FUTR-	Future work
L-STAT-NEWW-	New work
L-STAT-TEMP-	Temporary work
M-STAT-DEMO-	Demolition
M-STAT-DEMO-PHS1	Demolition - phase 1
M-STAT-DEMO-PHS2	Demolition - phase 2
M-STAT-DEMO-PHS3	Demolition - phase 3
M-STAT-FUTR-	Future work
M-STAT-NEWW-	New work
M-STAT-TEMP-	Temporary work
P-FUEL-NGAS-	Natural gas piping
P-STAT-DEMO-	Demolition
P-STAT-DEMO-PHS1	Demolition - phase 1

Layer/Level	Description
P-STAT-DEMO-PHS2	Demolition - phase 2
P-STAT-DEMO-PHS3	Demolition - phase 3
P-STAT-FUTR-	Future work
P-STAT-NEWW-	New work
P-STAT-TEMP-	Temporary work
S-STAT-DEMO-	Demolition
S-STAT-DEMO-PHS1	Demolition - phase 1
S-STAT-DEMO-PHS2	Demolition - phase 2
S-STAT-DEMO-PHS3	Demolition - phase 3
S-STAT-FUTR-	Future work
S-STAT-NEWW-	New work
S-STAT-TEMP-	Temporary work
T-STAT-DEMO-PHS1	Demolition - phase 1
T-STAT-DEMO-PHS2	Demolition - phase 2
T-STAT-DEMO-PHS3	Demolition - phase 3
V-STAT-DEMO-	Demolition (**Note:** comprehensive demolition is handled in Model File Type: Demolition Plan)
V-STAT-FUTR-	Future work
V-STAT-NEWW-	New work
V-STAT-TEMP-	Temporary work

E.1.13 Deicing Area.

Layer/Level	Description
C-APRN-DEIC	Aircraft Deicing Area

E.1.14 Dimension.

Layer/Level	Description
C-ANNO-	Not applicable

E.1.15 Docking Area.

Layer/Level	Description
C-SEAP-DOCK-	Seaplane dock

E.1.16 Driveway Area.

Layer/Level	Description
C-ROAD-DRIV-	Driveway edge of pavement

E.1.17 Driveway Centerline.

Layer/Level	Description
C-ROAD-DRIV-CNTR	Driveway centerline

E.1.18 Elevation Contour.

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

E.1.19 Environmental Contamination Area.

Layer/Level	Description
H-POLL-CONC-	Polluted area of concern
H-POLL-POTN-	Potential spill, emission, or release source

E.1.20 Fauna Hazard Area.

Layer/Level	Description
V-TOPO-SPEC-	Species Site

E.1.21 Final Approach and Takeoff Area.

Layer/Level	Description
C-HELI-DSRF	Helipad Design Surfaces
C-HELI-TLOF	Helipad TLOF

E.1.22 Flood Zone.

Layer/Level	Description
C-TOPO-FLZN-	Flood Zone

E.1.23 Flora Species Site.

Layer/Level	Description
L-PLNT-CTNR-	Containers or planters
L-PLNT-PLTS-	Planting plants (e.g., ornamental annuals and perennials)

E.1.24 Forest Stand Area.

Layer/Level	Description
L-PLNT-TREE-LINE	Tree line
V-SITE-VEGE-	Existing tree lines and vegetation

E.1.25 Frequency Area.

Layer/Level	Description
C-AIRF-FREQ-	Frequency area

E.1.26 Hazardous Material Storage Site.

Layer/Level	Description
H-STOR-HAZM-	Hazardous materials
H-STOR-HAZW-	Hazardous waste

E.1.27 Label Point.

Layer/Level	Description
	Not applicable

E.1.28 Land Use.

Layer/Level	Description
V-PROP-LUSE-	Land use area

E.1.29 Landmark Area.

Layer/Level	Description
C-AIRS-LNDM-POLY	Landmark polygon features

E.1.30 Landmark Line.

Layer/Level	Description
C-AIRS-LNDM-LINE	Landmark line features

E.1.31 Landmark Point.

Layer/Level	Description
C-AIRS-LNDM-PPNT	Landmark point features

E.1.32 Lease Area.

Layer/Level	Description
A-PROP-LEAS-	Lease line (interior)
C-PROP-LEAS-	Lease line (exterior / ground lease)
V-PROP-LEAS-	Lease line (surveyed)

E.1.33 Marking Area.

Layer/Level	Description
C-HELI-IDEN-	Heliport numbers and letters
C-RUNW-DIST-	Runway fixed distance markings
C-RUNW-IDEN-MARK	Runway numbers and letters

E.1.34 Marking Line.

Layer/Level	Description
C-APRN-CNTR-	Apron centerlines
C-APRN-HOLD-	Apron holding position markings

Layer/Level	Description
C-APRN-MRKG-	Apron markings
C-APRN-SECU-	Apron security zone markings
C-APRN-SHLD-	Apron shoulder stripes
C-HELI-BLST-	Helipad blast pad and stopway markings
C-HELI-CNTR-MARK	Helipad centerline markings
C-HELI-DIST-	Helipad fixed distance markings
C-HELI-SIDE-	Helipad side stripes
C-OVRN-CNTR-	Overrun centerlines
C-OVRN-SHLD-	Overrun shoulder markings
C-PADS-CNTR-	Pad centerlines
C-PADS-OTLN-	Pad - outlines
C-PVMT-MRKG-WHIT	Roadway markings (white)
C-PVMT-MRKG-YELO	Roadway markings (yellow)
C-RUNW-CNTR-MARK	Runway centerline markings
C-RUNW-SHLD-	Runway shoulder markings
C-RUNW-SHLD-	Runway shoulder
C-RUNW-SIDE-	Runway side stripes
C-TAXI-CNTR-MARK	Taxiway centerline markings
C-TAXI-EDGE-	Taxiway edge markings
C-TAXI-SHLD-	Taxiway shoulder transverse stripes
V-PVMT-MRKG-	Pavement markings

E.1.35 Natural Water Body.

Layer/Level	Description
C-DRED-OHWM-	Ordinary high water marks
C-TOPO-SHOR-	Shorelines, land features, and references
H-MNST-GWTR-	Ground water
H-MNST-SWTR-	Surface water
S-GRDL-WATR-	Water surface
V-SITE-EWAT-	Water features
V-SITE-WATR-	Water features
V-TOPO-SHOR-	Shorelines, land features, and references

E.1.36 NAVAID Critical Area.

Layer/Level	Description
C-AIRF-AIDS-CRIT	Airfield Navigational Aid - Critical Area

E.1.37 NAVAID Equipment.

Layer/Level	Description
C-AFLD-AIDS-	Airfield Navigational Aid

E.1.38 NAVAID Site.

Layer/Level	Description
C-AIRF-AIDS-SITE	Airfield Navigational Aid - Site

E.1.39 Navigation Buoy.

Layer/Level	Description
C-SEAP-BUOY-	Seaplane navigation buoy

E.1.40 Noise Contour.

Layer/Level	Description
C-TOPO-AUZN-	Noise contour zone

E.1.41 Noise Incident.

Layer/Level	Description
C-TOPO-AUCO-	Noise Complaint

E.1.42 Noise Monitoring Point.

Layer/Level	Description
C-TOPO-AUST-	Noise Monitoring Station

E.1.43 Object Area.

Layer/Level	Description
C-AIRS-OBST-POLY	Airspace representative or penetrating objects

E.1.44 Object Identification Surface.

Layer/Level	Description
C-AIRS-AAAS-APRC	Airport Airspace Analysis Survey - Approach Surfaces
C-AIRS-AAAS-CONL	Airport Airspace Analysis Survey - Conical Surface
C-AIRS-AAAS-HORZ	Airport Airspace Analysis Survey - Horizontal Surface
C-AIRS-AAAS-PRIM	Airport Airspace Analysis Survey - Primary Surfaces
C-AIRS-AAAS-TRNS	Airport Airspace Analysis Survey - Transitional Surfaces
C-AIRS-AAAS-VERT	Airport Airspace Analysis Survey - Vertical Guidance Protection Surface
C-AIRS-OTHR	Other airspace surfaces
C-AIRS-PART-APRC	14 CFR part 77 - Approach Surfaces
C-AIRS-PART-CONL	14 CFR part 77 - Conical Surface
C-AIRS-PART-HORZ	14 CFR part 77 - Horizontal Surface
C-AIRS-PART-PRIM	14 CFR part 77 - Primary Surface
C-AIRS-PART-TRNS	14 CFR part 77 - Transitional Surfaces
C-AIRS-TERP	TERPS Surfaces
C-AIRS-TERP-DEPT	Departure Analysis

E.1.45 Object Line.

Layer/Level	Description
C-AIRS-OBST-LINE	Airspace obstruction - Line

E.1.46 Object Point.

Layer/Level	Description
C-AIRS-OBST-PPNT	Airspace representative or penetrating objects

E.1.47 Parcel.

Layer/Level	Description
V-PROP-LINE-	Property lines (existing recorded plats)

E.1.48 Parking Lot.

Layer/Level	Description
C-PKNG-ISLD-	Parking islands
C-PKNG-OTLN-	Parking lots

E.1.49 Passenger Loading Bridge.

Layer/Level	Description
C-AIRF-JETB-	Airport jet bridge

E.1.50 Position.

Layer/Level	Description
C-TOPO-RNYE-	Runway centerline elevation points
C-RUNW-DISP-	Runway displaced threshold point
V-SURV-DATA-CTPT-	Survey data (benchmarks and horizontal control points or monuments)

E.1.51 Railroad Centerline.

Layer/Level	Description
C-RAIL-CNTR-	Railroad centerlines
C-RAIL-TRAK-	Railroads

E.1.52 Railroad Yard.

Layer/Level	Description
C-RAIL-YARD-	Railroad Yard

E.1.53 Restricted Access Boundary.

Layer/Level	Description
C-AIRF-SECR-RSTR	Restricted access boundary

E.1.54 Right and Interest.

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

E.1.55 Road Centerline.

Layer/Level	Description
C-ROAD-CNTR-	Road centerlines

E.1.56 Road Point.

Layer/Level	Description
C-ROAD-POIN-	Road Point

E.1.57 Road Segment.

Layer/Level	Description
C-PROF-ROAD-	Roads
C-ROAD-CURB-	Curbs
C-ROAD-OTLN-	Roads
V-PROF-ROAD-	Roads

E.1.58 Roof.

Layer/Level	Description
A-ROOF-OTLN	Roof outline

E.1.59 Runway.

Layer/Level	Description
C-RUNW-EDGE-	Airfield runway edges

E.1.60 Runway Arresting Area.

Layer/Level	Description
C-RUNW-ARSTC-RUNW-ARST-AIDS-CRIT	Runway arresting gear

E.1.61 Runway Blast Pad.

Layer/Level	Description
C-RUNW-BLST	Runway blast pad

E.1.62 Runway Centerline.

Layer/Level	Description
C-RUNW-CNTR-	Runway Centerline

E.1.63 Runway Direction.

Layer/Level	Description
C-RUNW-ENDP-	Runway endpoint

E.1.64 Runway Declared Distance.

Layer/Level	Description
C-RUNW-DIST	Runway declared distance values

E.1.65 Runway Element.

Layer/Level	Description
C-RUNW-SEGM-	Runway Element

E.1.66 Runway Helipad Design Surface.

Layer/Level	Description
C-AIRF-DSRF-BLDR-	Building Restriction Line
C-AIRF-DSRF-KEYH-	Key holes
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-RSA-	Runway Safety Area
C-HELI-DSRF-	Helipad design surface
C-RUNW-CLRW-	Runway clearway

E.1.67 Runway Intersection.

Layer/Level	Description
C-RUNW-INTS	Runway intersection

E.1.68 Runway LAHSO.

Layer/Level	Description
C-RUNW-LAHS-	Runway land and hold short area

E.1.69 Runway Protection Zone.

Layer/Level	Description
C-AIRF-DSRF-RPZ-	Runway Protection Zone

E.1.70 Runway Safety Area Boundary.

Layer/Level	Description
C-RUNW-SAFT-	Runway Safety Area

E.1.71 Sample Collection Point.

Layer/Level	Description
C-TOPO-BORE-	Boring locations
H-SAMP-AIRS-	Air samples
H-SAMP-BIOL-	Biological samples
H-SAMP-GWTR-	Ground water samples
H-SAMP-SEDI-	Sediment samples
H-SAMP-SOIL-	Soil samples
H-SAMP-SOLI-	Solid material samples
H-SAMP-SWTR-	Surface water samples
H-SAMP-WAST-	Waste samples
V-TOPO-BORE-	Boring locations

E.1.72 Seaplane Ramp Centerline.

Layer/Level	Description
C-SEAP-RAMP-CNTR	Seaplane ramp centerline

E.1.73 Seaplane Ramp Site.

Layer/Level	Description
C-SEAP-RAMP-	Seaplane ramp site

E.1.74 Security Area.

Layer/Level	Description
C- SECR-SECA	An area of the airport in which security measures required by 49 CFR 1542.201
C-AFLD-SECR-SECA	Airfield security area

E.1.75 Security Identification Display Area.

Layer/Level	Description
C-AIRF-SECR-SIDA	Security Identification Display Area

E.1.76 Security Perimeter Line.

Layer/Level	Description
C-DETL-FENC-SECU	Security Fencing

E.1.77 Shoulder.

Layer/Level	Description
C-HELI-SHLD-	Helipad shoulder
C-PADS-SHLD-	Pad shoulders with annotation

E.1.78 Sidewalk.

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

E.1.79 Sterile Area.

Layer/Level	Description
C-AFLD-SECR-STER	Airfield sterile area

E.1.80 Stopway.

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

E.1.81 Structure Line.

Layer/Level	Description
C-DETL-FENC-	Fencing
C-SECU-FENC-	Security fencing
C-SITE-FENC-	Fences and handrails
C-SITE-GATE-	Gates along fences or other barriers intended to restrict access
L-DETL-FENC-	Fencing
L-DETL-GATE-	Gate
L-SITE-FENC-	Fencing
L-SITE-GATE-	Gate
S-SAFE-FENC-	Fencing
V-SITE-FENC-	Fences and handrails

E.1.82 Structure Polygon.

Layer/Level	Description
A-ELEV-OTLN-	Building outlines
C-BLDG-OTLN-	Buildings and other structures
G-PLAN-OTLN-	Floor outline/perimeter/building footprint
H-BLDG-OTLN-	Command posts, information centers
M-ELEV-OTLN-	Building outlines
V-BLDG-OTLN-	Buildings and other structures

E.1.83 Structure Point.

Layer/Level	Description
C-STRC-TOWR-	Tower
E-POLE-GUYS-	Guy equipment
V-POLE-GUYS-	Guy equipment
V-STRC-TOWR-	Tower

E.1.84 Tank Site.

Layer/Level	Description
L-DETL-TKST-	Tank Site

E.1.85 Taxi Channel.

Layer/Level	Description
C-SEAP-TAXI-	Seaplane landing area

E.1.86 Taxiway Element.

Layer/Level	Description
C-TAXI-OTLN	Taxiway - outlines
C-TAXI-INTS	Taxiway intersection

E.1.87 Taxiway Holding Position.

Layer/Level	Description
C-TAXI-HOLD--	Taxiway holding lines

E.1.88 Touch Down Lift Off.

Layer/Level	Description
C-HELI-TLOF	Helipad takeoff and landing area

E.1.89 Tunnel.

Layer/Level	Description
L-SITE-TUNL-	Tunnels

E.1.90 Turning Basin.

Layer/Level	Description
C-SEAP-TBSN-	Seaplane turning basin

E.1.91 Utility Line.

Layer/Level	Description
C-FUEL-ABND-	Abandoned piping
C-FUEL-DEFL-	Defueling piping
C-FUEL-MAIN-	Main fuel piping
C-FUEL-SERV-	Service piping
C-FUEL-TRCH-	Fuel line trench
C-NGAS-ABND-	Abandoned piping
C-NGAS-MAIN-	Main natural gas piping
C-NGAS-SERV-	Service piping
C-PROF-PIPE-	Piping
C-SSWR-ABND-	Abandoned piping
C-SSWR-MAIN-	Sanitary sewer piping

Layer/Level	Description
C-SSWR-SERV-	Sanitary sewer service piping
C-STRM-ABND-	Abandoned piping
C-STRM-HDWL-	Headwalls and endwalls
C-STRM-MAIN-	Storm sewer piping
C-STRM-ROOF-	Roof drain line
C-STRM-SERV-	Storm sewer service piping
C-STRM-SUBS-	Subsurface drain piping
E-AIRF-DUCT-	Ductbanks
E-CABL-COAX-	Coax cable
E-CABL-FIBR-	Fiber optics cable
E-CABL-MULT-	Multi-conductor cable
E-CABL-TRAY-	Cable trays and wireways
E-CIRC-CTRL-	Control and monitoring circuits
E-CIRC-MULT-	Multiple circuits
E-CIRC-SERS-	Series circuits
E-COMM-OVHD-	Overhead communications/telephone lines
E-COMM-UNDR-	Underground communications/telephone lines
E-DUCT-MULT-	Ductbank
E-GRND-CIRC-	Circuits
E-LITE-CIRC-	Lighting circuits (including crosslines and homeruns)
E-POWR-CIRC-	Power circuits (including crosslines and homeruns)
E-PRIM-OVHD-	Overhead electrical utility lines
E-PRIM-UNDR-	Underground electrical utility lines
E-SECD-OVHD-	Overhead electrical utility lines
E-SECD-UNDR-	Underground electrical utility lines
F-AFFF-PIPE-	Piping
F-CO2S-PIPE-	CO2 piping or CO2 discharge nozzle piping
F-HALN-PIPE-	Halon piping
F-IGAS-PIPE-	Inert gas piping
F-PROT-HOSE-	Fire hoses
F-SPRN-PIPE-	Sprinkler piping
F-WATR-PIPE-	Piping
L-DETL-WIRE-	Wiring
L-IRRG-PIPE-	Piping
M-ACID-PIPE-	Acid, alkaline, and oil waste piping
M-ACID-VENT-	Acid, alkaline, and oil waste vent piping
M-AFRZ-PIPE-	Anti-freeze piping
M-AFRZ-WAST-	Waste anti-freeze piping
M-BRIN-PIPE-	Brine system piping
M-CHEM-PIPE-	Piping (includes fittings, valves)
M-CNDW-PIPE-	Condenser water piping
M-COND-PIPE-	Condensate piping (includes fittings, valves)
M-CONT-WIRE-	Low voltage wiring
M-CWTR-PIPE-	Piping (includes fittings, valves)
M-DETL-PIPE-	Piping
M-DETL-WIRE-	Electrical wiring

Layer/Level	Description
M-DUAL-PIPE-	Piping (includes fittings, valves)
M-GTHP-PIPE-	Piping (includes fittings, valves)
M-HTCW-ABND-	Abandoned piping
M-HTCW-CHLL-	Main chilled water piping
M-HTCW-CHLS-	Chilled water service piping
M-HTCW-HTPL-	Main high temperature piping
M-HTCW-HTPS-	High temperature service piping
M-HTCW-LTPL-	Main low temperature piping
M-HTCW-LTPS-	Low temperature service piping
M-HTCW-STML-	Main steam piping
M-HTCW-STMS-	Steam service piping
M-HVAC-RETN-	Return ductwork
M-HVAC-SUPP-	Supply ductwork
M-HYDR-PIPE-	Hydraulic system piping
M-INSL-PIPE-	Insulating oil piping
M-LUBE-PIPE-	Lubrication oil piping
M-PROC-PIPE-	Process piping
M-RCOV-PIPE-	Piping (includes fittings, valves)
M-REFG-PIPE-	Piping (includes fittings, valves)
M-RWTR-PIPE-	Raw water piping
M-STEM-PIPE-	Steam piping
P-CMPA-PIPE-	Piping
P-FUEL-FGAS-	Fuel gas piping
P-FUEL-FOIL-	Fuel oil piping
P-LGAS-PIPE-	Piping
P-MDGS-PIPE-	Piping
P-SANR-COND-	Condensate piping
P-SANR-PIPE-	Piping
P-SANR-VENT-	Vent piping
P-STRM-PIPE-	Storm drain piping
T-CABL-TRAY-	Cable trays and wireways
V-AIRF-DUCT-	Ductbanks
V-CIRC-CTRL-	Control and monitoring circuits
V-CIRC-MULT-	Multiple circuits
V-CIRC-SERS-	Series circuits
V-COMM-OVHD-	Overhead communications/telephone lines
V-COMM-UNDR-	Underground communications/telephone lines
V-DUCT-MULT-	Ductbank
V-ELEC-VALT-	Vaults
V-FUEL-ABND-	Abandoned piping
V-FUEL-DEFL-	Defueling piping
V-FUEL-MAIN-	Main fuel piping
V-FUEL-SERV-	Service piping
V-FUEL-TRCH-	Fuel line trench
V-GTHP-PIPE-	Piping (includes fittings, valves)
V-HTCW-ABND-	Abandoned piping

Layer/Level	Description
V-HTCW-CHLL-	Main chilled water piping
V-HTCW-CHLS-	Chilled water service piping
V-HTCW-HTPL-	Main high temperature piping
V-HTCW-HTPS-	High temperature service piping
V-HTCW-LTPL-	Main low temperature piping
V-HTCW-LTPS-	Low temperature service piping
V-HTCW-STML-	Main steam piping
V-HTCW-STMS-	Steam service piping
V-NGAS-ABND-	Abandoned piping
V-PRIM-OVHD-	Overhead electrical utility lines
V-PRIM-UNDR-	Underground electrical utility lines
V-PROF-PIPE-	Piping
V-SECD-OVHD-	Overhead electrical utility lines
V-SECD-UNDR-	Underground electrical utility lines
V-SSWR-ABND-	Abandoned piping
V-SSWR-MAIN-	Sanitary sewer piping
V-SSWR-SERV-	Sanitary sewer service piping
V-STRM-ABND-	Abandoned piping
V-STRM-MAIN-	Storm sewer piping
V-STRM-SUBS-	Subsurface drain piping
V-UTIL-ELEC-	Power lines, lights, telephone poles, communication lines
V-UTIL-STEM-	Steam lines
V-UTIL-STRM-	Storm sewer lines, culverts, manholes, and headwalls
V-UTIL-WATR-	Water lines, hydrants, tanks

E.1.92 Utility Point.

Layer/Level	Description
C-DETL-TANK-	Tanks
C-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves
C-FUEL-FTTG-	Caps, crosses, and tees
C-FUEL-HYDR-	Hydrant control pits
C-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes
C-FUEL-METR-	Meters
C-FUEL-PUMP-	Booster pump stations
C-FUEL-TANK-	Fuel tanks
C-FUEL-VENT-	Vent pits
C-FUEL-VLVE-	Valve pits
C-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves
C-NGAS-FTTG-	Caps, crosses, and tees
C-NGAS-METR-	Meters
C-NGAS-PUMP-	Compressor stations
C-NGAS-REDC-	Reducing stations
C-NGAS-VENT-	Vent pits
C-NGAS-VLVE-	Valve pits/boxes

Layer/Level	Description
C-SITE-SECU-	CMRA security camera locations outside of buildings
C-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves
C-SSWR-FILT-	Filtration beds
C-SSWR-FTTG-	Caps and cleanouts
C-SSWR-JBOX-	Junction boxes and manholes
C-SSWR-PUMP-	Booster pump stations
C-SSWR-TANK-	Septic tanks
C-STRM-CULV-	Culverts
C-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates
C-STRM-EROS-	Erosion control (riprap)
C-STRM-FMON-	Flow monitoring station
C-STRM-FTTG-	Caps and cleanouts
C-STRM-FTTG-	Caps and cleanouts
C-STRM-INLT-	Inlets (curb, surface, and catch basins)
C-STRM-MHOL-	Manholes
C-STRM-PUMP-	Pump stations
C-STRM-STRC-	Storm drainage, headwalls, inlets, manholes, culverts, and drainage structures
E-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
E-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
E-CATH-ANOD-	Sacrificial anode system
E-CATH-CURR-	Impress current system
E-CATH-TEST-	Test stations
E-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices
E-COMM-EQPM-	Other communications distribution equipment
E-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
E-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
E-ELEC-SUBS-	Other substation equipment
E-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches
E-ELEC-VALT-	Vaults
E-GRND-EQUI-	Equipotential ground system
E-GRND-REFR-	Reference ground system
E-LITE-CLNG-	Ceiling Fixtures
E-LITE-EMER-	Emergency fixtures (outline of light (if ceiling mounted) should go on E-LITE-CLNG)
E-LITE-EXIT-	Exit fixtures (outline of light (if ceiling mounted) should go on
E-LITE-EXTR-	Exterior lights
E-LITE-JBOX-	Junction boxes
E-LITE-PANL-	Main distribution panels, switchboards, lighting panels
E-LITE-SPCL-	Special fixtures

Layer/Level	Description
E-LITE-SWCH-	Lighting contactors, photoelectric controls, low-voltage lighting controls, etc.
E-LITE-WALL-	Wall mounted fixtures
E-LTNG-COND-	Lightning protection conductors
E-LTNG-TERM-	Lightning protection terminals
E-POLE-UTIL-	Utility poles
E-POWR-BUSW-	Busways and wireways
E-POWR-CABL-	Cable trays
E-POWR-FEED-	Feeders
E-POWR-GENR-	Generators and auxiliary equipment
E-POWR-JBOX-	Junction boxes
E-POWR-PANL-	Panelboards, switchboards, MCC, unit substations
E-POWR-SWCH-	Disconnect switches, motor starters, contactors, etc.
E-SERT-BURD-	Buried sensors
E-SERT-UNDR-	Buried sensors
E-SPCL-JBOX-	Junction boxes
E-SPCL-PANL-	Panelboards, backing boards, patch panel racks
E-SPCL-SRFS-	Surface Sensor System
E-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)
E-TRAN-PADM-	Pad mounted transformers
E-TRAN-POLE-	Pole mounted transformers
F-AFFF-EQPM-	Equipment
F-ALRM-INDC-	Indicating appliances
F-ALRM-MANL-	Manual fire alarm pull stations
F-ALRM-PHON-	Fire service or emergency telephone stations
F-CO2S-EQPM-	Equipment
F-CTRL-PANL-	Control panels
F-HALN-EQPM-	Halon equipment
F-IGAS-EQPM-	Inert gas equipment
F-LITE-EMER-	Emergency fixtures
F-LITE-EXIT-	Exit fixtures
F-LSFT-EGRE-	Egress requirements designator
F-LSFT-OCCP-	Occupant load for egress capacity
F-WATR-CONN-	Fire department connections
F-WATR-HYDR-	Hydrants
F-WATR-PUMP-	Fire pumps
H-DECN-EQPM-	Decontamination equipment
H-DISP-TANK-	Spill containment tanks
L-DETL-VLVE-	Valves, fittings
L-IRRG-SPKL-	Sprinklers
M-ACID-EQPM-	Acid, alkaline, and oil waste equipment
M-BRIN-EQPM-	Brine system equipment
M-CHEM-EQPM-	Equipment
M-CNDW-EQPM-	Condenser water equipment
M-CONT-THER-	Thermostats, controls, instrumentation, and sensors
M-CWTR-EQPM-	Equipment

Layer/Level	Description
M-DETL-BOIL-	Boilers
M-DETL-COIL-	Coils and fin tubes
M-DETL-DUCT-	Ducts
M-DETL-EQPT-	Equipment and fixtures
M-DETL-FANS-	Fans
M-DETL-PUMP-	Pumps and compressors
M-DETL-TANK-	Tanks
M-DETL-TRAP-	Traps and drains
M-DETL-VENT-	Vents
M-DETL-VLVE-	Valves and fittings
M-DUAL-EQPM-	Equipment
M-DUST-DUCT-	Dust and fume ductwork
M-DUST-EQPM-	Dust and fume collection equipment
M-GTHP-EQPM-	Equipment
M-HTCW-CHLP-	Chilled water plant
M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
M-HTCW-FTTG-	Caps and flanges
M-HTCW-PUMP-	Pump stations
M-HTCW-RTRN-	Return for all HTCW lines
M-HTCW-CHLP-	Chilled water plant
M-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
M-HTCW-FTTG-	Caps and flanges
M-HTCW-HTPP-	High temperature water plant
M-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
M-HTCW-PITS-	Valve pits/vaults, steam pits
M-HTCW-PUMP-	Pump stations
M-HTCW-RTRN-	Return for all HTCW lines
M-HVAC-DAMP-	Fire and smoke dampers
M-HVAC-DAMP-	Fire and smoke dampers
M-HVAC-EQPM-	Air system equipment
M-HVAC-ROOF-	Roof mounted HVAC equipment
M-HWTR-EQPM-	Equipment
M-HWTR-PIPE-	Piping (includes fittings, valves)
M-HYDR-EQPM-	Hydraulic system equipment
M-INSL-EQPM-	Insulating oil equipment
M-LUBE-EQPM-	Lubrication oil equipment
M-MACH-BASE-	Machinery bases
M-MATL-LIFT-	Miscellaneous lifting equipment
M-PROC-EQPM-	Equipment
M-RCOV-EQPM-	Equipment
M-REFG-EQPM-	Equipment
M-RWTR-EQPM-	Raw water equipment
M-STEM-EQPM-	Equipment
P-CMPA-EQPM-	Equipment

Layer/Level	Description
P-FUEL-EQPM-	Equipment
P-LGAS-EQPM-	Equipment
P-MDGS-EQPM-	Equipment
P-SANR-EQPM-	Equipment (e.g., sand/oil/water separators)
P-SANR-FLDR-	Floor drains, sinks, and cleanouts
S-BRAC-VERT-	Vertical bracing
S-GRAT-SUBS-	Subsurface grating
S-PIPE-GATE-	Gates (flap gates, sluice gates, other)
T-CABL-COAX-	Coax cable
T-CABL-FIBR-	Fiber optics cable
T-CABL-MULT-	Multi-conductor cable
T-COMM-ANTN-	Telecommunications antennae
T-COMM-JBOX-	Junction boxes
T-EQPM-COPP-	Distribution equipment for copper
T-EQPM-FIBR-	Distribution equipment for fiber optic
T-EQPM-OTHR-	Other telecommunications equipment
T-JACK-DATA-	Data/LAN jacks
T-JACK-PHON-	Telephone jacks
V-AIRF-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
V-AIRF-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
V-CATH-ANOD-	Sacrificial anode system
V-CATH-CURR-	Impress current system
V-CATH-TEST-	Test stations
V-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices
V-COMM-EQPM-	Other communications distribution equipment
V-COMM-JBOX-	Communication junction boxes, pull boxes, manholes, handholes, pedestals, splices
V-ELEC-DEVC-	Capacitors, voltage regulators, motors, buses, generators, meters, grounds, and markers
V-ELEC-JBOX-	Junction boxes, pull boxes, manholes, handholes, pedestals, splices
V-ELEC-SUBS-	Other substation equipment markers, oil/water separators, reducers, regulators, and valves
V-ELEC-SWCH-	Fuse cutouts, pole mounted switches, circuit breakers, gang operated disconnects, reclosers, cubicle switches
V-FUEL-DEVC-	Air eliminators, filter strainers, hydrant fill points, line vents, markers, oil/water separators, reducers, regulators, and valves
V-FUEL-FTTG-	Caps, crosses, and tees
V-FUEL-HYDR-	Hydrant control pits
V-FUEL-JBOX-	Junction boxes, manholes, handholes, test boxes
V-FUEL-METR-	Meters
V-FUEL-PUMP-	Booster pump stations
V-FUEL-TANK-	Fuel tanks
V-FUEL-VENT-	Vent pits

Layer/Level	Description
V-FUEL-VLVE-	Valve pits
V-GTHP-EQPM-	Equipment
V-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
V-HTCW-CHLP-	Chilled water plant
V-HTCW-DEVC-	Rigid anchors, anchor guides, rectifiers, reducers, markers, meters, pumps, regulators, tanks, and valves
V-HTCW-FTTG-	Caps and flanges
V-HTCW-HTPP-	High temperature water plant
V-HTCW-JBOX-	Junction boxes, manholes, handholes, test boxes
V-HTCW-PITS-	Valve pits/vaults, steam pits
V-HTCW-PUMP-	Pump stations
V-HTCW-RTRN-	Return for all HTCW lines
V-LITE-FIXT-	Exterior Lights
V-NGAS-DEVC-	Hydrant fill points, lights, vents, markers, rectifiers, reducers, regulators, sources, tanks, drip pots, taps, and valves
V-NGAS-FTTG-	Caps, crosses, and tees
V-NGAS-METR-	Meters
V-NGAS-PUMP-	Compressor stations
V-NGAS-REDC-	Reducing stations
V-NGAS-VENT-	Vent pits
V-NGAS-VLVE-	Valve pits/boxes
V-POLE-UTIL-	Utility poles
V-PROF-MHOL-	Manholes
V-SPCL-SYST-	Special systems (UMCS, EMCS, CATV, etc.)
V-SSWR-DEVC-	Grease traps, grit chambers, flumes, neutralizers, oil/water separators, ejectors, and valves
V-SSWR-FILT-	Filtration beds
V-SSWR-FTTG-	Caps and cleanouts
V-SSWR-JBOX-	Junction boxes and manholes
V-SSWR-PUMP-	Booster pump stations
V-SSWR-TANK-	Septic tanks
V-STRM-CHUT-	Chutes and concrete erosion control structures
V-STRM-CULV-	Culverts
V-STRM-DEVC-	Downspouts, flumes, oil/water separators, and flap gates
V-STRM-EROS-	Erosion control (riprap)
V-STRM-FMON-	Flow monitoring station
V-STRM-FTTG-	Caps and cleanouts
V-STRM-HDWL-	Headwalls and endwalls
V-STRM-INLT-	Inlets (curb, surface, and catch basins)
V-STRM-MHOL-	Manholes
V-STRM-PUMP-	Pump stations
V-TRAN-PADM-	Pad mounted transformers
V-TRAN-POLE-	Pole mounted transformers
V-UTIL-LINE-	Utilities
V-UTIL-NGAS-	Gas lines, features, and valves

Layer/Level	Description
V-UTIL-SSWR-	Sanitary lines and manholes

E.1.93 Utility Polygon.

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
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
V-STRM-LAGN-	Lagoons, ponds, watersheds, and basins

E.1.94 Vegetation Area.

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-TURF-	Lawn areas (turfing limits)
V-SITE-VEGE-	Existing tree lines and vegetation

E.1.95 Water Operating Area.

Layer/Level	Description
C-SEAP-WTOA-	Seaplane dock

E.1.96 Water Lane End.

Layer/Level	Description
C-SEAP-LNDA-	Seaplane landing area

E.1.97 Wetland.

Layer/Level	Description
V-TOPO-WETL	Wetland

E.1.98 Zoning.

Layer/Level	Description
V-PROP-ZONG-	Zoning Areas

APPENDIX F. THE FAA STANDARD 002 COMPLIANCE TABLES

F.1 Compliance Tables.

FAA Standard Engineering Drawing Preparation and Support (FAA-STD-002) [16] is a CADD standard developed by the National CAEG Program Office (Air Traffic Control Facilities Operational Services). This standard is intended to "develop a more efficient and effective means for management and technical data control of drawings prepared by and for the Federal Aviation Administration (FAA) and the National Airspace System (NAS) Program. The following table lists the layers defined in FAA-STD-002 and their corresponding feature classes defined in this standard.

Chapter 5 Feature Class	FAA-STD-002	
	Layer	**Definition**
AirfieldLight	A-LITE	Light fixtures
AirportBoundary	C-AFLD	Airfields; General Outline of Airports
AirportParcel, Parcel	S-PROP	Property Lines
AirportParcel, Parcel	C-PROP	Property lines, survey benchmarks, retaining walls
Bridge	C-BRDG	Bridge
ElevationContour,	C-TOPO	Contour lines and elevations
FloraSpeciesSite	L-PLNT	Plant and landscape materials; Trees; Ground covers and vines; Rock, bark, and other landscaping beds; Planting beds
FloraSpeciesSite, AirportSign,	D-SITE	Site features, retaining walls, plants, trees, signs, fences
HazardousMaterialStorageSite	H-HZMT	Hazardous materials on floor and/or site plan
LandUse	C-CEME	Cemetery
NaturalWaterBody	C-CHAN	Navigable Channels, Rivers, Lakes, Bodies of Water
NavaidEquipment	C-ATNA	Antenna (Comm / Radar) - antenna towers and antennas
ParkingLot	C-PKNG	Parking lots, islands, curbs, striping, handicapped symbols, drainage slope indications
Position	C-CTRL	Control Points and Survey Benchmarks
Position	C-TOPO	Spot elevations
RailroadCenterline	C-RAIL	Railroad
Rightandinterest	C-PROP-ESMT	Easements, rights-of-way, setback lines, runway approach zones
RoadCenterline, RoadSegment	C-ROAD	Roadways, runways, taxiways, curbs, Center lines

[16] FAA Standard Engineering Drawing Preparation and Support (FAA-STD-002g), August 29, 2008

Chapter 5 Feature Class	FAA-STD-002	
	Layer	Definition
Roof	A-ROOF	Roof, roof outline, level changes, roof surfaces
SampleCollectionPoint	C-BORE	Test Borings
Sidewalk	L-SITE	Site improvements, fencing, walls, steps, decks, bridges, pools, spas, sports fields, play structures, furnishings, walkways
StructureLine	D-SITE C-FENC L-SITE	Fences
structurepolygon	C-BLDG	Proposed building footprints, primary structures
TankSite, UtilityLine	M-FUEL-OIL	Fuel oil process tanks, piping and general piping
TankSite, UtilityPoint, UtilityLine	M-FUEL-GAS	Fuel system tanks, piping, gas process piping, fuel gas general piping
Utility Line	M-HOTW	Hot water heating system, equipment piping
UtilityLine	C-DTCH	Ditches or Washes
UtilityLine	M-CONT-WIRE	Low voltage control wiring
UtilityLine	P-STRM	Storm drainage system, storm drain piping and risers
UtilityLine	Q-CABL	Cables and Trays (Low voltage)
UtilityLine	T-CABL	Cable systems: coax cable, fiber optics cable, multi- conductor cable, cable tray and wireway
UtilityPoint	C-COMM	Site communications, (Overhead and Underground); telephone poles, boxes, towers
UtilityPoint	C-POWR	Power: (Overhead and Underground); Poles; boxes, towers
UtilityPoint	E-COMM	Telephone, communications outlets
UtilityPoint	E-DATA	Data outlets
UtilityPoint	E-JBOX	Junction box
UtilityPoint	E-POWR-EQPM	Power panels, equipment, switchboards
UtilityPoint	E-POWR-RECP	Power: wall and ceiling outlets and receptacles
UtilityPoint	E-SWCH	Lighting switches
UtilityPoint	F-PROT	Fire system equipment (fire hose cabinet extinguishers), fire alarm, smoke detectors/heat sensors
UtilityPoint	M-CONT	Thermostats, controls and instrumentation

Chapter 5 Feature Class	FAA-STD-002	
	Layer	Definition
UtilityPoint	M-HVAC-DFF	HVAC ceiling diffusers, other diffusers, supply diffusers, return air diffusers
UtilityPoint	P-FIXT	Plumbing fixtures and equipment
UtilityPoint	Q-POWR	Low voltage power connections
UtilityPoint	T-FIRE	Fire alarm, fire extinguishers
UtilityPoint	T-JBOX	Junction box
UtilityPoint	Y-CAMS	Security cameras
UtilityPoint	Y-SNSR	Security sensor locations
UtilityPoint, UtilityLine	C-FIRE	Fire protection: hydrants, connections; underground lines
UtilityPoint, UtilityLine	C-FUEL	Fuel Gas
UtilityPoint, UtilityLine	C-NGAS	Natural gas - manholes, meters, storage tanks, underground lines
UtilityPoint, UtilityLine	C-SSWR	Sanitary sewer -manholes, pumping stations, underground lines
UtilityPoint, UtilityLine	C-STEM	Steam Systems
UtilityPoint, UtilityLine	C-STRM	Storm drainage catch basins, manholes, underground lines
UtilityPoint, UtilityLine	C-WATR	Domestic water: manholes, pumping stations, storage tanks, underground lines
UtilityPoint, UtilityLine	D-COMM	Telephone and data lines, outlets
UtilityPoint, UtilityLine	D-ELEC	Wiring, outlets, fixtures, lighting, equipment
UtilityPoint, UtilityLine	D-HVAC	HVAC equipment, ductwork, diffusers
UtilityPoint, UtilityLine	D-PLBG	Plumbing fixtures, equipment, drainage and piping, hot and cold water supply pipes and equipment
UtilityPoint, UtilityLine	E-ALRM	Electrical alarm system
UtilityPoint, UtilityLine	E-AUXL	Auxiliary System
UtilityPoint, UtilityLine	E-CTRL	Control systems devices and wiring
UtilityPoint, UtilityLine	E-GRND	Ground system, counterpoise, ground rods
UtilityPoint, UtilityLine	E-INTC	Intercom, sound/PA system
UtilityPoint, UtilityLine	E-LITE	Lighting, special lighting, ceiling-mounted lighting, wall-mounted lighting, floor-mounted lighting, lighting outline for optional background lighting, roof lighting, lighting circuits, emergency and exit lighting, site lighting
UtilityPoint, UtilityLine	E-LTNG	Lightning protection system
UtilityPoint, UtilityLine	E-TVAN	TV antenna system
UtilityPoint, UtilityLine	F-AFFF	Aqueous Film-Forming Foam System
UtilityPoint, UtilityLine	F-CO2S	CO2 sprinkler piping and equipment

Chapter 5 Feature Class	FAA-STD-002	
	Layer	**Definition**
UtilityPoint, UtilityLine	F-HALN	Halon piping and equipment
UtilityPoint, UtilityLine	F-IGAS	Inert gas equipment and piping
UtilityPoint, UtilityLine	F-SPRN	Fire protection sprinkler system, sprinkler piping, sprinkler heads, sprinkler standpipes, fire protection systems
UtilityPoint, UtilityLine	L-IRRG	Irrigation systems, sprinklers, piping, equipment, coverage
UtilityPoint, UtilityLine	M-CMPA	Plant compressed air systems, equipment and piping
UtilityPoint, UtilityLine	M-CWTR	Chilled water system, piping and equipment
UtilityPoint, UtilityLine	M-DUST	Dust and fume collection system, equipment and ductwork
UtilityPoint, UtilityLine	M-ELHT-EQPM	Electric heat equipment
UtilityPoint, UtilityLine	M-ENER	Energy management system, equipment and wiring
UtilityPoint, UtilityLine	M-EXHS	Exhaust system, equipment and ductwork, roof exhaust equipment
UtilityPoint, UtilityLine	M-FUEL-NGAS	Natural gas systems, equipment and piping
UtilityPoint, UtilityLine	M-HVAC	HVAC system, HVAC ductwork and equipment
UtilityPoint, UtilityLine	M-PROC	Process/instrument air piping and equipment
UtilityPoint, UtilityLine	M-RCOV	Energy recovery system, equipment and piping
UtilityPoint, UtilityLine	M-REFG	Refrigeration systems, equipment and piping
UtilityPoint, UtilityLine	M-SPCL	Special systems, equipment and piping
UtilityPoint, UtilityLine	M-STEM	Steam systems: Steam systems condensation piping and equipment; Low pressure steam piping; Medium pressure steam piping; High pressure steam piping
UtilityPoint, UtilityLine	P-DOMW	Domestic hot and cold water systems and piping
UtilityPoint, UtilityLine	P-SANR	Sanitary drainage and piping, floor drains and piping, sanitary risers and equipment
UtilityPoint, UtilityLine	P-WAST-OIL	Waste oil systems and piping
UtilityPoint, UtilityLine	T-ALRM	Alarm system
UtilityPoint, UtilityLine	T-CATV	Cable television system
UtilityPoint, UtilityLine	T-CCTV	Closed-circuit TV

Chapter 5 Feature Class	FAA-STD-002	
	Layer	Definition
UtilityPoint, UtilityLine	T-DATA	Data/LAN system
UtilityPoint, UtilityLine	T-PHON	Telephone system
UtilityPoint, UtilityLine	T-SERT	Security system
UtilityPoint, UtilityLine	T-SOUN	Sound/PA system
UtilityPoint, UtilityLine	T-TVAN	TV antenna system
UtilityPoint, UtilityLine	Y-ALRM	Miscellaneous alarm system
UtilityPoint, UtilityLine	Y-CCTV	Closed-circuit TV
UtilityPoint, UtilityLine	Y-COMM	Security communication
UtilityPolygon	C-DFLD	Drain Fields
UtilityPolygon	C-EROS	Erosion and Sediment Control, Riprap

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APPENDIX G. COORDINATE

G.1 CodeCoordinateZone.

Value	Description
AK-1	NAD27 Alaska State Planes- Zone 1- US Foot (EPSG #26731)[17]
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)
AK-9	NAD27 Alaska State Planes- Zone 9- US Foot (EPSG #26739)
AK-10	NAD27 Alaska State Planes- Zone 10- US Foot (EPSG #26740)
AK83-1	NAD83 Alaska State Planes- Zone 1- Meter (EPSG #26931)
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
AK83-10	NAD83 Alaska State Planes- Zone 10- Meter (EPSG #26940)
AK83-10F	NAD83 Alaska State Planes- Zone 10- US Foot
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)

[17] EPSG website: www.epsg-registry.org

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)

Value	Description
CAHP-IF	HPGN California State Planes- Zone I- US Foot (EPSG #2870)
CAHP-II	HPGN California State Planes- Zone II- Meter (EPSG #2767)
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)

Value	Description
FL83-W	NAD83 Florida State Planes- Western Zone- Meter (EPSG #26959)
FL83-WF	NAD83 Florida State Planes- Western Zone- US Foot (EPSG #2237)
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)

Value	Description
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
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)

Value	Description
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)
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)

Value	Description
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)
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)

Value	Description
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
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)

Value	Description
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
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)

Value	Description
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)
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)

Value	Description
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)
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)

Value	Description
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
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

Value	Description
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)
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)

Value	Description
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
UTM27-2	NAD27 UTM- Zone 2 North- Meter
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)
UTM27-6	NAD27 UTM- Zone 6 North- Meter (EPSG #26706)
UTM27-7	NAD27 UTM- Zone 7 North- Meter (EPSG #26707)
UTM27-8	NAD27 UTM- Zone 8 North- Meter (EPSG #26708)
UTM27-9	NAD27 UTM- Zone 9 North- Meter (EPSG #26709)
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

Value	Description
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)
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)
UTM27-20	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
UTM27-58	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
UTM27-60	NAD27 UTM- Zone 60 North- Meter
UTM27-6F	NAD27 UTM- Zone 6 North- US Foot
UTM27-6IF	NAD27 UTM- Zone 6 North- Intnl Foot
UTM27-7F	NAD27 UTM- Zone 7 North- US Foot
UTM27-7IF	NAD27 UTM- Zone 7 North- Intnl Foot
UTM27-8F	NAD27 UTM- Zone 8 North- US Foot
UTM27-8IF	NAD27 UTM- Zone 8 North- Intnl Foot
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)
UTM83-2	NAD83 UTM- Zone 2 North- Meter (EPSG #26902)
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)

Value	Description
UTM83-4F	NAD83 UTM- Zone 4 North- US Survey Foot
UTM83-5	NAD83 UTM- Zone 5 North- Meter (EPSG #26905)
UTM83-6	NAD83 UTM- Zone 6 North- Meter (EPSG #26906)
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
UTM83-10	NAD83 UTM- Zone 10 North- Meter (EPSG #26910)
UTM83-10F	NAD83 UTM- Zone 10 North- US Foot
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
UTM83-20	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

Value	Description
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
UTM83-58	NAD83 UTM- Zone 58 North- Meter
UTM83-59	NAD83 UTM- Zone 59 North- Meter
UTM83-5F	NAD83 UTM- Zone 5 North- US Survey Foot
UTM83-5IF	NAD83 UTM- Zone 5 North- Intnl Foot
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
UTM84-1N	WGS 1984 UTM- Zone 1 North- Meter (EPSG #32601)
UTM84-1S	WGS 1984 UTM- Zone 1 South- Meter (EPSG #32701)
UTM84-2N	WGS 1984 UTM- Zone 2 North- Meter (EPSG #32602)
UTM84-2S	WGS 1984 UTM- Zone 2 South- Meter (EPSG #32702)
UTM84-3N	WGS 1984 UTM- Zone 3 North- Meter (EPSG #32603)
UTM84-3S	WGS 1984 UTM- Zone 3 South- Meter (EPSG #32703)
UTM84-4N	WGS 1984 UTM- Zone 4 North- Meter (EPSG #32604)
UTM84-4S	WGS 1984 UTM- Zone 4 South- Meter (EPSG #32704)
UTM84-5N	WGS 1984 UTM- Zone 5 North- Meter (EPSG #32605)
UTM84-5S	WGS 1984 UTM- Zone 5 South- Meter (EPSG #32705)
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)
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)

Value	Description
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)
UTM84-20N	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)
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)
UTM84-30N	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)
UTM84-40N	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)

Value	Description
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)
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)
UTM84-50N	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)
UTM84-60N	WGS 1984 UTM- Zone 60 North- Meter (EPSG #32660)
UTM84-60S	WGS 1984 UTM- Zone 60 South- Meter (EPSG #32760)
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
UTMHP-12	HPGN UTM- Zone 12 North- Meter
UTMHP-12F	HPGN UTM- Zone 12 North- US Foot

Value	Description
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)

Value	Description
WA-N	NAD27 Washington State Planes- Northern Zone- US Foot (EPSG #32048)
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)

Value	Description
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
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)

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to:

Federal Aviation Administration
Airport Engineering Division (AAS-100)
800 Independence Avenue SW
Washington, DC 20591

or (2) faxing it to the attention of Manager, Airport Engineering Division (AAS-100), (202) 267-3688.

Subject: AC 150/5300-18C, *Survey and Data Standards for Submission of Aeronautical Data Using Airports GIS* **Date:** ____________________

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _______________ on page _________________.

☐ Recommend paragraph _____________ on page _____________ be changed as follows:

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____
____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

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☐ Other comments:

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☐ I would like to discuss the above. Please contact me.

Submitted by: ______________________________ Date: ________________________