PROPOSED FOR REVISION

Arkansas Centerline File Standard

(All revisions shown in red underlined text.)

Arkansas GIS Board

Prepared By: Arkansas GIS Office

For: Arkansas GIS Board

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* For the purposes of this document, street (centerline) shall refer to any, bypass, interstate, cove, road, route or other means that typically supports automotive transportation.

Introduction

The State Land Information Board, now the State GIS Board, developed this document in order to support the legislative initiatives to establish the Arkansas Spatial Data Infrastructure (Arkansas Code 15-21-5). Spatial data layers are often stored digitally and accessed through a relational database management system (RDBMS). Although the centerline file is a component of the Arkansas Spatial Data Infrastructure, the way in which people format and maintain it can differ. People often disagree on the way a particular spatial data layer structure should be organized. This can pose problems in terms of sharing, locating, and extracting spatial data information. It is intended that these standards will benefit the Geographic Information Systems (GIS) user communities in numerous ways, including but not limited to: *The National Map Program*[1], The *TIGER Modernization Program*[2], E-911 applications, routing services, and location dependant services.

The following standards specifically speak to methodologies for creating a seamless statewide Arkansas Centerline File with address ranges that are shareable, geocodable, and have a horizontal accuracy better than 10 meters.

Background

The State Land Information Board (SLIB) was created by Act 914 of the 1997 General Assembly and is responsible for:

- Identifying problems and solutions in implementing a spatial data repository
- Developing and coordinating a schedule for state spatial data projects
- Recommending methods of financing for state spatial data projects
- Providing educational programs that are focused on spatial data technologies
- Coordinating collaborative projects
- Establishing spatial data standards (Section 4. (f) (1) of Arkansas Code 15-21-5).

Act 244 of 2009 renamed the Board to the State GIS Board.

Arkansas Code 15-21-5 An Act to Amend the Arkansas Code to Create the Geographic Information Office and Establish the Arkansas Spatial Data Infrastructure and for other purposes establishes these SLIB principles:

- Validity, consistency, comprehensiveness, availability, and currentness of data are essential components of all automated land information systems.
- Coordination with federal, state, regional, county, and municipal agencies, state universities and colleges, private firms, and others who require the same spatial data will reduce duplication of efforts and expense.
- Creation of new data in an accurate and usable format in accordance with the states shared technology architecture will ensure availability across state agencies.

Purpose

This standard is intended to make centerline files more uniform and horizontally accurate. This will facilitate the sharing of a statewide seamless centerline spatial data layer. Adhering to these standards will insure the "usability" of the spatial data theme and its attributes by multiple entities. This standard will insure a consistent manner in which the centerline and/or attributes are collected. This will enable the data to be merged seamlessly, and transferable regardless of creator or jurisdictional boundaries. All data used in the creation of the Arkansas Centerline File shall meet these standards.

*Note: Throughout the remainder of this document ACF shall refer to Arkansas Centerline File. This includes the vector spatial data layer and its attributes. The ACF shall be composed of centerline files created from multiple sources and/or entities. Centerline shall include all clearly defined passages through which a standard vehicle may travel as well as driveways extending more than 500 feet and/or driveways containing two or more addressed structures.

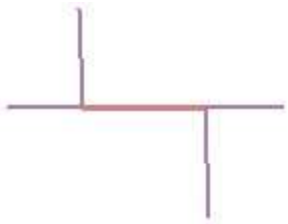
Technical Practices for Creating ACF Vector Layer geometry

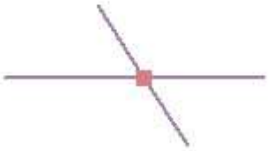
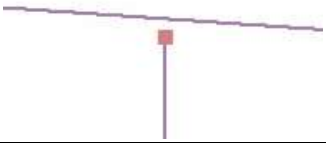
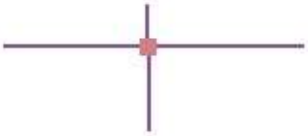
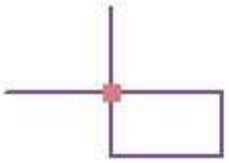
ACF Feature Type:

Vector lines shall be used to represent centerlines. The ACF shall "seamlessly" match across jurisdiction boundaries (i.e., cities, counties, etc.). Address ranges shall be organized along the linear feature to support address geocoding. The address ranges shall be stored within the centerline attribute table of the geospatial dataset.

Topology:

The centerline file shall be processed using appropriate GIS procedures to create and maintain accurate topology, if intended for incorporation into the ACF program. In order to eliminate common dangle and intersect topological errors, care should be taken while digitizing to snap the endpoints of line centerline segments to endpoints of other line segments. At a minimum the following topology rules should be adhered to:

Topology rule	Rule description	Examples
Must Not Overlap	Requires that lines not overlap with lines in the same feature class (or subtype). This rule is used where line segments should not be duplicated, for example, in a stream feature class. Lines can cross or intersect but cannot share segments.	

Must Not Intersect	Requires that line features from the same feature class (or subtype) not cross or overlap each other. Lines can share endpoints. This rule is used ~~for contour lines that should never cross each other or~~ in cases where the intersection of lines should only occur at endpoints, such as street segments and intersections. Exception would be a grade separated intersection of two streets at an overpass or underpass.	
Must Not Have Dangles	Requires that a line feature must touch lines from the same feature class (or subtype) at both endpoints. An endpoint that is not connected to another line is called a dangle. This rule is used when line features must form closed loops, such as when they are defining the boundaries of polygon features. It may also be used in cases where lines typically connect to other lines, as with streets. In this case, exceptions can be used where the rule is occasionally violated, as with cul-de-sac or dead-end street segments.	
Must Not Intersect Or Touch Interior	Requires that a line in one feature class (or subtype) must only touch other lines of the same feature class (or subtype) at endpoints. Any line segment in which features overlap or any intersection not at an endpoint is an error. This rule is useful where lines must only be connected at endpoints, such as in the case of lot lines, which must split (only connect to the endpoints of) back lot lines and cannot overlap each other.	
Must Not Self Overlap	Requires that line features not overlap themselves. They can cross or touch themselves but must not have coincident segments. This rule is useful for features, such as streets, where segments might touch in a loop but where the same street should not follow the same course twice.	 The individual line feature overlaps itself, with the error indicated by the coral line.
Must Not Self Intersect	Requires that line features not cross or overlap themselves. This rule is useful for lines, such as contour lines, that cannot cross themselves.	
Must Be Single Part	Requires that lines have only one part. This rule is useful where line features, such as highways, may not have multiple parts.	 Multipart lines are created from a single sketch.

**Topology rules excerpted from http://resources.esri.com.*

Inclusion of Specific Geometric Elements:

In order to support the development and ongoing maintenance of the all public roads linear referencing system, otherwise known as the All Roads Network Of Linear Referenced Data (ARNOLD, http://www.fhwa.dot.gov/policyinformation/hpms/arnold.cfm), geometric elements

representing particular road design types should be digitized in the ACF vector layer. Practices for digitizing these elements can be found in the subsequent *Digitizing* section.

1. Dual carriageway routes
2. Single carriageway
3. Connector segments
4. Traffic circles
5. Grade separated access ramps
6. At-grade access ramps
7. Frontage roads
8. Highway facilities

Digitizing:

Centerline files intended for incorporation into the ACF program may be produced utilizing heads-up digitizing techniques. Heads-up digitizing methodologies used may include, but are not limited to, point mode, stream mode, spaghetti mode, or increment mode. Heads-up digitizing should be performed utilizing the following standards.

Capture scale should be ~~1:12,000~~ 1:1,200
Projection – UTM Zone 15
Datum – North American Datum 1983 (NAD83)
Units – Meters
Source – At a minimum, the second Generation Digital Ortho Quarter Quadrangles (DOQQs) that have verified horizontal accuracies should be used. However, the best available imagery should always be used given that many jurisdictions have acquired their own aerial imagery since the acquisition of the state DOQQs mentioned above.

Best practices should always be adhered to when digitizing features in the ACF vector layer. These shall include, but may not be limited to the following:

1. All linear road features representing public or private roads that have been given a name and left/right range values for addressing purposes should be properly segmented into individual features at intersections representing ~~traffic~~ transportation decision points and snapped to endpoints to ensure proper topology. If an existing road feature is split to create proper segmentation, the left and right addresses ranges should be recalculated to reflect the change in geometry. The exceptions to this would be but are not limited to:
   a. Where the local jurisdiction digitizes driveways for location purposes and does not name or range them for addressing.
   b. Where two road centerline features intersect and do not represent a transportation decision point, e.g. an overpass or underpass where direct travel between the roads is not possible. Centerlines should not split (segmented) at these locations.

2. When digitizing curves, utilize the minimum number of vertices that will accurately represent the true shape of the road. However, use of arc/node, Bezier curve, or tangent curve tools is not recommended due to the excessive number of vertices the tools create.

3. For single carriageway roads, the actual centerline of the traversable lanes should be digitized. This also applies to connector segments, grade separated access ramps, at-grade access ramps, traffic circles, frontage roads, and highway facilities. Single carriageway roads should be digitized in the direction of increasing address range values as prescribed by the local addressing authority. All one-way access ramps should be digitized in the direction of vehicular travel.

4. For dual carriageway roads, separate linear features should be digitized along the actual centerline of each set of traversable lanes separated by the positive barrier or median. All access ramps should be included. Centerlines should be digitized in the direction of travel and left/right range values created in such a way to enable proper geocoding in the antilog direction.

Edge Matching:

Where roads cross political boundaries, e.g. city, county, or state boundary, the linear centerline feature shall be snapped to the edge of the applicable boundary and properly segmented. The city, county, and state boundaries maintained by the Arkansas Department of Transportation (ARDOT) and the Arkansas GIS Office and available via gis.arkansas.gov should be used as the geometric features to which the road segments are snapped. Where a road centerline is coincident with a political boundary and different jurisdictions are on each side, e.g. a city and a county, a single centerline feature should be used and differences in naming and addressing practices attributable to the different jurisdictions should be accounted for by using the alternate fields.

~~*Global Positioning Systems (GPS)*~~ *Global Navigation Satellite System (GNSS):*

Centerline files intended for incorporation into the ACF program may be produced utilizing current accepted standards for GNSS data collection. ~~If GPS techniques are utilized the Arkansas Standards for Collecting Mapping Grade Global Positioning System Positions[3] shall be followed.~~

Technical Practices for Creating ACF Attributes

The following standards apply to the collection and maintenance of the centerline attributes that are intended for incorporation into the ACF program.

Minimum Standards for ACF Attributes:

Table 1

Field Name	Length	Type	Alpha Case	Description
PL_ADD_F		Long integer		Primary Left From Address number
PL_ADD_T		Long integer		Primary Left To Address number
PR_ADD_F		Long integer		Primary Right From Address number
PR_ADD_T		Long integer		Primary Right To Address number
PRE_DIR	2	Text	Upper	Primary Directional Prefix
PRE_TYPE	4	Text	Proper	Primary Prefix Street Type
PSTR_NAM	72	Text	Proper	Primary Street Name
PSTR_TYPE	4	Text	Proper	Primary Suffix Street Type
PSUF_DIR	2	Text	Upper	Primary Directional Suffix
PSTR_FULNAM	255	Text	Proper	Stores the complete primary street name
CITY_L	30	Text	Proper	Stores the USPS preferred last line city name
CITY_R	30	Text	Proper	Stores the USPS preferred last line city name
COMM_L	30	Text	Proper	Stores the e9-1-1 jurisdictional community
COMM_R	30	Text	Proper	Stores the e9-1-1 jurisdictional community
CN_R_FIPS	3	Text		County FIPS code Right
CN_L_FIPS	3	Text		County FIPS code Left
STATE_L	2	Text	Upper	State Left
STATE_R	2	Text	Upper	State Right
ZIP5_L	5	Text		Zip Code Left
ZIP5_R	5	Text		Zip Code Left Right
UNIQUE_ID		Long integer		Unique Identifier
META _ID	20	Text		Metadata Identifier
ALTERNATE 1				
A1_LFADD		Long integer		Alternative 1 Left From Address number
A1_LTADD		Long integer		Alternative 1 Left To Address number
A1_RFADD		Long integer		Alternative 1 Right From Address number

A1_RTADD		Long integer		Alternative 1 Right To Address number
A1_PRTYP	4	Text	Proper	Alternative 1 Street Prefix Type
A1_STR	72	Text	Proper	Alternative 1 Street Name
A1_DRPR	2	Text	Upper	Alternative 1 Directional Prefix
A1_STYP	4	Text	Proper	Alternative 1 Street Type
A1_DRSF	2	Text	Upper	Alternative 1 Directional Suffix
A1_FULNAM	255	Text	Proper	Alternative 1 complete street name
ALTERNATE 2				
A2_LFADD		Long integer		Alternative 2 Left From Address number
A2_LTADD		Long integer		Alternative 2 Left To Address number
A2_RFADD		Long integer		Alternative 2 Right From Address number
A2_RTADD		Long integer		Alternative 2 Right To Address number
A2_PRTYP	4	Text	Proper	Alternative 2 Street Prefix Type
A2_STR	72	Text	Proper	Alternative 2 Street Name
A2_DRPR	2	Text	Upper	Alternative 2 Directional Prefix
A2_STYP	4	Text	Proper	Alternative 2 Street Type
A2_DRSF	2	Text	Upper	Alternative 2 Directional Suffix
A2_FULNAM	255	Text	Proper	Alternative 2 complete street name
ALTERNATE 3				
A3_LFADD		Long integer		Alternative 3 Left From Address number
A3_LTADD		Long integer		Alternative 3 Left To Address number
A3_RFADD		Long integer		Alternative 3 Right From Address number
A3_RTADD		Long integer		Alternative 3 Right To Address number
A3_PRTYP	4	Text	Proper	Alternative 3 Street Prefix Type
A3_STR	72	Text	Proper	Alternative 3 Street Name

A3_DRPR	2	Text	Upper	Alternative 3 Directional Prefix
A3_STYP	4	Text	Proper	Alternative 3 Street Type
A3_DRSF	2	Text	Upper	Alternative 3 Directional Suffix
A3_FULNAM	255	Text	Proper	Alternative 2 complete street name
RD_CLASS[1]	25	Text	Upper	The entity by or through which a road is maintained. Acceptable values are "federal", "state", "county", "municipal", "private", "levee road", or "public".
RD_DESIGN[2]	25	Text	Upper	Design characteristic of the road. Acceptable values are "dual carriageway", "single carriageway", "traffic circle", "connector segment", "grade-separated ramp", "at-grade ramp", "frontage road", or "highway facility"
RD_SURFTYP[3]	25	Text	Upper	Road surface type. Recommended values are 'paved' or 'unpaved'.
LOG_DIRECT[4]	25	Text	Upper	Indication of whether travel on a dual carriageway road is in the log or antilog direction. Acceptable values are "log" or "antilog".
AH_Dist	2	Text		The number of the Department District in which the road is contained (1 – 10).
AH_County	25	Text		The Department assigned number of the county in which the road is contained (1 – 75).

AH_Route	100	Text		The assigned official route number or name based on Department Road Inventory and official local road names.
AH_Section	3	Text		Department assigned section number of each highway and local road.
AH_BLM	6	Number		Department calculated begin log mile of each highway and local road segment.
AH_ELM	6	Number		Department calculated end log mile of each highway and local road segment.
AH_Length	6	Number		Department calculated length of each highway and local road segment.
AH_Seg_Num	5	Number		Calculated segment number based on road direction.
AH_Rev_ACF	Yes/No	Text	Proper	States if the road direction in the delivered file from AGISO was reversed to match the Department log direction (Yes or No).
AH_ID	150	Text		Concatenated county x route x section x log_direct x segment number. Unique ID required by FHWA

AH_RoadID	150	Text		Concatenated county x route x section x log_direct for Dynamic Segmentation.
AH_Signed	10	Text	Proper	Manner in which each road is signed for quick retrieval. Interstate = Interstate Highways US = U.S. Highways State = State Highways Local = All other local roadways

[1]'federal = maintained by specific federal agencies, e.g. U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, National Park Service, etc.
State = interstate highways, US highways, state highways, and any other road maintained by a state government entity
county = road officially accepted into a county road system and maintained as such by a county road department
municipal = road maintained by an incorporated municipality
private = any road or driveway not maintained by a public entity
levee road = road constructed atop a regulated levee under the jurisdiction of a local levee district
public = roads receiving some amount of county maintenance for public use, but not accepted as an official county road

[2]Each RD_DESIGN value is defined in the "Definition of Terms" section.

[3]A county may choose to maintain surface type attributes more detailed than "paved" or "unpaved". However, the RD_SURFTYP field will at a minimum carry the "paved" or "unpaved" attribute to meet the all public roads linear referencing system requirement.

[4]log = log direction, i.e. in the direction of increasing log mile values
antilog = antilog direction, i.e. in the direction of decreasing log mile values

*Note: The line in this instance is a linear geospatial theme that represents a centerline. Address ranges are typically established for individual centerline segments so address matching may be performed. Whenever practical, street names and address ranges shall conform to the actual situs addresses assigned.

Typographic Conventions:
The "#" symbol, hyphens or other punctuations shall not be used in any part of centerline attribute files created with the intent to be incorporated into the ACF program.

Directional Prefixes & Suffixes:
Centerline files intended for incorporation into the ACF program shall use directional prefixes and suffixes established by the United States Postal Service. (Refer to Appendix A.) The directional prefixes and suffixes shall be uppercase.

Metadata Identifier:
Centerline files intended for incorporation into the ACF program shall have a metadata identifier that associates (links) the contributed file to its proper metadata. Each segment shall have a metadata code assigned at the state level.

Street Name:
When primary street names are numbers, the numeral shall be used rather than the actual spelling. For example, "1" would be used rather than "First". Names that are made up of numbers shall also include additional characters such as "th", "rd", "st" or "nd", e.g. "1st", "2nd", "3rd", etc. These characters shall be included in the primary street name field.

Street names shall utilize capital and lower case letters. Common abbreviations are acceptable in the street name. These might include, but are not limited to Dr (Doctor) or Jr (Junior). This will insure the name fits the field length requirements.

In addition to the rules described above, naming conventions for the primary street names in the ACF should in all cases correspond to the actual situs addresses assigned by the local addressing authority. These should also be consistent with the naming conventions used in the situs address point data maintained by the local jurisdiction and with the local Master Street Address Guide (MSAG), if applicable.

Street Type:
Centerline files created with the intent to be incorporated into the ACF program shall use street abbreviations established by the United States Postal Service. The street type shall be composed of upper and lower case characters.

Unique Id:
Each line segment within the Arkansas Centerline File Program shall have a unique identifier. The unique identifier shall be assigned at the state level.

Additional Considerations

Updates/ Maintenance:
A specific entity shall be identified to insure that the ACF is updated and maintained in a timely manner. Following spatial or attribute updates and/or modifications performed to the ACF shall be submitted to the entity responsible for performing quality control practices.

Quality Control:
Rigorous quality control techniques shall be implemented to insure the ACF has an acceptable horizontal accuracy and attribute integrity is maintained.

a) The themes / attributes may be compared to existing spatial data layers /databases of higher quality.
b) Database management techniques shall be utilized to insure attribute consistency.
c) Spatial data themes shall be topologically correct.

Horizontal Accuracy:
The National Standard for Spatial Data Accuracy (NSSDA)- part 3 shall be used to perform horizontal accuracy assessments on the ACF in several geographically dispersed areas. Centerline files created utilizing heads-up digitizing and ~~GPS~~ GNSS techniques shall be tested, utilizing NSSDA- part 3 techniques in various locations.

Digital ortho-rectified photography may also be used to perform horizontal accuracy assessments in a more efficient and economical manner. This will enable the testing of larger portions of the spatial data theme.

Note: The horizontal accuracy of the digital ortho-rectified photography must be determined prior to utilizing it as a verification of the horizontal accuracy of the ACF.

Metadata:
Centerline files intended for incorporation into the ACF program shall have Federal Geographic Data Committee (FGDC) compliant metadata created for each spatial data file. Compliant metadata shall be provided with centerline files that are created, updated, or distributed by any parties participating in the ACF program. The metadata shall be supplied with the ACF anytime it is distributed and/or transferred among participants or other entities responsible for creating, performing quality control on, maintaining, updating, and/or distributing the ACF. The metadata shall be transferred in a FGDC standard format (i.e.- Z39.5, text or HTML file) and must have successfully passed through a FGDC compliant metadata parser.

ACF Program Participants:
Those participating in the ACF program shall follow the spatial, attribute, and metadata standards set forth in this document.

Centerline files created prior to the ACF program may be contributed to the program if FGDC compliant metadata is supplied. If the data is not in compliance with this standard, ACF program participants may standardize the centerline file and/or its attributes and incorporate the centerline file into the ACF program.

Distribution:
The ACF shall be distributed digitally via gis.arkansas.gov (Arkansas' Spatial Data Warehouse) at no cost to private or public users.

Definitions of Terms

Absolute Accuracy - A measure of the location of features on a map compared to their true position on the face of the earth.

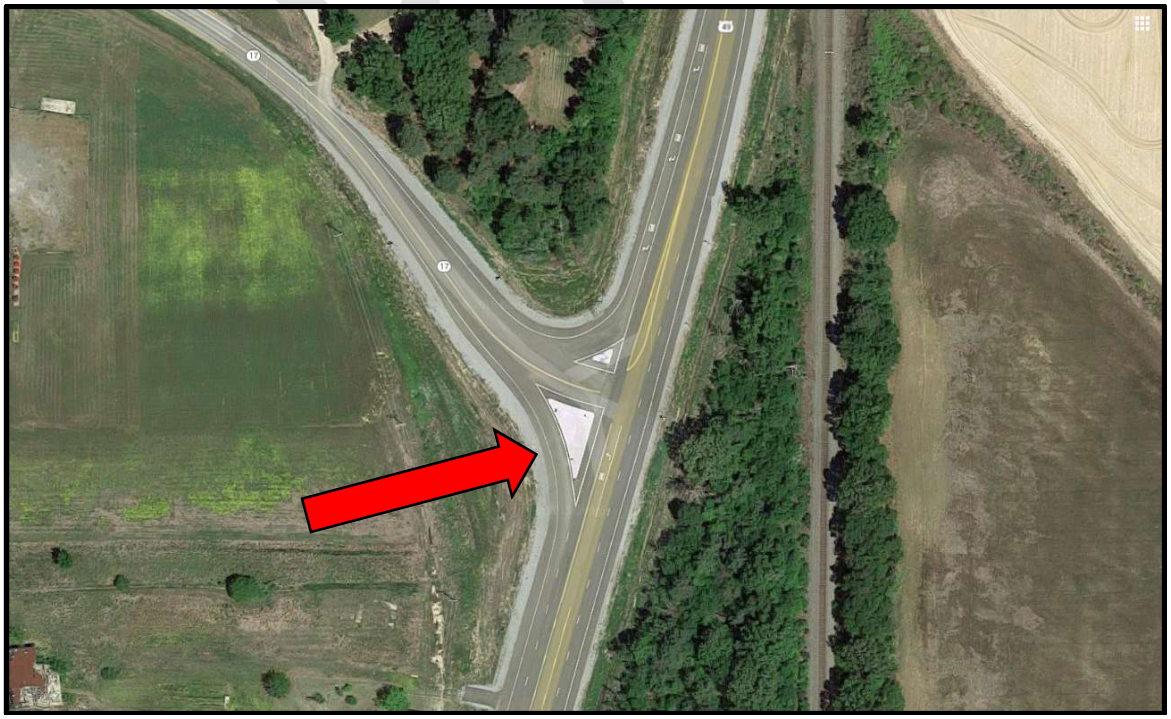
Address Actual or **Real** - The simple, everyday element that designates a specific, situs location, such as a house number or an office suite.

Address matching - See **Geocoding**.

Address Range - set(s) of numbers usually comprised of four (4) distinct values that represent a theoretical situs address at either end of a centerline segment. Two numbers of the range represent the lowest addresses, while the other two represent the highest. The numbers are further distinguished as being on either the left or the right side of the segment. In topological terms, the low numbers are associated with the FROM node of the segment, while the high numbers are associated with the TO node. Likewise, left and right are determined by the direction of the segment, as defined by the FROM and TO nodes.

At-Grade Access Ramp – Connects roadways, permitting traffic flow from one uncontrolled access route to another without crossing another traffic stream.

Example:



Attribute(s) - Properties and characteristics of spatial data entities.

Arc/Node Mode - Arcs and nodes are defined by the user as they are digitized.

Character - (Also known as text or alpha)

Centerline- (See road)

Connector segments – Minor road segments that permit traffic flow from one route to another without crossing any other traffic. These segments can be signed for official use only for government, law enforcement or emergency use only.

Example:

Dual carriageway routes – A physically divided roadway that necessitates two or more sets of line work to adequately represent the roadway geometry. According to the Federal Highway Administration (FHWA), divided facilities should be represented as dual carriageway if:

a. The median width is four feet or greater
b. The median type is a positive barrier (a positive barrier is defined as a physical structure that prohibits vehicular travel or a delineated area on the pavement that is not intended as a lane of travel).

Example:

Entity - Any object about which an organization chooses to collect data.

Frontage Road - Roadways that are often adjacent to interstate level highways and some single-carriageway highways.

Example:

Geocodable - An attribute database that is capable of being manipulated by GIS software to determine a theoretical address and its coordinates.

Geocoding - Mechanism for building a database relationship between addresses and geospatial features. When an address is matched to the geospatial features, geographic coordinates are assigned to the address.

Grade Separated Access Ramp – Connects roadways, permitting traffic flow from one mainline route to another without crossing any other traffic stream. These are typically found at controlled access interchanges, e.g. access ramps on an interstate highway. The grade separation implied by the name refers to the different levels at which the two mainline routes cross each other, i.e. at an overpass or underpass.

Example:

Highway Facility - Generally, these are public service facilities located along freeways and highways. Often similar in design, these may include weigh stations, welcome centers, overlooks, truck parking areas, and rest areas.

Example: *Rest Area*

Example: *Weight Station*

Example: *Welcome Center*

Increment Mode - Points are collected every *n* millimeters from the previous point.

NA- Not Applicable**.**

Point Mode - Single points are recorded one at a time.

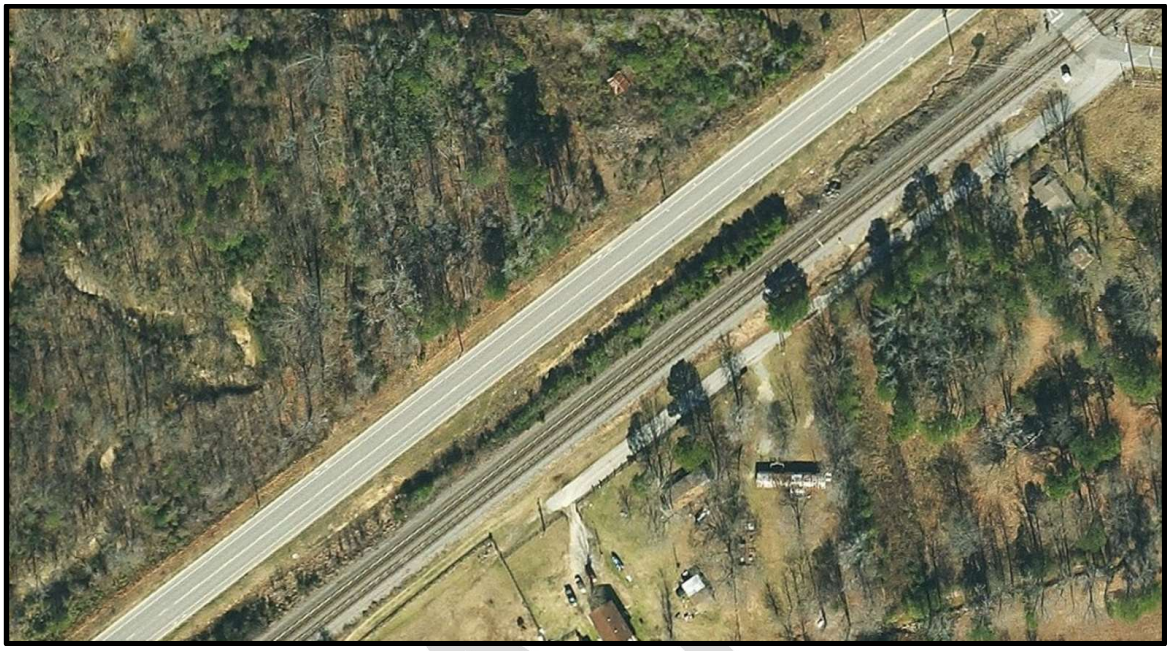
Range - Numbers associated with segments of a digital centerline file that represent the actual high and low addresses at either end of each segment.

Relative Accuracy - A measure of the accuracy of individual features on a map when compared to other features on the same map.

Road (centerline)- Centerline shall include all clearly defined passages through which a standard vehicle may travel as well as driveways extending more than 500 feet and/or driveways containing two or more addressed structures.

Single carriageway routes – A roadway with one, two or more lanes arranged within a single course with no central reservation or median to separate opposing flows of traffic.

Example:



Situs - The proper or original position of a specific location. An element that designates a fixed site, such as the address of a property or building.

Stream Mode - Points are collected on regular intervals or time or distance.

Spaghetti Mode - Points are collected every *n* milliseconds.

Theoretical - A location that can be interpolated along a centerline file through geocoding software.

Topology - Spatial relationships and connectivity among graphic GIS features, such as points, lines, and polygons. These relationships allow display and analysis of "intelligent" data in GIS. Many topological structures incorporate begin and end relationships, direction and right / left identification.

Traffic circles – The intersection of two or more roadways in an uncontrolled at-grade interchange, intended to keep traffic moving through the intersection.

Example:

Vanity - A special address that is inconsistent with or an exception to the standard addressing schema.

Appendix A Directional Prefixes & Suffixes- United States Postal Service Abbreviations

E = East
N = North
NE = Northeast
NW = Northwest
S = South
SE = Southeast
SW = Southwest
W = West

References

[1] *National Map Program*- The U.S. Geological Survey (USGS) is committed to realigning and reinvigorating its topographic mapping activities to put truly current information into the hands of our customers, in a cost-effective way. Our vision is that, by working with partners, we will ensure that the Nation has access to and use of current, accurate, and nationally consistent base geographic information, including digital data and derived topographic maps. Our vision is documented in a report, *The National Map* http://nationalmap.usgs.gov/

[2] *TIGER Modernization Program*- The U.S. Census Bureau (Census Bureau) intends to issue a solicitation for full and open competition for services in support of the MAF/TIGER Modernization Program. The selected contractor will be expected to provide services for the MAF/TIGER Modernization strategic program objective number 1- Improve Address/Street Location Accuracy; Implement Automated Change Detection. The scope of the solicitation is addressed in the accompanying draft "Statement of Objectives" (SOO). The approach in fulfilling the Census Bureau's requirement will involve an acquisition process that is best explained in terms of the order events. http://www.census.gov/geo/mod/SOODraft2.pdf

[3] ~~*Arkansas Standards for Collecting Mapping Grade Global Positioning System Positions*- Adopted by the Arkansas State Land Information Board August 29, 2001. http://www.gis.state.ar.us/LIB/AnneeGPS.asp~~

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