Kansas Geospatial Data Addressing Standard

Final Edition
October 29, 1999

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Kansas Geospatial Data Addressing Standard

1.0 Introduction

This document is a standard for addressing. For the sake of clarity, the term *address* refers to the simple, everyday element that designates a specific, situs location, such as a home or office. Addresses are very important. But, addresses are not always recorded and maintained in a standard manner. This document provides a set of guidelines by which addresses can be uniformly developed and, thereby, integrated with geospatial data structures. The guidelines should be incorporated into all efforts to establish address databases, for geocoding validation, and for the development of a master address list. The standard may be applied to both attribute databases and geospatial datasets.

1.1 Mission and Goal

The Kansas Geospatial Data Addressing Standard adopts the Kansas GIS Vision Statement as follows:

To shape the growth of GIS through open communication, education, and cooperation in order to:

- *Optimize data accuracy, reliability, and accessibility*
- *Meet the needs of the technical and non-technical user community*
- *Support the decision-making process*

In concert with the Cadastral Standard, the Addressing Standard echoes the following objectives:

- *Create an attitude of cooperation.*
- *Generate something that will build support at home.*
- *Identify common interests.*
- *Identify areas of need for standardization.*
- *Identify obstacles and barriers to data sharing.*
- *Avoid duplication in creating data.*
- *Establish standardized metadata.*
- *Ensure data security.*
- *Create flexible standards.*
- *Establish guidelines by which standards may be developed.*
- *Catalogue existing data.*
- *Build a larger community of technical and non-technical users.*
- *Develop a geographic data framework for Kansas that is compatible with the concept of the National Geospatial Data Framework.*

1.2 Relationship to Existing Standards

The Kansas Geospatial Data Addressing Standard integrates with existing standards as much as possible. Several resources were used to develop these standards, along with the working knowledge of the committee participants. Resources include the *U.S. Postal Addressing Standards, Publication 28*, the Planning Advisory Service *Street Naming and Property Numbering Systems*, *Report No. 332*, and the Environmental Systems Research Institute, Inc., *Address Geocoding*. Furthermore, the Addressing Standard has been written with consideration towards other standards being developed through the Geospatial Data Standards Development Process. Specifically, these include the *Cadastral Standard*, the *Jurisdictional and Administrative Boundary Standard*, and the *Transportation Standard*.

1.3 Description of the Standard

The Kansas Geospatial Data Addressing Standard promotes data consistency and provides a basis for developing a reliable master address file. The standard defines attributes, address components, and data characteristics for address databases. An address database may be a simple electronic file, routinely maintained by clerical staff, or it may be a more complex feature attribute table associated with points, polygons, or lines.

The Addressing Standard provides a simple approach to addresses, dealing with three primary issues:

1) Address attributes that can be associated with geospatial features.
2) Point and polygon geospatial features to which address attributes can be associated.
3) Linear geospatial features (i.e., street centerlines) to which address attributes can be associated.

The Standard does not limit or filter the information that can be included in a database. The rules and specifications for developing address information in the standard depend, in part, on the legal and administrative resources of each jurisdiction. In essence, there may be various sources from which jurisdictions can derive street names and addresses. Some examples include municipal codes, subdivision regulations, 911 requirements, and departmental regulations.

1.4 Applicability and Intended Uses of the Standard

The Kansas Geospatial Data Addressing Standard is intended to support the automation, integration, and sharing of publicly available addresses. It is intended to be usable by all levels of government, as well as the private sector. It standardizes the entities related to addresses, such as street directions and street types. The Addressing Standard deals with geospatial features such as points, polygons, and lines (i.e., street centerlines), and it is applicable to address databases that are often used for geocoding. The Standard also discusses common practices for assigning address numbers and street names.

In preparing this document, care was taken to devise standards that are:

- Simple, easy to understand, and as logical as possible.
- Uniformly applicable, whenever and wherever possible.
- Flexible and able to accommodate future expansions.
- Dynamic in terms of continuous review.

The standard is not intended to be a substitute for an implementation design. An implementation design requires adapting the structure and form of these definitions to meet specific application requirements.

1.5 Standard Development Procedures

1.5.1 Participants

Tim Hensley, Addressing Standard Committee Co-Chair
Cy Smith, Addressing Standard Committee Co-Chair
Jack Baines, Clay County
Stan Black, KS Division of Emergency Management
Johnson County Addressing Committee
  Doug Johnson, City of Overland Park, Chair
  Jay Heermann, Johnson County, Address Coordinator
Ray Ontiveros, Wichita-Sedgwick County Planning
Jim Parker, KS Department of Administration
Vicky Rice, Sedgwick County
John Rogers, Sedgwick County
Pam Schneider, Lyon County
Scott Smith, City of Lenexa
Lloyd Stullken, KS Division of Water Resources
Ivan Weichert, KS Department of Health and Environment
Lori Wilkerson, City of Wichita

1.5.2 Comment Opportunities and Reviews

The first meeting of the Addressing Standard Committee was held February 27, 1997, at the GIS Standard Forum in Wichita, Kansas. Approximately forty individuals attended the meeting, representing federal, state, local, academic and private sector interests. The meeting was primarily a brainstorming session during which a large number of issues were put forth for further consideration.

Four other meetings were held between the February, 1997, and the August, 1998, GIS Standards Forums. The committee met twice in Emporia, once in Olathe, and once more in Wichita. Progress was steadily made at each of the meetings.

It is important to note, however, much of the Addressing Standard was developed and written by the Johnson County Addressing Standard Committee under the direction of Doug Johnson, City of Overland Park, and Jay Heermann, Johnson County, Kansas. Without the concerted efforts of the committee, this standard would have taken much more time and effort to produce.

The first edition of the Addressing Standard was presented at the GIS Standards Forum of August, 1998.

1.6 Maintenance of the Standard

The Kansas Geospatial Addressing Working Group recognizes the need for a continuous maintenance process that may result in updates to meet user needs and to integrate with future standards.

1.7 Need for the Standard

Addresses are very important. They provide a common, systematic means by which people, places and events can be located within a community. Without a doubt, they are one of the cornerstones of modern society. Given the fact that virtually everyone understands the address, much of what we record about our world is tied to addresses.

With the wide spread use of computers traditional forms of information, like addresses, are often stored digitally and accessed through a relational database management system (RDBMS). Many organizations, particularly local government, maintain large databases for processing tax bills, recording crime events, and dispatching emergency services. Although, the address is often an important component within the database, the way in which people format and maintain addresses can differ. Even within the same jurisdiction, various departments will often use varying address formats. Furthermore, people often disagree on what a particular address should be; the home owner may use one address, the city or county another, and the Post Office yet another. This can pose problems in terms of sharing information and in terms of locating and extracting information that may be keyed to a situs address. Therefore, one of the principle needs for this standard is to make addresses more uniform and, thereby, facilitate the sharing of address information.

At its simplest level, an address is an attribute of an individual ownership parcel. A good example of this is the address associated with a person's home. The address provides a relatively unique identifier by which the home owner can receive mail and other deliveries. But, by storing the address in a RDBMS, it can also be associated with a parcel identification number, the home owner's name, the property's land use, etc. Furthermore, the RDBMS makes it possible to link the data with a geographic information system (GIS), providing a powerful combination of attributes and graphics.

It is important to note, however, the address attribute evolved long before the advent of computers. Consequently, the address can be a very poor candidate for inclusion into a RDBMS, as well as a GIS. As noted above, addresses are often recorded in an inconsistent manner. From a RDBMS perspective, this can disqualify the attribute as a reliable *key*. Furthermore, address databases can be difficult to maintain. By contrast, parcels and parcel IDs are relatively easy to maintain because deeds and plats are routinely filed with local governing bodies. In essence, source data for parcel maintenance is readily available. The same cannot be said for addresses.

Through a GIS, addresses can be directly associated with graphic features such as points or polygons, and lines. In the case of points or polygons, addresses can be associated with individual parcels as *situs addresses*. When linked to lines (i.e., street centerlines) addresses are stored as *address ranges*, making it possible to interpolate the location of an address along the length of a linear segment. It can be said that addresses linked to points and polygons are *explicit* addresses, while those matched to lines are *implicit*. Another way of describing this relationship is that point/polygon addresses are *real* addresses, while address ranges are only *theoretical* in nature.

The benefits of good addressing practices are clear, and most local jurisdictions do a good job of assigning addresses. But, there are many communities in which past indiscretions are now complicating current operations. Good software is available that allows us to find matches to address events (i.e., *address matching* or *geocoding*). But, several technical problems still plague addresses. For instance, what if there are multiple addresses associated with a single parcel ID? (In RDBMS terminology this is a *one-to-many* relationship, where there is one parcel ID to many situs addresses.) A good example of this is a commercial strip mall that is owned by one person, but contains an individual address for each store within the mall. The county appraiser would probably inventory such a parcel as a single entity and record one address for the entire tract. But, the local electric company would be interested in sending a utility bill to each and every store. Consequently, the appraiser's addresses might pose too many limitations to the electric company. An opportunity to share information would have been made less effective or lost entirely.

There are many complex issues related to addresses, and no standard could deal with every possible situation. Although the Addressing Standard provides a basis by which addresses can be formatted and used within a GIS, it is important to note that addresses are attributes, and this standard treats them as such. This standard does not deal with, for example, how street centerlines should be digitized; that is matter best left to a transportation standard. But, among other things, this standard provides guidelines by which address ranges and street names can be assigned to street centerlines.

There are significant advantages that could be realized if all addressing entities follow the same address formatting rules. A standardized format, for example, would reduce the opportunity for errors when addresses for an emergency service request are being reported and entered into a computerized dispatch system. It would also reduce confusion and misinterpretations when mail is sent or address information is communicated. Finally, a standard format for addresses would simplify the maintenance, exchange and interpretation of computerized address files in both the public and private sectors of the community.

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2.0 Technical and Operational Context

The technical and operational context of addresses may vary depending upon the source of the data. For example, the structure of a simple address table will differ significantly from that of a street centerline feature attribute table. But, that same address table may have much in common with the feature attribute table of a geospatial dataset of points.

When an address table is compared to a set of digital street centerlines, the former stores address incidences while the latter deals with address ranges. Although the incidences can be matched against the ranges, the structural requirements of the two files will be quite different.

When comparing an address table to a digital set of geospatial points (or polygons), the records in both files can be said to represent address incidences. Therefore, it is possible for a table of addresses to have a one-to-one relationship with a set of geospatial points/polygons. Given this similarity, the internal structures of the tables could be virtually identical. But, if the structures were identical, maintaining both tables would be a redundant effort. This Standard holds that raw addresses should be stored and maintained in a *master address file* or *address repository*, and a unique identifier be used to link address attributes to geospatial data. Thus, addresses would be derived for points/polygons by establishing a *relate* or *link* between a geospatial attribute table and the master address file. (See *Appendix C, Address Point Geospatial Dataset Model* for more information.) It is important to keep in mind that geospatial points/polygons are typically linked to other attributes, as well.

As noted earlier, addresses are attributes. Therefore, some of the technical and operational context that is prescribed by the *Kansas Geodata Compatibility Guidelines* is applicable to the points, polygons and lines to which addresses are linked, but are not necessarily applicable to the addresses themselves. This fact is noted under each topic, as appropriate.

2.1 Data Environment

Address data will typically be created, stored and maintained locally. Address metadata will be archived at Data Access and Support Center (DASC) and updated by the data custodian, as appropriate. The Federal Geographic Data Committee (FGDC) *Content Standards for Geospatial Metadata*, as endorsed by the State of Kansas, will apply. Address data will be accessible to potential users by electronic means or digital media through standard exchange formats.

2.2 Reference System

Applicable to the points, polygons and lines on which addresses are based.

2.3 Global Positioning Systems

Applicable to the points, polygons and lines on which addresses are based.

2.4 Integration of Themes

Addresses are attributes rather than a graphic features. Address data may be associated with geospatial datasets such as cadastral and street centerlines. Address data should utilize and be utilized by other themes within their respective development.

Nothing in this standard shall be intentionally devised in a manner that will conflict with other geospatial standards.

Address consistency must be pursued so as to make data (addresses) compatible with data captured in variant systems, such as KSCAMA, Emergency Management (911), Transportation, etc. Goals shall include:

- Coordinating addresses numbers between jurisdictions.
- Coordinating street names between jurisdictions.
- Road names on signs matching the local 911 database.

2.5 Encoding

Applicable to the points, polygons and lines on which addresses are based.

2.5.1 Points

Points may be used to represent parcel centroids. But, this may not be a complete representation of addresses because a single parcel may contain several addresses. This creates a *one-to-many* situation which poses some inherent problems. Therefore, it is highly recommended that each jurisdiction develop a geospatial dataset of situs address points (see *Appendix C*). Such a dataset would provide a single point for every address. The one-to-many problem is not totally eliminated because, potentially, multiple points may still correlate to a single parcel id. But, geocoding should be very reliable within a geospatial dataset of situs points. Vector based point topological structuring is required.

2.5.2 Polygons

Polygons will typically be parcel polygons. Vector based polygon topological structuring and connectivity are required. Note, it is NOT recommended that a geospatial dataset of situs polygons be developed, as such polygons may have no basis in reality.

2.5.3 Lines

Lines are used to represent street centerlines. Vector based linear topological connectivity and correct directionality are required.

2.6 Resolution

Addresses may exist at essentially three levels of resolution:

- Address fields in an associated attribute data file.
- Specific addresses assigned to points or polygons.
- Address ranges associated with street centerlines.

As the geometry of street centerlines is generalized, likewise the address ranges must be adjusted to match the new geometry.

2.7 Accuracy

2.7.1 Positional

Applicable to the points, polygons and lines on which addresses are based.

2.7.2 Content

Content has to do with the correctness of the overall address. There are three aspects of content correctness:

1) The address or address range must be correct for the location in question.
2) The address or address range must be correct sequentially in terms of its relationship with the overall addressing schema.
3) The individual components of the address or address range must be complete (filled in where appropriate) and contain the correct information.

2.7.3 Temporal

Temporal accuracy pertains to how current the address or address range is in relationship to the real world. There is often a time lag between when a plat is initially filed and when the subdivision is built. Addresses assigned early in the construction process may end up being incorrect later on. Thus, addresses are best assigned when construction actually takes place. It is important to note, however, that address ranges rarely change and may be assigned when a plat is filed.

2.8 Edge Matching

Applicable to the points, polygons and lines on which addresses are based.

2.8.1 Points/Polygons

Within the positional accuracy of the dataset, all polygonal and linear features will edgematch. Points and polygons must not be duplicated across tile boundaries.

2.8.2 Lines

Centerlines shall match across tile boundaries. Centerline breaks shall occur at natural breaks (i.e., intersections) at a tile edge.

2.9 Feature Identification Code

A unique identifier is required for all address databases, whether they are associated attributes or geospatial datasets. The unique identifier shall be used to link address attributes and indexes with geospatial features.

2.10 Attributes

Attributes are divided into three (3) principle categories:

1) Associated Attributes
2) Points/Polygons
3) Lines

2.10.1 Associated Attributes

Addresses are attributes (see *Section 3.1*). Address attributes are associated with points, polygons and lines.

2.10.2 Points/Polygons

Points and polygons are geospatial features to which address attributes can be associated. Ideally, point/polygon addresses are unique to each associated feature (i.e., there is a one-to-one relationship between each address and each feature). Addresses of this sort are often referred to as *address events* as they may represent anything from a person's home to an automobile accident.

Address events may be stored in either the feature attribute table of a geospatial dataset or in an attribute table that can be linked to a feature attribute table. A unique key that is common to both the associated attribute table and the feature attribute table is required for a link to be established.

Street name aliases may also be stored in an associated attribute table.

2.10.3 Lines

Lines are geospatial features to which address attributes can be associated. Addresses along linear features are often referred to as *address ranges*. Address ranges are typically stored within the feature attribute table of the geospatial dataset.

Address ranges are sets of numbers, usually comprised of four (4) distinct values, that represent theoretical situs addresses at either end of a street 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. Therefore, topology is an important factor when a set of addressed centerlines is being developed. Parity (i.e., odd vs. even) is usually determined by the addressing software.

Street name aliases may also be stored in an associated attribute table.

2.11 Transactional Updating

Transactional updating shall be a function of the data custodian. Changes to the data shall be distributed as appropriate. Time stamping shall be used whenever possible to ensure proper records management and adequate metadata.

2.12 Records Management

Whenever possible and appropriate, historical address files shall be archived in a medium appropriate to the original source files.

2.13 Metadata

Metadata shall be maintained for all address datasets. The metadata shall meet the FGDC *Content Standards for Geospatial Metadata*, as endorsed by the State of Kansas and shall be made available through accepted publishing methods.

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3.0 Data Characteristics

Data Characteristics are divided into three (3) principle categories:

1) Associated Attributes
2) Points/Polygons
3) Lines

3.1 Associated Attributes

3.1.1 General

Associated attributes pertain to the formatting and storing of address data within attribute tables that are external to and associated with feature attribute tables of geospatial datasets. For example, a city's master address database could be associated with and *address matched* against a city-wide geospatial dataset of points.

Each jurisdiction shall develop a master street name database that can be referenced when new street names are being created so that duplications are avoided. All street names shall be kept consistent with geospatial datasets.

Each jurisdiction shall develop a master address database that can be referenced when new street numbers are being assigned so that duplications are avoided. All address numbers shall be kept consistent with geospatial datasets.

3.1.2 Components

An associated address table shall be comprised of the following components:

- Unique identifier
- Address Number
- Directional Prefix
- Street Name
- Street Type
- Directional Suffix
- Unit Type
- Unit Number
- City Name
- State
- 5 Digit Zip Code
- +4 Zip Code

Example: 1235 W 19TH ST APT 24

At a minimum, the components shall be formatted as shown below:

Field Name	Length	Type	Description
UNIQ	20	Alpha or Numeric	A unique identifier within the associated address table that can be linked to other tables.
NUMBER	6	Alpha	Address Number
SUB_NUM	3	Alpha	Address Sub-number
PRE_DIR	2	Alpha	Directional Prefix
STR_NAM	30	Alpha	Street Name
STR_TYPE	4	Alpha	Street Type
SUF_DIR	2	Alpha	Directional Suffix
UNIT_TYPE	4	Alpha	Unit (i.e., APT, STE, BLDG)
UNIT_NUM	4	Alpha	Unit Number
CITY	17	Alpha	City name
ST	2	Alpha	State
ZIP5	5	Alpha	Zip Code
ZIP4	4	Alpha	+4 Zip Code

3.1.3 Address Numbers

Where possible, address numbers shall consist entirely of numbers. Where that is not possible, an alpha-character added to the address as a sub-number is preferable to a fraction. Characters other than letters and whole numbers shall be avoided in all parts of the address number. Hyphens shall also be avoided in the address number.

Example: 2456 A is preferable to 2456 1/2

3.1.4 Directional Prefixes & Suffixes

Standard directional prefix and suffix shall always be abbreviated and capitalized, and shall not include periods. Standard directional prefix and suffix abbreviations include the following:

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

3.1.5 Street Name

Numeric street names shall be written using numbers rather than spelled out. For example, "1ST" is to be used rather than "FIRST". In addition, numeric street names shall include the "TH", "RD", "ST" or "ND" characters as part of the street name. For example, 12TH shall be used rather than 12.

Street names will be thirty (30) characters or less. Cities, counties, and designated address assignment reviewers should be aware that this length, when coupled with prefix and type, may cause safety problems due to smaller letters on a sign, or an increase in costs when producing larger street signs. Names should be easy to read and pronounce so that the public, and children in particular, can handle the name in an emergency situation.

Alpha street names shall be capitalized. Elements of an alpha street name should not be abbreviated unless it is common practice to do so. For example, DR. MARTIN LUTHER KING JR. is acceptable and preferable to DOCTOR MARTIN LUTHER KING JUNIOR. Note: The latter example well exceeds the standard length of the street name field.

Highway abbreviations shall be input as shown below, using no spaces:

Example	Abbreviation
Interstate Highway 135	I-135
US Highway 50	US-50
State Highway 96	K-96

3.1.6 Street Type

Standard street type shall always be abbreviated and capitalized, and shall not include periods. Acceptable street type abbreviations can be found in *Appendix C* of the *Postal Addressing Standards, Pub. 28,* August, 1995.

Every street shall be assigned one, and only one, street type.

Below are a few of the more common street types:

Example	Abbreviation
Alley	ALY
Avenue	AVE
Boulevard	BLVD
Circle	CIR
Court	CT
Highway	HWY
Lane	LN
Parkway	PKWY
Place	PL
Plaza	PLZ
Road	RD
Street	ST
Terrace	TER

3.1.7 Unit Type

Standard unit types shall always be abbreviated and capitalized, and shall not include periods. Acceptable unit type abbreviations can be found in *Appendix G* of the *Postal Addressing Standards, Pub. 28,* August, 1995.

Below are a few of the more common unit types:

Example	Abbreviation
Apartment	APT
Basement	BSMT
Building	BLDG
Department	DEPT
Floor	FL
Lobby	LBBY
Office	OFC
Suite	STE
Unit	UNIT

3.2 Points/Polygons

3.2.1 General

Points and polygons are those features that typically represent single entities on the earth's surface, such as parcels or utility service connections. Addresses are usually assigned to such features on a one-to-one basis, but one-to-many relationships may exist. Note: Points and polygons have been lumped together for the purposes of this standard because address issues associated with these features are the same for both.

3.2.2 Component

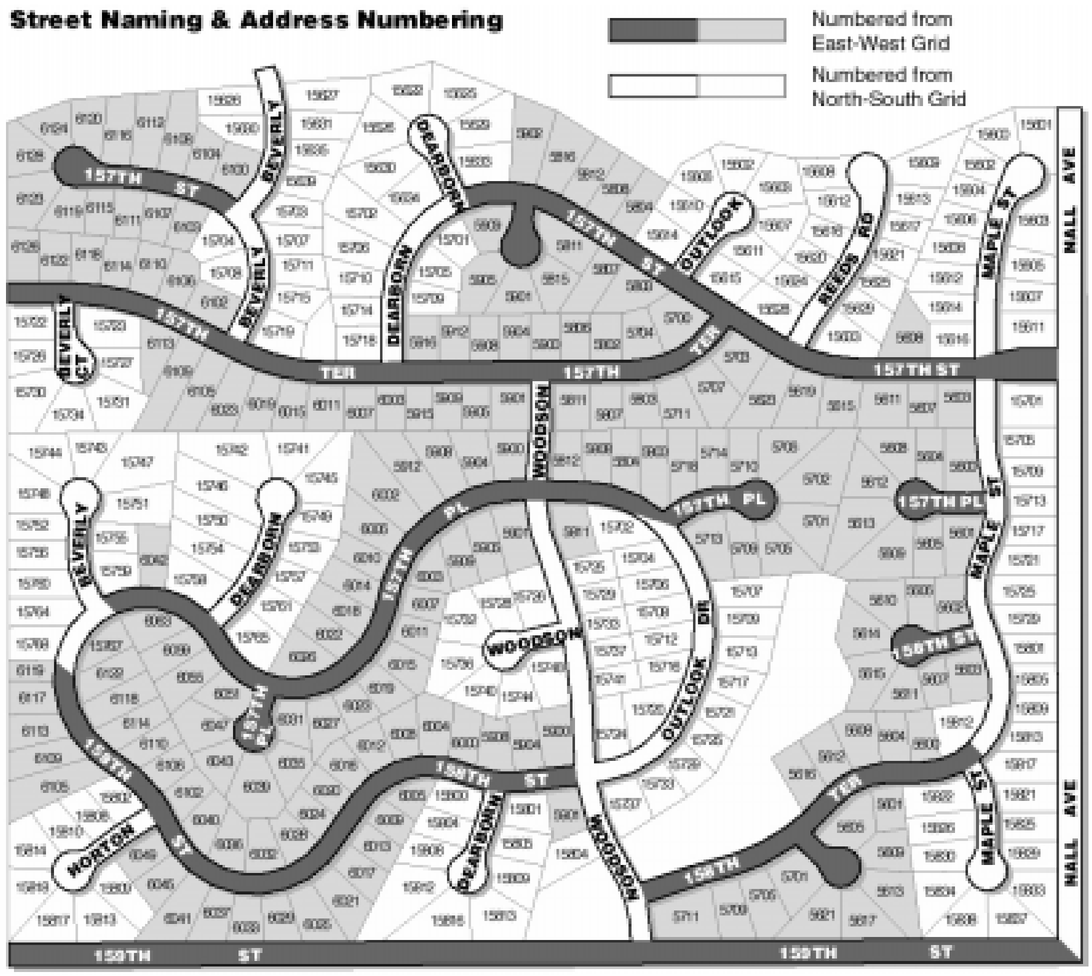
- Unique identifier

The only required component shall be formatted as shown below:

Field Name	Length	Type	Description
UNIQ	20	Alpha or Numeric	A unique identifier within the geospatial feature attribute table that can be linked to an associated address table.

3.2.3 Address Number Assignment

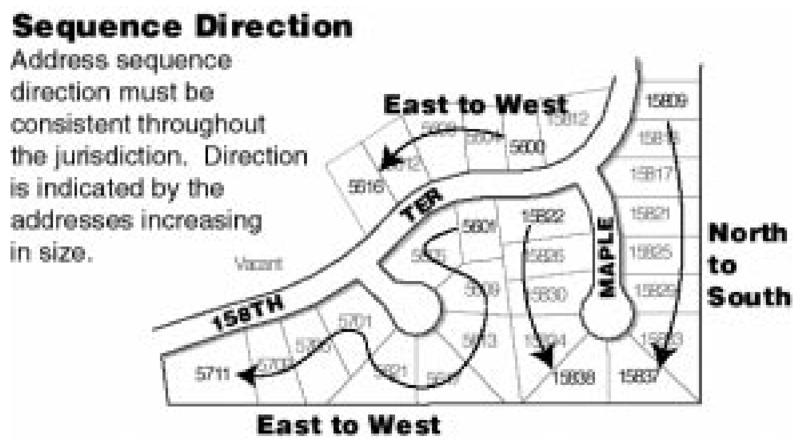
Each jurisdiction shall adopt a standard method of assigning address numbers. For instance, a jurisdiction may choose to have address numbers increase from north to south and from east to west. The jurisdiction may also choose to assign odd address numbers on the south and east sides of the street and even numbers on the north and west sides of the street. Whatever method is selected, it must remain consistent throughout the jurisdiction and should be coordinated with as many contiguous jurisdictions as possible.



Addresses shall be assigned to each habitable or substantial structure. Addresses should not be assigned to structures that are simply accessory to another building or insubstantial in nature. For example, a detached garage for a single-family residence does not need an address, but a commercial parking garage should have an address. Where a single building has multiple exterior entrances for separate tenant spaces or separate residential units, a separate address number shall be assigned to each such exterior door. Where a single building has multiple doors leading to a shared hallway or lobby, only one address shall be assigned. Each door may be distinguished by a suite or apartment number.

3.2.4 Sequence Direction

Address numbers shall increase as you travel in the direction adopted by the jurisdiction (for example, north to south and east to west).



3.2.5 Numeric Sequence

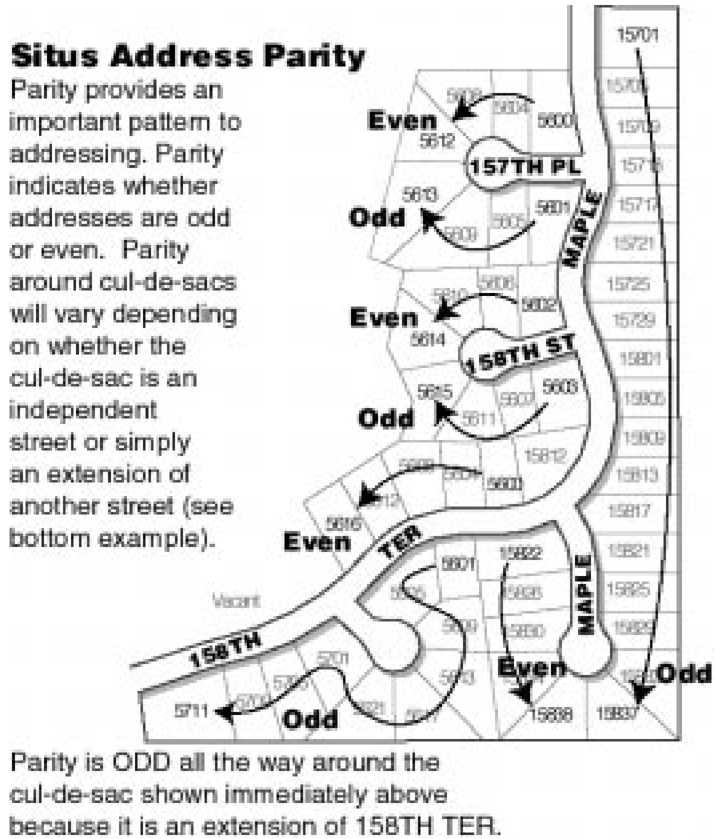
Addresses shall always be assigned so that they are in numeric sequence. Where two or more buildings addressed off of the same street are located in a "stacked" configuration (one building behind the other), addresses shall be kept in sequence within each building (rather than alternating between buildings) to the greatest degree possible. In addition, the stacked building closest to the street shall have a lower address number than a building farther away.

3.2.6 Odd/Even Numbering (Address Parity)

Parity shall remain consistent within the system adopted by the local jurisdiction.

Addresses on very short cul-de-sacs or "eyebrows" that are not given a separate street name shall be based on the numbering sequence and parity for the perpendicular street that provides access to the cul-de-sac.

Each jurisdiction will establish a threshold with regard to the number of lots in a cul-de-sac that will trigger the assignment of addresses specific to that cul-de-sac.



3.2.7 Consistency with Cross Streets

Since each street in the street name grid (see *Section 3.3*) will usually have a *hundred block* designation, addresses shall be assigned so that they are consistent with those designations. If OAK RD, for example, is the 1900 block, addresses on a numbered street that intersects with OAK RD should be less than 1900 east of OAK RD and greater than 1900 west of OAK RD.

3.2.8 Consistency with Distance-Based Address Grid

Address assignment shall be consistent with the standard street name grid for the jurisdiction. This means that hundred block designations will change at a regular distance interval determined by the quantity of named or numbered streets per mile.

3.2.9 Avoid Duplicate Address Numbers

Where two streets have the same street name but different street types (e.g., 98TH ST and 98TH TER), the same address number shall not be used on both streets.

3.2.10 Addressing Consistency

Addresses located across the street from each other shall be assigned so that they are nearly equal. Where there are more addresses on one side of the street, addresses assigned to the other side will be more widely spaced so that addressing consistency is maintained for addresses across from one another.

3.3 Lines

3.3.1 General

The *line* in this instance is a linear geospatial feature that represents a street 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 to points and polygons.

3.3.2 Components

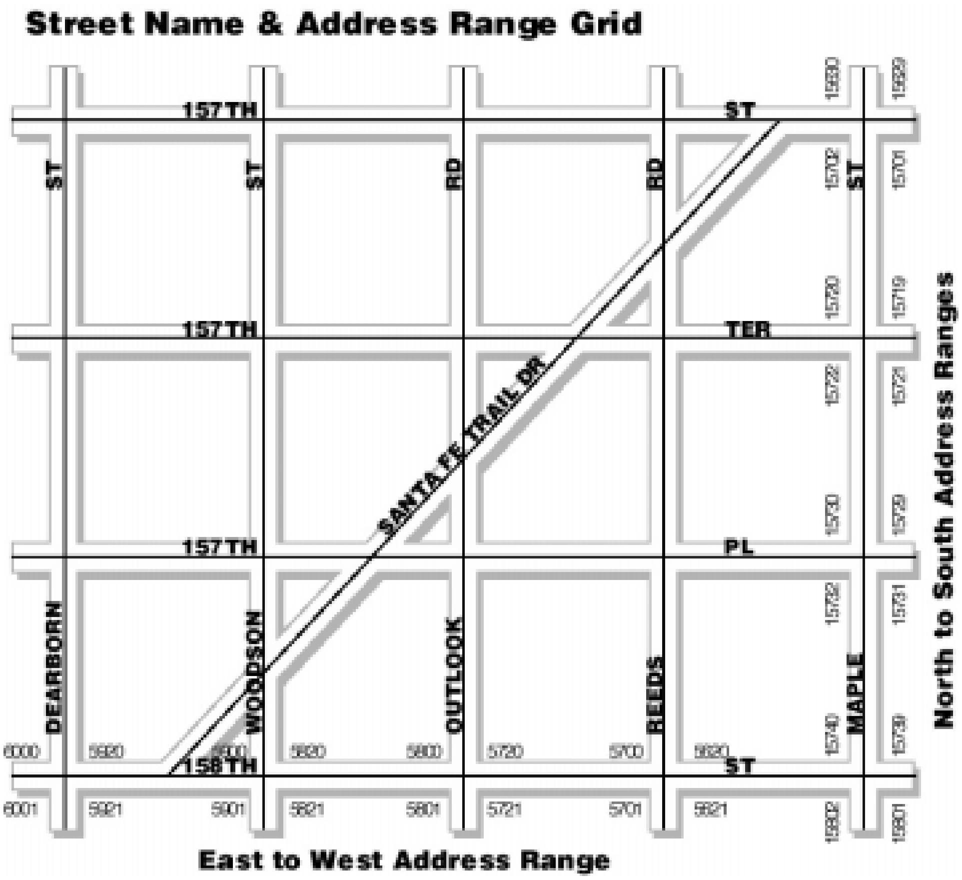
- Unique identifier
- Left From (Low) Address
- Left To (High) Address
- Right From (Low) Address
- Right To (High) Address
- Directional Prefix
- Street Name
- Street Type
- Directional Suffix

The components shall be formatted as shown below:

Field Name	Length	Type	Description
UNIQ	20	Alpha or Numeric	A unique identifier within the geospatial feature attribute table that can be linked to an associated address table.
L_ADD_FROM	5	Numeric	Left From (Low) Address
L_ADD_TO	5	Numeric	Left To (High) Address
R_ADD_FROM	5	Numeric	Right From (Low) Address
R_ADD_TO	5	Numeric	Right To (High) Address
PRE_DIR	2	Alpha	Directional Prefix
STR_NAME	30	Alpha	Street Name
STR_TYPE	4	Alpha	Street Type
SUF_DIR	2	Alpha	Directional Suffix

3.3.3 Street Name Composition - Within the Grid

A standard method of assigning numeric and character street names shall be developed and adopted for the whole jurisdiction. This is commonly referred to as a street name grid.



3.3.4 Street Name Composition - Beyond the Grid

Using a street name which is not in the street name grid is acceptable under the following conditions:

- All of the grid names have been used.
- When the street runs for a substantial distance on a diagonal and thus crosses several of the normal locations for grid streets.
- Where it is clear that a grid name would cause confusion.

When choosing a new street name that is not part of the accepted grid, names shall comply with the following standards:

- Avoid names that sound like existing street names even if they are spelled differently (e.g., "ROE" and "ROW").
- Avoid names that include directions (e.g., "SOUTHWIND", “W. WEST RIDGE”) or words commonly associated with street types (e.g., "MELROSE PLACE DRIVE").

- Avoid names that contain more than two words (except that hyphenated words should count as one word).

3.3.5 Vanity Addresses

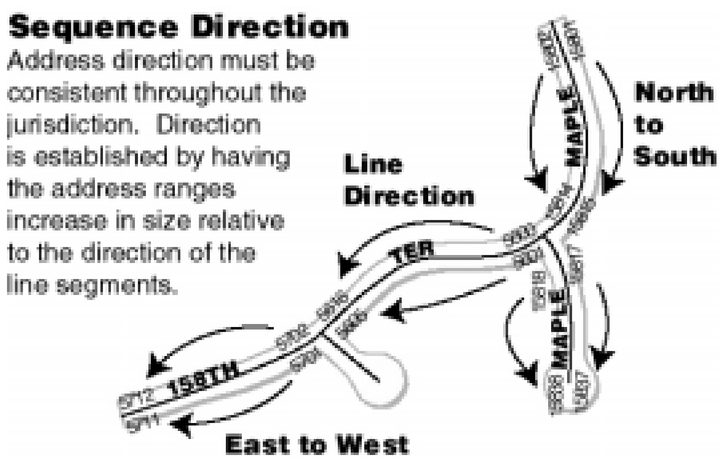
Vanity street names and numbers shall not be used as the primary street name or address range component.

3.3.6 Street Name Changes for Continuous Streets

The name of a continuous street shall change at the first intersection beyond which the primary direction of the street changes from north-south to east-west, or vice versa. Furthermore, the name of a continuous street shall change at an intersection where the alignment of the street with the street name grid makes another name more compliant with the grid.

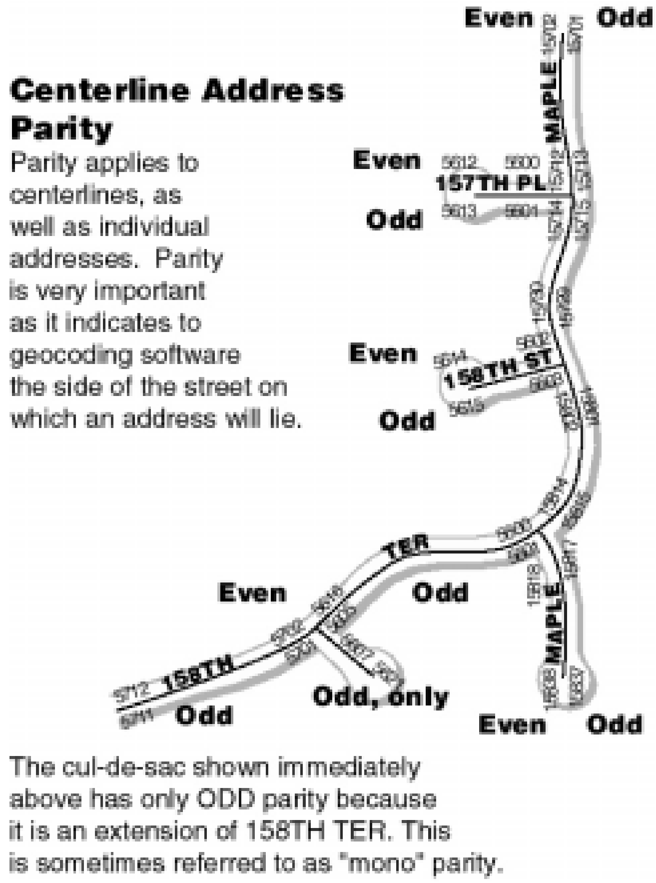
3.3.7 Sequence Direction

Address ranges shall increase as you travel in the direction adopted by the jurisdiction (for example, east to west and north to south). The direction of each line segment shall follow the sequence direction of the address ranges. Typically this is accomplished by controlling from-node and to-node topology. One-way streets are NOT an exception to this rule.



3.3.8 Odd/Even Numbering (Address Parity)

Parity shall remain consistent with the system adopted by the local jurisdiction.



3.3.9 Cul-De-Sac Street Names

Each jurisdiction will establish a threshold with regard to the number of lots in a cul-de-sac that will trigger the creation of a name that is unique to the cul-de-sac.

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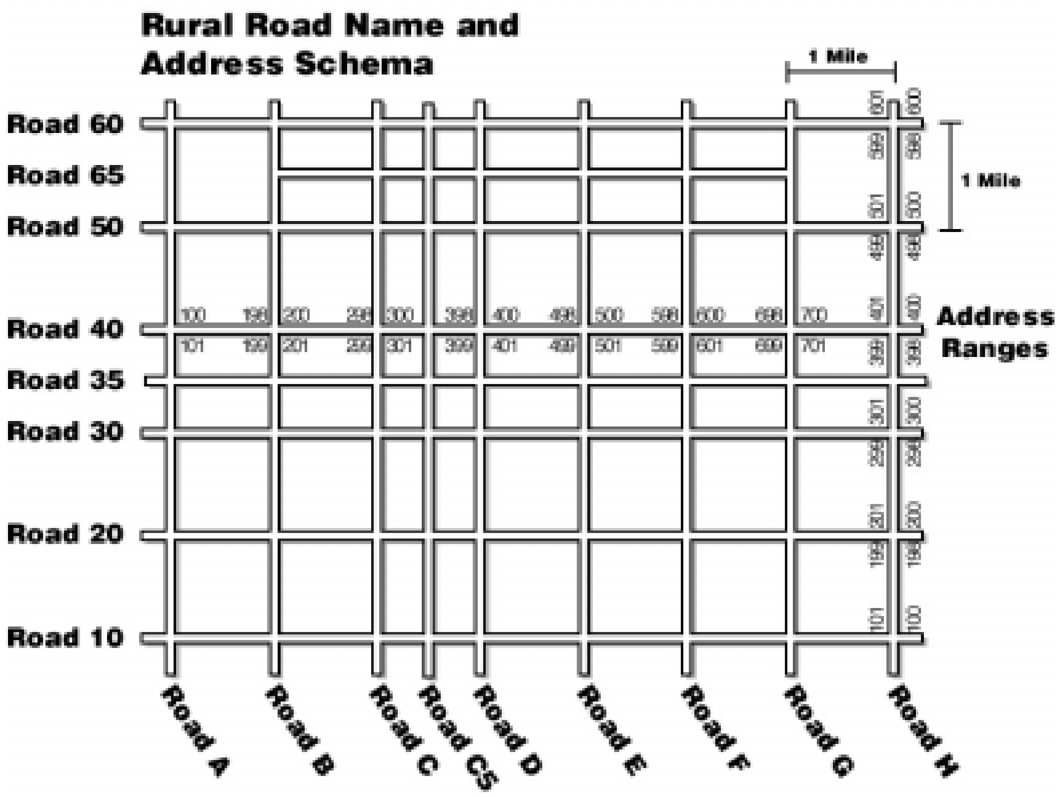
Appendix A
Rural Addressing Schema

This appendix describes an alphanumeric road system developed for use in the rural areas of several Kansas counties. The system establishes a grid, using letters of the alphabet as road names for north/south trending roads. The grid excludes the letters I, O, and Q because they could be mistaken for a number. The zero point for the grid is in the southwest corner of the county, as in Figure 1, below. The primary grid is coincident with the Public Land Survey System section lines.



The north/south roads with letter names follow the section lines, each approximately one mile apart. For north/south roads between the section lines, the road name is assigned based on how far east the road is from the nearest section line road. Road C5 would be 5 tenths of a mile east of Road C. Road F3 would be 3 tenths of a mile east of Road F.

The grid uses numbers as road names for the east/west trending roads, as indicated in Figure 1. The roads that are coincident with section lines are numbered in increments of ten, e.g., Road 10, Road 20, Road 30, etc. For east/west roads between the section lines, the road name is assigned based on how far north the road is from the nearest section line road. Road 35 would be 5 tenths of a mile north of Road 30. Road 57 would be 7 tenths of a mile north of Road 50.

In some counties, the section lines are not always one mile apart. In those cases, the primary grid would still be coincident with the section lines. The names for the roads between the section lines would be established by prorating the distance between the two section line roads. For instance, a road that was located 2 tenths of the distance between Road D and Road E would be named Road D2.

In some cases, a road may traverse a diagonal or circuitous path through all or part of a county. In many instances, these diagonal trending roads are state or federal highways, or perhaps roads that are named after an historical figure in the county. In those instances, the road would retain it's original or historical name. In cases where the diagonal trending road can be renamed to comply with the alphanumeric grid system, the name would be based on whether the road was trending more north/south or more east/west, and would be derived from the two roads at either end of the diagonal road. For example, a diagonal road that trends more in a north/south direction and traverses between Road C2 and Road C6 would be named Road C4. This road name would be determined by the location of the midpoint of the diagonal road segment. If the road trends more in an east/west direction and traverses between Road 30 and Road 38 would be named Road 34.

Individual situs addresses in the rural areas of the county would be similar to situs addresses in the municipalities within the county. In most municipalities in Kansas, the 600 block would be found between 6th Street and 7th Street, or between the two alpha-named streets six and seven blocks from the zero point of the street name grid. The 600 block in the rural areas would be found between Road 60 and Road 70, or between Road F and Road G. Address parity in the rural areas should reflect the standard address parity adopted by the municipalities within the county, so that odd and even addresses are consistent with regard to which side of the street they occupy throughout the county.

To make the initial situs address assignments for existing individual properties, a template would be developed that divides a one mile road segment in to 48 increments of 110 feet each. One side of the road segment template would be labeled with even numbers beginning with '02' and ending with '96'. The other side of the road segment template would be labeled with odd numbers from '01' to '95'. In sections that are longer or shorter than one mile, and for diagonal road segments that are longer or shorter than one mile, a special address assignment template would be created with 48 equal increments dividing the road segment.

Assignment of situs addresses is made by laying the template over an aerial photograph of each one mile segment of rural road and determining where on the template the driveway for the property is located. For example, if the driveway intersects Road D on the odd-numbered side of the road, within the template increment labeled '47', the last two digits of the situs address would be '47'. If the address assignment taking place on Road D is between Road 70 and Road 80, in the 700 block, the complete situs address would be '747 Road D'.

When more than one driveway occupies the same address number on the address assignment template, or when more than one dwelling uses the same driveway, the situs address should be extended to include a lot number for each property or dwelling, such as 747 Road D, Lot 1 and 747 Road D, Lot 3. The local standard for address parity would apply when determining whether a lot number should be odd or even, if more than one dwelling uses the same driveway.

When assigning addresses to new construction, following the initial address assignment for existing properties, the location of the new driveway should be located as accurately as possible on the aerial photo, in relationship to landmarks that can be identified on the photo.

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Appendix B
Standard Practices

Street Types

Each street name should have a street type that is used consistently, or have a street type that is based on a logical pattern of street types. The exception to this rule is where street type is needed to distinguish between two streets in the same area with the same name (e.g., MAPLE ST and MAPLE CT).

A common practice is to drop the street type where it is not needed for uniqueness (e.g., "9600 MAIN" rather than "9600 MAIN AVE”). However, this usage pattern should not be used as an excuse to not assign a street type to every street.

Where a street has two street types (e.g., 25TH ST PKWY), the first *type* should be considered part of the street name and the second should be the official street type (e.g., "25TH ST" is the street name and "PKWY" is the street type). Nevertheless, names that contain two types are contrary to the Addressing Standard.

Abbreviations

Directionals and street types shall always be abbreviated, but street names should never be abbreviated. The exception would be words that are normally abbreviated, such as JR. or DR. This will help to reduce confusion where street names could be mistaken for a directional or type. For example, 1235 W 125TH TER is preferred over 1235 WEST 125TH TERRACE.

Unless there are strong reasons for doing otherwise, it is recommended that standard Postal Service abbreviations be used.

Street Naming

Streets that run primarily east and west would use a numeric street name grid, while those that run primarily north and south would be based on names from a master street name grid, or vice versa. The primary objective of the standard in Section 3.3.3 is to establish a grid within each jurisdiction regardless of the detailed pattern of the individual grid.

The spacing of numeric street names should be based on a standard increment, such as a pattern of 8 numeric names per mile. A numeric street name should not be used outside of its proper location and sequence as established by the grid.

The spacing of character streets should be based on a similar pattern, such as 16 names per mile. A character street name that is part of the grid should not be used outside of its proper location and sequence as established by the grid.

Numeric street name example: W 43RD ST
Character street name example: N MAIN ST

Non-Grid Street Names

Street names that are not in the street name grid should always be unique to the overall jurisdiction (i.e., the County).

Vanity Street Names

Vanity street names and addresses (i.e., names or addresses that related to a particular business, developer or property owner) should never be used in place of the primary street address. They may, however, be used as a supplemental address in compliance with US Post Office standards.

Location of Street Name Break Points

Street name breaks should occur at an intersection whenever possible, and preferably at an intersection with a major cross street. Where it is not possible to make the break at an intersection, the break should occur at a point on the curve where the street orientation changes from primarily north-south to east-west, or vice-versa. Street name signs should be used at every street name break to clarify the change.

Cul-de-sac Street Names

Example: Cul-de-sacs that have 7 or more lots along their length or which are longer than 150 feet would be given a street name in the same manner as any other street. Short cul-de-sacs not meeting the above standard would be given the same name as the street they get access from (i.e., the street that generally runs perpendicular to the cul-de-sac). Provided, however, that where a cul-de-sac is an extension of a street with a street name separate from the perpendicular street, then that name should generally be used.

Address Number Assignment

Although assigning an address number to each structure on a particular street seems relatively straightforward at first glance, it actually poses some of the most difficult addressing problems. For example, the curvilinear streets and cul-de-sacs found in newer subdivisions create situations which are far harder to address than the traditional rectangular grid pattern of streets. Strip shopping centers and office parks often contain multiple buildings that are not in a clearly ordered sequence and often have the potential for many addresses being assigned in the same address range. As a result, it is likely that meeting all of the standards suggested in Section 3.2 will happen in most but not all situations. In a few cases, address number assignment will involve compromises between standards.

Odd/Even Numbering (Address Parity)

Since curvilinear streets may change direction for short distances or run at a diagonal, the standard for address parity should be applied given the primary direction of the street.

Assigning addresses based on the addressing sequence for the street that provides access to the short cul-de-sac will keep address numbers consistent with respect to the perpendicular street that is being used as the basis for addressing, although with respect to the cul-de-sac it may appear that there are odd or even numbers on both sides.

For larger cul-de-sacs that have their own name, addresses would be assigned with respect to the cul-de-sac, as opposed to assigning addresses with respect to the perpendicular street that provides access to the cul-de-sac.

Sequence Direction

This standard must be interpreted based on the primary direction of the street. Curvilinear streets may violate this standard for short stretches provided that they are in compliance with respect to the general direction of the full street segment. Where compliance with this standard is difficult or impossible, it may warrant considering a change in the street name at the point where it changes direction.

Consistency with Distance-Based Address Grid

Example: A jurisdiction has 16 named streets per mile and 8 numbered street names per mile. Consequently, hundred block designations should normally change every 330 feet on an east-west street and every 660 feet on a north-south street. Therefore, addresses can be assigned based on the distance south or west from the nearest section line. This standard is particularly useful in areas that are largely undeveloped (and thus don't have many cross streets) or in areas that have existing streets that are not in the standard street name grid. This standard should generally be considered to be less important, however, than staying consistent with the address designations of cross streets.

Avoid Duplicate Address Numbers

Example: Addresses for a block on 12TH ST are assigned as 2700, 2704, 2708, etc. Consequently, addresses on the corresponding block of 12TH TER should be assigned as 2702, 2706, 2710, etc. This may help minimize potential service delivery mistakes if there is some confusion over the street type.

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Appendix C
Address Point Geospatial Dataset Model

Introduction

This portion of the *Addressing Standard* discusses a model for developing a dataset of situs addresses that can be accessed as or through geospatial points. Such a dataset could be used for a variety of purposes, ranging from geocoding to assigning addresses in a reliable manner. The model has the potential to serve as both an address repository and a master street name list, providing an invaluable resource to a broad community of users.

An address point geospatial dataset could be designed in a number of ways, but this document provides one model that can be altered in a few subtle ways, as noted below:

1) The model does not absolutely require that the data be stored as a geospatial dataset. Rather, the data can be stored as simply a table within a relational database management system (RDBMS). But, for the data to be geospatial in nature, it is necessary to store X and Y coordinate values for each situs address so that points can be generated on an ad hoc basis. Z coordinates (i.e., elevation) could be stored, as well.
2) Parcel ID can be stored as a component of the dataset. However, because multiple addresses can exist for a single parcel, the parcel ID data must be stored in a table that is separate from the situs addresses. A unique key is used to link the addresses with the parcel data.
3) A separate table can be used to store street names. This has the benefical effects of providing a master street name list and reducing the potential for errors during data entry.

The Model

The model is comprised of one primary table and various other associated tables. The database design is based on the table that is defined in Section 3.1 of the *Kansas Geospatial Data Addressing Standard*. It is shown below:

Field Name	Length	Type	Description
UNIQ	20	Alpha or Numeric	A unique identifier within the associated address table that can be linked to other tables.
NUMBER	6	Alpha	Address Number
SUB_NUM	3	Alpha	Address Sub-number
PRE_DIR	2	Alpha	Directional Prefix
STR_NAM	30	Alpha	Street Name
STR_TYPE	4	Alpha	Street Type
SUF_DIR	2	Alpha	Directional Suffix
UNIT_TYPE	4	Alpha	Unit (i.e., APT, STE, BLDG)
UNIT_NUM	4	Alpha	Unit Number
CITY	17	Alpha	City name
ST	2	Alpha	State
ZIP5	5	Alpha	Zip Code
ZIP4	4	Alpha	+4 Zip Code

Two other fields for X and Y coordinates are needed to generate geospatial points from the data. The alternative to storing X and Y is to maintain the data with geospatial software. Thus, the geospatial software will maintain the XY coordinates as part of its normal functioning.

The diagrams that follow illustrate, in the simplest possible terms, how a master address file can be designed. To best understand the model, the material should be reviewed in sequence. Note: The diagrams depict examples in which polygons have been used rather than points. Since addressing issues related to points are also applicable to polygons, polygons have been used because they more clearly represent reality.

Diagram C-1 shows how things might be in a perfect world. Within the table there is a one-to-one correspondence between parcel identification numbers (PIN) and addresses. But, situations this "ideal" rarely occur in reality.

Diagram C-1

"Ideal" One-to-One Master Address File

PIN	NUMBER	PRE_DIR	STR_NAM	STR_TYPE
001	499	W	PARK	AVE
002	497	W	PARK	AVE
003	495	W	PARK	AVE
004	491	W	PARK	AVE
005	492	W	PARK	AVE
006	498	W	PARK	AVE
012	502	W	PARK	AVE
024	222	N	5TH	ST
025	226	N	5TH	ST
026	228	N	5TH	ST

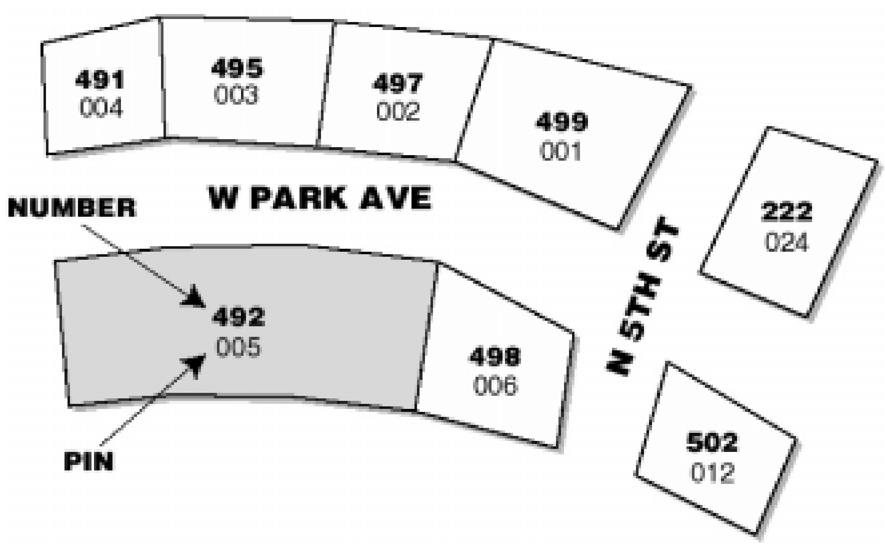


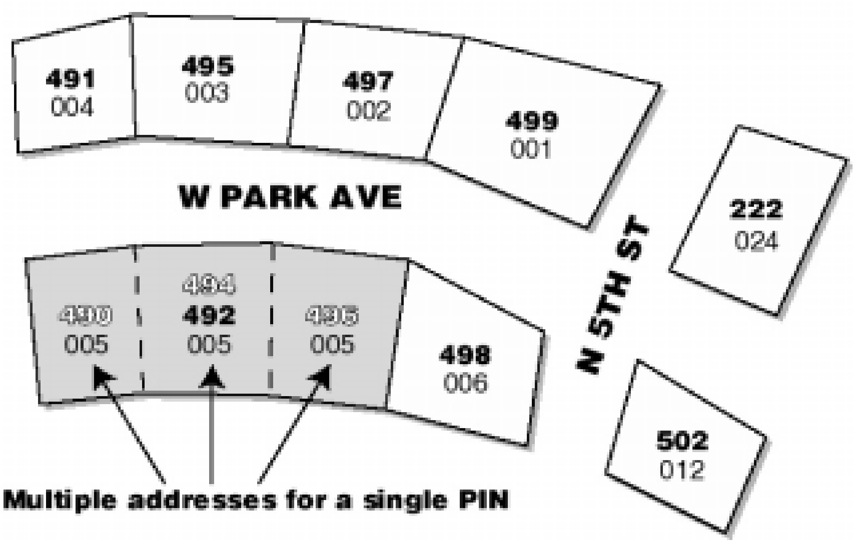
Diagram C-2 illustrates the one-to-many relationships between PINs and addresses that are more common. As a result, the Master Address File contains redundant data and the file is said to be *non-normalized*.

Diagram C-2

Non-Normalized Master Address File

PIN	NUMBER	PRE_DIR	STR_NAM	STR_TYPE
001	499	W	PARK	AVE
002	497	W	PARK	AVE
003	495	W	PARK	AVE
004	491	W	PARK	AVE
005	490	W	PARK	AVE
005	492	W	PARK	AVE
005	494	W	PARK	AVE
005	496	W	PARK	AVE
006	498	W	PARK	AVE
012	502	W	PARK	AVE
024	222	N	5TH	ST
025	226	N	5TH	ST
026	228	N	5TH	ST

Parcel 005 can be associated with as many as four addresses.



In Diagram C-3 the design is slightly better in that the Master Address File is normalized on the field UNIQ. Furthermore, a separate table (Parcel ID No. File) has been created to correlate UNIQ with parcel identification numbers (PIN). However, parcel 005 is still carried redundantly in the Parcel ID No. File.

Diagram C-3

Parcel ID No. File

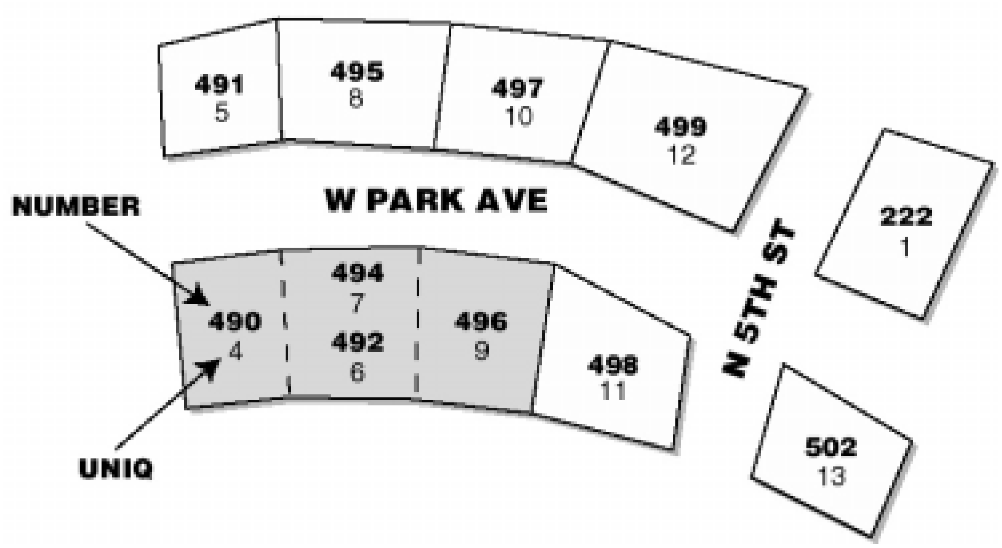
UNIQ	PIN
1	024
2	025
3	026
4	005
5	004
6	005
7	005
8	003
9	005
10	002
11	006
12	001
13	012

UNIQ provides a one-to-one link between the tables.

But, PINs are still redundant.

Master Address File Normalized on UNIQ

UNIQ	NUMBER	PRE_DIR	STR_NAM	STR_TYPE
1	222	N	5TH	ST
2	226	N	5TH	ST
3	228	N	5TH	ST
4	490	W	PARK	AVE
5	491	W	PARK	AVE
6	492	W	PARK	AVE
7	494	W	PARK	AVE
8	495	W	PARK	AVE
9	496	W	PARK	AVE
10	497	W	PARK	AVE
11	498	W	PARK	AVE
12	499	W	PARK	AVE
13	502	W	PARK	AVE



In Diagram C-4 a new field, ORIG, has been added to the Master Address File. ORIG, which stands for *origin*, indicates if there is a parent/child relationship between records. When UNIQ is equal to ORIG in the Master Address File, the record is the regarded as the *parent* address of the parcel. When different, ORIG points back to the parent of the parcel and is, therefore, a *child* address. Thus, record 6/6 has a parent/child relationship with records 4/6, 7/6 and 9/6.

Diagram C-4

Parcel ID No. File

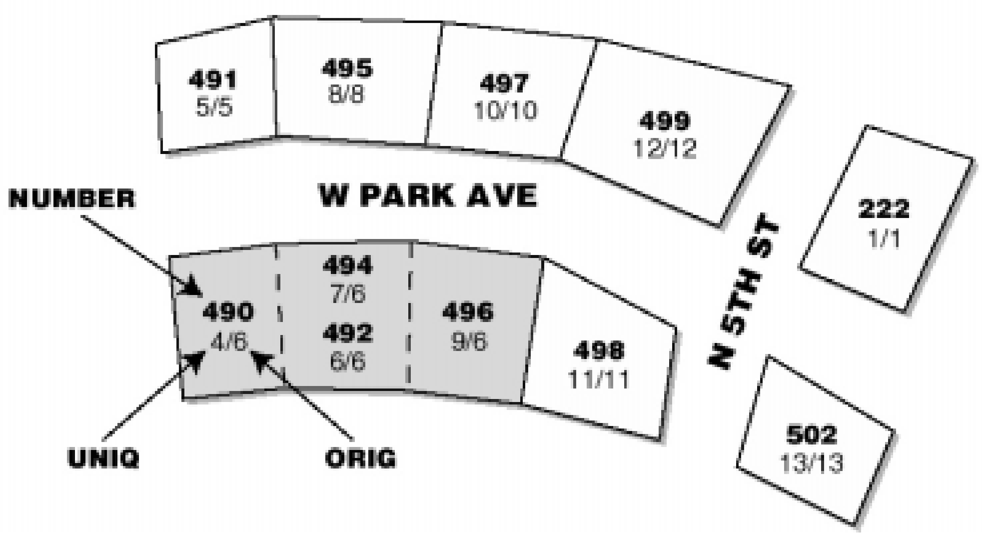
UNIQ	PIN
1	024
2	025
3	026
5	004
6	005
8	003
10	002
11	006
12	001
13	012

UNIQ provides a one-to-one link between the tables.

ORIG provides a parent/child relationship between records (as indicated by the smaller arrows).

Master Address File Normalized on UNIQ and ORIG

UNIQ	ORIG	NUMBER	PRE_DIR	STR_NAM	STR_TYPE
1	1	222	N	5TH	ST
2	2	226	N	5TH	ST
3	3	228	N	5TH	ST
4	6	490	W	PARK	AVE
5	5	491	W	PARK	AVE
6	6	492	W	PARK	AVE
7	6	494	W	PARK	AVE
8	8	495	W	PARK	AVE
9	6	496	W	PARK	AVE
10	10	497	W	PARK	AVE
11	11	498	W	PARK	AVE
12	12	499	W	PARK	AVE
13	13	502	W	PARK	AVE



Notice too, some of the UNIQ numbers are not even stored in the Parcel ID No. File. This is because ORIG provides a link between records within the Master Address File (as indicated by the smaller arrows). The Parcel ID No. File and the Master Address Files are now *normalized*.

Diagram C-5 takes the structure from C-4 a step further by linking the master address file to another attribute table. In this example, CAMA is the associated table, but it could be any table in which PIN serves as a key. Through this structure situs addresses can be maintained as a centralized database, allowing for input from a variety of sources, such as building codes and 911.

Diagram C-5

Parcel ID No. File

UNIQ	PIN
1	024
2	025
3	026
5	004
6	005
8	003
10	002
11	006
12	001
13	012

Master Address File

UNIQ	ORIG	NUMBER	PRE_DIR	STR_NAM	STR_TYPE
1	1	222	N	5TH	ST
2	2	226	N	5TH	ST
3	3	228	N	5TH	ST
4	6	490	W	PARK	AVE
5	5	491	W	PARK	AVE
6	6	492	W	PARK	AVE
7	6	494	W	PARK	AVE
8	8	495	W	PARK	AVE
9	6	496	W	PARK	AVE
10	10	497	W	PARK	AVE
11	11	498	W	PARK	AVE
12	12	499	W	PARK	AVE
13	13	502	W	PARK	AVE

UNIQ and PIN can work together to create links between tables.

CAMA Data

PIN	OWNER	VALUE	LAND_USE
001	JOHN	$15000	670
002	MARY	$27000	671
003	LYDIA	$42000	670
004	TYRONE	$90000	111
005	SAM	$150900	111
006	BARBARA	$10000	100
007	TOM	$120000	112
008	FRANK	$35000	800
009	SUSAN	$12000	850
010	CITY	$0	458

Diagram C-6 illustrates that other master tables can be created. In the example, street names (STR_NAM) have been placed in a separate table and referenced through, again, a unique identifier (NAM_CODE). This has the advantage of minimizing data entry errors because all street names come from a single source. However, there is some cost to this structure in that more effort may be required to provide user friendly access to the overall database. It is important to note that other fields within the master address file could be managed in the same manner. For instance, street type (STR_TYPE) is a good candidate for this structure

Diagram C-6

Master Street Name File

NAM_CODE	STR_NAM
1	1ST
2	2ND
3	3RD
4	4TH
5	5TH
6	ELM
7	MAIN
8	PARK
9	QUINCY

NAM_CODE is the link between tables.

Master Address File

UNIQ	ORIG	NUMBER	PRE_DIR	**NAM_CODE**	STR_TYPE
1	1	222	N	5	ST
2	2	226	N	5	ST
3	3	228	N	5	ST
4	6	490	W	8	AVE
5	5	491	W	8	AVE
6	6	492	W	8	AVE
7	6	494	W	8	AVE
8	8	495	W	8	AVE
9	6	496	W	8	AVE
10	10	497	W	8	AVE
11	11	498	W	8	AVE
12	12	499	W	8	AVE
13	13	502	W	8	AVE

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Appendix D
Definitions of Terms

Term	Definition
Accuracy	**Absolute** - A measure of the location of features on a map compared to their true position on the face of the earth. **Relative** - A measure of the accuracy of individual features on a map when compared to other features on the same map.
Address	**Actual** or **Real** - The simple, everyday element that designates a specific, situs location, such as a house number or an office suite. **Range** - Numbers associated with segments of a digital street centerline file that represent the actual high and low addresses at either end of each segment. **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. **Theoretical** - A location that can be interpolated along a street centerline file through geocoding software. **Vanity** - A special address that is inconsistent with or an exception to the standard addressing schema.
Address matching	See **Geocoding**.
Attribute	Attributes are the properties and characteristics of entities.
CAMA	Computer Assisted Mass Appraisal refers to a software system used to appraise large quantities of properties through modelling schemas.
Custodian	Agency responsible for developing the data.
Entity	A data entity is any object about which an organization chooses to collect data.
Geocoding	A 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.

Geospatial feature	A point, line or polygon stored within geospatial software.
Geospatial software	Mapping software with analytical capabilities.
Legal description of boundaries	Lot, block, subdivision, city, county, state.
Line	A linear feature built of straight line segments made up of two or more coordinates.
Normalize	The decomposition of data structures into new data structures that exhibit simpler properties.
Parcel	In land ownership mapping a parcel is a tract of land under one ownership. It may be a combination of two or more tracts acquired by separate deeds.
Parity	A characteristic of a set of addresses or address ranges in which the numbers are either odd or even.
Point	A geospatial feature that is stored as a single XY coordinate.
Polygon	A plane surface that is circumscribed by three or more intersecting lines.
RDBMS	Relational database management system.
Unique identification number	Every element is assigned an identification number within the computer software that is unique to it.

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