

**Street Addressing
Standards and Guidelines
for the State of Georgia**

**Prepared by
Georgia Spatial Data Infrastructure
GIS Coordinating Committee
Framework Transportation Technical Working Group
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FOREWORD

This guideline was produced by The University of Georgia's Office of Information Technology Outreach Services (ITOS) under contract with Georgia's GIS Coordinating Committee as part of a collaborative effort to develop the State of Georgia's core Geographic Information System (GIS) base map.

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1 INTRODUCTION

Because the property address is a fundamental component of any government service delivery system, it must be assigned through a logical and consistent procedure. The importance of proper addressing cannot be overstated; during an emergency it can mean, quite literally, the difference between life and death. Additionally, addressing helps define educational and political districts, and affects the quality of services available to citizens. A logical and consistent addressing system, therefore, can tangibly improve the quality of life in a community.

Unfortunately, the importance of the addressing task is frequently overlooked, resulting in addressing schemes that are often unorganized or incomprehensible and that lead to inefficient and ineffective governmental and commercial service delivery. But easily understood addressing systems are not simple to design and maintain. Local governments have found that managing a coherent addressing system can be difficult even under the best circumstances. During periods of steep growth, existing flaws in addressing systems -- duplicate street names, unnecessary name changes, non-sequential numbering, etc. -- can cause small inconsistencies to propagate through the system, creating even larger problems. Currently, many Georgia counties do not use municipal style addresses (*e.g.*, **101 E Main St SE**), but conversion from the old system of rural routes and boxes is inevitable as more counties implement 911 systems. The standards and guidelines in this document are designed to make the process a little easier and to help make addressing across the State of Georgia more consistent.

Citizens usually bear the cost of poorly designed addressing systems through inefficient government services and through lost business when potential customers are unable to locate an establishment. Poorly designed addressing systems result in postage increases, delivery delays, lost parcels, and even loss of property and life. Yet ironically, those most likely to oppose the revamping of older addressing systems (which may contain errors likely to interfere covertly with services) are the local citizens and businesses themselves, who may be required to revise subscriptions and billing, or to reprint labels, stationery, and the like. As a result, public officials who are aware of the dangers posed by addressing-system problems may discover that their constituencies do not support change. Education and public involvement are essential elements

in developing a comprehensive solution. Citizens must know why it is necessary to readdress, and they must be provided an opportunity to participate in the process.

Today there are various tools to help implement a new addressing system or revamp an existing one. Although Geographic Information System (GIS) tools will not make the political process any easier, they certainly make technical implementation much simpler, faster, and more consistent. This document was written with GIS implementation in mind; most, if not all, of the applications described in this document will be applicable to the non-digital world, but the standards herein were developed primarily for electronic implementation.

2 PURPOSE

In the development of this document, political concerns were necessarily attenuated, while safety and efficiency concerns remained paramount. The purpose of this document, *Street Address Standards and Guidelines for the State of Georgia*, is to assist county and municipal governments with implementing and maintaining a consistent, safe, useful, and standardized addressing system.

3 GOALS

The primary goal of this report is to provide local government agencies with a complete set of addressing guidelines, so that addressing may become more consistent statewide and efficiency of government services such as emergency response may be improved.

Secondary goals include:

- To improve the quality of life for residents of Georgia through improved delivery of mail and services;
- To project a positive and progressive image to residents, prospective residents, and developers;
- To make address location simpler for residents and businesses;

- To emphasize the importance of a consistent, county-wide addressing system;
- To promote the use of GIS for creation and maintenance of a roads database with address ranges (RDAR).

4.0 TERMINOLOGY

In order to understand the following recommended standards, one must first understand the difference between a **physical address** and a **mailing address**, as well as the difference between an **address database** and a **roads database with address ranges (RDAR)**.

4.1 Physical Address & Mailing Address

A **physical address** describes where a dwelling, business, or lot is physically located, not necessarily where mail is received. For instance, a person may reside at *123 N America St NE*, but receive mail at *PO Box 128*. The PO box is a **mailing address**, while *123 N America St NE* is a **physical address**.

4.2 Parsing

During data entry, both physical and mailing addresses should be broken down into as many components as possible, a process known as *parsing*. See examples of parsed and unparsed physical address formats below. (Note: For mailing addresses, an additional column should be included for PO boxes).

Unparsed Address Database

NAME	ADDRESS
Doe, Jane C., Dr.	123 N America St NW
Smith, Joe B. Jr.	125 Oak St SE
Jones, Terry	357 Magnum Rd NE

Parsed Address Database

LAST-NAME	MI	FIRST-NAME	TITLE	NAME-SUF	HOUSE-NUM	PRE-DIR	ST-NAME	ST-TYPE	QUAD
Doe	C	Jane	Dr		123	N	America	St	NW
Smith	B	Joe		Jr	125		Oak	St	SE
Jones		Terry			357		Magnum	Rd	NE

4.3 Address Database

An **address database**, for the purposes of these guidelines, is a database that contains specific **physical addresses**, which describe a location for receipt of emergency services, utilities, *et al.* It is not uncommon for agencies and businesses to maintain databases containing both physical and mailing addresses, as service and billing locations are not always identical. This document is written with concern for **physical addresses only**, but the recommendations given for physical addresses can be closely followed for mailing addresses as well.

4.4 Roads Database with Address Ranges (RDAR)

The differences between an **address database** and a **roads database with address ranges (RDAR)** are just as significant as the differences between a physical address and a mailing address. As mentioned above, an **address database** is a collection of any number of specific addresses, each of which correlates to one (and only one) spot on the earth. A RDAR, on the other hand, records the **acceptable range of addresses** for every street or portion of a street in an area. For example, a specific address might appear in an **address database** as *124 N America Street NW*. A **RDAR** might locate this address on the following road segment: *N America St NW 100 101 158 159* (*i.e.*, the section of *N America St NW* extending from addresses *100* and *101* to addresses *158* and *159*).

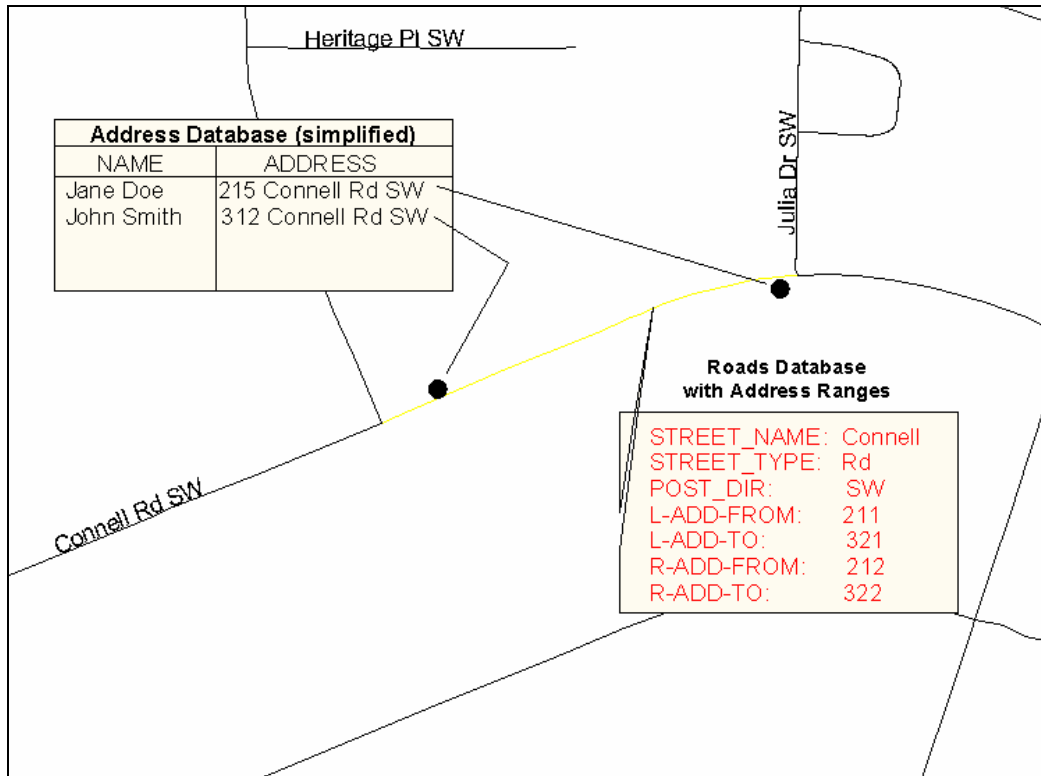


Figure 4.0: GIS map with address database and RDAR

A roads database with address ranges (RDAR) allows an address database to be mapped. Here, the two physical addresses *215 Connell Rd SW* and *312 Connell Rd SW* (identified from the address database, inset upper left) are located on a section of *Connell Road SW* spanning nos. 212-322 on the right, and nos. 211-321 on the left (identified from the RDAR, inset lower right).

With the advent of GIS, the RDAR is becoming more and more common. It is often used by 911 centers to dispatch calls, and is typically used to create a Master Street Address Guide (MSAG).[†] The RDAR is invaluable to GIS applications and is commonly used to map events (such as crimes) or approximate location of utility customers. The RDAR does *not* replace the address database; it is a GIS enhancement which can transform a standard address database into a very powerful tool for geographic and visual analysis.

[†] NENA defines an MSAG as “A database of street names and house number ranges within their associated communities defining Emergency Service Zones (ESZs) and their associated Emergency Service Numbers (ESNs) to enable proper routing of 9-1-1 calls.”

5.0 REVIEW OF EXISTING STANDARDS

To develop these guidelines and standards, many existing standards were examined, with primary consideration given to data published by the U.S. Postal Service (USPS), U.S. Census Bureau (USCB), National Emergency Numbering Association (NENA), American Planning Association (APA, formerly ASPO), and the Southern Association of State Planning and Development Agencies. Upon review, it became apparent that existing systems were not mutually compatible, especially in the area of database design, each having been developed for a particular scope of work. The recommendations made in this publication are an attempt to take the best features from all current systems and combine them into a single standard that will best serve local governments and the State of Georgia.

Furthermore, this publication does not attempt to encompass the general issue of database design, but focuses only on the addressing portion of a database. However, as a general rule, database design in the age of inexpensive data storage should implement parsing of data as much as possible. As an example, an address should be broken down into 10 different data fields (see Appendix, sec. 7.A.1); names should arguably be broken down into 6 data fields. Parsing of data typically results in more consistent data entry and will always produce a more versatile database.

5.1 United States Postal Service (USPS)

USPS Publication 28, *Postal Addressing Standards*, is primarily devoted to describing how a mailing address should appear on a parcel; no standards are provided for address data storage, address range storage, street naming, or street addressing. There are, however, abbreviations listed in Appendices B, C, F, and G of Publication 28, which are recommended for data entry into both address databases and address range databases. (Note: Although abbreviations listed in Publication 28 are shown in all uppercase letters, it is recommended that a mixture of uppercase and lowercase letters be used in an address database or RDAR. This issue is discussed in greater detail in section 5.2.3.)

5.2.0 US Census Bureau (USCB)

The USCB publishes standards for both address databases (Computer-readable Census Address List) and address range databases (Topologically Integrated Geographic Encoding and Referencing system, or TIGER).

5.2.1 Roads Database (RDAR)

Most RDARs in use today originate from the USCB TIGER/Line files, although in many cases the data has been enhanced and/or updated. TIGER/Line files are relatively complex extracts from the Census TIGER database utilizing **linked tables** related by **unique identifiers** -- these concepts must be understood in order to work with TIGER/Line files successfully. With TIGER data, address range information for a road segment (spatial object) is stored separately from the data file containing the spatial object itself (see LaMacchia). However, since both tables have a unique identifier in common, the two tables can be easily linked so that address range information can be accessed via the spatial object. This is a very desirable and very common way of storing data, as it provides coherent and comprehensive organization and reduces file sizes.

The diagram below illustrates the concept of linking tables. This concept will be mentioned again in section 5.4, where it is recommended in conjunction with the DLG-F dataset to be adopted as a state base map layer and used and maintained by Georgia DOT in the fall of 2000.

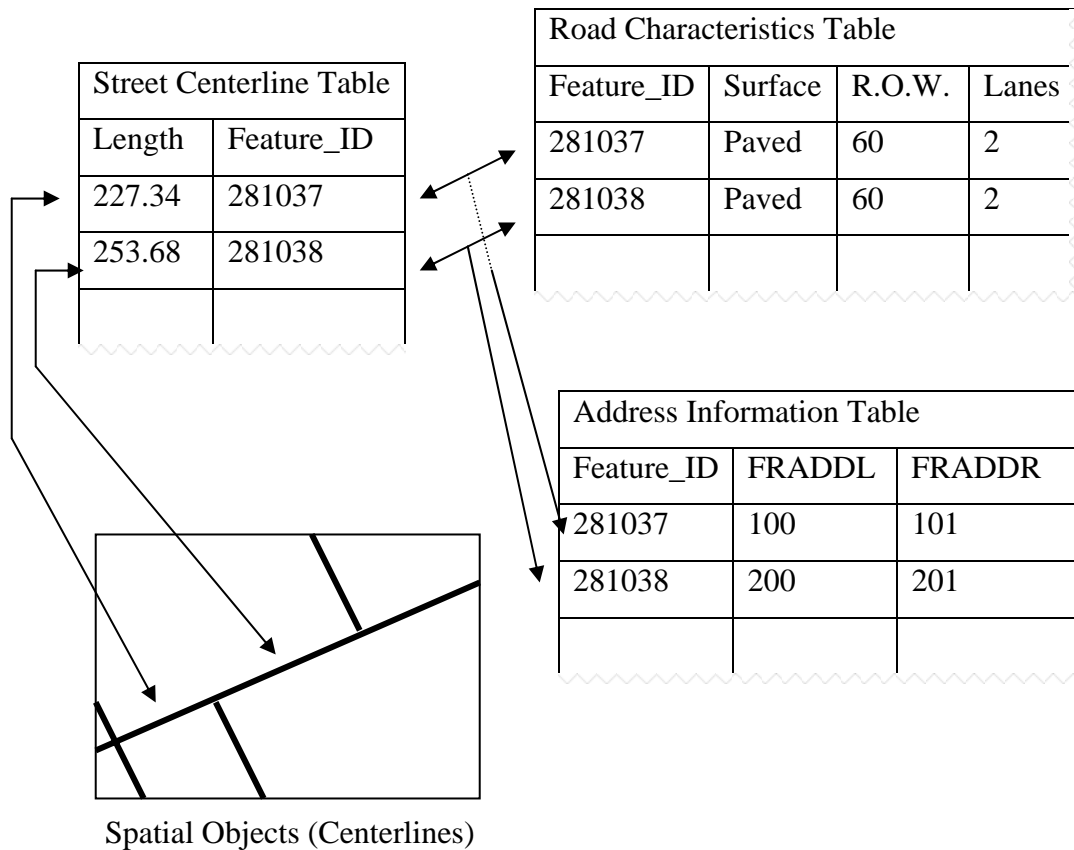


Figure 5.2.1: Linking Tables with Unique Identifiers

Since TIGER data was built to accommodate addressing, the roads database design recommended in section 7.A.2 closely resembles the design of the TIGER/Line file's *Record Type 1*. The most noticeable differences between the Record Type 1 data dictionary and the data dictionary recommended here are the removal of several unrelated data fields, inclusion of a field for the **full street name** (see section 6.2.0) and narrower strictures on data types. For example, the TIGER design allows alphabetical characters to be entered into the address range fields, which is not recommended here. The format described in this document should better serve local governments in Georgia by forcing more conscientious data entry; and since these standards are stricter than TIGER standards, data can easily be converted to Census Bureau format if necessary.

5.2.2 Address Database

The recommended format for an address database, however, is not patterned after the USCB design, because the Computer-readable Census Address List used by the USCB is not parsed enough to serve the needs of local governments. USCB format confines the entire street name to one field of 43 characters, which must encompass pre-direction, street name, street type and quadrant. This format is inadequate for most local government applications, because greater data-entry-level parsing allows for easier and more versatile recombination of data (concatenation) when needed. Conversely, if data-entry field options are insufficient, parsing at a later time becomes a complex and labor-intensive process. Therefore, it is better to have more fields of data than originally deemed necessary than to make the mistake of having too few. Parsing of data during entry also helps reduce data-entry errors, which is crucial to most local government applications, especially where GIS and 911 are concerned. (See the table in section 4.2 for an example of a parsed database and Appendix 7.A.1 for the recommended address database design.)

5.2.3 Alphabetic Case

The data entry style of **mixed uppercase and lowercase letters**, which the US Census Bureau uses, is recommended because it allows for a more versatile database than single-case formats can produce. For data entry purposes, it is recommended that the first letter of each word or abbreviation be entered in uppercase. Some words or abbreviations (such as *McCrae* or *NE*) will include additional uppercase letters after the initial.

Strong consideration was given to this recommendation, as it diverges from the all-uppercase style currently used for most road signs and maps. However, this recommendation can be made in good conscience, since most GIS software packages include tools to convert from mixed-case to all-uppercase or -lowercase, but do not include tools capable of correctly and consistently converting all-uppercase or -lowercase addressing data to mixed-case.

5.3 National Emergency Numbering Association (NENA)

5.3.1 Address Database

The address database design recommended by the National Emergency Numbering Association closely resembles the design recommended here. NENA recognizes the need to parse data so as to assure versatility and reduce data entry errors. Most of the recommendations in Appendix 7.A.1 for an address database design comply with NENA standards, except that the street name **field width** of 40 or 60 characters, recommended by NENA, is here reduced to 30. In order to minimize confusion, and to avoid problems with data entry and sign construction, the **street name** portion of a **full street name** (see section 6.2 for explanation of these terms) should never exceed 30 characters.

5.3.2 Roads Database (RDAR)

NENA does not make recommendations about RDARs *per se*. NENA standards do, however, make recommendations about the format of an MSAG; and since the MSAG is usually an output from a RDAR, the layout of the roads database can be inferred from the MSAG design. The MSAG design recommended by NENA closely compares to the format recommended here for the RDAR. The most significant difference is field width for street names and field type for low and high address ranges. NENA recommendations allow for alphabetical characters in the high and low range, whereas the format recommended here will allow only numbers. The purpose of this recommendation is, once again, to reduce data entry errors and to force compliance with numbering recommendations, which do not allow for alphabetical characters. NENA standards also allow for alphabetical characters in a ZIP code. Since letters should never occur within US ZIP codes, we recommend that this field also be strictly numerical.

5.4 Georgia Department of Transportation (GDOT)

In the fall of 2000, Georgia DOT will adopt and begin using Georgia's DLG-F transportation database. For the State of Georgia this is by far the most comprehensive and accurate road database available. At the time of this report (August 2000) there is no address information available with the DLG-F database, but conflation of TIGER address ranges and Atlanta Regional Commission (ARC) address ranges to the DLG-F data is currently underway for the Atlanta Metropolitan Area. Furthermore, there are tentative plans to perform the conflation of TIGER address ranges to the DLG-F database on a statewide basis. Even if the conflation does not take place on a statewide basis, the DLG-F data set is probably the best place to start for anyone looking to create a RDAR.

Since every road segment (arc) in the DLG-F database has a permanent unique identifier (Feature ID) it lends itself to being easily linked to separate tables. Just as the TIGER road segments are linked to the *Record Type 1* table through the TIGER Line ID (TLID), any local address range databases could be linked to the DLG-F data via the Feature ID. Therefore, anyone creating a separate address range database should include a Feature ID in their database design. This field should have a format and values identical to those used in the DLG-F data set (see 7.A.2).

5.5 American Planning Association (APA)

In 1978, the American Society of Planning Officials (now called the APA) published a comprehensive review of addressing systems, *Report No. 332: Street-Naming and Property-Numbering Systems*, focusing primarily on street naming conventions and various addressing methods. Because the report was written when very few cities had computers, it understandably omits database design. Still, many recommendations given for **street naming** and for establishing **reference points** and **baselines** are mirrored in this document with little or no modification. However, the hybrid addressing system and database design recommendations are direct results of intervening changes in computer technology.

6.0 RECOMMENDED STANDARDS AND GUIDELINES FOR ADDRESSING

Appendix 7.A of this document contains recommended database designs, with justifications, for both address databases and RDARs. They list the bare minimum number of data fields required. There may be many other elements necessary to meet your local requirements, but practically every address database and every RDAR should have the fields included here. To enhance the RDAR, for example, it may be necessary to add a field for emergency service zones, in order to meet the needs of the 911 center. Furthermore, for the address database, it may be necessary to add a field designating an address as commercial or residential. (For more ideas about additional data elements you may wish to include, refer to the publications and other sources referenced in sections 5, 7.C, and 8 of this document.)

6.1 ESTABLISHING A REFERENCE POINT AND BASELINES

6.1.1 Establishing a Reference Point

The process of assigning street names and numbers should begin by establishing a **reference point** for the county. The reference point should be an appropriate locale such as (but not necessarily) a prominent intersection in the county seat. Ideally, the reference point will be near the center of the county. It is highly recommended that the reference point be the intersection of two streets.

6.1.2 Establishing Baselines

The two streets that intersect at the reference point are called **baselines**. The baselines should continue all the way to the county line — even if this requires one or more changes of contiguous streets en route — thereby dividing the county into four roughly equivalent sections, or **quadrants**. In an ideal situation, the baselines will emanate from the reference point in predominantly N-S and E-W directions.

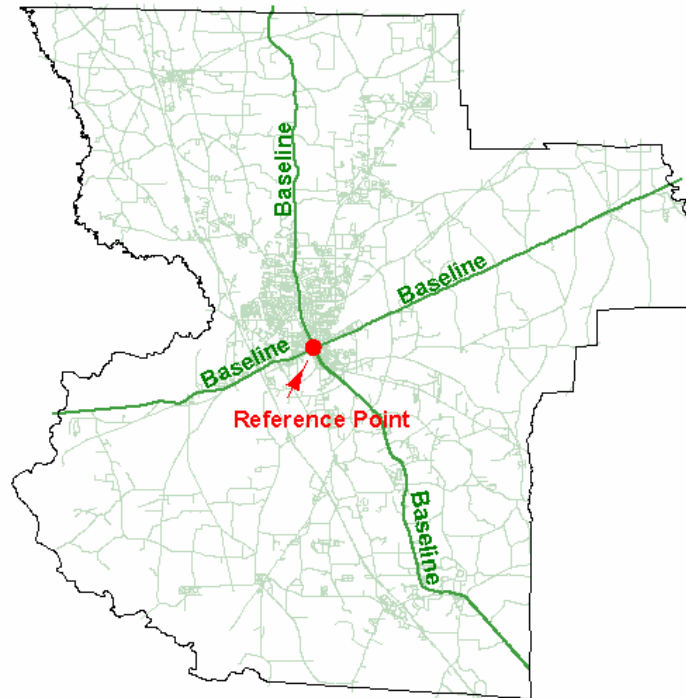


Figure 6.1: Establish a reference point and baselines

6.2.0 STREET NAMING

Assigning street names is not the most complex part of addressing; but in practice, the task may appear deceptively simple. The importance of carefully reviewing new street proposals and understanding their placement in the context of the county road system is fundamental to an efficient and effective addressing program and cannot be overemphasized.

Problems in assigning street names become manifest as new development occurs and as existing streets are rerouted or intersect with new streets. As an area grows, a lack of county-wide coordination and inadequate control and review mechanisms inevitably result in continuous roads changing names several times, numbering becoming non-sequential, and/or street names being duplicated. Adherence to the following guidelines should help alleviate such problems in the future; however, they do little to correct today's problems if not applied to revamp existing systems.

To fully understand the language used in the following sections, one must first understand the anatomy of a **full street name**, which is comprised of four distinct components. Just as most people have a first name, middle name, and last name which all combine to form a full name, a street has a **pre-direction**, **street name**, **street type**, and **quadrant** which all combine to form a **full street name**. Be careful to think of these individual components as you read and interpret these guidelines. Be aware that, just as not every person has a middle name, not every street will have a value for all of the components. As far as the database is concerned, every **full street name** does have four components, but some components may have a null value. However, every street must have a **non-null street name and street type**. Furthermore, every street except interstate highways and baselines should be assigned a quadrant.

Anatomy of a full street name:

<u>Pre-direction</u>	<u>Street Name</u>	<u>Street Type</u>	<u>Quadrant</u>
S	Oak	St	SW
	Deer	Run	NE

Pre-direction + Street Name + Street Type + Quadrant = Full Street Name:

S Oak St SW

Deer Run NE

6.2.0(a) Pre-direction: Indicates the primary compass direction that a second order street (see sec. 6.3.1) follows from the **baseline** (*i.e.*, *N, S, E, W*).

6.2.0(b) Street Name: The principal identifying component of a full street name, which in most cases should uniquely distinguish a street from all others (*e.g.*, *Oak, Broad*).

6.2.0(c) Street Type: Gives some indication of the primary use, length, or shape of the street (*e.g.*, *Lane, Circle*).

6.2.0(d) Quadrant: Indicates the street's location relative to the **reference point** and **baselines** (*i.e.*, *NW, NE, SW, SE*).

6.2.1 General Principles of Assigning Pre-Directions

6.2.1(a) Use Proper Reference Point

Street pre-directions should be used only to indicate the primary direction that a street travels **from its intersection with the baseline**. Even if it has been common practice in a particular area to assign pre-directions relative to a landmark or major thoroughfare other than the baseline, this practice should not be allowed, as it will eventually result in confusion. Furthermore, pre-directions should not be assigned to streets that do not continue across a baseline.

6.2.1(b) Use Proper Format

A street pre-direction should consist of only **one primary direction** (*North, South, East, or West*) and not a combination of two.

6.2.2 General Principles of Assigning Street Names

6.2.2(a) Avoid Duplication

A **full street name** should be used only once in any county. A **street name** should also be unique, except that it is acceptable to have one duplicate street name in closed subdivisions (those having access via only one or two entry points), and even in these cases such streets must have a different **street type** (e.g., *Quail Drive, Quail Lane*) and one should be a cul-de-sac (or dead-end) intersecting the other at a perpendicular (or nearly perpendicular) angle. Except in this manner, street name duplication — regardless of street type or jurisdiction (city, fire, police, ambulance) — should not occur in any county. Furthermore, duplication should not occur in any portion of an adjacent county in which a ZIP code is identical to a ZIP code used within the county in question.

6.2.2(b) Avoid Confusion

A street name should be appropriate, as well as easy to read, spell, and pronounce – even for children – in an emergency situation.

6.2.2(b.1)

Names which have **homonyms** (*i.e.*, other words pronounced similarly but spelled differently) should not be used on any street and certainly not on multiple streets even if the street type is different (*e.g.*, ***Steven Lane*** / ***Stephen Lane***; ***Disk Drive*** / ***Disc Lane***).

6.2.2(b.2)

Names that tend to be **mispronounced** or **misspelled** or are difficult to pronounce or spell should not be used (*e.g.*, ***Javelina***, ***Peony***, ***Weimaraner***).

6.2.2(b.3)

Two-word names or one-word names that can be confused as two-word names should not be used. This avoids the problem of two words being combined into one word, or vice versa, when entered (*e.g.*, ***Clearlake***, ***Clear Lake***, ***Brookhaven***, ***Baytree***).

6.2.2(b.4)

A street name should not contain **directional words** such as *North*, *South*, *East*, or *West*. If they are used, it is difficult if not impossible to distinguish the pre-direction portion of a full street name from the street name itself. ***Northridge*** is an example of a street name that breaks this rule as well as the two-word rule above.

6.2.2(b.5)

Street names containing **punctuation** or **special characters** (*e.g.*, ***Fishermen's***, ***J.F.K.***, ***Holman-Fuller***) should be avoided, as punctuation makes street names unnecessarily complicated, and some database programs do not gracefully handle punctuation. Furthermore,

words that normally require punctuation should not be used with the punctuation omitted (*e.g.*, *Fishermens Landing*). Apostrophes, hyphens, or dots may be included when necessary (to avoid confusion, for example), but **it is especially important that special characters such as commas, quotation marks, and asterisks not be used**. In the case of numbered streets, such as *First Street* or *Tenth Avenue*, it is recommended that the names be spelled out as opposed to using numbers with suffixes. This practice allows for the creation of a complete yet strictly alphabetical index.

6.2.2(c) Avoid Emotion

Except where historically significant; avoid using **proper names** as street names (*e.g.*, *Wilma Calumet Road*). While this naming practice may not cause problems today, it will certainly create problems in the future if a name change or street closing becomes necessary. Furthermore, use of a first and last name usually results in an unnecessarily long street name. It is recognized that many streets already bear names of historically significant individuals and will continue to do so, but the desire to commemorate local history must be tempered by the ultimate goal of making street names easy to use for citizens, visitors, and service providers (especially in the area of emergency services).

6.2.2(d) Promote Continuity

A continuous street should have one name and one name only throughout its entire length, even if the street changes direction one or more times. In the case of permanent voids (such as a pond or closed railroad crossing) where a portion of a road is permanently closed or non-continuous, the road can have the same name on both sides of the void, if the void can be easily breached by an alternate route. If, however, a new street is added on the opposite side of a permanent void, in line or out of line with an existing street, that new street should be given a unique name. Also, it may be desirable to make exceptions to this “one name” rule in areas where a grid pattern prevails and streets are named according to their primary direction of travel.

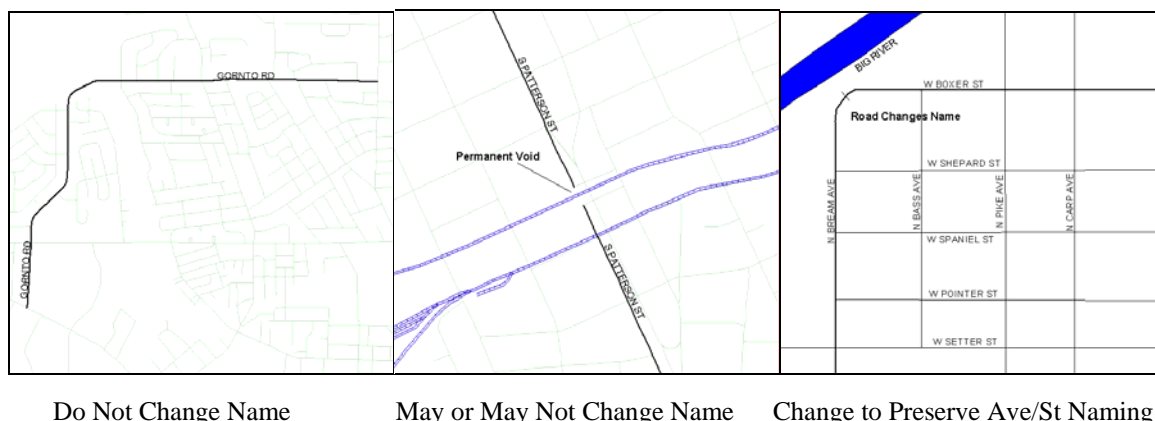


Figure 6.2.2(d): Name changes on continuous roads

6.2.2(e) Keep Names Short

Street names should be made up of one word, preferably of **15 characters or fewer**. Remember that a full street name may very well be made up of a pre-direction, street name, street type, and quadrant. Keeping the street name under 16 characters will reduce data entry errors and make the production of street signs more manageable.

6.2.2(f) Use Themes

Where possible, use naming themes in subdivisions or even larger geographic areas such as quadrants. Choosing names related to a single theme (*e.g.*, flowers, states, presidents) is suggested as a means of general identification for streets in a subdivision, rather than duplicating the name and differentiating only by the street type designator. As an example, use ***Jefferson Drive*** and ***Reagan Drive*** rather than ***Jefferson Drive*** and ***Jefferson Lane***. Also, consideration should be given to naming streets in alphabetical order to further aid navigation. Under this system, ***Alabama Drive***, for example, would be nearer the main entrance to a subdivision than would ***Delaware Drive***.

6.2.3 General Principles of Assigning Street Types

6.2.3(a) Be Consistent

Every street should be assigned a street type. Street types carry certain expectations of the length, shape, direction, width and other characteristics of a road. These expectations should not be violated. While many different possibilities for street types exist, the most commonly used street types are listed and described in Appendix 7.B. (Note: The descriptions are intentionally broad and in many cases overlapping; they are provided for consideration as guidelines, but are **not official or restrictive**.)

6.2.3(b) Avoid Confusion

Maintain a clear distinction between **street name** and **street type**. Create an exhaustive list of street types to be used in your jurisdiction and reserve those words to be used as street types only. You should not use a full street name of *Terrace Drive SW* and another full street name of *Spring Terrace NE*. Use the word *Terrace* as a street type or a street name, but not both. A list of common street types, with their abbreviations and descriptions, is provided in Appendix 7.B.

6.2.4 General Principles of Assigning Quadrants

6.2.4(a) Be Consistent

A quadrant should be assigned to **every street except interstate highways and streets that form baselines**.

6.2.4(b) Use Proper Format

By assigning a quadrant to a street, one can quickly determine where a street is in relation to the reference point and baselines. Since a quadrant is a multi-directional reference, it should be made up of a combination of two primary compass directions always starting with *North* or *South* and always ending with *East* or *West*. There are **only four acceptable values for this element** (*NW, NE, SW, SE*).

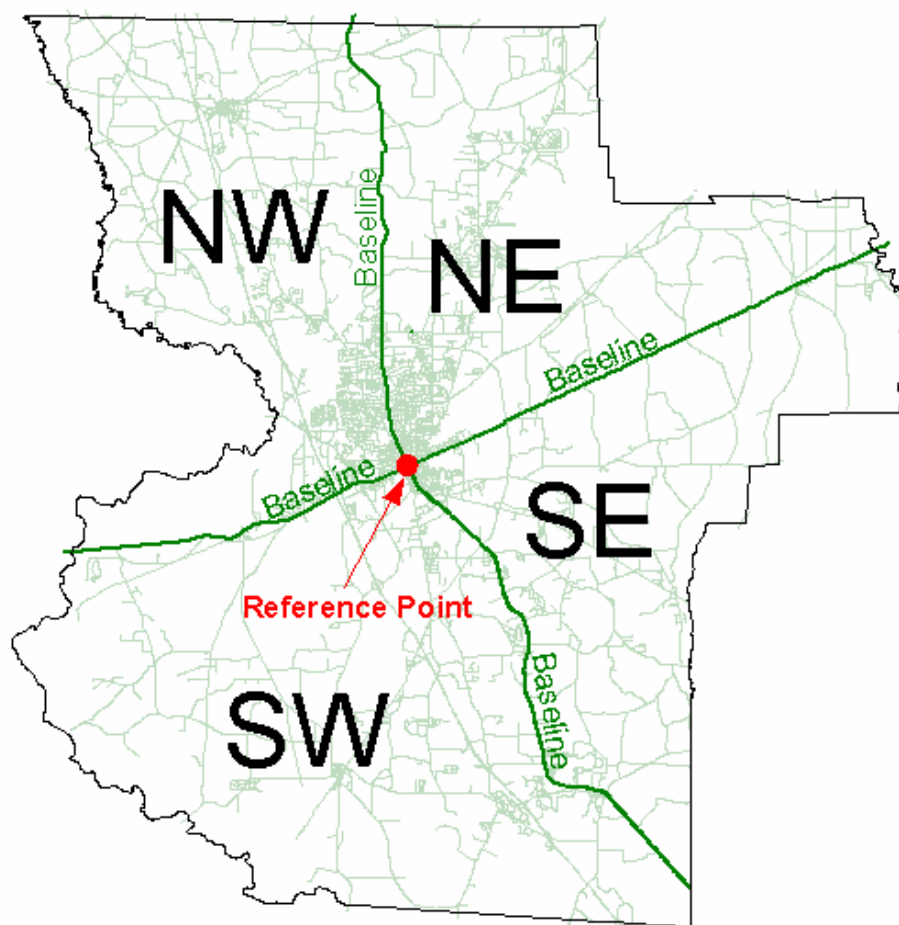


Figure 6.2.4: County divided into quadrants

6.3.0 STREET NUMBERING

Note: It is not unusual, during the development of a new subdivision, that construction will begin at both ends of a street and continue in phases toward a common centerpoint. In this situation, it is **very important that addressing be done from the master plan**. Otherwise, **parent streets** (see section 6.3.2) may be misassigned and it may be necessary to readdress one or both ends of the completed street.

6.3.1 Assign Each Street an Order

After a reference point and baselines have been established, a tree branch scheme should be used to assign an order to each street. The **baseline roads** act as the trunk of the tree and are referred to as **first order streets**. Any street that intersects a baseline street is designated a **second order street**. Any street that intersects a second order street, and that is not a baseline or second order street itself, is designated as a **third order street**. This process should continue until all streets are assigned an order.

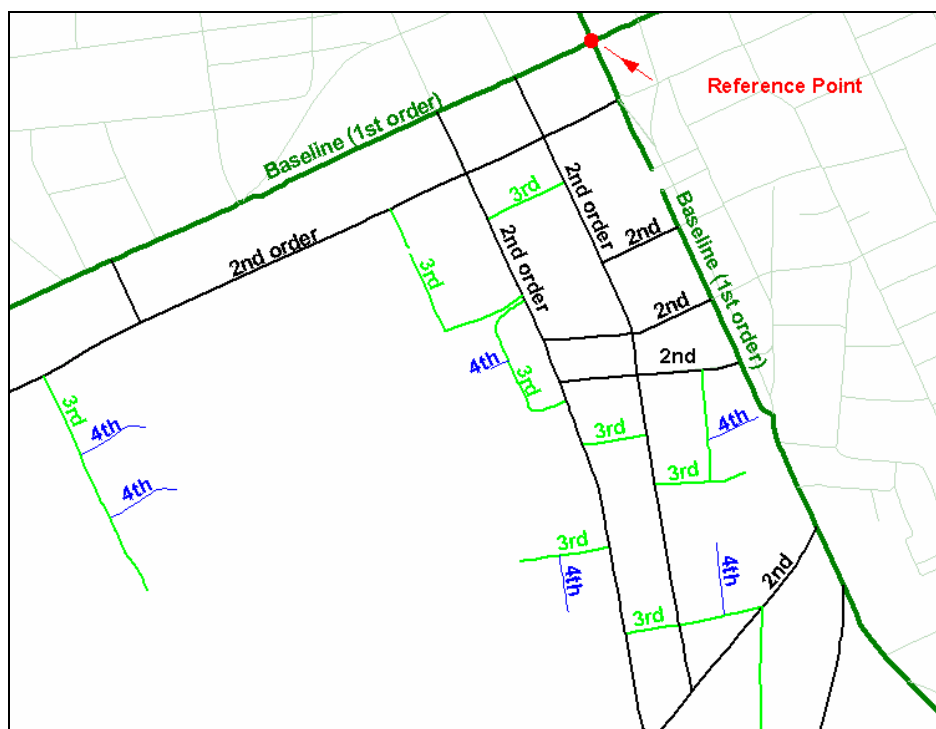


Figure 6.3.1: Assign each street an order

6.3.2 Assign Each Street a Parent

After every street is assigned an order, each must also be assigned a **parent**. The importance of the parent is to designate a starting point for the addressing sequence. Each street must be given one and only one parent, which will be of **one order lower (numerically) than itself**. If a street intersects more than one street of an immediately lower order, that street will be assigned a parent based upon which intersection is **closest to the reference point via a straight-line (not road distance)**, as this value is easy to calculate and will never change.[†] If the intersection closest to the reference point is shared by more than one street of an immediately lower order, the parent will be assigned to the lower order street that intersects its own parent closest to the reference point.

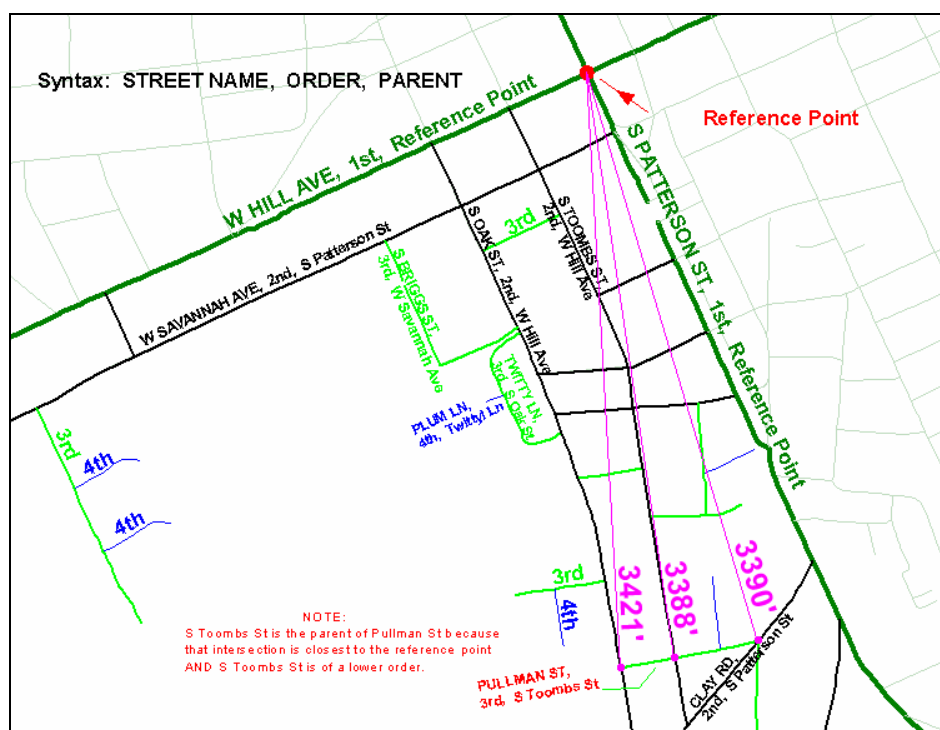


Figure 6.3.2: Assign each street a parent

[†] Although it is possible that construction of a new intersection may link a street with a lower-order street closer to the reference point by straight-line measure, such changes should be ignored once addressing is completed, since all addresses “down stream” would be affected. Road distance measures, on the other hand, are inherently difficult to work with, as they require multiple calculations (of values that are continually subject to change).

6.3.3 Assign Address Ranges

For streets of all orders, these three general principles will hold:

1. Numbering should always **commence at the intersection of the centerlines**, as opposed to the edge of pavement or right-of-way.
2. **Even numbers should be assigned to the right side of streets and odd numbers to the left side** as you travel **in the direction of increasing address numbers**.
3. **Numbers increase as you move away from the reference point** and toward the county boundary.

6.3.3(a) First Order Streets

Baselines should be assigned addresses first. Addressing is accomplished by **starting at the reference point** and subdividing the baseline streets into **20' sections** as they extend toward the county boundary. Each 20' section should be assigned a pair of sequential whole numbers, starting with the first section which should receive a value of **100** on the right side and a value of **101** on the left side.

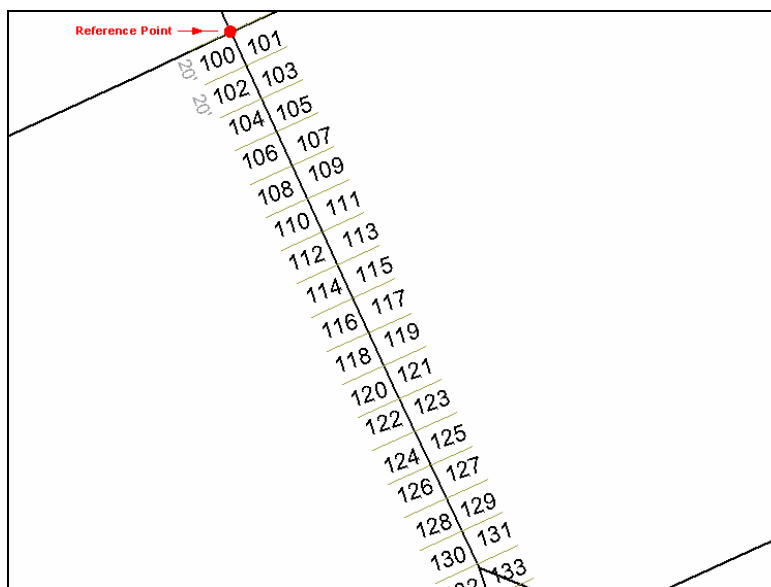


Figure 6.3.3(a): Sequential addressing of a 1st order street

Throughout the entire length of a street, sections should be assigned only according to distance traveled along the centerline. This means that **intersections and blocks should be ignored** during the segmenting process. In some GIS software, this process would be accomplished by dynamic segmentation. For example, if the distance from the reference point to the county boundary along a 1st order street is 10 miles (52,800'), there will be a total of 2,640 numbers assigned along each side of that street ($52,800 / 20 = 2,640$). Since each side is assigned 2,640 numbers, there will be a total of 5,280 numbers assigned. Because the lowest number used will be 100, the ending street numbers will be **5380** and **5381**.

6.3.3(b) Higher Order Streets

After first order streets are numbered, second order streets should be numbered in a similar fashion. Any non-baseline street will **commence numbering with the address of the parent at the intersection**, and **increase or decrease** depending on whether the parent-intersection is central (closer to the reference point) or peripheral (farther from the reference point) when compared to that street's other end.

- If the intersection with the **parent** is **closer** to the reference point (in a direct line) when compared with the street's other terminus, numbers will **increase** sequentially from the parent address.
- If the intersection with the **parent** is **farther** from the reference point (in a direct line) when compared with the street's other terminus, numbers will **decrease** sequentially from the parent address.

[For a nontechnical paraphrase of this rule, see general principle 3 in sec. 6.3.3 above.]

For example, in Figure 6.3.3(b)1, **Oak St** intersects its parent street (**S Patterson St**) at section **132/133** and proceeds toward a cul-de-sac at a distance farther away from the reference point. Therefore, **Oak Street** is assigned **increasing** numbers beginning with **132/133** at the parent-intersection. **S Patterson St** is also a parent to **Elk Ln**, which intersects it at the **120/121** section. However, because **Elk Ln** proceeds toward a cul-de-sac which is closer to the reference point, it is assigned a **decreasing** sequence of addresses beginning with **120/121**.

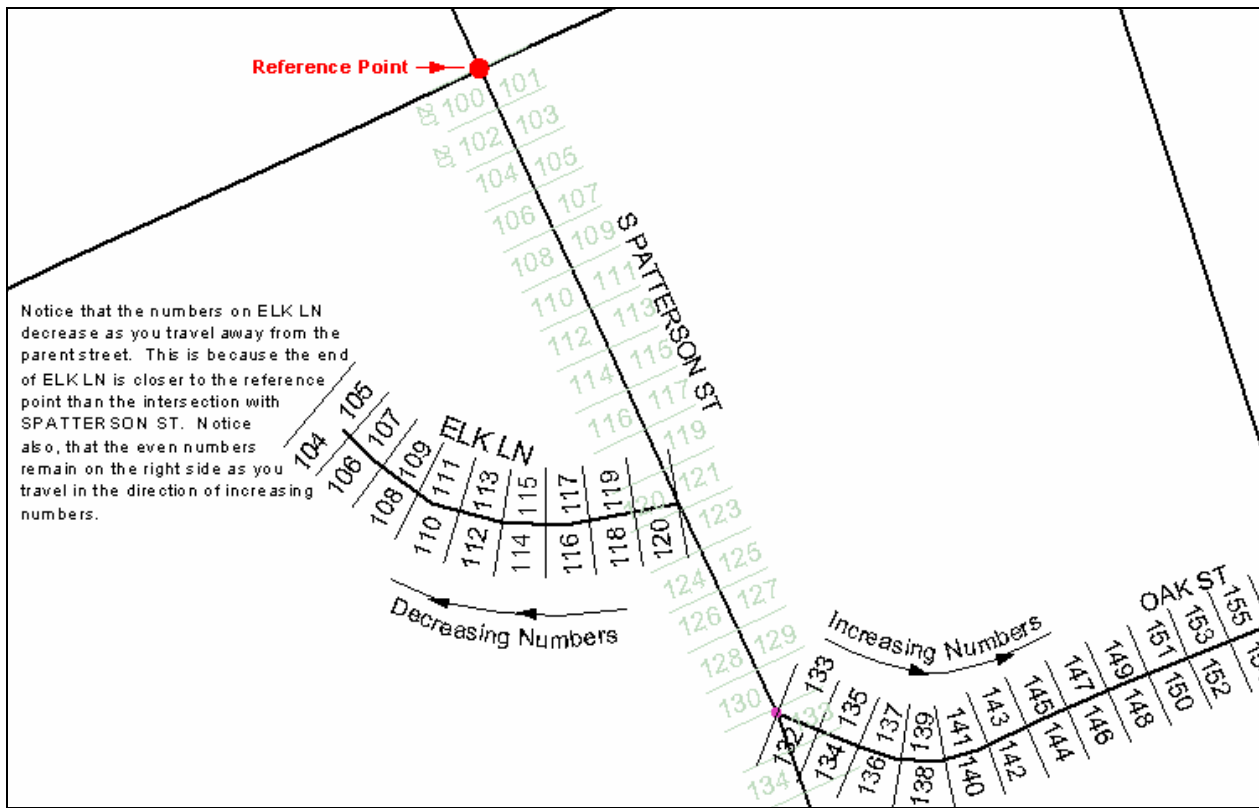


Figure 6.3.3(b)1: Sequential addressing of 2nd order streets

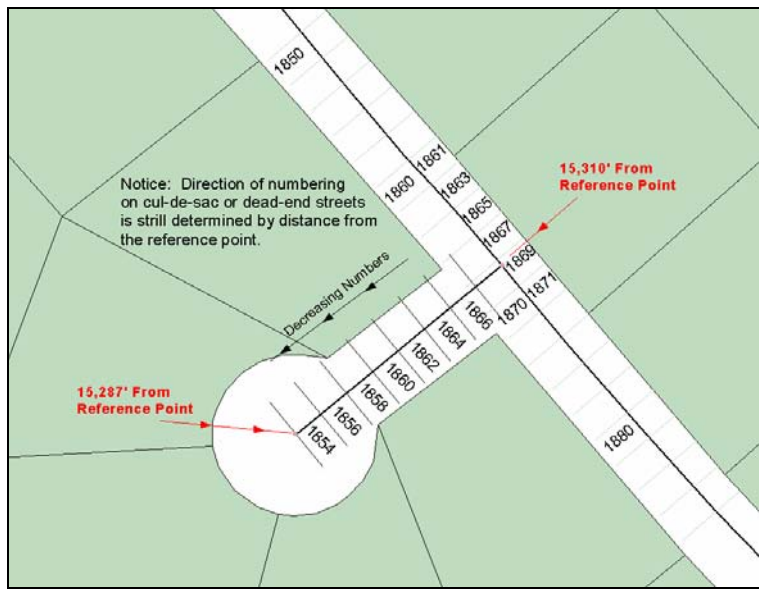


Figure 6.3.3(b)2: Numbering proceeds from the more central terminus

If a street continues in two directions from the parent, numbers will increase in one direction (on that portion which ends at a point farthest from the reference point) and decrease in the other direction.

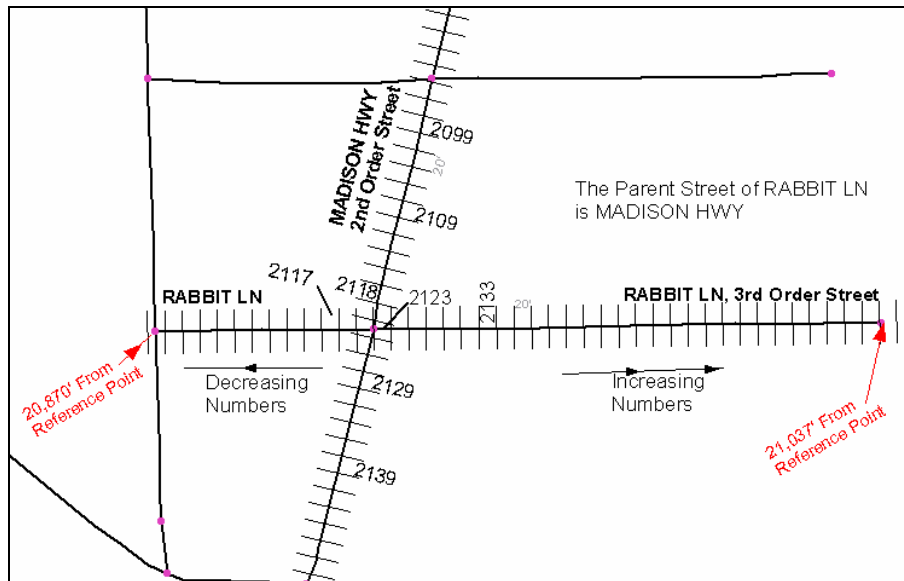


Figure 6.3.3(b)3: Sequential Addressing of 3rd order streets

6.3.3(c) Special Cases

In some cases, very short unnamed cul-de-sacs, containing accesses to five or fewer lots, may be addressed from the centerline of a named street [see fig. 6.3.3(c)1 below].

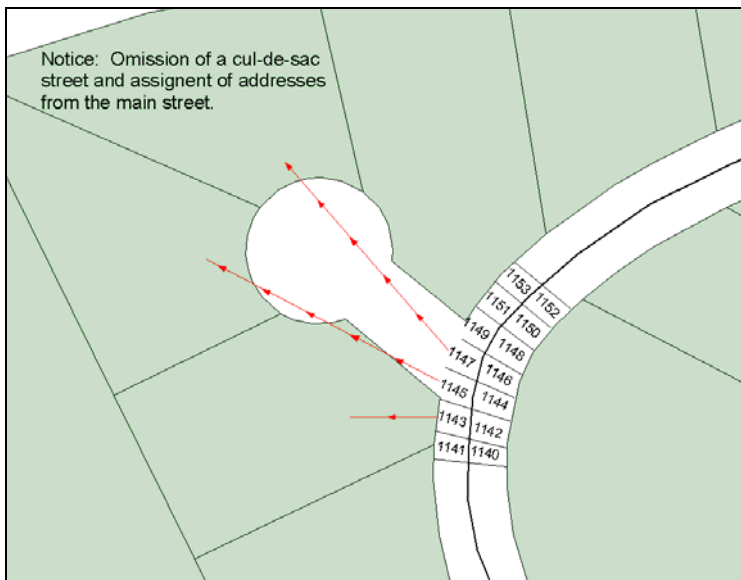


Figure 6.3.3(c)1: Assigning addresses to an unnamed cul-de-sac

If a street forms a **closed loop**, addressing should proceed clockwise from the base of the loop [see fig. 6.3.3(c)2 below].

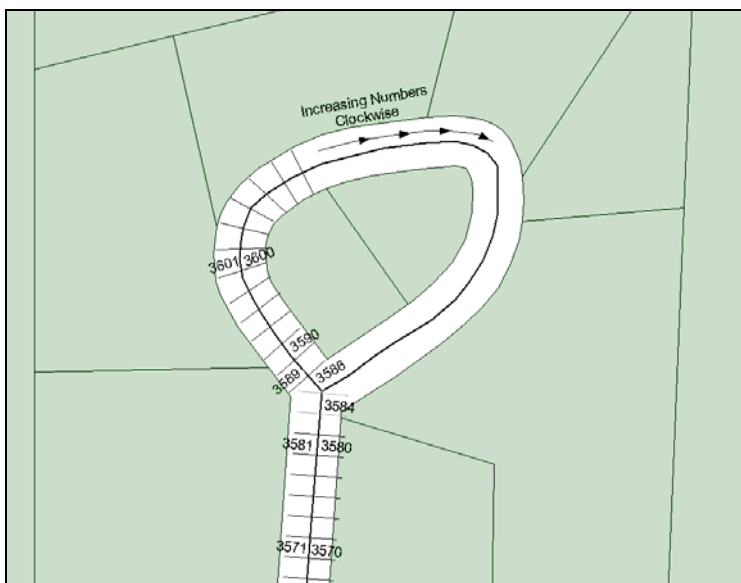


Figure 6.3.3(c)2: Addressing a closed loop

6.3(a) Advantages of This System

The primary advantage of this addressing system is that it is based totally on mathematical logic and can therefore be automated, except for designation of the reference point and baselines. Given an adequate GIS road centerline coverage, it would be possible to use programming logic to output a fully addressed road coverage.

Since the addressing is done on a countywide basis, future annexations, de-annexations, street additions or street closings will not cause addressing problems. Furthermore, with this addressing system it is possible to know approximately how far an address is from the reference point or from any other address. With block numbering systems, it is impossible to predict your distance to any address even if numbering by distance is used within the blocks, because a varying span of numbers must be omitted whenever a new block is reached.

Figure 6.3(a) shows the bull's-eye pattern of address ranges resulting from the recommended system. Each mile of street contains approximately 528 addresses. Since the addressing starts at **100**, the address **628** should be approximately one road mile from the reference point, and the address **1156** ($628 + 528$) should be approximately two road miles from the reference point.

By extrapolating this process, distance to a target address may be estimated from the addressing sequence, or an address from a known road distance. Just keep in mind that:

1. Numbering starts with 100 rather than 0; and,
2. A pair of numbers is assigned to every 20' section of road, averaging one address number per every 10 feet of centerline.

Example One: Estimate the address of a lot 2½ miles from the reference point.

Formula: **(Distance in feet / 10) + 100 = Address#**

$(13,200 / 10) + 100 = \mathbf{1420}$

Example Two: Estimate the distance between address **4419** and the reference point.

Formula: **(Address# - 100) x 10 = Distance in feet**

$(4419 - 100) \times 10 = 43,190'$ or 8.18 miles

To get a very rough idea of the distance, in miles, from the reference point it is possible to take an address and divide by 500. Using this approximation method, the address **5000** should be approximately 10 miles from the reference point. Using the exact math above would result in an approximation of 9.28 miles, but it is much more complicated math, especially when you are driving. As a general rule, with this approximation method, lower address numbers will result in less accurate approximations since addressing begins with the number 100.

The hybrid addressing system recommended here is probably not the best system for highly organized grid systems such as those common in the Midwest. However, this system should work well in Georgia, which is spotted by small towns with loosely defined and quickly deteriorating grid systems giving way to predominantly curvilinear road networks.

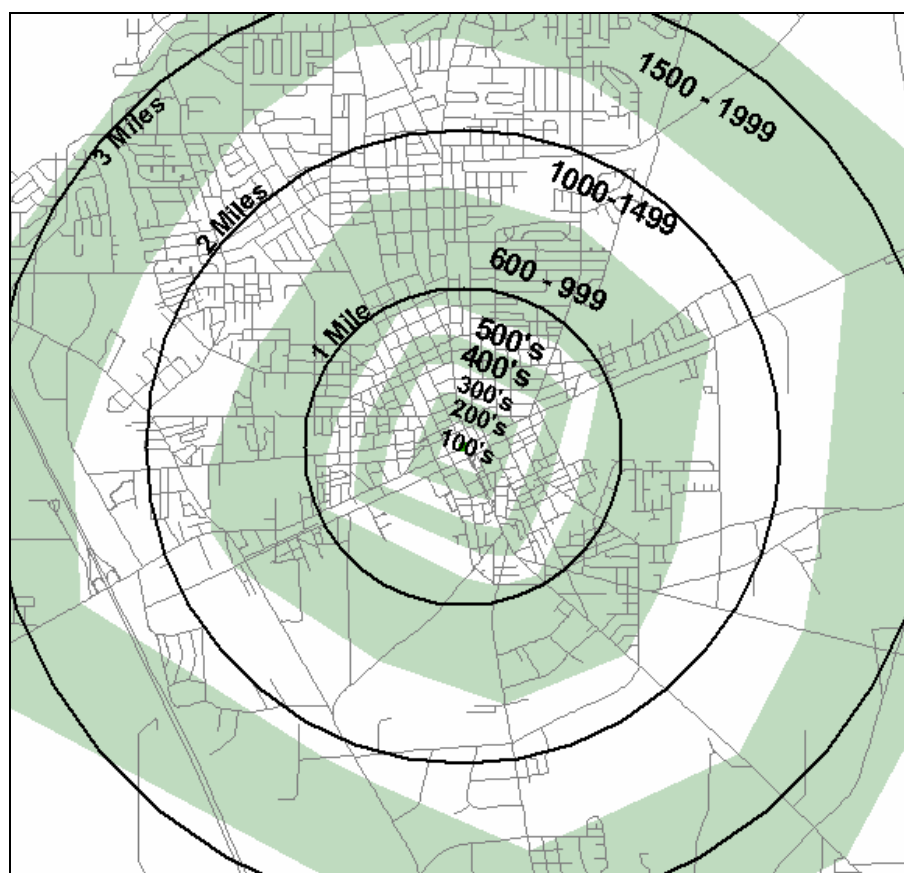


Figure 6.3(a): Addresses grouped by distance from a reference point

6.3(b) Disadvantages of This System

This addressing system is not “traditional” — that is, city blocks do not serve as its standard unit. Therefore, when applied to a street grid pattern, it does not result in all addresses between *100* and *200* being on the same block, and thus would likely cause confusion in the initial stages of use. The confusion would be compounded in a community where streets are named with numbers, because everyone expects a *250 X Ave* address to be somewhere between *X Avenue*’s intersections with *Second Street* and *Third Street*, for example. However, the confusion resulting from the change should quickly subside, as sequential numbering is easy to understand and grid systems in Georgia rarely prevail throughout an entire city (and never throughout an entire county). If this addressing system is to be used in an area where a grid pattern prevails with street numbers as names, it is recommended that the street names be changed to something other than numbers. **Street numbering does not work well with a sequential addressing system.**

6.4.0 HOUSE NUMBERING

The final stage of the addressing process is to assign addresses to particular residences, businesses, and other property. The general rule is to assign the address of the 20’ section of street aligned with the center of the front of a building or lot (in a line perpendicular to the centerline of the road). In the majority of cases, especially if a GIS is used, this is a very simple process involving verification from digital aerial photographs. Yet while it may be possible to automate the entire process of assigning addresses to road segments, automation of house numbering is infeasible. Rules must be established for assigning numbers with consistency, but human judgment will be necessary at various stages of the procedure. When no existing rule applies workably to a particular situation, let **safety** and **consistency** guide the decision making process. The following sections discuss how to handle the most common situations in which application of the general rule results in ambiguity.

6.4.1 Corner Lots

Usually, addresses will be assigned from the center of the side of the building where the front door is located. However, when the front door is obscured or invisible from the road, or the structure is obviously best reached for emergency purposes by the driveway, assign the property number based on where the driveway intersects the road .

6.4.2 Stacked Addresses

Houses or trailers behind other houses or trailers sharing a common driveway should be given separate numbers. The average house is approximately 60 feet long; therefore, there will normally be at least 3 numbers in front of a house. Assign the **first possible number to the front house** and the second number to the next house, etc. This is much preferred over the use of hyphenated, alphanumeric, or fractional numbering (*e.g.*, **437-2**, **437B**, **437½**).

6.4.3 Apartments and Duplexes

Apartments and all other multi-tenant structures should be **numbered by the main building or main entrance to the complex**. Each individual unit should then be given a **secondary location indicator** such as the building designator, floor number and unit number. It is **preferable that buildings be lettered, and that floors and apartments be numbered**. For example, the residence at the address **3006 Firehouse Rd, Apt F-1-27** should be the 27th apartment on the 1st floor of building F. The hyphens in the unit distinguish the 27th apartment on the 1st floor from the 7th apartment on the 12th floor.

6.4.4 Businesses

Businesses should be addressed like houses or apartments, depending on the layout. If there are several businesses within the same building, they should be addressed just as apartments are addressed, except they should be designated as **suites** (*e.g.*, **2506 Birdy Ln, Ste G257**).

6.4.5 Mobile Home Parks

There are two logical methods of addressing mobile home parks. The best choice for a particular mobile home park will depend on the specifics of the park design. The first choice is to handle the park as if it were an apartment complex: that is, assign one street address for all mobile homes and then give each unit a secondary designator that specifies which lot it occupies. The second choice is to treat internal park streets like any other streets, dividing them into 20' sections and assigning addresses to the mobile homes just as you would to any other home.

7 APPENDICES

7.A RECOMMENDED DATABASE DESIGNS

The **field name** recommendations shown below are not critical to database use or compatibility. No agency referenced in this document used a database with field names matching these precisely; however, each agency utilized a set of field names closely resembling those described here. Therefore, there is some flexibility in this area; however, field names should be **always descriptive**, and **never misleading**.

Unlike field names, **field widths** and **field types** are critical and **do affect compatibility**, and should therefore conform precisely with this standard.

7.A.1 Recommended Design of Address Database (Minimum Content)

<u>FIELD NAME</u>	<u>WIDTH</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
HOUSE-NUM	5	I	HOUSE NUMBER (1307)
UNIT	15	C	UNIT DESIGNATION (A-1-2)
PRE-DIR	2	C	PRE-DIRECTION (N, S, E, W)
STREET-NAME	30	C	STREET NAME (Oak)
STREET-TYPE	4	C	STREET TYPE (Blvd)
SUF-DIR	2	C	SUFFIX DIRECTION (NE, SW)
CITY	32	C	CITY (Townville)
STATE	2	C	TWO DIGIT STATE (GA)
ZIPCODE	5	I	ZIP CODE (30067)
ZIP-EXT	4	I	FOUR DIGIT ZIP EXTENSION (2804)

C = Character, I = Integer

Optional Content: OWNER NAME, OCCUPANT NAME, USE (commercial, residential, etc.), EMS ZONE, *et al.*

7.A.2 Recommended Design of RDARs (Minimum Content)

<u>FIELD NAME</u>	<u>WIDTH</u>	<u>TYPE</u>	<u>DESCRIPTION</u>
FRADDL	5	I	LEFT ADDRESS FROM (100)
TOADDL	5	I	LEFT ADDRESS TO (128)
FRADDR	5	I	RIGHT ADDRESS FROM (101)
TOADDR	5	I	RIGHT ADDRESS TO (129)
FEDIRP	2	C	PRE- DIRECTION (N, S, E, W)
FENAME	30	C	FEATURE (STREET) NAME (Elm)
FETYPE	4	C	FEATURE (STREET) TYPE (Rd)
FEDIRS	2	C	SUFFIX DIRECTION (NE)
FSTNAME	40	C	FULL STREET NAME (N Elm Rd NE)
ALIAS_1	40	C	FSTNAME ALIAS (Jones Memorial Dr)
*FEAURE_ID	10	C	Unique permanent feature identifier

C = Character, I = Integer

* Only used in the case of a separate address range database that will be linked to a road centerline coverage such as the DLG-F data.

Optional Content: LEFT EMS ZONE, RIGHT EMS ZONE, JURISDICTION (city, county), RIGHT FIRE ZONE, LEFT ZIP CODE, RIGHT ZIP CODE, ALIAS 2, *et al.*

7.A.3 Justification for Width and Data Type Recommendations

HOUSE-NUM

Width: If one pair of addresses is assigned for every 20' of centerline, a five-digit system will accommodate a road length of over 189 miles. No Georgia county has a single road longer than 189 miles; therefore, no more than 5 digits will ever be needed.

Type: To reduce data entry errors, ease indexing, and ensure database compatibility, address numbers should not include alphabetic characters, punctuation, or other special characters.

UNIT

Width: If proper abbreviations are used, a width of 15 spaces should allow for entry of building numbers, suites, apartment numbers, or combinations thereof. Where possible hyphens should be used to separate the building, floor, and unit.

Type: A character field type, the most liberal of all data types, is necessary here to accommodate letters and words such as *Bldg F Ste 2* or *Apt G-1-2*. Standard abbreviations from USPS Publication 28 should be used with no punctuation or special characters.

PRE-DIR & FEDIRP

Width: If these guidelines are followed there will only be 4 possible entries for this item (*N*, *S*, *E*, *W*). These entries require a width of only one character. Though it is not recommended, it is recognized that some may want to use combinations of the primary directions, such as NE or SW. For this reason the database design recommended here allows for two characters. This same width is recommended by NENA.

Type: A character data type is necessary to enter valid data.

STREET-NAME & FENAME

Width: Though some standards suggest a width greater than 30 characters to accommodate existing names, we suggest that a street name longer than 30 characters should be changed in order to reduce data entry errors and to ensure complete and easily readable roadsigns.

Type: A character data type is necessary to enter valid data.

STREET-TYPE & FETYPE

Width: If recommended abbreviations are used, street types should be no longer than 4 characters. The same width is suggested by NENA, USPS, and USCB.

Type: A character data type is necessary to enter valid data.

SUF-DIR & FEDIRS

Width: If these guidelines are followed, there will only 4 possible entries for this item; *NE*, *NW*, *SE*, *SW*. These entries require a width of only two characters. This same width is recommended by NENA.

Type: A character data type is necessary to enter valid data.

CITY

Width: A width of 32 characters allows for any city name in the state of Georgia to be entered without using abbreviations. This same width is recommended by NENA.

Type: A character data type is necessary to enter valid data.

STATE

Width: A width of 2 characters allows for all state abbreviations recommended by the USPS to be entered. The same width is suggested by NENA, USPS, and USCB.

Type: A character data type is necessary to enter valid data.

ZIPCODE

Width: All ZIP codes are comprised of 5 numbers plus a possible extension. The ZIP Code should be stored here without the extension. The same width is suggested by NENA, USPS, and USCB.

Type: An integer data type will prevent alphabetical characters and punctuation from being accidentally or intentionally entered into the ZIPCODE field, where they do not belong.

ZIP-EXT

Width: All ZIP code extensions are comprised of 4 numbers. The same width is suggested by NENA, USPS, and USCB.

Type: An integer data type will prevent alphabetical characters and punctuation from being accidentally or intentionally entered into the ZIP-EXT field, where they do not belong.

FRADDL, TOADDL, FRADDR, TOADDR

Width: This field has the same recommended width as the HOUSE-NUM since it will contain a possible house number.

Type: This field has the same recommended type as the HOUSE-NUM since it will contain a possible house number.

FSTNAME

Width: If recommendations in this guideline are followed strictly, a full street name will never exceed 40 characters [see 6.2.2(e) regarding street name portion of a full street name].

Type: A character data type is necessary to enter valid data.

ALIAS_1

Width: This field has the same recommended width as FSTNAME.

Type: A character data type is necessary to enter valid data.

7.B STREET TYPES WITH DESCRIPTIONS

Alley (Aly)

A short, narrow passage commonly found between close buildings and not used for through traffic.

Avenue (Ave)

A thoroughfare running principally in an east-west direction and usually terminating at a north-south running street. (Note: Although this directional arrangement is the recommended standard, some cities or counties may already have established grid systems in which avenues run N-S and streets run E-W. In any case, avenues should never run parallel to streets.)

Boulevard (Blvd)

A street divided by a landscaped center or median, often flanked by sidewalks, and generally designated with an alphabetical name (rather than a number).

Bypass (Byp)

A thoroughfare specially designed to allow nearly uninterrupted travel around the periphery of a congested area.

Causeway (Cswy)

A roadway elevated above wet ground or water.

Circle (Cir)

A short street that intersects another street only once and terminates in a closed loop [see fig. 6.3.3(c)2].

Court (Ct)

A relatively short, uninterrupted dead-end street.

Crossing (Xing)

A roadway that traverses an important feature such as a railroad, waterway, mountain pass, or gorge. (Note: In many cases, **crossing** is a historical designation for what was once the only route of transport over a prominent feature. Many roadways, therefore, retain this designation even if that feature is now passable at many points or has ceased to exist.)

Drive (Dr)

A curvilinear street of appreciable length which continues through to other rights-of-way.

Expressway (Expy)

A high-speed, limited-access divided highway for through traffic.

Extension (Ext)

This street type is **not** recommended, because it is often incompatible with database standards. If it must be used, it should **never be combined with another street type**. For example, if *Laurel Boulevard* is a wide roadway in town with a median, which changes to an un-divided roadway with narrow lanes for a short distance after a “dogleg”, the narrower portion may be designated *Laurel Extension*, but **never *Laurel Boulevard Extension***.

Freeway (Fwy)

A high-speed, limited-access divided highway for through traffic.

Highway (Hwy)

A designated state or federal highway, usually designed to accommodate a large proportion of relatively high-speed traffic between cities. U.S. routes are also designated as highways.

Interstate (Int)

A road of the highest order which crosses state boundaries, characterized by limited access (usually merge/exit rather than signal controlled), wide right-of-way, and a through-traffic preference. This type is also used to designate a seamless extension of such a road (such as a spur or bypass) which does not cross state lines.

Lane (Ln)

A relatively short, uninterrupted street ending in a cul-de-sac.

Loop (Loop)

A short street that begins at and ends into the same parent street at two different points.

Parkway (Pky)

A special scenic street or park drive.

Pass (Pass)

A thoroughfare allowing access around or between obstacles.

Path (Path)

A non-urban roadway for low-speed traffic.

Place (Pl)

A relatively short, uninterrupted dead-end street.

Plaza (Plz)

An urban roadway accessing several commercial centers; also used in industrial parks.

Point (Pt)

A roadway allowing access to a bluff, dock, landing, scenic overlook, peninsula, or other terminal point.

Road (Rd)

A limited thoroughfare that is frequently used and often allows heavy traffic volume. A road may run in any direction, and is normally non-urban although it may extend through an urban area.

Spur (Spur)

A relatively short dead-end street, usually allowing access to a staging area or to other types of transportation.

Street (St)

A thoroughfare running principally in a north-south direction and usually terminating at an east-west running avenue. (Note: Although this directional arrangement is the recommended standard, some cities or counties may already have established grid systems in which streets run E-W and avenues run N-S. In any case, streets should never run parallel to avenues.)

Terrace (Ter)

A roadway flanked by a decline, often with an incline on the opposite side, and in many cases overlooking a river, gorge, park, or other scenic area.

Trail (Trl)

Any curvilinear street.

Walk (Wlk)

A thoroughfare designed to accommodate vehicular and pedestrian traffic, usually with access to recreational areas or storefronts.

Way (Way)

A widely applied thoroughfare designation, usually utilized in residential areas for aesthetic purposes.

7.C POTENTIAL ADDRESS DATA SOURCES

Practically every state agency, county, and city in the state of Georgia has a database containing addresses along with related information. Such databases might include utility customers, property owners, building permits, crime records, *et al.* These are all good examples and sources of specific address information; however, they do very little or nothing to help establish spatial relationships among these addresses. Without intimate local knowledge it is impossible to determine the spatial relationship, such as direct- or driving-distance, between any two addresses with a high level of confidence. To establish spatial relationships between addresses, it is necessary to have a **GIS road centerline coverage with address range attributes**, referred to in this document as a **roads database with address ranges (RDAR)**.

Unfortunately, the RDAR is much less common than the address database. The most widely used RDAR would be the Topologically Integrated Geographic Encoding and Referencing (TIGER) system developed and maintained by the USCB. TIGER data is comprehensive — that is, it contains address data for practically every part of the United States where such data exists. However, because the TIGER data encompasses the entire US, many imperfect or incomplete records have been assimilated. The Census Bureau cannot track every address change or road addition in the nation. City, county, and regional government agencies such as Regional Development Centers (RDCs) are better suited for the task of keeping record of street additions and address ranges. Unfortunately, not every city, county, or RDC has the resources to develop a detailed RDAR. Thus, there is great disparity in the scope and quality of data available at the local level, and even high quality data can be unwieldy if it exists only in paper form.

In summary, TIGER data is readily available for practically the entire United States, but the quality is unpredictable for local level use. Locally created data is not comprehensive and may range in quality from excellent to poor depending on the care that was taken in developing the data.

8. SELECTED REFERENCES

- Carl Vincent Institute of Government. Cobb County Addressing Report. Athens, GA: The University of Georgia, 1992.
- Centre County Street Naming and Addressing Policy. Centre County, PA: Centre County Board of County Commissioners, nd.
- Corwin, Margaret A. Street-Naming and Property-Numbering Systems (Report No. 332). Chicago: American Society of Planning Officials, 1978. ASPO is now the American Planning Association (APA).
- Information Technology Outreach Services. DLG-F Data Dictionary: Transportation. Athens, GA: The University of Georgia, 1998.
- LaMacchia, Robert A., et al. TIGER/Line[®] Files, 1998: Technical Documentation. Washington, DC: U.S. Department of Commerce, 1998.
- Miller, Harold V. A Guide to Street Naming and Property Numbering. nl: Tennessee State Planning Commission, 1951. Reprinted by Southern Association of State Planning and Development Agencies, 1960.
- National Emergency Number Association (NENA) Data Standards Subcommittee. NENA-02-001: Recommended Formats for Data Exchange. nl: NENA, June 1993.
- Property Identification Task Force of the Salt Lake County Council of Governments. Guidelines for Property Identification within the Salt Lake Metropolitan Area. Salt Lake City: Salt Lake County Public Works Department, Development Services Division, 1984.
- Street Naming and Property Numbering Systems: A Technical Manual. Little Rock: Metroplan, 1985.
- Subcommittee on Cultural and Demographic Data. Address Data Content Standard. nl: np, 1999.
- United States Postal Service. Publication 28: Postal Addressing Standards. Washington, DC: USPS, 1995.