State of Florida

Cadastral Mapping Guidelines

Compiled by the:

Florida Department of Revenue
Property Tax Administration
Mapping & GIS Section

In cooperation with the:
Florida Geographic Information Board

Table of Contents

Section 1

1.0 Introduction

The principal responsibility of the county property appraiser is to locate, inventory, and appraise all property within the jurisdiction. A complete set of maps is necessary to perform this function. Maps help determine the location of property, indicate the size and shape of each parcel, and reveal geographic relationships that affect property value. Maps and map data are important not only for property appraisers, but for other agencies and individuals.

To make maximum use of data on land parcels, it is desirable for jurisdictions to try to develop a multipurpose cadastre. A multipurpose cadastre furnishes a framework to record, store, and provide comprehensive land information at the parcel level, and makes it possible to share parcel data among all users of the data.

A multipurpose cadastre should have the following components: a series of current, accurate, large-scale photogrammetric base maps that are tied to a geodetic network; cadastral overlays delineating all real property parcels; a unique identifier assigned to each parcel that is used as a common index to all land records; and a series of land files each containing the parcel identifiers in addition to other data.

Any jurisdiction that undertakes a cadastral mapping program should work with other agencies to establish a multipurpose cadastre.[1]

1 International Association of Assessing Officers (IAAO), Standard on Cadastral Maps and Parcel Identifiers, 1988

These guidelines have been compiled by the Florida Department of Revenue, Property Tax Administration Program, Mapping & GIS Section to provide direction and assistance to the county property appraisers of the state.

1.1 Applicability

These guidelines apply to all county property appraisers or any other agency, institution, or corporation engaged in the preparation of maps for purposes as specified in Chapter 193.085 FS. Portions of these guidelines are practical only in a digital environment. Currently operating map programs which are technically or structurally unable to comply are not required to retrofit to these guidelines, but are encouraged to implement as many of these guidelines as soon as possible.

1.2 Staffing and Training

An effective mapping program requires adequate staff support. Staffing needs will depend on the type of mapping system and the size of the jurisdiction. All mapping personnel should receive training in procedures that are appropriate to the jurisdiction.[2]

In addition to traditional cadastral mapping skills and knowledge such as drafting, photogrammetry, and land transfer principles, among others, it may be desirable that personnel should also be capable of performing system analysis and design, database management, network administration, and computer operations. Adequate resources should be allocated to ensure that new and existing personnel receive appropriate periodic training.

Section 2

2.0 Base Map Development

A base map is a geometric control feature in a digital mapping system that permits many other specialized theme layers to be brought into absolute position by registration on the base map (See Appendix A). There are three general themes or layers of base map content that will permit registration of most other themes or layers: boundaries, roads, and water features. Boundaries can be divided into three classes: public land survey boundaries, parcel boundaries, and political boundaries.

2.1 Paper to Digital Conversion

Any approach to remapping should begin with a determination of the desired outcome of the project based on user needs and accuracy requirements prior to hardware and software purchases. Quality control measures should be implemented throughout the course of the project. There are several methods of converting paper maps to the

2 International Association of Assessing Officers, (IAAO) Standards on Cadastral Maps and Parcel Identifiers, 1988

computer. Each method must follow these fundamental principles to be successful. The alternatives of scanning, board digitizing and coordinate geometry must be evaluated to determine the most desirable method to be employed for each portion of a mapping project. Most mapping strategies will probably use a combination of conversion methods to effect the optimum conversion strategy for an entire project. Care should be taken to plan each project with adequate time and resources to ensure a final product that will meet the standard of accuracy determined for the project.

1. The source document must be of usable quality.
   a. Legible or restorable.
   b. Accurate in scale and direction.
   c. There are adequate sources to cover the area mapped.
   d. Source documents are accessible and available.

2. There is adequate control to locate the map in the real world.
   a. The frequency of the control ensures that all map portions are fitting properly.
   b. The dispersion of the control ensures that there is no distortion in areas of difficult fits.
   c. Controlled photos of project area should be inventoried and evaluated for use.
   d. All existing digital coverage should be inventoried and evaluated for control potential.

3. Coordinate geometry (COGO) should be implemented as much as possible to ensure consistency between recorded instruments, as built designs, other available digital maps, and the base map. Although coordinate geometry is usually regarded as the most accurate method of base map construction, it is sound practice to integrate the COGO work with existing reliable digital sources to ensure accuracy and consistency and minimize the expense and effort of the duplication of existing digital work. When inconsistencies between the property records and other mapping sources (i.e.: photo evidence) appear, a thorough investigation should be initiated to discover all the relevant evidence to make the judgement for locating the element on the map accurately. The recorded instrument remains the authoritative record upon which all property valuations must rely. If the record conflicts with the evidence of the map, the recourse for the mapper is to identify the discrepancy for reconciliation by the proper authorized parties.

4. Hardware and software should be evaluated and chosen that will implement the conversion successfully.

   a. Scanners should be of adequate resolution to convert source documents to a pixel size that will support desired accuracy.
   b. Scanners should support an adequate number of shading levels to reproduce the detail of the original document to the screen.

c. Scanners should be of adequate size to accommodate source material with a minimum of cutting or folding.
d. Digitizer resolution should support accuracy required.
e. Computer processing and storage must have the capacity to process and store large raster files.
f. The video adapter and monitor of the system must allow clear viewing of digitized materials.
g. The software employed must offer adequate manipulation tools to capture and enhance source documents.
h. The software employed must be friendly enough to ensure consistent, accurate use by trained operators.
i. Software employed must provide all the tools required to ensure accurate fitting of digitized source to project.
j. Software employed should facilitate quality control procedures.

5. Operators are trained and follow sound conversion procedures.

6. Quality control is frequent and thorough.

2.2 Outsource

Several vendors are available who can provide services ranging from technical assistance to turn-key systems, complete with periodic updates of map changes. Costs vary depending on the approach to conversion and the level of service provided. Careful consideration should be given to the costs and services provided, as well as ultimate ownership and use of the data generated. An in-house quality control program is essential to ensure that the product delivered is according to predetermined specifications.

Section 3

3.0 Accuracy

Map accuracy is the degree toward which any given feature(s) on a map conforms to its true position on the ground.

3.1 Benefits

The direct benefit of map accuracy is to ensure accurate spatial representation of mapped features not only on cadastral maps, but also for features included in other map themes such as those used for planning, permitting, routing and emergency services. Accurate cadastral maps aid property appraisers in the determination of equitable assessments throughout the jurisdiction.

3.2 Control

A base map consists of geometrically controlled features in digital mapping system that permits many specialized theme layers to be brought into absolute position by registration on the base map. A base map that would support property appraisal has three base components (Geodetic Control, Public Land Survey System, and Parcel Boundary) that permit the overlaying of other themes: boundaries, roads, and water features.

3.3 Horizontal Accuracy

Horizontal accuracy should meet or exceed U.S. National Map Accuracy Standards (NMAS). NMAS are reproduced in Appendix B of this document. Note, however, that adherence to NMAS can usually be achieved only when maps are compiled directly by survey, GPS, and/or photogrammetric methods.

U.S. National Map Accuracy Standards require that at scales of 1:20,000 and larger (for example, 1:12,000, 1:1,200) that 90% of a randomly chosen sample of well-defined map features will be on the map within 1/30 inch (0.03 inches) (at scale) of their true location on the ground. The table below illustrates the positional accuracy of several relevant scales.

Scale Horizontal Accuracy

1:1,200 + or - 3.33 feet

1:2,400 + or - 6.67 feet

1:4,800 + or - 13.33 feet

1:9,600 + or - 26.67 feet

1:10,000 + or - 27.78 feet

1:12,000 + or - 33.33 feet

3.4 Scale Mixing

The mixing of digital map data of widely divergent scales into a common database should be avoided, as the positional accuracy of the aggregate database would be considered to be no better than that of the smallest scale.

Section 4

4.0 Projections and Coordinate Systems

The following projections and coordinate systems are recommended for the input, storage, and in particular, the exchange of digital map data. It is recommended that cadastral maps in Florida be based upon state plane coordinates adjusted to the 1983 (1990 readjustment) horizontal datum. Other projections and coordinate systems may be used to satisfy special requirements.

4.1 Florida Coordinate Systems (1927 and 1983 datums)

The Florida Coordinate Systems, 1983/90 datum, in which map distortion has been minimized by dividing the state into three zones (See Appendix C) must, by state law, be used for surveying and the compilation of engineering maps. These systems may also be used for the compilation of regional maps, but since they do not provide uninterrupted coverage of the entire state, such mapping should not extend beyond the limits of any given zone. These systems may be used for the input, storage, and exchange of digital map data, as well as for the output of hardcopy maps.

4.2 Latitude - Longitude (Geographic)

Latitude - Longitude is a projectionless coordinate system that may be used for the input, storage, and exchange of digital map data. Although it may also be used for the output of hardcopy maps, it is not structurally suited for that purpose.

4.3 Universal Transverse Mercator (UTM)

The Universal Transverse Mercator map projection system may be used for regional mapping, but like the State Plane Coordinate Systems, such mapping should not extend beyond the limits of any given zone. This system may be used for the input, storage, and exchange of digital map data, as well as for the output of hardcopy maps.

4.4 Transverse Mercator Projection

The Transverse Mercator map projection is based on an imaginary cylinder covering the area of interest. This projection is best for areas that lie in a north-south direction such as the Florida peninsula. This system may be used for the input, storage, and exchange of digital map data, as well as for the output of hardcopy maps.

4.5 Lambert Conformal Conic Projection

Lambert projects an imaginary cone to cover the area of interest and has greater east-west integrity than north-south such as the Florida panhandle area. This system may be used for the input, storage, and exchange of digital map data, as well as for the output of hardcopy maps.

Section 5

5.0 Cartography

Map design considerations determine whether a map is legible and easily interpreted. The following cartographic elements should appear on all cadastral maps in order to facilitate functionality, while other elements may be included as optional according to local needs or resources.

5.1 North Arrow

An arrow-like symbol indicating the direction to which the control framework of a map or drawing is referenced.

5.2 Scale Representation

Since maps must necessarily be smaller than the areas mapped, their use requires that the ratio or proportion between comparable measurements be expressed on the map. This is called map scale and should be the first thing of which the map user becomes aware.[3] Scale should be expressed as a statement of map distance in relation to earth distance or a graphic (or bar) scale or both.

5.3 Map Date

The actual date the map was plotted should be prominently displayed.

5.4 Title Block

A title block may include such items as county and state names, scale, north arrow, legend, plot date, disclaimer, and map index, among others.

3 Elements of Cartography, Fourth Edition, John Wiley & Sons Inc., 1978, pg. 46

5.5 Disclaimer

Disclaimers are used to limit and define the map author's responsibility for the content, accuracy, and currency of a map. Although some maps may require specialized disclaimers, the following disclaimer represents one suggestion:

> "This map is the product of *Agency, Division* and was printed on *Date.* This map was produced with the intent that it be used for *Purpose* at the scale of *X*. There are no warranties made as to the fitness of this map for any unlisted purpose or reproduction at any other than the original scale."
>
> The agency can complete the italicized sections with appropriate information relating to the agency and the purpose of the map.

5.6 Lines and Other Delineations

Certain lines are basic and are expected to appear on any cadastral map. Significance of some lines may be distinguished by line weight.

5.6.1 Public Land Survey System Lines (PLSS)/Land Grant Lines

Rule 12D-8.008, (1), (a), Florida Administrative Code, requires all descriptions (and thus parcel maps) to be based upon reference to the government grid survey system.

5.6.2 Parcel Lines

Parcel, or boundary lines of all assessed property. Parcel lines may include the following line types: subdivision, block, right-of-way, hydrographic.

5.6.3 Lot Lines

All recorded subdivision lot lines, except that when said lines are not coincident with parcel boundary lines they may be displayed as "broken lines" and/or maintained in a separate layer.

5.6.4 Block Lines

Recorded subdivision block lines.

5.6.5 Easement Lines

All easement lines that present a significant influence on property value should be displayed. A significant influence on property value may occur in the presence of an easement that is not general or common to all properties (i.e. conservation

easements, drainage easements, and ingress and egress or right-of-way easements).

5.6.6 Right-of-Way Lines

Road, utility, and railroad right-of-way lines form parcel boundaries.

5.6.7 Hydrographic Lines

Water boundaries (i.e. seas, lakes, streams, rivers) forming parcel boundaries, or where significant to value.

5.7 Annotation

Lettering a map means the preparation of this aspect of the artwork, which includes all the names, numbers, and other typographical material.[4] Procedures for the placement and size of annotation should be developed by each jurisdiction. Accurate interpretation of a map is dependent upon the annotation placed thereon. Certain elements of annotation are expected to appear on any cadastral map.

5.7.1 Acreage

Rule 12D-1.009, Florida Administrative Code states that all acreage of parcels over one acre in size, where known, are to be reflected on the map. Where known as used in the rule means acreage from instruments of title as are usually recorded in the public records of the county.

5.7.2 Dimensions

Rule 12D-1.009, Florida Administrative Code states that all dimension of parcels over one acre in size, where known, are to be reflected on the map. Where known as used in the rule means dimensions from instruments of title as are usually recorded in the public records of the county.

5.7.3 Lot Numbers

Numbers of all recorded subdivision lots, all Government Lots, and where applicable, numbers of lots in "unrecorded subdivisions".

5.7.4 Block Numbers

Numbers of blocks in all recorded subdivisions and where applicable, numbers of blocks in "unrecorded subdivisions".

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4 Elements of Cartography, Fourth Edition, John Wiley & Sons, Inc., 1978

5.7.5 Street, Road, Right-of-Way Names

Names and/or route numbers of streets, roads, and rights-of-way forming parcel boundaries.

5.7.6 Subdivision and Condominium Names

Names or reference codes of all subdivisions and condominiums. Where only reference codes are utilized it is suggested that an associated legend be shown.

5.7.7 Easements

Where easements are shown it is recommended that the type of easement be displayed.

5.7.8 Parcel Numbers

See Section 10 of this document.

Section 6

6.0 Map Compilation

Five major tasks need to be considered when actually developing a parcel map system.[5] These tasks include:

1. Assembling and weighting source data
2. Constructing a framework for the parcel maps
3. Compiling the boundaries of parcels
4. Adding notation as needed
5. Maintenance
6. Quality control

The issues of annotation and maintenance are addressed in Section 5.8 and Section 7.0, respectively, of this document.

6.1 Assembling Source Data

The first task in the creation of a parcel map is to assemble relevant records from appropriate sources. These sources include but are not limited to:

5 Multipurpose Land Information Systems: THE GUIDEBOOK, October, 1989, Federal Geodetic Control Committee, Chapter 13

1. Title records
2. Assessment records
3. Infrastructure records (highways, utilities, transmission lines, etc.)
4. Land use and zoning regulation records
5. Resource and environmental records
6. Court records
7. Survey records (plats, plans, and surveyor notes)
8. Aerial photographs
9. U.S. Geological Survey maps
10. Government Land Office Surveys (township plats and notes)
11. Existing parcel (or tax) maps.

Highly weighted information should be plotted first and held fixed, while lower-weighted information is fitted to it.[6] Highly weighted information means the most precise and accurate data available, upon which the highest degree of reliance can be placed.

Weighting source data is a process by which you classify your mapping data, from the geodetic control to the parcel descriptions. It can and will determine the validity and accuracy of your maps. It should be done by a person with extensive cadastral mapping experience and a good working knowledge of surveying principles and practices.

It should be noted that the various sources of control will likely be based on unrelated reference systems or bases. It is imperative that a single reference base be chosen for the entire jurisdiction being mapped and that all subsequent survey data be "rotated" to the common control base.

6.2 Constructing a Framework for the Parcel Maps

The framework for parcel mapping establishes a link to a ground control system that is common to all maps in a digital mapping system. This linkage has two forms: 1) direct ties by ground surveys between the National Geodetic Reference System (NGRS) and the legal referencing system for parcels and 2) the planimetric detail of the base map.

6.3 Compiling the Boundaries of Parcels

Once relations between locations that constitute the framework are determined, the process of placing parcels within the framework begins. This process depends upon a prioritization of the parcel records and data.

While all aspects of parcel mapping are important, particular attention should be focused on ensuring that all parcels are accounted for.

6 Multi Purpose land Information Systems: THE GUIDEBOOK, October, 1989, Federal Geodetic Control Committee, Chapter 19

6.3.1 Map Boundary Compilation Issues

To effectively display and perform analysis on mapped data, consideration should be given to the following issues:

1. Tax district or taxing unit boundaries shall split contiguous ownership into separate parcels. Exceptions to this rule are subdivided lots that are already described in their smallest legal division. When a taxing district or line cuts through a subdivision lot, it shall be parcelled in the district where the largest volume of land occurs or where the improvement is located, wherever practical.[7]

Section 7

7.0 Map Maintenance

It is important that cadastral maps be a reflection of the respective county's tax roll. A regular maintenance program should be implemented to assure that the maps are current and accurate.

7.1 Updating

There should be a direct correlation between what is depicted on a parcel map and the assessment roll.

7.2 Quality Control

Standard procedures for quality control should be established to continuously edit and inspect all ownership maps for accuracy, neatness, and completeness.

Section 8

8.0 Land Descriptions

Real property descriptions prepared for the assessment rolls shall conform to the minimum requirements as set forth in Rule 12D-8.008, F.A.C. Descriptions should be written so as to afford a taxpayer adequate notice of the tax assessed against his property. Furthermore, such clarity in a description would reduce errors in the tax sale process.

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7 International Association of Assessing Officers, Standards on Cadastral Maps and Parcel Identifiers, 1988, page 25

8.1 Interpretation

Omission of qualifying and descriptive words and phrases should be avoided, as should unnecessary abbreviations, which would render the description nonsensical. Remainder descriptions of a parcel that has been divided should be written as negative, that is, by excepting the portion from the parent parcel for which an accurate description appears of record.

8.2 Abbreviation

It is preferable, for clarity, to avoid the use of abbreviations in property descriptions except for those words or phrases that are commonly abbreviated. In such cases, usage should be made in accordance with the abbreviations and their associated meanings as given in Rule 12D-8.008, 2, (d), F.A.C.

8.3 Condensing Descriptions

This is a difficult and important process and should be avoided except in extreme cases. Reducing the length of descriptions by using accepted standard abbreviations and eliminating unnecessary wording results in a more compact assessment roll, however qualifying words and phrases should never be eliminated. When bearings and dimensions are used, rounding and truncating should be avoided. If condensing a land description is necessary the corresponding public record (i.e. official record book and page) should be referenced.

Section 9

9.0 Land Description Conflicts and Solutions

Some of the errors, problems, and omissions encountered in land descriptions are discussed and suggested solutions offered in the sections, which follow.

9.1 Double Assessment

Double assessment is the most common error found on the assessment roll and is described as a parcel that appears on the assessment roll twice, in part or in its entirety. Parcels that are double assessed in their entirety are usually the result of errors copying, or condensing, from the source document, or failure to except a parcel from the original description.

9.2 Omitted Areas

Omitted areas are frequently the result of the excepting of an exempt parcel from a description and failing to list the descriptions for these areas. These descriptions may frequently be located in assessment rolls for prior years.

9.3 Parcel in Vacated Portion of Plat

Vacated portions of a plat have the same status as any other acreage property and should be assessed by a metes and bounds description. Plats not vacated but which are superseded by a plat recorded at a later date should be dropped from the assessment roll. The plats or parts recorded last take precedence over all earlier recorded plats of the same area.

9.4 Government Lands

The land of any governmental unit is to be mapped in the same manner as all other lands.

9.5 Islands

Islands within an assessing district are to be mapped the same as other areas of a county. The (U.S.G.S.) quadrangle maps will usually give the island name.

9.6 Addressing Erroneous Descriptions

Cadastral mapping will occasionally reveal errors in deed descriptions such as gaps, gores, overlaps and the failure to mathematically close. It is not within the scope of the duties of the property appraiser or the cadastral mapper to attempt to resolve such discrepancies. Efforts may be made to contact deed scriveners or parties in the transaction to reveal the discrepancy.

Section 10

10.0 Parcel Numbering

A parcel identification system provides a method for referencing land parcels, or data associated with parcels, using a number or code instead of a complete legal description. The correlation of maps and individual property records requires that all parcel files be indexed using a uniform parcel identifier.

There are three basic forms of parcel identifiers in common use: location identifiers, name-related identifiers, and alphanumeric identifiers. The primary identifier for assessment purposes should be a location identifier.

A location identifier is one in which the parcel number provides the location of the parcel. Examples include map-based identifier systems, geographic coordinate identifier systems, or identifiers related the Public Land Survey System.

Parcel identifiers should be unique and permanent, that is assigned to one and only one parcel and should change only when the boundaries of the parcel change, and a new parcel is created.[8]

It is recommended that, when mapping is accomplished digitally, a centroid, or geographic coordinate system of parcel identification, based upon the Florida State Plane Coordinate System be established as a secondary method of identification. Parcel identifiers using this system are composed of x and y coordinates for a single point, usually the approximate center of the parcel. The following example illustrates such a concept:

Parcel (polygon) Centroid: This number would consist of 19 numeric character fields in the current 12D-8 (NAL) file that is submitted to the Department of Revenue annually. It would be added to the end of the existing record layout and broken out as follows:

Fields 1 through 7 would represent whole numbers left of the decimal in the State Plane Coordinate Easting (X) value;
Fields 8 through 14 would represent whole numbers left of the decimal in the State Plane Coordinate Northing (Y) value;
Fields 15 through 17 would represent condominium unit, if applicable. (Units 1-999);
Field 18 and 19 would denote the Datum (ie. 27= 1927 datum, 83=1983 datum).

Since the State Plane Coordinate zone boundaries follow county boundaries and the Department requires a county code number (first 2 character fields) as part of the 12D-8 record layout, there is no need to indicate the zone nor further identify the county.

This number can be generated in two ways:

(1) Software generated; Most, if not all CADD/GIS software that are polygon based generate this number automatically when a polygon (parcel) is built. It calculates the mathematical centroid of that polygon. In many cases it is the tag (or label) point. However, in some cases the mathematical center of the polygon could fall outside of the actual polygon boundary. In those cases, or if the county chooses not to use this method, the following is an alternative method:

(2) Manually generated; The mapper and/or CADD operator can physically pick the centroid point with the mouse.

As long as the actual point falls within the parcel boundary, either means is acceptable.

8 International Association of Assessing offices, 1988, Standard on Cadastral Maps and Parcel Identifiers, page 10

This number would not be a replacement to the current parcel number now in place in all 67 counties, however it would be in addition to that number and would provide an actual physical location to all parcels within the state. It is up to the discretion of the property appraiser whether this record is maintained throughout the year or only generated at the time of tax roll submission.

Section 11

11.0 Data Archival

It is recommended that each jurisdiction implement a plan for archival of digital map data.

In order to avoid loss of digital map data in the event of mechanical failure, a back-up copy of the map data base should made on a regular schedule. The frequency, method, and media used for data back up will be determined by the jurisdiction's maintenance schedule.

Consideration should be given to off-site storage of the map data base to protect against the loss of on-site archived data in the event of theft, fire or natural disaster.

Section 12

12.0 Data Exchange Standards

Various methods of data exchange used by state, regional, local governments and private sector organizations depend on the complex matrix of hardware and software systems in place at both the source and target organizations. In determining the most desirable exchange format, considerations must be made for the preservation of accuracy and completeness, transfer efficiency, the data type (vector or raster) and the intended use of the data. In addition, compliance with F.S. 119 should also be assured.

12.1 Native and Direct Data Exchange Formats

Native data exchange formats for vector and raster data should be used for transfers between like software systems. If a direct exchange format exists between two dissimilar GIS software systems, it should be used only after a detailed investigation based on the considerations stated above in section 12.0.

12.2 Common Data Exchange Formats

Common exchange formats listed below should be used when vector data exchange in native and direct exchange formats are not available. If compression of data is used to

reduce file size be certain that the receiving agency has the appropriate software to read the data.

- **ESRI Export Format (.e00)**
- **ESRI Shape File (.shp)**
- **Spatial Data Transfer Standard (SDTS)**
- **Drawing Exchange Format (DXF)**
- **Digital Line Graphs (DLG-3) standard or optional format**
- **Initial Graphics Exchange Standard (IGES) Version 3**
- **Standard Interchange Format (SIF)**

12.3 Data Exchange Media

Various data exchange media are dependent on the hardware systems installed at the source and target organizations. The users exchanging data will determine the best media based on available network connections, modem connections, available input and output devices, CDROM or other transfer media.

Section 13

13.0 Metadata

Metadata are commonly defined as the data about data or the data about the processes performed on data. The major uses of metadata are:

- To maintain an organization's internal investment in geospatial data.
- To provide information about an organization's data holdings to data catalogues, clearinghouses, and brokerages, and
- To provide information needed to process and interpret data to be received through a transfer from an external source.[9]

13.1 Federal Geographic Data Committee (FGDC) Metadata Standards

It is recommended that consideration be given to documentation of the data utilized in the construction of cadastral maps. The State of Florida Geographic Information Board (GIB) has chosen to adopt the full Federal Geographic Data Committee (FGDC) Content Standard for Geospatial Metadata, and reserves the right to add to this content standard as necessary to accommodate the needs of the citizens of the State of Florida. It is further recommended that the FGDC Content Standard for Geospatial Metadata be referred to as a template for documenting the quality and source of cadastral map data.

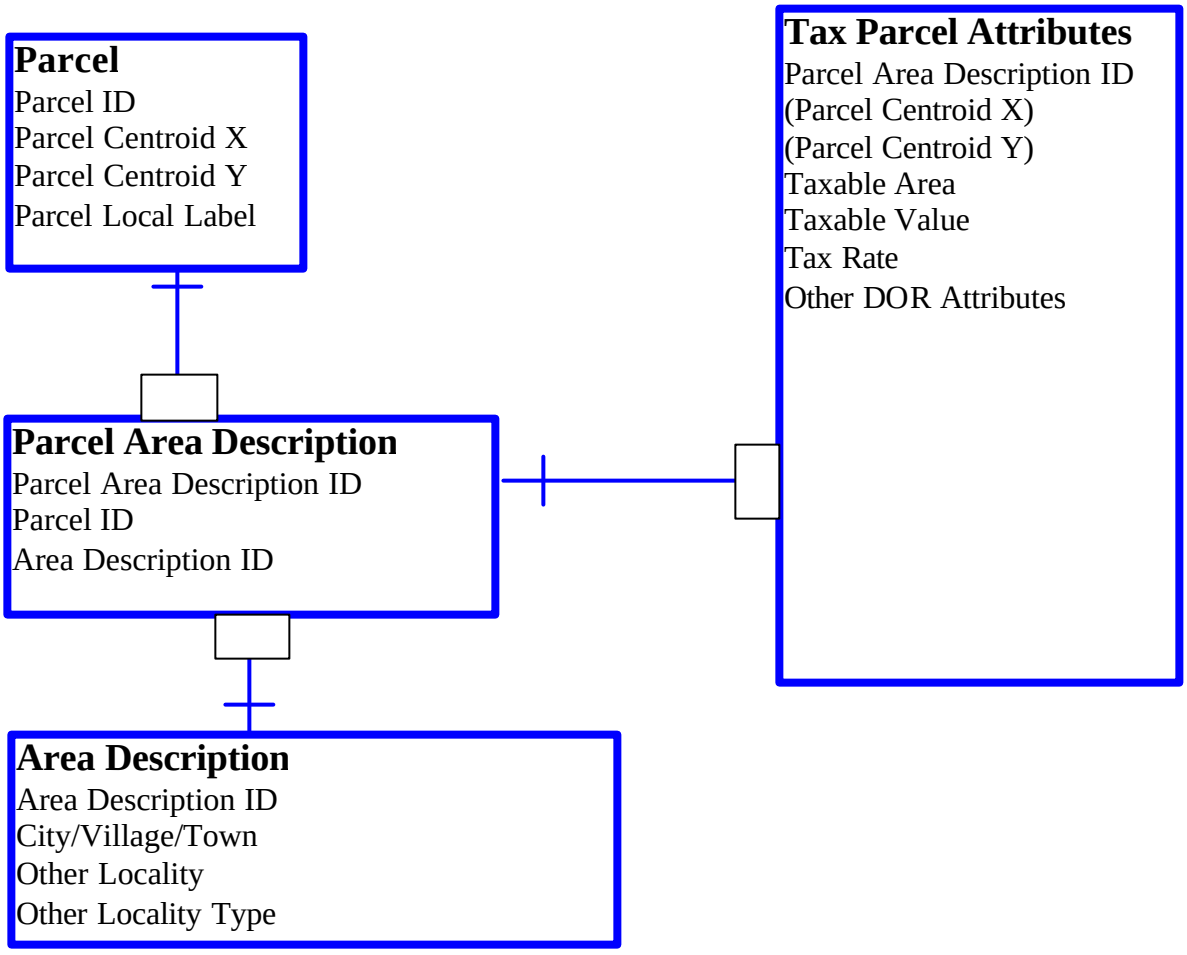
9 Federal Geographic Data Committee, Cadastral Standards for the National Spatial Data Infrastructure

Section 14

14.0 Data Base Design

Particular attention should be paid to data base design and organization to facilitate data exchange among state and local governmental agencies. The following illustrates a logical model for tax parcel geometry and tabular data intended for newly designed systems, if desired.

14.1 Logical Model for Tax Parcel Geometry and Tabular Data



This diagram illustrates the core components for transferring the geometry of tax parcels. In this diagram, the parcel is assumed to be the tax parcel. The parcel boundaries have been determined by the local government prior to transfer. The method for computing the boundary of each parcel, such as coordinate geometry or best fit to an orthophoto, are not being transferred in this example. The parcel geometry is expressed as a Shape (or similar) file.

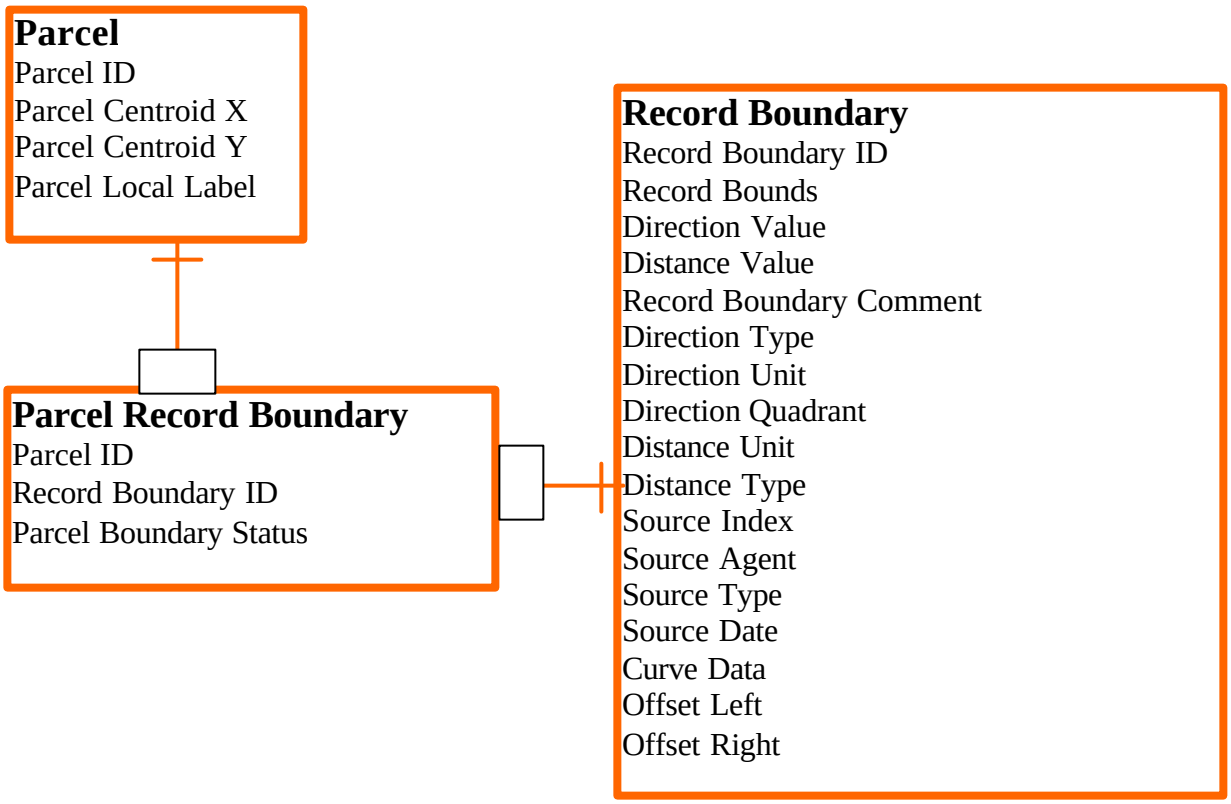
This model indicates that the polygons or areas that define cities, villages and towns and other tax districts may be separate shape files. For example, if the boundaries of the cities, village, and towns come from a different source than the parcels or are stored on a separate layer or as a separate object or separate graphic, then these items should be transferred as separate shape files. In these cases, the metadata for the cities, villages, and towns and other tax districts would be different than the metadata for the parcels.

If the city, village, and town are carried as attributes of the parcel, then any time a new city, village, or town or tax district intersects an ownership parcel, a new tax parcel is created. In this case the attributes for city, village and town and tax districts would be in the same Shape file as the parcel.

By connecting the tabular tax records to the intersecting entity, both scenarios are accomplished.

In the related tabular data file the primary key form the joining of the parcel to the tax districts is carried as the database primary key. The additional attributes for Parcel Centroid X and Parcel Centroid Y were added explicitly. In a relational database system this is not necessary, but is included to show that the linkage could also be made in this way.

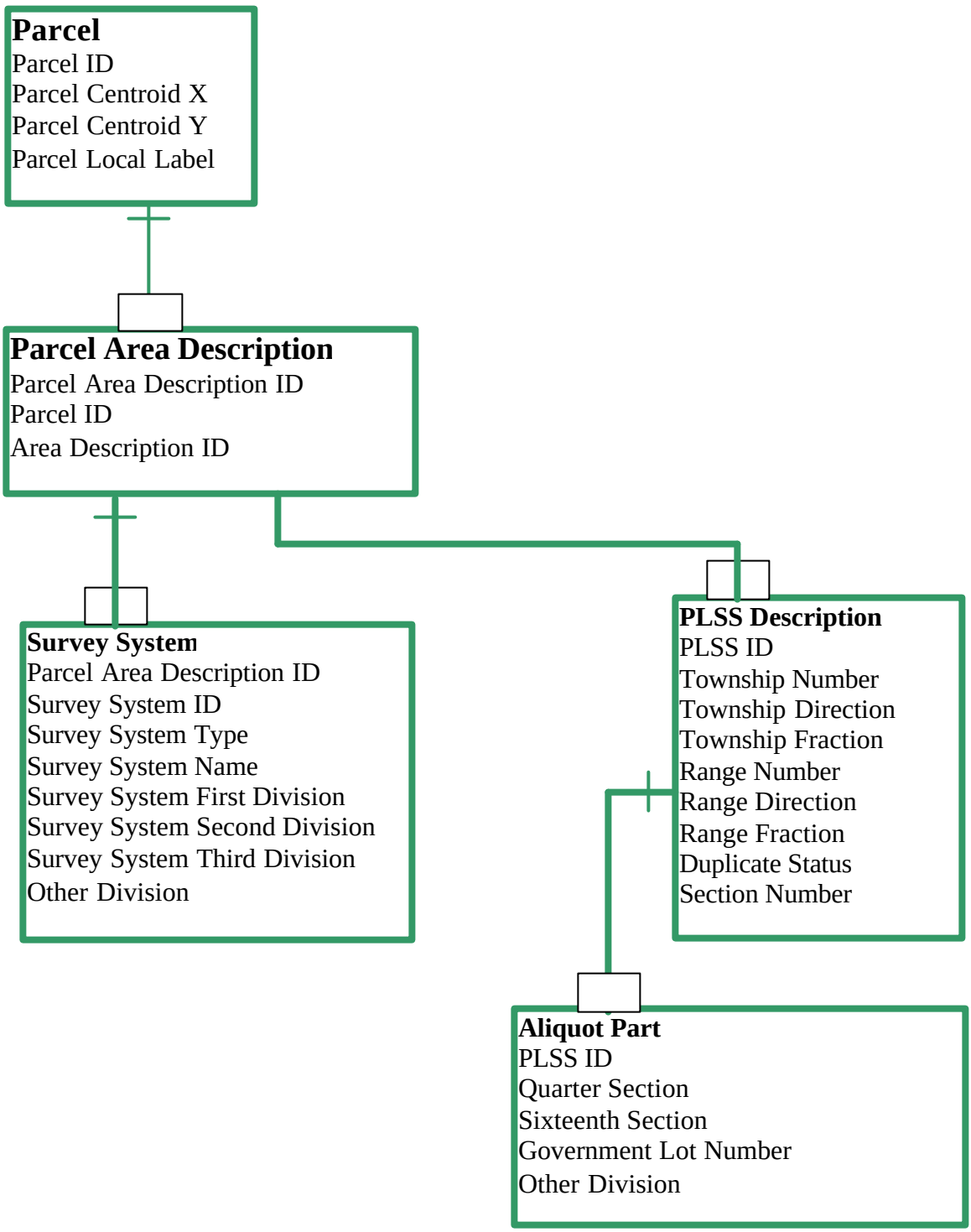
14.2 Logical Model for Tax Parcel Boundary Geometry



This diagram illustrates the core components for transferring the boundary information for the tax parcels from local governments to the Department of Revenue. In this diagram, as in the first diagram, the parcel is assumed to be the tax parcel. These are attributes that attach to lines in a file that describe the measurement information used to generate the tax parcel boundary.

Much of the information in this diagram is captured automatically as part of the coordinate geometry or other parcel automation process.

14.3 Logical Model for Tax Parcel Legal Area Description



This diagram could be an attachment to a parcel geometry file from the first diagram or this may be part of the County's existing GIS or CAD data files. The content of this file serves as a checklist for the information that may need to be included in a boundary

information file. The logical model provides a structure for the boundary information and standardizes the content and abbreviations. This standardization will make it easier to write programs to develop exports to or extract from a parcel boundary information file.

In terms of physical form, the information on units and source may be stored in separate look up tables that are then related to the line or boundary through the primary key, Records Boundary ID. It is also possible to further standardize the curve information and pull it out to a look up table as well.

Section 15

15.0 Glossary of Terms

absolute map accuracy. The accuracy of a map in relationship to the earth's geoid. The accuracy of locations on a map that are defined relative to the earth's geoid are considered absolute because their positions are global in nature and accurately fix a location that can be referenced to all other locations on the earth.

base map. A map showing certain fundamental information, used a base upon which additional specialized data are compiled.

cadastre. An official register of the quantity, value, and ownership of real estate; used in determining property value.

cadastral map. A map showing the boundaries of subdivisions of land, for the purposes of describing and recording ownership; used in determining property value.

compilation. (1) Cartography: the production of a new or revised map or chart, or portion thereof, from existing maps, aerial photographs, surveys, new data, and other sources. (2) Photogrammetry: The production of a map or chart, or portion thereof, from aerial photographs and geodetic control data, by means of photogrammetric instruments.

coordinates. Linear or angular quantities that designate the position of a point in a given reference frame or system. Also used as a general term to designate the particular kind of reference frame or system, such as state plane coordinates or spherical coordinates.

coordinate geometry (COGO). Automated mapping software that translates the alphanumeric data associated with a survey (distances, bearings, coordinates, etc.) into digital map information for creating and updating a digital cartographic data base.

centroid. A code (usually numerical) used to locate or identify a point, such as the center of a parcel.

Florida High Accuracy Reference Network. The extension of the National Geodetic Reference System into Florida is referred to as the Florida High Accuracy Reference Network (HARN). A HARN is a statewide or regional upgrade in accuracy of the North American Datum 1983 (NAD83) coordinates using GPS observations.

geodesy. A branch of applied mathematics concerned with the determination of the size and shape of the earth and the exact positions of points on its surface and with the description of variations of its gravity field.

geodetic coordinates. The quantities of geodetic latitude or longitude that define the position of a point on the surface of the earth with respect to the reference spheroid.

geographic coordinates. A system of spherical coordinates for defining the position of points on the earth. The declinations and polar bearings in this system are the geographic latitudes and longitudes respectively.

Geographic Information System (GIS). A computerized data-base system for capture, storage, retrieval, analysis, and display of spatial data.

geoid. The shape of the earth as a three-dimensional spheroid that coincides with the surface of the earth at sea level and extends in an imaginary surface through the continents with a direction of gravity that is perpendicular at every point.

geometric. Of, relating to, or according to the methods or principles of geometry.

Global Positioning System (GPS). Determination of coordinates of points using a network of satellites intended for this purpose.

index map. (1) A map of smaller scale on which are depicted the locations (with accompanying designations) of specific data, such as larger-scale topographic quadrangles or geodetic control. (2) Photography: A map showing the location and numbers of flight strips and photographs.

lot. A plot of land, generally a subdivision of a city, town, or village block, or some other distinct tract, represented and identified by a recorded plat.

monument. A permanent physical structure marking the location of a survey point or boundary line. Common types of monuments are inscribed metal tablets set in concrete post, solid rocks, or parts of buildings: distinctive stone posts; and metal rods driven in the ground.

multipurpose cadastre. A framework that supports continuous, readily available, and comprehensive land-related information at the parcel level.

parcel. A single, discrete piece of land having defined physical boundaries and capable of being separately conveyed.

photogrammetry. The art, science, and technology of obtaining reliable information about physical objects and the environment through processes of recording, measuring, and interpreting images and patterns of electromagnetic radiant energy and other phenomena.

planimetric map. A map that presents only the horizontal positions for the features represented; distinguishable from a topographic map by the omission of relief in measurable form.

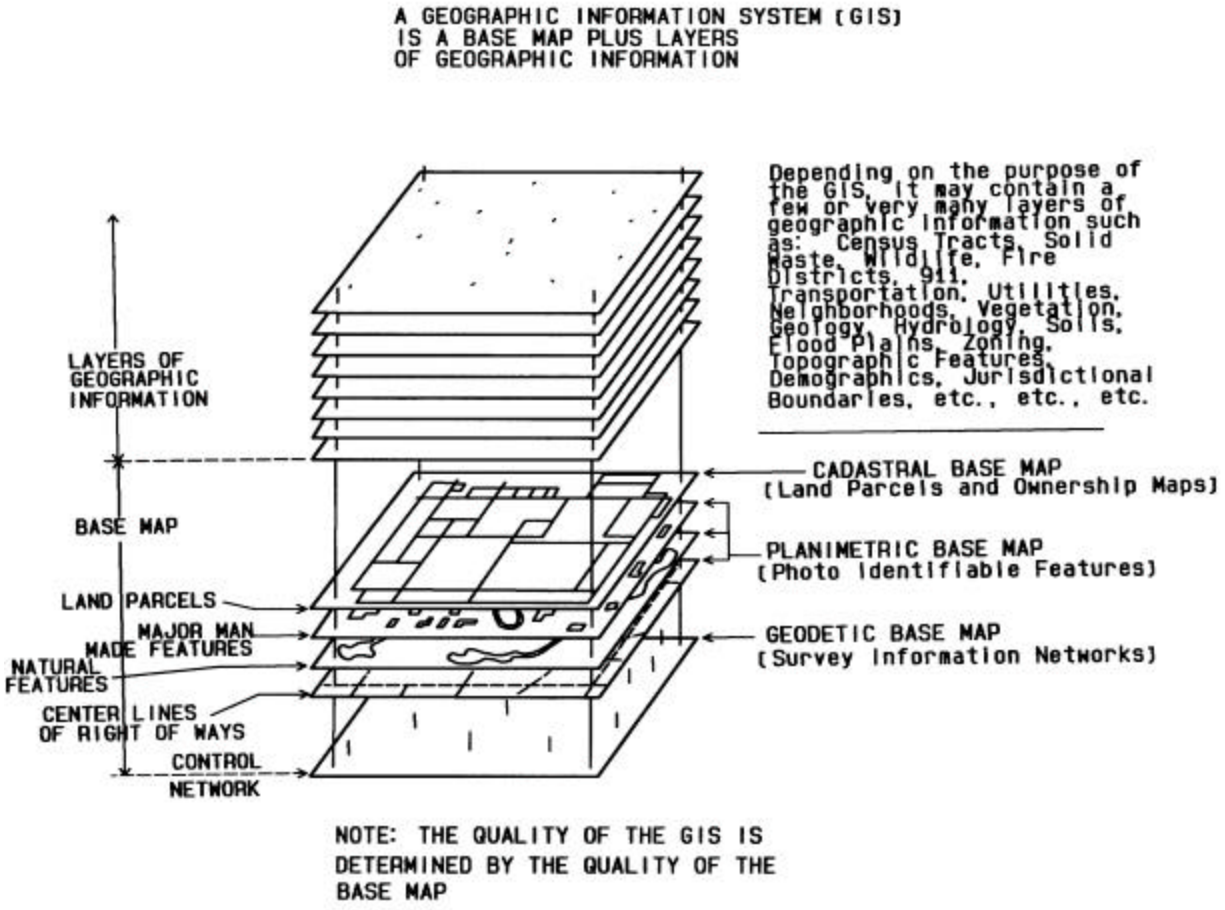
plat. A diagram drawn to scale showing all essential data pertaining to the boundaries and subdivision of a tract of land, as determined by survey or protraction.

projection. A systematic representation of all or part of the surface of a sphere onto a plane.

relative map accuracy. The accuracy of a map in relation to a local survey network that is not tied to the earth's geoid. The accuracy of locations on a map defined relative to a local survey network is considered relative because the positions are accurate only within a certain geographic area covered by the network.

state plane coordinate systems. A series of grid coordinate systems prepared by the U.S. Coast and Geodetic Survey for the entire United States, with a separate system for each state. Each state system consists of one or more zones. The grid coordinates for each zone are based on, an mathematically adjusted to, a map projection.

Appendix A


A GEOGRAPHIC INFORMATION SYSTEM (GIS)
IS A BASE MAP PLUS LAYERS
OF GEOGRAPHIC INFORMATION
Depending on the purpose of the GIS, it may contain a few or very many layers of geographic information such as: Census Tracts, Solid Waste, Wildlife, Fire Districts, 911, Transportation, Utilities, Neighborhoods, Vegetation, Geology, Hydrology, Soils, Flood Plains, Zoning, Topographic Features, Demographics, Jurisdictional Boundaries, etc., etc., etc.
LAYERS OF GEOGRAPHIC INFORMATION
BASE MAP
CADASTRAL BASE MAP
(Land Parcels and Ownership Maps)
PLANIMETRIC BASE MAP
(Photo Identifiable Features)
GEODETIC BASE MAP
(Survey Information Networks)
LAND PARCELS
MAJOR MAN MADE FEATURES
NATURAL FEATURES
CENTER LINES OF RIGHT OF WAYS
CONTROL NETWORK
NOTE: THE QUALITY OF THE GIS IS DETERMINED BY THE QUALITY OF THE BASE MAP

Appendix B

United States National Map Accuracy Standards

With a view to the utmost economy and expedition in producing maps which fulfill not only the broad needs for standard or principal maps, but also the reasonable particular needs of individual agencies, standards of accuracy for published maps are defined as follows:

1. Horizontal Accuracy. For maps on publication scales larger than 1:20,000, not more than 10 percent of the points tested shall be in error by more than 1/30 inch, measured on the publication scale; for maps on publication scales of 1:20,000 or smaller, 1/50 inch. These limits of accuracy shall apply in all cases to positions of well-defined points only. Well-defined points are those that are easily visible or recoverable on the ground, such as the following: monuments or markers, such as bench marks, property boundary monuments; intersections of roads, railroads, etc.; corners of large buildings or structures (or center points of small building); etc. In general what is well defined will also be determined by what is plottable on the scale of the map within 1/100 inch. Thus while the intersection of two road or property lines meeting at right angles would come within a sensible interpretation, identification of the intersection of such lines meeting at an acute angle would obviously not be practicable within 1/100 inch. Similarly, features not identifiable upon the ground within close limits are not to be considered as test points within the limits quoted, even though their positions may be scaled closely upon the map. In this class would come timber lines, soil boundaries, etc.

2. Vertical accuracy, as applied to contour maps on all publication scales, shall be such that not more than 10 percent of the elevations tested shall be in error more than one-half of the contour interval. In checking elevations taken from the map, the apparent vertical error may be decreased by assuming a horizontal displacement within the permissible horizontal error for a map of that scale.

3. The accuracy of any map may be tested by comparing the position of points whose locations or elevations are shown upon it with corresponding positions as determined by surveys of higher accuracy. Tests shall be made by the producing agency, which shall also determine which of its maps are to be tested, and the extent of such testing.

4. Published maps meeting these accuracy requirements shall note this fact on their legends as follows; "This map complies with National Map Accuracy Standards."

5. Published maps whose errors exceed those forestated shall omit from their legends all mention of standard accuracy.

6. When a published map is a considerable enlargement of a drawing (manuscript) or of a published map, that fact shall be stated in the legend. For example, "This map is an enlargement of a 1:20,000-scale map drawing," or "This map is an enlargement of a 1:24,000-scale published map."

7. To facilitate ready interchange and use of basic information for map construction among all Federal mapmaking agencies, manuscript maps and published maps, wherever

economically feasible and consistent with the uses to which the map is to be put, shall conform to latitude and longitude boundaries, being 15 minutes of latitude and longitude, or 7.5 minutes, or 3-3/4 minutes in size.

U.S. BUREAU OF THE BUDGET

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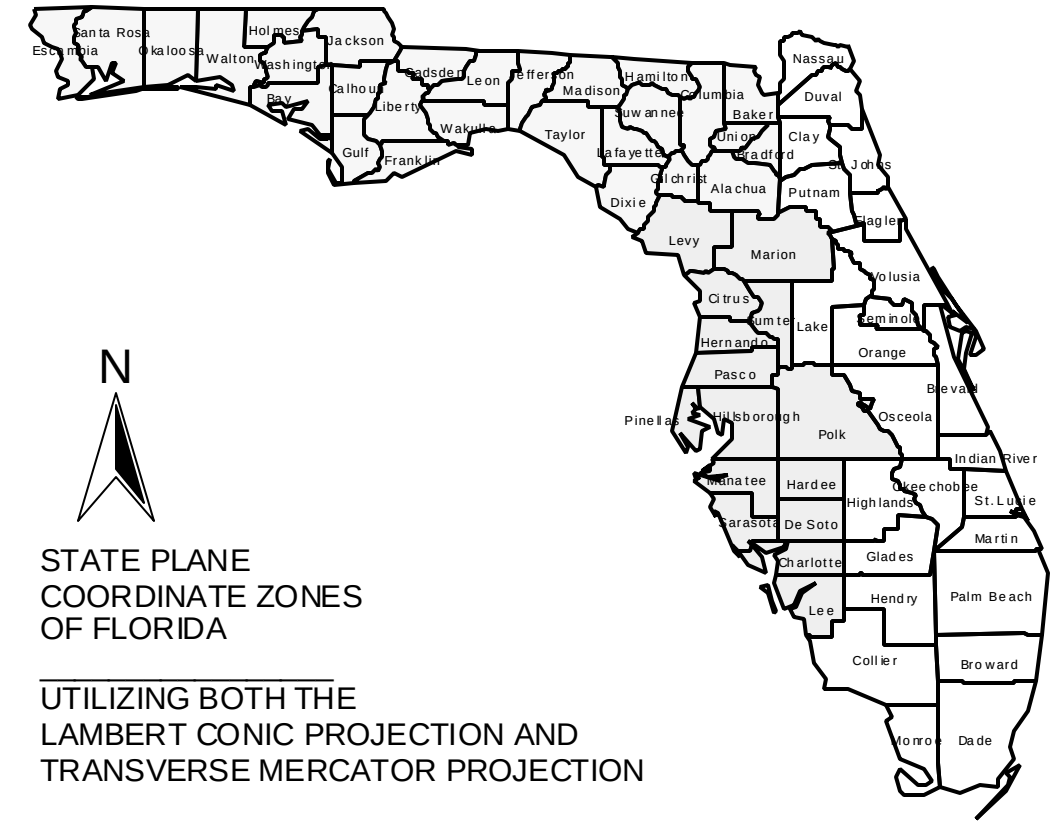
Appendix C



STATE PLANE
COORDINATE ZONES
OF FLORIDA

_____

UTILIZING BOTH THE
LAMBERT CONIC PROJECTION AND
TRANSVERSE MERCATOR PROJECTION

☐ WEST
☐ NORTH
☐ EAST

FLORIDA DEPT. OF REVENUE
PROPERTY TAX ADMINISTRATION
GIS/MAPPING SECTION