CADASTRAL AERIAL MAPS AND A PERMANENT PARCEL NUMBERING SYSTEM--TOOLS FOR LOCAL GOVERNMENT

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During the past 20 years The Sidwell Company has completed 61 tax map (fiscal cadaster) projects encompassing over 4 million parcels, or 1/20 of the national total.

A large portion of the financial structure of local government is based on the foundation of property assessments. If the foundation is well laid, the structure can be strong; if poorly laid, the structure may be weak.

At one time in our history, assessing was a job that could be done by any honest, intelligent person well acquainted with the area that he was assessing. Today, however, assessing requires much more. It is a technical job requiring the training, experience and judgment of a specialist and the use of specialized records, modern methods and equipment.

Unfortunately, most assessing officials are working without the benefit of good records, systems or maps; in fact, many have only last year's assessment roll with which to work.

The most important basic tool that can be provided to assist the assessor is cadastral aerial maps with a permanent parcel numbering system.

The fiscal cadaster or tax map system usually refers to the official register of the location, size, ownership and value of each real property parcel within a given jurisdiction.

The assessor's key needs are to know the relative location of parcels and areas so he can establish parcel values and know where to send the tax bill. There is not the need for exact, precise boundary line locations, areas and officially marked property corners as needed for a legal cadaster which establishes title. The difference in the degree of precision or accuracy required for the fiscal cadaster makes it possible to prepare the tax maps in far less time and at less expense than a legal cadaster or a multipurpose land information system.

A fiscal cadaster consists of at least three parts: (1) a graphical data base, the tax map, which shows the size and location of each parcel of land; (2) a register which provides information on land ownership, assessed value, source of title, taxes; and (3) a parcel numbering system which links the register data and graphic data. In addition, auxiliary registers and parcel identifiers may be useful in data handling.

A tax mapping system must consider present as well as future needs and, because of the large expenditure of time and money, must be easily revised and updated to reflect changes in land ownership. Unless the system provides for maintenance, the investment will be lost.

Today, most tax map systems begin with aerial photography which provides rapid, economical, current, accurate data. Controlled orthographic enlargements of the aerial photography are used as the base for the map preparation. Proper map scales and formats will provide for the clear portrayal of each parcel.

The most difficult, time consuming and costly phase of the map preparation is the parceling process. This can best be compared to working a giant jigsaw puzzle, with original land surveys, subdivision plats, tax descriptions, deeds and rights-of-way being the pieces. Many times the pieces don't fit, or there are gaps or overlaps which require further research; and some of these are not cartographically resolvable. When the parceling is completed, the parcel number system is applied to both the map and the input document for the preparation of the register.

There are many parcel numbering systems in use in the United States today, but only two separate and distinct systems of land survey: the system of metes and bounds in which each parcel is individually described and bounded, and the system of rectangular surveys under which the land is divided into basically equal sized townships, sections, and fractions thereof.

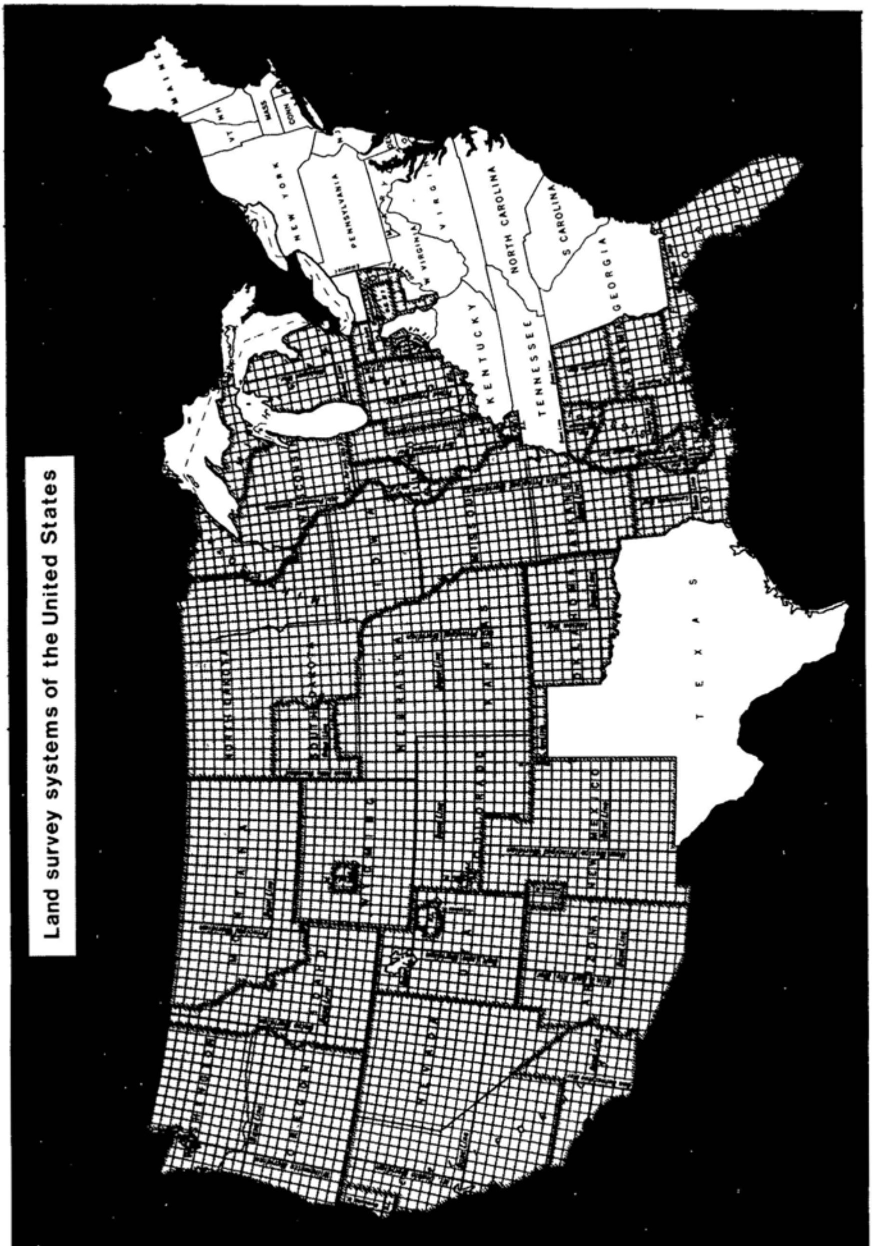
The metes and bounds, irregular survey system is used in the eastern states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Maryland, Delaware, Virginia, West Virginia, Kentucky, Tennessee, North and South Carolina and Georgia; also in parts of Ohio and all of Texas. Each parcel is independently described, varies in size and is not tied to any system.

Some descriptive terms found in old metes and bounds records are, "commencing at a heap of stone," "about a stone's throw," "small clump of beech," "in a contrary direction," "not far from the old trail," "yellow oak tree," "big hemlock tree where Phil Blake killed the bear," and "the red oak when an owl hoots at midnight."

The rectangular survey system of townships and sections, as first defined by the Continental Congress, enacted into federal law in 1784 and subsequently modified, represents the most widespread system used to mark and describe land within the United States, over 2/3 of the land mass.

In this system, primary lines are run with reference to meridian lines and parallels of latitude which are identified as principal meridian (north-south line) and base line (east-west line). Lands are divided into townships, 6 miles square, which are related to the meridian and base lines established by the federal government. Township numbers east or west of the principal meridian are ranges, and numbers north or south of the base line are tiers. Thus, Township 12 south, Range 3 east is located 12 tiers south of the base line and 3 ranges east of the meridian.

The township, 6 miles square, is divided into 36 square mile sections of 640 acres. The sections can be further divided into halves, quarters, quarter-quarters, and so on. Irregularly described metes and bounds tracts within the rectangular survey system are tied to the monuments established under the rectangular survey system.


Land survey systems of the United States
MAINE
VT
N H
MASS
CONN
NEW YORK
PENNSYLVANIA
W VIRGINIA
NORTH CAROLINA
S CAROLINA
GEORGIA
KENTUCKY
TENNESSEE
TEXAS

In the design and preparation of a mapping and numbering system for lands under the federal rectangular survey, a system which combines the basic land divisions of the township, section and quarter section as the base for the mapping and numbering system is logical and advantageous. The assignment of numbers to the land divisions of the rectangular survey system provides for a parcel number which will describe and locate any specific parcel.

Briefly, a permanent parcel identification number of 12 digits based on the federal rectangular system of survey would break down as follows: the initial two digits would represent a particular county within the state using the system; the next two digits would stand for a specific survey township within the county; the following two digits would indicate the section number within the survey township; the succeeding three digits would determine the quarter section and parcel block number; and the final three digits would identify the specific, individual parcel of land.

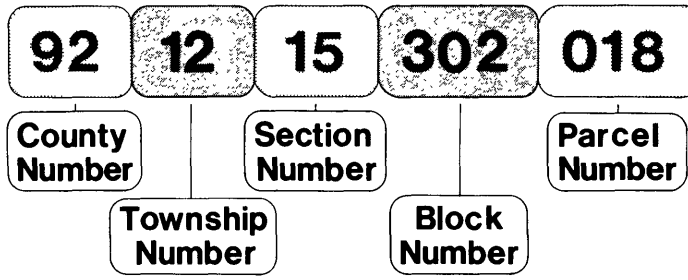
The permanent parcel number is easily adapted to modern office equipment. Because of its simplicity and utility for data processing programs, it can contribute to the more accurate computation of taxes, automatic billing, quicker collection, and subsequent swift distribution of tax monies. In addition, immediate retrieval of information through computer terminals is possible by numeric, geographic, or alphabetic filing. This saves both time and money for the county and the public.

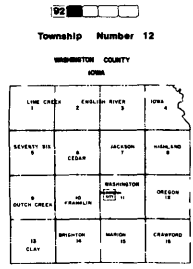
In many ways, properly designed tax maps actually should pay for themselves with the increased benefits that they provide. They can help to eliminate lost tax revenues caused by incomplete or inaccurate maps and records. Missing parcels and property improvements can be added to the tax roll, providing thousands of dollars in new assessments and a more equalized tax base. They can help to reduce costs by simplifying office procedures, and the introduction of permanent parcel numbers facilitates the use of data processing.

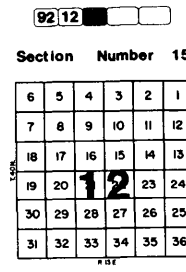
An often overlooked benefit is that the new maps can be used by many other offices, such as planning and building. They provide an excellent base map for such items as soil maps and can be used as the basis of land information systems for public works, planning and zoning.

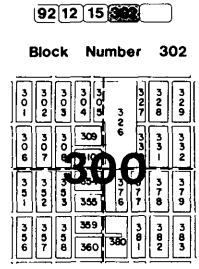
In those states not covered by the rectangular survey system, a key popular base for new mapping and parcel numbering systems is the use of the State Plane Coordinate System as the guide or framework

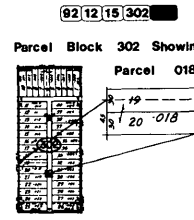
Permanent Parcel Numbering System











for the map base. In some instances, the parcel number system is comprised of a map book, page, parcel block and parcel, whereas others use the coordinate value's apparent visual centroid of the parcel, and still others use a dual system. The benefits derived from the new maps and parcel numbers are similar to those of the federal rectangular survey system.

Computer assisted cartography and interactive graphics systems are applicable to either of the described mapping and numbering programs; but before applying these means, it is mandatory that the needs and desires of the users be studied and subjected to a thorough cost/benefit analysis. A system which will suit the long term needs of a county with 10-30,000 parcels may be inadequate for a large, fast growing county. The state and local laws must be checked and revised. The overall system's cost and maintenance cannot be overlooked.

A brief look at the list of topics and speakers at this symposium, previous symposiums and conferences and articles in professional journals indicates we have a wealth of knowledge in the fields of computer assisted cartography, photogrammetry, aerial surveys and surveying. However, as Mark Bricklin stated in a recent article in Prevention Magazine:

> "Knowledge is the most overrated commodity in the world today. I mean when it's just knowledge: facts lying there on the shelf, an inventory that isn't going anywhere or doing anyone any good. In a world that's already come apart at the seams and is now starting to wear out in the seat of its pants, what we need is knowledge that becomes a system and systems that turn into action. The kind that gets things done."

The advancement of cartography and computer graphics can gather momentum and be of far greater value only if each of us systematically spreads this knowledge to the potential users and funders: our state and local government officials, assessors, auditors, taxation departments, registers of deeds, engineers, surveyors, managers, council members, mayors, planners, and each and every one who is affected. Only through our action can we expect their action and get things done.

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