THE ZIGS AND ZAGS OF LEGAL DESCRIPTIONS

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With so many methods used to describe rights of way, understanding the basic principles in reading, writing, retracing and interpreting legal descriptions can go a long, long way.

The term "right of way" can mean several different things. Generally, a right of way is an easement, but the term may also apply to a fee simple strip of land or a public right of way for roads, drainage or utilities. No matter what form of ownership or property rights are intended, the exact location of rights of way must be described with accuracy.

COMMON TYPES OF LEGAL DESCRIPTIONS

A sufficient legal description is one that either identifies the location of the land on the ground to the exclusion of all other land, or furnishes some means by which such location can be obtained from other sources. On the other hand, a legal description is insufficient if it does not, even with the aid of extrinsic evidence, identify the subject land to the exclusion of all other land. Unfortunately, there is no standard rule which uniformly defines the sufficiency of a legal description. Rather, courts generally apply rules of construction which favor certain possible interpretations of a description over others to further the overall goal of determining the true intent of the parties to the instrument containing the description.

A legally sufficient land description can be written in several different ways, and can include combinations of different methods. If it is not written in a proper manner, the subject land may be described in an unintended location. If the description is erroneous or insufficiently vague, it may locate the land on another person's property or may not describe any land. In such instances, the insufficient description may render a conveyance void, cloud or slander the title of another, or negate the value of the property rights intended to be granted, acquired or described.

There are five types of legal descriptions that have been developed to achieve greater accuracy and precision in identifying land and land rights: 1) the United States Public Land Survey System (USPLSS), sometimes referred to as the "rectangular" or "quadrangular" survey system; 2) descriptions referring to recorded subdivision plats; 3) the metes and bounds description; 4) the State Plane Coordinate Systems; and 5) general descriptions incorporating extrinsic evidence.

There is no single preferred method for writing legal descriptions. Any one of these five types, or different combinations thereof, may be the most appropriate means for describing the location of a right of way, depending on the factual, contractual and physical circumstances. Rather, the preferred method of writing descriptions is simply to use the best type or combination of types and parts that will give the clearest and shortest description possible.

THE UNITED STATES PUBLIC LAND SURVEY SYSTEM (USPLSS)

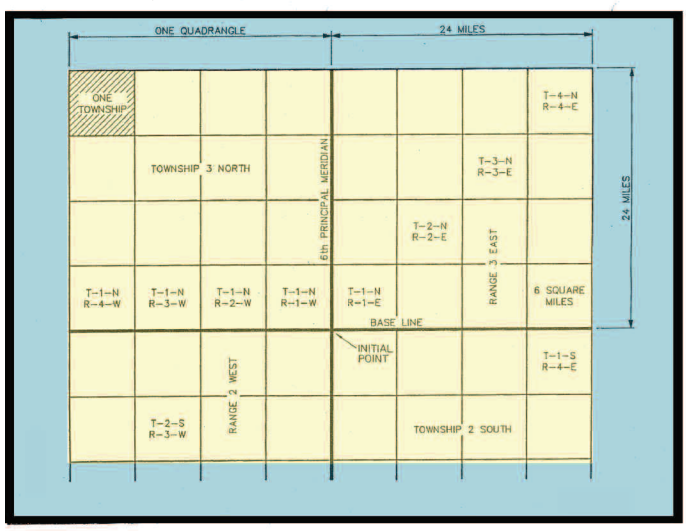
The most common method for describing large parcels of land in public land states is by reference to the USPLSS. This is a grid system that is unique to North America. Any parcel of land can be precisely identified, to the exclusion of all other land, by stating the section (or a fractional subdivision thereof), township and range numbers in relation to a specific Principal Meridian. The rectangular survey system that is the foundation of the USPLSS was implemented to locate and describe the first sales of public lands in the U.S., and substantially all federal disposals of the public domain since 1800. Since then, the USPLSS has been extended westward and now covers 30 of the 50 states.

Since all major legislation authorizing the disposal of public lands, except for the mining claims, has required that the land be surveyed prior to disposal, the demand for private ownership of the public domain required the extension of the USPLSS to cover all of the new territories and states. Until 1910, all public land surveys were conducted by private surveyors pursuant to contracts executed by the Surveyors General who were under the supervision of the Secretary of Treasury from 1797 to 1812 and the Commissioner of the GLO from 1812 to 1910. This contract system ended with the Civil Appropriations Act of 1910 which provided for the direct employment of competent surveyors by the Secretary of Interior. Today, substantially all official surveying by the federal government is performed by the Cadastral Survey branches of the Bureau of Land Management (BLM), whose service center is located in Lakewood, Colorado.

USPLSS Grid System

The objective of the USPLSS was to create a checkerboard of identical squares covering a given area. The largest squares measure 24 miles on each side and are called quadrangles. Each quadrangle is further divided into 16 squares called townships, the boundaries of which measure six miles and run north-south and east-west.

USPLSS Grid System



A column of townships running north-south is called a range and is numbered numerically east and west according to its distance from the Principal Meridian. There are now 36 principal meridians, the first of which was numbered 1 through 6, located in different parts of the U.S.

Following is a general summary of the how the USPLSS was systematically extended across the U.S., and which methods were used by surveyors to address certain topographical features that did not fit squarely within its rectangular grid.

Initial Points

First, an initial point would be established from which all subsequent survey lines were oriented. The initial point for the first official government survey was expressly described in the Land Ordinance of 1785 as the point that was "due north from the western terminus of the southern boundary of the State of Pennsylvania." Subsequent legislation left the designation of initial points to the applicable federal agency. Many of the initial points were selected to be very prominent and visible landmarks on which an official monument would be erected.

Principal Meridians and Baselines

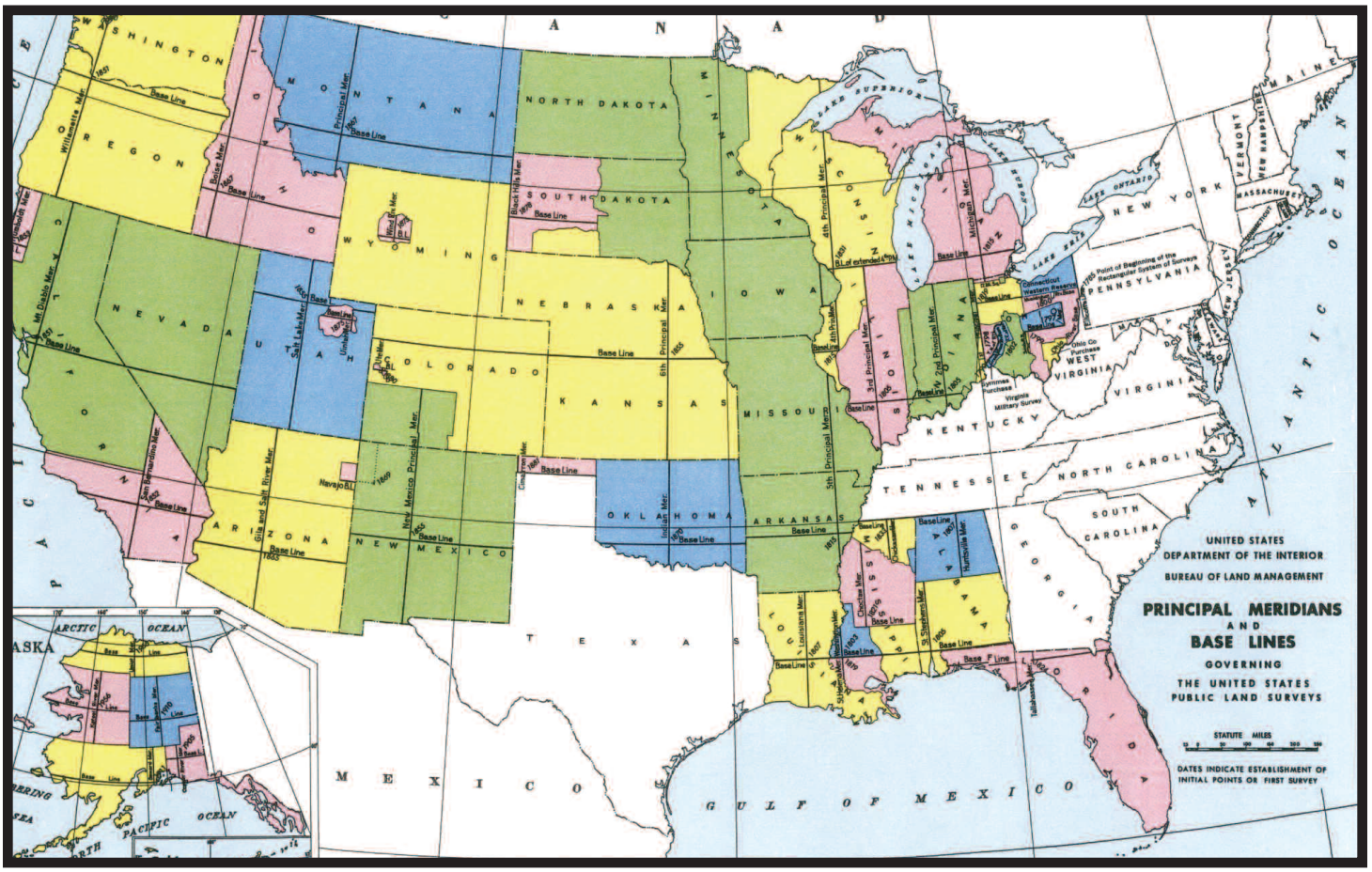
Principal Meridians (i.e., north-south lines) and Baselines (i.e., east-west lines) originating at the initial points were marked on the ground by deputy surveyors. Each Principal Meridian was intended to conform to the true meridian extending north and/or south from the initial point. Regular quarter-section and section corners were established alternately at intervals of 40 chains (2640 feet or ? mile) and regular township corners were established at intervals of 480 chains (31,680 feet or 6 miles) along each Principal Meridian and Baseline.

There are now 36 Principal Meridians located throughout the United States, the first of which were numbered one through six. For example, the 6th Principal Meridian to which legal descriptions for Kansas, Nebraska, and most of Colorado and Wyoming are tied, is approximately 402 miles east of Colorado Boulevard in Denver, and its Baseline, which follows the 40th degree line of latitude is the boundary between Kansas and Nebraska and runs on Baseline Road through Boulder, CO.

Standard Parallels and Guide Meridians

Standard Parallels were extended east and west from the Principal Meridians at intervals of 24 miles north and south of the corresponding Baselines. Guide Meridians were then extended north from the Baseline or Standard Parallel at intervals of 24 miles east and west from the Principal Meridians. These Guide Meridians were terminated at the points of their intersection with the Standard Parallels. At the true point of intersection of each Guide Meridian with a Standard Parallel, a closing township corner was established. The resulting 24 mile squares are commonly referred to as quadrangles.

Principal Meridians and Baselines



Whenever practicable, the exterior lines of each township were surveyed successively through the quadrangle in ranges of townships beginning from the south. Each quadrangle was then divided into sixteen townships which, ideally, should each be exactly six miles square. The townships are numbered originally from north to south and east to west according to their distance from the Baselines and Principal Meridians to which they relate. Rows of townships running east and west are referred to as township numbers and columns of townships running north and south are referred to as range numbers.

Correction Lines

Because of the curvature of the earth, the north-south lines or ranges converge, or come closer together, as they extend toward the north pole. To keep the range lines as nearly parallel as possible and six miles apart, the lines are laid out for approximately 24 miles. Then, there is a jog, referred to as a correction line, so the lines are again six miles apart, to preserve, as close as possible, the square shape of the township. Other errors or irregularities causing quadrangles to be more or less than 24 miles square or townships to be more or less than six miles square, are accommodated in the further subdivision of the townships.

Documentation for Official Surveys

Public lands are not considered to be surveyed until the survey is approved by the responsible official and all field notes, plats and supplemental plats are filed with the administering land office. The physical evidence of a governmental survey consists of the monuments established on the ground, and the duly approved field notes and plats which are available to the public for viewing on microfilm in various offices of the BLM.

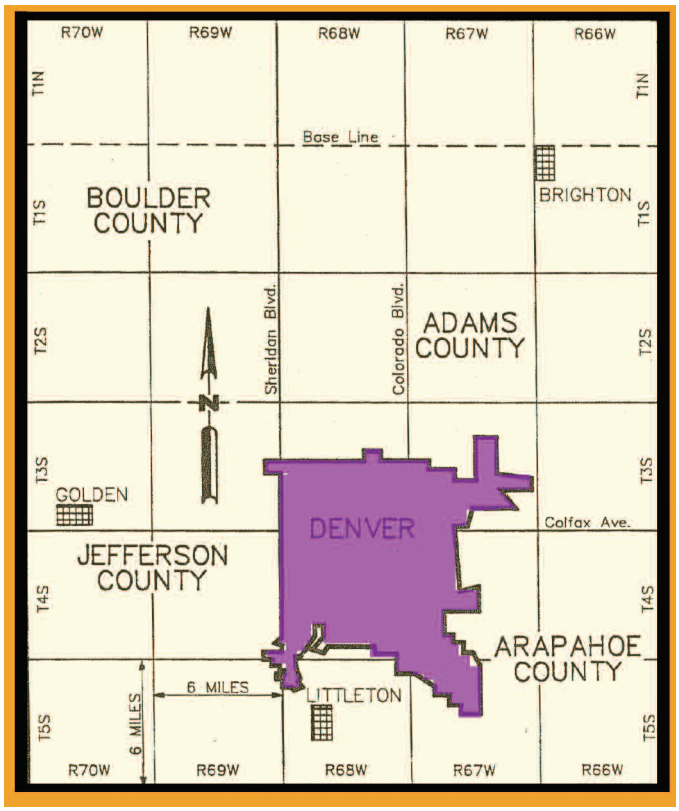
The original township, section, quarter-section, and other monuments physically evidencing the survey will be considered to represent the true corner and control over conflicts with the course, distance and area calls set forth in the field notes and plats. Once approved and filed, the official survey and plat becomes the final source for resolving all disputes regarding the location of and area within land disposed of by the federal government. As such, most of the land for which title originates from the federal government can be identified by an official survey which locates it within the USPLSS.

Monuments

The initial surveys of the Seven Ranges in Ohio marked only the township boundaries and a section was the smallest subdivision of land platted. Later surveys by the GLO subdivided alternating townships into half sections, and eventually quarter sections. Government surveyors are now required to monument the corners of each quarter section in all townships on the ground and return a formal record thereof in the form of field notes. Further subdivisions can be made by county or private surveyors.

Each section and quarter section corner has an established point known as a corner monument, or "survey monument." Initially, these survey monuments were made of natural materials such as stones, pits & mounds or charred stakes. The legal monument used today is a 3-1/2 inch cap made of brass or aluminum on a 2-1/2 inch pipe, 30 inches long. Up until recently, land surveyors could use other materials such as rebar, axles, and pipes in addition to the standard BLM monuments for marking land corners. Most states now have statutes and rules regulating the establishment and rehabilitation of monuments which conform them to the BLM requirements.

Actual Townships and Ranges in Denver and Vicinity



Field Notes

Each surveyor keeps notes in the field which identify and describe the lines and corners of the survey and significant topographic features of the subject land. These initial notes are transcribed into official, typed field notes conforming to the arrangement and phraseology prescribed by the BLM Manual. These transcribed field notes and the township plats prepared from them are considered to be the primary record of the survey upon official approval, acceptance and filing, whereupon the initial survey notes prepared in the field are destroyed.

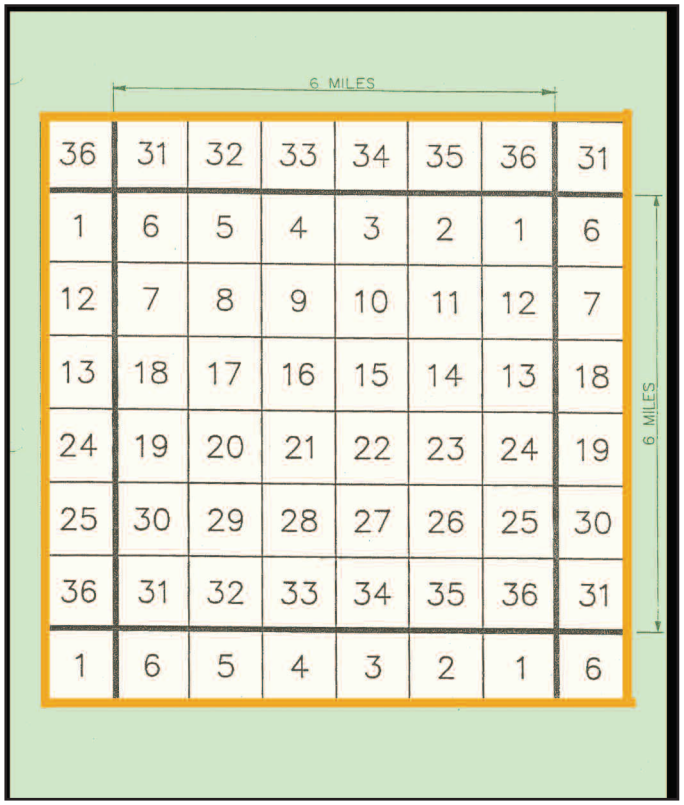
The introductory statement to the field notes should include: 1) the history of any prior surveys; 2) a list of the surveys included in the subject field notes; 3) a description of any unusual survey situations and any special method used to address them; 4) a statement that the survey was conducted according to the specifications set forth in the BLM 1973 BLM Manual; 5) a description of how the directions of lines were determined and that they refer to the true meridian; 6) a statement that the original survey lines were retraced in the case of a dependent resurvey; 7) identification of the geographical position of the corner of the survey and how it was determined; and 8) the observed magnetic declination.

The field notes should then proceed with a full description of the monuments established by the survey on the ground, the directions and distances of the lines measured, and additional notes reflecting the surveyor's observation of topographical, cultural and other significant features of the subject land, including the character of the land, soil, and forest cover. The surveyed lines should be summarized at the conclusion of the field notes for each mile. A general description of the topography, soil, forest cover, water supply, drainage, mineralization, settlement, improvements, etc. should be provided for the township as a whole at the conclusion of the subdivisional notes for each township. The field notes should also include a record of the names of the surveyors, their assistants, and the authorized officials approving the survey.

Township Plats

The township plat is a drawing which depicts the survey lines marked on the ground. The plats are constructed from the field notes to depict the subdivision of each regular section into quarter-quarter sections. They also show the direction and length of each line, the relation to adjoining surveys, the boundaries of each subdivision and a description of the area of each parcel of land. Acreages for irregular sections, and any significant topographical features or categorical information may also be noted on a township plat.

Township Showing Adjoining Sections



Each regular township contains 36 sections which, ideally, should each be exactly one mile square. They are numbered sequentially starting with Section 1 in the northeast corner and proceeding in an alternating serpentine pattern, "as the oxen plow," from east to west and then west to east, ending with Section 36 in the southeast corner. In the case of fractional townships, the sections bear the same number they would have if the township was complete. Each regular section will show center section lines only and indicate that the area is 640 acres. For irregular sections, or other circumstances requiring lotting, each subdivision must be distinctly shown.

Lots

The north and west rows or tiers of sections in the township are known as closing sections. These areas are where discrepancies of measurements, known as closure, between the interior section lines and exterior boundary line surveys are adjusted. These sections usually contain more or less than the 640 acres in a regular section. The portions of the section where the discrepancies are places are referred to as lots. Generally, irregular sections will be platted to subdivide as many regular quarter-quarter and half-quarter and quarter sections as possible. Then, lots will be established across the northern and/or western boundaries, setting forth the number and acreage, with area computed to the nearest 1/100th of an acre, for each lot. Because the underlying object of the quadrangular survey system is to achieve the maximum number of perfect one-mile square sections containing exactly 640 acres, all distance and acreage corrections required are accounted for in one or more irregular sections along the north (i.e., Sections 1-6) and/or west (i.e., Sections 6, 7, 18, 19, 30 and 31) boundaries of each section. The remaining 24 sections are usually regular one-mile square sections.

For irregular sections on the north and west of a regular township, protracted the quarter-quarter section lines are utilized to designate lots, which are numbered sequentially from east to west starting with Lot 1 in the northeast corner for sections along the northern border or sequentially from north to south starting with Lot 1 in the northwest corner for sections along the western border. In Section 6, in the northwest corner of each township, lots are numbered from east to west starting with Lot 1 in the northeast corner and then continuing from north to south from Lot 4 in the northwest corner to Lot 7 in the southwest corner. Lots may also be established and numbered in other parts of the section when irregularities, such as water bodies, mining claims, or defective alignments, are incurred. The remainder of the section will, to the maximum extent practicable, be platted in aliquot quarter, half-quarter and quarter-quarter sections.

Tracts

Another common exception to the goal of establishing perfectly square quadrangles, townships and sections, was the need to accommodate vested property rights that did not conform to the linear concept inherent in the system. Whenever a resurvey is deemed necessary, or an original survey was subject to prior vested property rights, the prior ownership established on the ground must be preserved. This is accomplished by first surveying the land subject to the prior vested property right and monumenting the corners of each tract. The surveyed tracts are then numbered sequentially in the plat for each township, starting with Tract 37 so that the tract numbers do not overlap the section numbers. Then, the township lines are surveyed just like an original survey, with closing corners set at the intersection of any tract boundary with a section line, and lottings are established for the fractional quarter-quarter sections adjoining the tracts.

Supplemental Plats

In areas covered by mining claims and other property rights that were vested prior to the initial survey, the township plats often include supplemental plats of those portions of the township. Supplemental plats are also often prepared to depict the irregular

boundaries bodies of water and of prior vested rights identified in resurveys. Generally, supplemental plats are drafted on a larger scale to facilitate the inclusion of additional detail. All supplemental plats should show a reference to the base plat and the purpose and authority for its preparation.

Meander Lines

The presence of rivers, lakes and other bodies of water present a special challenge to the implementation of the quadrangular system, because, if for no other reason, permanent monuments cannot be established therein. Moreover, since the Land Ordinance of 1785, the navigable rivers, lakes, and streams have been declared public highways which were never subject to disposal by the federal government.

The survey line demarcating the bank of any natural body of water, whether or not navigable, is referred to as a meander line. Meander lines do not constitute boundaries defining the area of ownership of the lands adjacent to a water body. The actual course of the stream or lake defines the boundary and the ownership of adjoining land changes with the changing water course. Meander corners are established at every point where standard township or section lines intersect with the bank of every navigable stream or other meanderable body of water. However, the actual monument for a meander corner should be established on a line at a secure point near the true location of the meander corner.

SUBDIVISION PLATS

All states have statutes providing for the platting of subdivisions. Once a plat has been approved and recorded in the county records, legal descriptions in instruments affecting title to or uses of land which refer to the designations given in the plat are generally sufficient. However, in the event of a conflict between the recorded plat and an actual survey with respect to the courses, distances, measurements, or acreage quantities, the actual survey will control. Likewise, the survey from which the plat was drawn controls over any conflict between the survey calls and the depiction thereof in the plat.

It is well established that a reference to a plat in an instrument affecting title to land as part of the property description, the plat becomes incorporated into the instrument. As such, the plat should be considered as giving the true description. For example, if an easement purports to convey rights to use a specific amount of acreage, but describes the right of way granted by reference to a recorded subdivision plat, the actual acreage identified in the plat will control even if it differs from the acreage in the easement instrument.

While reference must be made to the subdivision statutes of the state in which the subject land is located for the specifics, the basic process for the preparation, approval and recording of a subdivision plat is essentially as follows:

1. A detailed survey of the boundaries of the land to be subdivided, and all streets, alleys, utility easements, interior subdivisions (i.e., blocks and lots) and other designations, must be prepared by a registered professional land surveyor.

2. A plat, which reflects all of the boundary and subdivision lines established by the survey, and such other information as may be necessary, convenient or appropriate for the given circumstances, must be prepared in accordance with the specifications set forth in the applicable statutes. The plat must be executed and acknowledged by the owner of the subdivided land and a certificate of the surveyor stating that it is a proper survey and plat must be included therein or appended thereto.

3. The subdivision and plat must be approved by the governmental official or commission with jurisdiction over subdivisions, usually a zoning or planning board and/or a county, municipal or other local official or commission.

4. The plat, surveyor's certificate and governmental approval must be filed in the office of the county recorder or registrar of deeds where the land is located.

When an instrument describes land by reference to a recorded plat, and the reference is solely for the purpose of describing the land affected thereby, any technical defect in the subdivision approval process should not affect the validity of the land description. Likewise, the loss or destruction of a plat referred to in a instrument conveying real estate should not, generally, void the conveyance if the land can be identified on the ground from the description provided. Even if an instrument does not expressly refer to a recorded plat and make it part of the description, the plat may be resorted to for identification of the lands the parties intended to describe.

On the other hand, where a plat is clearly erroneous, it may not provide an adequate description of the land. Still, parole evidence may be admitted to establish the location of the land the parties intended to describe on the ground, even though portions of the actual survey or plat are inaccurate. Moreover, the fact that a plat referred to in a legal description is invalid because it was not duly approved or properly filed and recorded in accordance with applicable statutory requirements, should not affect the validity of the legal description if the survey and plat are correct, the description

provided reflects the intent of the parties as to the location of the subject land, and the plat referred to is accessible.

Likewise, a property description that referred to an unrecorded plat may be sufficient if the plat can be identified by parole evidence. This is really nothing more than an extension of the general rule that allows parole evidence to be admitted if it helps explain the intent of the parties to an ambiguous instrument. Producing the unrecorded plat referred to in an instrument may clarify a property description that appears to be ambiguous on its face. This result is similar to the result when a legal description is given by reference to another recorded instrument. In both instances, the parties have in mind a specific parcel of land and are merely using the reference as a convenience.

Ordinarily, a description by tract or lot and block (or other designation) in a recorded subdivision plat will prevail over courses, distances, measurements and other calls for monuments provided in the description, unless there is evidence indicating that the parties specifically intended otherwise. Similarly, a description of property by its designation in a subdivision plat will generally be construed as intending the metes and bounds depicted in the plat and may incorporate other information or restrictions identified therein.

METES AND BOUNDS

The U.S. and Canada are the only countries in the world using the rectangular system. In all of the rest of the world, tracts of land are surveyed and described by metes and bounds. The term metes means measures of length and bounds are the boundaries. The term metes and bounds comes from the method used to describe land in the original 13 states. This method would use natural features, such as trees, a pile of stones or a creek as monuments in describing the lengths and directions of the lines. Adjacent landowner names were also included in the description.

Example of historical metes and bounds description: Beginning at the 24 inch oak tree at the northeast corner of Jake Miller's property; thence north along the east line of Jake Miller's property and along Rock Creek, a distance 400 feet to the 6 inch Cedar tree…

Survey Calls

When an appropriate description cannot be accomplished by reference to the USPLSS or a recorded subdivision plat, usually due to the non-rectangular shape of the parcel and/or the lack of any USPLSS or subdivision plat to reference, the land may be described by metes and bounds. Today, descriptions following the perimeter of a parcel are still commonly referred to as a metes and bounds description even though the bounds are usually omitted.

Metes and bounds descriptions, as well as most other descriptions, should be established or verified by a survey for accuracy and reliability. Most, if not all, states now license and regulate professional land surveyors. Likewise, most states now have statutes with specific requirement for the preparation and filing of land survey plats. Many also have requirements for legal descriptions that must be satisfied to record instruments affecting title to or the use of land, such as the acquisition of easements, fee property or other land rights.

Courses

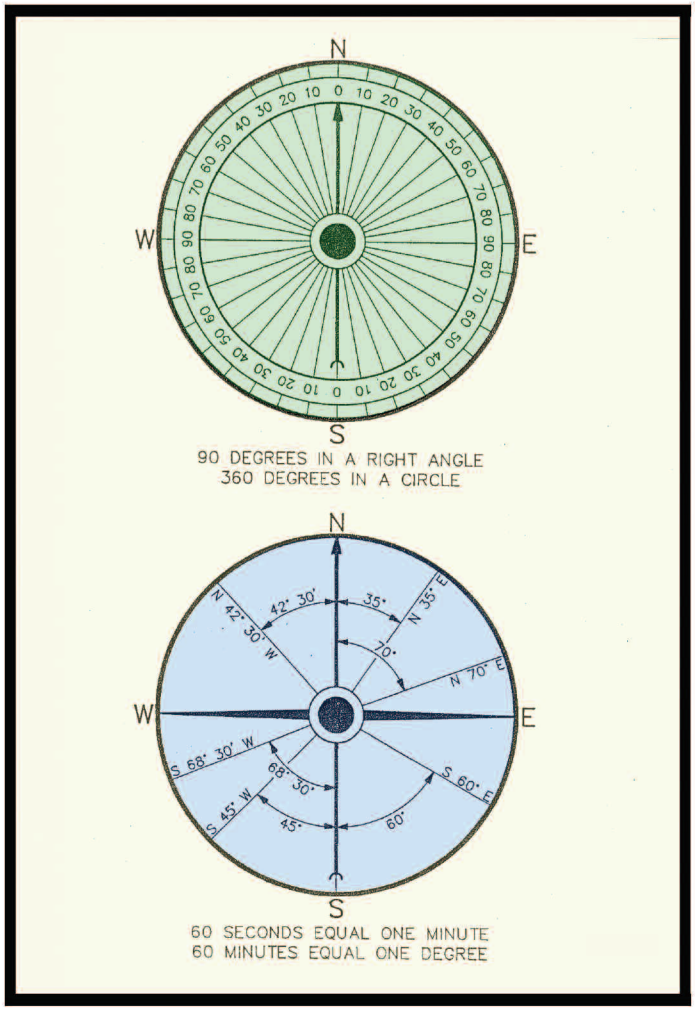
When writing legal descriptions it may be necessary to indicate the direction of a line. The direction of a line, known as the bearing, is stated in terms of the angle it makes with the meridian, or a line, through the beginning point of the line. The angles are always measured from a line, not from a point. It is described in degrees, minutes and seconds from the cardinal directions of North or South; ***never*** from the cardinal directions of East or West.

Examples of a bearing: North 70°19' East; or South 24°10' 22" West

A tip to remember is to imagine yourself walking down the survey line, using the appropriate directions to describe the line. Any cardinal direction of North, South, East or West is expressed as such. All other measurements are described in degrees from these four cardinal positions. Four quadrants, each being 90° of the 360° circumference of a circle can be delineated. The degrees, minutes and seconds from cardinal north or south, starting from 0°00'00" are called out to the east or west until 90°00'00" is reached at cardinal east or west.

Another method to denote the direction of a survey line is the azimuth. It differs from a bearing in that it expresses all directions in terms of the angle from one direction only, from 0 through 360°, instead of being broken into four quadrants. Azimuths are usually referenced from cardinal north, but military azimuths are usually referenced from cardinal south. In order to indicate a direction, a surveyor would merely write for example, "290°," moving clockwise using cardinal north as the starting point, instead of "North 70° West." Surveyors sometimes use azimuths in their work and in computations, but generally convert it to the usual bearing description

Use of Bearing and Azimuth



Distances

In colonial times, survey distances were actually measured with chains and/rods as the distance measurements imply. Today, the BLM still records measurements noted on plats in chains while distances measured by non government surveyor are in feet, to the hundredth decimal. Many rights of way, usually in the oil and gas industry, are still measured and paid for by the rod, which is equal to 16 1/2 feet. The difficulty in paying for right of way by the rod is the lack of a defined or standard width.

One thing that has not been mentioned so far, and needs to be, is the use of metrics in legal descriptions. For years there have been discussions, plans and rumors about the U.S. going to the metric system. These rumors may be coming closer to reality. The federal government is mandating transportation departments such as the Colorado Department of Transportation (CDOT) to use the metric system in plans and specifications for highways. On the surface this may seem to effect only the highway department. However, there are many other groups of professionals that this use of metrics will have an effect on. Appraisers, title companies and surveyors, to name a few, will all need to know how to use and convert their work to and from the metric system. It may be still be some time before metric measurements are used extensively in legal descriptions.

Basis of Bearing

When necessary, the meridian or cardinal direction can be established by using astronomical observations and calculations or by the use of a compass. There are many be instances, however, where bearings can be determined from a monumented survey line that has already been established, such as a section line, quarter section line, or a lot or block line in subdivision plat. A bearing of a line can also be assumed or related to the grid of a map.

Colorado requires that land surveys and legal descriptions using bearings include a statement identifying the source or otherwise explaining how the bearings were determined so that future surveys of the parcel can be retraced accurately. Presumably, other states have similar requirements. Basis of bearing statements can be incorporated into the description or added as an additional statement before or after the description.

Example of stand alone basis of bearing statement: Bearings are based on the north line of the Northwest 1/4 of Section 30 to bear North 89°42' East with all bearings contained herein relative thereto.

Example of basis of bearing statement incorporated in description: Commencing at the Northeast corner of Section 23, Township 6 North, Range 95 West of the 6th Principal Meridian; Rio Blanco County, Colorado; Thence North 89° 53′ 45″ West, along the North line of said Section 23, a distance of 1326.89 feet to the point of beginning; Thence South 0° 06′ 15″ West, a distance of 300.00 feet; Thence South 89° 53′ 45″ East, a distance of 250.98 feet; . . . .

Whether or not a basis of bearing statement is specifically required by state law, it is always a good practice to expressly state the basis for the bearings rather than assuming that it will be implied from the calls in the description. This is because a land surveyor who is requested to retrace or survey a legal description without any express point of reference or basis of bearing, may be required to obtain bearings by astronomic observation. This could cause problems with the location "on the ground" of the description being surveyed if the bearing used at the time the description was written and the astronomic bearing are not exactly the same. At worst, the two lines could be in considerably different locations and might require legal action to correct. At best, the surveyor must spend additional time (usually at the client's expense) to determine and/or confirm the basis for the original bearings.

Curves

Legal descriptions may not always have the luxury of using all straight lines to locate the boundary of a parcel of land. Many times curves are required for part of the description and must be described along with linear courses. There are several kinds of curves that may be encountered, such as: circular, compound, reverse, spiral or vertical. When describing a curve there are a number of the parts of the curve that must be included in the description to properly describe the curve. The most commonly used terms for describing parts of curves and their abbreviations include the following:

Curve Element	Abbreviation
Radius	R
Point of Curve	PC
Tangent	T
Central Angle or Delta	(triangle)
Point of Tangent	PT
Arch Length	L
Point of Intersection	PI
Chord	Ch
Degree of Curvature	D

In most cases where curved lines are necessary, such as curved roadways, easement descriptions and property boundaries, a simple curve is used. When describing a simple curve at least two of the foregoing elements of the curve must be given, but usually three or more are provided. Survey drawings and plats prepared by professional land surveyors may provide additional detail for the curves described.

When describing a line with a curve, the distance and direction of the curve must be provided. This can be stated such as " thence on a curve to left having a radius of 205.76 feet...." In some cases the bearing of the long chord can be included to provide more clarity. As was mentioned earlier with respect to bearings, it is often helpful to imagine yourself walking down the line as you describe a curve. If the line curves to the left or right, it is a curve to the left or right.

Example of a Curve Description: Commencing at the Southwest corner of Lot 7, Ridge Subdivision; Thence North 00°00'31" East, along the southerly line of said Lot 5, a distance of 149.06 feet; Thence North 89°59'29" West, a distance of 26.17 feet to a point of curve; Thence on a curve to the left having a central angel of 53° 36'35", a radius of 15.00 feet, an arc length of 14.04 feet and whose long chord bears South 63°12'14" West, a distance of 13.53 feet to a point of tangent.....

Spiral curves are often encountered in highway work. This type of curve will have a changing radius and can be found, for example, on entry and exit ramps to and from a freeway. A vertical curve is also used in highways. An example of where a vertical curve is used would be a portion of a highway crossing a depression or valley. This type of curve not only incorporates the elements of a circular curve but also uses vertical elevations along the line.

It may, at times, be necessary to compute an element of a curve that is not provided in the description. In order to compute this curve information, some knowledge of trigonometry is required. It may be best to request the assistance of someone knowledgeable in this area if you are not comfortable with the computations. The use of curves can be confusing even to professionals with a surveying or engineering background.

State Plane Coordinate Descriptions

The Colorado State Plane Coordinate System is another method used to describe property although not very common in the past but becoming more popular due to the use of Global Positioning Systems (GPS). Currently, the State Plane Coordinate System is primarily used by land surveyors. The state is divided into three zones with a grid imposed upon a map projection. Coordinates, X & Y, (North & East) are assigned to the grid based on a mathematical relationship between the grid and the map projection. The system has not been used much in the past due to the many mathematical adjustments and computations required. Today, the computer and GPS makes it much more practical and cost effective to use but is not used by the layman much due to its complexities. ◉