



# SURVEYOR

*California*

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Summer 2007 Issue #193

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# Surveyor *California*

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“Recognizing that the true merit of a profession is determined by the value of its services to society, the California Land Surveyors Association does hereby dedicate itself to the promotion and protection of the profession of land surveying as a social and economic influence vital to the welfare of society, community, and state.”

“The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of land surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in Land Surveyors and their work.”

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## On The Cover:

From "We've Been Working On The Railroad!", an ongoing exhibit at the California State Railroad Museum, Sacramento, California.

This fine exhibit is of particular interest for Land Surveyors. It includes a re-creation of a 19th century survey camp, complete with period equipment, and highlights the important role that surveying played in the development of our nation's rail system. This issue of the California Surveyor is dedicated to the memory of Francois D. "Bud" Uzes, PLS, who provided technical guidance for the exhibit and posed for the painting that appears on the cover.





## From the Editor

Boundary surveyors know from experience that deficiencies in professional practice do not improve with age. One of my projects involved a deed that contained a land description of the metes and bounds variety, yet the subject parcel was a lot created per a 1927 subdivision map. Although the courses described in my client's deed matched those shown on the map, happily enough, there was no reference to the map in her deed. Deeds of adjoining parcels were lacking similarly. Furthermore, research into the chain of title disclosed that my client's parcel had always been described that way, without reference to the subdivision map that created it. That was problematic because it presented a dilemma in choosing the correct method for resolving the boundaries: Was this a simultaneous conveyance, or were senior rights to be considered?

The map in question is typical of the period for land divisions and residential development, except for one curious twist. The surveyor of record also signed the map as the County Surveyor. You can rest assured that he was satisfied with the correctness of his work. The third time he signed the map he did so as the City Engineer. Those were the days! This made the facts surrounding the unusual deeds even more bewildering. To thoroughly muddy the waters he made no comment regarding the character of his monuments. Not helpful!

When I first read Professor William G. Raymond's 1896 essay *What Constitutes a Survey and Map*, I was reminded of a quote by Edna St. Vincent Millay: Life isn't one thing after another, it's the same damn thing over and over again. From Gunter's chain to EDM and beyond, measurement technology has undergone astounding progress since the 19th century. Yet a profession consists of more than its tools. Progress should likewise be measured by the upward evolution of standards, ethics, and principles. Professor Raymond had a keen appreciation of the importance of stable land boundaries, and was therefore disturbed by the unnecessary grief that resulted from careless habits and deficient practice. So he offered remedies for improvement. He referred to his readers as young surveyors, but it is clear that he hoped others would also benefit from his guidance. Many of his suggestions for field procedures and mapping standards are today codified in state statutes. It is a testament to the extraordinary foresight of a man committed to the betterment of his profession.

A more recent effort to promote higher standards and professional uniformity is the *Guide to the Preparation of Records of Survey and Corner Records*, which was prepared by the *County Engineers Association of California* (CEAC). This useful document contains valuable information for Professional Land Surveyors performing boundary surveys in California. It is certain to be appreciated by all who are interested in promoting public faith in our work. The complete, unedited text contains guidelines for GPS records of survey and can be downloaded from the website noted in the article.

Cavalier practice in 1927 made the survey of my client's property more time consuming, complicated and expensive than it should have been. But I was lucky in one key respect. My client had a technical background and understood, better than most, the nature of my work. She wanted her boundaries resolved properly, she wanted a map of my survey filed in the public records, and she was willing to pay a fair price for it. I was grateful for such good fortune.

As is common elsewhere in the area where I practice, there are tagged monuments without record in this subdivision. Using the license number from one that appeared fairly new, I looked up the contact information for the surveyor on the Board for Professional Engineers and Land Surveyors (BPELS) website. I called him on the telephone and we spoke at length, but when the conversation ended his interpretation of the Professional Land Surveyors Act was unchanged. He considered his survey data to be proprietary and had no intention of filing a corner record, let alone a record of survey. With that I completed my fieldwork and submitted my record of survey to the County Surveyor for filing.

For all the progress in surveying technology, modern surveyors can benefit from professional guidance as much as their 19th century predecessors could. By using resources like CEAC's *Guide to the Preparation of Records of Survey and Corner Records*, the same damn thing over and over again doesn't have to apply to professional practice. ❖

John P. Wilusz, PLS, PE, is in private practice in Citrus Heights, CA.



## Letters to the Editor



Dear Editor:

I'm LS 2689, CLSA Life Member; been around a while.

I think something needs to be said about lack of interest in current programs in Surveying and "Geomatics Engineering" in our academic institutions.

Last weekend I attended (briefly) Fresno State's Annual Conference, in Fresno, and met a number of people between sessions, back in the booth and mixing area, and you know what? All the people I met were Surveyors, not "Geomatics Engineers".

Where are the Geomatics Engineers and who are they?

I believe it is a manufactured term which has little or no substance or meaning to a vast majority of us or to the public, who are our ultimate employers, to be realistic.

I also believe the term is not only not understood, but is a "turn-off" to a good many, if not most of the public. Does Mr. Smith, who needs a corner of his property determined and marked, look in the yellow pages under "Geomatics Engineers", or does he look under Surveyors or Land Surveyors? Try finding a category "Geomatics Engineers" in the yellow pages.

Oh, but you say, surveying has gone far beyond just plugging in Mr. Smith's property corner. We are in the cyber age when everything must go through the computer and have acronyms and ponderous nomenclature attached, run through GIS and bow to ESRI, whatever that is. "Plugging in" Mr. Smith's property corner is the last ignominious act of the process. So we must rename the process to impart dignity; let's call it "Geomatic Engineering".

Hey, come on now. Let's call a spade a spade, and a surveying task just what it is. Plugging in Mr. Smith's corner could range all the way from hammering a pipe in the ground (in the correct place to be sure), to going through a long and costly litigation process, depositions, testimony and all, that demonstrates that Mr. Smith does not own his own bedroom. In the process we might use all the mind-boggling technology that is available today (yes, we can do that), but Sir, this is Surveying, not Geomatics Engineering.

The occupation of Surveying has a long and respected tradition and history. To impart dignity, we do not need to rename it "Geomatics Engineering" and disown the term Surveyor (the "S-Word"), as Dr. Crossfield did a few months ago.

Our calling carries its own dignity with it. I am not concerned whether it is a "profession". That term is too much belabored. Professional is as professional does, be one a cobbler or a cabinet minister.

I guess what I am saying is let's be real; let's have pride in being Surveyors, and not be concerned about renaming ourselves to something we're not, and more specifically, to something that **is not**. OK?

I do not by any means claim to speak for everyone, but in my own observation, the young people I have spoken with ("young" being anyone under 60 or so), have regard and respect for the Land Surveyor. I have not heard the term Geomatics Engineer, except on the program heading.

Now let us make no mistake about this: the Land Surveyor, if called upon and where needed, is fully capable and prepared to employ the current state of the art equipment and technology, software, hardware. We are not in the Middle Ages. It is my humble opinion that GIS, correctly regarded, is an extended form of Land Surveying. Could the tail be wagging the dog?

And, in my humble opinion, the institutions of learning should be offering instruction and counsel for Surveyors.

Let the Swiss have their Geomatics Engineers if they must. I'm a Licensed Land Surveyor of the State of California for 55 years, and damned proud of it.

**Delwyn C. Rasmussen, LS 2689**

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# President's Message



## Greetings from the OC!

### Photogrammetry Checklist

In our previous Cal Surveyor, I wrote an article intended to remind us of our responsibilities and liabilities when working with unlicensed subordinates; particularly unlicensed photogrammetrists. In that article I opined that one can hire a photogrammetrist who does not have a licensed Land Surveyor on staff and still operate within the laws of our state so long as the Land Surveyor acts in responsible charge of the photogrammetric process. I noted that I had developed a checklist to remind me of what I believe I must do to be in responsible charge of a photogrammetric project. In the days since I wrote that article, I have been asked by several surveyors if I would share the checklist. I will happily do so with the understanding that this may or may not be a complete list and I would encourage healthy discussion as to whether following a list like this covers the definition of responsible charge.

This is the checklist that I utilize:

#### 1. Obtain and have on file at surveyors office:

- a. Copy of camera calibration certificate
- b. Copy of stereoplotter calibration report.

#### 2. Prior to each new project:

- a. Sign contract and schedule
- b. Provide photogrammetrist with map of area to be mapped (including area outside of actual project limits)
- c. Provide photogrammetrist with final map scale
- d. Provide photogrammetrist with list or appropriate instructions of planimetric items to be mapped
- e. Provide photogrammetrist with contour interval to be mapped
- f. Provide photogrammetrist with map accuracy standards to be utilized
- g. Provide photogrammetrist with CAD standards for deliverables

#### 3. Review and approve Photogrammetrists recommendation for:

- a. Aerial control panel locations
- b. Aerial control panel size
- c. Photo scale and flying height
- d. Flight lines and neat model layout
- e. Aerotriangulation vs. fully controlled models
- f. Optical-mechanical plotting methods vs. softcopy methods
- g. Orthophoto deliverables and pixel resolution

#### 4. During each project:

- a. Obtain and review copy of aerotriangulation report or single stereo model residual report and approve the results or recommend corrections.
- b. Perform profile line and/or spot check analysis of contours, spot elevations and planimetric features
- c. Review and approve delivered CAD products
- d. Sign and stamp a hard copy of the final topographic product ❖

### The Great Recruitment Campaign of '07

Thanks to the combined efforts of many within CLSA, we now have a tool chest full of great products to promote our profession. The "Your Career as a Land Surveyor" portfolio is complete and in the hands of our chapters and schools throughout the state. As many of you know, this portfolio contains the "Choose Your Path / Make Your Mark" DVD along with information on



scholarships, college and university surveying programs, TrigStar and other information about a career in surveying. A PowerPoint presentation is available which facilitates classroom, career fair, TrigStar, and other presentations designed to inform and lure future surveyors. The surveypath.org website contains a wealth of knowledge for future surveyors and tools for teachers. Even the Path/Mark video can be viewed from this site. The CLSA Central Office is in need of articles pertaining to a career in land surveying to post to the new web site.

Remember that TrigStar "season" runs from October through April. This summer is an excellent time to plan for contacting high school math departments as we work our way into the classroom and the 2007-2008 curricula. We have also found that many schools have classes (other than just math classes) that might have future surveyors in them. Be sure to inquire whether the school has an architecture, GIS or construction class scheduled. Most teachers that we have been in contact with are thrilled with the idea of having someone come in and explain how the skills the students are learning can be applied in the "real" world. Also consider finding a location like the local junior college to hold a Trigstar competition for multiple schools on a single date. This makes it easier to focus resources and will also give you the opportunity to hold a career day event. Whatever you can do to get involved in spreading the word about our profession will be beneficial. Please don't depend on someone else to insure the future of our profession. It is up to all of us to do our part and spread the word about a great career in surveying.

If you would like to volunteer to assist with the CLSA recruitment campaign, or if you have scheduled a classroom presentation and need supplies (DVDs, brochures, etc.) to distribute to students, please contact the CLSA Central Office at (707) 578-6016 or [clsa@californiasurveyors.org](mailto:clsa@californiasurveyors.org).

Have a great summer,  
Steve Shambeck  
CLSA State President



# EFFICIENCY BEYOND MEASURE



[ DEEDS ]

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DATA TREE

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*By: William G. Raymond, Civil Engineer and Professor of Geodesy, Road Engineering & Topographical Drawing, Rensselaer Technical Institute*

*Submitted by: Hal Davis, PLS*

# What Constitutes a Survey and Map

*This article was first published in 1896 in "A Textbook of Plane Surveying". It demonstrates the remarkable foresight of the author - many of his remedies are addressed in modern statutes and discussed in "Guide to the Preparation of Records of Survey and Corner Records", also in this Issue. Read on to see how startlingly relevant many of the Professor's observations still are today- Editor*

The object of a boundary survey is to provide definite information as to the location of a parcel of land, including reference to adjoining tracts, so that from this information the land may at a future time be found. For a complete survey the corners must be fixed, the boundaries marked on the ground, and all facts necessary to preserve their location delineated on a map

It is true that a great many surveyors hold a different opinion and purposely return their maps and notes in such condition, that, while they may serve the purpose for which they are primarily made, do not tell the whole story. Nor do they make it easy for another surveyor to relocate the tract surveyed. When this is done the person ordering the survey does not receive what he pays for. Something is withheld. No argument is needed to show that this is radically wrong. But there is another reason for condemning this practice. The correct and permanent location of all boundaries, public and private, is a matter of the gravest importance. The entire community is interested in the permanency of land boundaries, and all surveyors should cooperate to preserve, in their correct places, the boundaries within their district. It is too important a matter to be subject to avaricious and jealous rivalry.

To this end, the returns of every surveyor should be thorough and complete. Maps made for filing as public records should be so finished as to enable any surveyor to relocate the land without the least uncertainty as to the correctness of his work. That this is done in very few instances is well known to every surveyor who has had occasion to examine public records. While some states have good laws prescribing what shall appear on a map before it will be received as a public record, this is often not the case. Anything that is made up of lines and figures and labeled "this is a map," is considered sufficient, whether it is drawn by hand, photo-lithographed, or simply printed with "rule" and type. Worse than this, these maps are frequently purposely distorted to create a favorable impression of the property to be sold. Wide streets are shown where only narrow ones exist, streets appear opened for the



*From the Collection of Bryant N. Sturgess, PLS, PE*

*Continued on next page*



full width where they have been opened for but half their width, subdivisions are indicated as rectangles that really may not be even parallelograms, etc. Such maps as these frequently form the only basis for the description and location of the property they are supposed to represent.

Examine one of these maps closely. Often there will be no evidence that a monument has been set in the field, nor an angle recorded. The lines may cross at all sorts of angles, and dimensions are given that do not agree among themselves. There may be no signature except, possibly, that of the surveyor, who thus advertises what we shall charitably call his stupidity. When monuments are set they may be small stakes at block corners, but even the fact that such stakes have been set is not recorded on the plat. Only those surveyors acquainted with standard practice in a given district know where to look for such stakes. If the stakes have been set, and not subsequently pulled out to make room for a fence post or building, they may even succeed in finding them. Some surveyors are accustomed to set stakes a certain distance away from the point the stake is supposed to mark, but no mention of this fact appears on the map. In fact, the map is so drawn that no one but the surveyor who made it can write a description of any one of the parcels of land shown, or correctly locate it on the ground. Furthermore, the surveyor himself finds it impos-

sible, after the lapse of a few years and the destruction of his "private marks," to rerun any one of the lines exactly as originally laid out.

It is easy to see to where this leads – impossible descriptions of property, giving opportunity for differences in judgment as to interpretation of what was intended. Boundary disputes, costly litigation, expensive movement of structures, and the actual shifting of lines back and forth by different surveyors, or even by the same surveyor, are all but guaranteed. The writer has seen enough trouble of this sort to indicate to him that a radical change is needed in the field work and mapping of cities, towns, and additions, not to mention farms and other tracts of land that it may be necessary to lay out and describe. So long as fallible man is responsible for the accuracy of surveys, maps, and descriptions of properties, there will be errors. But this writer is fully persuaded that it is possible to greatly reduce their number by proper regulation.

A map of a city, town, or addition, or other tract of land, serving as a basis for the description of property, should furnish all the information necessary for the proper description and location of the entire tract and its various parcels. It should also show the exact location of the tract relative to the lands immediately adjoining. In order for the map to be sufficient, it should include the following:

*Continued on next page*



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## What Constitutes a Survey and Map

1. The lengths of all lines shown.
2. The exact angle made by all intersecting lines.
3. The exact position and character of all monuments set, with notes of reference points.
4. The number of each block and lot.
5. The names of all streets, streams or bodies of water, and recognized landmarks.
6. The scale.
7. The direction of the meridian and a note as to whether the true or magnetic meridian is shown. (It should be the true meridian.)
8. The angles of intersection made by the lines of adjoining property with the boundaries of the tract mapped.
9. A simple, complete, and explicit title, including the date and the name of the surveyor.

Of course monuments will not be shown if none have been set, and very frequently none are, either from carelessness on the part of the surveyor, or an unwillingness on the part of the


owner to pay their cost. Monuments of a permanent character should be set at each corner, and at least two inter-visible monuments should be on the line of each street. Where monuments are not placed on the centerline of the street, they should be placed at uniform distances from them. Uniformity in practice saves a vast amount of time and checks confusion.

In order that the map may be relied upon, there should appear on it the following:

1. The certificate of the surveyor stating that he has carefully surveyed the land, that the map is a correct representation of the tract, and that he has set monuments (to be described) at the points indicated on the map.
2. The acknowledged signature of all persons possessing title to any of the land shown in the tract, and, if possible, signatures of adjoining owners.
3. If the map is of an "addition", the acknowledged dedication to public use forever of all areas shown as streets or roads.
4. If a street of full width, whose centerline is a boundary of the tract, is shown, the acknowledged signature of the owner of the adjoining property, unless his half of the street has been previously dedicated.


In some states a map may be filed at the request of any person, and without signature. This practice frequently leads to trouble. The writer knows of cases in which owners of large tracts of land have had those tracts subdivided and have taken land of adjoining non-resident owners for street purposes without the consent or knowledge of those owners. When, at a later date, the owners of the land so-taken have objected and attempted to close half of the street, trouble of a serious character has arisen. The same trouble has occurred where streets have been run through narrow gores of land and have subsequently been completely closed, leaving houses built on the mapped property without outlet. Time and again have cases of this sort come to the knowledge of the writer.

Having pointed out certain evils, it remains to suggest a remedy. It lies in the enactment of laws governing these matters. There should be included in the statutes of every state pertinent laws that explicitly define what shall appear on every map filed for reference. To file a map that does not strictly conform to such requirements should be a misdemeanor. In the absence of such laws it is believed that the young surveyor can assist greatly in a much-needed reform by following the principles suggested in this paper as the correct ones, and avoiding the errors here indicated. It is hoped that those graduates of our engineering schools who drift into this line of work will be guided by higher principles than covering up their tracks, at the expense of others, in order to secure a monopoly on business. Certainly, a thorough education should so broaden the young surveyor's views as to make it impossible for him to be controlled by those meaner instincts which, if indulged, lead only to the perpetual grief of his community. ❖



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# Guide to the Preparation of Records of Survey and Corner Records

John Canas, Chairman  
Surveying and Land Use Committee  
January 1, 2000

The complete, unedited text of this article, which also contains guidelines for GPS records of survey, can be found at [www.ceac-counties.org/resource\\_center/resource\\_center.asp](http://www.ceac-counties.org/resource_center/resource_center.asp). The sample Corner Record herein was provided by John McDonough, PLS. This article is presented for informational purposes only; it is not intended to be used in place of current state statutes. - Editor

## RECORD OF SURVEY AND CORNER RECORD PREFACE

In writing this, it was the purpose of the County Engineers Association of California to develop a statement of procedure for filing records of survey and corner records which, if followed by the surveyor or engineer, would result in the document being filed with a minimum of difficulty in all of the counties. The materials presented here represent the results of this effort.

Recognizing that the Land Surveyor or Civil Engineer is a professional practitioner and that the Professional Land Surveyors Act allows great flexibility in the preparation of the record of survey map, these materials are presented as guidelines which are believed to reflect good professional practice without being unduly restrictive. These guidelines are **NOT** to be construed as representing one method which is acceptable in all of the counties.

This Guide conforms with the Professional Land Surveyors Act through January 1, 2000.

## PURPOSES AND REQUIREMENTS FOR A CORNER RECORD

The corner record is the means by which the re-establishment or rehabilitation of public land survey corners or other property corners may be made of record and brought to public attention. The Professional Land Surveyors Act (Business and Professions Code, Chapter 15, Division 3, Section 8700 et. seq.) provides that:

1. A corner record **shall** be filed when the survey is a retracement of lines shown on a subdivision map, official map, or record of survey, where no material discrepancies with those records are found and sufficient monumentation is found to establish the precise location of property corners thereon which are set or reset or found to be of a different character than indicated by prior records. (8765(d))
2. A corner record **shall** be filed for every public land survey corner or accessory, except a lost corner, which is found, set, reset or used as control in any survey by a Land Surveyor or Civil Engineer. (8773(a))

After the establishment of a lost corner, as defined by the Manual of Instructions for the Survey of the Public Lands of the United States, a record of survey shall be filed as set forth in Section 8764. (8773(b))

A licensed land Surveyor or registered Civil Engineer may file a cor-

ner record as to any property corners, property controlling corners, reference monuments or accessories to a property corner. (8773(c))

The filing of a corner record with the County Surveyor does not relieve the Professional Land Surveyor or Civil Engineer authorized to practice land surveying of the responsibility to file a record of survey if required by Section 8762 of the Professional Land Surveyors Act.

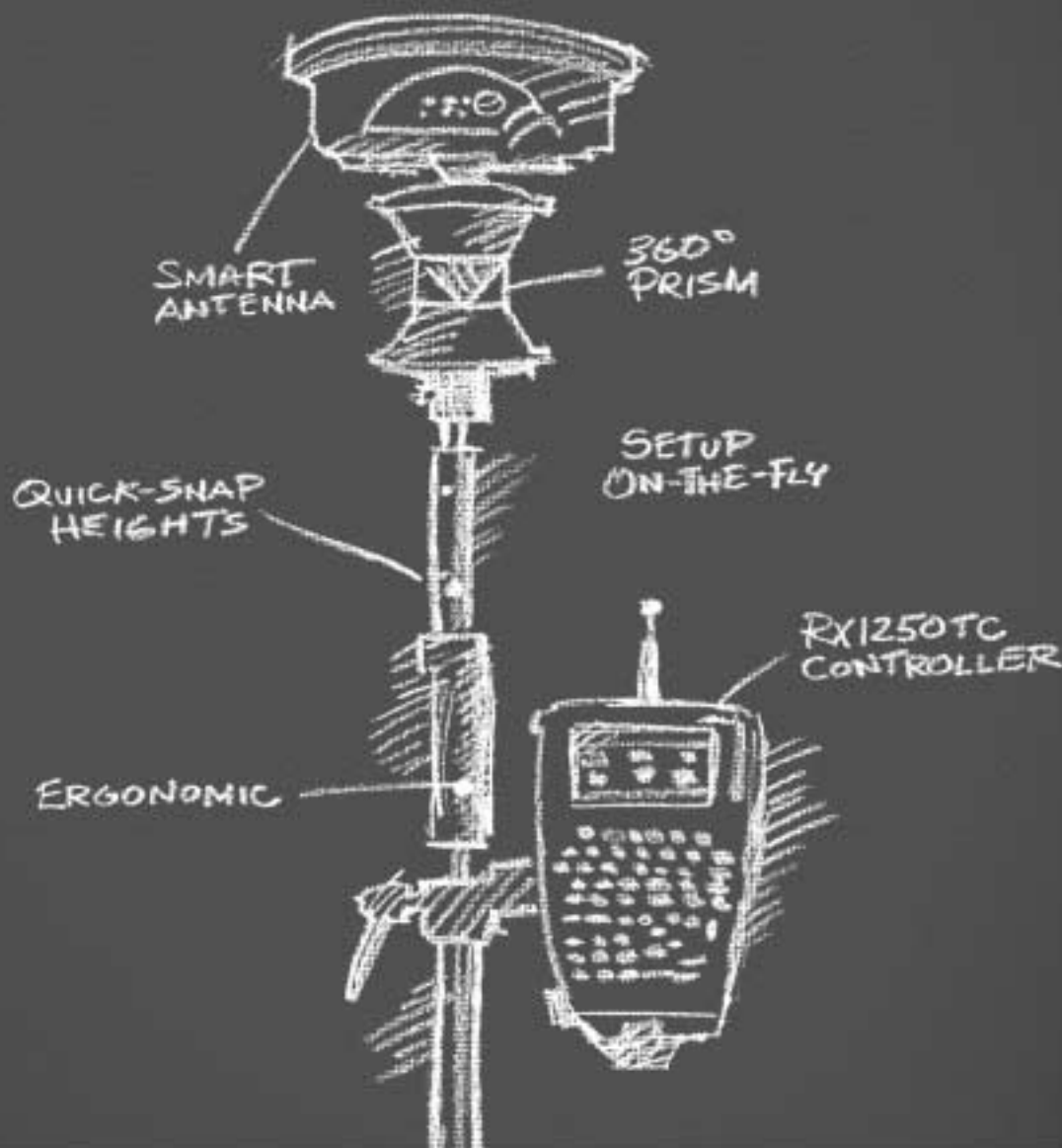
The corner record was created to fill the need for a short and inexpensive method of making survey information available to the public without the necessity of a record of survey. The County Engineers Association of California believes that the following interpretation of the Professional Land Surveyors Act as it relates to the corner record is a reasonable approach and in line with the purpose for which the corner record was created.

1. Corner records shall be legibly drawn in ink or pencil. (Some counties will only accept ink). (All signatures to be in ink).
2. The corner record should be legible, clear and dark enough for archival and reproduction purposes.
3. A Corner Record shall be a single 8.5 x 11 inch sheet which may consist of a front and back page.
4. When monuments are recovered, their record should be identified. No record monuments should be identified as such.
5. The corner record should clearly indicate the method used to determine the location of all monuments set.
6. A corner record may be used when monuments are set to replace monuments previously shown on the subdivision map, official map or record of survey.
7. More than one monument can be shown on a corner record provided the sketch is adequate to indicate how each monument was set and its relationship to other monuments of record.
8. The survey of a parcel described by a metes and bounds description and not shown on a previously filed or recorded subdivision map, official map or record of survey requires that a record of survey be filed.
9. A corner record shall be filed on lots within a subdivision where no original monuments are shown to be set, provided there is no material discrepancy with record and sufficient monumentation is found to establish the precise location of property corners thereon. (8765(d))

Continued on page 16



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10. Sections 8762(b) and 8765(d) of the Professional Land Surveyors Act limits material discrepancy to the material discrepancy in the position of points or lines, or in dimensions.

11. A reference to the California Coordinate System is optional at the discretion of the submitting surveyor. Refer to Sections 8813 and 8817 of the Public Resource Code.

12. Any survey based upon the metric system should be clearly identified as such. It is recommended that a bold note and/or metric logo be placed on the page with the drawing.

### RESPONSIBILITIES OF THE PRIVATE SURVEYOR/ENGINEER-CORNER RECORD-

1. The surveyor or engineer authorized to practice land surveying is responsible to recognize the conditions permitting the use of a corner record in compliance with the Professional Land Surveyors Act.

2. The person authorized to practice land surveying shall complete, sign, stamp with his/her seal, enter expiration date of license or registration, and file with the County Surveyor in the County in which the corner is located a corner record when required.

3. The sketch prepared as part of the corner record shall be sufficiently complete and in accordance with Board Rule 464 to allow another surveyor or engineer to determine the method used to establish the corner. The drawing shall show measurements that relate the corner to other identifiable monuments. (Board Rule 464 (a)(6))

4. The surveyor or engineer authorized to practice land surveying shall reconstruct or rehabilitate the corner monuments shown on a corner record, and accessories to such corners, so that the same shall be left by him/her in such physical condition that it remains a permanent monument. (8773.3)

5. The surveyor or engineer authorized to practice land surveying shall file the corner record within 90 days from the date a corner was found, set, reset or used as control on any survey, when required. (Board Rule 464(10)(c), 8762 LS Act

### RESPONSIBILITIES OF THE COUNTY SURVEYOR WHEN REVIEWING A CORNER RECORD

1. The County Surveyor shall, by examination, assure that the corner record does not indicate a division of land nor require a record of survey, after which he/she shall file the corner record.

2. The County Surveyor of the County containing the corner shall receive and file the completed corner record by assigning a document number to the corner record and securing it in a book for that purpose. (8773.2)

3. Corner records shall be filed and cross-indexed in such a manner to be readily available to the public for research purposes. (8774.5)

4. The County Surveyor shall examine the corner record within 20 working days after receipt for conformance with the Profession Land Surveyors Act. (8773.2)

5. Should the County Surveyor discover that a problem exists with the corner record, as submitted, he/she shall return it to the surveyor or engineer authorized to practice land surveying who submitted it, with a full written explanation of the problem. The surveyor or engineer who submitted the corner record has the option of correcting the corner record or asking the County

Surveyor to file it as originally submitted. If the surveyor or engineer requests the County Surveyor to file the corner record as originally submitted, the County Surveyor shall describe the problem in the County Surveyors comment on the form and file it as requested within 10 working days after receipt. When the County Surveyor places an explanatory note on a corner record, he/she shall transmit a copy of the filed document within 10 working days of the filing to the submitting land surveyor or registered civil engineer. (8773.2)

### PURPOSE AND REQUIREMENTS FOR A RECORD OF SURVEY

The record of survey is the means by which field surveys relating to property lines, land boundaries or other subjects are brought to public attention. The Professional Land Surveyors Act (Business and Professions Code, Chapter 15, Division 3, Section 8700 et. seq.) provides that a record of survey made in conformance with the practice of land surveying as defined therein may be filed with the County Surveyor of the county in which the survey was made. It further provides that a record of any survey relating to land boundaries or property lines shall be filed when certain conditions exist.

The thrust of the law is clearly that all property surveys be recorded and that all monuments set to denote property corners or boundary lines be made of public record, while surveys of other types and for the other purposes may be recorded as desired, as provided by the Professional Land Surveyors Act.

Continued on next page



A record of survey is required of any field survey relating to land boundaries or property lines whenever the survey discloses any of the following:

1. Material evidence or physical change which in whole or in part does not appear on any previously filed or recorded subdivision map, official map or record of survey or survey record maintained by the Bureau of Land Management of the United States. (8762)

Material evidence has been defined as evidence of sufficient import as to effect the outcome of a court case, and includes, but is not limited to, the particular items mentioned in Section 8764 of the Professional Land Surveyors Act. This section requires that the record of survey show monuments both found and set, however, the resetting of a previously recorded monument which has become dilapidated would not in and of itself require the filing of a new record of survey but merely a corner record. As long as the purpose and functional identity of the previously recorded monument is maintained by the new monument, and as long as the record (of the monument) is not abrogated by the new monument, there would be no need for a new record of survey.

Physical change would apply to topographic or landmark features of importance to the survey which, if not noted, may adversely affect the interpretation of the survey. In regard to monuments, physical change would include the discovery of any evidence pertinent to a monument (except as discussed above) which differs from the previous existing record of said monument.

When the monument to any corner of the Public Survey of the United States or any accessory thereto, (or any other survey corner or control point at the option of the Land Surveyor or Civil Engineer) is found, reset, or used as control in a survey and the same is not shown on a previously recorded record of survey, official map, or subdivision map, such corner or control point shall be reported by means of a corner record or record of survey, as required by the Professional Land Surveyors Act.

2. Material discrepancy with a map of prior record as specified in Section 8762, or other evidence that, by reasonable analysis, might result in alternate positions of lines or points. Section 8762 limits material discrepancy to material discrepancy in the position of points or lines, or in dimensions.

Here, material discrepancy would be any discrepancy in dimensions or positions occurring between the current survey and a survey or map of prior record such that alternate or varying conclusions or interpretations might arise between the two. Factors such as the date(s) of the survey(s), the survey methods and equipment contemporary with said date(s), land values and the requirements of the survey(s), would combine to determine the seriousness of the discrepancy, at which time a professional judgment would be rendered to dictate the subsequent course of action.

3. Any line or lines not shown on a map of prior record, the positions of which are not ascertainable from an inspection of such map.

4. The points or lines set during a survey of any parcel described in any deed or other instrument of title recorded in the County Recorder's Office and not shown on any subdivision map, official map, or record of survey. This includes new lines created by lot line adjustments that are monumented or are established during the course of a field survey.

5. After the establishment of a lost corner, as defined by the Manual of Instructions for the Survey of the Public Lands of the United States. (8773(b))

A record of survey is not required per Section (8765) if any of the following conditions exist:

1. The survey was made by a public officer or under his direction, in his official capacity and a reproducible copy thereof, showing all the data required by Section 8764 with the exception of the recorder's statement, has been filed with the County Surveyor of the county in which the land is located.

2. The survey was made by the U.S. Bureau of Land Management.

3. A Final Map or Parcel Map is in preparation for recording under the provisions of the Subdivision Map Act.

4. When the survey is a retracement of lines shown on a subdivision map, official map, or a record of survey, where no material discrepancies with those records are found and sufficient monumentation is found to establish the precise location of property corner thereon, provided that a corner record is filed for any property corners which are set or reset or found to be of a different character than indicated by prior records.

5. When the survey is of interior lots in a mobile home park provided that the park has not converted to residential ownership or no subdivision map, official map or record of survey has been previously filed.

A record of survey cannot be used to create a division of land. All divisions of land must be made by means of a subdivision map, unless exempted by the Subdivision Map Act.

Any line shown on a record of survey map which does not represent an existing title line and which appears to create a new parcel of land should be clearly labeled as to its purpose.

#### RESPONSIBILITIES OF THE PRIVATE SURVEYOR/ENGINEER-RECORD OF SURVEY-

1. The surveyor or engineer authorized to practice land surveying is responsible to recognize the need to file a record of survey in accordance with the Professional Land Surveyors Act.

2. The surveyor or engineer must assure himself/herself that no violation of the Subdivision Map Act will be created by the filing of the record of survey.

3. The survey must be made in conformance with the accepted practices of land surveying in the State of California and the latest edition of the Professional Land Surveyors Act and Section 465 of the Rules and Regulations of the Board for Professional Engineers and Land Surveyors.

4. The survey must be made under the direct supervision of a licensed Land Surveyor or registered Civil Engineer authorized to practice land surveying in accordance with the Professional Land Surveyors Act.

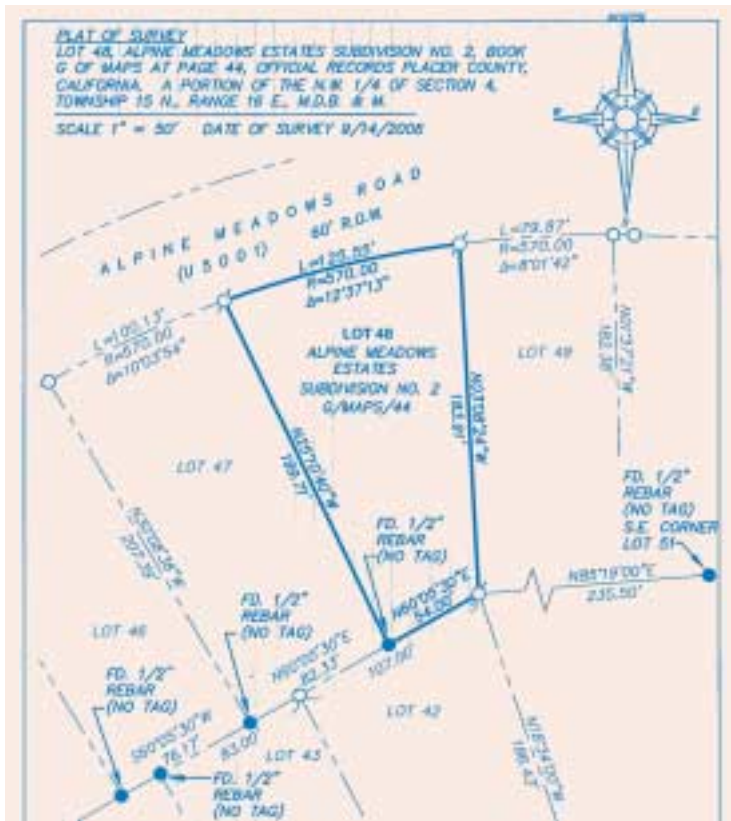
5. All information pertinent to the establishment of land boundary lines must be plainly shown or referenced on the map of the survey. It shall be the responsibility of the surveyor to examine all available records in analyzing his or her survey.

6. The surveyor or engineer shall administer and certify oaths when necessary in accordance with Section 8760 of the Professional Land Surveyors Act and so indicate on his/her map.

7. The surveyor or engineer authorized to practice land surveying should supply the County Surveyor with copies of pertinent deeds, field notes, and other such evidence not readily available in the office of the County Surveyor to aid in the examination of the map.

8. The surveyor or engineer shall deliver to the County Surveyor the completed tracings and the required number of prints of each sheet and shall deposit with him/her the required examination and filing fees when or as required.

# Guide to the Preparation of Records of Survey and Corner Records



The Land Surveyor or Civil Engineer authorized to practice land surveying submitting the record of survey shall not be required to change the methods or procedures utilized or employed in the performance of the survey, nor is a field survey required for the County Surveyor to verify the data shown on the record of survey. The County Surveyor may add notes to the record of survey expressing opinions regarding the methods or procedures used.

The County Surveyor's examination shall be performed by, or under the direct supervision of a licensed Land Surveyor or registered Civil Engineer authorized to practice land surveying.

3. County Surveyor endorsement — If the County Surveyor finds that the record of survey complies with the examination in Section 8766, the County Surveyor shall endorse a statement on it of his or her examination, and shall present it to the County Recorder for filing. Otherwise, the County Surveyor shall return it to the person who presented it, together with a written statement of the changes necessary to make it conform to the requirement of Section 8766. The licensed Land Surveyor or registered Civil Engineer submitting the record of survey may then make the agreed changes and note those matters which cannot be agreed upon in accordance with the provisions of Section 8768 and shall resubmit the record of survey within 60 days or within a time that is mutually agreed upon. (8767)

4. Record of survey explanations of differences — If the matters appearing on the record of survey cannot be agreed upon by the licensed Land Surveyor or the registered Civil Engineer and the County Surveyor within 10 working days after the licensed Land Surveyor or registered Civil Engineer resubmits and requests the record of survey be filed without further change, an explanation of the differences shall be noted on the map and it shall be presented by the County Surveyor to the County Recorder for filing, and the County Recorder shall file the record of survey. The parties shall attempt to reach agreement regarding the language for explanation of the difference and if an agreement cannot be reached, then both shall add a notation explaining the differences. The explanation shall be specific to identify the factual basis for the difference. (8768)

5. Upon completion of his examination of the map, the County Surveyor shall endorse a statement on the map showing his or her stamp or seal and the expiration date of his or her license or registration and present it to the County Recorder for filing.

Note: The following page is a guideline endorsed by the County Engineers Association for the review of Records of Survey by the County Surveyor. The guideline is based upon the provisions of the Business and Professions Code and is intended to provide consistency in map checking statewide.

## EXPLANATORY NOTES FOR RECORD OF SURVEY CHECK SHEET

The notes below apply to the stated items on the Check Sheet. The remaining items are (hopefully) self-explanatory.

**A. MAP TITLE:** The recommended title block for the map sheet should contain the essential items listed on the Check Sheet and should, for the sake of conformity, follow the basic format shown on the sample sheet.

9. Upon the filing of a record of survey or amended record of survey the surveyor or engineer who prepared the map shall transmit a copy of the map, including all recording information, to the County Surveyor, who shall maintain an index, by geographic location, of the maps. The County Surveyor may charge a fee equal to the cost of recording the maps for the purpose of maintaining an index of the maps. This requirement shall not apply to any county which requires these documents to be transmitted to the County Surveyor and requires that official to maintain an index of those documents.

10. The surveyor or engineer should encourage the filing of record of survey maps in other situations where a public record would be desirable but not necessarily mandatory under Section 8762 of the Professional Land Surveyors Act.

## RESPONSIBILITIES OF THE COUNTY SURVEYOR WHEN EXAMINING A RECORD OF SURVEY

1. The Professional Land Surveyors Act requires the County Surveyor to examine the map for conformance with the requirements of Section 8766 of said Act.

2. Section 8766 states that the County Surveyor shall examine the map within 20 working days or such additional time as may be mutually agreed upon, with respect to:

- a) Its accuracy of mathematical data and substantial compliance with the information required by Section 8764 of the Professional Land Surveyors Act.
- b) Its compliance with Section 8762.5, 8763, 8764.5, 8771.5 and 8772 of the Professional Land Surveyors Act.

Continued on page 20



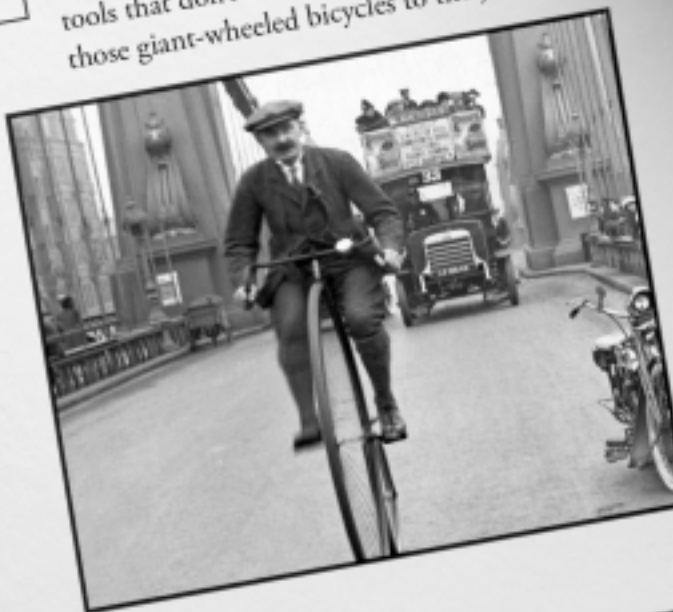
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**RECORD OF SURVEY CHECK SHEET**

First Check \_\_\_\_\_ File No. \_\_\_\_\_  
 Recheck No. \_\_\_\_\_ Fee Paid \$ \_\_\_\_\_ Date Paid \_\_\_\_\_ Date \_\_\_\_\_  
 Surveyor/Engineer \_\_\_\_\_ Checked By \_\_\_\_\_  
 Survey Requested By \_\_\_\_\_ Location \_\_\_\_\_

Circle (0) indicates deficiency – Check (v) indicates no deficiency

**Business and Professions Code, Chapter 15, Division 3, Section 8700 et seq.**

\_\_\_\_ Map appears to create a division of land: Subdivision or Parcel Map required. (8762.5)

**MAP TITLE**  
 \_\_\_\_ Name of City, if applicable  
 \_\_\_\_ Name of County, California  
 \_\_\_\_ "RECORD OF SURVEY."  
 \_\_\_\_ General description of land surveyed. (8764)  
 \_\_\_\_ Date of survey.  
 \_\_\_\_ Sheet number, when two or more sheets.

**CERTIFICATES**  
 \_\_\_\_ County Recorder's Certificate or space for same. (8764.5)  
 \_\_\_\_ Surveyor's Statement. (8764.5)  
 \_\_\_\_ Signed and sealed. (8764.5)  
 \_\_\_\_ County Surveyor's Statement. (8764.5)  
 \_\_\_\_ Certificate per Sec. 8762.5, if applicable.  
 \_\_\_\_ Memorandum of costs, if applicable. (8760)  
 \_\_\_\_ No non-technical certificates or statements on map. (8764.5)

**SURVEYOR'S NOTES**  
 \_\_\_\_ Basis of Bearings: map of record, celestial observation, Side Plane Coordinates, or County Surveyor's Records.  
 \_\_\_\_ Found monuments: Solid symbol. Must include type, size, L. S. or R.C.E. No. (8764)  
 \_\_\_\_ Set monuments: Open symbol. Must include type, size, L. S. or R.C.E. No. (8764)  
 \_\_\_\_ Symbols and nonstandard abbreviations defined. (8764)

**MATHEMATICAL ACCURACY**  
 \_\_\_\_ Map loop closures less than 0.02 ft.  
 \_\_\_\_ All bearings shown. (8764)  
 \_\_\_\_ All distances shown. (8764)  
 \_\_\_\_ All overall bearings shown.  
 \_\_\_\_ Sum of parts equal total distance or delta.  
 \_\_\_\_ All curve data shown. (Minimum = Delta, Radius, Arc length.)  
 \_\_\_\_ All radial bearings shown where required.  
 \_\_\_\_ All areas shown (if required)  
 \_\_\_\_ Others \_\_\_\_\_

**MAP BODY**  
 \_\_\_\_ Map material: tracing cloth or polyester base film; black in. (8763)  
 \_\_\_\_ Map size: 18" x 26" or 460 x 660 mm (8763)  
 \_\_\_\_ Margin: 1" or 25 mm all around. (8763)  
 \_\_\_\_ Map orientation, title and map body to read from bottom or right side of sheet when north arrow points away from reader.  
 \_\_\_\_ North arrow. (8764)  
 \_\_\_\_ Scale. (8764)  
 \_\_\_\_ City, County or State boundary lines as required.  
 \_\_\_\_ Reference to adjacent tracts or other maps of record when pertinent. (8764(d))

\_\_\_\_ Legibility of map data. (8763)  
 \_\_\_\_ Street names and widths shown.  
 \_\_\_\_ Reference for all found monuments or statement of acceptance if used as a control monument. (8764)  
 \_\_\_\_ Reference to deeds or official records if necessary for the establishment of lines or points. (8764)  
 \_\_\_\_ Record measurements in parenthesis to be shown when beneficial to the interpretation of lines or points or substantially different from measured.  
 \_\_\_\_ Purpose indicated for all easements shown.  
 \_\_\_\_ Detail required for clarity.  
 \_\_\_\_ Arrows needed to clarify dimensions.  
 \_\_\_\_ No dots marks.  
 \_\_\_\_ Spelling

**SURVEY PROCEDURES**  
 \_\_\_\_ Survey based upon sufficient control.  
 \_\_\_\_ Additional survey information required. (8762)  
 \_\_\_\_ Prorations correct.  
 \_\_\_\_ Sectional breakdowns correct.  
 \_\_\_\_ Deed interpretations correct.  
 \_\_\_\_ Durable monuments sufficient in number. (8771)  
 \_\_\_\_ Monuments tagged. (8772)  
 \_\_\_\_ Relationship to adjacent lines of record when pertinent. (8764)  
 \_\_\_\_ Methods of establishment of lines or points shown where necessary. (8764)  
 \_\_\_\_ Other \_\_\_\_\_

To the Surveyor / Engineer

Pursuant to Section 8767 of the Land Surveyor's Act, the subject map should be corrected as indicated on the above check list and / or check part and returned to this office with:  
 \_\_\_\_ Corrected Prints  
 \_\_\_\_ The corrected original and the \_\_\_\_\_ filing fee (Payable to County Recorder)

(Name) County Surveyor  
 \_\_\_\_\_  
 Deputy

**B. SURVEYORS NOTES:**

1. Basis of Bearings. The bearings shown on the map should be defined in terms of one of the following:

a. A line appearing on an existing map of record. The reference line shall be a line between any two existing monuments which have been made a part of the current survey and have been shown on the map. The bearing and distance of the reference line shall be shown on the map, and if the distance is also of record, it shall be so stated. Maps acceptable for reference purposes are final maps, parcel maps, records of survey maps, City or County Surveyors or Engineer maps, and State Highway Department Coordinate Control maps.

The form of the note should be substantially as follows: The basis of bearings for this survey is the North line of the NW 1/4 Sec. 3, T.7S., R.2W., S.B.M., shown on R.S. 54/23-25 as S89;21 58 E.

b. A solar or stellar observation.

If the astronomic observation were made on a line which is monumented and shown on the map, the note should make specific reference to that line as, for example:

The basis of bearings for this survey is the centerline of Sierra Road, shown hereon as N10;15 20 E; as determined by observation of (Polaris) (the sun).

If the astronomic observations were made on a line not appearing on the map, the note may be generalized to indicate that the bearings shown on the map are referred to the true meridian as determined by observation of (Polaris) (the sun).

In either case, the field notes of the sun or Polaris observation and connection to the lines on the map should be made available to the

*Continued on page 22*

## Welcome New CLSA Members

### CORPORATE

Michael S. Baird, Concord  
Jeffrey M. Barnes, Riverside  
William A. Brooks, Durant, OK  
Robert J. Brunel, Oakland  
John Cardarelli, Petaluma  
David Cockrum, Apple Valley  
Keith V. Crowe, Atascadero  
Adam J. D'Alvia, Irvine  
Gerald F. Ding, Loomis  
Michael R. Donoho, El Cajon  
Terry Goff, Oroville  
Peter C. Golding, San Diego  
Clive J. Hopwood, Escondido  
Douglas J. Jacobson, Bakersfield  
Nick Kazemi, Woodland Hills  
Gary K. Lamb, Pleasanton  
Jon M. Lamb, Pleasanton  
Steve C. Lehman, Vacaville  
Greg C. Lienhard, Frazier Park  
Richard Lopez, Hacienda Heights  
Malcolm J. Macdonald, Red Bluff  
Anthony Maddox, Palm Desert  
Cynthia Marthaler, Santa Fe  
Brian K. Mickelson, Irvine  
George L. Musallam, Yuba City  
Steven C. Nix, Alta Loma  
Michael Pniewski, Royal Oak, MI  
Thomas E. Propst, Irvine  
Alan A. Rawlins, Ventura  
Forrest A. Reed, Alameda  
William J. Reno, Valencia  
Susan Roberts, San Luis Obispo  
Tiberius C. Rosu, Yorba Linda  
John L. Smith, Ventura  
James O. Steines, San Juan Capistrano  
John Stewart, Napa  
Richard Allen Tetreault, Mission Viejo  
Thomas J. Tucker, Calistoga  
Kurt G. VanBentham, La Mesa  
Kurt VanBentham, La Mesa  
Joseph R. Willard, Twentynine Palms  
Randall T. Willis, Petaluma  
Gary A. Winglovitz, Temecula  
Howard A. Wright, Bell  
Robert L. Yeckley, Colton

### AFFILIATE

Daniel Baldwin, Riverside  
Harold Baldwin, Snowflake, AZ  
Randy Clifford, Redding  
Cole Dawson, Riverside  
Timothy L. Dawson, Moreno Valley  
Shane Dawson, Riverside  
Daniel J. Forgey, Citrus Heights  
Jeff E. Grimm, Garden Grove  
Alicia Hall, Anaheim

James W. Heck, El Sobrante  
Matthew Leedholm, Simi Valley  
Matthew P. Loesch, San Leandro  
Catherine May, Los Angeles  
Christy Mickel, San Diego  
Don Miller, Riverside  
Jonathan R. Miller, Riverside  
Don Miller, Riverside  
Shawn Ohannessian, Granada Hills  
Matthew H. Okubo, San Bernardino  
Robert R. Oliver, Fullerton  
Joe Pannattoni, Riverside  
Marlene Geni Perez, Woodland Hills  
Daedri Peters, Jefferson Valley, NY  
Ruben Rodriguez, Riverside  
Harinder Singla, Morgan Hill  
Justin Sousa, Blue Lake  
Patrick Taylor, Oakland  
Robert Thompson, Riverside  
Judy A. Tsutsumi-Smith, Irvine

### ASSOCIATE

Daniel Baldwin, Riverside  
Harold Baldwin, Snowflake, AZ  
Randy Clifford, Redding  
Cole Dawson, Riverside  
Timothy L. Dawson, Moreno Valley  
Shane Dawson, Riverside  
Daniel J. Forgey, Citrus Heights  
Jeff E. Grimm, Garden Grove  
Alicia Hall, Anaheim  
James W. Heck, El Sobrante  
Matthew Leedholm, Simi Valley  
Matthew P. Loesch, San Leandro  
Catherine May, Los Angeles  
Christy Mickel, San Diego  
Don Miller, Riverside  
Jonathan R. Miller, Riverside  
Don Miller, Riverside  
Shawn Ohannessian, Granada Hills  
Matthew H. Okubo, San Bernardino  
Robert R. Oliver, Fullerton  
Joe Pannattoni, Riverside  
Joe Pannattoni, Riverside  
Marlene Geni Perez, Woodland Hills  
Daedri Peters, Jefferson Valley, NY  
Ruben Rodriguez, Riverside  
Ruben Rodriguez, Riverside  
Harinder Singla, Morgan Hill  
Justin Sousa, Blue Lake  
Patrick Taylor, Oakland  
Robert Thompson, Riverside  
Robert Thompson, Riverside  
Judy A. Tsutsumi-Smith, Irvine

### STUDENT

Steven Boice, Clovis  
Mark Carpenter, Santa Rosa

Mark Chappell, Morongo Valley  
Nguyen Chau, San Jose  
Hektor Dino, Riverside  
Michael Fite, Riverside  
Tristan Higgins, Delhi  
David Klienman, Clovis  
Rick Peters, Santa Rosa  
Ailyn Renteria, Walnut  
Cesar Rodriguez, Santa Rosa  
Khae Saetern, Clovis  
Matthew Setterquist, Los Banos  
Jonathan Shattuck, Fresno  
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Josh Tatman, Vista  
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Continued from page 20

## Guide to the Preparation of Records of Survey and Corner Records

County Surveyor for his review.

c. The California Coordinate System. When this system is used, the map shall show the line or lines connecting the survey to the control stations used, showing the grid bearings between them, and the relationship between grid north and astronomic north (theta angle). Should coordinates be shown for points established on the map, the control scheme by means of which the coordinates were determined must also be shown on the map. Refer to Section 8813 of the Public Resources Code.

The form of the note should be substantially as follows: The basis of bearings for this survey is the California Coordinate System (NAD 27 or NAD 83) Zone 5, as determined locally by the line between USG&GS stations BACHELOR and MARCH, shown herein as: N27°32'15" E. If an FGCS, or its successor, order of accuracy is claimed for a survey or a map, it shall be justified by additional written data that shows equipment, procedures, closures, adjustments, and a control diagram.

Note: Public Resource Code, Section 8817 requires NAD 83 on all new surveys and new mapping projects effective January 1, 1995. The Federal Geodetic Control Subcommittee (FGCS) was formerly the Federal Geodetic Control Committee.

2. Any survey based upon the metric system should be clearly identified as such. It is recommended that a bold note and/or metric logo be placed conspicuously on the map.

3. Other explanatory notes and comments as required.

### C. MAP BODY:

1. All lettering should be placed so as to be read most conveniently with the North arrow pointing away from the reader.

2. Adjacent Subdivisions, etc. The relationship to those portions of adjacent tracts, streets, or senior conveyances which have common lines with the survey. For the sake of clarity, this information should be shown in light dashed lines.

3. References for Found Monuments. All monuments shown as found on the map shall be described as to type, material, height relative to the ground surface, stamping/tagging, with a reference to a record map or field book where the monument was shown as having been set or accepted for use as the corner cited. If no record can be found to substantiate the monument, indicate same by stating No reference. It is recommended that untagged monuments used for control or accepted as corners should be tagged by the preparer of the map.

### D. LEGIBILITY OF MAP DATA:

1. Lines. Normally, the weight of a line is used to denote a specific level of importance to that line, the heavier lines being of more importance than the light weight lines. It has been customary to represent various types of lines as follows:

a. Lines denoting the boundary of the land requested specifically to be surveyed are shown with heavy solid lines, the weight being usually three times greater than that of other lines on the map, except the border, unless clarity dictates otherwise.

b. Public street side lines are shown by light solid lines, unless clarity dictates otherwise.

c. Other lines (adjoining lots, tracts, etc.) are shown as light dashed lines, unless clarity would dictate otherwise. ❖

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# Measurement of a Calibration Baseline

## (A lesson in Redundancy)

In August of 2005 the *Riverside/San Bernardino Chapter of the California Land Surveyors Association (CLSA)* decided to establish an EDM (electronic distance measurement) calibration base line (CBL). After conferring with Marti Ikehara, *National Geodetic Survey (NGS) Geodetic Advisor for the State of California*, and reviewing NGS publications *NOS NGS 8 and NGS EDM Calibration Base Line (CBL) Policy*, a site was selected along the *Riverside County Flood Control "Salt Creek Channel"* near the town of Winchester, California. In mid-September 2005, five baseline monuments were installed at station increments of 0 m, 100 ft., 150 m, 430 m, and 1200 m. Each monument is a 14 in. diameter concrete cylinder, 3 ft. long, with a standard NGS brass disc. One of the NGS requirements is that these monuments go through a settlement process, so we scheduled the measurements for Spring 2006.

*Setting up Tribrach w/ Collimator (Lt. to Rt. - Steve B., Bill H., Paul C.)*



*Continued on next page*

*Continued from previous page*

Steve Breidenbach, NGS Instrumentation and Methodology Branch, provided additional technical guidance for our project. The fieldwork began by setting up tripods and Wild GDF-23 tribrachs on all stations. These tribrachs were used because they have a large lockdown screw that allows for direct height measurement through the tribrach. They also allow adequate light to be received by the NL collimator. A Wild Zenith/Nadir Collimator ZBL 16, and a Wild NL collimator were used to plumb over the mark, and tribrach adaptor heights were measured and recorded for all five stations. Base line measurements were made using a Wild T2000 theodolite with two Wild Leica DI2002 EDM top mounts. This is a very accurate short range (2000 m) EDM with specifications of  $\pm 1 \text{ mm} + 1 \text{ ppm}$ . The same prism was used for all measurements throughout the entire calibration procedure. A single mirror configuration was all that was required for this particular baseline.



*Setting up Tripod & Tribrach  
(Lt. to Rt. - Bill C., Ken J., Justin G., Ed K.)*

Day-one measurements began with the instrument at Station 1 (0 m) and the prism at Station 2 (100 ft). Relative humidity, temperature and barometric pressure were recorded, and five direct and reverse measurements were made with each EDM to each of the other four stations, with the prism ending at Station 5. The EDM was then moved to Station 2 (100 ft.) and the process was repeated. This leap-frog technique was used throughout, with a total of eighty independent measurements being taken and recorded from each of the five stations. At the end of the day an observation check was run to assure that all measurements met specifications. Day-two measurements were executed likewise, except that the EDM began at Station 5 (1200 m) and the prism at Station 4 (430 m).

Measurements and metadata were entered into an HP1000CX hand-held computer using a DOS 5.0 operating system. This DOS screen was quite difficult to see outdoors but the software is very intuitive with most selections defaulting to the required entry. Steve Breidenbach assured us that within a few years NGS would have new EDMs with digital data collection capabilities and new software.

*Continued on next page*

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# Measurement of a Calibration Baseline

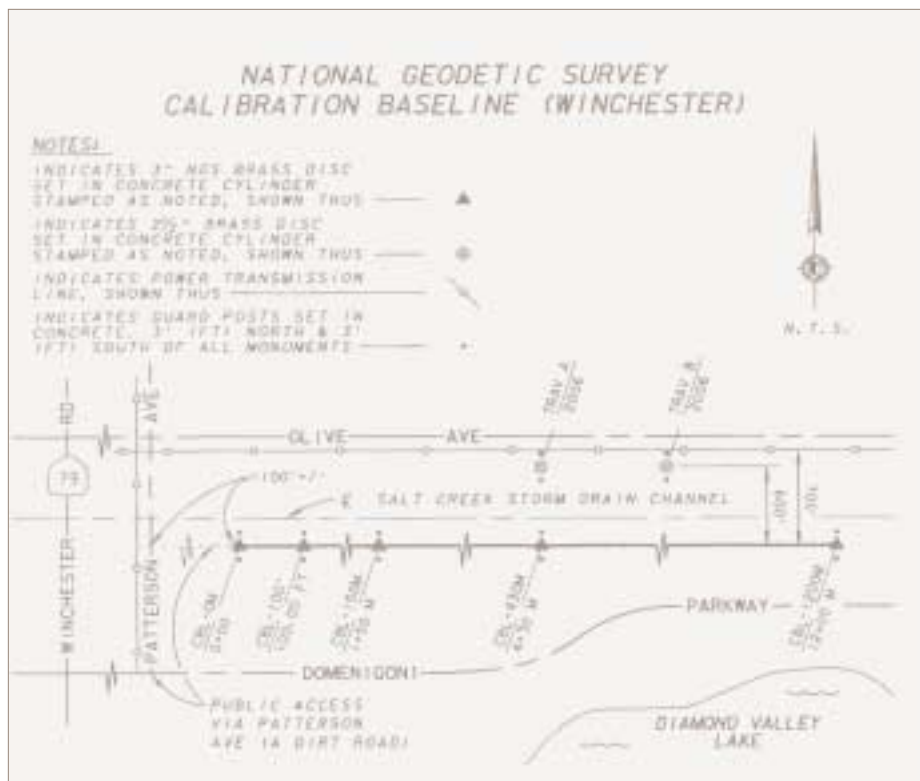
(A lesson in Redundancy)



Instrument team on stand- by waiting for glass to be moved  
(Lt. to Rt.- Steve B., Brian W., Sean F., Marti I., Gavin M.)

Some eight hundred independent measurements were made to achieve the adjusted distances between the monuments. The field-work took two very long days in high-90's weather, but the first CBL to be measured in California in more than a decade has been successfully completed. During the following weeks three other CBLs in southern California were also observed. The equipment was then shipped back to Virginia and re-calibrated over an NGS CBL to verify that it was still within tolerance. With the tolerance check successfully completed, the data for these southern California CBLs is now available online from NGS at: <http://www.ngs.noaa.gov/CBLINES/BASELINES/ca>.

In the near future two more monuments will be tied into the Winchester base line and the entire project will be compiled into a



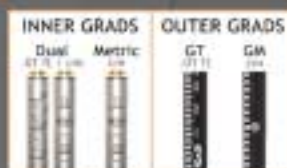
Continued on page 28

# Telescopic Quick Change™ Prism Poles

The simple-to-use Quick Change™ Prism Pole system is designed to be compatible with all targets, prisms, and GPS antennas!

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5507-11	Dual	1.64 to 2.30 ft	Aluminum	
5507-13	Dual	4.36 to 7.22 ft	Carbon Fiber	Yes
5507-15	Dual	4.97 to 8.53 ft	Aluminum	
5507-16	Dual	4.97 to 8.53 ft	Carbon Fiber	
5507-17	Dual	4.97 to 8.53 ft	Carbon Fiber	Yes
5507-20	Dual	5.18 to 11.81 ft	Aluminum	
5507-22	Dual	5.18 to 11.81 ft	Carbon Fiber	Yes
5507-30	Dual	5.41 to 15.25 ft	Aluminum	
5527-10	Metric	1.33 to 2.20 m	Aluminum	
5527-11	Metric	0.50 to 0.70 m	Aluminum	
5527-13	Metric	1.33 to 2.20 m	Carbon Fiber	Yes
5527-15	Metric	1.51 to 2.60 m	Aluminum	
5527-16	Metric	1.51 to 2.60 m	Carbon Fiber	
5527-17	Metric	1.51 to 2.60 m	Carbon Fiber	Yes
5527-20	Metric	1.58 to 3.60 m	Aluminum	
5527-22	Metric	1.58 to 3.60 m	Carbon Fiber	Yes
5527-30	Metric	1.65 to 4.65 m	Aluminum	



Aluminum and carbon fiber poles can be ordered with external GT or GM graduations.

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# Measurement of a Calibration Baseline

(A lesson in Redundancy)

record of survey and submitted to the *Riverside County Surveyor* for filing. The map will provide CCS83 Zone 6 coordinates and NAVD88 elevations for all monuments, and will allow for checking of linear measurements, as well as for checking traverse and level loops closures. Although intended for EDMs, I encourage all users to be creative and push the envelope of ideas as to how other survey equipment can be calibrated with this base line.

NGS publications *NOS NGS-10* (use of calibration base lines) and *CALIBRAT, version 1.0*, (scale and constant corrections software used for previously determined base lines) can be found by following links from the NGS home page: <http://www.ngs.noaa.gov>. Before heading out into the field to check your EDM, it would be helpful to become familiar with these NGS tools.

Thanks to everyone who volunteered their time to make this project a success. All can be proud of a job well done! ♦

Steve Breidenbach	National Geodetic Survey
Marti Ikehara	National Geodetic Survey
Bill Hofferber	Riverside County Flood Control
Randy Patterson	Riverside County Flood Control
Paul Clements	Riverside County Flood Control
Bill Craig	City of San Diego
Steve Martin	County of San Diego
Ed Koterwas	Riverside County Transportation Dept.
Justin Grunewald	Riverside County Transportation Dept.
John Lombardo	Riverside County Transportation Dept.
Sean Fitzpatrick	Manitou Engineering Co.
Gavin Mc Kellar	Manitou Engineering Co.
Brian Wiseman	Metropolitan Water District
Art Andrew	Orange County
Craig Whaley	Orange County
Britt Klingenberg	Orange County
Greg Lopez	California Dept. of Transportation District 8
Phil Kneuss	California Dept. of Transportation District 8
Ken Joyce	Stantec, Moreno Valley
Jason Moore	Stantec, Irvine



---

**William Hofferber Jr., PLS**, is Supervising Land Surveyor for the Riverside County Flood Control and Water Conservation District, and a past President of the Riverside/San Bernardino Chapter of the California Land Surveyors Association. He is also a CLSA liaison to BPELS, serves as a General Director of the Education Foundation, and has been elected Treasurer of CLSA for 2008.



The Voice of the Land Surveyors of California

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## CALL FOR ARTICLES

Do you have a topic you would like to share with the land surveying profession? Or, are you involved in a project that would be of interest to our readers? Then please accept our invitation to have your article printed in the *California Surveyor* magazine.

## ABOUT THE MAGAZINE

The *California Surveyor* is a quarterly magazine written and edited specifically for land surveying professionals. Quarterly, it provides in-depth articles on issues affecting the profession as well as current events, and general interest articles. Our readers are members and non-members of CLSA. They are Land Surveyors in private practice and public employees, Land-Surveyors-in-Training, employees of title companies and other related industry professionals.

## FINDING THE MINDSET

Personal experience is probably your best source of article ideas. As a Land Surveyor, you have encountered problems, made mistakes and found solutions that can be shared with your colleagues. Have you worked on a unique project you would like to share with the profession? Do you have a fresh approach to an old problem or a cost-effective solution to a new one? Examine back issues of *The California Surveyor* to get a feel for the kinds of articles that are published and the way they are written. Visit the *California Surveyor* page on the CLSA website at [www.californiasurveyors.org/files/calsurv.html](http://www.californiasurveyors.org/files/calsurv.html). Before you write the article, feel free to write or call the editor to discuss your ideas.

## EVALUATION & ACCEPTANCE

All articles submitted will be reviewed by the editor. We may accept your article outright, accept it for a staff rewrite, or accept it contingent on your revision. Your writing style is your own, and we make every attempt to preserve it as we prepare your article for publication. But we will try to make the copy as substantive and clear as possible. If your article is substantially revised, we will email you the edited version, and you will have approximately one week to review it and make any additional changes.

## ARTICLE SUBMISSION

Generally, articles should be between 500 and 4,800 words. Articles must be submitted digitally. Pictures must be sent as individual files at least 300 dpi. Please include a head-and-shoulders photo and a brief bio of author. **Articles cannot promote a product, service, or company.**

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## TOPIC IDEAS

### Project Narratives

Personal accounts of interesting land surveying/geomatics projects including the people, equipment and field procedures involved, together with tips for success that may benefit other surveyors.

### CLSA

Reports from committees and local chapters regarding Trigstar and the Boy Scout Merit Badge, joint activities with ACSM and NSPS, and service work (such as baselines and PLS examination review classes).

### Education

Reports from land surveying/geomatics curriculums in California including school location, program administrator, classes and degrees offered, status of enrollment, and job placement of graduates.

### Boundary Resolution and Mapping

Research opportunities available at public agencies, certifications and ALTA surveys, gaps and overlaps, easements, using survey narratives and notes on record maps, and applying PLSS methods.

### GPS and Geodetic Surveying

Using emerging technologies, fundamentals of datums for practical applications, defining geoids and ellipsoids, finding geodetic data on the web, interpreting published data sheets, and project planning.

### GIS

The surveyor's roles and responsibilities regarding GIS, the acquisition, use and dissemination of geographic information, and opportunities for networking with the GIS community.

### Photogrammetry and Remote Sensing

Principles, practical applications and limitations, descriptions of equipment and procedures, evaluating data quality, finding sources for existing coverage, and graphic examples of mapping products.

### Business Management

Strategies for diversifying a private practice, identifying nontraditional opportunities, suggestions for crafting contract language that satisfies clients, minimizes surprises, and limits liability.

## Article Submission Deadlines:

February 1st • May 1st  
August 1st • November 1st



By: Robert J. Reese, LS

## Care and Feeding of Your UHF Radio Link for RTK GPS Surveying

Are you using UHF radios for data link for your RTK work? If so, do you ever wonder why your radio system sometimes performs well and other times it doesn't? Well, so do I. Maybe some of my experience will help. Before I get going, let's cover some basics.

### DEFINITIONS

Frequency is a wave thing, or cycle thing. The rate at which a particular energy repeats its cycle is the frequency, usually measured in hertz. Radio is electromagnetic energy and can be pulsed. It's what your RTK radios do to transmit the corrections at your base unit to your rover unit.

Hertz is a time thing, abbreviated Hz. It is how many times per second a wave might repeat its energy cycle. 1Hz is one time per second. 5Hz is five times per second, or it repeats every 0.20 seconds. See <http://en.wikipedia.org/wiki/Hertz> for some more info about this SI unit.

Bandwidth is the range of frequencies used for a particular transmission.

Radio Frequency Allocation has several bands. UHF (Ultra High Frequency) covers 328.6 MHz to 2.9 GHz. It is highly likely that your U.S. UHF radio license assigns frequencies between 450 & 470Mhz, in Canada between 430 & 450Mhz. See <http://www.jneuhaus.com/fccindex/spectrum.html> for a list of frequency band allocations.

Watts, Amps and Volts are a power thing. The basic equation for their relationship is  $W=AV$ . See <http://science.howstuffworks.com/question501.htm> for more info about this equation.

Gain and loss both are a ratio thing. Gain refers to the additional power added to a system through amplification. Loss refers to the subtraction of power from a system by resistance and other circuit characteristics. The unit of both gain and loss is the decibel.

Antenna gain is the amount of "efficiency" of an antenna relative to a standard baseline antenna, the dipole antenna. It is NOT power added by an antenna. A radio antenna itself has no way of adding power per se to a signal. See <http://www.marcspages.co.uk/tech/antgain.htm> for a good page on antenna gain.

But your antenna can "focus" power, making the apparent radiated power in a particular direction more than the radiated power from the dipole, the baseline for radiated power ratio. The unit for that comparative ratio is the decibel. See <http://www.marcspages.co.uk/tech/antchase.htm> for a good explanation of radiated power and the pros and cons of different antenna configurations.

Decibel (abbreviated dB) is one tenth of a Bel (abbreviated B, and named after Alexander Graham Bell), which is a logarithmic value of a ratio of power out to power in. This is a critical item to know about if you are going to optimize your UHF radios. I'll let you dust off your high school math book for information about logarithms. See <http://www.ac6v.com/db.htm> for a good explanation of the decibel.

GAIN				LOSS			
decibel(dB)	Bel (B)	10 x	mult. by	decibel(dB)	Bel(B)	10 x	mult. by
20 dB	2.0 B	10 <sup>2.0</sup>	100x	-20 dB	-2.0 B	10 <sup>-2.0</sup>	0.010x
10 dB	1.0 B	10 <sup>1.0</sup>	10x	-10 dB	-1.0 B	10 <sup>-1.0</sup>	0.100x
3 dB	0.3 B	10 <sup>0.3</sup>	2x	-3 dB	-0.3 B	10 <sup>-0.3</sup>	0.5x
1 dB	0.1 B	10 <sup>0.1</sup>	1.259x	-1 dB	-0.1 B	10 <sup>-0.1</sup>	0.794x
0.5 dB	0.05 B	10 <sup>0.05</sup>	1.122x	-0.5 dB	-0.05 B	10 <sup>-0.05</sup>	0.891x
0 dB	0 B	10 <sup>0</sup>	1.000x	-0 dB	-0 B	10 <sup>0</sup>	1.000x

It's easier to use a logarithmic scale to add and subtract gains and losses, rather than multiply and divide actual system increases or decreases. Some examples will help.

### OPTIMIZING YOUR RADIO SIGNAL

Radios have a set amount of power coming out of the terminal to which you attach an antenna or a cable. If you have the UHF radios that I have, you can throw a switch on the base station to transmit either 2 watts or 35 watts of signal power. But what mainly affects the power coming out of the antenna, and thus affects your rover range, is power or signal loss from connectors, cables and antenna "tuning".

**OPTIMIZATION #1** - Get rid of extra connectors and poor connections. Rule of thumb is 0.5 dB power loss per connector. That means, ignoring everything else, if you have 2 watts of power out of the radio, considering just the losses from the two connectors at each end of the cable, there is 1dB power loss which results in 1.589 watts to the point where your cable attaches to your antenna.



Fig 1a - With enough connectors, you might be able to survey only 10 feet away, or you might not get any signal out at all!



Fig 1b - One terminal on the antenna cable: much better.

Loss =  $[(-0.5\text{dB}) + (-0.5\text{dB})] = -1.0\text{dB} = -0.1\text{ B} = 10^{-0.1} \times 2\text{ watts} = 0.794 \times 2\text{ watts} = 1.589\text{ watts}$ .

That's 20% loss in power to the antenna right there! See Fig 1a & 1b below.

About connectors: male gender is determined by center pin. BNC connectors are the twist on type, with the female end having two small posts that engage in slots on the male end. TNC connectors are the threaded type of connector, with the male end having interior threads and a center pin, while the female end has external threads. N-type connectors are much bigger and are roughly the same as TNC connectors, but are generally used for much larger diameter wire, and in marine or harsh environments.

See figure 2a on page 32

Continued on next page



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# Care And Feeding of Your UHF Radio Link for RTK GPS Surveying

Continued from page 38



fig 2a – BNC female on left (posts on side of terminal), BNC male on right (center post, slots).



fig 2b – TNC female on left, TNC male on right (center post, internal threads).



fig 2c – N-type male on left (center post, internal threads), N-type female on right.

**OPTIMIZATION #2** – Use low-loss cables. There are lots of different cables with many loss characteristics. The usual RG 58

A/U cable, at 460 MHz, has 10.78 dB loss per 100 feet or 1.078 db per 10 feet. I use RG 8X, which is a little bigger diameter but much more flexible and has 8.28 dB loss per 100 feet or 0.828 db per 10 feet. That's a conservation of almost 25% power through the cable! I also use crimp connectors to make up whatever cables I need so that I minimize connectors.

See <http://www.ocarc.ca/coax.htm> for an online cable loss calculator for various cables.

**OPTIMIZATION #3** – Get the right antenna! This is a big deal. Ever use a “rubber ducky” antenna? Well, that rubber ducky antenna has a -3dB gain (loss)! This means that the rubber ducky antenna is one half as efficient as a dipole antenna, which itself is a very low efficiency antenna. It is degrading the signal, not sending it out efficiently. Get rid of the rubber ducky antenna at your

rover and at your base if you need to optimize radio range, or keep it if range doesn't matter.

Also, radio antennas have “ground plane” or “no ground plane” configuration. That means, if you are mounting your antenna on a vehicle, use a ground plane antenna. This antenna is designed to use the roof of the vehicle as a reflector (ground plane) for the radio wave. If you are putting the antenna on a rod, or a non-metallic surface (boat cabin, fiberglass camper shell, survey rod, etc.), be sure to use a non-ground plane antenna. They look the same as a ground plane antenna, but operate very differently.

Your base antenna is the main concern for radio signal propagation. It has power and signal wave form as a consideration. ❖

See fig 3a-3e below for antenna



Left to right

Fig 3a – Antenna model: Reynolds Oven Foil with Dry Cleaning hanger. Better for frat house TV than RTK data link.

Fig 3b – Rubber ducky antenna, -3dB, what you probably were given with your GPS equipment. Still not good except for close work.

Fig 3c – “This is an AnteneX B4502N (no ground plane) 2.4 dB antenna. The whip is tuned” (trimmed to length) for 465MHz frequencies. It is mounted on a piece of 2” aluminum square tubing.

Fig 3d – This is an AnteneX B4505CN (no ground plane) 5dB antenna, with a coil mid-whip. This is a very good antenna for base applications. Also mounted on the same 2” aluminum square tubing.



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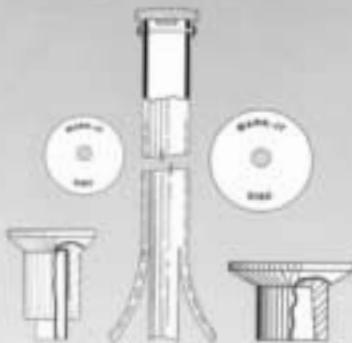
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# Q&A SMA Expert

## Question:

The author asked three questions that can be summarized as follows: What is the controlling law concerning the approval of Tentative and Final Maps when the property being mapped is either annexed into an existing city or is part of the incorporation of a new city.

## Answer:

### 1. Annexation to an Existing City

Where a Tentative Map (or Vesting Tentative Map) application is submitted to a county and the property being mapped is later annexed to a city anytime before the county approves the Final Map, then the county's approval no longer controls and the entire mapping application and approval process begins anew with the city. (Map Act § 66413.) A new application and approval process is required because the city will have different land use regulations than the county, in particular the general plan, with which the map must conform. Therefore, if it looks like the property will be annexed before the county approves the Final Map, it perhaps makes better sense to file an application with the city. California law allows a city to grant "pre-approvals" regarding land to be annexed (with the approval becoming effective upon successful annexation), such as pre-approval of a Tentative Map (Map Act § 66454) and pre-zoning (Gov. Code § 65859). This possibility should be explored with the relevant jurisdiction.

If the Final Map is filed with the county before annexation to the city, then the lots are considered "established" (real) after annexation, but the use of those lots will still be subject to the annexing city's general plan and other land use regulations.

### 2. Incorporation of a New City

The mapping process is different in the case of the incorporation of a new city. This difference presumably

reflects the fact that under city incorporation law, a newly incorporated city may be subject to the county's general plan for up to 30 months. (Gov. Code § 65360.)

Where the Tentative Map has been approved by the county but a Final Map has not yet been filed with the county, the newly incorporated city is required to approve a legally-complying and timely-filed Final Map (relating to that county-approved Tentative Map) if:

**(1)** The application for the Tentative or Vesting Tentative Map is submitted prior to the date that the first signature was affixed to the petition for incorporation pursuant to Government Code section 56704...or the adoption of the resolution pursuant to Government Code section 56800, whichever occurs first; and

**(2)** The county approved the Tentative or Vesting Tentative Map prior to the date of the election on the question of incorporation. (Map Act § 66413.5(f).)

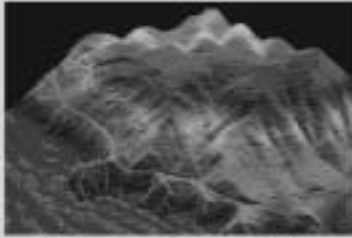
Further, in a situation where the new city is otherwise required to approve the Final Map, the new city may condition or deny the Final Map if the failure to do so would place the residents of the subdivision or the immediate community, or both, in a condition dangerous to their health or safety, or both, or if the condition or denial is required in order to comply with state or federal law. (Map Act § 66413.5(c).) In addition, the new city may impose reasonable conditions on subsequent required approvals or permits necessary for the development, and authorized by the ordinances, policies, and standards described in Map Act section 66474.2.

Therefore, if the property being mapped is going to be part of a future city incorporation, applying to the county for a Tentative Map approval may make sense because the city may be required to approve the legally-complying and timely-filed Final Map as a matter of law. ❖



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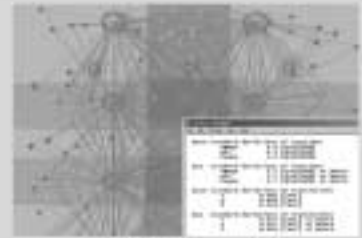
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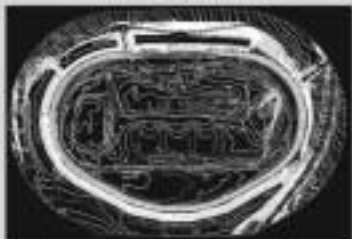
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# Conference 2007

## *Afterthoughts* By: Dave Ryan



Ever since the 2006 conference in Reno wrapped up, CLSA has been offering the admonition that we mark our calendars for the 2007 conference at the Rancho Bernardo Inn - San Diego. Well, the conference has come and gone. This conference was presented jointly by CLSA and WFPS (Western Federation of Professional Surveyors). Here are some observations and afterthoughts.

CLSA decided to change things up a bit this year and take a break from the casino theme. After about a ten year run alternating between Tahoe, Vegas, and Reno, the time was ripe to breathe some fresh air into the conference. For my money, it was a welcome change. The Rancho Bernardo Inn is surrounded by a beautiful golf course located about, oh... 4 or 5 quad maps north of San Diego.

The mild San Diego area weather was perfect, especially while commuting between sessions. Due to the separation of the two main venues, one could find themselves getting a fair amount of fresh air walking back and forth between the two (depending on your selection of sessions). For surveyors accustomed to spending most of their time outdoors, this was a welcome change from stagnating inside the typical indoor cities at the casinos. To the office surveyor, this was a welcome change from being constantly stuck indoors. A perfect opportunity to fill the lungs with some fresh air, reset the brain, and work the flat spot off your cheeks as you make the 5 minute trek up (or down) the hill to the next session.

Michael Jones, Chief Technologist at Google Earth kicked things off on Sunday afternoon as the keynote speaker. I'm sure we could have tolerated considerably more of the endlessly cool stuff his company has to offer, but his thirty minute talk sparked a notion in me regarding parallels between our two professions. Michael's massive success has hinged largely on his technical qualifications and creativity. We as surveyors are regularly thrust into situations requiring technical creativity with our high-tech toys, while being paid to do so. A subtle reminder of our good fortune to be surveyors.

The conference offered a good mix of the legal, the technical, and business. There was the usual conundrum of having to give up a good session for a better one. Or choosing wrong and finding that the one you missed was superior. I don't know the answer to scheduling sessions so everyone gets to magically attend everything they want to, but there was something for everyone. It should be noted that the conference actually kicked off on Friday with a golf tournament, followed by a BLM seminar Saturday. Doing

the numbers in my head, that's 6 days if you wanted to attend the whole thing!

Looking back at the schedule, it appears I loaded up heavily on the legal aspects. First up was Chuck Karayan, who is licensed in several western states as a land surveyor, and also attended law school. He has specialized in boundary law matters for most of his career, which dates back to the 1960's. His session was entitled Federal Rules of Evidence and was weighted heavily towards the courtroom. If you chose Chuck's session, you were committed for an entire day. Well, at least that was my choice. I guess I could have skated out on the afternoon half and taken in something else, but Chuck's style brought me back after lunch. He kept it moving, didn't require a microphone, and engaged the audience in some thought provoking discussions. These California surveyors are a sharp bunch and challenged the issues on several occasions. Chuck even alluded to the fact this was one of his more enjoyable presentations in recent memory. Now if you were a speaker, would you want everyone sitting there for hours nodding their heads in agreement treating your every word as gospel? I don't think that's what studying the legal aspects of surveying is all about, nor did I get the impression that's Chuck's idea of a successful day. Go see Chuck Karayan if you get the chance. You won't be disappointed.

Tuesday's choices were tough. Subdivision Map Act, the PLSS or ensuring I heard Dave Doyle of NGS talk first hand of the 2007 readjustment. I can never get enough of boundary seminars, yet have been lacking in recent times on the activities of the Feds and what's been happening with the control we all rely so much upon. So, the choice was made. Never having seen Dave speak, I was impressed with him as a dynamic speaker who engages the listener successfully, even with the highly technical nature of his topic. When it comes to adjustments, epochs, datums, and transformations, there's always the danger the eyes will glaze over and then you're a goner. I have to say Dave made perfect sense and did so with a sense of humor. He's a good speaker who knows his stuff. This is not the place to get into the details of his presentation, but be aware NGS's website has a plethora of information regarding the latest coordinate values, as well as tool kits to utilize that data.

Approaching the last day of the conference, I decided I couldn't miss a chance at seeing Jerry Broadus. Although I have seen him speak several times over the years, I always

*Continued on next page*



get something from Jerry that warrants a permanent place on the hard drive. Jerry wrote the POB column "The Surveyor and the Law" for several years, and is an attorney and licensed surveyor practicing in Washington state.

I attended two of his sessions, both involving the legal aspects of boundary surveying. It's amazing how hearing the same case he discussed 15 or 20 years ago sounds so dissimilar this time. Did Jerry really present the facts so differently this time, or has there been some sort of evolution in my brain? One message that has never changed is the rule; "don't use the terms *due north* in a legal description or on a survey." You'll likely create a mess. Even "true north" can be dicey, considering astronomic or geodetic north would be more definite. Jerry does present a fair amount of cases that seem to come from left field that can leave one feeling less confident than when you arrived. I don't want to flippantly say, "that judge was out to lunch," and ignore the outcome, yet it's also incumbent upon us to read the cases and arrive at our own conclusions. Jerry can tend to cover a lot of ground and rush things. He's not as open to the give and take with the audience as he could be, but he's the expert and can't let things bog down.

There was so much more to take in that this doesn't even begin to do justice to the conference. I heard good things about Wendy Lathrop's boundary seminars, Mike Durkee's Subdivision Map Act talk (too short), and Steve Parrish and Skip Robinson's PLSS classes, plus others too numerous to mention. The peripheral activities haven't even been mentioned; Monday's scholarship auction/dinner, Tuesday's lunch out on the spacious patio in the gorgeous sunshine, and lest I forget, Casino Night!

There's something about the conference I look forward to every year, and it's not just the opportunity to hear some of the best and most authoritative speakers in the business. CLSA seems to have mastered what it takes to put on a top-notch program year after year and at the best venues. There's the opportunity to see people you may not have seen in years, hear other perspectives if you take the chance to ask others what they thought about that last speaker, and make new acquaintances.

Rumor has it the 2008 conference will be back at one of the ski resort-casino type venues and maybe a little earlier in the year. But that's only a rumor, so stay tuned. ❖



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# CLSA-WFPS San Diego Conference 2007 *Highlights*









## Introducing Ric Moore, PLS

Staff Land Surveyor, Board for Professional Engineers and Land Surveyors (BPELS)



Ric began surveying in September, 1980 in Denver, Colorado. He worked for several firms in the Denver metro area and then moved to Arizona in 1984. In Arizona he was employed as a Crew Chief performing land surveys predominately in and around the Tucson, Phoenix, Tombstone and Sierra Vista areas. In 1987 he accepted a position as a Crew Chief in Boston, and during his three years in Massachusetts, he worked his way up to Office Survey Coordinator. His projects were throughout eastern Massachusetts, Rhode Island and Connecticut.

He arrived in Ventura County, California in 1990, and worked as an Office Surveyor for several private firms in and around Ventura and Santa Barbara. He was licensed as a *Professional Land Surveyor* in California in 1996, and was a partner in a small multi-discipline firm in Camarillo from 1999 to 2007. He started *Moore Associates Professional Services* in May 2007. In January 2007 he was hired by BPELS to be their Staff Land Surveyor.

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### Staff Land Surveyor Duties

As Staff Land Surveyor for BPELS, Ric's primary responsibilities involve technical review of applications for the *Professional Land Surveyor Examination*, representing BPELS at *Professional Land Surveyor Examination Development* activities (to provide guidance for compliance with state statutes, rules and regulations), reviewing complaints and enforcement cases, and providing BPELS outreach to the professional communities.



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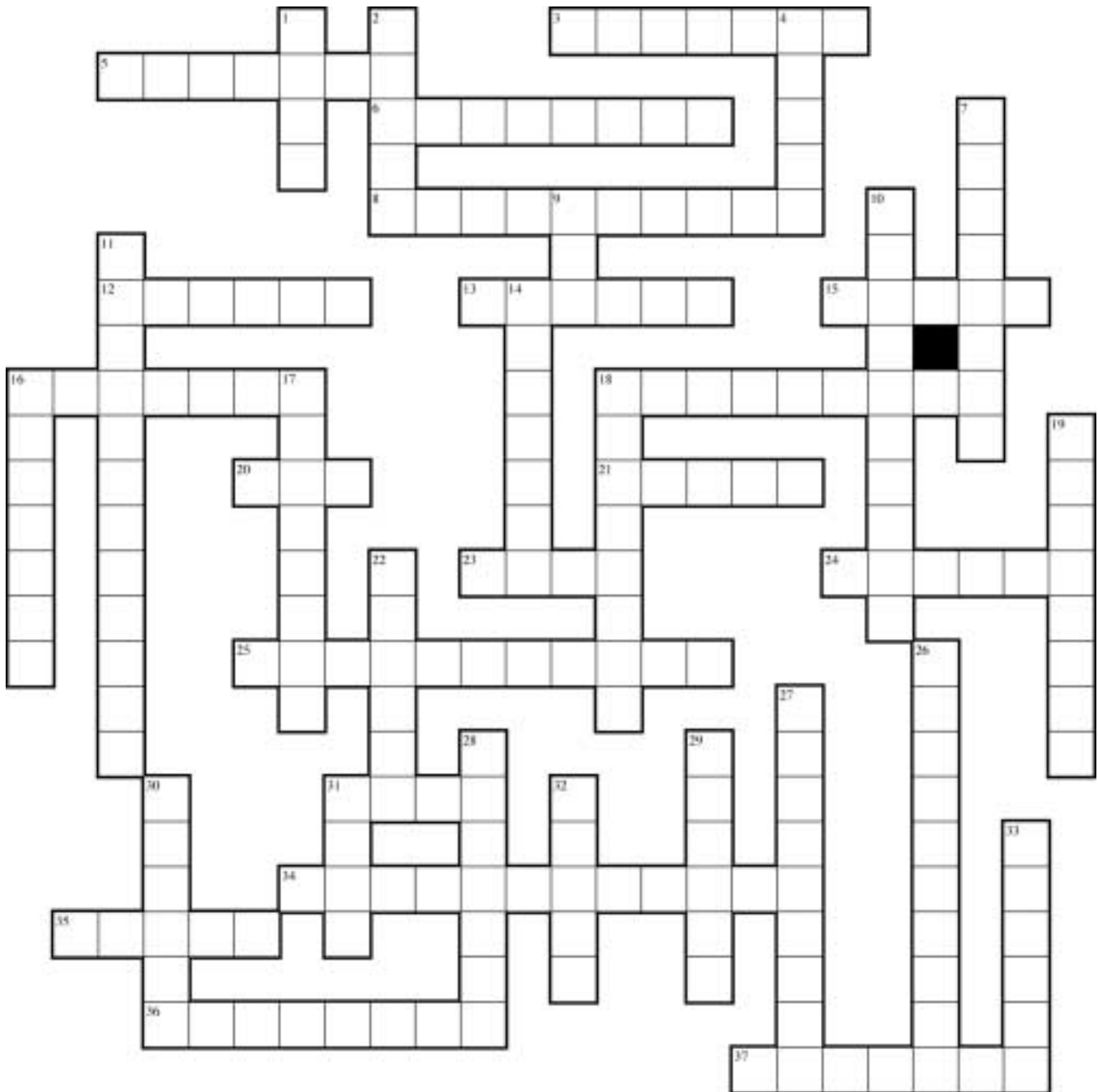
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# Crossword Puzzle

By: Ian Wilson, PLS

## CLSA Crossword Puzzle #4



Created with EclipseCrossword - [www.eclipsecrossword.com](http://www.eclipsecrossword.com)

**Ian Wilson, PLS** is the president of Ian Wilson Land Surveying, Inc., in Temecula, CA. His practice specializes exclusively in boundary and topo surveys. He has worked in both private and public sectors for small firms in California and Caltrans, respectively. As well as being a licensed land surveyor, he and his wife, Laura, are newly certified SCUBA divers. They are looking forward to "getting wet" on future trips along coastal California and around the world.



**Across**

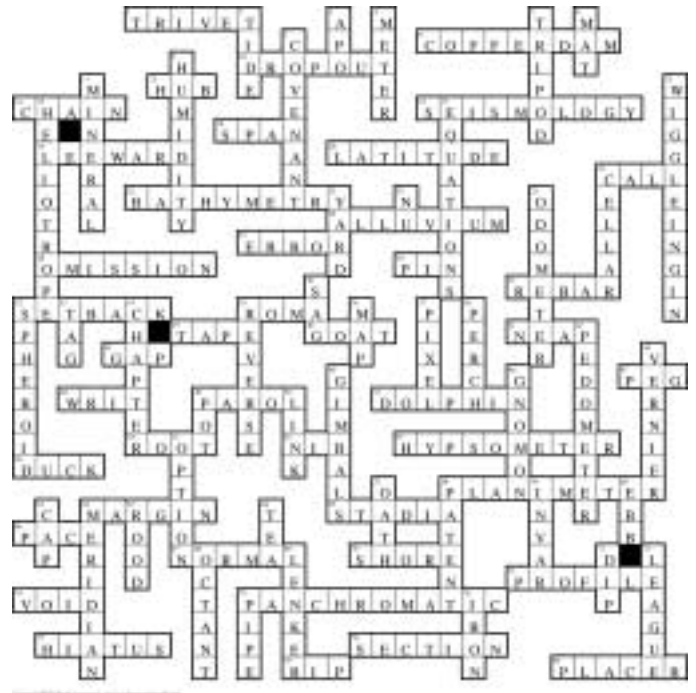
- 3. CREATOR OF 2007 COMPASS ROSE QUILT AUCTIONED AT THE CONFERENCE
- 5. MISTAKE
- 6. NEARNESS TO TRUTH
- 8. EAST-WEST POSITION OF SKY LIGHT
- 12. 57°17'44.8"
- 13. FLEXIBLE RULER
- 15. 18 INCHES
- 16. SECOND MAGNITUDE STAR IN URSA MAJOR
- 18. NEARNESS OF MEASUREMENTS
- 20. 16.5 FEET
- 21. LINE CROSSING MERIDIANS AT SAME ANGLE
- 23. CRAYON OR BOAT SPINE
- 24. 0.84625 ACRES IN LOUISIANA
- 25. COMPASS POLE OR WALKING STICK (TWO WORDS)
- 31. ONE STEP
- 34. 6070.10 FT (TWO WORDS)
- 35. 39.37 INCHES, IN CALIFORNIA
- 36. SURVEYORS BAR
- 37. DEFINITE UNDERTAKING

**Down**


- 1. MINE ENTRANCE
- 2. ELEVATION OF FINISHED SURFACE
- 4. 66 FEET
- 7. RATE OF RISE OR FALL
- 9. 1 CM PER SEC PER SEC
- 10. GEORGIAN ATTORNEY AND SURVEYOR
- 11. EXTENDED LINE
- 14. VERTICAL SECTION OF GROUND
- 16. CONDITION PROHIBITED BY 13TH AMMENDMENT
- 17. TRANSIT TO TRANSIT DAY
- 18. DISPLACEMENT OF POSITION
- 19. AGREEMENT
- 22. MARGINAL NOTES
- 26. SURVEYORS MIRROR
- 27. 2008 CLSA TREASURER
- 28. CROSSHAIR GRID
- 29. VARIATION IN ELEVATION
- 30. GAP
- 31. SCALE DIAGRAM
- 32. ALMOST PERPENDICULAR SLOPE
- 33. FEDERAL QUITCLAIM

**Key to CLSA puzzle #3**

(Surveyor Issue # 150)



If you have an idea for a puzzle theme or a clue you would like to include in an upcoming puzzle, email to [crossword@californiasurveyors.org](mailto:crossword@californiasurveyors.org)



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By: Carl C.deBaca, PLS



# What is the NSPS, how does it work, and what do we want out of it?

The National Society of Professional Surveyors is an organization headquartered in Gaithersburg, Maryland. It is made up of a Board of Governors, a Board of Directors, and a group of officers. Licensed land surveyors can belong to the organization as individuals and the various states and territories of the US belong as Affiliate Organizations. It in turn, is a member organization of the ACSM.

The Board of Governors, (BOG) is made up of one representative from each of the states and territories of the U.S.A. plus a representative from Canada whose job it is to liaise between the Canadian Council of Land Surveyors and the NSPS. The BOG is analogous to the lower house of Congress while the Board of Directors, (BOD) is analogous to the upper house. These analogies can only be taken so far: the BOD can completely override any motions passed by the BOG — even if the motion was passed unanimously, unlike the way our Congress works.

The Governors and Directors meet twice a year. The Spring meeting is always held in conjunction with the annual ACSM/NSPS conference, wherever it may be. The Fall meeting is always held in the Washington D.C. area, near the NSPS central office. The format of the meetings is generally as follows: committee meetings on Friday and Saturday, BOG meeting Sunday and the BOD meeting on Monday.

The BOG meeting kicks off with reports. Topics from the various committees and governors councils find their way to the governors meeting in the form of motions. The motions are voted on and the ones that pass are sent to task committees for refinement, revision or withdrawal. The following day the refined or revised motions are discussed on the floor and voted on. Examples of the kinds of motions entertained on the floor of the Fall 2005 governors meeting included:

- ☞ *To adopt the recommendation of the Private Practice Committee and accept an insurance firm and give them the rights to use the NSPS Logo and mailing list.*
- ☞ *To adopt the 2005 ALTA/ACSM Minimum Standard Detail Requirements as brought forward by the ALTA Committee.*
- ☞ *To Select from among the governors - judges for NSPS awards.*
- ☞ *To adopt the new Logo.*
- ☞ *To approve the Public Relations Guide.*
- ☞ *To approve and accept the most recent NAFTA MRD.*
- ☞ *To contact surveying instrument manufacturers for the purpose of establishing a fee for lacing security devises in existing surveying equipment, installing the same in newly manufactured equipment and expressing urgency for the sake of safety of survey crew members.*

While the BOG votes on the above described motions, the BOD does not always pass the motions sent up to them and can even entertain substitute motions if they are not pleased with the motion at hand. This was in fact the case with the NAFTA motion. Examples of the kinds of actions taken at the Fall 2005 directors meeting include:

- ☞ *voted to move forward with the insurance firm proposal.*
- ☞ *voted to adopt the Public Relations Guide*
- ☞ *passed a motion to transfer Trig Star permanent funds to the NSPS foundation for management.*
- ☞ *voted to adopt the new logo.*
- ☞ *voted to adopt the 2005 ALTA Standards.*
- ☞ *voted to entertain a substitute motion regarding the NAFTA MRD.*
- ☞ *voted to accept a budget for the following year.*

The National Society of Professional Surveyors serves a primary function of setting the stage for the next generation of land surveyors through programs such as TrigStar and support for the Boy Scouts of America Surveying Merit Badge. They took great strides in this area with the development of the Speakers Kit, which allows any one of us to go well-armed into a high-school or community college career day presentation. Everyone in NSPS and the surveying community at large can feel good about these efforts.

Protecting our interests, enhancing our image and furthering our goals are the most fundamental and obvious functions of the national group of professional surveyors. Some of these things are accomplished by lobbying Congress to get legislation created, changed or stopped, depending on the nature of the issue. Lobbying Congress is a numbers game and the more people NSPS represents the more money we have to spend and the louder our voice is to the legislators we approach. The Government Affairs Committee of the NSPS is one of the more successful components of the national group, but it could be better still. The best-case scenario for maximum success with respect to lobbying efforts would be to develop an agreement between the Affiliate Organizations and the NSPS so as to achieve the greatest possible mutual membership. So far such an agreement has proven to be very elusive.

The NSPS asserts itself to the federal government, to foreign surveying societies and to the nation at large as representing all U.S. surveyors and in that capacity:

- ☞ *Develops standards of practice such as the 2003 Model Standards of Practice and the 2005 ALTA standards.*
- ☞ *Helps craft model law such as the model law definition of Surveying and the 2006 Right-of-Entry Composite law.*
- ☞ *Works on legislation at the Federal level as noted above.*
- ☞ *Interfaces with federal agencies such as NGS and FEMA in policy-related matters.*
- ☞ *Works out agreements (or fails to) with foreign survey groups as in the case with NAFTA. (There are more trade agreements and treaties out there and beyond the horizon too. We are fools to think that backing away from the NAFTA MRD ends the matter for all time.)*

*Continued on page 46*



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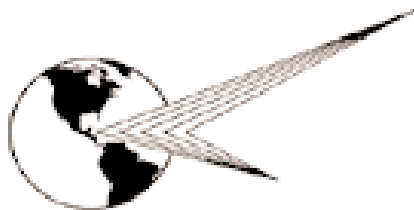
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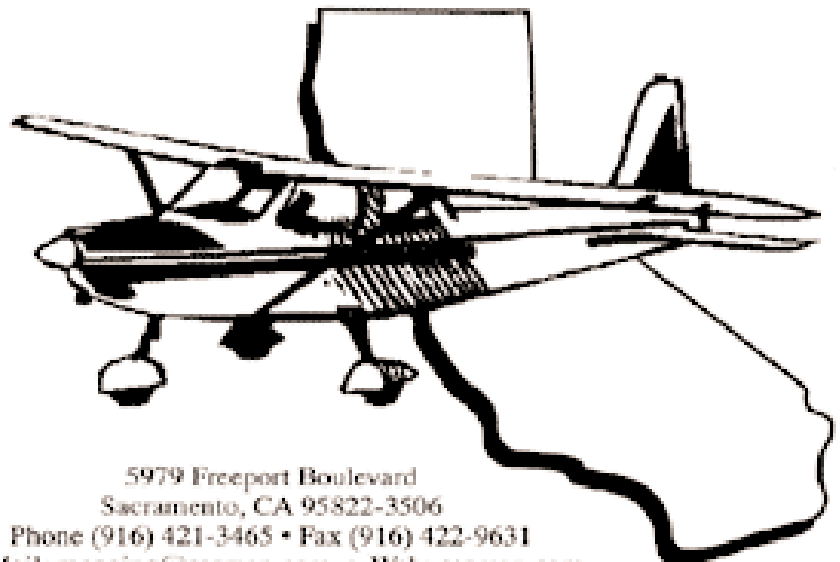
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## What is the NSPS, how does it work, and what do we want out of it?

These bullet points alone should whet your desire to have a more active role in NSPS affairs.

One NSPS committee that has achieved only middling success, is the Membership Committee. This committee is charged with increasing membership, a critical concern for the national organization. They routinely brainstorm ways to accomplish this by coming up with ideas for membership benefits and considering ways to partner with the Affiliates to encourage sign-ups from state members. They are not doing enough. I watched this committee spend over a year wrapped around the axle debating a new logo for NSPS. Meanwhile multiple entreaties from California to offer a reasonable cost break to their members, which would have certainly encouraged more to sign up, were rejected. Securing a better price break for state society members to join NSPS should be a priority for all of us.

Another area that concerns me greatly is the blurring of distinctions between NSPS and The National Council of Examiners for Engineering and Surveying. NSPS is a group of like-minded professionals and NCEES is an organization made up of the states regulatory boards. These boards, generally speaking, are part of their states Departments of Consumer Affairs and by definition exist to regulate us and to protect the

public from us. Two such groups can certainly have many positions in common and should cooperate to the fullest extent possible, but these two groups also have many differences and many different goals. Two of the last three presidents of NSPS have been extremely active at the highest levels of NCEES and have brought the values of this other group with them when they assumed the president's seat. Nowhere was this more obvious than the NAFTA Mutual Recognition Document, (MRD) debacle. When I became involved I saw the MRD as something worthy of a little more debate, even though it had been in one committee or another for ten years. The MRD process was ultimately killed, in my opinion, because NCEES opposed it in any form. The multi-tiered definition of Land Surveying which eked its way through NSPS work for a few years until finally deposed, is another NCEES ideal inserted into NSPS business. I am not suggesting that the two groups are opponents or that close ties between the two should be severed. I think one of the most important committees of NSPS is the Liaison to NCEES and we should work together as much as makes sense for our profession. We should not however automatically assume that their position on any given topic will be the one most beneficial for us as professionals.

It seems too, that the NSPS has some financial concerns. The new NSPS is exactly that, new. And its funds are from membership dues collected in the past few years without a long history of savings, unlike some longer-standing state organizations which have been running in the black for a long time. The 2006 NSPS budget was approved by the BOD with an \$11,000 shortfall. This is a situation that cannot persist for long. Accountability and frugality with respect to committee projects would be one area where these issues could be addressed directly.

At this time it seems to me that NSPS is an organization that has not yet performed to its potential but it is on the right track and it would be good for us all to see it on its way. NSPS can accomplish great things for all surveyors given steady and innovative leadership but it needs its numbers and consequent influence to swell and that's where you come in. Join if you haven't yet and participate if you have. Area 9, comprised of California, Nevada and Hawaii has never had such an opportunity to exert a strong influence and assume a leadership role in the national organization as it has right now.

The Area 9 Director represents these states to the NSPS Board of Directors. This director should also represent the NSPS Board to the Member Organizations of these states and this second function is one that has been long under-emphasized. In Area 9 there has only been a one-way flow of representation at the director level for several years. As a former NSPS governor from California and one-time chair of the NSPS NAFTA MRD Review Committee, I have a keen interest in NSPS. After much deliberation I am offering myself as a candidate for the NSPS Area 9 Director's position. I propose to make representation a two-way current by dint of an increased effort to communicate with the three state societies. If elected I commit to attend at least one Board of Directors meeting of each state society each year and you could expect to see a detailed Directors Report in each summer issue of your state newsletter. ❖

Carl C.deBaca, PLS, is the owner of Alidade, Inc., Elko, NV, and is a past editor of the California Surveyor.

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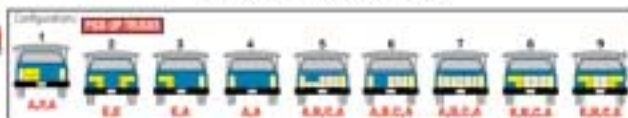
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# It's Really Not as Bad as it Seems

## Your Insurance Requirement Review

Look below at all those Client contract words. What do they mean? What can you do? How can you do it? It seems like a good job. Should you take it or leave it? Will you, your broker and your insurance company be able to:

- Name the client as additional insured on your policies
- Waive subrogation against them
- Hold them harmless
- Indemnify them?

Yes you can and still provide your work at a competitive price.

## An Unreasonable Proposition?

Here's a sample contract from a California city for a minimum scope of insurance for land surveying plan check services on major subdivisions and development plans that include mapping, road design and utilities for up to two days a week at their site:

"Prior to commencing work and during the entire term of the Agreement, Consultant shall procure and maintain the following insurance policies

1. Insurance Services Office Commercial General Liability Coverage (occurrence Form CG 0001), \$1,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the work to be performed under this Agreement, or the general aggregate limit shall be at least twice the required occurrence limit.
2. Insurance Services Office Form Number CA 0001 covering Automobile Liability, Code 1, \$1,000,000 per accident for bodily injury and property damage.
3. Workers' Compensation as required by the State of California, and Employers' Liability Insurance, \$1,000,000 per accident for bodily injury or disease.
4. Errors and Omissions Liability (Professional Liability): 1,000,000 per occurrence."

OK so far. All this can be done.

"Endorsements: Each general liability and automobile liability insurance policy shall be endorsed with the following specific language:

1. The Town..., its elected and appointed officers, employees, agents and volunteers are to be covered as additional insureds with respect to liability arising out of work performed by or on behalf of the Consultant.
2. For any claims related to this Agreement, Consultant's insurance coverage shall be considered primary insurance as respects the Town, etc. Any insurance or self-insurance maintained by the Town, etc. shall be excess of the Consultant's insurance and shall not contribute with it.
3. This insurance shall act for each insured and additional insured as though a separate policy had been written for each. This, however, will not act to increase the limit of liability of the insuring company.

4. The insurer waives all rights of subrogation against Town, etc.
5. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Town, etc.
6. Each insurance policy required by this agreement shall provide that coverage shall not be cancelled, except after 30 days prior written notice has been given to the Town.

The Consultant shall, prior to commencement of performance of work under the Agreement, deliver to the Town certificates of insurance reflecting the required insurance coverage set forth herein."

All the above is also OK as long as they don't ask to be named as additional insured on your professional liability policy. But remember that providing the Town all this additional insured, primary insurance, indemnification and holding harmless business can lessen or erode your own policy limits in event of a loss.

## Finally, you may also be required to indemnify the Town:

"To the fullest extent permitted by law, Consultant shall indemnify, defend and hold harmless the Town, its officers, employees and agents (collectively the "Indemnified Parties") from and against all claims, damages, losses and expenses, including but not limited to reasonable attorneys' fees, that arise out of, pertain to or relate to the negligence, recklessness or willful misconduct of the Consultant or its employees in the performance of this Agreement. This indemnity shall apply to all claims and liability regardless of whether any insurance policies are applicable. The policy limits do not act as a limitation upon the amount of indemnification to be provided by the Consultant.

Notwithstanding the foregoing, nothing herein shall be construed to require Consultant to indemnify the Indemnified Parties from any claim arising from the sole or active negligence or willful misconduct of the Indemnified Parties."

Be sure to talk to your insurance agent or broker to see how much of this he or she can get done for you. You can negotiate with the Client about coverages, indemnifications and limits. You can ask them to include you on their insurance since you'll be working for them on their site.

You can always follow one of the risk management principles we've been discussing in the last two issues of the California Surveyor and avoid the risk by walking away from it. But with the help of your broker or agent, however, I believe you can control and transfer most of the risk to your insurance carrier. With your good negotiation skills only a small amount of this risk will be retained by you as a business risk: a cost versus comfort thing. Remember to put something in your bid to cover your insurance costs and contingencies. Finally make sure you have enough of your own insurance to cover your equipment, property, business interruption, accounts receivable and valuable papers exposure. ❖

*Arrata to California Surveyor issue #150  
The Risk Management for Surveyors article "Watch Out for Those Dangerous Indemnity Agreements" referred to Assembly Bill 753 (AB 753). This should have been AB 573.*



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Membership in the California Land Surveyors Association, Inc. as a Sustaining Member is open to any individual, company, or corporation who, by their interest in the land surveying profession, is desirous of supporting the purposes and objectives of this Association. For information regarding Sustaining Membership, contact:

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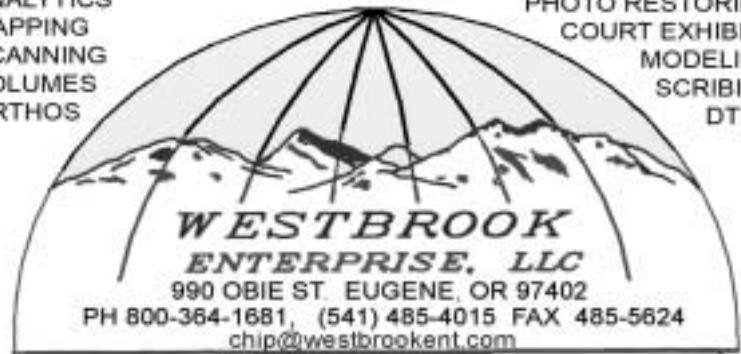
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# Here's Some Important Information About CLSA

The goal of the California Land Surveyors Association is to promote and enhance the profession of surveying, to promote the common good and welfare of its members, to promote and maintain the highest possible standards of professional ethics and practice, and to elevate the public's understanding of our profession. CLSA represents all Land Surveyors, whether they are employees or proprietors, whether in the public or private sector.

## Representation

**LOCAL:** Your local chapter represents you in local issues. Through your chapter representative to the State Board of Directors, the individual member can direct the course CLSA will take. **STATE:** The Surveyor is represented at the state level through an active legislative program, legislative advocate, and liaison with the State Board of Registration. **REGIONAL:** CLSA is an active member of the Western Federation of Professional Surveyors. This Federation is composed of associations throughout the western United States and addresses regional issues. **NATIONAL:** Through institutional affiliation with the National Society of Professional Surveyors and the American Congress on Surveying and Mapping, CLSA is represented at the national level.

## Educational Opportunities

CLSA presents annual conferences which provide technical and business programs, as well as exhibits of the latest in surveying and computing technology. Seminars and workshops are presented to assist in continuing education. CLSA publishes the California Surveyor magazine and the CLSA NEWS to keep the membership abreast of changing legislation, legal opinions, and other items which affect our profession.

## Business and Professional Services

CLSA provides a fully staffed central office which is available to answer questions or to provide up-to-date referrals concerning legislation, educational opportunities, job opportunities, or other issues concerning our membership. Professional liability insurance programs are available to members.

### JOIN CLSA TODAY!

- **CORPORATE MEMBER** \*\$159.00 + Entrance Fee. Shall have a valid CA Professional Land Surveyor or Photogrammetric license.
- **CE CORPORATE MEMBER** \*\$159.00 + Entrance Fee. Any California registered Civil Engineer who is authorized to practice land surveying pursuant to Article 3, Section 8731 of the PLS Act and must be actively practicing land surveying and show sufficient proof thereof. CE Corporate membership must be approved by the Board of Directors.
- **AFFILIATE MEMBER** \*\$79.50 + Entrance Fee. Any person who, in their profession or vocation, relies upon the fundamentals of land surveying.
- **ASSOCIATE MEMBER GRADE** \*\$79.50 + Entrance Fee. Any person who holds a valid certificate as a Land Surveyor-in-Training.
- **OUT-OF-STATE CORPORATE MEMBER GRADE** \*\$79.50 + Entrance Fee. Any person who resides in a state other than CA, who is a member of the other state's Association, and meets the requirements of Corporate Member.
- **STUDENT MEMBER GRADE** \*\$15.90. A student in a college or university actively pursuing a surveying education.
- **SUSTAINING MEMBER GRADE** \* Annual Dues \$318.00 + Entrance Fee. Any individual, company or corporation who, by their interest in the land surveying profession, is desirous of supporting the purposes and objectives of this corporation.

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