



Mathematically Speaking

The Key to Getting Project Estimates Approved

BY GARY L. GLANCZ

The days when right of way professionals struggled to move up the ladder in mainstream government and corporate America are pretty much gone. However, there is still a particular stigma that some of us still face when presenting anything that affects the bottom line.

Historically, right of way professionals are not known for applying scientific resources, mathematical formulas and research in our cost estimates. Of course, this is exactly what appeals to the engineers and financial types, who equate bottom line numbers with credibility of the report.

An opportunity to change this perception arose early in my career. As manager of a right of way department, I recall presenting my first solo route estimate for approval. It appeared to be identical in format to those of my predecessors. However, instead of getting the approval I expected, I received something much different - the third degree. From the questions and comments that bombarded me, it was obvious that this skepticism stemmed from past experience with other right of way professionals, who clearly underwhelmed them.

For the first time in my career, I felt the sting of second-class status. Rather than transfer to another department (my first reaction) or change mindsets, I realized that rising to a challenge was my only viable option. Preparing unimpeachable right of way cost estimates would become my sole focus. This took me about five years to develop. Fortunately, my credibility rose along the way, and so did my career.

Achieving “No Questions Asked” Credibility

One of the most valuable things I discovered was that energy and utility companies are generally ruled by engineers and financial types. To be accepted, you had to present yourself and your work product as if you were an engineer or accountant. While I didn't really have an engineer's outlook, I understood what was needed to adapt. With an undergraduate degree in accounting, I was well versed in mathematical formulae and equations. Engineers trust math, and trust is the key to getting cost estimates approved.

While I was the right of way attorney for Colonial Pipeline Company, I learned how to gain that level of trust and acceptance. It came from the basic understanding that, for project estimates to get approved, it was critical that the estimate use language that appeals to the audience. This may sound overly simplistic, yet many right of way professionals find it difficult to execute.

Two Approaches

Let's assume that you need an outside consultant to prepare a right of way cost estimate to legitimize the process and get past the due diligence portion of the contribution to the consolidated project cost estimate. This cost estimate is a complete departure from the standard product, namely a collection of opinions that assumes the audience believes that a thorough due diligence was performed. Today's decision-makers prefer a fact-based analysis rather than the value of easements derived from the usual resources - what you or your appraiser thinks is the value of land and how much an easement or workspace should cost based on what was done in the past.

Oftentimes, I prepared my estimate on two separate tracks - the old method and the statistical method. After many years of comparing the two, I found that the final numbers never differed by more than five percent. That's when I realized that I was on to something valuable.

Changing the Presentation Mindset

In using the statistical approach, it's essential to divorce yourself from previous approaches used in preparing estimates. Simply replace past assertions with verifiable statistics, actual measurements and data derived by your engineering department. Start by collecting data and measurements already in use by the project engineers, such as the linear distance of the project, width of the easements they prefer and workspace needed. If any information is missing, ask for a prepared estimate of what they expect to use or require. By doing so, the engineers will feel a sense of collaboration, and they might even recognize their information is being applied within your

estimate. This collaborative process will go a long way in building consensus and gaining approval.

Chances are your engineers will have already obtained GPS coordinates for the route and prepared route drawings based on the coordinates. If the project route parallels existing facilities that your company owns, then you have a reliable measurement resource. If your route parallels another company's right of way, then you might be able to get it from industry records. If none of these sources are available, you can purchase simple mapping software. You can then duplicate the route on the software and it will build you a database of measured distances and coordinates.

Beginning the Statistical Process

Regardless of whether you are good at math, the spreadsheet software available today can fill in the gaps. Creating data tables is the best way to begin the process. These data tables will ultimately be incorporated into your estimate, so the earlier you establish them, the faster your estimate will develop.

The use of data tables transforms your estimate from conjecture to scientific. Try to find data that already exists in historical record. If your project route is paralleling an existing company route, then you have the best foundation for determining easement costs - actual verifiable payments revised to account for the time value of money.

For instance, if your existing route was acquired ten years ago, you have the makings for an equation. The first element in the equation is the price you paid ten years ago on a per-foot basis. The U.S. Consumer Price Index (CPI) for the ten-year period will be another element or value. If your easement's square footage was different for the previous project, simply adjust the formula accordingly, or include fractions or percentages of the previous amounts and calculate the difference. That product will be another element in the equation. Before long, you will have the makings of a formula that cannot be disputed by engineers or anyone else who requires reliable facts before making a decision.

The first example to demonstrate this is based on an underground pipeline route, however it can easily be converted to other linear facilities. Let's start with the permanent right of way width for your primary route and include primary construction workspace beyond the permanent right of way. This will begin to look like the illustration in Table 1.

Table 1 - Easements and Construction Workspace Source

	Width	Length
Primary Easement	100 ft.	
Extra Workspace - Road Crossings	50 ft.	100 ft.
Extra Workspace - Water Crossings	100 ft.	300 ft.
Distance of Primary Route for Easements	739,200 ft.	

Identifying Resources

It's crucial that you use the CPI in addition to a local appraisal analysis of values. While the latter may be the best source for your project, it is not the best way to get management approval of your estimate. The distinction is that engineering and financial types are accustomed to relying on governmental statistics that are publicly published. Also, they probably have used the CPI in the past, so they can relate to it. This gives your estimate automatic credibility over any other value resource available. Finding something they are comfortable with is the key to project acceptance.

If you are concerned that using an inferior (but more acceptable) source tarnishes the process, then you might appreciate an experiment I conducted to get me past this hurdle. I was given the latitude to prepare two estimates - one with current appraisal data, and the other with some appraisal data, but mostly government statistical data published for the current year. I asked several company engineers and financial specialists to select the estimate they preferred if they had to present it to our board of directors. They chose the government statistical data in a heartbeat. The amount of the difference between the two estimates was within five percent. Since then, I always prepared two estimates, one

for the board comprised of statistical data, and a separate one from appraisals. The route appraisal is eventually needed to support individual offers and condemnations. Only when the estimates were farther than five percent apart did I consider submitting both as alternate estimates, and allow the board to select the one they liked best.

Making Your Own Calculations

Most routing projects eventually need aerial photographs which are placed on what are commonly called strip maps. All you need is one of the off-the-shelf mapping software products. I began using Delorme's Street Atlas for a couple of reasons - I saw it marketed at an IRWA conference, and it was one of the first to include coordinates and measuring tools that didn't require an engineering course to use them. Also, it is reasonably priced.

This next step may seem tedious, but you need to populate your mapping software with the coordinates of the route. If these have not been produced by your engineering department or routing contractor, you now have the tools to perform the task yourself. Duplicate the strip map route on the mapping software, identifying the coordinates for every road, railroad, government land, water crossing, utility crossing and boundary lines for states and counties. The pointing tool on the software will highlight the name of each and display the coordinate. You may do the same with other features on the strip map. I use this mapping tool to delineate and display the divisions between land uses, such as forest and farmland, and mark and measure the population/political divisions such as rural, suburban and urban areas.

This process provides you with more tables to include in your estimate. You can list all the roads and other crossings, their respective coordinates, the size and shape of all the easements and construction workspace areas, construction staging areas, equipment yards and prospective station sites. The table can also display the conversion to square feet of area occupied, as well as acres of land (*See Table 2*).

Table 2

Railroad Crossings	Longitude X	Latitude Y	Length	Width	Sq. Ft.	Acreage*
Sou. RR	77.72145960590	39.89229849450	100	15	1500	.034435
Sou. RR	77.71457352080	39.89092424610	100	15	1500	.034435
Total					3000	.06881

*Acreage is calculated by dividing square feet by 43,560 - the square feet in one acre.

Classification Tables

Land uses and population are visible on aerial strip maps and geographical maps. Using strip maps, one can visually observe the changes from forests to farmland, from farmland to subdivisions and then to commercial development. For most projects of considerable distance, I usually establish 5-10 land use classifications, and each classification has a land value established by previous payment or route appraisal. As I follow the route from beginning to end, I normally draw a line perpendicular to the route that indicates a logical separation point between classifications (see Table 3).

Table 3- Land Values

County "A"	Distance in Feet	Easement Width	Acres	Cost/Acre @ 50% Fee	Total Costs Easements
Exurban	52,800	50	60.6	\$1,000	\$60,600
Forest	52,800	50	60.6	\$1,250	\$75,750
Farmland	52,800	50	60.6	\$1,750	\$106,050
Rural	52,800	50	60.6	\$2,000	\$121,200
Suburban	52,800	50	60.6	\$7,500	\$454,500
Commercial	52,800	50	60.6	\$25,000	\$1,515,000
Urban	52,800	50	60.6	\$17,500	\$1,060,500
Total					\$3,393,600

Note: While pipeline rights of way can vary in cost, 50% of fee value is typical.

Saving Time/Gaining Accuracy

The beauty of spreadsheet software is that it allows you to create equations that will ultimately save you hours and hours of work. Revisions can be made quickly and easily when formulas have already been created. The software also facilitates global revisions, where a revision on the source spreadsheet will automatically recalculate all subsequent references and equations. This saves you countless hours, eliminates errors and is particularly valuable when immediate revisions are expected. When your executive committee sees that you produce your estimates in a scientific manner on spreadsheets, your credibility rises accordingly. I remember the first time a company engineer wanted to see how I was calculating the values. After emailing him a copy of the spreadsheets, he became one of my biggest supporters.

I also suggest including a spreadsheet summary in each report. This basically summarizes those calculations that led to your final cost estimate and should be created to appeal to your specific audience. Most of my clients prefer that it

contain totals for each county or segment. They also want separate amounts shown for certain classifications, such as line right of way, station sites, pipe yards and valve sites, appraisal costs and legal fees.

Conclusion

Typically, two questions arise at this point. The first is, "Once the spreadsheets and data tables are populated and prepared, how do I describe them and explain how it all works?" I expect that the process of preparation will produce the "ah ha" moment you are seeking.

The next question is, "Is there any reason I shouldn't use your spreadsheet estimate technique for an appraisal-based estimate?" The answer is no. In fact, the more math-based your estimate appears, the more respect it will be afforded by your executives.

There is also a residual byproduct of producing the first estimate on this basis. Since right of way projects can be so similar, the spreadsheets of tables and equations can be copied for subsequent estimates, thereby further reducing the production time. Also, the data population isn't as work-intensive as it might appear. Much of it is repetitive. You will end up copying and pasting much of the data rather than computing it.

The fact is, the use of statistical estimates as support for actual acquisitions will most likely get you thrown off the farm, laughed out of court and out of a job. However, they are very useful to persuade engineers, financial types, board of directors and government regulators. I was very fortunate that in my early years I was employed by the one of the largest and most innovative utilities. Their culture allowed me to explore new ideas and be creative, and I was given the resources to create processes such as this. Now it's yours. I hope you find it useful.



Gary L. Glancz

With more than 30 years of legal and pipeline industry experience, Gary was past president of SafeLines, LLC, the President of Glancz Consulting, and served as an attorney for Colonial Pipeline Company. Although retired, he remains a member of IRWA and the Georgia Bar.