



# TRANSMISSION LINES and PROXIMITY IMPACT

Improved residential property study reveals marginal effect on value

BY MARIAN J. BARNES, SR/WA, MAI

High voltage transmission lines (HVTLs) continue to be planned, funded and constructed to improve the power grid across America. As these lines become more omnipresent, appraisers are continually challenged to measure their impact on real estate value.

Over the years, a number of studies have been conducted on the impact of HVTLs on residential property value. A recent project necessitated more specific data on improved residential properties encumbered with a 138 kV transmission line. I was able to locate a subdivision with sufficient sales to conduct a statistical analysis. While it is located in Wisconsin, the data appears to be representative—both geographically and economically—of a mid-section of the United States.

## A Wisconsin Case Study

In the Meadowlands Village subdivision in Fond du Lac, Wisconsin, there were 71 improved properties that sold between 2012 and 2016. The homes ranged in size from 1,218 to 2,115 square feet, with an average lot size of 11,118 square feet and an average price of \$180,641, close to the U.S. median home value of \$175,700.

The subdivision was platted in 1995, with an existing 138 kV transmission line located on the south and west sides. On the south side, the HVTL poles are located on the lots, with the entire easement spanning 50 feet. This includes 40 feet on the north side of the structures toward the homes and 10 feet on the south side of the structures extending into Rienzi Road right of way. The easement encumbers at least 33 percent of each lot, and is located anywhere from 17 to 35 feet from the edge of the homes.

The easement on the west side is 15-foot wide. The easement here is narrower and encumbers a smaller percentage of each lot. The centerline and poles are located on the lots in Meadowlands Village. The easement is 20 to 35 feet from the edge of the homes.

### A Question of Utility or Proximity

A residential property encumbered with an easement may suffer a diminution in value from a number of factors. These can be categorized as either a loss of utility of the land, or the proximity to the structures and conductors. Utility represents restrictions on the use of the land that are identified in the easement document. The encumbered land typically cannot be used for residential structures, sheds, swimming pools or landscape vegetation.

Proximity includes visual impact of the lines and poles, noise from the lines and stigma. Proximity is quantified by the distance of the house to the edge of the easement area, and the number of poles located on the property.

After observing wooded landscaping, gardens, clotheslines, and playground structures in the encumbered areas, I found the loss in utility to be minimal. The land encumbered with the easement in Meadowlands Village was primarily used as yard space. Therefore, nearly all of the potential impact to value can be attributed to proximity.

Of the 71 sales of improved properties, eight of the sold properties were encumbered with a transmission line easement. Three of the sales were located on the west side of the subdivision with a 15-foot wide easement, and five were located

on the south side with a 40-foot wide easement. To determine if an adjustment for the time of sale was needed, sales prices over the four-year period were considered, including three properties that had sold twice during that time. Since the data indicated a less than one percent increase in price over four years, an adjustment was not warranted.

### Testing the Methodologies

I conducted both a regression analysis and a simple statistical analysis to determine the potential impact of the transmission line on the value of the improved properties.

#### Multiple Regression Analysis

Multiple regression analysis recognizes that the sales price can be influenced by a number of factors such as property size, gross living area and date of sale. The presence of an HVTL easement can also impact price. The benefit of using a multiple regression analysis model is that it provides an indication of the extent to which a single factor influences the overall value. The analysis is based on utilizing known information to predict a result in similar situations.

To determine if this particular easement had an impact on value, I conducted a regression analysis for the 71 property sales using standard features that can impact residential property value. These include the number of bedrooms and bathrooms, age, lot size, garage spaces, and the presence of the easement. Gross living area was not used in this case because some of the multi-level homes had additional living area below grade that is not counted.



In the Meadowlands Village subdivision, the easement encumbers roughly 33 percent of the impacted lots.

The P-value and t-stat results are one measure of validity of the regression analysis. The P-value measures the randomness of the results. A P-value greater than 0.05 indicates that there is a 95 percent chance that the observed results could happen randomly. The t-stat is a measure of the significance of a feature to the total value or price. If there is substantial variation in the data, a t-stat less than 2 indicates that the variable is not a reliable indicator of value.

The P-value and t-stat revealed that age and number of bathrooms were the only features that could be reliably predicted by the model. The HVTL easement, when compared to price, could not be reliably predicted by the regression analysis model.

#### Statistical Analysis

Emotions play a large factor in home buying. The price someone pays for a house may be reflective of those feelings and not necessarily linked to a specific feature, such as a transmission line easement. This variation can make results from a regression analysis not significant when there may be a quantifiable difference. To overcome this possibility, a simplified statistical approach was used.

	Average Sale Price No adjustments	Average Sale Price Adjusted for age/bathrooms
Homes with no easement	\$180,641	\$170,779
Homes with HVTL easement	\$173,213	\$166,933
<b>Price Difference</b>	<b>- 4.22%</b>	<b>- 2.25%</b>

Making no adjustments to the sales data, the average selling price of properties with the easement was 4.22 percent lower than those without the easement. When the sale prices were adjusted for age and number of bathrooms, the properties with the easement were 2.25 percent lower. This diminution in value is consistent with other studies where the impact ranges from zero to 20 percent, and usually within the three to six percent range.

One of the encumbered sales had a pole on the lot. I considered potential diminution in value from its direct view. The attached garage was located in front of the pole, possibly constructed to block the view. This property also had an outdoor living room with walls that limited the view of the pole. When compared to other properties with the easement, this property sold for a higher than average sales price. This sale cannot be used to test the theory that a direct view of a pole will have a larger impact on value because the direct view had been minimized by structural improvements.

Another sale involved a house that was 17 feet from the edge of the easement. This home sold for the highest price of any of the encumbered properties. It also happened to be one of the larger homes on one of the larger lots. As a result, this sale does not support the theory that close proximity to an easement has a larger impact on value.

Average Lot Size	Square feet
With no easement	10,841
With an easement	13,298
<b>Difference in lot size</b>	<b>23%</b>

The average lot size of properties with the easement was 23 percent larger than the size of properties without an easement. This average is skewed by one corner lot with the easement that is larger than any of the 71 properties that sold. The properties along Rienzi Road are deeper lots. The deeper lots may accommodate the easement area, as well as provide a distance from the house to Rienzi Road. The regression analysis did not indicate that lot size influenced price.

### In Conclusion

Sufficient sales data from a residential subdivision were available to study the potential impact of an HVTL on improved property values. A regression analysis revealed that there is no statistically significant relationship between price and easement encumbrance. A simple statistical analysis revealed that residential properties burdened with an easement sold for up to 4.22 percent less than similar properties without the easement. The encumbered land appears to be fully utilized by the owners as yard space. The diminution in value can be attributed almost entirely to the proximity of the HVTL to the houses.

The results of this study are consistent with other published work in that the impact of an HVTL on value is small and is not always what the general public expects. One of the characteristics of real estate is that each parcel is unique. This

study is based on one set of properties in one subdivision. The right of way professional is encouraged to collect and study data in their project area to estimate the impact of an HVTL on value. ☼

### References

- Thomas O. Jackson and Jennifer Pitts, "The Effects of Transmission Lines on Property Values: A Literature Review," *Journal of Real Estate Literature*, 2010, Vol. 18, No. 2.
- James A. Chalmers, "High-Voltage Transmission Lines and Rural, Western Real Estate Values," *The Appraisal Journal*, Winter 2012.
- Ted Tatos, Troy Lunt, Mark Glick, "A Closer Look at Proximity Damages" *Right of Way*, March/April 2016.
- John Rolling and Marian Barnes, "Utility versus Proximity," *Right of Way Magazine*, January/February 2015.
- U.S. Census, 2010-2014 American Community Survey 5-year estimate.



Marian is a partner at Rolling & Barnes, LLC, and specializes in valuation for transmission line and avigation easements, acquisitions and asset management. She has been appraising eminent domain and public works projects in Michigan and Wisconsin since 2007.

A special thanks to Ted Tatos, Principal in iQuantix LLC and Director with Empirical Analytics, for his review and analysis.