Martin A. Skolnik, MAI, and M. Carla Domingo

Supply and Demand Considerations in Residential Subdivision Analysis

Residential subdivision analysis is one of the most difficult appraisal specialties to master. Looking to historic trends and projecting them to the future is not a sufficient analysis for estimating absorption of lots or homes into the marketplace. An appraiser must analyze anticipated demand as well as anticipated supply to adequately address the issues of absorption and project feasibility.

Residential subdivision projects are among the greatest single nonperforming property types held by institutional lenders and governmental asset managers as a result of substantial overbuilding during the late 1980s in many housing markets. One reason for this surplus in subdivision properties is that the recession during the past two years has kept many home buyers out of the market, despite low interest rates for home mortgages. The depth and breadth of this recessionary economy could not have been foreseen by appraisers, analysts, lenders, and underwriters.

The appraisal community (with the support of the financial institutions' lenders and underwriters) has erred, and continues to err, in their analytical methodology for subdivision valuation. Specifically, appraisers have mistakenly relied on historical lot sales of the subject and competing subdivisions as their sole support for anticipated absorption without considering existing and prospective competition. In addition, appraisers have ignored projected future demand for such lots.

Many appraisers have been able to generate a reliable inventory of existing supply. They fail to account, however, for prospective future supply and prospective future demand. In addition, they fail to consider the subject's competitive characteristics in relation to the existing and prospective supply (i.e., the subject's appeal to the market in relation to its competition).

The valuation of a property (whether raw land, a platted parcel, or a fully de-

Martin A. Skolnik, MAI, is vice president of the Commercial Division of Campanella & Company, Inc., a mid-Atlantic real estate and consulting firm located in Baltimore, Maryland. Mr. Skolnik received an MBA from the University of Baltimore, and has served on the faculty of the Johns Hopkins University's Berman Institute of Real Estate. He has published in several real estate–related journals.

M. Carla Domingo is an associate analyst for the Commercial Division of Campanella & Company, Inc. Ms. Domingo is an MAI candidate with the Appraisal Institute and holds a degree in business administration from Loyola College's Sellinger School of Business and Management in Baltimore.

veloped parcel ready for home construction) depends on three characteristics: 1) pace of lot sales; 2) price of lots; and 3) costs of development. These characteristics create a cash flow that a prospective purchaser would evaluate as a potential investment. The terms of risk and reward in a land development project would then be compared to other, alternative investments to derive a purchase price. The relationship of the purchase price to the cash flow depends on the purchaser's anticipated profit requirements and the cost of funds to leverage the purchase of the site. Typically, the greater the risk, the greater the profit expectation required to compensate for that risk.

Most appraisers deal with the issue of pricing and the costs of development primarily through market research. In many markets, the prices of finished, buildable home sites are available through municipal land records, discussions with buyers or sellers, or through secondary published sources. Appraisers are generally proficient in mastering techniques for uncovering these comparable properties and applying a series of adjustments to derive expected lot pricing at the subject.

Similarly, the costs of development are typically available from the client, the developer, or the engineering firm handling the property, with additional support available from published sources such as *Marshall and Swift Valuation Service* and reports published by the National Home Builders Association. When cost information is outdated or too general, an appraiser may subcontract with an engineering firm to itemize the actual development costs.

Regardless of the availability of market data, many appraisal reports lack reliable data on the determination of accurate absorption and sales pace or sell-off of the subject's lots. Although in some markets data pertaining to supply and demand are not readily obtainable, an estimate of absorption should be performed; this is true even if based on a variety of anecdotal secondary market sources.

The basis for the relationship between supply and demand for subdivision land (whether raw, platted, or fully developed) is found in the market data for new home sales. If there were no demand for new homes, there would be no demand for a finished, fully developed site. It follows that there would be no demand for a platted or raw lot. The basis for subdivision lot demand is found in household growth within the market area. The measurement of demand for subdivision lots is found in the new home markets. The absorption estimates for the subject property are simply a correlation of supply and demand over time, based on the subject's competitive position within its market.

ANALYTICAL PROCESS

The first step in the analytical process is to define the market area in which the subject competes. Areas can be defined by zip code, geographical boundaries, or by some governmental delineation such as census tract or planning district. Defining a market area helps an appraiser (and a client) focus on a specific geographical area, often familiar, such as a town or community. Generally, defining a market area by governmental planning districts is the most efficient categorization because the demand data (discussed later in this article) are compiled by the local jurisdictions according to these geographical areas.

The second step requires that an appraiser take a current inventory of all competing projects within the subject's trade area. This inventory should consider the date at which the developer/builder began marketing, the total number of properties proposed at each subdivision, the total number sold to date, and the total number remaining to be sold. In addition, the appraiser should note the physical characteristics of the homes being sold (e.g., gross living area, number of bedrooms, number of bathrooms), locational attributes, unit pricing (both base models and options), and any other factors that may help the appraiser define the local market's perception of salable product types. This type of analysis will enable the appraiser to make sound judgments on the most acceptable product type for the subject's market. The characteristics of the inventory will be used in both the demand analysis and the supply analysis, which are described in the next section.

ESTIMATING DEMAND

The function of a demand analysis is to clarify the demand generators for the land use being analyzed. The estimate of demand for a property can be determined through the demand for similar types of properties at various stages of the development process. As mentioned, the demand for the subject subdivision's individual lots is directly related to the demand for finished housing. Without demand for new homes, there is no demand for developed lots, and therefore no demand for raw subdivision parcels.

Historic sales of homes are examined through field research of competing projects within the subject's market area (as defined by the appraiser). This can be accomplished in the following ways:

- Site visits to competing properties, including discussions with marketing personnel and determination of the number of new home sales
- Research of local Board of Realtors data including the retrieval of data from multiple listing services
- Subscription to secondary data sources that already inventory new home sales (many metropolitan areas have one or more services such as this)
- Review of public records such as the local property tax assessment office, planning and zoning, or other governmental agencies

It is recommended that as many sources as possible be referenced to accurately reflect historical absorption trends. Historical sales should be viewed as reflections of the past, not necessarily as projections of the future. The current asset management problem was partially caused by the projection of future absorption that had been based on only historical sales.[1] These projections were made without any consideration of the impact of future development in relation to existing supply.

From the historic sales information obtained within a subject's market area, an appraiser should be able to discuss current inventories (e.g., total units planned, total units sold, total units remaining), finished lot pricing (if these types of data are available), home pricing, home characteristics (e.g., number of bedrooms, options, living area), historical absorption, and the typical buyer profile (e.g., demographics relating to household income, size of household).

The weakness of historic data is that, although providing a sound basis for past demand trends in a subject's trade area, they do not provide an indication of prospective future demand for housing, on which lot sales depend. A key question that remains to be answered is: How long will the current demand last?

HOUSEHOLD GROWTH AS KEY TO PROJECTED DEMAND

It is necessary to discuss the projected household growth in a subject's trade area, the future demand for owner-occupied housing, and the actual percentage of the population that can afford such housing characteristics to derive an estimate of annual demand for the subject's trade area.

Household growth is the key to future demand. Without household growth, there would be no necessity to construct new housing, other than replacement housing resulting from demolition. "Positive" household growth demands that new housing be constructed. "Negative" household growth means that migration from an area is causing homes to be left vacant because no new households are moving into that area. If there is no household growth (i.e., negative household growth), individuals desiring to move to a new house will not be able to sell their old homes.

It would take many hours of primary research, consumer surveys, data collection, and data analysis for an appraiser to independently estimate household growth. Fortunately many local governments provide just such a service. Generally, an individual or department within a planning and zoning function is charged with the task of making population and household projections, either annually or on some five- or ten-year plan. Delineating a subject's market area based on a governmental planning district helps to save some steps in the research process.

The weakness of historical data is that, although providing a sound basis for past demand trends in a subject's trade area, they do not provide an indication of prospective future demand for housing, on which lot sales depend.

1. The poet Mary Shelley said, "What is past is prologue." This does not necessarily apply to real estate markets.

This is especially true in terms of household data. If a subject's trade area can be defined to be within the same region as the planning district, the appraiser's data are readily interpreted and available.

The general caveat in using these household growth projections is to understand the effect of their date of publication on their reliability. Data published in the late 1980s may have a bias toward increased, rapid growth. This is not to say that these data are wrong or misleading. Many localities did not foresee the recent slowdown in growth, so the data must be applied with caution. It is reasonable to apply a factor to these figures to account for the overly optimistic projections. If published figures are adjusted downward to reflect a change in assumptions from the government's estimates, an appraiser must acknowledge this within the report, so as not to violate the *Uniform Standards of Professional Appraisal Practice* (USPAP) provisions. If the local market has changed since these government reports were published, it is imperative that this be so noted by the appraiser in the report and accounted for in the analysis. Without these considerations, the absorption estimate will be inflated and inaccurate.

The next step is to determine the housing type best suited to the subject site. This conclusion is reached based on zoning regulations, lot sizes, neighboring house types, population and income characteristics in the trade area, and in particular the success of competing projects. A competing project inventory should provide an appraiser with a strong indication as to what type of housing product would be most successful in a subject's trade area. Close attention should be paid to projects with a stronger absorption rate because they are likely to be hitting the market "on target." Taking all other factors into consideration (e.g., remaining inventory, pricing structure, floor plans), it is a reasonable premise that a project developed with characteristics similar to the most successful projects could generate a similar absorption rate.

It may be helpful to rank the competing projects and their pricing structures in order of current sales pace (i.e., absorption rate). This exercise can assist an appraiser and his or her clients by creating a visual description of the correlation (if any) between sales pace and price. In balanced markets, an indirect relationship between the sales pace and the price of each project is typical; for example, the lower the pricing structure, the higher the sales pace. While in some markets it may be proven that there is no relationship at all, the exercise can help an appraiser understand the demand for housing.

It is then necessary to ascertain how many of the new households in a subject's trade area are projected to be owner-occupied housing, how many of the households are attached or detached housing, and how many potential buyers can afford the most probable housing type that will be constructed on the subject. These data can be gleaned from U.S. Census publications or secondary data providers. Because this information is historically based, an appraiser needs to determine whether the historical trends in a subject's trade area will continue, or whether there should be some adjustment to the data for future expectations.

To estimate the number of qualified potential buyers for a subject's projected product type, a housing affordability analysis is applied in which income requirements necessary to support the probable home prices at the subject subdivision are discussed. It is possible to determine a weighted average selling price using historic sale prices of homes similar to those projected for the subject.

Applying market-derived loan terms and mortgage underwriting requirements to the weighted average sale price, the minimum household income necessary to purchase a typical home is calculated. This minimum qualifying income is then compared to the income characteristics of the subject's trade area to ascertain the percentage of households in that trade area that could afford to purchase an expected new home at the subject property. The application of this qualifying percentage of households to the prospective annual growth in households is the anticipated effective annual demand for a finished home at the subject subdivision. An example of this analysis is outlined in Table 1.

In this example, the effective annual demand for households that can afford the homes that fit the physical characteristics

TABLE 1 Effective Annual Demand Analysis

Ten-year household growth[1]	5,400 units
Date of governmental data	1988
Adjustment for overestimation[2]	75%
Modified ten-year household growth[3]	4,050 units
Annual household growth (straight-line)[4]	405 units per year
Owner-occupied, detached housing[5]	62%
Annual demand for owner-occupied units[6]	251 units per year
Qualification of potential buyers:[7]	
Loan-to-value ratio	80%
Interest rate	8.5%
Loan term	30 years
Projected home price	$190,000
Loan amount	$152,000
Monthly payments	
Principal and interest	$1,170
Real estate taxes	$ 225
Insurance	$ 25
Total monthly payment	$1,420
Calculation of qualifying income	
Annualized mortgage payments	$17,040
Debt/payment ratio[8]	30%
Minimum household income[9]	$56,800
Percentage of households in trade area to qualify[10]	47%
Effective annual demand[11]	118 units

[1]Based on local government projections.
[2]Based on an appraiser's judgment derived from comparison of projections with actual household deliveries in the subject's trade area.
[3]Gross household growth adjusted for the modification factor.
[4]Modified growth over the entire projection period divided by the number of years in the governmental study period.
[5]Based on historical census or other governmental data.
[6]Annual household growth multiplied by the percentage of owner-occupied detached housing units.
[7]These assumptions are based on local market conditions and expectations.
[8]Local underwriting requirements or custom.
[9]Annual mortgage payments divided by debt/payment ratio.
[10]Based on the number of households in the subject's trade area that earn at least the minimum household income gleaned from U.S. Census or other demographic data.
[11]Annual demand for owner-occupied units multiplied by percentage of households in trade area that meet minimum household income standards.

projected for the subject subdivision is estimated as 118 new housing units per year.

ESTIMATING SUPPLY

Supply is generally easy to measure, especially with access to governmental records. As mentioned, most appraisers are able to count existing inventory very well. Prospective future supply is important, however, in that it is the arena in which the subject will compete over its absorption period. Without an understanding of prospective supply, an appraiser's market study is incomplete.

In most jurisdictions, approvals of subdivision projects are a matter of public record. In many cases, these records are classified according to the stage of the approval process (e.g., preliminary plat approval, final plat approval, date of recordation, the issuance of building permits). An appraiser can research approved projects that directly compete with a subject in any stage of its development.

Total supply within a subject's trade area can fall into one of two categories: 1) existing, fully developed building lots actively being marketed; and 2) proposed competition as lots pending preliminary plan approval, lots that have only received preliminary plan approval, and lots that have been recorded but not yet developed. Each of these categories of lots offers a varying degree of competition with the subject lots. It should be noted that each jurisdiction's subdivision process varies, and these categories are generic in nature.

Existing competition consists of all subdivisions in a subject's trade area that are fully developed and available for home construction. These lots are immediate and certain competition. Again, an appraiser's inventory accounts for all of these projects. Proposed competition can be tracked from a review of governmental

records. Many jurisdictions have current listings of projects in the review process, in many instances categorized by development stage. An appraiser can then inventory the prospective competition within a subject's trade area. Generally, the subdivision process is open to public inspection, which means that an appraiser can review the status of any project in terms of submitted plans, number of lots, and public comments in the file.

Lots that are fully developed are certain competition; however, lots still in the subdivision approval process, or lots that have gained governmental approvals but have not yet been developed, are only probable competition.

Subject lots must be compared with the trade area's prospective competition. Lots that are fully developed are certain competition; however, lots still in the subdivision approval process, or lots that have gained governmental approvals but have not yet been developed, are only probable competition. As an example, assume the subject is a 100-lot parcel with final subdivision approval, not yet developed (e.g., no roads, infrastructure, grading). Assume further that the appraiser anticipates that the lots will sell out within five years. The competition for this hypothetical property is comprised of the following segments:

- All of the fully developed subdivision lots within the subject's trade area
- All of the subdivision lots that have received subdivision approval but have not yet been developed (a situation similar to that of the subject), multiplied by a factor representing the probability that these lots will ever be developed within the estimated five-year absorption period
- All of the subdivision lots that have only received preliminary approvals, multiplied by a factor representing the probability of these lots being fully developed and thus becoming competition with the subject within the five-year absorption period
- Those lots just beginning the subdivision approval process, but which have not yet attained any level of approvals, multiplied by a probability factor that reflects the appraiser's best estimate of the chances of these lots being competition for the subject lots within the five-year absorption period

The total weighted competition for the subject is represented in Table 2. In this example, the total estimated supply of subdivision lots that may be marketed within the next five years is approximately 421 lots.

FAIR SHARE AND CAPTURE RATE

Fair share is an estimate of the total amount of effective annual demand that a subject can capture when it competes with similar properties on an equal basis. Using the previous example, the subject's fair share is calculated as 75 lots (100 lots multiplied by the probability factor of 75%) divided by the total probable supply for the subject's trade area of 421 lots. That is, the subject's fair share is 18%.

Capture rate is the fair share adjusted for the advantages or disadvantages of a subject's competitive position. If a subject is wooded with two-acre lots and the competition mainly consists of treeless one-acre lots, the subject has a competitive advantage. Conversely, if the subject's lots have steep topography and the market evidence reflects a disinterest toward these types of properties, it has a competitive disadvantage. If the subject's

TABLE 2 Total Weighted Competition for Subject

Category of Development	Probability of Competing in the Five-Year Period[1]	Number of Lots in Trade Area	Probable Supply in Lots
Fully developed	100%	50	50
Final subdivision approval[2]	75%	225	169
Preliminary approval	30%	485	146
Applications pending	10%	560	56
Total estimated supply for the five-year absorption period			421

[1]These probabilities are used as examples only. An appraiser must make a judgment regarding the appropriate probabilities in the subject's trade area based on experience and market trends.
[2]This category includes the subject's 100 proposed lots. Note that, in this example, the subject's probability of development fruition is also at 75%.

lots are generally typical in that market, then the fair share is equal to the capture rate. The appraiser must use judgment supported by a discussion of the characteristics of the subject lots in comparison with the competition when assigning an increase or a decrease to fair share in determining the capture rate.

ABSORPTION PERIOD

The absorption period flows from the application of capture rate to the effective annual demand. In this example, the capture rate is 18%; the effective annual demand is 118 units. Therefore, the subject can reasonably expect 21 units per year to be absorbed into the market for a 4.8-year absorption period.[2]

CONCLUSION

Prospective absorption of lots is fundamental to a reasonable estimate of value for any residential subdivision. Without applying a standard method to the issue of absorption, an appraiser is simply guessing about the key assumptions in the report. Many of the assumptions in the methodology are based on an appraiser's judgment. This should not deter anyone from applying these techniques in his or her daily practice; all appraisal assignments require judgment about future events. By applying a standard supply-and-demand method to an assignment, an appraiser offers a client a systematic analytical approach, based on readily available data, to the very complicated issue of subdivision analysis.

2. A capture rate of 18% multiplied by an effective annual demand of 118 units equals 21.2 units per year. The subject has 100 units altogether, resulting in 4.8 years of absorption, on a straight-line basis.