Section D

# Standard on Mass Appraisal of Real Property

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## International Association of Assessing Officers

This standard replaces the 2002 *Standard on Mass Appraisal of Real Property*. The 2002 standard combined and replaced the 1983 *Standard on the Application of the Three Approaches to Value in Mass Appraisal*, the 1984 *Standard on Mass Appraisal*, and the 1988 *Standard on Urban Land Valuation*. The IAAO's assessment standards represent a consensus in the assessing profession and have been adopted by the Executive Board of the International Association of Assessing Officers (IAAO). The objective of the IAAO's standards is to provide a systematic means by which concerned assessing officers can improve and standardize the operation of their offices. The IAAO's standards are advisory in nature and the use of, or compliance with, such standards is purely voluntary. If any portion of these standards is found to be in conflict with the *Uniform Standards of Professional Appraisal Practice* (*USPAP*) or state laws, *USPAP* and state laws shall govern.

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# Standard on Mass Appraisal of Real Property

## 1. Scope

This standard defines requirements for the mass appraisal of real property. The primary focus is on mass appraisal for ad valorem tax purposes. However, the principles defined here should also be relevant to computer-assisted mass appraisals (or automated valuation models) used for other purposes, such as mortgage portfolio management. The standard primarily addresses the needs of the assessor, assessment oversight agencies, and taxpayers.

This standard addresses mass appraisal procedures by which property can be appraised at market value, including mass appraisal application of the three traditional approaches to value (cost, sales comparison, and income). Appraisals made on an other-than-market-value basis or on an individual basis are outside the scope of this standard. Where assessed value differs from market value because of statutory constraints such as use value, acquisition value, base year value, or classification, this standard does not provide guidance for determining assessed value.

Mass appraisal requires complete and accurate data, effective valuation models, and proper management of resources. Section 3 focuses on the collection and maintenance of property data. Section 4 summarizes the primary considerations in valuation methods, including the role of the three approaches to value in the mass appraisal of various types of property. Section 5 discusses certain managerial considerations: staff levels, data processing support, contracting for reappraisals, support of valuations, and benefit-cost issues.

## 2. Introduction

Market value for assessment purposes is generally determined through the application of mass appraisal techniques. Mass appraisal is the process of valuing a group of properties as of a given date using common data, standardized methods, and statistical testing (IAAO [1990, chapter 5] and Gloudemans [1999, chapter 5]). To determine a parcel's value, assessing officers must rely upon valuation equations, tables, and schedules developed through mathematical analysis of market data. Unless required by law, values for individual parcels should not be based solely on the sale price of a property; rather, valuation schedules and models should be consistently applied to property data that is correct, complete, and up-to-date.

Properly administered, the development, construction, and use of a computer-assisted mass appraisal system results in a valuation system characterized by accuracy, uniformity, equity, reliability, and low per-parcel costs (see section 5.5). Except for unique properties, individual analyses and appraisals of properties are not practical for ad valorem tax purposes.

## 3. Collecting and Maintaining Property Data

Choose software wisely because it can limit the data that can be collected. The choice of data is largely dictated by the valuation software, whether it is programmed in house or supplied by a commercial service, a mass appraisal company, or a state agency.

### 3.1 Overview

Uniform and accurate valuation of property requires correct, complete, and up-to-date property data. Assessing offices must establish effective procedures for collecting and maintaining property data (that is, property ownership, location, size, use, physical characteristics, sales prices, rents, costs, and operating expenses). Such data are also used for performance audits, defense of appeals, public relations, and management information. The following sections recommend procedures for collecting these data.

### 3.2 Geographic Data

Assessors should maintain accurate, up-to-date cadastral maps (also known as assessment maps, tax maps, parcel boundary maps, and property ownership maps) covering the entire jurisdiction. At a minimum these maps should display a unique parcel number for each parcel. Such cadastral maps allow assessing officers to identify and locate all parcels, in both the field and the office. Maps become especially valuable in the mass appraisal process when a geographic information system (GIS) is used. A GIS permits graphic displays of sale prices, assessed values, inspection dates, work assignments, land uses, and much more. In addition, a GIS permits high-level analysis of nearby sales, neighborhoods, and market trends; when linked to a computer-assisted mass appraisal system, the results can be very useful. For additional information on cadastral maps, parcel identification systems, and GIS, see the *Standard on Manual Cadastral Maps and Parcel Identifiers* (IAAO 2004), *Standard on Digital Cadastral Maps and Parcel Identifiers* (IAAO 2003), and *Procedures and Standards for a Multipurpose Cadastre* (National Research Council 1983), and *GIS Guidelines for Assessors* (URISA/IAAO 1999).

### 3.3 Property Characteristics Data

The assessor should collect and maintain sufficient property characteristics data for classification, valuation, and other purposes. Accurate valuation of real property by any method requires descriptions of land and building characteristics.

### 3.3.1 Selection of Property Characteristics Data

Property characteristics to be collected and maintained should be based on the following:

- factors that influence the market in the locale in question
- requirements of the valuation methods that will be employed
- requirements of classification and property tax policy
- requirements of other governmental and private users
- marginal benefits and costs of collecting and maintaining each property characteristic

Determining what data on property characteristics to collect and maintain for a computer-assisted mass appraisal system is a crucial decision with long-term consequences. A pilot program is one means of evaluating the benefits and costs of collecting and maintaining a particular set of property characteristics. (See IAAO [1990, chapter 5] and Gloudemans [1999, chapter 2].) In addition, much can be learned from studying the data used in successful computer-assisted mass appraisals in other jurisdictions. Data collection and maintenance are usually the most costly aspects of a computer-assisted mass appraisal. Collecting data that are of little importance in the assessment process should be avoided unless another governmental or private need is clearly demonstrated.

The quantity and quality of existing data should be reviewed. If the data are sparse and unreliable, a major recanvass will be necessary. Data that have been confirmed to be reliable should be used whenever possible. New valuation programs or enhancements requiring major recanvass activity or conversions to new coding formats should be viewed with suspicion when the existing database already contains most major property characteristics and is of generally good quality. See Gloudemans (1999, chapter 2) and IAAO (1990, chapter 5) for characteristics of land, location, and improvements usually required for mass appraisal.

### 3.3.2 Collecting Property Characteristics Data

#### 3.3.2.1 Initial Data Collection

The primary way to obtain property characteristics data is to physically inspect the properties. This inspection can be performed either by appraisers or by specially trained data collectors. In a joint approach, experienced appraisers would make key subjective decisions, such as the assignment of construction quality class or grade, and data collectors would gather all other details. Depending on the data required, an interior inspection might be necessary. At a minimum, a comprehensive exterior inspection should be conducted.

To ensure that data are recorded correctly and consistently, the data collection program must incorporate a comprehensive quality control system with proper checks and audits such as audit trails, checks of logical consistency, and checks of validity (for example, numeric characters in numeric fields).

#### 3.3.2.2 Data Collection Format

Data should be collected in a prescribed format designed to facilitate both the collecting of data in the field and entry of the data into the computer system.

A logical arrangement of the collection format makes data collection easier. For example, all items requiring an interior inspection should be grouped together. The coding of data should be as objective as possible, with measurements, counts, and check-off items used in preference to items requiring subjective evaluations (such as "number of plumbing fixtures" versus "adequacy of plumbing: poor, average, good"). With respect to check-off items, the available codes should be exhaustive and mutually exclusive, so that exactly one code logically pertains to each observable variation of a building feature (such as type of room). In general, the data collection format should maintain consistency among data collectors, be clear and easy to use, and adaptable to virtually all types of construction. Specialized data collection formats may be necessary to collect information on agricultural property, timberland, industrial parcels, and other property types.

#### 3.3.2.3 Data Collection Manuals

A clear, thorough, and precise data collection manual should be developed, updated, and maintained. The written manual should explain how to collect and record each data item. Pictures, examples, and illustrations are particularly helpful. The manual should be simple yet complete, with a high degree of standardization for uniformity. Data collection staff should be trained in the use of the manual and updates to maintain consistency. The manual should present guidelines for personal conduct during field inspections and, if interior data are required, should outline procedures to follow when the property owner has denied access or when entry might be risky.

### 3.3.3 Data Entry

To avoid duplication of effort, the data collection form should be able to serve as the data entry form.

All data entry programs must include data edit capabilities. These are error or warning messages generated in response to invalid or unusual data items. Examples of data errors include missing data codes and invalid characters. Warning messages should also be generated when data values exceed normal ranges (for example, more than eight rooms in a 1,200-square-foot residence). Many

problems can be prevented by incorporating editing in the data entry/maintenance programs rather than deferring the "cleaning up" of the data to the time when the valuation models are being constructed. Data entry reviews should be made to determine possible problem areas.

### 3.3.4 Maintaining Property Characteristics Data

Property characteristics data should be continually updated in response to changes brought about by new construction, new parcels, remodeling, demolition, and destruction. There are several ways of doing this. The most efficient involves building permits. Ideally, strictly enforced local ordinances would require building permits for all significant construction activity, and the assessor would be given copies of the permits. This would allow the assessor to identify properties whose characteristics are likely to change, to inspect such parcels on a timely basis (preferably as close to the assessment date as possible), and to update the files accordingly.

Aerial photographs also can be helpful in identifying new or previously unrecorded construction and land use.

Some jurisdictions have used self-reporting, in which property owners are given the data in the assessor's records and asked to provide additions or corrections. Information derived from multiple listing sources and other third-party vendors can be used to update property records.

A system should be developed for making periodic field inspections to identify properties and ensure that property characteristics data are complete and accurate. Properties should be periodically revisited to ascertain that assessment records are accurate and current. Assuming that most new construction activity is identified through building permits or other ongoing procedures, a physical review at least every four to six years should be conducted, including an on-site verification of property characteristics. A reinspection should include partial remeasurement of the two most complex sides of improvements and a walk around the improvement to identify additions and deletions or independent review of the current measurements with specific requirements by an outside auditing firm or oversight agency. Photographs taken at previous physical inspections can help identify changes.

### 3.3.5 Alternative to Periodic On-Site Inspections

Jurisdictions may employ a set of digital image technology tools to replace a routine cyclical field inspection with a computer assisted office review. This tool set should include:

- High-resolution street-view images (at a sub-inch pixel resolution that enables quality grade and physical condition to be verified, updated at least every 6 years)
- Orthophoto images (minimum 6" pixel resolution in urban/suburban and 12" resolution in rural areas, updated every 2 years in rapid growth areas, or 6–10 years in slow growth areas).
- Low level oblique images capable of being used for measurement verification (four cardinal directions, minimum 6" pixel resolution in urban/suburban and 12" pixel resolution in rural areas, updated every 2 years in rapid growth areas or, 6–10 years in slow growth areas).

Effective tool sets validate CAMA data and incorporate change detection software that compares building dimension data (footprints) in the CAMA system to georeferenced imagery or remote sensing data from sources (such as LiDAR [light detection and ranging]) and identify potential CAMA sketch discrepancies for further investigation.

Changes to interior characteristics may be monitored on a regular and cyclical basis (such as every 6 years).

This alternative should be used in conjunction with information obtained through the permitting process, where available. In addition, appraisers should visit assigned areas on an annual basis to observe changes in neighborhood condition, trends and property characteristics. A physical review is recommended when significant construction changes are detected, a property is sold, or an area is affected by catastrophic damage.

## 3.4 Sales Data

States and provinces should seek mandatory disclosure laws to ensure comprehensiveness of sales data files. Regardless of the availability of such statutes, a file of sales data must be maintained. Sales data are required in all applications of the sales comparison approach, in the development of market-based depreciation schedules in the cost approach, and in the derivation of capitalization rates or discount rates. Refer to IAAO (1990, chapter 5) and Gloudemans (1999, chapter 2) for guidelines relating to the acquisition and processing of sales data.

## 3.5 Income and Expense Data

Income and expense data must be collected for income-producing property, as these data are required in the application of the income approach to value. (See section 4.4.) Refer to IAAO (1990, chapter 5) and Gloudemans (1999, chapter 2) for guidelines addressing the collection and processing of income and expense data.

## 3.6 Cost and Depreciation Data

Current cost and depreciation data adjusted to the local market are required for the cost approach (see section 4.2). Cost and depreciation manuals and schedules may be purchased from commercial services or created in-house. See Gloudemans (1999, chapter 4) for guidelines on creating manuals and schedules.

# 4. Valuation

## 4.1 Valuation Models

Any appraisal, whether single-property appraisal or mass appraisal, uses a model, that is, a representation in words or an equation of the relationship between value and variables representing factors of supply and demand. Mass appraisal models attempt to represent the market for a specific type of property in a specified area. Mass appraisers must first specify the model, that is, identify the variables (supply and demand factors) that influence value, for example, square feet of living area. Then, mass appraisers must calibrate the model, that is, determine the adjustments or coefficients that best represent the value contribution of the variables chosen, for example, the dollar amount the market places on each square foot of living area. Careful and extensive market analysis is required for both specification and calibration of a model that estimates values accurately. All three approaches to value—the cost approach, the sales comparison approach, and the income approach—are modeled for mass appraisal.

Geographic stratification is appropriate when the value of property attributes varies significantly among areas. It is particularly effective when housing types and styles are relatively uniform within areas. Separate models can be developed for market areas (also known as economic or model areas). Subareas or neighborhoods can serve as variables in modeling and can also be used in land value tables and selection of comparable sales. (See Gloudemans [1999, chapter 3].) Smaller jurisdictions may find it sufficient to develop a single residential model.

Commercial and income-producing properties should be stratified by property type. In general, separate models should be developed for apartment, warehouse/industrial, and retail properties. Large jurisdictions may be able to stratify apartment properties further by type or area or to develop multiple commercial models.

## 4.2 The Cost Approach

The cost approach is applicable to virtually all improved parcels and, if used properly, can produce highly accurate valuations. The cost approach is more reliable for newer structures of standard materials, design, and workmanship.

Reliable cost data are imperative in any successful application of the cost approach. The data must be complete, typical, and current. Current construction costs should be based on the cost of replacing a structure with one of equal utility, using current materials, design, and building standards. Costs of individual construction components and building items should also be included in order to adjust for features that differ from the base specifications. These costs should be incorporated into a construction cost manual and related computer software. The software can perform the valuation function, and the manual, in addition to providing documentation, can be used when nonautomated calculations are required.

Construction cost schedules can be developed internally, based on a systematic study of local construction costs, obtained from firms specializing in such information, or custom generated by a contractor. Cost schedules should be verified for accuracy by applying them to recently constructed improvements of known cost. Construction costs also should be updated before each assessment cycle.

One weakness in the cost approach tends to occur in the estimation of accrued depreciation. This estimate must be based on non-cost data (primarily sales) and can involve considerable subjectivity.

Depreciation schedules can be extracted from sales data in several ways. Methods for extracting depreciation can be found in IAAO (1990, chapter 8) and Gloudemans (1999, chapter 4).

Another key difficulty in use of the cost approach is determination of land value, which is estimated independently from sales (often from sales of improved property because sales of vacant land are scarce). Land values used in the cost approach must be current and consistent. Section 4.5 provides standards for land valuation in mass appraisal.

## 4.3 The Sales Comparison Approach

The sales comparison approach estimates the value of a subject property by analyzing the sales prices of similar properties. Mass appraisal programs should be able to adjust sales prices for date of sale. Adjustments should be considered for financing, personal property, assumed leases, delinquent taxes, and special assessments. Sales with special conditions, such as trades, exchanges, partial interests, land contracts, and auctions require a thorough validation and may be used with caution. See Gloudemans (1999, chapter 6), IAAO (1990, chapter 6), and IAAO (1999). Reliability of the sales comparison approach rests on the number and quality of available sales. When sufficient valid sales are available, this approach tends to be the preferred valuation method.

In mass appraisal, application of the sales comparison approach generally involves the use of automated statistical techniques, with multiple regression analysis (MRA), adaptive estimation procedure (feedback), and automated comparable sales analysis. (See Gloudemans [1999, chapter 4], IAAO [1990, chapter 15], and IAAO [1999].)

## 4.4 The Income Approach

In general, for income-producing properties the income approach is the preferred valuation approach when reliable income and expense data are available, along with well-supported income multipliers, overall rates, and required rates of return on investment. Successful application of the income approach requires the collection, maintenance, and careful analysis of income and expense data.

**Table 1**
**Rank of Typical Usefulness of the Three Approaches to Value in the Mass Appraisal of Major Types of Property**

| | Cost approach | Sales comparison approach | Income approach |
|---|---|---|---|
| **Single-family residential** | 2 | 1 | 3 |
| **Multifamily residential** | 3 | 1,2 | 1,2 |
| **Commercial** | 3 | 2 | 1 |
| **Industrial** | 1,2 | 3 | 1,2 |
| **Non-agricultural land** | — | 1 | 2 |
| **Agricultural*** | — | 2 | 1 |
| **Special-purpose**** | 1 | 2,3 | 2,3 |

*Includes farm, ranch, and forest properties. **Includes institutional, governmental, resort, and recreational properties

Mass appraisal applications of the income approach begin with collecting and processing income and expense data. (These data should be expressed on an appropriate per-unit basis; such as per square foot or per apartment unit.) Appraisers should then compute normal or "typical" gross incomes, vacancy rates, net incomes, and expense ratios. These figures can be used to judge the reasonableness of reported data for individual parcels and to estimate income and expense figures for parcels with unreported data. Alternatively, models for estimating gross or net income and expense ratios can be developed using actual income and expense data from a sample of properties and calibrated using multiple regression analysis. For an introduction to income modeling, see IAAO (1990, chapter 14) and Gloudemans (1999, chapter 3). The developed income figures can be capitalized into estimates of value in a number of ways. The most direct method involves the application of gross income multipliers, which express the ratio of market value to gross income. At a more refined level, net income multipliers or their reciprocals, overall capitalization rates, can be developed and applied. These multipliers and rates should always be extracted from actual income and sale price data obtained from properties that have recently been sold. Income multipliers and overall rates tend to provide reliable, consistent, and readily supported valuations when good sales and income data are available.

## 4.5 Land Valuation

State or local laws may require the value of an improved parcel to be separated into land and improvement components. When the sales comparison or income approach is used, an independent estimate of land value must be made and subtracted from the total property value to obtain a residual improvement value. Some computerized valuation techniques provide a separation of total value into land and building components.

Land values should be reviewed annually. At least once every four to six years the properties should be physically inspected and revalued. The sales comparison approach is the primary approach to land valuation and is always preferred when sufficient sales are available. In the absence of adequate sales, other techniques used in mass appraisal include allocation, abstraction, anticipated use, capitalization of ground rents, and land residual capitalization. (See IAAO [1990, chapter 7] and Gloudemans [1999, chapter 3].)

## 4.6 Considerations by Property Type

The appropriateness of each valuation approach varies with the type of property under consideration. Table 1 ranks the relative usefulness of the three approaches in the mass appraisal of major types of properties. The table assumes that there are no major statutory barriers to obtaining cost, sales, and income data. Again, although certain approaches tend to produce better results for a given type of property, the use of two or more approaches should produce greater accuracy.

### 4.6.1 Single-Family Residential Property

The sales comparison approach is the best approach for single-family residential property, including condominiums. Automated versions of this approach are highly efficient and generally accurate for the majority of these properties. The cost approach is a good supplemental approach and should serve as the primary approach when the sales data available are inadequate. The income approach is usually inappropriate for mass appraisal of single-family residential properties, because most of these properties are not rented.

### 4.6.2 Multifamily Residential Property

The sales comparison and income approaches are preferred in valuing multifamily residential property when sufficient sales and income data are available. Multiple regression analysis and related techniques have been successfully used in valuing this property type. Income multipliers can also be highly effective. As with other residential property, the cost approach is useful in providing supplemental valuations and can serve as the primary approach when good sales and income data are not available.

### 4.6.3 Commercial and Industrial Property

The income approach is the most appropriate method to apply when valuing commercial and industrial property if sufficient income data are available. Direct sales comparison models can be equally effective in large jurisdictions with sufficient sales. When a sufficient supply of sales data and income data is not available, the cost approach should be applied. However, values generated should be periodically checked against available sales data. Cost factors, land values, and depreciation schedules must be kept current through periodic review.

### 4.6.4 Non-Agricultural Land

The sales comparison approach is the preferred approach for non-agricultural land. Application of the sales comparison approach to vacant land involves the collection of sales data, the posting of sales data on maps, the calculation of standard unit values (such as value per square foot, per front foot, or per parcel) by area and type of land use, and the development of land valuation maps or computer-generated tables, in which the pattern of values is displayed. When vacant land sales are not available or are few, additional benchmarks can be obtained by subtracting the replacement cost new less depreciation of improvements from the sales prices of improved parcels. The success of this technique requires reliable cost data and tends to work best for relatively new improvements, for which depreciation is minimal.

If neither vacant-parcel nor improved-parcel sales data are available, the assessor will need to apply allocation methods or use valuation methods that provide separate land and building values. Sometimes income approach applications can also be used.

### 4.6.5 Agricultural Property

If adequate sales data are available and agricultural property is to be appraised at market value, the sales comparison approach would be preferred. However, nearly every state or province provides for use-value assessment (and usually appraisal), which significantly understates the market value for agricultural property, so the sales comparison approach is usually not applicable. Because of this limitation, it is imperative to obtain good income data and to use the income approach for agricultural land. Land rents are often available, sometimes permitting the development and application of overall capitalization rates. This method, of course, also entails the estimation of normal land rents for unrented parcels. When agricultural parcels include improvements, the cost approach or sales comparison models that provide separate building values may be used to determine their value.

### 4.6.6 Special-Purpose Property

The cost approach tends to be most appropriate in the appraisal of special-purpose properties, due to the distinctive nature of such properties and the general absence of adequate sales or income data.

## 4.7 Frequency of Reappraisals

Section 4.2.2 of the *Standard on Property Tax Policy* (IAAO 2004) states that current market value implies annual assessment of all property. Annual assessment does not necessarily mean, however, that each valuation must be reviewed or recomputed individually. Instead, trending factors based on criteria such as property type, location, size, and age can be developed and applied to groups of properties. These factors should be derived from ratio studies or other market analyses.

Analysis of ratio study data can suggest groups or strata of properties in need of physical review. In general, trending factors can be highly effective in maintaining equity when appraisals are uniform within strata. However, such factors are not a substitute for physical reviews and individual reappraisals, which are required to correct lack of uniformity within strata.

Although assessment trending can be effective for short periods, properties should be physically reviewed and individually reappraised at least every four to six years. This can be accomplished in at least three ways:

- reappraising all property at periodic intervals (that is, every four to six years)
- reappraising properties on a cyclical basis (for example, one-fourth or one-sixth each year)
- reappraising on a priority basis as indicated by ratio studies or other considerations while still ensuring that all properties are physically reviewed at least every sixth year

# 5. Managerial Considerations

## 5.1 Overview

Mass appraisal requires human, computing, and other resources to be well managed and appropriate appraisal and analytical methods need to be employed. In this section certain key managerial considerations are discussed.

## 5.2 Staffing

A successful in-house appraisal program requires a sufficiently large staff composed of persons skilled in general administration and supervision, appraisal, mapping and drafting, data processing, and secretarial and clerical functions. Typical staffing sizes and patterns for jurisdictions of various sizes are illustrated in *Property Appraisal and Assessment Administration* (IAAO 1990, chapter 16).

Unless efficiency or practical concerns dictate otherwise, persons performing the various mass appraisal functions should be employees of the assessor. When these functions are not performed by assessment staff, it is imperative that they be adequately provided by other departments, an oversight agency, a service bureau, a qualified contractor, or another source. Strong lines of

communication must be established between the assessor's staff and the designated support groups.

## 5.3 Data Processing Support

Computer-assisted mass appraisals require considerable data processing support. (See the *Standard on Facilities, Equipment, Computers, and Supplies* [IAAO 2003].)

### 5.3.1 Hardware

The hardware should be powerful enough to permit computerization of appropriate applications of the cost, sales comparison, and income approaches, as well as providing word processing, data inquiry, and activity summaries. The requirements for efficient running of desired software should be established before the acquisition of hardware. Computer equipment can be purchased, leased, rented, or shared with other jurisdictions. If the purchase option is chosen, the equipment should be easy to upgrade so that technological developments can be taken advantage of without purchasing an entirely new system.

### 5.3.2 Software

Computer software can be developed internally, adapted from software developed by other public agencies, or purchased (in whole or in part) from private vendors. (Inevitably there will be some tailoring needed to adapt externally developed software to the requirements of the user's environment.) Each alternative has advantages and disadvantages. The software should be designed so that it can be easily modified; it should also be well documented, at both the appraiser/user and programmer levels.

Security measures should exist to prevent unauthorized use and to provide backup in the event of accidental loss or destruction of data.

## 5.4 Contracting for Appraisal Services

### 5.4.1 Overview

Reappraisal contracts can include mapping, data collection, data processing, and other services, as well as valuation. They offer the potential of acquiring professional skills and resources quickly. Often these skills and resources are not available internally. Contracting for these services can permit the jurisdiction to maintain a modest staff and to budget for reappraisal on a periodic basis, but also makes the assessor less likely to develop in-house expertise. (See the *Standard on Contracting for Assessment Services* [IAAO 2002].)

### 5.4.2 In-House Staff

The assessor's staff must have confidence in the appraisals and be able to explain and defend them. This confidence begins with application of reliable appraisal techniques, generation of appropriate valuation reports, and review of preliminary values. It may be helpful to have reports that list each parcel, its characteristics, and its calculated value. Parcels with unusual characteristics, extreme values, or extreme changes in values should be identified for subsequent individual review. Equally important, summary reports should show average values, value changes, and ratio study statistics for various strata of properties. These should be reviewed to ensure the overall consistency of values for various types of property and various locations. (See the *Uniform Standards of Professional Appraisal Practice*, Standards Rule 6-7, for reporting requirements for mass appraisals [The Appraisal Foundation, Appraisal Standards Board 2008–2009].)

The staff should also be prepared to support individual valuations as required, preferably through comparable sales. At a minimum, staff should be able to produce a property record and explain the basic approach (cost, sales comparison, or income) used to estimate the value of the property. A property owner should never merely be told that "the computer" or "the system" produced the appraisal. Generally, the staff should tailor the explanation to the taxpayer's knowledge and expertise. Equations converted to tabular form can be used to explain the basis for valuation. Cost tables can be used to explain values based on the cost approach.

In all cases, the assessor's staff should be able to produce sales or appraisals of similar properties in order to support (or at least explain) the valuation of the property in question. Comparable sales can be obtained from reports that list sales by such features as type of property, area, size, and age. Alternatively, interactive programs can be obtained or developed that identify and display the most comparable properties.

Assessors should notify property owners of their valuations in sufficient time for property owners to discuss their appraisals with the assessor and appeal the value if they choose to do so (*Standard on Public Relations* [IAAO 2001]). Statutes should provide for a formal appeals process beyond the assessor's level (*Standard on Assessment Appeal* [IAAO 2001]).

## 5.5 Benefit-Cost Considerations

### 5.5.1 Overview

The object of mass appraisal is to produce equitable valuations at low costs. Improvements in equity generally require increased expenditures.

Benefit-cost analysis in mass appraisal involves two major issues, one of policy and the other of administration.

### 5.5.2 Policy Issues

An assessment jurisdiction requires a certain expenditure level simply to inventory, list, and value properties. Beyond that point, additional expenditures make possible rapid improvements in equity initially, but marginal improvements in equity diminish as expenditure increases. At a minimum, jurisdictions should budget to meet

statutory standards of equity. Refer to the *Standard on Ratio Studies* (IAAO 2007) for a listing of performance standards.

### 5.5.3 Administrative Issues

Maximizing equity per dollar of expenditure is the primary responsibility of assessment administration. The assessor must provide leadership, make decisions, and get results by planning, budgeting, organizing, and controlling within all social, economic, and governmental limits (IAAO 1990, chapter 16). The computer-assisted mass appraisal system selected must be designed and used to evaluate appraisal performance and ensure compliance with laws, regulations, and policies.

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## Glossary

**Abstraction Method**—Method of land valuation in the absence of vacant land sales, whereby improvement values obtained from the cost model are subtracted from sales prices of improved parcels to yield residual land value estimates. Also called land residual technique.

**Accrued Depreciation**—(1) The amount of depreciation, from any and all sources, that affects the value of the property in question on the effective date of the appraisal. (2) In accounting, the amount reserved each year or accumulated to date in the accounting system for replacement of a building or other asset. When depreciation is recorded as a dollar amount, it may be deductible from total plant value or investment to arrive at the rate base for public utilities. See also Depreciation.

**Acquisition Value**—An assessed value based on the cost of acquiring the property; increases in this value are usually limited until the next qualifying sale.

**Adaptive Estimation Procedure (AEP)**—A computerized, iterative, self-referential procedure using properties for which sales prices are known to produce a model that can be used to value properties for which sales prices are not known. Also called "feedback."

**Adjusted Sale Price**—The sale price that results from adjustments made to the stated sale price to account for the effects of time, personal property, financing, or the like.

**Adjustments**—Modifications in the reported value of a variable, such as sale price or gross income. For example, adjustments can be used to estimate market value in the sales comparison approach by adjusting the sale price of the comparable for differences between comparable and subject properties.

**Ad Valorem Tax**—A tax levied in proportion to the value of the thing(s) being taxed.

**Aerial Photograph**—A photograph of a part of the earth's surface taken by an aircraft-supported camera.

**Agricultural Property**—Improved or unimproved land devoted to or available for the production of crops or other agricultural products, livestock, and agricultural support buildings.

**Allocation Method**—A method used to value land, in the absence of vacant land sales, by using a typical ratio of land to improvement value. Also called land ratio method.

**Appraisal Foundation, The**—The organization authorized by the United States Congress as the source of appraisal standards and appraiser qualifications.

**Appraisal Ratio**—(1) The ratio of the appraised value to an indicator of market value. (2) By extension, an estimated fractional relationship between the appraisals and market values of a group of properties. See also Level of Appraisal.

**Appraisal Ratio Study**—A ratio study using independent expert appraisals as indicators of market value.

**Arm's-Length Sale**—A sale between two unrelated parties, both seeking to maximize their positions from the transaction.

**Assessment Cycle**—A legally sanctioned reappraisal period generally ranging from one to ten years.

**Assessment Date**—The status date for tax purposes. Appraised values reflect the status of the property and any partially completed construction as of this date.

**Assessment Equity**—The degree to which assessments bear a consistent relationship to market value.

**Assessment Level**—The common, or overall, ratio of assessed values to market values.

**Assessment Maps**—See Cadastral Map.

**Assessment Ratio**—(1) The fractional relationship an assessed value bears to the market value of the property in question. (2) By extension, the fractional relationship the total of the assessment roll bears to the total market value of all taxable property in a jurisdiction. See Level of Assessment.

**Assessment Ratio Study**—An investigation intended to determine the assessment ratio and assessment equity.

**Assessment Ratio**—(1) The fractional relationship an assessed value bears to the market value of the property in question. (2) By extension, the fractional relationship the total of the assessment roll bears to the total market value of all taxable property in a jurisdiction. See Level of Assessment.

**Assessment Ratio Study**—An investigation intended to determine the assessment ratio and assessment equity.

**Audit**—A systematic investigation or appraisal of procedures or operations for the purpose of determining conformity with specifically prescribed criteria.

**Audit, Performance**—An analysis of an organization to determine whether or not the quantity and quality of work performed meets standards. Ratio studies are an important part of performance audits of an assessing organization.

**Audit, Procedural**—An examination of an organization to determine whether established or recommended procedures are being followed.

**Audit Program**—The procedures undertaken or particular work done by an accountant in conducting an examination.

**Audit Trail**—A set of records of the changes made to another set of records.

**Automated Valuation Model**—A computer program for property valuation that analyzes data using an automated process. See also Computer-assisted Mass Appraisal.

**Base Year Value**—In a nonmarket-value assessment system, the assessed value established as of a specific year.

**Benchmark**—(1) A term used in land surveying to mean a known point of reference. (2) In property appraisal, a property of known value and of known effective age and replacement cost. (3) By extension, a model property to be used in determining by comparison the grade or quality class of other properties.

**Cadastral Map**—A scale map displaying property ownership boundaries and showing the dimensions of each parcel with related information such as parcel identifier, survey lines, and easements.

**Calibration**—The process of estimating the coefficients in a mass appraisal model.

**CAMA**—See Computer-assisted Mass Appraisal.

**Capitalization Rate**—Any rate used to convert an estimate of future income to an estimate of market value; the ratio of net operating income to market value.

**Capitalization of Ground Rents**—A method of estimating land value in the absence of comparable sales; applicable where there is an income stream; for example, to farmland and commercial land leased on a net basis.

**Class**—A set of items defined by common characteristics. (1) In property taxation, property classes such as residential, agricultural, and industrial may be defined. (2) In assessment, building classification systems based on type of building design, quality of construction, or structural type are common. (3) In statistics, a predefined category into which data may be put for further analysis. For example, ratios may be grouped into the following classes: less than 0.500, 0.500 to 0.599, 0.600 to 0.699, and so forth.

**Coding**—(1) The act of reducing a description of a unique object, such as a parcel of real estate, to a set of one or more measures or counts of certain of its characteristics, such as square footage, number of bathrooms, and the like. (2) Encoding, a related term, is usually used to refer to the act of translating coded descriptions useful to human beings into a form that can be processed by computers. (3) Coding is sometimes also used to refer to the writing of instructions that direct the processing done by computers.

**Coefficient**—(1) In a mathematical expression, a number or letter preceding and multiplying another quantity. For example, in the expression, 5X, 5 is the coefficient of X, and in the expression aY, a is the coefficient of Y. (2) A dimensionless statistic, useful as a measure of change or relationship; for example, correlation coefficient.

**Commercial Property**—Generally, any nonindustrial, nonresidential realty of a commercial enterprise. Includes realty used as a retail or wholesale establishment, hotel or motel, service station, commercial garage, warehouse, theater, bank, nursing home, and the like.

**Comparable Sales; Comparables**—(1) Recently sold properties that are similar in important respects to a property being appraised. The sale price and the physical, functional, and locational characteristics of each of the properties are compared to those of the property being appraised in order to arrive at an estimate of value. (2) By extension, the term "comparables" is sometimes used to refer to properties with rent or income patterns comparable to those of a property being appraised.

**Comparative Unit Method**—(1) A method of appraising land parcels in which an average or typical value is estimated for each stratum of land. (2) A method of estimating replacement cost in which all the direct and indirect costs of a structure (except perhaps architect's fees) are aggregated and specified with reference to a unit of comparison such as square feet of ground area or floor area, or cubic content. Separate factors are commonly specified for different intervals of the unit of comparison and for different story heights, and separate schedules are commonly used for different building types and quality classes.

**Computer-assisted Assessment System**—A system for assessing real and personal property with the assistance of a computer. A computer may be used, for example, in the appraisal process, in keeping track of ownership and exemption status, in printing the assessment roll, in coordinating the work load of real property appraisers and personal property appraisers with respect to the assessment of commercial and industrial properties, and in a number of other areas.

**Computer-assisted Mass Appraisal (CAMA)**—A system of appraising property, usually only certain types of real property, that incorporates computer-supported statistical analyses such as multiple regression analysis and adaptive estimation procedure to assist the appraiser in estimating value.

**Cost**—The money expended in obtaining an object or attaining an objective; generally used in appraisal to mean the expense, direct and indirect, of constructing an improvement.

**Cost Approach**—(1) One of the three approaches to value, the cost approach is based on the principle of substitution—that a rational, informed purchaser would pay no more for a property than the cost of building an acceptable substitute with like utility. The cost approach seeks to determine the replacement cost new of an improvement less depreciation plus land value. (2) The method of estimating the value of property by (a) estimating the cost of construction based on replacement or reproduction cost new or trended historic cost (often adjusted by a local mul-

tiplier), (b) subtracting depreciation, and (c) adding the estimated land value. The land value is most frequently determined by the sales comparison approach.

**Cost Schedules**—Charts, tables, factors, curves, equations, and the like intended to help estimate the cost of replacing a structure from a knowledge of some other factors, such as its quality class and number of square feet.

**Data**—The general term for masses of numbers, codes, and symbols. "Data" is the plural of datum, one element of data.

**Data Edit**—The process of examining recorded data to ensure that each element of data is reasonable and is consistent with others recorded for the same object, such as a parcel of real estate. Data editing, which may be done by persons or by computer, is essentially a mechanical process, distinct from verifying the correctness of the recorded information by calling or writing property owners.

**Data Management**—The human (and sometimes computer) procedures employed to ensure that no information is lost through negligent handling of records from a file, that all information is properly supplemented and up-to-date, and that all information is easily accessible.

**Depreciation**—Loss in value of an object, relative to its replacement cost new, reproduction cost new, or original cost, whatever the cause of the loss in value. Depreciation is sometimes subdivided into three types: physical deterioration (wear and tear), functional obsolescence (suboptimal design in light of current technologies or tastes), and economic obsolescence (poor location or radically diminished demand for the product). See also Accrued Depreciation.

**Depreciation Schedules**—Tables used in mass appraisal that show the typical loss in value at various ages or effective ages for different types of properties.

**Discount Rate**—The rate of return on investment; the rate an investor requires to discount future income to its present worth.

**Economic Area**—A geographic area, typically encompassing a group of neighborhoods, defined on the basis that the properties within its boundaries are more or less equally subject to a set of one or more economic forces that largely determine the value of the properties in question.

**Equity**—(1) In assessment, the degree to which assessments bear a consistent relationship to market value. Measures include the coefficient of dispersion, coefficient of variation, and price-related differential. (2) In popular usage, a synonym for tax fairness. (3) In ownership, the net value of property after liens and other charges have been subtracted.

**Expense Ratios**—The ratio of expenses to gross income.

**Factor**—(1) An underlying characteristic of something (such as a house) that may contribute to the value of a variable (such as its sale price), but is observable only indirectly. For example, construction quality is a factor defined by workmanship, spacing of joists, and materials used. Factor definition and measurement may be done subjectively or by a computer-assisted statistical algorithm known as factor analysis. (2) Loosely, any characteristic used in adjusting the sales prices of comparables. (3) The reciprocal of a rate. Assessments may be equalized by multiplying them by a factor equal to the reciprocal of the assessment ratio, and value can be estimated using the income approach by multiplying income by a factor equal to the reciprocal of the discount rate.

**Feedback**—See Adaptive Estimation Procedure.

**Front Foot**—The unit or standard of linear measure used in measuring frontage.

**Geographic Information System (GIS)**—(1) A database management system used to store, retrieve, manipulate, analyze, and display spatial information. (2) One type of computerized mapping system capable of integrating spatial data (land information) and attribute data among different layers on a base map.

**Gross Income**—The payments to an owner that a property can generate before expenses are deducted.

**Gross Income Multiplier**—A capitalization technique that uses the ratio between the sale price of a property and its potential gross income or its effective gross income.

**Improvements**—Buildings, other structures, and attachments or annexations to land that are intended to remain so attached or annexed, such as sidewalks or sewers.

**Income Approach**—One of the three approaches to value, based on the concept that current value is the present worth of future benefits to be derived through income production by an asset over the remainder of its economic life. The income approach uses capitalization to convert the anticipated benefits of the ownership of property into an estimate of present value.

**Industrial Property**—Generally, any property used in a manufacturing activity, such as a factory, wholesale bakery, food processing plant, mill, mine, or quarry.

**Integrity**—The quality of a data element or program being what it says it is; usually distinguished from validity, the quality of its being what it should be in terms of some ultimate purpose. After data are edited and encoded and programs are prepared, their integrity is ensured by safeguards that prevent accidental or unauthorized tampering with them.

**Land**—(1) In economics, the surface of the earth and all the natural resources and natural productive powers over which possession of the earth's surface gives

man control. (2) In law, a portion of the earth's surface, together with the earth below it, the space above it, and all things annexed thereto by nature or by man. See also Improvements.

**Land Residual Technique**—See Abstraction Method.

**Legal Description**—A delineation of dimensions, boundaries, and relevant attributes of a real property parcel that serve to identify the parcel for all purposes of law. The description may be in words or codes, such as metes and bounds or coordinates. For a subdivided lot, the legal description would probably include lot and block numbers and subdivision name.

**Level of Appraisal**—The common, or overall, ratio of appraised values to market values. Three concepts are usually of interest: the level required by law, the true or actual level, and the computed level, based on a ratio study.

**Level of Assessment; Assessment Ratio**—The common or overall ratio of assessed values to market values. Compare Level of Appraisal. Note: The two terms are sometimes distinguished, but there is no convention determining their meanings when they are. Three concepts are commonly of interest: what the assessment ratio is legally required to be, what the assessment ratio actually is, and what the assessment ratio seems to be, on the basis of a sample and the application of inferential statistics. When level of assessment is distinguished from assessment ratio, "level of assessment" usually means either the legal requirement or the true ratio, and "assessment ratio" usually means the true ratio or the sample statistic.

**Linear Regression**—A kind of statistical analysis used to investigate whether a dependent variable and a set of one or more independent variables share a linear correlation and, if they do, to predict the value of the dependent variable on the basis of the values of the other variables. Regression analysis of one dependent variable and only one independent variable is called simple linear regression, but it is the word simple (not linear) that distinguishes it from multiple regression analysis with its multiple independent variables.

**Location**—The numerical or other identification of a point (or object) sufficiently precise so the point can be situated. For example, the location of a point on a plane can be specified by a pair of numbers (plane coordinates) and the location of a point in space can be specified by a set of three numbers (space coordinates). However, location may also be specified in other terms than coordinates. A location may be specified as being at the intersection of two specific lines by identifying it with some prominent and known feature (for example, "on top of Pikes Peak" or "at the junction of the Potomac and Anacostia Rivers").

**Map**—A conventional representation, usually on a plane surface and at an established scale, of the physical features (natural, artificial, or both) of a part or the whole of the earth's surface. Features are identified by means of signs and symbols, and geographical orientation is indicated.

**Map, Tax**—A map drawn to scale and delineated for lot lines or property lines or both, with dimensions or areas and identifying numbers, letters, or names for all delineated lots or parcels.

**Market**—(1) The topical area of common interest in which buyers and sellers interact. (2) The collective body of buyers and sellers for a particular product.

**Market Adjustment Factors**—Market adjustment factors, reflecting supply and demand preferences, are often required to adjust values obtained from the cost approach to the market. These adjustments should be applied by type of property and area and are based on sales ratio studies or other market analyses. Accurate cost schedules, condition ratings, and depreciation schedules will minimize the need for market adjustment factors.

**Market Analysis**—A study of real estate market conditions for a specific type of property.

**Market Area**—See Economic Area.

**Market Value**—Market value is the major focus of most real property appraisal assignments. Both economic and legal definitions of market value have been developed and refined. A current economic definition agreed upon by agencies that regulate federal financial institutions in the United States is:

> *The most probable price (in terms of money) which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:*
>
> *The buyer and seller are typically motivated;*
>
> *Both parties are well informed or well advised, and acting in what they consider their best interests;*
>
> *A reasonable time is allowed for exposure in the open market;*
>
> *Payment is made in terms of cash in United States dollars or in terms of financial arrangements comparable thereto;*
>
> *The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.*

**Market-Value Standard**—A requirement of law or practice that the assessment ratio of all properties be equal to one. Two issues are implicit here: that fractional

assessment levels be avoided and that all property be assessed on the basis of its market value and not on the basis of its value in some particular use—for example, agriculture—unless that use is the only use to which the property can legally be put (in which case its use value would be equal to its market value).

**Mass Appraisal**—The process of valuing a group of properties as of a given date, using standard methods, employing common data, and allowing for statistical testing.

**Mass Appraisal Model**—A mathematical expression of how supply and demand factors interact in a market.

**Model**—(1) A representation of how something works. (2) For purposes of appraisal, a representation (in words or an equation) that explains the relationship between value or estimated sale price and variables representing factors of supply and demand.

**Model Area**—See Economic Area.

**Model Calibration**—The development of adjustments, or coefficients, based on market analysis, that identifies specific factors with an actual effect on market value.

**Model Specification**—The formal development of a model in a statement or equation, based on data analysis and appraisal theory.

**Multiple Regression, Multiple Regression Analysis (MRA)**—A particular statistical technique, similar to correlation, used to analyze data in order to predict the value of one variable (the dependent variable), such as market value, from the known values of other variables (called "independent variables"), such as lot size, number of rooms, and so on. If only one independent variable is used, the procedure is called simple regression analysis and differs from correlation analysis only in that correlation measures the strength of relationship, whereas regression predicts the value of one variable from the value of the other. When two or more variables are used, the procedure is called multiple regression analysis. See Linear Regression.

**Neighborhood**—(1) The environment of a subject property that has a direct and immediate effect on value. (2) A geographic area (in which there are typically fewer than several thousand properties) defined for some useful purpose, such as to ensure for later multiple regression modeling that the properties are homogeneous and share important locational characteristics.

**Net Income**—The income expected from a property after deduction of allowable expenses.

**Net Income Multiplier**—A factor expressing the relationship between value and net operating income; the reciprocal of the overall rate.

**Objective**—The quality of being definable by specific criteria without the need for judgment.

**Open Market**—A freely competitive market in which any buyer or seller may trade and in which prices are determined by competition.

**Overall Rate (OAR)**—A capitalization rate that blends all requirements of discount, recapture, and effective tax rates for both land and improvements; used to convert annual net operating income into an indicated overall property value.

**Parcel**—A contiguous area of land described in a single legal description or as one of a number of lots on a plat; separately owned, either publicly or privately; and capable of being separately conveyed.

**Parcel Identifier**—A code, usually numerical, representing a specific land parcel's legal description. The purpose of parcel identifiers is to permit reference to legal descriptions by using a code of uniform and manageable size, thereby facilitating record-keeping and handling. Also called parcel identification number.

**Personal Property**—Consists of every type of property that is not real property. Personal property is movable without damage to itself or the real estate and is subdivided into tangible and intangible.

**Price, Adjusted Sale**—The sale price that results from adjustments made to the stated sale price to account for the effects of time, personal property, atypical financing, and the like.

**Price, Market**—The value of a unit of goods or service, expressed in terms of money, as established in a free and open market. Note: This term is sometimes distinguished from "market value" on the ground that the latter term assumes that buyers and sellers are informed, but this assumption is also implied by the phrase "free and open market." Compare Price, Sale.

**Price, Sale**—(1) The actual amount of money exchanged for a unit of goods or services, whether or not established in a free and open market. An indicator of market value. (2) Loosely used synonymously with "offering" or "asked" price. Note: The sale price is the "selling price" to the vendor and the "cost price" to the vendee.

**Property**—(1) An aggregate of things or rights to things. These rights are protected by law. There are two basic types of property: real and personal. (2) The legal interest of an owner in a parcel or thing.

**Property Record Card (Form)**—An assessment document with blanks for the insertion of data for property identification and description, for value estimation, and for property owner satisfaction. The basic objectives of property record forms are, first, to serve as a repository of most of the information deemed necessary for identifying and describing a property, valuing a property, and assuring property owners that the assessor is conversant with their properties, and, second, to document property

appraisals. Use of properly designed property record forms permits an organized and uniform approach to amassing a property inventory.

**Ratio, Assessment**—See Assessment Ratio.

**Ratio Study**—A study of the relationship between appraised or assessed values and market values. Indicators of market values may be either sales (sales ratio study) or independent "expert" appraisals (appraisal ratio study). Of common interest in ratio studies are the level and uniformity of the appraisals or assessments. See also Level of Appraisal and Level of Assessment.

**RCN**—Replacement cost new or reproduction cost new.

**RCNLD**—Replacement cost new less depreciation or reproduction cost new less depreciation.

**Real Estate**—The physical parcel of land and all improvements permanently attached. Compare Real Property.

**Real Property**—Consists of the interests, benefits, and rights inherent in the ownership of land plus anything permanently attached to the land or legally defined as immovable; the bundle of rights with which ownership of real estate is endowed. To the extent that "real estate" commonly includes land and any permanent improvements, the two terms can be understood to have the same meaning. Also called "realty."

**Reappraisal**—The mass appraisal of all property within an assessment jurisdiction accomplished within or at the beginning of a reappraisal cycle (see below, sense 2). Also called revaluation or reassessment.

**Reappraisal Cycle**—(1) The period of time necessary for a jurisdiction to have a complete reappraisal. For example, a cycle of five years occurs when one-fifth of a jurisdiction is reappraised each year and also when a jurisdiction is reappraised all at once every five years. (2) The maximum interval between reappraisals as stated in laws.

**Reassessment**—(1) The relisting and revaluation of all property, or all property of a given class, within an assessment district by order of an authorized officer or body after a finding by such an officer or body that the original assessment is too faulty for correction through the usual procedures of review and equalization. (2) The revaluation of all real property by the regularly constituted assessing authorities, as distinguished from assessment on the basis of valuations most or all of which were established in some prior year. See also Revaluation.

**Reciprocal**—The result obtained when 1 is divided by a given number.

**Reconciliation**—The final step in the valuation process wherein consideration is given to the relative strengths and weaknesses of the three approaches to value, the nature of the property appraised, and the quantity and quality of available data in formation of an overall opinion of value (either a single point estimate or a range of value). Also termed "correlation" in some texts.

**Regression Analysis**—See Multiple Regression Analysis.

**Reliability**—The degree to which measures are free from random error and therefore yield consistent results; the extent to which a procedure yields consistent results on repeated trials.

**Replacement Cost; Replacement Cost New**—The cost, including material, labor, and overhead, that would be incurred in constructing an improvement having the same utility to its owner as a subject improvement, without necessarily reproducing exactly any particular characteristics of the subject. The replacement cost concept implicitly eliminates all functional obsolescence from the value given; thus, only physical depreciation and economic obsolescence need to be subtracted to obtain replacement cost new less depreciation (RCNLD).

**Replacement Cost New Less Depreciation (RCLD)**—In the cost approach, replacement cost new less physical incurable depreciation.

**Reproduction Cost; Reproduction Cost New**—The cost of constructing a new property, reasonably identical (having the same characteristics) with the given property except for the absence of physical depreciation, using the same materials, construction standards, design, and quality of workmanship, computed on the basis of prevailing prices and on the assumption of normal competency and normal conditions.

**Residential Property**—Property used for housing such as single-family residences, duplexes, or apartment buildings.

**Residual**—The difference between an observed value and a predicted value for a dependent variable.

**Residual Technique**—A method of arriving at the unknown value of a property component by subtracting the known values of other components from a known overall value.

**Revaluation**—A reappraisal of property; especially a complete reappraisal of real property after assessment for one or more years on valuations most (or all) of which were established in some prior year. Compare Reassessment and Reappraisal.

**Review**—(1) Consideration by a board of appeals, a board of equalization, a board of review, or a court, of individual, property class, or district assessments, whether for the purpose of adding omitted taxable property, removing exempt property, or equalizing the valuations placed on listed property. (2) The act or process of critically studying a report, such as an appraisal, prepared by another.

**Sale, Arm's-Length**—A sale in the open market between two unrelated parties, each of whom is reasonably knowledgeable of market conditions and under no undue pressure to buy or sell.

**Sale Price**—See Price, Sale; Price, Adjusted Sale.

**Sales Comparison Approach**—One of three approaches to value, the sales comparison approach estimates a property's value (or some other characteristic, such as its depreciation) by reference to comparable sales.

**Sales Data**—(1) Information about the nature of the transaction, the sale price, and the characteristics of a property as of the date of sale. (2) The elements of information needed from each property for some purpose, such as appraising properties by the direct sales comparison approach.

**Sales File**—A file of sales data.

**Sales Ratio Study**—A ratio study that uses sales prices as proxies for market values.

**Schedules**—Tables, equations, or some other means of presenting the relationship between the values of two or more variables that are functionally related. For example, cost schedules present the relationship between cost per square foot and living area for a number of quality classes, building heights, and other characteristics.

**Single-Property Appraisal**—Systematic appraisal of properties one at a time.

**Site**—The location of a person, thing, or event.

**Site Characteristics**—(1) Characteristics of (and data that describe) a particular property, especially land size, shape, topography, drainage, and so on, as opposed to location and external economic forces.

**Software**—(1) Computer programs. (2) Those parts of a computer system that are not machinery or circuits; procedures and possibly documentation are included along with programs.

**Special-Purpose Property**—A property adapted for a single use.

**Standard 6**—See *Uniform Standards of Professional Appraisal Practice*.

**Stratify**—To divide, for purposes of analysis, a sample of observations into two or more subsets according to some criterion or set of criteria.

**Stratum, Strata (pl.)**—A class or subset that results from stratification.

**Subclass**—A group of properties within a class, smaller than the class, usually (although not necessarily) defined by stratification rather than by sampling.

**Subject Property**—The property being appraised.

**Subjective**—Having the quality of requiring judgment in arriving at an appropriate answer of value of a variable (such as the quality class of a structure).

**Three Approaches to Value**—A convenient way to group the various methods of appraising a property. The cost approach encompasses several methods for estimating replacement cost new of an improvement less depreciation plus land value. The sales comparison approach estimates values by comparison with similar properties for which sales prices are known. The methods included in the income approach are based on the assumption that value equals the present worth of the rights to future income.

**Time-adjusted Sale Price**—The price at which a property sold, adjusted for the effects of price changes reflected in the market between the date of sale and the date of analysis.

**Trending**—Adjusting the values of a variable for the effects of time. Usually used to refer to adjustments of assessments intended to reflect the effects of inflation and deflation and sometimes also, but not necessarily, the effects of changes in the demand for microlocational goods and services.

**Trending Factor**—A figure representing the increase in cost or selling price over a period of time. Trending accounts for the relative difference in the value of a dollar between two periods.

**Uniformity**—The equality of the burden of taxation in the method of assessment.

***Uniform Standards of Professional Appraisal Practice***—Annual publication of the Appraisal Standards Board of The Appraisal Foundation: "These Standards deal with the procedures to be followed in performing an appraisal, appraisal review, or appraisal consulting service and the manner in which an appraisal, appraisal review, or appraisal consulting service is communicated. ... Standard 6 establishes requirements for the development and reporting of mass appraisals of a universe of properties for ad valorem tax purposes or any other intended use" (The Appraisal Foundation, Appraisal Standards Board 2002, Preamble, p. 6).

**Unit of Comparison**—A property as a whole or some smaller measure of the size of the property used in the sales comparison approach to estimate a price per unit.

**Use Class**—(1) A grouping of properties based on their use rather than, for example, their acreage or construction. (2) One of the following classes of property: single-family residential, multifamily residential, agricultural, commercial, industrial, vacant land, and institutional/exempt. (3) Any subclass refinement of the above—for example, townhouse, detached single-family, condominium, house on farm, and so on.

**Use Value**—(1) The value of property in a specific use. (2) Property entirely used for a specific purpose or use that may entitle the property to be assessed at a different level than others in the jurisdiction. Examples of properties that may be assessed at use value under the statutes include agricultural land, timberland, and historical sites.

**USPAP**—See *Uniform Standards of Professional Appraisal Practice.*

**Valuation**—(1) The process of estimating the value—market, investment, insured, or other properly defined value—of a specific parcel or parcels of real estate or of an item or items of personal property as of a given date. (2) The process or business of appraising, of making estimates of the value of something. The value usually required to be estimated is market value.

**Valuation Date**—The specific date as of which assessed values are set for purposes of property taxation. This date may also be known as the "date of finality." See also Assessment Date.

**Valuation Model**—A representation in words or in an equation that explains the relationship between value or estimated sale price and variables representing factors of supply and demand.

**Value**—(1) The relationship between an object desired and a potential owner; the characteristics of scarcity, utility, desirability, and transferability must be present for value to exist. (2) Value may also be described as the present worth of future benefits arising from the ownership of real or personal property. (3) The estimate sought in a valuation. (4) Any number between positive infinity and negative infinity. See also Market Value.

**Variable**—An item of observation that can assume various values, for example, square feet, sales prices, or sales ratios. Variables are commonly described using measures of central tendency and dispersion.

**Verify**—To check the accuracy of something. For example, sales data may be verified by interviewing the purchaser of the property, and data entries may be verified by check digits.

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## Assessment Standards of the International Association of Assessing Officers

JANUARY 2008
*Standard on Mass Appraisal of Real Property*

JULY 2007
*Standard on Ratio Studies*

DECEMBER 2005
*Standard on Valuation of Personal Property*

AUGUST 2004
*Guide to Assessment Administration Standards*

AUGUST 2004
*Standard on Manual Cadastral Maps and Parcel Identifiers*

AUGUST 2004
*Standard on Property Tax Policy*

SEPTEMBER 2003
*Standard on Automated Valuation Models*

JULY 2003
*Standard on Administration of Monitoring and Compliance Responsibilities*

JULY 2003
*Standard on Digital Cadastral Maps and Parcel Identifiers*

JANUARY 2003
*Standard on Facilities, Computers, Equipment, and Supplies*

FEBRUARY 2002
*Standard on Contracting for Assessment Services*

JULY 2001
*Standard on Assessment Appeal*

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*Standard on Public Relations*

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*Standard on Valuation of Property Affected by Environmental Contamination*

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*Standard on Professional Development*

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