

Appraisal of air rights: an introduction

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A SHORT REVIEW OF APPRAISAL THEORY INTRODUCTION

It is important to quickly review the basic principles and concepts of real estate appraisal as they apply to all properties. Thus, when these principles and concepts are mentioned in relation to air rights, the similarities and dissimilarities will become clear. Discussed in this section are the basic principles that appraisers use when valuing real property, and the three approaches used in obtaining value. There is a great deal of interaction among these three approaches, e.g., the cost approach uses a land value established by the direct comparison approach.

Because this paper is directed towards the appraisal of air rights, some areas of appraisal theory will be either skipped over altogether or mentioned only in passing, since they do not relate to the problem at hand.

BASIC PRINCIPLES OF REAL PROPERTY VALUE

Appraising is the valuation of rights to ownership. Some of the most important principles involved are:

1. **Highest and best use:** that use which is most likely to produce a gross net return over a given period of time. The merits of the property, the laws that guide development, and zoning must be considered.
2. **Change:** there will be growth, maturity and decline of all property. The appraiser is not looking at permanency, but at transition. The appraiser must

train himself or herself to read the social and economic forces which are having their effect on the property being appraised.

3. **Supply and demand:** this is one of the most fundamental of all economic laws and it governs the pricing of all goods, including real estate. The following statements will define and explain this law in an oversimplified form:
 - a) The price of a given product tends to be set at the point where supply and demand intersect.
 - b) Supply varies directly with price, demand varies inversely with price, or supply increases as price increases, demand decreases as price increases.
 - c) If supply exceeds demand, prices will tend to fall, and if demand exceeds supply, prices rise.
4. **Balance:** the inter-dependence of one form of life upon another in nature is also indicated in the world of business. Too many businesses of one kind will spoil it for most. A community with a given population can only support a certain number of any type of business.
5. **Diminishing returns:** there is a point in the investment of labour and capital upon unit of land beyond which further investment yields less and less production per unit. In other words, larger and larger amounts of labour or capital will produce a larger and larger net income to a certain point, and beyond that point any additional investments will not produce a return commensurate with the

additional investments. This might be more tritely stated as "too many cooks spoil the broth." More to the point, size may result in value being less than cost.

6. **Substitution:** (this is a fundamental basis of all three approaches to value, and perhaps one of the most important principles of real estate appraisal theory.) The value of property tends to be the cost of acquisition of an equally desirable and valuable substitute property, providing there is not costly delay in making the substitution. This may be:

- a) A replica structure (see cost approach).
- b) A similar structure with equivalent functional utility (replace — see cost and direct comparison approaches).
- c) An investment having an equal degree of investment opportunity (see income approach).

In summary, when property or goods are replaceable, their value tends to be set by the cost of acquiring an equally desirable substitute.

7. **Anticipation:** an appraiser is dealing in "futures."
8. **Utility and scarcity:** there must be a demand for a product, as well as a limited supply, for that item to command a price.

THE COST APPROACH TO VALUE

The basic premise of this approach is that the value of property is the sum of the land value as if vacant; plus the depreciated reproduction cost of improvements. The purpose of this approach is to find the necessary expenditure to duplicate the property under consideration. There are five steps in the cost approach:

1. value land as if vacant;
2. cost of improvement as if new;
3. measuring depreciation;
4. subtracting depreciation from the new replacement value; and
5. add land to the depreciated improvements giving the total value of the subject property.

The cost approach is applied by, first of all, valuing the land by the market approach. Here, vacant land sales are analyzed and adjusted as necessary to indicate a value for the subject. Next, the improvements are valued, normally by the square foot method or by "indexing" (also known as "factoring up"). If the building is not new, depreciation must be applied. Since the application of depreciation is not important

to the valuation of air rights, there will be no further discussion on this subject.

The conclusion arrived by the cost approach is that cost is generally synonymous with value when structures are new, and land is improved to the highest and best use.

The application of some of the appraisal principles inherent in the cost approach can be seen. Most obvious is the principle of substitution, which affirms that when a property is replaceable, its value tends to be set by the cost of acquiring an equally desirable substitute property, assuming no costly or unnecessary delay encountered when making the substitution.

While it is realized that typically no one will pay more for a property than it would cost to create a substitute, a problem in application arises regarding a possible time lag in erecting a substitute building, particularly if the subject is a large commercial or industrial building. This is also applicable when the extra problems of building over air rights are considered. It is, therefore, indicated that the estimated cost of the subject building as though new, should include all hidden and indirect costs; including interest on money, taxes, and insurance during construction.

Moreover, it is emphasized that cost and value are not necessarily synonymous. Cost is defined as the amount of money necessary to produce a commodity, whereas value is thought of

as a relationship between a thing desired and a potential purchase, i.e., the market. In situations such as just cited, any difference between the cost of a new building and its value (if less than cost) is depreciation.

DIRECT COMPARISON APPROACH

The direct comparison approach is the most common approach to value and may be applied to estimate value by comparison, or as an adjunct to the cost and income approaches. The basic premise of this approach is that the value of the property is the price; (a) paid for comparable properties recently sold; (b) to acquire comparable properties (listings); and (c) latest cost of acquiring an equally desirable substitute property. (principle of substitution). The process of this approach is to:

- a) determine comparable properties recently sold and to adjust differences to establish comparability;
- b) determine comparable properties available for



Granville Square, looking east.

purchase and adjust to establish the comparability; and

- c) compare the units of value, i.e., consider square foot, per acre, or net income figures.

Important conclusions derived by the market approach are that:

- a) the principle of substitution is the best practical test of value;
- b) data utilized must be verified; and
- c) Comparability must exist, be compensated for, and properly analyzed.

The major weakness of this approach is the difficulty (if not impossibility) of finding market transactions of properties that can logically be compared to the subject. This is especially true of air rights appraisal, where there is a significant problem in finding vacant land sales, let alone sales of air rights parcels.

INCOME APPROACH TO VALUE

This is probably the most important concept regarding air rights for properties to be analyzed for economic value. The basic premise of this approach is that value of a property is the value of the future net income discounted for present worth plus reversionary value of property.

Some considerations of income and value are that income may be considered terminable. However, for simple valuations the income may be considered perpetual, which leads to a straight line capitalization and depreciation.

Income can be considered value only when coupled with a capitalization rate. In this case, and using the appropriate technique, the value of the property becomes dependent on the quality and duration of income.

The process of this approach is to:

- a) estimate gross income;
- b) estimate future expenses;
- c) subtract expenses from gross income to determine probable future net income; and
- d) estimate probable duration of net income and size of capitalization rate.

From the application of this income approach to value, it can be concluded that the present value of an

income is the present value of a property which is owned for purposes of producing an income, and the connecting link between income and value is the capitalization rate.

The income approach or capitalization method of valuation is the approach whereby the estimated rental value of property is capitalized at an appropriate rate in order to arrive at the capital value. The capital value is the price which it is expected that property would realize if offered for sale in the open market and under normal conditions.

Perhaps this section could be summarized with the use of formulas.

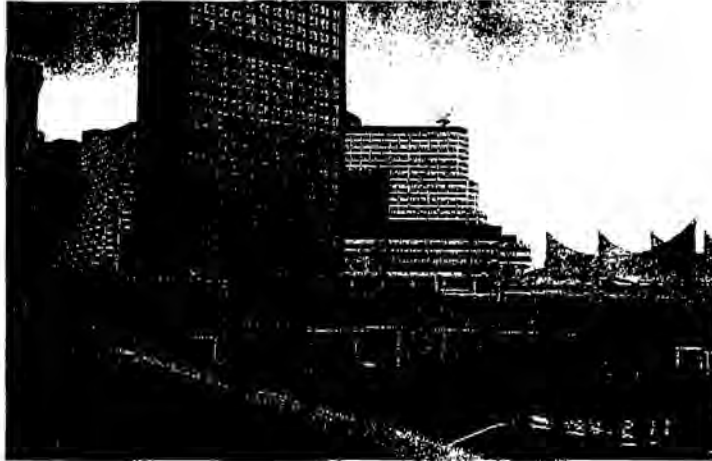
Assume that $v=i/r$; or value equals income divided by the rate. For example, if the income per year is \$10.00 and the rate of interest is 10 per cent, then the value must be \$100.00. If interest rates rise to 15 per cent, and income remains constant, then $v=\$10/0.15$; or \$66.67.

Some interesting applications of the income approach are generally known as residual techniques. Two of these are known techniques. These are not important in valuing air rights and will not be discussed here. Third

and last is the land residual technique. This can be applied to air rights and will, indeed, be shown to be a most important procedure to be used in valuing air rights. The basic outline of the process is as follows:

- a) the improvements are valued independently of the land;
- b) the fair annual net return on the building value — interest and depreciation — is deducted from the estimated net annual income of the property; and
- c) the residual amount is attributable to land.

It follows that the improvements should be new or fairly new and upon which depreciation can be estimated with some degree of accuracy — otherwise, use a hypothetical new and proper improvement. According to *The Appraisal of Real Estate*, published by the APPRAISAL INSTITUTE OF CANADA (AIC), this approach is most helpful in the appraisal of vacant lots where there are few or no comparable (pages 466-467). The same publication goes on to indicate that the negative items of this approach are fraught with danger, because relatively small variances in income estimation are magnified in the land value estimate.



Looking north, the view is impeded by the seabus skywalk. The track disappears under the platform.

APPRAISAL THEORY — AIR RIGHTS

Definition

Air space — The cubic volume of space above the earth's surface. (A physical concept).

Air rights — The ownership of rights to air space. (A legal concept).

Air rights over railways — a) The air lot above a specified horizontal plane. b) The three-dimensional column lots and caisson lots needed to contain the supports for the structure occupying air space (normally called "ground rights").

Special characteristics

As compared to the appraisal of a conventional piece of land, there are special characteristics of air rights appraisal.

First, this can be considered a residual process. The valuation begins after the complete interest in the specific parcel of land has been valued. The value of the air rights is the value remaining after deductions for extra costs and capitalized economic loss because of design.

It can also be considered a comparative approach. The appraiser will compare an adequate and well designed building constructed on the air rights parcel to a conventional building.

The value of air rights must have utility. In other words, the highest and best use must permit a profitable improvement. That is to say, the final structure must generate an income to the building with something left over for the land.

When valuing air rights, one must be aware of the extra or exceptional costs. These will include access for streets, sewer, water mains, etc.

Required data

Data required for an air rights appraisal is as follows:

1. The value of the fee simple interest — analyze current sales of land with similar utility.

The best indications of value of the complete fee interest in the land are current sales prices of comparable land. Unfortunately, several sales of reasonably direct comparables are not usually available. Appropriate adjustments must be made for varying degrees of difference between the subject land and sold land; access, location, view, etc.

2. Costs of services compared with a conventional lot. An accurate estimate of relative cost to construct elevated streets, viaducts, sanitary and storm sewers and similar improvements as compared to the cost of ground level facilities is difficult to make, and it is usually beyond the orbit of even seasoned appraisers. Ordinarily, the appraiser should be provided with the construction cost engineer's estimate of such relative cost. The cost can vary widely, depending on the lay of the streets, the heights above grade, the kind, type, and size of utilities being

installed, and the quantity scheduled for installation.

Next, the appraiser must consider the cost of the building compared with a similar conventional building.

First, there are some major savings in the case of air rights. These include cost of basement excavation, basement walls and footings, basement heating, electrical and plumbing. Some of the added cost would include additional columns, beams and girders required to support the elevated structure; installation of a bottom structural slab as compared with a bottom slab on ground in the conventional building; added sewage plumbing costs, and cost of smoke disposal.

Further, there will be a difference in the earning capacity of the completed project vis-a-vis a conventional building. First, there is a loss in rental of the basement space. In an average multi-storey building, above 75 per cent of the gross basement floor area is usable for utility spaces and tenant occupancy. The balance of the gross basement area is used for foundation walls, partitions, column bases, stairwells, elevator pits and corridors. An amount equal to about 20 per cent of gross area of the basement is ordinarily devoted to utility spaces, such as boiler rooms, pump rooms, electric switchboard rooms, building work and storage spaces. The balance, or about 50 per cent of the gross basement, is usually rentable.

In an air rights structure, an amount of upper floor rental area equal to about 20 per cent of the usual gross basement area is also lost since this upper floor area must house the utility spaces usually located in the basement. These losses in basement and upper floor rental spacing in the air rights building result in loss of gross income. However, the operating expenses of the air rights



The SLRT (skytrain) is on the left while the station is at ground level.

building, to be deducted from gross income, should be somewhat less than that of a conventional building because of the loss in rental area.

The economic loss relating to the above problems can be capitalized at an appropriate interest rate to determine its present negative economic worth.

Approaches to value

One method of valuing air rights is the extraction approach, a derivation of the direct comparison approach, which may be outlined as follows:

1. Determine the highest and best use of the air space parcel.
2. Estimate the market value of the fee simple interest in the underlying land by the usual comparison processes of land appraisal as if the land were clear and vacant.
3. Obtain an estimate of the excess cost of utilities and of construction in the air rights building, as compared with a conventional building.
4. Compare earning capacity of the air rights building with that of the conventional building and estimate the economic loss in the air rights building.
5. Capitalize the economic loss at an appropriate rate.
6. Deduct the excess cost of utilities and construction and capitalize economic loss from the value of the fee interest.
7. The remainder is the estimated market value of the air rights.

Second, the appraiser may wish to use the direct comparison approach directly. This exercise means simply comparing the subject with sales of other air rights properties.

Third, the appraiser may use a residual technique, which is part of the income approach. This is very similar to that outlined in basic appraisal theory, and is simply a case of using what is called the "land residual" technique. In this case, the steps are as follows:

1. Impute gross income.
2. Deduct operating costs.
3. Deduct an allowance for depreciation on the building.
4. Deduct a return for the building.
5. The residual income may be capitalized into the value of the air space parcel.

EXAMPLES OF AIR RIGHTS APPRAISALS

The following pages indicate the two most appropriate appraisal techniques recommended for use in air rights appraisal.

The first example closely follows what was then called the "residual" technique where no building is in existence. The figures indicate the method used by the assessor to establish a value for assessment purposes.

The second example shows how a value might be established on a property with a relatively new building deemed to be the highest and best use of the property. This example has been simplified so that the important steps of the process are shown.

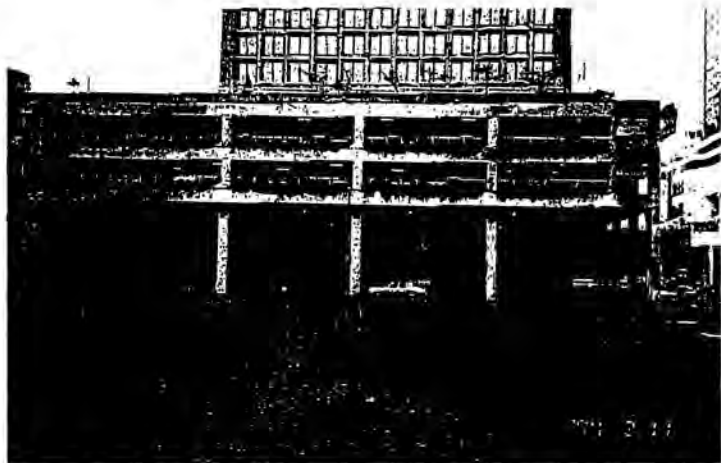
The Extraction (Residual) Approach

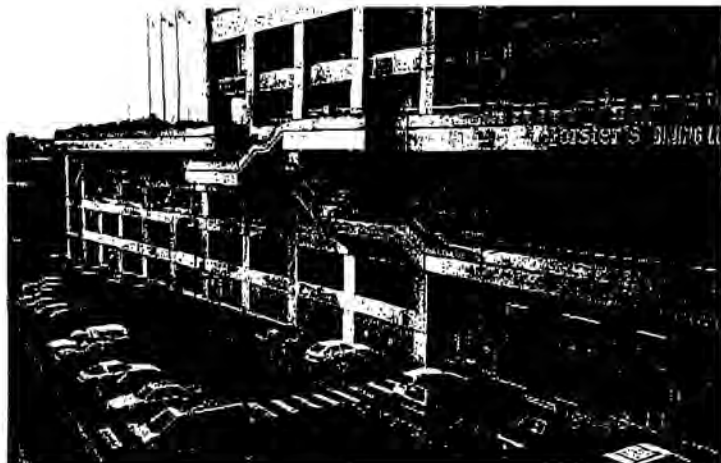
The assessor, in arriving at his or her assessed land value for the 4.184 acres of air rights, has used the conventional approach to air rights appraisal.

The method is as follows:

1. Ignore the air rights characteristics of the parcel and appraise it as if it were a normal piece of development land.
In doing this, the appraiser hypothesises that the platform which will exist is land for the purpose of his or her market comparison.
2. Once the hypothetical land value has been established, the appraiser then deducts those costs necessary to physically achieve a platform at this level. These costs include the following:
 - a) Additional construction costs to bridge the tracks. (Create a platform or new ground level.)
 - b) Additional costs through inflexibility of locating columns, etc.

Looking west, note the tracks, baselands, support columns, platform, and building.





The north elevation of Granville Square depicts the loading dock and support columns (baselands).

- c) Additional costs due to the presence of structural elements in non-rentable areas between platform and ground level.
 - d) Additional protective costs due to the continued use of the land beneath the platform for incompatible purposes.
 - e) Additional costs in the relocation of the facilities beneath the platform.
 - f) Additional professional costs.
3. Any savings which may be realized by developing in this manner, as opposed to developing a normal piece of land, are then added.

The resultant value is a value for the air rights portion of the parcel of land at and above a specified horizontal plane.

However, as the structural elements have been physically constructed on this particular site, so the assessor has added them back into his or her valuation for land purposes and not for improvement valuation purposes.

Cost details of existing platform

1. Excess cost of construction	
Decking over tracks	\$ 893,000
Sprinkler system	85,000
Smoke disposal system	55,000
Street approach (Cordova)	150,000
Relocation of railway facilities	428,000
Additional costs for caissons	100,000
	\$1,711,000
2. Cost saved (no basement)	
Excavation 810,000 cubic feet @ 6¢	\$ 48,600
Walls 1,000 linear feet @ \$66.00 per foot	66,000
Stairs and partitions	15,000
Elevators	24,000
Heating, plumbing and electrical	10,000
	\$163,600
3. Economic loss (no basement area)	
Loss per building	\$391,250

As each cost or portion has been extended, the amount extended has been further reported.

Thus, in reporting to the assessor, the following expenditures were reported:

1. Decking over tracks	\$ 893,000
2. Sprinkler system (50 per cent complete)	42,500
3. Smoke disposal (50 per cent complete)	227,500
4. Relocation of railway facilities	178,000
5. Caissons	100,000
	\$1,441,000
Total expenditure in place	\$1,441,000
Total structural expenditure (excluding Item 4)	\$1,283,000

This leaves a balance of expenditure as follows:

Sprinkler system (50 per cent)	\$42,500
Smoke disposal system (50 per cent)	27,500
Relocation costs	250,000
Street approach (Cordova)	150,000
	\$470,000

The assessment is computed as follows:

Comparative hypothetical land value	\$4,590,656
Deduct structural cost not yet completed	
Sprinkler system	\$42,500
Smoke system	27,500
Street approach (Cordova)	150,000
	\$220,000
Deduct relocation costs not yet completed	250,000
Deduct economic losses	
Two towers each @ 391,250	782,500
Deduct further costs to extend platform for tower number 2 (18,066 sq. ft. @ \$15.00)	271,000
Total deductions	\$1,523,500
Add costs saved	163,600
	\$1,359,900
Total deductions made by assessor	\$1,359,900
Residual	\$3,230,756



Looking east, note the extension of the platform for newer buildings, also on air rights.

The total area of the site is 180,077 square feet.

The residual value per square foot is therefore \$17.94.

This is rounded to \$18.00 and applied to the site area giving an assessed value of \$3,241,386.00

2. Example of income approach — air rights

385,000 sq. ft. GLA @ \$8.00 =	\$ 3,080,000.00	GI
Less: 5% vacancy & collection =	2,926,000.00	EGI
Less non-recoverable expenses: (rounded to)	668,455.00	Exp.
	<u>2,257,545.00</u>	Ni
cap. @ 8% (from direct comparison)	<u>28,219,320.00</u>	Mkt V
Less: bldg. value cost (including additional):	<u>25,000,000.00</u>	Bldg V
Therefore "land" value	<u>3,219,320.00</u>	Land V
Less: "base lands" 1 acre @ \$3.00 per sq. ft.	<u>130,680.00</u>	
Therefore, air rights equal	<u>\$3,088,640.00</u>	Air Rights V

SUMMARY OF AIR RIGHTS APPRAISAL

1. Air rights are a unit of real property, comprising part of the fee simple rights in land.
2. Air rights relating to railroad land include the air lot above the surface, and the column lots, or ground rights.
3. Air rights are usually sold, if permitted, otherwise they are leased.
4. An air rights appraisal is a residual process. Value of the air rights is the value after deductions of

excess costs of utilities and excess cost of construction.

5. The guide to market value of air rights is their degree of utility. As in any appraisal, utility may consist of profitable economic improvement, or satisfaction or a social or public need for the site.
6. The first step in an air rights appraisal is a determination of the highest and best use of the land and the air rights. Unless such is of high degree, such as skyscraper use, the air rights may have little or no value.
7. Data to be gathered and analyzed by the air rights appraiser include:
 - a) current sales prices of comparable lands;
 - b) costs of utilities for and costs of construction of the air rights improvement, as compared with a conventional building; and
 - c) earnings capacity of the air rights improvement as compared with a conventional building.
8. Residual methods are generally the chief approaches to value of air rights. A comparison or market approach and an income approach may also be employed. In the case of vacant land or railroad trackage land, the income approach is sometimes known as the hypothetical best building approach.

Bibliography

- Nelson, R.L. Appraisal of Air Rights, *The Appraisal Journal*, pub. AIREA, October 1955, pp. 509-515.
- Leyden, R.J., Appraisal of Air Rights. *Encyclopedia of Real Estate Appraising*: E.J. Fredman, ed., Prentice Hall Inc., Englewood Cliffs, N.J.
- Williams, L.E. and McNichol, D.J., Valuation of Air Space, *The Appraisal Journal*, pub. AIREA, April 1973, pp. 234-253.