JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

V. INDUSTRY SEMINARS AND SPEECHES - SHORT TERM

A. Appraisal Organizations

6. 1974

f. "Advanced Appraisal Practice Seminar", SREA, Tampa, FL, June 10, 1974

Index

ADVANCED APPRAISAL PRACTICE SEMINAR
Sponsored by Society of Real Estate Appraisers - Chapter #89
The Airport Holiday Inn, Tampa, Florida
Monday, June 10, 1974

Instructor: Professor James A. Graaskamp
University of Wisconsin School of Business

MORNING SESSION

8:00 - 9:00 Registration

9:00 - 10:30 Basic Appraisal Premises Under Review

A. The Concept of Fair Market Value
B. The Concept of Highest and Best Use
C. The Concept of Point Rather than Range Estimating
D. An Alternative - Most Probable Sales Price

10:30-10:45 COFFEE BREAK

10:45-12:00 The New Discipline of Most Profitable Use Studies

A. The Basic Limitations: Suitability, Capacity, Compatibility and Economic Impact
B. The Explosion in Data Services
   1. Census Data
   2. Aerial Mapping Data
   3. Planning District Data
C. Appraisal Function: Interpretation of Economic Consequences of Suitability, Capacity, and Compatibility
D. Evaluation of Land as a Development Residual (a demonstration)

12:00-1:00 LUNCH

1:00-2:30 Two Demonstrations of Most Probable Price Appraisal

A. Market Comparison Appraisal of Single Family Homes Weighted for Buyer Preference (a demonstration)
B. Market Comparison Appraisal of Vacant Land Using Linear Regression

2:30-2:45 REFRESHMENT BREAK

2:45-4:30 Appraisal Assumptions and New Government Regulations on Land Use and Structures

A. The Mortgage Loan Ratio
B. FHA Environmental Impact Criteria for Suitability
C. The Federal Flood Disaster Protection Act
D. The Office of Interstate Land Sales Regulation
E. The Securities and Exchange Commission and Market Value

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I. The fundamental premise on which this seminar is built is that the United States is in a decade of transition from a viewpoint of land as a commodity to a belief that land is a public utility, or perhaps ultimately an exhaustable public resource which must be rationed among competitive uses, primarily by non-price methods.

A. The Rockefeller Land Use Commission noted a growing public concenus that land use was central to both environmental balance and social equity and therefore subject to public control first and private development second.

B. In Wisconsin the State Supreme Court in Just vs. Marinette ruled that the owner of a lake lot has no right to develop land which in its natural state is a marsh served an important function as a filter and wild life edge for the general area. The family had enjoyed camping on the tract many years prior to applying for a permit to build a cottage and the judge ruled that it served adequately as recreational property without a cottage. Said State Supreme Court Chief Justice Hallows, "The changing of wetlands and swamps to the damage of the general public by upsetting the natural environment and the natural relationship is not a reasonable use of the land which is protected from plice regulation. . .
. . . nothing this court has said or held in prior cases indicates that destroying the natural character of a swamp or a wetland so as to make that location available for human habitation is a reasonable use of that land when the new use, although of a more economical value to the owner, causes a harm to the general public.
. . . While loss of value is to be considered in determining whether a restriction is a constructive taking, value based upon changing character of the land at the expense of harm to public rights is not an essential factor or controlling.
The Land belongs to the people. . .a little of it to those dead. . . some to those living. . . but most of it belongs to those yet to be born. . ." 56 Wis 2d 7

C. Here in Tampa-St. Petersburg and in Florida, each day is spawning a new land use control law or court case which clarifies or voids existing regulations with the result that it is virtually impossible to predict the immediate future uses of most vacant sites or tracts. Nevertheless appraisal is primarily concerned with the future productivity of a property and the expectations of buyers and sellers in the market place.

D. The law has always defined private property as those rights which are not exercised by the public which has:
   1. First claim on productivity - the real estate tax
   2. First prerogatives on determining use - the police power
   3. Recovery of retrenched private prerogative - eminent domain

E. There is no real clear law today as to when the exercise of a police power clearly represents the taking of a private right.
   1. How does the appraiser define the rights to be appraised and at what point can his limiting conditions relative to public regulation invalidate the utility value of his appraisal?
   2. As a professional what obligation does he have to his client to point out local land use regulation trends which may adversely affect the property to be valued?
   3. At what point must comparables be screened for their vunerability to public control, down zoning, or suitabilities.

F. Urban land economics is moving toward significant re-definition with immediate and long-term implications for real estate appraisal format and techniques.

G. Real estate is a dynamic space-time interface of land (public resource), people (cultural preference) and artifacts (improvements). These forces can be reduced to specific decision makers - a consumer, a producer, and a political agency. The planner is an arbitrator.

H. Each of the three decision makers represents an enterprise. An enterprise is an organized undertaking and some enterprises are cash cycle enterprises constrained by a need for solvency, short term and long term.
   1. The interface occurs where the consumer, producer, and governmental cash cycle each achieve solvency.
   2. The business of real estate is the process of converting space-time to money-time.
   3. The business of real estate is a service industry using manufactured products to create profit opportunities for services.

I. The essence of Real Estate is potential for cubage to house an activity - an idea whose time has come. Planners and lawyers throughout the country are talking about transferable development rights as a means for:
   1. Compensation of owners of landmarks or open space for loss of development potential.
   2. Leveling of windfalls and wipeouts created by density planning
   3. Re-allocation of real estate taxes among land owners
   4. Re-allocation of economic benefits of development between and among governments within a region. See: Space Adrift by John J. Costonis, University of Illinois Press, 1974 and "Transfer of Development Rights: A New Concept in Land Use Management" by B. Budd Chavooshian and Thomas Norman, Esq., University of Florida Land Use Center, Gainesville, Florida.

J. Today we are going to start slow on some basic appraisal problems but it is important to remember that at a time of accelerating innovation relative to decisions about land, totally new concepts are being introduced which appraisal conepts must accomodate.

II. The appraisal framework is a decision model which must consider so many variables that the model will only lead to a firm, single-number conclusion if a large number of implicit assumptions about behavior are accepted.

A. Assuming you can define the property and the property rights to be appraised, an appraisal begins with a statement of purpose, to wit: "The purpose of this appraisal is to determine fair market value."
   1. Note the appraiser has re-defined the problem to answer his own question rather than to contribute to the criteria with which somebody else may make a decision. Only in court cases and real estate tax law can we find more explicit instructions as to the benchmarks to be provided by appraisal.
   2. Purpose is a critical issue - is it your function to predict most probable sales price even if the market depends on dummies and doctors?
   3. If clients were educated, could purpose be more explicit such as liquidating value of a property presently incomplete or subject to marketing obselence for loan collateral?

B. Definition of Market Value. Society of Real Estate Appraisers: "The price which a property will bring in a competitive market under all conditions requisite to a fair sale, which would result from negotiations between a buyer and a seller, each acting prudently, with knowledge, and without undue stimulus." (SREA, Real Estate Appraisal Principles and Terminology [Chicago, The Author, 1960]. p. 85).
   1. Competitive market conditions
   2. An informed buyer and seller
   3. No undue pressure on either party
   4. "Rational" or prudent economic behavior by both buyer and seller
   5. A reasonable turnover period
   6. Payment consistent with the standards of behavior of the market
   7. Market Value looks at the transaction from the point of view of the buyer

C. The increasing detail of public control means "windfall or wipeout" for the owner of real estate. Properties pre-dating and non-conforming to certain regulations enjoy a monopoly value while vacant lands may no longer have acceptable development uses. To identify highest and best use for a subject property the appraiser must range through a process of the thought process of a <u>rational and informed</u> decision maker - the viewpoint of the buyer:
   1. Legal use
   2. Physically possible uses (static attributes of size, shape, soils, water table etc.)
   3. Appropriate use (in terms of dynamic attributes of linkages, utilities, access etc.)
   4. Financially justified use

D. Of the remaining alternatives which are legally permissable, physically possible, suitably located, and profitable, the best or most profitable use is that one which is expected to generate the highest rate of net return over a given forecast period as of the date of the appraisal.

E. There are two readings which should be basic to the appraiser expecting to testify on highest and best use:
   1. "Highest and Best Use," William Crouch, The Appraisal Journal, April 1966, pp. 166-176.
   2. "Highest and Best Use - Fact or Fancy," Paul Wendt, The Appraisal Journal, April 1972, pp. 165-174.

F. Professor Wendt makes the case very well that the opinion of highest and best use must consider so many variables that the conclusions must vary just as judgements and analytical skill must vary.

G. Eventually appraisal analysis to determine market value within these rigidly defined concepts arrives at a single number or "point" value. Since all of the implied conditions rarely are true in an imperfect market or during the period of rapid public and market changes of policy and preference, value is seldom priced.
   1. To hedge the appraisal conclusion with a variety of limiting conditions at a time when the variables for consideration are increasing, is to produce a value conclusion that is almost fictious.
   2. Since the concept of limiting conditions must be used sparingly less the appraiser support consitency rather than accuracy, better methods must be found to introduce some tolerance for the conditions of uncertainty which surround the appraisal estimate.

III. To provide better services for customers and a stronger theoretical base for your conclusions, it would be useful to change the outline of the appraisal along the following lines. These ideas are gently and diplomatically introduced in your basic 201 text - INCOME PROPERTY VALUATION by William Kinnard and can be used legitimately by the appraiser.

A. The function of the appraisal report should be defined to better reflect the client's purposes in seeking an appraisal.
   1. For the courts and the assessor, the statement of function leads to the definition of value as the traditional market value.
   2. A report for a would-be buyer or lender leads to the definition of value as investment market value.
   3. For most other cases the appraiser would seek to determine the most probable selling price.

B. Investment market value is a term coined by Mack Hodges for the present value of future income receipts, considering a specific set of assumptions about the after-tax cash flow of property and requires some general description of the investment standards and tax status of buyers interested in a specific type of property, specifically income-investment property.

C. The broader concept, which still depends on careful identification of the property buyer, is most probable selling price (Vp). It provides a point conclusion as the central tendency (mode, mean, or median) around which sale prices are likely to occur. In addition, it

generally supplies the range within which the majority of alternative prices will occur, similar to but not necessarily a statistical standard error concept.

1. The appraisal report begins with a description of the legal rights and then the physical property to be sold.
2. From this it determines the most probable use.
3. The most probable use leads to a prediction of the most probable buyer-type but it need not be a whole class of buyers. It could be the owner next door or a particular fast-food franchise, or a particular investor in the area with a strong preference for the property type involved. It may not be necessary to explore all alternative uses or even presume that the buyer is fully informed. Dummies may make up the market.
4. Identification of the most probable user should lead to a selection of comparables of simulation of how the investor makes his decision.

D. Most probable selling price is derivative of Professor Ratcliff's work and his terminology that has come into considerable acceptance in doing appraisal work for buyers and sellers. Not only is it acceptable, but it eliminates the need of a whole host of flat assertions or greatly detailed limiting conditions. It leads to a greatly improved appraisal outline.

E. Following the coffee break we wish to explore the discipline of most probable and profitable use analysis of land in keeping with our original objective to suggest appraisal methods consistent with changing public control of land use. This afternoon we will explore implications for appraisal of inference about the behavior of most probable buyers.

IV. Suggested Outline for Appraisal Report Leading to Estimate of Most Probable Selling Price

A. Statement of purpose of appraisal for the client

B. Statement of appraisal method or value definition appropriate to client

C. Definition and description of the legal interest to be appraised

D. Productivity analysis of subject property
   1. Physical (static) site attributes
   2. Locational (dynamic) site attributes
   3. Physical attributes and condition of improvements
   4. Current uses and tenancies
   5. Legal-political constraints on use
   6. Possible market or merchandising opportunities or alternatives

E. Determination of most probable use

F. Description of most probable buyer
   1. Possibility for inference of buyer behavior
   2. Possibility for simulation of buyer behavior (any appraisal method is legitimate if it forecasts probable price).

G. Analysis of historical comparables to predict most probable range of offering prices.

H. Analysis of inferential simulation of buyer calculus to determine range of offering prices.

I. Description of external economic conditions or other factors affecting buyer behavior.
   1. Local market conditions
   2. Real estate finance terms available
   3. Investor morale and self confidence
   4. Other relevant external influences

J. Analytical application of external conditions to prices determined from historical inference or investment simulation.

K. Conclusion indicating probable price and range of alternative outcomes as of a given forecast date.

L. Certification of objectivity

M. Statement of limiting conditions
   1. Forecasting under conditions of uncertainty about the future
   2. Contributions or responsibilities to other professionals
   3. Instructions or assumptions provided by the client

V. The basic elements to vacant land profitability analysis have to do with the definition of those old elements of highest and best use, legal, possible, appropriate, and economic recast into the jargon of the 1970's - SUITABILITY, CAPACITY, COMPATIBILITY, and ECONOMIC IMPACT.

A. Louie Carter has a song about things that seem the same but are really not - like a place with birds and bees and grass and trees which to some is just a vacant lot. There is no such thing today as raw land (exception: Bong) or a vacant lot.

B. There has been a revolution in the supply of information about sites. This in turn has drastically altered the ability of the public to police land use within the concept of due process of law and within an acceptable cost benefit ratio.
   1. The appraiser must have an adequate map of the static attributes or physical facts of the site to determine suitability for use and begin to measure capacity.
   2. A basic list of data types and cheap sources of information is provided in Exhibit A and C.
   3. The appraiser will soon discover that land appraisal assignments may often require the skills of a professional land planner to organize and present all the free data in a comprehensible form.
   4. Keep in mind the appraisal function is to interpret the economic (sales price) consequences of suitability, capacity, and compatability.

C. Space technology will have more immediate impact on the use of the surface of this earth than it will have for a long time on the surface of the moon. Space research and military intelligence have developed some incredible new information gathering devices in the form of aerial surveillance.
   1. High and low survey photography coordinated with 1/4 1/4 section markers and planning departments can now overlay building permits and other data tied to tax code numbers. (Example DU counts and growth potential for shopping center or bank site).

EXHIBIT "A"

INTRODUCTION

This data list is not to be viewed as a final or all inclusive list of needed environmental factors but rather a general framework through which we can work with the County's representatives in identifying the necessary factors needed to assist them in their decision making.

SUGGESTED ENVIRONMENTAL FACTORS AND POSSIBLE DATA SOURCES

A. PHYSICAL CHARACTERISTICS

1. EARTH

*a. Mineral resource [Geological studies/U.S.G.S.]
*b. Construction material [Geological studies/U.S.G.S.]
*c. Landform [Geological studies/U.S.G.S.]
*d. Unique physical features [Geological studies/U.S.G.S.]
*e. Soil [Form 1972 Soil Survey]
1. Depth to bedrock
2. Depth to seasonal high water table
3. Unified class
4. AASHO class
5. Liquid limit
6. Plastic limit
7. Permeability
8. Available water capacity
9. Reaction-ph.
10. Salinity
11. Shrink-swell
13. Suitability-topsoil
14. Suitability-sand and gravel
15. Suitability-road fill
16. Hydrologic soil group
17. Suitability-road location
18. Water retention-embankment

19. Water retention-reservoir area
20. Agricultural drainage
21. Irrigation
22. Limitation-septic tank
23. Agricultural capability unit

f. Topography
*1. % slope-average predominant type [U.S.G.S.]
*2. Centroid elevation [U.S.G.S.]
*3. Orientation [U.S.G.S.]

2. WATER

*a. Surface
*1. Lakes or pond [U.S.G.S./Infra Red Photo]
*2. Rivers [U.S.G.S./Infra Red Photo]
*3. Stream [U.S.G.S./Infra Red Photo]
*4. Intermittent stream [U.S.G.S.]

b. Underground
*1. Ground water levels at wells [Hydrologic data]
*2. Recharge areas [Geological studies]

3. PROCESSES
*a. Floods
1. 10 year [Infra Red or Color Photo]
2. 25 year [Infra Red or Color Photo]
3. 50 year [Infra Red or Color Photo]
4. 100 year [Infra Red or Color Photo]

*b. Stability
Slides and slumps [Geological studies/Soil Map/Photo]

*c. Stress-strain
Earthquake [Geological studies/Photo's]

*d. Air movements [Climatological Data]

B. BIOLOGICAL CONDITIONS

1. FLORA
*a. Dominant type [Infra Red Photo]
1. Trees
2. Shrubs
3. Grass
4. Crops
5. Swamp
*b. Endangered species [State/County Studies]

1. Tree
2. Shrub
3. Grass
4. Other

2. Fauna
*Endangered species [State/County Studies]

C. CULTURAL FACTORS

*1. LAND USE- Dominant type [Infra Red Photo's]

a. Wilderness
b. Wetland
c. Forest
d. Grazing
e. Agriculture
f. Residential
g. Commercial
h. Industrial
i. Mining and quarrying/wells

*2. RECREATION [State/County/Infra Red Photo]

a. Hunting
b. Fishing
c. Boating
d. Swimming
e. Camping and hiking
f. Picnicking
g. Golfing
h. Tennis
i. Other

*3. AESTHETICS AND HUMAN INTEREST [State Studies/Infra Red Photo]

a. Scenic views and vistas
b. Wilderness qualities
c. Landscape design
e. Unique physical features
f. Parks and reserves
g. Monuments
*h. Rare and unique species or ecos./stems [State/Infra Red Photo]
*i. Historical or archaeological sites and objects [State Studies/Infra Red Photo]

4. CULTURAL STATUS
*a. Cultural patterns (life Style) [State/ Photo's]

*b.	Population density	[Photo's]

5. MAN-MADE FACILITIES

*a.	Transportation network	[U.S.G.S./Photo's]
*b.	Utility network	[County/Photo's]
*c.	Waste disposal	[County/Photo's]

6. POLITICAL BOUNDARIES

*a.	Zoning	[County]
*b.	Special assessment districts	[County]
*c.	Sewage district	[County]
*d.	City boundaries	[County]
*e.	School district High, Junior, Elementary	[County]

Exhibit B

INTRODUCTION

Appraisers and real estate counselors are expected to consider a great array of information when reviewing land in its present and projected uses. In attempting to respond to these reviews or assistments these persons must begin to search out and exploit to the fullest all sources of accurate and relevant information.

A variety of government agencies are expanding the number of free and low cost sources of information. This information is available to the citizen, providing he knows how and from where to request the information.

The following list of sources is organized by agency and type of information or data index available from each agency.

I. The United States Geological Survey

Address: Map Information Office
U.S. Geological Survey
Washington, D.C. 20242

Phone: 202/343-2446

A. Topographic Map

A topographic map is a graphic representation of selected manmade and natural features. It is a record in convenient readable form of the physical characteristics of the terrain as determined by precise engineering surveys and measurements. The distinguishing characteristic of a topographic map is that through the use of a contour symbol it portrays the shape and elevation of the landscape. To understand the contour symbol, think of it as an imaginary line on the ground which takes any shape necessary to maintain a constant elevation above sea level.

The colors in which symbols are printed indicate the general classes of map features they represent. Symbols for water features are printed in blue; manmade objects (roads, railroads, buildings, transmission lines, and many others) are shown in black; and green is used to distinguish wooded areas from clearings. The contours which portray the shape and elevation of the land surface are printed in brown.

On recent maps, solid red is used to represent or emphasize certain cultural features, such as the more important roads, fence lines, and the boundary lines of townships, ranges, sections, and land growth in states subdivided by public land surveys.

A booklet describing topographic maps and symbols is available free upon request from the Map Information Office of the U.S. Geological Survey.

B. Status Index Maps

Maps showing the status of various phases of mapping and areas covered by aerial photography in the United States are available free on request. There are three types of status index maps all printed at the same scale. Scale, 1:5,000,000 (1 inch = about 80 miles); Size, 27 x 41 inches.

1. Topographic Mapping--Status and Progress of Operations (7-1/2 and 15 minute series).

   Shows the status of topographic mapping and progress of operations in the United States by the Geological Survey and other federal agencies. General appraisal of the adequacy of these maps is indicated by color patterns. Published semi-annually.

2. Status of Aerial Photography.

   Shows the areas that have been photographed and agencies holding the film. Aerial photographic coverage is shown only if reproductions are available for purchase.

3. Status of Aerial Mosaics.

   Shows areas in the United States for which mosaics or photomaps have been prepared from aerial photographs, scale of negatives, dates of photography, and sources from which copies may be obtained.

C. State Index Maps

Shows published topographic maps in each state, Puerto Rico, and the Virgin Islands. Available free on request

from U.S. Geological Survey, Washington, D.C. 20242, or Federal Center, Denver, Colorado 80225. These indexes contain lists of special maps, addresses of local map reference libraries, local map dealers, and federal map distribution centers. An order blank and detailed instructions for ordering maps are also supplied with each index.

D. Geological Survey Photography

Probably one of the greatest sources of exploitable information is the aerial photograph. Advances in the development of new films and cameras has brought to the decision-maker a totally new dimension in area analysis. Available today is not only the customary black and white photography taken from 5,500 to 24,000 feet above the ground, but also color and color infrared photographs, many taken from an elevation as high as 65,000 feet above the ground.

1. Aerial Photographic Reproductions

The Map Information Office, U.S. Geological Survey, maintains records of aerial photographic coverage of the United States and outlying areas, based on reports from federal and state agencies and commercial companies. From these records, the Map Information Office furnishes data to prospective purchasers on the available photography and the agency or firm holding the aerial film.

Geological Survey vertical aerial photography is obtained primarily for topographic and geologic mapping. Reproductions from this photography are usually satisfactory for general use. Because reproductions are not stocked, but are custom processed for each order, they cannot be returned for credit or refund.

2. Print Sizes

Contact prints are the same size as aerial negatives, approximately 9 x 9 inches. Prints are available with stereoscopic overlap or without such overlap (pictorial coverage). Photographs with stereoscopic overlap, when viewed with a stereoscope, will permit the observer to obtain a mental impression of the three dimensional shape of the

landscape. Stereoscopic coverage requires about twice as many prints as pictorial photography. Orders for photographs or requests for information should specify which type is needed.

Enlargements to an exact ratio or to a specific scale are available. If ratio factors are not furnished by the purchaser, enlargements will be processed to ratios derived from lens focal lengths and flight heights specified in the photographic contract or reported by the contractor.

Prints are processed only from whole negatives; prints of selected parts of negatives are not available.

Index: A complete index listing type of photography, scale, date, direction flight was flown, and lens focal length is available from any of the regional headquarters. Where large areas are involved, photo indexes are essential for selecting prints and should be requested.

3. Photography Orders

Because many types of reproductions are available, requests should state the purpose for which the photographs are desired and define the specific area of interest by means of a detailed description, sketch, or latitude and longitude position. The size of photographs and type of coverage (pictorial or stereoscopic) should also be specified.

a. Requests for reproductions or information from the following states should be sent to: Atlantic Region Engineer, U.S. Geological Survey, 1109 N. Highland St., Arlington, Va. 22210.

Alabama, Connecticut, Delaware, Florida, Georgia, Indiana, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, Vermont, West Virginia, Puerto Rico, Virgin Islands, U.S.

b. Requests for reproductions or information from the following states should be sent to: Central Region Engineer, U.S. Geological Survey, Box 133, Rolla, Mo. 65401.

Arkansas, Illinois, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Oklahoma, Nebraska, North Dakota, South Dakota, Wisconsin.

c. Requests for reproductions or information from the following states should be sent to: Rocky Mountain Region Engineer, U.S. Geological Survey, Building 25, Federal Center, Denver, Colorado 80225.

Alaska, Colorado, Montana, New Mexico, Texas, Wyoming.

d. Requests for reproductions or information from the following states should be sent to: Pacific Region Engineer, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025.

Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, Washington.

Shipment by parcel post or railway express is prepaid. Extra charges for shipment by air express or airmail and special delivery are paid by the purchaser.

Check, money order, or draft payable to the U.S. Geological Survey must accompany the order. Refund will be made for any part of the order that is not filled.

II. ERTS

On Sunday, July 23, 1972, the Earth Resources Technology Satellite (ERTS-A) was launched into orbit. It is a butterfly shaped observatory flying in a 570 mile circular orbit which is nearly polar. From this vantage point, its imaging systems provide useful information concerning agriculture and forest resources, mineral and land resources, water resources, marine resources, land use and environmental quality, and ecology.

ERTS circles the earth every 103 minutes or 14 times per day. The pass is from north to south at an angle of 80^{o} retrograde to the equator. Each pass covers a region 115 miles wide, however there is some overlap between the proceeding and succeeding passes. After 18 days or about 252 passes the satellite returns to the same position. In other words ERTS covers the entire globe every 18 days.

The ERTS-A spacecraft carries two types of imaging sensors: the Return Beam Vidicon (RBV) cameras and the Multi-Spectral Scanner (MSS).

The Return Beam Vidicon cameras are television cameras mounted side by side in the spacecraft and bore-sighted to simultaneously photograph the earth beneath the spacecraft in each of three spectral regions: .475 to .575 micrometers (blue-green, Band 1); .580 to .680 micrometers (red, Band 2); and .690 to .830 micrometers (near infrared, Band 3). These cameras do not contain film but rather their images are stored on photosensitive surfaces within each vidicon camera which in turn is scanned by an internal electron beam to produce a video picture. This process requires 11 seconds to read out and transmit all three pictures. The RBV cameras will repeat the cycle each 25 seconds producing overlapping pictures of the ground scene below with 10% overlap.

The Multi-Spectral Scanner Subsystem (MSS) covers the same area as the RBV system in four wavelength bands: .5 to .6 micrometers (green, Band 1); .6 to .7 micrometers (red, Band 2); .7 to .8 (near infrared, Band 3); and .8 to 1.1 (near infrared, Band 4).

The Multi-Spectral Scanner and Return Beam Vidicon cameras on ERTS-A take pictures in specific wavelength bands for very particular reasons.

1. Green, Band 1, .5 to .6 micrometers.

   This band appears green to the naked eye. Water is quite transparent in this band which consequently tends to enhance features contained within water such as sediment. Unfortunately, light scattering in the atmosphere makes "seeing" in this band difficult at times.

2. Red, Band 2, .6 to .7 micrometers.

This band appears red to the eye. Unlike the green band, the red easily penetrates the atmosphere. This is good for land use mapping where regional population patterns need to be observed against the vegetation patterns. The red band shows good contrast between natural surface cover such as vegetation which absorbs most of this energy against manmade structures which strongly reflect this energy. Many manmade structures appear very bright against dark appearance of vegetation. Bare soil is often highly reflective in this band, so that deserts are best seen in this band.

3. Infrared, Bands 3 and 4, .7 to 1.1 micrometers.

This is invisible to the human eye. Water appears black in the infrared because water almost totally absorbs the radiant energy in these wavelengths. A significant characteristic about the infrared bands is that vegetation appears bright and water appears dark. As a comparison, vegetation is as bright in the infrared as snow is in the visible region.

The average green leaf reflects about 20% of green light and absorbs the other 80%. It absorbs approximately 95% of red light due to absorption by chlorophyll and is frequently called the chlorophyll absorption band. It reflects approximately 80% of the infrared light and transmits the other 20%. The brightness of vegetation in this band depends upon several things. First, the type of vegetation, i.e., big leaves will be brighter than small ones. Hardwood trees (deciduous) show up brighter than pine (evergreen). Because of leaf thickness, tobacco shows up brighter than wheat. Second, in the infrared, crop brightness depends upon plant health. Healthy crops, in the infrared will be much brighter than diseased vegetation.

A. <u>How ERTS Imagery May Be Obtained</u>

ERTS imagery may be obtained at cost from several sources: EROS (Earth Resources Observation Systems), NOAA (National Oceanographic and Atmospheric Administration, and The Department of Agriculture.

1. The EROS Data Center

The EROS Data Center in Sioux Falls, South Dakota, is operated for the Earth Resources Observation Systems Program of the Department of the Interior by the Topographic Division of the Geological Survey to provide access to Earth Resources Technology Satellite (ERTS) imagery, USGS aerial photography, and NASA aircraft data for the general public, domestic government agencies at all levels, foreign government agencies at all levels, and foreign government. Facilities are available for data storage, retrieval, reproduction, and dissemination, and for user assistance and training.

a. ERTS Imagery

ERTS imagery, originally processed at the Goddard Space Flight Center, NASA Data Processing Facility (NDPF), is a significant part of the Data Center imagery file. Each scene, covering 10,000 square nautical miles, is imaged seven times from ERTS-A. The raw data is either system corrected images (bulk processed) and provided to the Data Center in the form of 70 mm film, or scene corrected images (precision processed) and provided on 240 mm film at a scale of 1:1,000,000. The Data Center has a catalog of the ERTS imagery and a 16 mm browse film including only one RBV image and one MSS image per scene for rapid evaluation of coverage and cloud cover.

Copies of the system corrected individual images are available at contact scale, 1:3,369,000 approximately 2-1/2 x 2-1/2 inches or enlarged by a factor of 3.369 to 1:1,000,000 scale, approximately 9 x 9 inches including marginal data. Color composites, derived by processing the three RBV or three of the four MSS images together are available only at a scale of 1: 1,000,000 of those frames prepared by NDPF.

Copies of scene corrected (precision) images may be obtained only at scales of 1:1,000,000 or larger. These images have been rectified at the NDPF to orthographic photographs and have been overprinted with the UTM grid.

Both individual and color composites are available at 1:1,000,000 scale, approximately 9 x 9 inches including marginal data. Only about 5% of the ERTS images available in the Data Center will have been precision processed.

b. NASA Aircraft Imagery and Photography

Imagery and photography obtained by NASA, as part of its aircraft program in support of the development of Earth Resources Surveys by aircraft and spacecraft, are processed at the Manned Spacecraft Center, Houston, Texas, and at the Ames Research Center, Moffett Field, California. The data was acquired for specific purposes and to varied specifications as to time, aerial coverage, and sensors, and is primarily of test sites within the continental United States. Supplementary to the NASA aircraft program data, are the earth-oriented photographs from the Apollo and Gemini manned spacecraft missions. A catalog of all this NASA imagery and photography, and browse films, is also at the Data Center.

Copies of these images and photographs may be purchased at contact scales, enlargements, or reductions, in color or black and white, on film or on paper, in rolls or cut. Provided with each image order are annotations on a computer printout that provide: date, local time, geographic coordinates, print scale, flying height, film, filter, sensor, originating agency, project, roll and frame, and order number in an understandable code.

c. USGS Aerial Photography

Aerial photographs taken by the U.S. Geological Survey primarily for purposes of topographic and geologic mapping are available from the Data Center. The vast majority are black and white vertical photographs at a scale of approximately 1:24,000, but they range in scale from 1:12,000 to 1:66,000. In addition, photography flown in support of various projects of the Bureaus of Reclamation and Land Management is routinely provided to the U.S. Geological Survey for indexing and general distribution.

These photographs are at various scales reflecting the specifications of the particular project.

Photographs obtained prior to 1941 are held by The National Archives and Record Service. This material is available on request but not within the normal one week reproduction time.

d. How to Place an Order

To obtain data from the EROS Data Center you may:

Telephone from: 7:00 a.m. to 7:00 p.m., Central Time
605/339-2270 (Commercial)
605/336-2381 (Federal Telephone System Users)

Visit from: 7:45 a.m. to 4:30 p.m., Central Time
EROS Data Center
10th and Dakota Avenue
Sioux Falls, South Dakota

Write at any time:

EROS Data Center
Data Management Center
Sioux Falls, South Dakota 57198

If you should need assistance EROS personel will help you identify the data best suited to your needs, but you must be prepared to tell them:

1. Limits of the geographic area of interest,

2. What you want to use the data for, and

3. How you want to use the data.

e. Browse Films

Copies of ERTS imagery, aircraft program imagery and photography, and USGS photography produced on 16 mm film are available for purchase. These films are not intended for basic research.

They are designed to provide prepurchase evaluation of such things as: aerial coverage, cloud cover, and sensor angle. Most of the browse films have two indexes to locate scenes at high speeds: Kodamatic Indexer Code Lines and Image Control; NASA aircraft program imagery and photography browse films have only Image Control. The film is supplied on an open reel and each film is designed so that it can be cut and mounted by the user for microfiche presentation. Browse films for ERTS data are updated every 18 days and are available on a subscription basis. Updating of the other browse films is irregular and films must be purchased individually.

Browse file locations have been established by the Department of the Interior at:

EROS Data Center
U.S. Geological Survey
10th and Dakota Avenue
Sious Falls, South Dakota 57198
Phone: 605/339-2270

Map Information Office
U.S. Geological Survey
Room B-310, GSA Building
18th and F Streets, NW
Washington, D.C. 20242
Phone: 202/343-2611

CARETS Information Center
U.S. Geological Survey
Room 837, 1717 H Street, NW
Washington, D.C. 20242
Phone: 202/343-5985

Water Resources Division
U.S. Geological Survey
Room 343, Post Office and
Court House Building
Albany, New York 12201
Phone: 518/472-3107

U.S. Geological Survey
5th Floor, 80 Broad Street
Boston, Massachusetts 02110
Phone: 617/223-7202

EROS Program Assist. Office
Room B-210, Building 1100
U.S. Geological Survey
Mississippi Test Facility
Bay St. Louis, Miss. 39520
Phone: 601/688-3541

Regional Topographic Engineer
U.S. Geological Survey
Room 2404, Building 25
Denver Federal Center
Denver, Colorado 80225
Phone: 303/234-2351

Water Resources Division
U.S. Geological Survey
Room 5107, Federal Building
230 North 1st Avenue
Phoenix, Arizona 85025
Phone: 602/261-3188

Public Inquiries Office
U.S. Geological Survey
Room 7638, Federal Building
300 N. Los Angeles Street
Los Angeles, California 90012
Phone: 213/688-2850

Public Inquiries Office
U.S. Geological Survey
Room 678, U.S. Court House Bldg.
West 920 Riverside Avenue
Spokane, Washington 92201
Phone: 509/456-2524

Public Inquiries Office
U.S. Geological Survey
108 Skyline Building
508 2nd Avenue
Anchorage, Alaska 99501
Phone: 907/277-0577

Regional Topographic Engineer
U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025
Phone: 415/323-8111

Inter American Geodetic Survey
Headquarters Building
Fort Clayton, Canal Zone
Phone: 117-1201
Panama Routine 833-227

Topographic Division
U.S. Geological Survey
961 Pine Street
Rolla, Missouri 65401
Phone: 314/364-3680

State Topographic Engineer
Florida Dept. of Transportation
State Topographic Office
Lafayette Building
Koger Office Center
Tallahassee, Florida 32304
Phone: 904/599-6212

Director
Portland Service Center
U.S. Bur. of Land Management
710 N.E. Holladay
Portland, Oregon 97208
Phone: 503/234-4100

EROS Program Library
U.S. Geological Survey
Room 827, 1717 H Street, NW
Washington, D.C. 20244
Phone: 202/343-7500

Chief, Maps and Surveys Branch
Tennessee Valley Authority
200 Haney Building
311 Broad Street
Chattanooga, Tennessee 37401
Phone: 615/755-2133

Dr. Everett A. Wingert
University of Hawaii
Department of Geography
Physical Science Building
Room 313-C
Honolulu, Hawaii 96822
Phone: 944-8463

EROS Coordinator
Office of the Governor
Pago Pago, American Samoa
Phone: 32203

EROS Coordinator
Trust Territory of the Pacific Islands
Office of the High Commissioner
Saipan, Mariana Islands 96950
Phone: 202/343-2141 or 2176

Dr. Frank J. Janza
Sacramento State University
Dept. of Electrical Engineering
6000 Jay Street
Sacramento, California 95819
Phone: AC-916/454-6545

Dr. Douglas Smith
University of Guam
EROS/P.I.E.R. Program
Section of the Pacific Room
P.O. Box EK
Agana, Guam 96910
Phone: 749-2921, Ext. 363

2. National Ocenaographic and Atmospheric Administration

The Department of Commerce, National Oceanographic and Atmospheric Administration (NOAA) has an Earth Resources Data Center at Suitland, Maryland. This center will furnish data gathered by ERTS to users in the oceanographic, hydrologic, and atmospheric sciences as well as to the general public.

To aid in selecting the data desired, NOAA has established public browse files at 22 locations around the nation. They are located in:

Hillcrest Heights, Md.	Fort Worth, Tex.
Rockville, Md.	Salt Lake City, Ut.
Silver Spring, Md.	Anchorage, Alaska
Washington, D.C.	Honolulu, Hawaii
Miami, Fla.	Norman, Okla.
Norfolk, Va.	Boulder, Colo.
Garden City, N.Y.	LaJolla, Calif.
Woods Hole, Mass.	Tibaron, Calif.
Asheville, N.C.	Seattle, Wash.
Detroit, Mich.	Madison, Wisc.
Kansas City, Mo.	College Station, Tex.

Reproductions may be ordered from the National Climate Center, NOAA Environmental Data Service, Federal Building, Asheville, N.C. 28801.

3. Department of Agriculture

The Department of Agriculture also sells ERTS imagery dealing with agriculture. Photos may be obtained from the Western Aerial Photo Laboratory, Agricultural Stabilization and Conservation Service, USDA, 2505 Parley's Way, Salt Lake City, Utah 84109.

It is now possible to order ERTS Standard Catalogs from the Superintendent of Documents. Private individuals should direct requests to the NASA Publications Desk, at the main GPO bookstore, 710 North Capital Street, Washington, D.C. 20402, Telephone: 202/783-3238.

III. U.S. Department of Agriculture - Soil Conservation Service

The U.S. Department of Agriculture, in cooperation with state agricultural experiment stations and other federal and state agencies, has been making soil surveys and publishing them since 1899. These surveys are designed to furnish soil maps and interpretations needed in guiding decisions about soil selection, use, and management.

Since these soil surveys are a basic scientific inventory, they can provide valuable information needed for land use planning, highway location and design, park and open space planning, subdivision layout and designs, planning and design of sewage disposal facilities, zoning and other land use controls, as well as for agricultural and forest land use planning and management.

Soil surveys published since 1957 contain many different kinds of interpretations for each of the different soils mapped in the area. The kind of interpretations included in these recent surveys vary with the needs of the area, but the following interpretations are in most of them: estimated yields of the common agricultural crops under defined levels of management, land-capability interpretations, soil-woodland interpretations, range land interpretations, engineering uses of soils, interpretations for community planning, suitability of the soil for drainage and irrigation, and suitability of the soil for recreation and wildlife.

Most of the soil surveys published since 1957 contain soil maps printed on a photomosaic base. The usual scale is 1:20,000 or 1:15,840 depending upon the needs of the area.

A soil survey published by the U.S. Department of Agriculture that is still in print may be obtained in one of the following ways:

1. Land users in the area surveyed and professional workers who have use for the survey can obtain a free copy from the local office of the Soil Conservation Service, from their county agent, or from their congressman. Those outside the area surveyed who have

use for the survey can obtain a free copy from the Information Division, Soil Conservation Service, Washington, D.C. 20250.

2. For a time after publication, copies may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

3. Many libraries keep published soil surveys on file for reference. Also soil conservation district offices and county agricultural extension offices have copies of local soil surveys that may be used for reference.

A list of all published soil surveys may be obtained by writing the Information Division, Soil Conservation Service, Washington, D.C. 20250.

Requests for information pertaining specifically to soil conservation service photography should be addressed to: Director, Cartography Division, Soil Conservation Service, USDA Federal Center Building, Hyattsville, Maryland 20781.

IV. Additional Federal Agency Photography

Besides the Geological Survey and Soil Conservation Service, several other federal agencies regularly make extensive use of aerial photography. These include the Agricultural Stabilization and Conservation Service and the U.S. Forest Service.

Requests for information pertaining to Agricultural Stabilization and Conservation Service Photography should be addressed to a regional laboratory.

Orders for photographs of the following states should be addressed to: Western Aerial Photography Laboratory, Compliance and Appeals Division, ASCS-USDA, 2505 Parley's Way, Salt Lake City, Utah 84109 (Tel. 801/524-5856).

Arizona, Arkansas, California, Colorado, Hawaii, Idaho, Kansas, Louisiana, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Texas, Utah, Washington, Wyoming.

Orders for photographs of the following states should be addressed to: Eastern Aerial Photography Laboratory, Compliance and Appeals Division, ASCS-USDA, 45 South French Broad Avenue, Asheville, North Carolina 28801 (Tel. 704/254-0961, Ext. 610).

Alabama, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, West Virginia, Wisconsin.

Requests for information pertaining to U.S. Forest Service Photography should be addressed to: Division of Engineering, Forest Services, USDA, Washington, D.C. 20250.

V. Conclusion

The interpretation of aerial photographs and soil surveys represents a tool for efficient, economical, and highly detailed landscape evaluation. It is hoped that the use of these new and ever expanding data sources will assist in providing socially acceptable decisions concerning the land development and valuation process.

The sources of information outlined in the paper do not begin to represent all the available information, either by agency or within agency. These information sources do represent an initial contact point from which other information concerning a particular area or problem can be identified if needed.

EROS Data Center Photographic Products Price List -- November 1972

Contact prints, enlargements and transformed prints are unmounted and untrimmed. The reproduction will be printed on standard paper stock unless the order specified other materials.

PRODUCT	PRICE	
Black and white paper prints	1 to 25	Over 25*
Contact prints:		
70 mm	$ 1.25	$ 1.00
5 in x 5 in	1.50	1.00
9 in x 9 in	1.75	1.25
10 in x 12 in*	2.50	2.50
20 in x 24 in**	3.00	3.00
Enlargements:***		
20 in x 20 in	3.50	3.00
30 in x 30 in	4.50	3.50
40 in x 40 in	9.00	8.00
Black and white film transparency		
Contact prints:		
16 mm (100 ft. roll)	15.00	15.00
35 mm (100 ft. roll)	20.00	20.00
70 mm	2.50	2.50
5 in x 5 in	2.75	2.75
10 in x 10 in	3.00	3.00
Color paper print		
Contact prints:		
70 mm	4.00	2.50
10 in x 10 in	7.00	3.00
Enlargements:***		
20 in x 20 in	12.00	9.00
30 in x 30 in	17.00	13.00
40 in x 40 in	25.00	20.00
Color film transparency		
Contact prints:		
16 mm (100 ft. roll)	20.00	20.00
35 mm (100 ft. roll)	25.00	25.00
70 mm	4.00	2.50
10 in x 10 in	7.00	4.00
Enlargements:***		
20 in x 20 in	15.00	8.00
30 in x 30 in	19.00	15.00
40 in x 40 in	27.00	22.00

	1 to 25	Over 25*
Transformed prints from either convergent or transverse low-oblique photographs	$ 3.50	$ 3.00

---

* Quantity prices apply only to those prints ordered in excess of 25 of the same size, i.e., 26 contact prints cost: 25 at $1.75 each--$43.75 plus 1 at $1.25 - $45.00.

** Photo indexes.

*** For an intermediate-size enlargement, use the price listed for the next larger size.

The EROS Data Center is located at 10th and Dakota Avenue, Sioux Falls, South Dakota 57198, Telephone: 605/339-2270.

REFERENCES

1. Avery, T. Eugene, Interpretation of Aerial Photographs, Burgess, Minneapolis, Minnesota, 1962.

2. Bartelli, Linda, ed., Soil Surveys and Land Use Planning, Soil Science Society of America, Madison, Wisconsin, 1966.

3. Geological Survey Circular 645, "A Procedure for Evaluating Environmental Impact", U.S. Geological Survey, Washington, D.C., 1971.

4. Gruen, Gruen and Associates, The Impacts of Growth, California Better Housing Foundation, Inc., Berkely, California, 1972.

5. Guidelines for the Preparation and Evaluation of Environmental Impact Reports, State of California Office of the Secretary for Resources, Sacramento, California, 1973.

6. Kiefer, Ralph W., "Terrain Analysis for Metropolitan Fringe Area Planning", Journal of the Urban Planning and Development Division, ASCE, Vol. 93, No. UP4, Paper 5649, 1967.

7. Kiefer, R. W. and M. L. Robbins, "Computer-Based Land Use Suitability Maps", Paper presented to 1972 Annual and National Environmental Engineering Meeting, Houston, Texas, October, 1972.

8. List of Published Soil Surveys, U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C., January, 1972.

9. Lueder, Donald R., Aerial Photographic Interpretation, McGraw-Hill, New York, 1959.

10. Lynch, Kevin, Site Planning, The M.I.T. Press, Cambridge, Massachusetts, 1962.

11. McHarg, Ian L., Design With Nature, Natural History Press, Garden City, New York, 1969.

12. Miller, Allen H. and Bernard J. Niemann, An Interstate Corridor Selective Process, Environmental Awareness Center--Department of Landscape Architecture, University of Wisconsin, Madison, Wisconsin, 1972.

13. Scherz, James and Alan Stevens, An Introduction Photography and Remote Sensing, Department of Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin, 1969.

14. "Topographic Maps", U.S. Geological Survey, Washington, D.C.

Exhibit C

Cost Effective Data Collection Sources

Data Requirement	Data Sources							
	High Altitude Aerial Photography	Low Altitude Aerial Photography	Field Investigations	Special Purpose Maps	Topographic Maps	Government Publications	Non-government Publications	Local Experts
I. Topography	2				1			
II. Soils								
Class	2			1				
Permeability						1		2
Depth of Bedrock						1		2
I. Vegetation								
Association Level	1			2				
Community Level	1			2				
Species Level			1					2
IV. Land Use								
Urbanized Area	1			2				
Commercial Land	1					2	2	
Commercial Type			1	1				
V. Agriculture								
Cultivated Land	1			2		2		
Crop Class	1		2					
Crop Type		2	1	1				

1 Primary Source
2 Secondary Source

Exhibit D

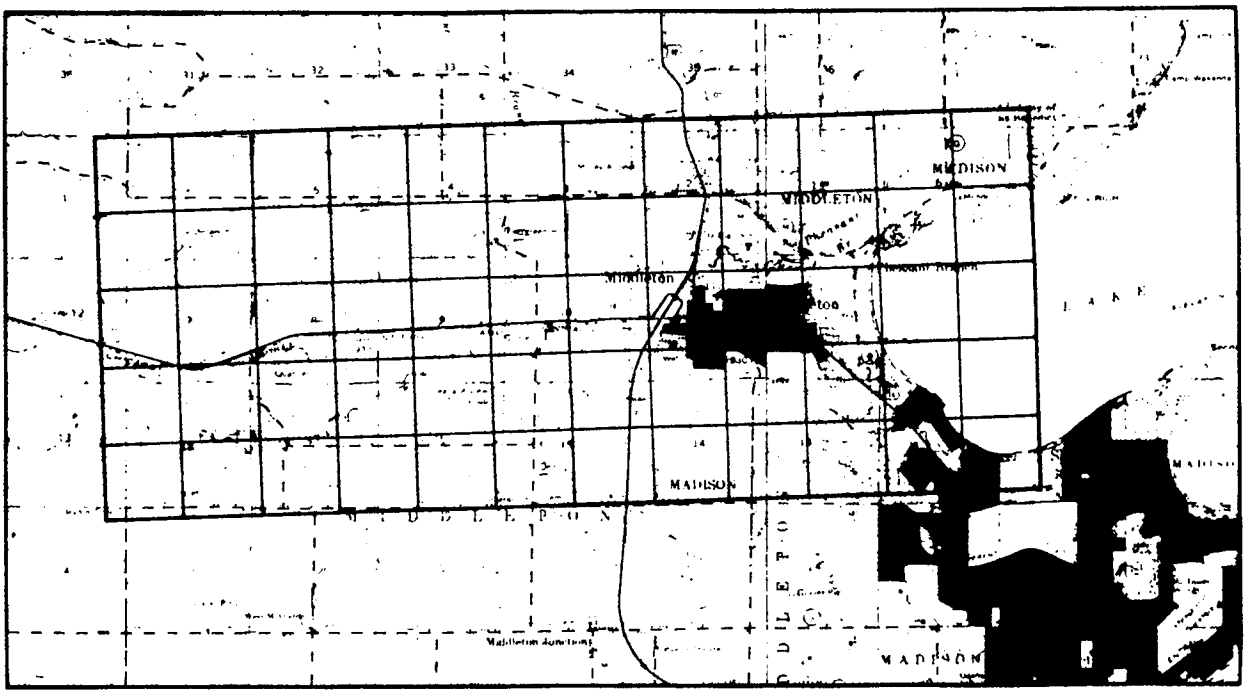


FIG. 1 - U.S.G.S. TOPOGRAPHIC MAP WITH 1 km^2 GRID

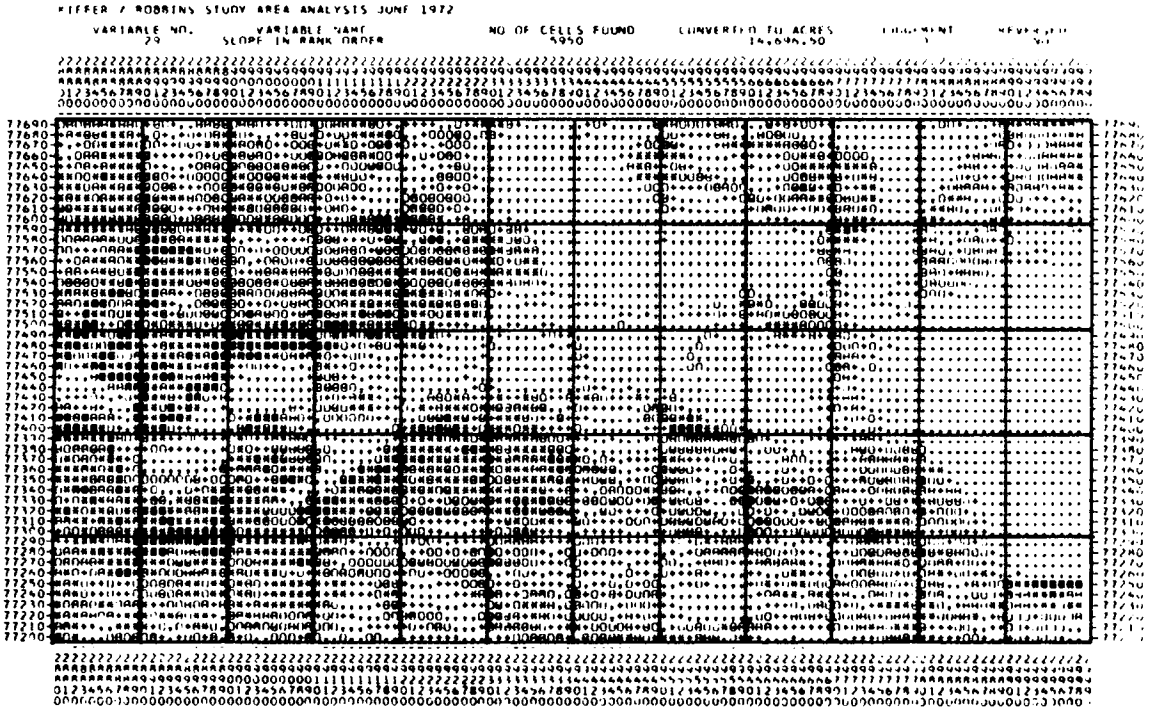


FIG. 2 - COMPUTER PRINTOUT OF TOPOGRAPHIC SLOPE WITH 1 km^2 GRID

Exhibit D

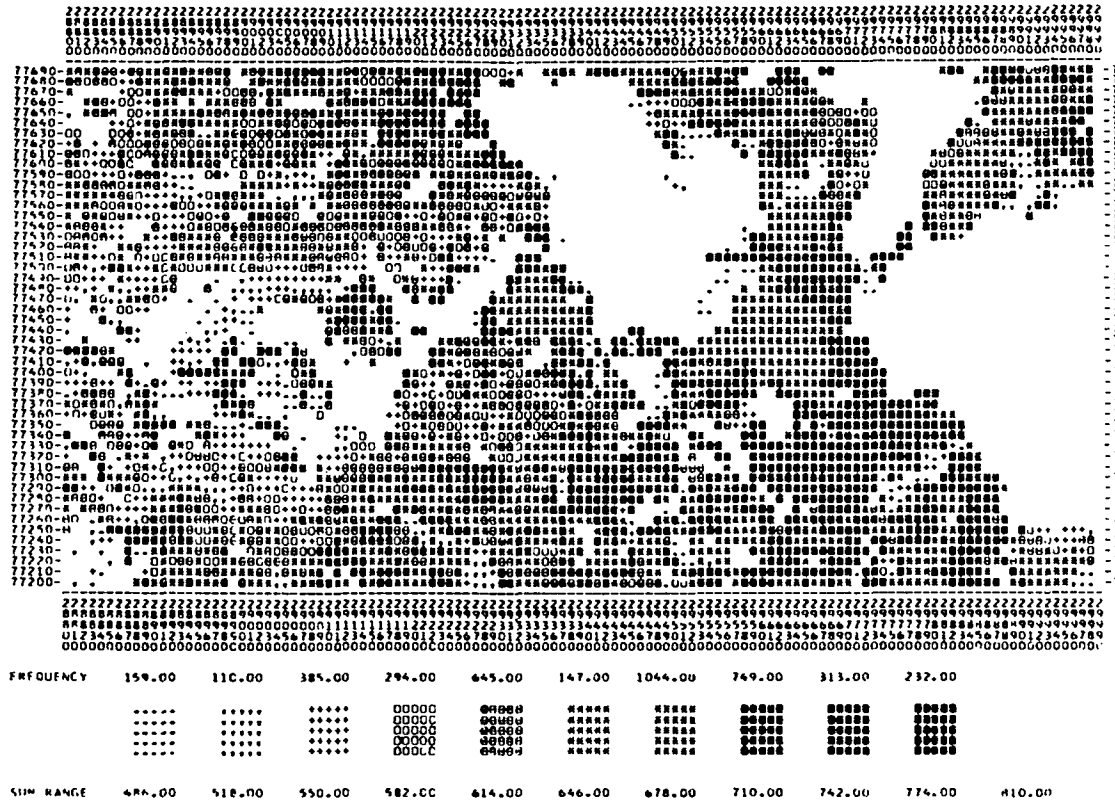


FIG. 21 - RESIDENTIAL LAND USE SUITABILITY WITH 1401 LEAST FAVORABLE CELLS DROPPED (4078 CELLS SHOWN)

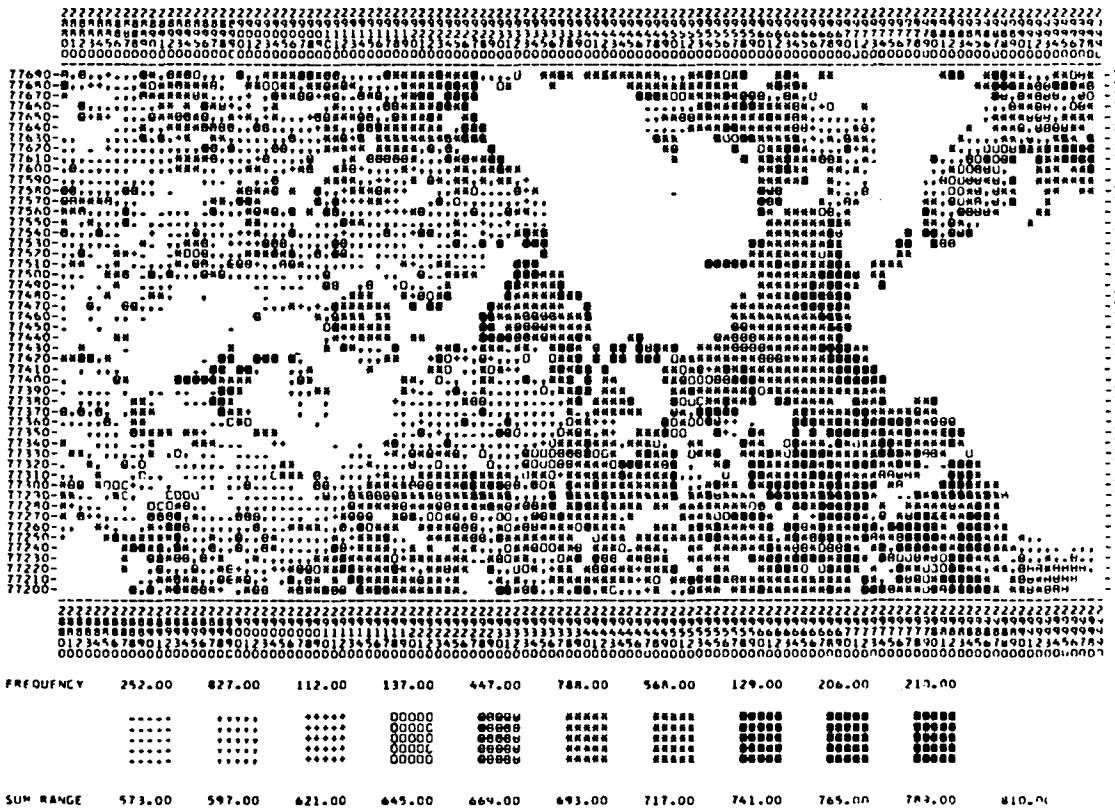


FIG. 22 - RESIDENTIAL LAND USE SUITABILITY WITH 1803 LEAST FAVORABLE CELLS DROPPED (3676 CELLS SHOWN)

Exhibit E

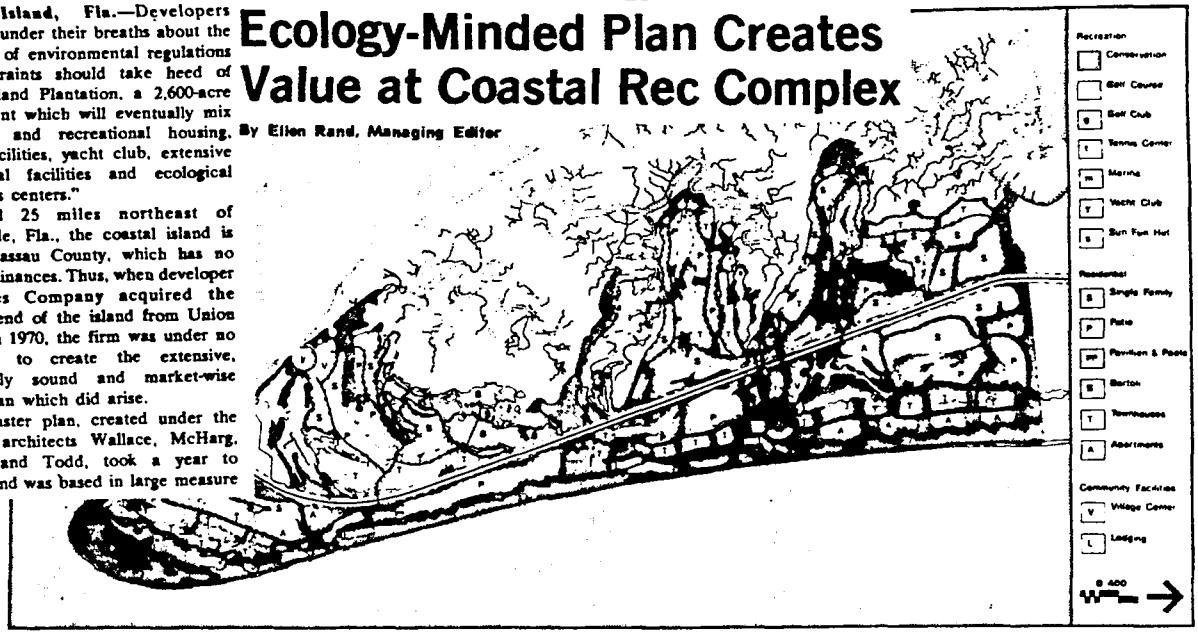
Ecology-Minded Plan Creates Value at Coastal Rec Complex

By Ellen Rand, Managing Editor

Amelia Island, Fla.—Developers grumbling under their breaths about the rising tide of environmental regulations and constraints should take heed of Amelia Island Plantation, a 2,600-acre development which will eventually mix residential and recreational housing, lodging facilities, yacht club, extensive recreational facilities and ecological "awareness centers."

Located 25 miles northeast of Jacksonville, Fla., the coastal island is part of Nassau County, which has no zoning ordinances. Thus, when developer Sea Pines Company acquired the southern end of the island from Union Carbide in 1970, the firm was under no obligation to create the extensive, ecologically sound and market-wise master plan which did arise.

The master plan, created under the aegis of architects Wallace, McHarg, Wallace and Todd, took a year to develop and was based in large measure



NEITHER WHOLLY RESIDENTIAL nor wholly resort, Amelia Island Plantation will be a stable community of single family homes, townhouses, patio homes and apartments. The site includes four miles of ocean frontage, 1,642 acres of high ground and 1,000 acres of tidal marshland. Residential area will cover 498 acres. There will be rec facilities, yacht club, golf course, lodging facilities and village center. Undeveloped marshbank covers 968 acres, additional conservation areas cover 364 acres.

Developers Mix Residential, Resort Units, Keep Tight Controls for Long-Range Value

Matrix 2: Environmental Evaluation Matrix for Residential Land Uses on Amelia Island

Physical Characteristics	Sub-classification Characteristics	Housing Types Land Use Suitability: Single Family Detached	Bartoli	Pavilion & Pools	Patio	Villas	Town-houses	Dune Houses	Garden Apart-ments	Planning, Design and Management Guidelines
Vegetation										
Tolerance to Disturbance	1. sea oats grassland	□	□	□	□	□	□	□	□	no residential uses
	2. sea oats savanna	□	□	□	□	□	□	⊟	□	
	3. wind-pruned scrub	□	□	□	□	□	□	□	□	no residential uses
	4. wind-pruned woodland	◪	■	□	■	□	□	■	◪	siting in the field with minimum clearance
	5. broadleaf forest	■	■	■	■	■	■	□	■	
Tree Size	1. over 10" dbh	■	◪	◪	■	■	■	■	■	selective clearing
	2.									
	3. 6"–10" dbh	◪	■	■	◪	■	◪	■	◪	minimum trimming of lower branches
	4.									
	5. under 6" dbh	⊟	◪	◪	⊟	⊟	⊟	⊟	⊟	
Height of Tree Canopy	1. 0'–6'	□	□	□	□	□	□	□	□	
	2. 6'–12'	⊟	□	⊟	□	⊟	□	□	□	
	3. 12'–25'	◪	◪	◪	◪	◪	⊟	◪	□	minimum trimming of lower branches
	4. 25'–50'	■	■	■	■	■	■	■	◪	preserve canopy
	5. 50'–70'	■	⊟	⊟	◪	◪	■	□	■	
Understory Type	1. wax myrtle	◪	■	⊟	■	⊟	■	□	◪	minimum clearance
	2. slash pine	■	□	□	□	◪	■	□	◪	incorporate into landscape plan
	3. berry thickets	□	■	□	□	□	□	□	□	
	4. mixed	■	■	■	■	■	■	■	■	
	5. saw palmetto	■	■	■	■	■	■	■	■	incorporate handsome stands into landscape design

□ = Unsuitable ⊟ = Low Suitability ◪ = Moderate Suitability ■ = Suitable

FOLLOWING EXTENSIVE FIELD WORK, master plan evolved by creating spatial description of collected data and social value system which determined locational suitabilities for all prospective land uses. Trade-offs could be made to arrive at an optimum fit, according to architects. Shown here are some environmental criteria for residential land uses on Amelia Island.

Continued from page 1...

on original field work conducted by various consultants in climatology, limnology, soil study, dune restoration, herpetology, mammology and ornithology.

The plan proved not only to be a classic of its kind, but has boosted the community's image and marketability. Land sales are fully 50 percent higher than originally anticipated with one-fifth acre lots selling as high as $16,000 and the first phase of dune villas, in the $50,000 to $80,000 range, have been sold with completion scheduled for this summer.

In addition to professional and academic consultants and the Sea Pines Co.'s own planning staff, the environmental design team was served by a Board of Review created to make recommendations on the plan. The Board is comprised of environmental planning experts as well as leaders of local citizens' groups.

"We found that coastal studies of natural scientists had generally overlooked Amelia Island, and therefore much needed scientific information on the geology, soils, plants and animals on the island had to be developed in the field," explained Jonathan Sutton of Wallace, McHarg, Roberts and Todd, and project director for Amelia Island Plantation. "When we were asked to do the master plan, we were on a two-month timetable, with a critical path established. It soon became apparent that we would need more time, and the two-month period was extended to a year."

A series of interpretive maps, suggesting the processes of each natural phenomenon over time, was derived from the descriptive data collected. By recording rates of erosion or relative heights of tides or temperature gradients, such information was categorized and

Continued on page 32...

Exhibit E

SCIENTIFIC PLACEMENT of air movement in clearings was determined for optimum human comfort in residential areas of Amelia Island Plantation. Such details are typical of the studies that were done for Sea Pines Co.'s master planned development by Wallace, McHarg, Roberts and Todd.

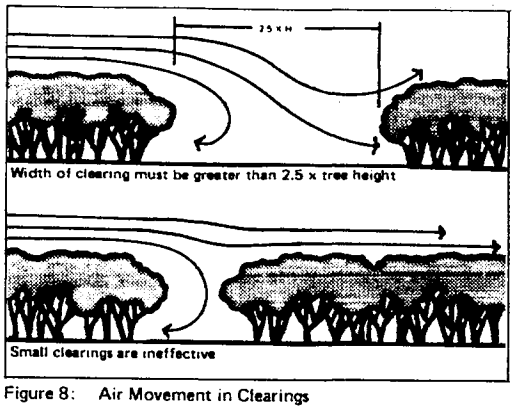


Figure 8: Air Movement in Clearings

Strict Architectural Controls by Review Committee is Key Operating Principle

Continued from page 34...

offered the most promising and flexible development possibilities for early phases, more thorough planning and design investigations were conducted there. The site was divided into five development zones.

Installation of major utilities was initiated in January 1972 and at the same time, the buildings which will serve as the hub of Amelia Island Plantation were begun. Utilities are underground.

A water treatment and supply system for the complex has been designed by the Jacksonville engineering firm of Bessent, Hammock and Ruckman, Inc.

Likewise, a sewage treatment plant is being constructed, hidden in the woods, on 22 acres just outside the Plantation. It will treat sewerage to the tertiary level, which means that all discharge will exceed any minimums set by regulating agencies. As an extra precaution, all treated discharge is pumped into a conservation area surrounding the treatment plant, which provides for natural ground filtration of the discharge and saves oyster beds in the Amelia River. Eventually, sewage discharge will be pumped back onto the golf courses to provide irrigation.

Eight tennis courts, a pro shop, the beach club and restaurant-bar will open this summer, and 18-hole golf course will open in the fall and the Amelia Island Inn will open in late December, according to Glen McCaskey, vice president of Sea Pines Co. and head of the firm's leisure systems and environmental control group.

With the emphasis on golf and tennis, Amelia Island Plantation is drawing a lot of sports-minded buyers, particularly from the East and Midwest, said Jonathan Sutton.

While the Amelia Island Company will, for a fixed commission, act as rental agent for condo owners, the firm does not plan to operate a rental pool. Amelia Island Company is a wholly-owned subsidiary of the Sea Pines Company.

Besides mixing residential and resort housing a preserving large areas in their natural states, one of the key development principles of the Sea Pines Company is the strict control of land usage through extensive deed covenants and architectural controls.

The controls are administered by an architectural review committee of the Company. A key paragraph in the deed restrictions provides that "No building, fence or other structure shall be erected, placed or altered on any lot in such residence areas until the proposed building plans, specifications, exterior color or finish, plot plans (showing the proposed location of such building or structure, drives and parking areas), and construction schedule shall have been approved in writing by the Amelia Island Company, its successors or assigns. . . . No alterations may be made in such plans after approval by the Company is given except by and with the consent of the Company. No alterations in the exterior appearance of any building or structure shall be made without like approval by the company. One copy of all plans and related data shall be furnished the Company for its records."

The Plantation Community Association will be a non-profit corporation formed under Florida state laws. The Amelia Island Company, as the developer of Amelia Island Plantation, will be entitled to the same number of votes in each association as all other members of the Association combined plus one vote, during the period of development. The Amelia Island Company has a right to such a vote until January 1, 1986.

The Sea Pines Company now has five communities under development. Besides Amelia Island Plantation and Sea Pines Plantation, the company also began a residential community near Charlotte, N.C. in 1971. Construction is underway on a new Sea Pines resort on the southeastern coast of Puerto Rico and will take 20 years to complete. □

2. Thermal and infra-red photography (identification of underground faults or vegetation disease as well as micro-climate).
3. In Wisconsin free soil conservation service is considered constructive notice to the public of site limitation and therefore must be considered by the appraiser.
4. The Earth Resources Technology Satellite (Exhibit B)
5. Computerized mapping of suitability (Exhibits D and E)

Suggested reading:

DESIGN WITH NATURE by Ian L. McHarg, Natural History Press, 1969

CITY PLANNING AND AERIAL INFORMATION, by Melville C. Branch, Harvard University Press 1971

MANUAL OF COLOR AERIAL PHOTOGRAPHY by American Society of Photogrammetry, American Society of Photogrammetry, 1968.

D. The site inventory should include physical limits which are created by:
   1. Access controls (proximity is not accessability)
   2. Concealed utility easements
   3. Flood plains which have been determined by Corp of Engineers, etc.
   4. Old foundations, etc.
   5. Scarce environmental elements which almost certainly mean environmental impact litigation
   6. Landmarks or historical structure

E. The land map should also include possible physical controls imposed by legal-political characteristics of the site which are not always obvious from existing zoning or recorded easements. Consider:
   1. Water district, harbor commission, or other special district lines
   2. Premises of community master plans still in incubation process
   3. Tax conservancy commitments
   4. Extra territorial zoning or subdivision powers
   5. Attitudes of sewer, water, and highway commissions
   6. Contractual agreements among previous buyers and sellers which may or may not run with the land.
   7. Planner views or physical barriers to contain sprawl

F. Anticipate impact of impending legislation which appears to have reasonable probability of passage rather than simply meeting current standards relative to:
   1. Septic tank installation
   2. Ground water, depth and conservation of high water recharge areas
   3. Salt water encroachment
   4. Conservation of environmental edges
   5. Conservation of prime agricultural
   6. Impact on off-site areas down wind or down stream

G. Some static attributes can lead to monopoly advantage because its suitability is unique relative to lands all about it, because of prior political review and approval of development plans, including licenses for dredging, creation of water control districts, or control of riparian features essential to contiguous property owners.
   1. Keep in mind that static attributes will help identify most probable use and buyer.
   2. Property with high speculative uncertainty can still be given a probable price with a high range of alternatives, providing the appraiser with a method of treating speculative property which would be unacceptable for fair market valuation.

H. A map of land use suitabilities will define its maximum capacity to provide usable net acres for different type of land uses. Ultimately the purchase price must always be related to the buyer viewpoint of usable net acres even though sellers like to talk in terms of gross area.
   1. Usable net acres relative to development is similar to farm appraisal which classifies net acres as cropped land, pasture, etc. and may subdivide these in terms of soil fertility, etc.
   2. Usable net acres becomes an important qualification in the selection of comparables for the adjustments which must be made.
   3. Mixed use acreage may require a set of comparables for each.

VI. Before final determination of suitability and capacity, it is also necessary to define the dynamic attributes of the site, that is behavior of people and customers in relationship to the site.

A. First there are image problems inherent in the location:
   1. Historical community reputation and values attached to the area
   2. Image conditioning of the approach zone
   3. Anxiety factors of access and security
   4. Visual factors in terms of prominence of the site, views from the site, potential for controlled sight lines, etc.
   5. Noise as a function of traffic count
   6. Prevailing air currents and airborne pollution (phosphate plants or sulphite paper mills, for example)

B. Existing improvements on a given site may provide potentials for romancing or discouraging the politician and the consumer.
   1. Recycling of old buildings within existing urban areas is fashionable among architects and the upper class.
   2. Recycling may establish historical roots and images (such as the Plantation House at Sea Pines)
   3. Potential for dislocation of the disadvantaged or the politically articulate

C. In short, the dynamic attributes of the site relate to identified relationships and reactions of people to the site in terms of visibility, convenience, status, esthetics, anxieties, and linkages of the site to all manner of supporting or adverse land uses in its market area.

VII. Appraisal depends upon the correct identification of the property attributes to be sold. Facts can be assembled at some expense with patient inquiry about the physical aspects of land. Today there is no need to speculate about the facts.

A. The physical facts go a long way toward identification of comparable properties and probable buyers.

B. Comparable buyers will suggest the appropriate uses or improvements and therefore the capacity of the site to serve those uses.

C. Many of the physical, static and dynamic attributes of the site suggest the capability of the site to the uses for which it might be appropriate.

1. At this point social compatability is unknown
2. Economic impact on the public sector as an element of compatability has been left to later.
3. It may not be necessary to provide further analysis for appraisal depending on the possible timing for development.

D. There are four basic phases of the land development process which represent alternative investment strategies and therefore rather different probable buyers.
   1. Sale of unimproved property
   2. Sale of unimproved property with master plan and public approvals
   3. Sale of improved lots and building pads
   4. Sale of totally improved packages to investors/public authorities/ final user (see attached box outline).

E. The passive land speculator type of buyer is planning for the spread between low intensity raw land and land which may be ready for development. His success depends on his ability to forecast a trend to control land which will be in limited supply and to carry payments for an indefinite period of 3-10 years purchase terms are significant.

F. The packager options for the wholesale price from the land speculator and creates a spread or value by focusing a trend on a specific site and by securing the initial political and financial approvals. His success depends upon his ability to perform at conceptual selling and reliable feasibility analysis. He builds almost nothing.

G. The land developer executes the detail of the plan including construction of necessary streets, sewer, water, etc., expecting the wholesale sites to others who build and rent buildings.

H. The contractor-developer builds on the prepared pads and creates a spread from his construction skill and retailing ability.

I. The final phase is property management of the rental properties and periodic refurbishing of aging development. An important point to note is that moving from speculator to manager the amount of money is increasing, time span for execution is decreasing, value spreads are shifting from entrepreneurial risk taking to administrative execution skills.
   1. Since the profit centers and risk positions are different at each phase, the appraiser must be careful not to simply discount revenues from a finished product back to raw land as this can exaggerate values and timing.
   2. Changing stringency and lead times for public approvals and the risk of no public approval should drastically alter the discount rates between sites ready for improvement with buildings and raw land. The monopoly premium and the risk premium will significantly distort price from any cost to reproduce approach.
   3. Since the packager may or may not succeed, the values he would enjoy with political approvals are too speculative to include in a fair market value appraisal or to side-step the statement of limiting conditions.
   4. The appraiser could determine the unit value of sites ready for construction of site improvements (See Exhibit F).

STRATEGIC FORMAT OF DEVELOPER ROLE AND FUNCTION

	LAND CONTROL	SALE OF UNIMPROVED PROPERTY	SALE OF UNIMPROVED PROPERTY WITH SOME DEVELOPMENT PLANS & APPROVALS	SALE OF IMPROVED LOTS OR BUILDING PADS TO BUILDER/ DEVELOPER OR FINAL USER	SALE OF VARIOUS BUILDING IMPROVEMENT TO INVESTORS/PUBLIC HOUSING AUTHORITIES/ FINAL USERS
DEVELOPMENT ROLE ASSUMED	LAND SPECULATION hold or "land bank" interesting property	"PACKAGING" conceptualize development plan or land use — acquire broader public approvals such as zoning — arrange financing or structure deal.	LAND DEVELOPER undertake and complete land development phase — install roads, utilities, common improvements, survey and subdivide for sale.	BUILDING DEVELOPER undertake and complete various building improvements — offer and consummate sales.	
MAJOR OBJECTIVE	capture "spread" between raw land purchase cost and wholesale price created by "mass" market trends.	increase spread or value by bringing an important trend to focus on a specific site or into focus as a potential project. Shift buyer's perception through description, analysis, various "enabling" factors	increase spread or value by virtue of completing improvements that further shift buyer's perception of utility and make sites available for construction.	create construction and sales profit through completion of building improvements that further shift buyers perception of utility/value and make buildings available for occupancy/ownership	
KEY DETERMINANTS OF ECONOMIC SUCCESS	1) ability to accurately forecast a trend 2) ability to select and control attractive land	1) ability to complete a commence study of economic feasibility. 2) ability to obtain key public action in timely fashion 3) ability to perform at "conceptual selling"	1) ability to efficiently complete various improvements 2) ability to efficiently (and tastefully) market improved building sites. 3) ability to carry financing cost	1) ability to efficiently complete various building improvements 2) ability to efficiently market 3) ability to carry debt.	
THOSE ELEMENTS OF THE COST/PRICE RELATIONSHIP OVER WHICH THE DEVELOPER HAS SOME CONTROL (major tasks to be completed or costs to be incurred — specific problems of estimating, analysis, evaluation)	1) land price 2) carrying costs 3) legal expense 4) maximum loss	5) feasibility determination: • site or physical determinants • regulatory or political factors • market determinants • "reappraisal" or investment valuation (what's the deal worth if we do it vs. what's the deal worth if we get out now? 6. obtain basic public approval: (zoning) 7) arrangement of financing (takeout) 8) marketing costs	9) obtain specific public approvals 10) negotiate and secure various contracts within budget 11) stage/manage/control development on time, within budget + quality standards 12) arrange interim financing — land development loan 13) stage/manage/control the marketing of improved lots or building sites 14) obtain sales approval, registration etc.	9) obtain construction permits + approvals 10) negotiate and secure various contracts within budget. 11) stage/manage/control construction effort on time, within budget + quality standards 12) arrange interim + long term financing (construction loan and mortgage) 13. stage/manage/control the marketing of various building improvements 14. obtain sales approval, registration, etc.	

2

	LAND CONTROL	SALE OF UNIMPROVED PROPERTY	SALE OF UNIMPROVED PROPERTY WITH SOME DEVELOPMENT PLANS + APPROVALS	SALE OF IMPROVED LOTS OR BUILDING PADS TO BUILDER / DEVELOPER OR FINAL USER	SALE OF VARIOUS BUILDING IMPROVEMENTS TO INVESTORS / PUBLIC HOUSING AUTHORITIES / FINAL USERS
ELEMENTS OF RISK INCURRED (or places where "slippage" may occur)	1) various factors or events never materialize in a way that makes the property an attractive candidate for development 2) complete lack of analysis, planning, or other preparation for development means that property is never perceived as attractive or ready for development	1) costs of undertaking and completing above-listed analyses, estimates (esp. if feasibility study produces unattractive outcome and development is dropped) 2) development cost shifts 3) shifts in market situation (new market or competitive standard, general economic conditions) 4) regulatory standards change 5) cost or availability of financing shifts 6) reliability of various estimates + analyses 7) lose control of land or development situation 8) public approvals denied, delayed, or conditioned	1) delay in obtaining public approvals, attachment of conditions to approval, high costs of soliciting approval, or denial. 2) delay in completion of improvements 3) cost over-run on improvements 4) poor quality of finished improvements or related adverse side effects (eg. class action suits) 5) failure to carefully estimate TOTAL cost of improvements (installation, operation/maintenance, assurances) 6) lagging market performances • slowed pace of sales • lower price of units offered • higher cost of sales	1) delay in obtaining permits 2) delay in completion of improvements 3) cost over-run on improvements 4) poor quality of finished improvements or related adverse effects (eg. call-backs, class actions) 5) lagging market performance • slowed pace of sales • lower price of units offered • higher cost of sales	
GENERALIZATIONS	entrepreneurial-intensive roles	time necessary to capture profit is diminishing (holding period shortens) and this affects capital turnover? How about "entry fee" or amount of capital needed, however? ratio of value-added to costs is diminishing as the composite cost base builds up? more complexity, more internal variables to control; management burden requirements? increasing "image" or credibility exposure — what are the consequences of taking on a deal and failing — a lingering risk even if you escape with the dollars		management-intensive roles incremental cost vs profit centers	

PROPERTY NUMBER

Exhibit F

Profit Center Identification of Typical PUD

Townhouse sale		$35,000
Sales Commission	$1,750	
Mortgage loan finders fee	350	
Insurance fee	50	
*Profit Center to sales agency		2,150
		32,850
General Contracting Profit Center		3,000
Direct cost of construction		21,000
Sales value of townhouse pad		8,850
*Profit Center to land developer		1,850
		7,000
*Profit Center for engineering and planning services		1,000
		6,000
Construction costs of site improvement		2,500
*Profit Center to site improvement contractor		500
Value attributable to raw land after master plan		3,000
*Profit Center for securing approval of preliminary master plan and rezoning		1,000
Market value of raw site before rezoning		2,000
Original purchase price basis		500[1]
		1,500
*Profit Center approciation due to passive land banking		1,500
		$ 0

[1] Six pads per gross acre @ $3,000/gross acre

Exhibit 6

ACQUISITION PRIORITY TABLE

(ratings (0 to 4) in matrix represent each parcel's rating by criteria)

	Parcel Number	1	2	3	5	6	7	9	10	13	14	15	17	18	19	20	21	22	23	24
	Acreage	80	120	170	160	40	150	165	130	180	35	75	75	75	26	30	140	24	65	70
Criteria Weight	*Criteria**																			
7X	Contiguity	0	1	3	3	3	4	1	2	2	0	3	3	0	0	1	0	0	0	0
5X	Assemblage Strategy	(this criteria not applied for hypothetical example)																		
4X	Gross Acreage	2	3	4	4	1	4	4	4	4	1	2	2	2	1	1	4	1	2	2
4X	Amenity Proximity	4	4	3	3	1	1	3	3	2	1	3	3	3	0	1	3	0	1	0
3X	Existing Highway Frontage	3	3	2	3	3	1	3	1	4	3	2	2	3	4	0	4	4	0	4
2X	Proposed Highway Frontage	4	0	0	3	0	0	0	4	0	0	4	0	0	0	3	0	0	4	4
2X	Sewer	3	2	3	2	2	2	4	0	4	4	0	4	4	4	0	4	4	2	4
2X	Water	0	0	0	1	1	2	2	2	4	3	4	3	3	3	2	2	3	1	0
2X	Topography	(this criteria not applied for hypothetical example)																		
—2X	Noxious Use Proximity	0	1	3	0	0	1	3	0	1	1	0	2	1	0	3	2	1	4	4
	Total Score (Weight (X) Rating)	47	46	55	(70)	44	57	50	57	(64)	29	(63)	57	41	30	19	48	28	18	28

Rating System: ratings (0-4) in the matrix represent each parcel's rating by criteria

0 = No relevance to parcel
1 = Negligible relevance
2 = Minor relevance
3 = Moderate relevance
4 = Extreme relevance

DEFINITIONS AND ANALYSIS

Contiguity: In view of the scattered, noncontiguous nature of the presently controlled properties, the critical need which must be met by additional assemblage activity is to fill "doughnut holes." The success of the new town venture will depend upon the developer's ability to plan and create a total environment within the assemblage boundaries. Large "out" parcels, not under the developer's control, could seriously compromise the aesthetics and financial profitability of the new town.

Assemblage strategy: The sequence of purchases can be critical to the overall assemblage when related to the intentions of other landowners and developers and existing zoning. For example, it may be known that other developers are attempting to assemble large holdings within the boundaries of the contemplated assemblage. Where such action can be blocked by acquiring a parcel critical to another man's assemblage, that action should be taken immediately. Generally, this criteria is a catchall intended to cover the market and political environment of the assemblage.

Gross acreage: The goal of this assemblage is the development of a new town. By definition, that requires contiguous acreage large enough to plan a total environment containing a variety of land uses, including all densities of residential, retail, commercial, and open space. The larger the parcel acquired, the more meaningful its inclusion is to the primary goal of the assemblage.

Amenity proximity: There are three important amenities (river, golf course, reservoir) within or adjacent to the boundaries of the contemplated assemblage. To the extent it is possible to acquire property adjacent to these amenities, the marketability of the overall new town development will be greatly enhanced.

Existing highway frontage: An important part of the proposed development's public image will be its visual impact from the heavily traveled arterial, Route 14. The more frontage the developer controls along Route 14, the more he will be able to control the environmental impact. Whether the purpose is to develop retail and commercial uses or merely to provide a gracious entrance, as much highway frontage as possible should be controlled.

Proposed highway frontage: A new controlled access Interstate Highway will parallel the southern boundary of the assemblage. Traffic projections reveal that it will be as heavily traveled as Route 14. Because the developer will have total environmental control along this arterial, the main entrance to the new town could logically be located here rather than on Route 14 where that level of control cannot be reasonably obtained. It is also known that Assembly Road will be improved as a major thoroughfare running north and south through the site. Control of adjacent parcels on both sides of that right-of-way should be obtained.

Sewer: Staging of the new town development will probably be related to sewer lines that exist at the time of development. At present, there is limited sewerage available parallel to Route 14. At a later time, a trunk line running parallel and adjacent to the river is anticipated. Parcels within reach of the limited existing line should be acquired to permit early planning and development for the first phases of the new town.

Water: Water in sufficient quantity to serve the new town development runs along Assembly Road north to south. The first-phase development should be planned to be reasonably proximate to that water line to avoid excessive utility installation costs. Thus, parcels adjacent to the existing water line should be acquired for early development.

Topography: Each type of land use has a corresponding ideal topography type from a planner's point of view, although the uses contemplated here are generally best suited to well-drained, rolling, wooded land. All other factors being equal, the parcels with this ideal topography profile should be acquired first.

Noxious use proximity: At the eastern end of the assemblage is a regional sanitary land fill, and at the northern boundary, a large sand and gravel operation. Parcels adjacent to these uses should be penalized by the quantitative rating system.

and costs which could be attributed to the proposed development.

C. Must reading for the appraiser are two articles in House and Home: "A Solution to the Coming Crisis in Land," House and Home, August, 1972. "A New Approach to Land Development Feasibility," House and Home, October, 1973.

D. For the demonstration for the conversion of suitability and capacity to a test of compatability and impact, let us refer to Exhibit H.

BREAK FOR LUNCH

J. Valuation of a single parcel which may be part of a larger future assemblage for a packager requires not only analysis of physical suitability but at least some idea of the priority of the parcel for impossible or probable buyer type. The location of the parcel may provide an adjacent developer or professional packager with highway frontage, contiguity for annexation, control of site lines for a valley or any number of other attributes of value primarily to him (See Exhibit G).

VIII. If the appraiser is looking at land with known suitability and capacity for a certain type of development, the next problem is to determine the compatability of such development with its surrounding environs.

A. The impact of the land use which is possible gains or loses probability of ever occurring depending on the impact it makes upon the immediate neighbors, with existing physical infra-structure of existing roads, utilities, etc., and impact on the cash budgets of the governments making the decisions.

B. Compatability is essentially the social acceptability of the project while impact is concerned with the physical and financial benefits and costs which could be attributed to the proposed development.

C. Must reading for the appraiser are two articles in House and Home: "A Solution to the Coming Crisis in Land," House and Home, August, 1972. "A New Approach to Land Development Feasibility," House and Home, October, 1973.

D. For the demonstration for the conversion of suitability and capacity to a test of compatability and impact, let us refer to Exhibit H.

BREAK FOR LUNCH

ADVANCED APPRAISAL PRACTICE SEMINAR
Sponsored by Society of Real Estate Appraisers - Chapter #89
The Airport Holiday Inn, Tampa, Florida
Monday, June 10, 1974

AFTERNOON SESSION

Instructor: Professor James A. Graaskamp
University of Wisconsin School of Business

I. A demonstration of the appraisal of land following analysis of most probable use and definition of most probable buyer type is not intended to suggest there is only one way to do it but rather to emphasize that physical comparability for market comparison is no more important than buyer comparability. The definition of the buyer defines the proper market area and the range and character of possibly appropriate sales with which to infer future sales price - most probable sales price and range.

A. To demonstrate one technique and also show the application of Vp to residential appraisal, we'll begin with a single family home case and then apply the technique to a vacant land appraisal.

B. Professor Ratcliff, in Chapters 6 and 7 of his most recent book VALUATION FOR REAL ESTATE DECISIONS (available from Democrat Press, P.O. Box 984, Santa Cruz, Cal. 95060) demonstrates a means of converting physical features of homes in comparison to the subject property without having to make arbitrary dollar adjustments.
1. He would first analyze home buyers in the neighborhood of the subject property to identify the basic goals and preferences of such a home buyer. Some knowledge of the economic-social profile of the neighborhood plus some phone calls to recent buyers of roughly comparable properties to the subject property, might suggest the following factors and weights which the probable buyer attaches to them.

Feature	Middle Income Weight	Low Income Weight
Structural soundness	5	5
Space utilization	25	25
Mechanical equipment	5	5
Off-site utilities and services	5	15
Visual appeal	10	5
Location	40	15
Financial operating burden	10	30
	100	100

C. The following actual student appraisal is an example of how seven sales might be rated, these in turn are converted to weighted ratings and a total number of amenity points determined for each property.

D. The third step is to graph points scored against the sale price for each comparable property and fit a straight line to the scatter diagram by inspection or by calculator (HP 80 has a good, linear regression procedure to establish the coefficients in $Y = a + bX$).

EXHIBIT A.

Features	Weight	821 Minakwa St.	3120 Gregory [redacted]	645 Sheldon St.	636 Crandell St.	628 Crandell St.	640 Knicherbocker	657 Knicherbo[redacted]	SUBJECT
		Rating / Weighted Ratings							
Location & Neighborhood	25	2/50	6/150	4/100	2/50	2/50	4/100	4/100	2/50
Lot	5	2/10	4/20	4/20	6/30	4/20	4/20	4/20	4/20
Financial Burden	15	4/60	2/30	4/60	6/90	4/60	4/60	4/60	6/90
Exterior Architecture	15	4/60	4/60	4/60	6/90	6/90	6/90	6/90	4/60
Mechanical	10	2/20	2/20	4/40	6/60	6/60	4/40	4/40	6/60
Physical Condition	10	2/20	4/40	4/40	4/40	4/40	4/40	4/40	4/40
Interior Attractiveness	20	2/40	2/40	4/80	4/80	6/120	6/120	6/120	4/80
TOTAL	100	260	360	400	440	440	470	470	400
PRICE		$26,300	$24,500	$23,800	$22,900	$22,900	$21,900	$21,900	???

Ratcliff Linear Regression

EXHIBIT B

$$Y = a + bx$$

$$b = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - \Sigma(x)^2}$$

$$a = \frac{Y - b(\Sigma x)}{n}$$

$n = 7$	The number of comparables.
$\Sigma Y = 164,200$	The sum of the seven actual prices paid for the comparables. ($26,300) + ($24,500) + ($23,800).....
$(\Sigma y) = 164,200$	
$(\Sigma x) = 2840$	The sum of the total weighs for the comparables. (260) + (360) + (400) + (440) + ...
$(\Sigma xy) = 65,916,000$	(260)(26,300) + (360)(24,500) + ..
$(\Sigma x)(\Sigma y) = 465,328,000$	(2840)(164,200)
$\Sigma(x)^2 = 8,065,600$	$(2840)^2$
$(\Sigma x^2) = 1,186,200$	$(260)^2 + (360)^2 + (400)^2 + (440)^2$ + ..

$$b = \frac{7(65,916,000) - (465,328,000)}{7(1,186,200) - (8,065,600)} = -16.467619 \simeq -16.5$$

$$a = \frac{164,200 - (-16.5)(2840)}{7} = 30,151.428 \simeq \$30,151.$$

$$Y = a + bx$$

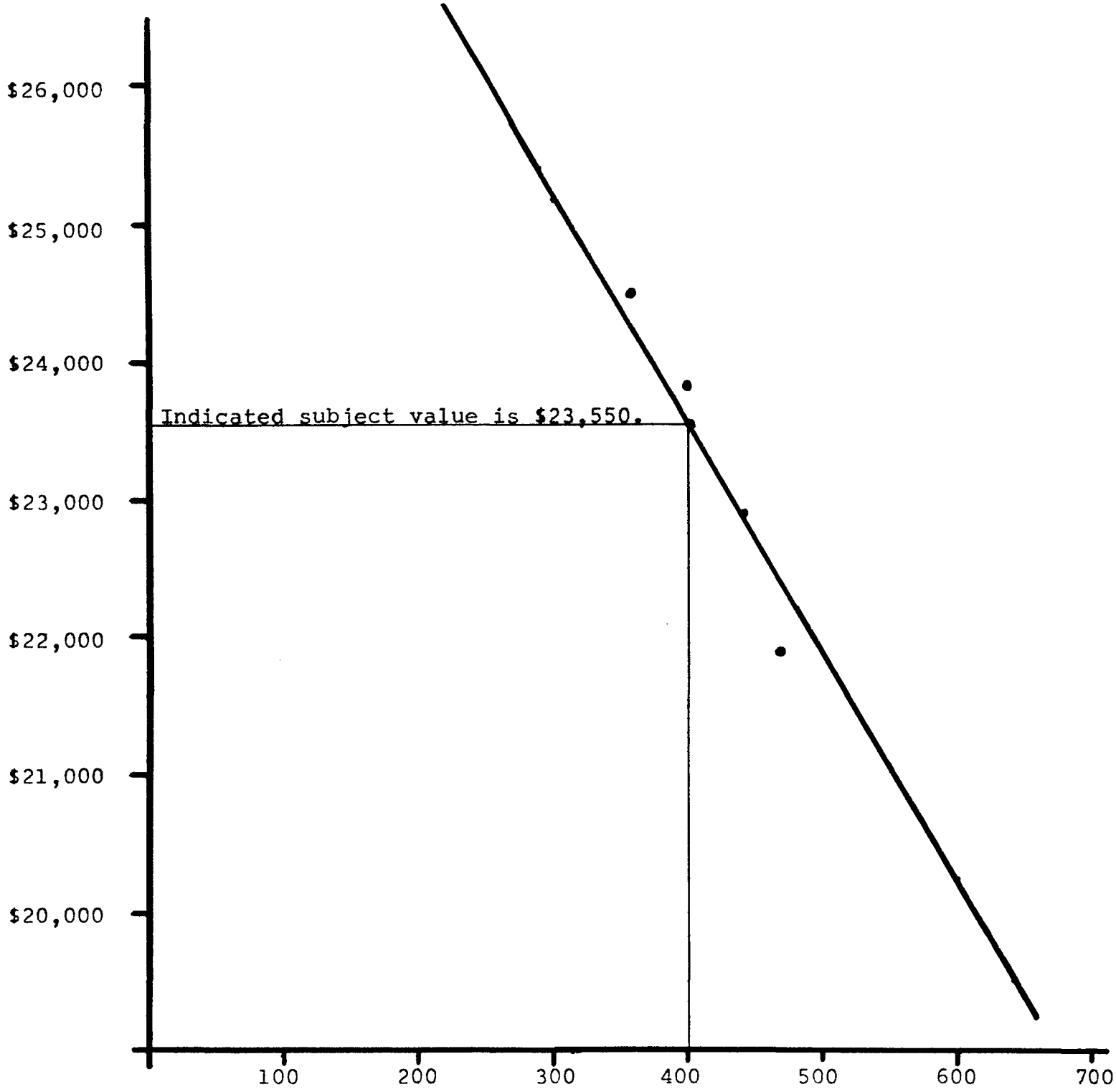
$$Y = 30,151 + (-16.5)(x)$$

'x' for the subject property was 400

$$Y = 30,151 + (-16.5)(400)$$

$$Y = \$23,550$$

EXHIBIT 2


$26,000
$25,000
$24,000
$23,000
$22,000
$21,000
$20,000
Indicated subject value is $23,550.
100
200
300
400
500
600
700

1. By locating the points scored by the subject property on the hand-fit line it is possible to read the price on the verticle axis of the scale.
2. The statistical technique is more useful because it gives you the central tendency and the standard error of the estimate for the regression line.

II. While most of you can do a residential appraisal much more quickly with probably the same accuracy, this technique does illustrate how to relate features and attributes to price with roughly the same emphasis that a possible buyer might place on these features. The linear regression technique is very useful in interpreting and adjusting a few comparable sales for tracts of vacant land and therefore we have created a step by step illustration for you to follow. These statistical techniques are very well explained on page 238-242 of GENERAL APPLIED STATISTICS by Fadil Zuwaylif, published by Addison Wesley.

A. Taking your inventory of physical land features and your knowledge of buyers for that type of site, it should be possible to build a weighted rating on the important elements of SUITABILITY, CAPACITY, COMPATIBILITY, and IMPACT. (See Exhibit D)
   1. For difficult comparisons use a 1,2,3 or 1,3,5 scale with average being the middle number. The weight attached will magnify the result.
   2. A 10 point scale could be adjusted as a 0,2,4,6,8 or 10 using your judgment of how it compares to the best of available. NOTE: IT IS NOT COMPARED TO THE SUBJECT.
   3. While the adjustments are rough, one is relying on the theory of offsetting errors to permit some leveling of these errors in degree. It is simply a way of quantifying your judgment for an organized synthesis which the client can follow and possibly criticize.

B. The next step is to calculate the coefficients of the regression line to convert the points scored by the subject site to a price per gross acre (See Exhibit E).

C. The best way to communicate the results is with a graph as on Exhibit F.

D. Initially the regression equation indicates a central tendency of $2,366 per gross acre. However, probable price requires a statement of range around which transactions might likely fall:
   1. Step VI computes the standard error of the estimate, which in this case is $107 plus or minus. Statistically we could say that 66 times out of 100 times the price should fall between $2259 and $2473.
   2. 95% of the time the probable transaction price will fall between $2152 and $2580.
   3. The appraisers work is not done at this point since he may wish to modify this result by introducing the influence of current regional phenomenon in terms of finance, legislation, etc. as these institutional factors might be expected to modify industrial behavior. (Refer to suggested outline of appraisal in Part IV of the morning session).

VACANT LAND MARKET COMPARISON

USING WEIGHTED SCALE

Feature	Scale	Subject	A	B	C	D	Weight	Subject	A	B	C	D
Suitability (40)												
Soils	5	5	2	5	3	3	10	50	20	50	30	30
Shape	5	4	3	5	3	4	10	40	30	50	30	40
Vegetation	10	6	5	2	3	5	10	60	50	20	30	50
Water	10	0	8	5	3	2	10	0	80	50	30	20
Capacity (15)												
Public Infrastructure	5	3	1	5	5	0	9	27	9	45	45	0
Economic Scale	5	2	1	5	2	3	3	6	3	15	6	9
Area Growth	5	5	2	3	0	3	3	15	6	9	0	9
Comparability (15)												
Social	5	5	5	3	3	4	5	25	25	15	15	20
Physical	10	3	3	5	6	4	10	30	30	50	60	40
Impact (30)												
Fiscal	10	10	6	8	6	7	15	150	90	120	90	105
Environmental	10	6	3	10	4	8	15	90	45	150	60	120
TOTALS							100%	493	388	574	396	443
Gross Price per Acre			1500	2500	1700	1900						

EXHIBIT D

Exhibit E

Least Squares Method of Appraising Vacant Land

$$Y = a - bX$$

where Y = estimated land

X = weighted points for subject site

a = intercept b = slope of line

Step I: Construct 5 columns to record actual values of Y (price) and X (points), their squares and their crossproducts.

Comp	Y	X	Y^2	X^2	XY
A	15~~00~~	388	225	150544	582000
B	25~~00~~	574	625	329476	1435000
C	17~~00~~	396	289	156816	673200
D	19~~00~~	443	361	196249	841700
	$\Sigma = 76$	$\Sigma = 1801$	$\Sigma = 1500$	$\Sigma = 833085$	$\Sigma = 3531900$

Step II: Compute the mean of Y and the mean of X

$$\bar{Y} = \frac{\Sigma Y}{n} = \frac{76}{4} = 19$$

$$\bar{X} = \text{Sum of } \frac{X}{n} = \frac{1801}{4} = 450$$

Step III: Compute Σy^2, Σx^2, and Σxy (Note that we use lower-case letters for these terms which are completely different from the terms denoted by upper-case letters that we computed previously). Use the following these equations:

$$\Sigma y^2 = \Sigma Y^2 - n(\bar{Y})^2$$
$$= 1500 - 4(19)^2 = 56$$
$$\Sigma x^2 = \Sigma X^2 - n(\bar{X})^2$$
$$= 833085 - 4(450)^2 = 23085$$
$$\Sigma xy = \Sigma XY - n\bar{X}\bar{Y}$$
$$= 3531900 - 4(450)19 = 3297700$$
$$= 1119$$

Step IV: Compute the regression coefficient b:

$$b = \frac{\Sigma xy}{\Sigma x^2} = \frac{1119}{23085}$$

$$= .098$$

Step V: Compute the regression coefficient a:

$$a = \bar{Y} - b\bar{X}$$

$$= 19 - .048(450)$$

$$= -2.81$$

Hence the regression equation is

$$Y' = 2.81 + .048X$$

Subject Price Equals $.048(493)(100) = 2366$

Step VI: Compute the Standard error of the estimate.

$$S_{yx} = \sqrt{\frac{\Sigma y^2 - b\Sigma xy}{n-2}}$$

$$= \sqrt{\frac{56 - .048(1119)}{4-2}}$$

$$= \sqrt{\frac{2.29}{2}} \quad = \sqrt{1.146}$$

$$\approx (1.07)(100) = 107$$

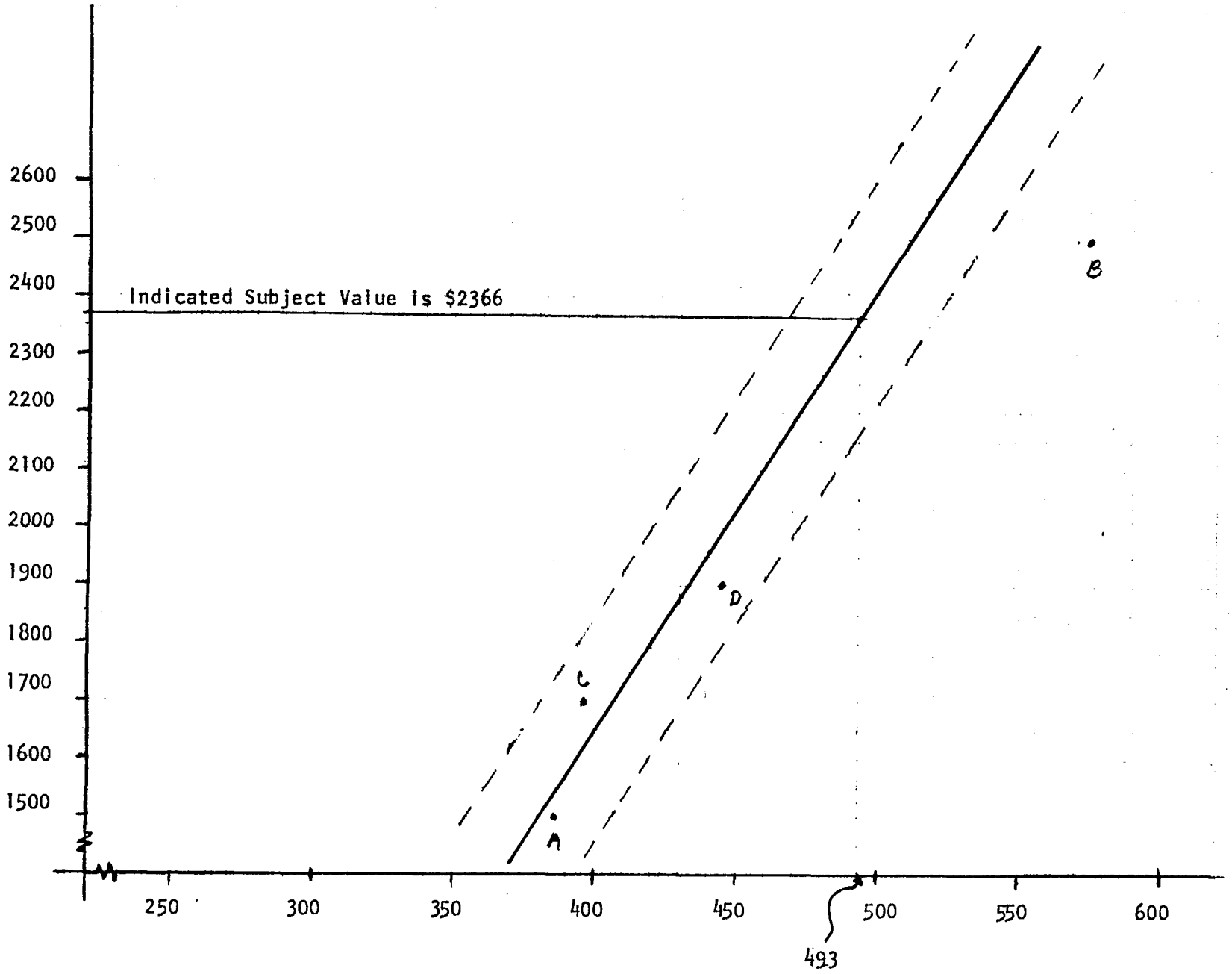
Step VII: Compute the Correlation Coefficient

$$r = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \Sigma y^2}}$$

$$= \frac{1119}{\sqrt{23085(56)}}$$

$$= \frac{1119}{\sqrt{1292760}} \approx \frac{1119}{1137} = .98$$

EXHIBIT F



Weighted Point Scale for Comparable Lands Tracts

E. Step VII computes the correlation coefficient which attempts to measure the relationshp of the sample to the true population. In this case it is a very high .98 which indicates the data was limited (for sales) and perhaps a little artificial.
   1. A small sample of four minus one dependent variable minus one as a correction for a small sample gives us only two degrees of freedom.
   2. A statistics textbook table of significance indicate this means we have a 5% chance of rejecting or excluding the right answer in the manner in which we use our standard error. Put another way the real distribution of transaction prices could fall around a different average price and in different ranges only five out of 100 times.

2:30-2:45 REFRESHMENT BREAK

III. As land is brought under public control, the uncertainties surrounding sale values must eventually have an impact on site value. Existing uses will enjoy monopoly premiums and future uses will be sharply discounted for delay, risk, the high front end costs of securing development approval, and potential for down zoning.

A. The future shock of accelerating change in the ground rules of real estate are leading the professional to plant both feet and balk at any proposed regulation. Instead you as a professional should assist in the development of procedures which advance environmental objectives and concentrate your attack on regulations which are a sham and require you to deliver a product which is not suitable for the use intended.
   1. Mortgage loan ratios have been around for years and is a sham used by the lenders to simplify their regulatory proces and to shift the burden of mortgage lender ignorance and hypocracy on the appraiser. Simplistic out-of-date concepts such as this you have a professional obligation to resist.
   2. When communities use regulation to exclude low income groups or less d esirable land use solely on the basis of environment, cast iron zoning, or fiscal impact you have a professional duty to speak out in opposition. Appraisers are often not highly regarded because of their go-along to get-along attitude. This period of trnasition to public land use control gives you an excellent opportunity to reestablish yourselves as the economic impact analyst of public policy alternatives.
   3. More appraisers should consider seeking career opportunities with land regulating agencies. Many of these agencies are being staffed with anti-real estate graduates of the planning schools who teach an "us against them" type of adversary planning without ever finding out anything about real estate enterprise and how it works.

B. The real problem with new regulations such as the development of regional impact (DRI Section) of the Florida Environmental Land and Water Management Act of 1972 (ELMS) are the two related problems of an agreed on data base and expedient processing of development plans.
   1. The scope of the entire impact analysis is requiring development of mechanics for review and development of clear concise and hopefully graphic standards for impact testing. Pending that the DRI may be premature in scope.

SPECIAL MANUAL TRAFFIC COUNT

UNIVERSITY AVENUE

BETWEEN LAKE ST. & FRANCIS ST.

		WESTBOUND					EASTB'ND	TOTAL E'BND + W'BND
		CARS (C_W)	TRUCKS (T_W)	BUSES (B_W)	TOTAL	%(T&B)	BUSES (B_E)	
	3:00 - 3:15	274	4	3	281		1	282
	3:15 - 3:30	323	9	2	334		3	337
	3:30 - 3:45	319	2	2	323		1	324
	3:45 - 4:00	327	7	3	337		4	341
	4:00 - 4:15	354	3	2	359		4	363
PEAK HOUR 4:15 - 5:15	4:15 - 4:30	397	1	1	399	0.50	7	406
	4:30 - 4:45	414	1	2	417	0.72	2	419
	4:45 - 5:00	376	2	4	382	1.57	5	387
	5:00 - 5:15	399	1	1	401	0.50	2	403
	5:15 - 5:30	351	1	3	355		6	361
	5:30 - 5:45	351	1	2	354		4	358
	5:45 - 6:00	309	1	3	313		6	319

COUNT TAKEN: WED. 11/28/73

WEATHER: DRY, COOL (MID 30's TO 40's)

Herman A.J. Kuhn

COUNT SUPERVISOR: HERMAN A.J. KUHN

ASSOC. PROF. - CIVIL AND ENVIRONMENTAL ENGINEERING

COUNT SUMMARY : UNIVERSITY AVENUE

PEAK HOUR : 4:15 - 5:15 pm

TOTAL VOLUME : 1615

	VOLUME	% OF TOTAL
WESTBND AUTOS	1586	98.2
" TRUCKS	5	.3
" TRANSIT BUSES	8	.5
EASTBND TRANSIT BUSES	16	1.0

% OF TRUCKS & LOCAL TRANSIT IN BOTH DIRECTIONS : 1.8

Worksheet C – Roadway Noise

List all major roads within 1000 ft of the site:	Acceptability Category: Automobiles	Trucks
1. University Avenue	Normally Acceptable	Clearly Unacceptable
*2. UNIVERSITY AVENUE	NORMALLY ACCEPTABLE	NORMALLY UNACCEPTABLE
**3. UNIVERSITY AVENUE	NORMALLY ACCEPTABLE	NORMALLY UNACCEPTABLE
4.		

Necessary Information:	Road #1	*Physical Count ~~Road #2~~ Peak Hour 4:15-5:15pm	**Physical Count ~~Road #3~~ Peak Truck Hour 3:15-4:15pm	Road #4
1. The distance in feet from the site to the centerline of				
a. nearest lane:	62'	62'	62'	
b. farthest lane:	89'	89'	89'	
2. The total number of automobiles per hour in both directions:	1482	1,615	1323	
3. The number of trucks per hour				
a. uphill direction:				
b. downhill direction:				
c. both directions:	100	29	42	
4. Effective distance from site to road:	74'	74'	74'	
Adjustments for Automobile Traffic				
5. Stop-and-go:	148	162	132	
6. Mean speed:	N/A	N/A	N/A	
Adjustments for Truck Traffic				
7. Road gradient:	N/A	N/A	N/A	
8. Stop-and-go:	500	145	210	
9. Mean speed:	N/A	N/A	N/A	
Barrier Adjustment				
10. Distance from site to barrier:				
11. Distance from center of road to barrier:				
12. Effective elevation of road:				
13. Effective elevation of site:				
14. Effective elevation of barrier:				
15. Difference in elevation between site and road:				

(Over)

REVISED: AS/EMPIRICAL DATA

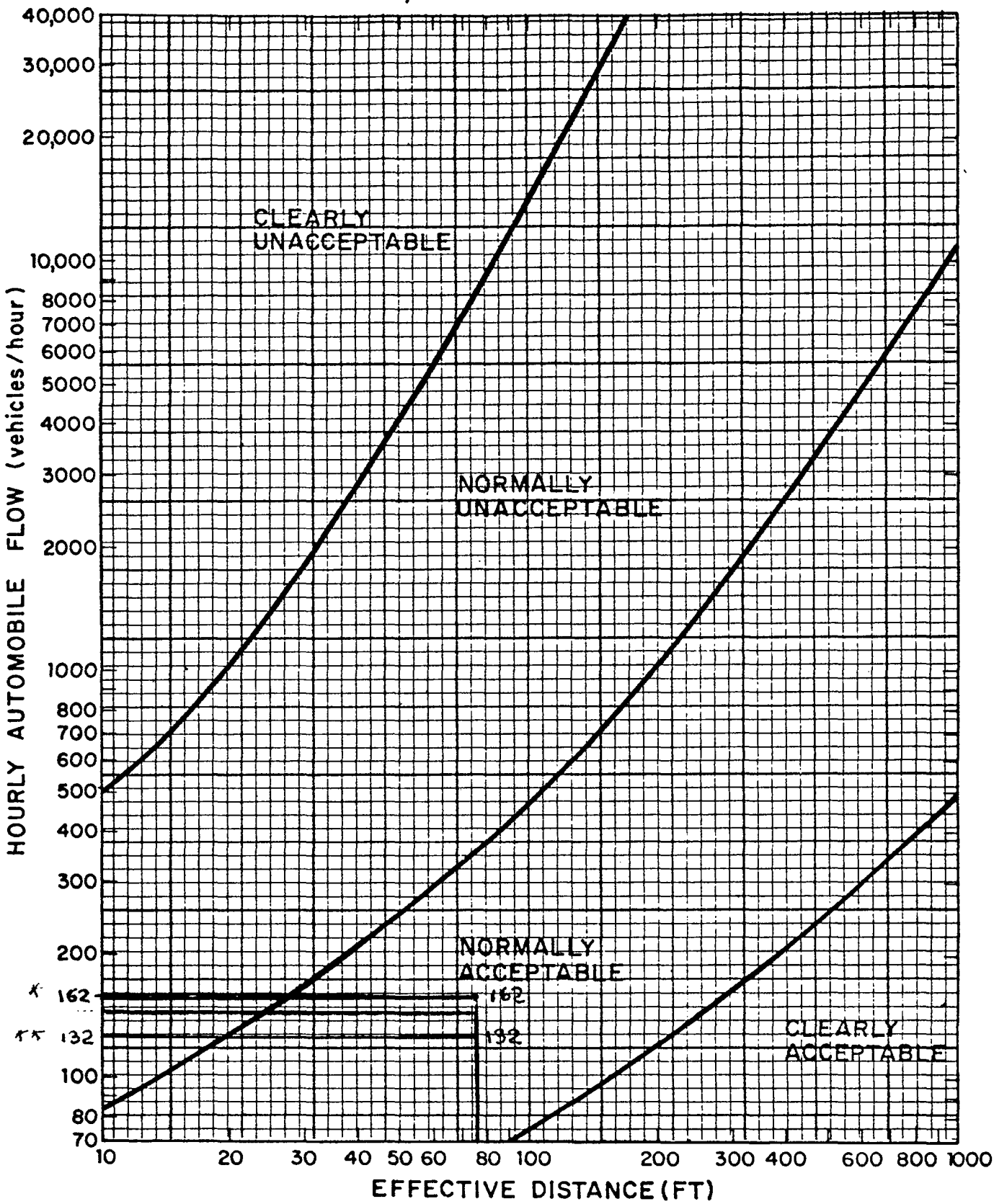


Figure 2.

* PEAK HOUR

** PEAK TRUCK HOUR

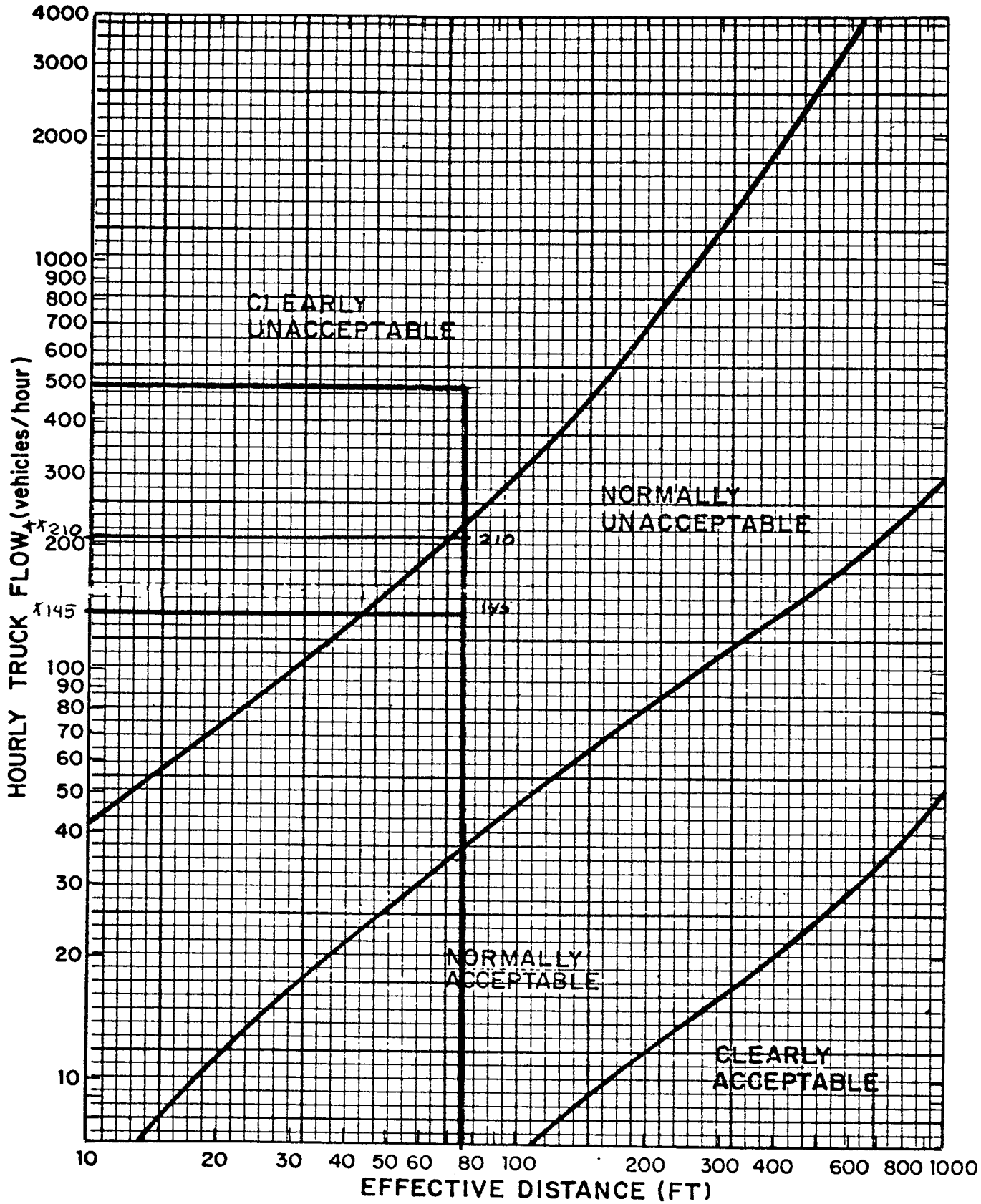


Figure 3.

U.S. GOVERNMENT PRINTING OFFICE : 1971 O - 450-445

* PEAK HOUR

** PEAK TRUCK HOUR.

2. Regulators are groping for easily understood standards for very complex problems but one must hope that they will not find anything so simple minded as a mortgage loan ratio.

3. However, let us look at several basic federal systems for environmental site attributes.

C. If you do any appraisal for or feasibility studies for FHA financed projects, the HUD noise assessment guidelines are a must. They are also extremely useful for any residential site evaluation. (Written by Theodore Schultz and Nancy McMahon, it is available from the Superintendent of Documents, U.S. Printing Office, Washington, D.C. 20402 - price 70¢ - Stock #2300-1194).
   1. This project involves a 221-d4 on a five lane street in Madison. There was a stop light on one corner of the block and a bus lane devoted entirely to buses. Automatic application of the guidelines determined that trucksare 5% of vehicle count and the stop light would multiply that factor by 10 so that the site would be clearly unacceptable for residential use.
   2. HUD seriously suggested that the developer should request the city to pass an ordinance banning all through truck traffic on that segment of University Avenue!
   3. The alternative was to show them that trucks normally did not use University Avenue and that the presumption of 5% truck traffic was wrong. The city traffic count did not distinguish between vehicles. HUD defined any vehicle with dual wheels or a bus - a truck.
   4. The emperical data, analytical form, and simplified chart decision making forms Exhibit G.

D. The federal Flood Disaster Protection Act has made it illegal for federally regulated lenders to make loans on properties in areas identified as flood plain unless the property is covered by flood insurance. It went into effect February 28, 1974.
   1. In 15,000 flood prone communities only 2300 currently participate in subsidized federal flood insurance.
   2. If the community is to qualify it must provide proof of a building permit system which allows for review of new construction.
   3. HUD may identify "special flood hazard areas" where subsequent new construction will be ineligible for insurance.
   4. As an aside one can expect that earthquake zones may soon have a similar requirement.

E. The action was required as most communities continued to ignore the reality of 25 and 50 year high water marks and because the nation can seldom afford to provide all types of unnecessary financial assistance to those who persist in tempting fate and the environmental cycle. (See attached materials)

F. The Office of Interstate Land Sales Regulation affects the sale of projects with 50 or more lots or units. A project is to define to include a series of plats which are part of a larger master plan or are contiguous to eliminate technical avoidance. Exemptions from the act are limited and useful current information is available from two excellent sources:

1. Real Estate Review, a quarterly, such as the article "Exemptions Under the Federal Land Sales Disclosure Act" by William H. McMullin, Jr. Fall 1973, pp. 92-97.
2. American Land magazine published by American Land Development Association, 1000 16th Street NW, Washington, D.C. 20036.

G. The Securities Exchange Commission has become interested in limited partnerships and condominiums as investment securities. However, many of those in NAREB organizations, the Institute for Real Estate Securities and Syndications, are of the opinion that over the next decade most real estate investment will be classified as a security position.
   1. To avoid costly registration the small developer will need to avoid large projects.
   2. To finance the high cost of large scale development registration, the large developer must pay less for the land or receive more generous terms from the seller.
   3. Large appraisal offices and appraisal chapters may find it useful to subscribe to services such as: The Land Development Law Reporter available to non-member of ALDA for $225 a year.

IV. Inherent in all of these regulatory constraints on land use and marketing of finished products are a number of basic implications for the appraiser:

A. A premium will be paid for sites which already have public services and zoning approval which are of sufficiently small scale that the small developer can avoid direct contact with many overlays of regulation.

B. For those projects or sites which have a large number of uncertainties relative to political acceptability or capacity, the lead time necessary to secure political approval may now be 2 or 3 years.
   1. Negative cash flows will persist for longer periods of time.
   2. Discount rates to determine present value must be higher.
   3. Land sales prior to '73 and '74 are no longer comparable nor necessarily easily adjusted.
   4. Land values are not going to increase steadily in value for the passive investor and may actually be decreasing since it is a residual between total value and total cost of improvements and indirect charges.

C. In the appraisal of land and larger tracts, the appraiser must consider some of the basic regulatory constraints which introduce significant uncertainty as to the value of the site.
   1. He cannot dismiss these regulations in his statement of limiting conditions because that would be inconsistent with the professional societies definition of highest and best use.
   2. There is an ethical responsibility of the professional to participate in development of regulatory mechanisms to carry out the social consensus that land use is a public concern.
   3. The buyer who pays too much for land deserves no compensation from society on the basis of hardship when he is not permitted to exploit his site to the injury of others.
   4. The appraisal societies must lead in the development of public regulations which are workable rather than parrot the gripes and concerns of their developer customers and clients who are having difficulties adapting to the new courses of environment and consumer protection.