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# THE ECONOMIC INFLUENCES OF ELEMENTARY SCHOOL SITES ON RESIDENTIAL PROPERTY TAX REVENUE IN SELECTED URBAN NEIGHBORHOODS

by

Karl William Grube

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Education)
in The University of Michigan
1973

Doctoral Committee:

Professor Frederick W. Bertolaet, Chairman
Professor Carl D. Johnson
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ABSTRACT

THE ECONOMIC INFLUENCES OF ELEMENTARY SCHOOL SITES ON RESIDENTIAL PROPERTY TAX REVENUE IN SELECTED URBAN NEIGHBORHOODS

by

Karl William Grube

Chairman: Frederick W. Bertolaet

The purposes of this study were: (1) to develop research criteria and statistically valid analyses; (2) to measure the economic influences of well-developed and undeveloped elementary school sites, large open space and small, limited space, on the market sale prices of comparable single-family residential housing units in matched pairs of urban neighborhoods; and (3) to make estimates of the potential additional property tax revenue yields for residential housing units of the well-developed school sites based on the 1972 property tax millage rates applicable in the subject population neighborhoods.

Procedures for Determining Comparable Samples

In developing the research criteria for this study, the writer evaluated 75 (seventy-five) Michigan school districts and their respective elementary school site neighborhoods to insure comparable sample populations. Elementary

school site neighborhoods were selected for detailed data-gathering and statistical analyses and included the comparable characteristics of: (1) relative land acreage sizes; (2) degrees of site development; (3) types of schoolhouse construction; (4) matched single-family residential housing units; and (5) similar socio-economic stratification within subject neighborhoods.

The study selected matched pairs of elementary school site neighborhoods in the school districts of Dearborn and Lansing, Michigan. Market sale price histories of the subject population, 1224 (one thousand two hundred twenty-four) were obtained for single-family residential housing units for five, large, open space elementary school site neighborhoods and for five, comparable, small, limited space elementary school site neighborhoods. Pertinent market sales data, building and site data, and neighborhood profile data which occurred during the period from 1952 through 1971 were collected and statistically analyzed.

The primary sources of elementary school building and site data were obtained from the official records of the Michigan Department of Education, School Plant Planning Section and from the records of the boards of education of the subject school districts.

The primary sources of data for the determination of neighborhood profile characteristics of comparable neighborhoods were obtained from the 1970 United States Census Data, the official records of City Treasurers of Dearborn and Lansing, and from the Dearborn and Lansing City Engineering offices.

The primary sources of market sales data for the subject population were obtained from the records of Boards of Realtors of the Dearborn and of the Lansing Associations and from the public records of the Register of Deeds Offices of Wayne and of Ingham counties, the Burton Abstract and Title Insurance Company and the Lawyers Title and Trust Company of those respective school districts.

## Findings

The study tested and rejected the following four null hypotheses.

$H_o$ = There is no significant difference in the last sale price of residential housing as adjusted for the covariates of the first sale price, the number of years between sales, and the number of streets crossed for large, open space and for small, limited space elementary school sites.

$H_o$ = There is no significant difference between

the relationship of the number of streets crossed and the first sale price for large, open space and for small, limited space elementary school sites.

$H_o$ = There is no significant difference between the relationship of the number of streets crossed and the last sale price for large, open space and for small, limited space elementary school sites.

$H_o$ = There is no significant difference between the relationship of the projected potential additional property tax revenue yield and the last sale price of residential housing as adjusted for the covariates of the first sale price, the number of years between sales, and the number of streets crossed for large, open space and for small, limited space elementary school sites.

On the basis of the statistical analyses of the data, the following conclusions were reached:

1. The combination of: educational, community, and landscape developed acreage; natural or manmade amenities; good site development practices; good site design; and, site maintenance, are all influential in contributing to higher market sale prices of residential housing surrounding the subject elementary school sites.

2. The enlargement and conversion of a formerly small, limited space elementary school site into the site

criteria standards of a large, open space elementary school site increased the market sale prices dramatically (one sample site); thus, the most recent market sale prices in this neighborhood equaled those recorded around the comparable, large, open space elementary school site.

3. The size of the land acreage of large, open space elementary school sites is related significantly to the higher market sale prices recorded on residential housing units sold in the subject neighborhoods.

4. The size of the land acreage of small, limited space elementary school sites is related significantly to the lower market sale prices recorded on residential housing units sold in the subject neighborhoods.

5. When developed parkland is the major portion of an elementary school site, these parklands influence positively the market sale prices of nearby residential housing.

6. The land acreage size and the degrees of school site development of the elementary school sites surveyed in this investigation exerted positive and negative influences on the recorded market sale prices of residential housing units as far away as five street crossings from the site.

7. The residential housing units located in close proximity to large, open space elementary school sites produced higher market sale prices than did comparable

residential housing located at the same proximity to small, limited space elementary school sites.

8. The residential housing units that are located one, two, and three street crossings away from large, open space elementary school sites are selling for higher market sale prices than similar residential housing units located farther from the site.

9. Higher market sale prices were recorded for residential housing units located near well-developed small, limited space elementary school sites as compared to similar residential housing units located four or more street crossings away from the subject site.

10. The projected potential additional property tax revenue yields from residential housing units surrounding large, open space elementary school sites could be sufficient to pay the additional investment for open space acreage, site development, and site maintenance when collected over a thirty-year period.

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To my wife, Mary Marshall, I am grateful for the

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# CHAPTER I

## THE NATURE AND PURPOSE OF INVESTIGATION

### Introduction

America's population is confronted with an increasing number of complex environmental problems which threaten the existing quality of their lives. As this nation approaches the midpoint of the 1970's, the problems of counteracting urban blight, mismanagement of land and other natural resources will require a national commitment to realize lasting solutions. Within the span of the next three decades, the American citizenry must become aware of these problems and be willing to effectively change what appears as a movement toward environmental disaster.

The past fifty years, especially the era of the 1960's, has produced two notable land use trends as applicable to the land surrounding our great cities. Our once prominent rural population continues to migrate to our metropolitan areas, which places increased pressures upon the capacity of the land to support a quality standard of living for all its inhabitants. Our metropolitan regions continue to sprawl into the countryside in a haphazard manner with the result that land values throughout the

nation are rising five to ten per cent annually and the cost of lands suitable for public recreation is rising even faster.[1] According to the eminent landscape architect, John Ormsbee Simonds:

> The city of Toronto, for example, is surging northward for no apparent reason, into an area seven miles from its harbor on Lake Ontario. Aside from the convenience and more favorable topography of the lakeshore, which has ample room for expansion, the summer temperature at the lake is often 26 degrees cooler and the winter temperature 30 degrees warmer than at the areas of new building concentration.[2]

The phenomenon of urban sprawl is not only a major environmental problem for America, but seems to invade all human habitation, regardless of immense territorial space or nationhood.

The expanding urbanization of our countryside is concentrating a greater percentage of the nation's population in the fringe areas of our suburban regions. According to The President's Council on Recreation and Natural Beauty:

> For more than seven out of ten Americans, home is an urban setting - not only the place of residence, but the site of most experience. By the year 2000 - a mere 32 years away - nearly nine out of ten Americans will dwell in urban areas.[3]

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[1]U.S. Department of Interior Yearbook No. 4, Man... An Endangered Species? (Washington, D.C.: U.S. Government Printing Office, 1968), p. 20.

[2]John Ormsbee Simonds, Landscape Architecture An Ecological Approach to Environmental Planning (New York: McGraw-Hill Book Company, 1961), p. 27.

[3]President's Council on Recreation and Natural Beauty, From Sea to Shining Sea (Washington, D.C.: Government Printing Office, 1968), p. 29.

This projected growth in population and the explosive quality of concentrated countryside urbanization are significant elements in the competition for land usage in our urban society.

The development of new suburban communities on the fringe of America's cities has actually limited the amount of open space available for human usage. In a recent publication entitled "Land-Rich or Poor Schools," Dwayne E. Gardner stated:

> As suburbs sprawl across the land and cities stretch up to capture the sky, the people, the inhabitants, have less and less room to sprawl and stretch. By 1975, we will need over two million homes a year. We will need schools for more than ten million additional children, welfare and health facilities for five million people over the age of 60. But the accelerated demand for homes, shopping centers, highways, and public facilities leaves less open space in the suburbs and produces progressive decay in the cities.[1]

Instead of developing planned communities which meet the increased leisure demands for open space, urban sprawl development has had the reverse effect.

In considering the quality factors which comprise an environment that is satisfying to man, logic indicates that one must identify and examine the elements which compose this environment. Of major importance to many

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[1]Dwayne E. Gardner, "Land-Rich or Poor Schools," American Education, III (Novemher, 1967), 13.

Americans is the residential neighborhood of their youth which provided the medium for environmental experience. Most adults can recall quite vividly the neighborhoods in which their childhood years were spent; these experiences provide a deep emotional impact to their present family structure. In discussing the elements of an environment which are meaningful to individuals, The President's Council on Recreation and Natural Beauty indicated:

> These formative experiences are inevitably enhanced and enriched in attractive, well-ordered neighborhoods; they are demeaned in districts of blight, litter, and ugliness, whether in decaying, crime-infested slums of the central city or in dreary sprawling suburbs on the outer urban fringes, the slums of the future.[1]

Historically, a focal point of many well-established neighborhoods was the public school site. It was the public school and its site which provided a common facility and land resource for potentially satisfying environmental experiences. On the other hand, most public school systems in America have given little or no consideration to the ways in which the school site, the only common land that youth have in a neighborhood, could be used to enhance the environmental quality of neighborhoods. The public school site, this land which constitutes the commons for socialization of youth as well as adults, has been located

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[1]President's Council, Shining Sea, p. 31.

to service a residential population with a limited amount of public or private transportation required. Many residential neighborhoods do not have public land set aside for use such as parkland space; however, the public school site is available in all residential neighborhoods.

If large, open space elementary school sites contribute to the market sale price appreciation of residential housing, the total property tax base of the public school district should be expanded. This expansion of the property tax base allows for the collection of incremental property tax revenues which could be utilized for improving small, limited space elementary school sites. Other governmental units which rely on the property tax as a means for financing public services, i.e., city and county governments, would also benefit by the collection and accumulation of additional property tax revenues associated with large, open space elementary school site neighborhoods.

Accordingly, if the expansion of the property tax base can be attributed to positive economic influences of large, open space elementary school sites on the appreciation rates of surrounding residential housing, the homeowner, a property taxpayer and voter, will have gained a personal economic advantage. The psychological feelings associated with this personal economic advantage may

contribute to a more favorable voting attitude regarding public school issues. In a study conducted by Edward C. Banfield and James Q. Wilson, the voting attitudes of various income voters in seven United States' cities were examined regarding public referenda proposals between 1957 and 1963. In the words of Banfield and Wilson:

> The voter tried to maximize his family income or (the same thing) self-interest narrowly conceived. We assume that the voter estimates in dollars both the benefits that will accrue to him and his family if the proposed public expenditure is made and the amount of the tax that will fall on him in consequence of the expenditure; if it is less, he votes against it.[1]

If the residential homeowner perceives that expenditures for public education, especially capital outlay for buildings and sites, are capitalized through higher market prices being paid for residential housing associated with large, open space elementary school sites; perhaps his political voting attitude toward public school issues will be favorably affected.

A question of prime importance in this investigation revolves around the defining of the quality factors of an elementary school site which contributes to the total environmental quality of a neighborhood. These quality

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[1]Edward C. Banfield and James Q. Wilson, "Voting Behavior on Municipal Public Expenditures: A Study in Rationality and Self-Interest," in The Public Economy of Urban Communities, ed. by Julius Margolis (Washington D.C.: Resources for the Future, 1965), p. 74.

factors such as site size, educational, community, and landscape development of school sites are undoubtedly related to the economic value of neighborhood residential housing. If large, open space elementary school sites improve the total environmental quality of a neighborhood, then it behooves educators to develop systems for the financing of these projects. In a publication for the Association of School Business Officials of the United States and Canada, Donald A. Jones alluded to the contemporary purpose of public school sites:

> In my opinion a large, roomy site is of prime importance. Fifty years ago our children were going to school in a different world. They could roam freely in the adult community with comparative safety. Today the thoroughfares of our urban world are crowded with metal monsters traveling at death dealing speeds, electric wires are overhead, gas is piped underfoot, and the "sand lots" or "commons" are gone. The world we have constructed has left few areas of safety where our children can freely move and explore in a relaxed atmosphere. Hence, if our children of today and tomorrow are to have freedom of movement it must be in an area planned for the purpose and reserved for the children's use.[1]

Public elementary school sites located in residential neighborhoods can function as a fundamental network in establishing a system of open space areas for the use of

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[1]Donald A. Jones, "School Site Selection: Methods, Policies, and Procedures in Acquisition and Purchase," Journal of the Association of Business Officials of the United States and Canada, LVI (1956), 75.

neighborhood residents. In order for open space preserves to be established: boards of education must either acquire additional land; restructure school site policies to include significant site development expenditures; and/or develop programs which are designed to serve all of the residents of a neighborhood.

Accordingly, the acquisition of land adjacent to small, limited space elementary school sites will be a major recoverable public investment by school districts and municipalities. Research has shown that when public agencies buy or invest public funds in land, that when these lands are resold, a profit is realized. If large, open space elementary school sites add dollar value to the market sale prices of surrounding residential housing and this results in the expansion of the property tax base, the residential housing will return higher property tax revenues to local units of government, thus creating a self-financing system for open space projects.

In 1972, 54.2 per cent of the total expenditures for public elementary and secondary education in the United States was provided from local property tax revenues.[1]

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[1] U. S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1972 (Washington D.C.: Government Printing Office, 1972), p. 106.

Also, municipalities collect local property taxes on these same properties so that in 1970, municipalities received 84.9 per cent of their tax revenues from local property taxes.[1] The additional property tax revenue collected by the expansion of the property tax base for both school districts and municipalities may be sufficient to provide the necessary funds for upgrading of small, limited space elementary school sites to open space standards.

## Need for Study

An immediate need exists for our American system to develop and maintain a planned, systematic approach to improving the quality of the environmental standard of life for all its citizens, especially the unborn generations that will constitute our posterity. A planned approach to improving America's environment can be expressed and delineated in terms of economic rationale.

The requirements of modern living for roads, housing, water, power, factories, office space, and schoolhouses will continue to exert significant pressure upon the economy's ability to respond adequately to these demands. Further, the anticipated growth in population will create additional

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[1] Ibid., p. 409.

burdens upon the American system to adequately plan and finance the growth demands of increased population. In a recent article entitled "Buying the Future," Howard Flieger remarked:

> By 1980 U.S. population will have increased by 14 million people to a total of 224 million. In an era when talk of trillions is humdrum, 14 million doesn't sound like much. But it means that the equivalent of a new town of 38,000 people must be opened up every week from now until mid-1980.[1]

The projected growth in population and the explosive quality of concentrated urbanization will be significant elements in the competition for land usage. Certain evidence indicates that increased competition is already reflected in data related to land usage trends. According to a study of the Citizens Committee for the Outdoor Resources Review Commission:

> Three centuries of settlement and population expansion have appreciably changed the American landscape. Cities and roads have been built and expanded at the expense of forests and agricultural land. Today, about 2 1/2 per cent of our land area represents cities, roads and airports. Parks and similar regulated open areas represent about 3 1/2 per cent. Crops cover 20 per cent. Wild land is being used up alarmingly fast. As cities become crowded, there is a spill-out of people to new urbanized corridors, subdivisions, and existing towns and villages. Each year a million acres of land are developed in one way or another.[2]

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[1]Howard Flieger, "Buying the Future," U. S. News & World Report, May 28, 1973, p. 108.

[2]Citizens Committee for the Outdoor Recreation Resources Review Commission Report, Action for Outdoor Recreation for America (Washington, D.C.: Government Printing Office, 1963), p. 3.

Representing a portion of the increased land consumption in our countryside is the significant market demand for open space devoted to recreation. In summarizing a Bureau of Outdoor Recreation study report on recreational demands, the Department of Interior indicated:

> By the year 2000, participation in major summertime outdoor recreation activities will be four times greater than it was in 1960. Only a three-fold increase had been anticipated. Outdoor Recreation Trends, a BOR report, shows that public participation in major outdoor recreation activities increased a sturdy 51 per cent between 1960 and 1965.[1]

The acceleration in the cost of land parcels continues to reflect an increased market demand for developable raw land. The Educational Facilities Laboratories in a publication entitled, The Cost of a Schoolhouse, discussed the cost of future land for proposed school sites in San Mateo, California. The Educational Facilities Laboratories reported:

> . . . For example, take San Mateo, a bursting California community. This case study deals with just one phase of their system-wide approach - the acquisition of building sites. It shows how the ultimate economy of a school building program may be determined long before the architect sets pencil to paper. By early acquisition of sites money was saved - $3.5 million to pay for the cost of an entire high school.[2]

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[1]U.S. Department of Interior, Conservation Yearbook No. 4 of Interior, 1968 (Washington, D.C.: Government Printing Office, 1968), p. 18.

[2]Educational Facilities Laboratories, The Cost of a Schoolhouse (New York: Educational Facilities Laboratories, Inc., 1960), p. 46.

It should be noted that the five San Mateo school sites were larger than the 1964 recommendations for school sites as proposed by the Council of Educational Facility Planners (formerly named the National Council on Schoolhouse Construction).[1] Furthermore, the urban need for outdoor community recreation areas was firmly established through the utilization of the large, open space school sites in conjunction with recreation-oriented programs.

As one reflects upon the literature associated with school sites, a definite trend toward larger school sites over the years becomes apparent. However, it is discernible that larger school sites have been proposed to the extent that they promote better educational programs. In an article entitled, "The Need for Large School Sites," the writers discuss the new role of larger school sites. Richard W. DeRemer and Billy G. Lauda stated:

> The trend towards larger school sites has been predicted upon the assumption that school grounds should be used to enrich the instructional program. Large sites, properly developed, provide opportunities for enriching academic studies as well as other sectors of the school program.[2]

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[1]Council of Educational Facility Planners, NCSC Guide for Planning School Plants (Columbus, Ohio: The Council, 1964), p. 22.

[2]Richard W. DeRemer and Billy G. Lauda, "The Need For Large School Sites," American School Board Journal, CXLVIII (April, 1964), p. 72.

In order to offer a wide variety of educational experiences as related to environmental learning activities on school sites, it is not only important to consider the size of the site, but rather the unique environmental quality features of the school site. In discussing criteria for school site selection, William B. Stapp stated:

> In selecting school sites, one criterion should be the unique features which can be used to enrich the school's educational program and serve the neighborhood community.[1]

In a recent article entitled, "Places Within Ann Arbor and Nearby Where One May Take Nature Walks," Clarence J. Messner alluded to the role of Ann Arbor's large, environmentally developed school sites as related to the contribution of these sites to all the community's citizens. In the words of Messner:

> . . . many of the public schools have small outdoor nature study areas available to the general public. Of importance, these are used by school children under the expert leadership of naturalists for the purpose of teaching our youth some of the principles of ecology and giving them knowledge, appreciations, attitudes and understandings about the outside world of nature.[2]

A publication prepared by the U.S. Soil Conservation

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[1]William B. Stapp, "Outdoor Laboratories," in Manual of Outdoor Interpretation, ed. by Joseph J. Shomon (New York: National Audubon Society, 1968), p. 66.

[2]Clarence J. Messner, "Places Within Ann Arbor and Nearby Where One May Take Nature Walks," 24th Annual Conservation Report, XXIV (December, 1972), 25.

Service supports the premise that public school lands should not only be large in acreage terms, but a portion of these lands should be developed for and devoted to the study of environmental education. The U.S. Soil Conservation Service reported:

> As an integral part of the school site, an outdoor classroom expands the traditional learning environment to a new one that is readily accessible to youth and teachers. . . . it is immediately available for continuous studies, for unexpected observation, for supervised individual study projects, and for capitalizing on the teachable moment.[1]

Thus, a rationale for larger school sites appears to be assuming a new quality; the recognition that open space school sites can serve as a fundamental asset in the enrichment of the curriculum.

In examining the needs of an expanded educational curriculum, the desirability for large, open space elementary school sites becomes apparent. In a study conducted in the Omaha Public Schools by Robert Schultze, which surveyed and recorded present and past practices of elementary school site utilization, the following recommendations were indicated:

> The recommendations for future planning of the Omaha Public Schools were: (1) Total site size: An elementary school site should include ten acres plus

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[1]U.S. Department of Agriculture, Soil Conservation Service, Outdoor Classrooms On School Sites (Washington, D.C.: Government Printing Office, 1972), p. 2.

> an additional acre for each 100 pupils. (2) Playground: Elementary school sites must provide adequate well-planned space for physical education and community recreational use. (3) On construction of a new building on a new site consideration should be given to leaving an area in its natural state.[1]

The need for developing large, open space elementary school sites in high density habitation areas as it related to curriculum expansion is supported by a study conducted by R. D. Srivastava. He said, "The properly equipped school site should provide enough space to aid in the mental and physical development of every child . . ."[2] In a curriculum-oriented study conducted in the State of Virginia, it was proposed to establish site size requirements for the schools in the State of Virginia. The researcher, George Granville Tankard, Jr., indicated:

> Significant conclusions of the study are: The outdoor programs in Virginia's elementary schools are inadequate for three reasons: (a) insufficient space; (b) inadequate facilities, even though adequate area is available, and (c) failure of school faculties to conduct a desirable program despite adequate facilities.[3]

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[1]Robert Schultze, "The Utilization of Building Sites of the Elementary Schools of the Omaha Public Schools" (Unpublished Ed.D. dissertation, University of Nebraska Teachers College, 1966), p. 82.

[2]R. D. Srivastava, School Sites and Spaces in High Density Habitations, Report to the Central Building Research Institute (Roorkee, India: The Institute, 1968), p. 4.

[3]George Granville Tankard, Jr., "Site Requirements for Outdoor Instruction for Virginia Elementary Schools" (Unpublished Ed.D. dissertation, George Peabody College for Teachers, 1956), p. 192.

In accordance, larger school sites have been advocated since a report by the Commission on the Reorganization of Secondary Schools was published in 1924. The Commission recommended:

> There is abundant evidence from experience to prove that no high school site should be less than three acres for the most modest building. Of this space two acres are necessary for physical education. Five acres is the minimum for a school of 500 pupils.[1]

Twenty-five years later, the American Association of School Administrators stated:

> The size of any school site should be determined by the nature and scope of the contemplated educational program . . .
>
> (a) For elementary schools, five acres plus an additional acre for each hundred pupils of ultimate enrollment.
>
> (b) For secondary schools, ten acres plus an additional acre for each 100 pupils of ultimate enrollment.[2]

The Council of Educational Facility Planners tendered recommendations for the size of minimum school sites. The Council reported:

> For elementary schools, it is suggested a minimum site of five acres plus an additional acre for each

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[1]National Education Association, High School Buildings and Grounds, Report of the Committee on the Reorganization of Secondary Schools (Washington, D.C.: Government Printing Office, 1953), p. 49.

[2]American Association of School Administrators, American School Buildings (Washington, D.C.: The Association, 1949), p. 75.

> 100 pupils of predicted ultimate maximum enrollment.
>
> For junior high schools, it is suggested a minimum of ten acres be provided, plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment.
>
> For senior high schools, it is suggested a minimum site of 20 acres plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment.[1]

Thus, the past five decades have seen major changes in the school site requirements of programs which have provided educational standards for the recommendations by professional educational organizations for expanded school sites.

A recent development in the field of land economics research is the analysis of the impact that single-family subdivision developments have upon the municipal costs of a suburban region. A recent publication by the Open Space Institute defines the economic land use concept which is receiving national research efforts. In the words of Charles E. Little:

> . . . the "New Municipal Math" - the truism that public service costs in suburbia increase faster than property tax in income as vacant land is subdivided into single family developments.[2]

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[1]Facility Planners, NCSC Guide, p. 22.

[2]Charles E. Little, Challenge of the Land (New York: Pergamon Press, 1969), p. 79.

In essence, the preservation of open space in America's suburban regions translates into significant dollar savings as measured by the costs of providing municipal public services such as roads, electrical power transmission lines, sidewalk development, and maintenance of roads. According to Charles E. Little:

> In Closter, New Jersey, a controversy arose in 1965 over the acquisition of seven open space parcels totaling some 80 acres. According to an account in the Bergen Evening Record, Major James E. Carson applied a Fitch like formula this way. If the land had not been acquired, 80 acres would accommodate 160 houses. The houses, if constructed would produce about 200 children to be educated at an average cost of $720 for each pupil or a total cost per year of $144,000 annually. Additional garbage collection would cost about $4,000 annually, additional police patroling $6,000, additional fire hydrants, lighting, and other services, $2,000 for a total of $156,000 per year in services.
>
> Carson estimated the tax revenue to be $100,000 a year; therefore, the community's net annual loss would be $56,000.[1]

In a study conducted in Lloyd Harbor, New York, which documented the total effect of developing 1,426 acres into single-family residences, the following results were recorded by Charles E. Little.

> . . . the village board hired a firm of planning consultants to assess exactly what the damage would be, and, yes, it would be significant - an increase of $2.58

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[1]Ibid., p. 83.

> hundred, nearly 20% (from $14.33 to $16.91). But that was only a part of what the planners were asked to figure out. Assumming the land would eventually be developed, they set up a statistical model based on two-acre plots containing houses worth $35,000. In this case, said the planners to the dismay of some, the tax rate would go to $21.64, and increase nearly three times greater.[1]

It is not a major tenet of this research investigation to document the municipal overburden costs of single-family development associated with communities which have not set aside large tracts of open space; however, it is a point of reference in this study that research is needed to document the economic affects of municipal overburden as related to small, limited space elementary school sites. It is postulated that large, open space elementary school sites provide significant public service savings proportional to the acreage size accorded to the public school site.

On the other hand, it is a major objective of this research investigation to document certain economic value relationships of large, open space elementary school sites upon the surrounding residential property tax base. This study postulates that large, open space elementary school sites add market value to surrounding residential dwellings; thus, positively influencing the potential property tax base. If large, open space elementary school sites, a

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[1]Ibid., p. 84.

form of open space preserve within communities, add incremental value yearly to surrounding neighborhood properties, this increase in accrued additional property tax revenues may be sufficient to self-finance open space school site projects. Certain documented evidence that school-park combinations exert upon the market demand for nearby residential housing appears throughout the literature. According to the American Society of Planning Officials Newsletter:

> . . . it is a common practice throughout the United States for FHA appraisers to place a higher valuation on houselots if the development contains a park or if it is adjacent to or near a public park.[1]

Further evidence of this market demand to be located close to school-park combinations was pointed out in a study conducted by the National Association of Home Builders in 1958. The report indicated:

> Today's home buyer is looking for features beyond the confines of the house and lot. Proximity to school, park, and community recreation is high on his list of looked-for items. . . . In the vicinity of park and recreation area, enhanced values of building sites up to 15 to 20%, with a high level of sustained value over the years are not an uncommon experience. The cost of land and improvements involved will be,

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[1] "Question and Comment: Parks and Property Values," American Society of Planning Officials Newsletter, XXIII (March, 1963), 92.

> in most cases, more than covered by the enhanced value which accrues to the development as a whole.[1]

This investigation will attempt to document certain economic value relationships of elementary school sites upon the market price trends of surrounding residential housing. The writer selected ten elementary school site neighborhoods; five which have large, open space sites and five which contain small, limited space sites. Buildings were matched for nearly identical physical characteristics; neighborhoods represent compatible profile characteristics with the differing factor being the type and quality of development on the school site.

## Statement of Problem

This study investigated certain market sale price trends of residential housing surrounding public elementary school sites in the school districts of Dearborn and Lansing, Michigan. The financial analyses of the study utilized a time-series approach, 1952 through 1971, in assessing the economic impact of elementary school sites

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[1]National Association of Home Builders of the United States, Home Builder's Manual for Land Development (2nd rev. ed. Washington, D.C.: National Association of Home Builders, 1961), p. 194.

upon surrounding neighborhood residential real estate. Accordingly, seven economic objectives of this investigation are offered to formulate the conceptual basis of the problem.

## Statement of Objectives

### Objective One

To develop an appropriate economic model to measure and evaluate the fiscal impact of elementary school sites on surrounding residential housing market sale prices.

### Objective Two

To determine certain economic influences of elementary school sites on the market sale prices of surrounding residential housing.

### Objective Three

To qualify the financial affects of elementary school sites upon the market sale prices of surrounding residential housing as related to the linear distance of the house to the site.

### Objective Four

To ascertain if potential additional property tax

revenue yields exist between comparable large, open space and small, limited space elementary school site neighborhoods.

Objective Five

To identify elementary school site development practices which stabilize or appreciate the market sale prices of surrounding residential real estate.

Objective Six

To record the educational, community, and landscape design features of elementary school sites which contribute to the appreciation or depreciation of the market sale prices of residential housing surrounding these sites.

Objective Seven

To ascertain if parkland in association with elementary school sites is significant in appreciating the market sale prices of residential housing surrounding school-park neighborhood sites as compared to elementary school sites without parkland.

## Criteria for School Site Design

In order to formulate a concept of a large, open

space elementary school site, certain specific site design features are presented. These criteria formulate a classification system for evaluating the site components which comprise a large, open space elementary school site. In constructing the concept of a small, limited space elementary school site, the absence of these school site design features becomes the fulcrum for classifying those sites.

## Large, Open Space Elementary School Site

### Acreage

The acreage approximates the recommended standard of the Council of Educational Facility Planners of ten acres minimum plus one acre per each 100 pupils enrolled.[1] The research published by this Council indicates that few existing elementary school sites conform to this standard; thus, elementary school sites in combination with parkland that formulate twelve acres minimum was considered as qualifying for the open space designation. The parkland was a natural and contiguous extension of the school site and the entire open space school site had to contain educational, community and landscape developmental features.

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[1]Facility Planners, NCSC Guide, p. 22.

## Educational Development

The site contains a sealed-surface playground area, standard and/or creative playground equipment, vegetative areas for environmental study, distinctive type of recreational fields, observation hills, water habitat for instructional use, a basic site plan, and a master site plan.

## Community Development

A portion of the site is devoted to parkland and is available to all neighborhood residents during school and non-school hours. Recreational features such as activity areas for baseball, football, basketball, tennis and related physical sports are present on the site. Site development may include such features as trails, walks, rest benches, picnic tables, wading and/or swimming pool, rest shelters, pre-school play area and equipment, a community center facility, and related neighborhood park features.

## Landscape Development

The elementary school plant is set back at least fifty feet from the public sidewalk. The site has well-maintained turf, mature shade trees lining the perimeter, shrubbery, perennials, and various species of nursery

stock surrounding the school building. Cyclone wire fencing and man-built walls are used sparingly to limit access to the site. Adequate parking for staff and visitors is provided with appropriate natural and artificial screening devices. Natural and ornamental vegetation is used for the creation of buffer zones separating the site into specified use areas. The topographical contours of the site have been utilized in the location of the elementary school plant, especially as related to the natural or manmade site amenities.

## Small, Limited Space Elementary School Site

### Acreage

The site consists of a maximum of seven acres with the corresponding schoolhouse building being located within the limits of one city block.[1] The site may contain

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[1]George Collins, National Inventory of School Facilities and Personnel (Washington, D.C.: Government Printing Office, 1964), pp. 48-49. In 1962 with the median site of three acres and the mean average site at five acres, 67.7 percent of all public school elementary school sites were in the one to five acre catagory. A seven acre or less size classification would identify the major portion of public elementary schools as in the small, limited space school site category.

inblock residential housing, housing that is located within the one city block and adjacent to the school site.

Educational Development

This type of site development is limited with the exceptions of a sealed-surface playground area, standard play equipment, and liberal use of cyclone fencing materials. Access to the site by neighborhood children is difficult as related to the manmade barriers.

Community Development

The site has limited or no development other than the occasional cooperative use of the building's interior facilities for school-related activities or community meetings. Parking for staff and visitors is usually provided by on-street parking space.

Landscape Development

The school building is set back a minimum of fifty feet from the public sidewalk, and is accompanied by minimal landscaping such as turf, shade trees, shrubbery, and perennials. The school site land is flat with a limited degree of topographical relief. Upon visual inspection, the school building appears to totally dominate the site, and reflects an imbalance in the neighborhood environment.

## Criteria for Price Comparability

These criteria for school site design allow for classification and evaluation of elementary school sites regardless of their geographical location. Further, the criteria allow for inter- as well as intra-school district site comparisons.

In order to eliminate the influence of market price fluctuations, additional criteria were utilized in market sales sample selection. Only those school sites purchased prior to 1952 are included in the study population. These techniques serve to reduce a market price fluctuation which occurs when some buyers bid up house prices in order to locate near a newly acquired school site. Also, only residential housing that was built after the construction of the school building was measured in the study population.

## Definition of Terms

Throughout the entirety of this study, specific meaning is accorded to certain terms. The reoccurrence of these terms indicates that precise definition be provided. Definition of these terms as applicable to this study are presented below.

### Open Space

A parcel of land which is relatively free from

development; has a low percentage of surface covered by buildings and other impermeable surfaces; has a low permanent population density; provides visual contrast to the manmade environment; and provides significant, identifiable social benefits in excess of social costs resulting from all uses of the land.[1]

Limited Space

A small, flat parcel of land which is dominated by building structures; has confined land surface for neighborhood social activities; and projects a visual image of imbalance in regard to the surrounding environment.

Large, Open Space Elementary School Site

A residential neighborhood public elementary school site: consisting of a minimum of twelve acres; has a portion of the site dedicated to parkland; and contains educational, community, and landscape development features as defined by the Criteria for School Site Design.

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[1]U. S. Department of Agriculture, Economic Research Service, Open Space - Its Use and Preservation, Misc. Publication No. 1121 (Washington, D.C.: Government Printing Office, 1968), p. 12.

Small, Limited Space Elementary School Site

A residential neighborhood public elementary school site: consisting of a maximum of seven acres; and contains a minimum of educational, community, and landscape development features as defined by the Criteria For School Site Design.

Residential Real Estate

A parcel of real property which includes a single-family residence: has no more than two-family living units; reflects similar architectural style and building characteristics consistent with nearby residential housing; has been recorded as part of a designated land plat; and was constructed within the time period associated with the age of nearby dwellings. Records of the Bureau of Census indicate that family housing remains the major type of residential housing in the country. In 1971, of the 2,052,000 private housing starts, 1,151,000 housing units were for single-family occupancy.[1]

Market Sale Prices of Residential Housing

The true market sale prices refer to the highest

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[1]Department of Commerce, Statistical Abstract, p. 682.

estimated in terms of money which a property will bring if exposed for sale in the open market allowing a reasonable time to find a purchaser who buys with knowledge of all the uses to which it is adapted and for which it is capable of being used.[1] True market sale prices of residential housing were obtained from the records of the Dearborn and Lansing Boards of Realtors Associations, the Wayne and Ingham County Register of Deeds Offices, the Burton Abstract and Title Company and the Lawyers Title and Trust Insurance Company of the respective cities noted.

## Statement of Assumptions

In order to formulate a research design to measure and evaluate the fiscal influences of elementary school sites upon the market sale price trends of surrounding residential real estate, it is important to provide several basic postulates for this investigation. The following basic assumptions are presented as a point of reference for the investigation.

### Assumption One

Residential housing associated with large, open space

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[1] American Institute of Real Estate Appraisers, Appraisal Terminology and Handbook, 4th ed. (Chicago: Author. 1962), p. 131.

elementary school sites are selling for higher market sale prices than are similar housing surrounding small, limited space elementary school sites.

Assumption Two

Residential housing surrounding large, open space elementary school sites that are located in close proximity to the site are selling for higher market sale prices than are similar housing located farther from the site.

Assumption Three

Residential housing surrounding small, limited space elementary school sites that are located in close proximity to the site are selling for lower market sale prices than are similar housing located farther from the site.

Assumption Four

The potential additional property tax revenue yields derived from higher market sale prices associated with residential housing surrounding large, open space elementary school sites are directly related to the site size, educational, community, and landscape developmental practices.

Assumption Five

A thirty-year collection and accumulation of the

potential additional property tax revenue derived from higher market sale prices associated with residential housing surrounding large, open space elementary school sites are significant enough to provide incremental funds for the expansion in acreage of small, limited space elementary school sites to large, open space elementary school site standards and will provide additional property tax revenues for other governmental units relying on the property tax for support of public services.

Assumption Six

Residential housing surrounding large, open space elementary school sites have a lower turnover rate, sale-resale ratio, as compared to similar residential housing surrounding small, limited space elementary school sites.

## Statement of Research Hypotheses

A useful research method for measuring a sample population is the employment of a well-defined research hypothesis. Since the study encompasses the measurement of ten elementary school site neighborhoods only, the investigator has selected the research method of employing four null hypotheses. According to George J. Mouly in The Science of Educational Research:

> Specifically, the null hypothesis denies the existence of any real difference between the expected value and that obtained in the sample, until the factor of chance has been eliminated as the causative agent in the discrepancy noted.[1]

This investigation of the market sale price trends of compatible residential housing surrounding elementary school sites will determine the validity of the following null hypotheses.

Null Hypothesis One

$H_o$ = There is no significant difference in the last sale price of residential housing as adjusted for the covariates of the first sale price, the number of years between sales, and the number of streets crossed for large, open space and for small, limited space elementary school sites.

Null Hypothesis Two

$H_o$ = There is no significant difference between the relationship of the number of streets crossed and the first sale price for large, open space and for small, limited space elementary school sites.

Null Hypothesis Three

$H_o$ = There is no significant difference between the

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[1]George J. Mouly, The Science of Educational Research (New York: American Book Company, 1963), p. 151.

relationship of the number of streets crossed and the last sale price for large, open space and for small, limited space elementary school sites.

Null Hypothesis Four

$H_o$ = There is no significant difference between the relationship of the projected potential additional property tax revenue yield and the last sale price of residential housing as adjusted for the covariates of the first sale price, the number of years between sales, and the number of streets crossed for large, open space and for small, limited space elementary school sites.

## Limitations of Study

This investigation of certain fiscal relationships of elementary school sites to neighborhood residential properties is limited to the study of elementary school site neighborhoods in the urban communities of Lansing and Dearborn, Michigan. The writer collected and analyzed pertinent market sales data, building and site data, and neighborhood data which occurred during the twenty-year period from 1952 through 1971. The study focused upon elementary school sites only and did not attempt to include secondary or higher education school sites which were considered beyond the scope of this investigation.

The interpretation of this study should be confined to the subject elementary school site neighborhoods and should not be extrapolated or projected as research facts totally applicable to public school sites located in similar urban centers. For example, numerous suburban public school systems have established public policies to orient their school building and site program to encompass large, open space site standards.[1] Further, the school curriculum, pupil-teacher ratios, grade spans, property tax wealth of a district, sociological components of neighborhoods, or governmental decisions related to urban renewal projects are variables that differ significantly from school district to school district. Therefore, a comparison of urban core school sites, for example, the Detroit Public Schools, with surrounding suburban school district sites, for example, Warren Consolidated Public Schools, would be grossly misleading as it relates to the decision variables of the home purchaser.

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[1]The Michigan Public School Districts of Livonia, Warren, and Waterford have adopted and implemented open space concepts in the acquisition and development of their school sites. Respective governmental units of these cities have conducted economic feasibility studies of municipal over-burden as related to the small acreage school sites.

An attempt was made to correlate assessed values with true market sale prices of residential housing for subject neighborhoods; however, experience gained during the investigation indicated great variations in assessment practices existed which would compromise the validity of the data. Assessment of real property, residential property in particular, in the State of Michigan has been well-documented as to inappropriateness of assessment practices and processes.[1]

No attempt was made to analyze in detail site development costs and expenditures: such as parkland development costs; school site expenditures; original land costs of public school sites; elementary building construction costs; or related site expenditures. Within these limitations, the writer selected ten elementary school site neighborhoods for the sample population. Six of the elementary school sites and their respective neighborhoods are located in the school district of Dearborn and four of the elementary sites and their respective neighborhoods are located in the school district of Lansing. Inclusive in the data collection and analyses were the sale histories of 1,224

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[1]Roy Smith, et. al., Michigan Property Tax Assessment Study, 1971, Michigan Legislature, House, Lansing, Michigan, 1971.

(one thousand two hundred twenty-four) residential houses; elementary schoolhouse construction data; school site inventory and evaluation data; and neighborhood profile data.

Accordingly, an analysis was made of four variables that presumably affect the market sale prices of residential housing surrounding neighborhood elementary school sites: (1) Last sale price of residential housing; (2) First sale price of residential housing; (3) Number of years between first and last sale price of neighborhood dwellings; and, (4) Number of streets crossed to reach the school site. As additional research is conducted into the areas pertaining to the determination of market sale prices of residential housing, more precise observations can be formulated as to their influences upon residential market price levels.

## Significance of Research

The public school system, the land and the lands' potential for open space use, may render a possible solution to the urgent needs of increased open space in rapidly urbanizing communities. Since public school sites have been located to service residential neighborhoods with a minimum of required transportation, the present-day school site may offer the distinct advantage of creating open space.

Large, open space elementary school sites which are developed for community use can function as a fundamental network in establishing a system of open spaces for the increased leisure time of an affluent society. In order for open space areas to be established, most school sites must either acquire additional land or restructure site development practices in order to offer a community a land resource which serves both adults and youth. According to the authors of the Ann Arbor Schools Site Development and Selection - Advisory Committee:

> Open space school site development can be justified economically. As the quality and 'educational potential' of a school site is improved, the surrounding property value of residential homes is increased. Increased property tax value is reflected by an increase in the tax rate of neighboring lands. Therefore, every time a school millage issue is passed, the school will receive additional funds as a direct result of the impact of the site development.[1]

A major problem confronting public education in the United States is the constant sale and resale of residential housing which is associated with well-established residential neighborhoods. If the turnover rate of neighborhood housing

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[1] Report of the Ann Arbor Schools Site Development and Selection - Advisory Committee (Opportunities for Environmental Education on School Sites) to the Ann Arbor Board of Education, Russell E. Wilson, Chairman (Ann Arbor, Michigan: Ann Arbor Public Schools, 1971), p. 6 (mimeographed).

is exceptionally high, the normal school population is affected by changing enrollments and the educational programs originated at the elementary school level loose their effectiveness. If it can be ascertained that large, open space elementary school sites have a stabilizing effect on the market sale prices of surrounding residential housing which contributes to lower market sale-resale ratios, the entire community will benefit. In the words of Richard L. Philipson:

> School-park sites in the city of Milwaukee exert a positive influence upon the market prices of nearby residential real estate. Research has indicated that the city of Milwaukee's property tax base has been expanded by school-park combinations which have appreciated the market prices of nearby residential real estate. It appears that a stabilizing influence has been exerted in the school-park neighborhoods as residential sale-resales are significantly lower than comparable neighborhoods which have small, asphalt type school sites.[1]

The stabilization and/or the appreciation of the market sale prices of residential housing associated with the residential neighborhoods of large, open space elementary school sites is of prime importance in this investigation.

This study was conducted to provide initial research methodology, appropriate measurement techniques, and

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[1]Interview conducted with Mr. Richard L. Philipson, January 20, 1973, Milwaukee, Wisconsin. A complete discussion of Philipson's research results appears in the Review of Relevant Literature and a table of the study's results appears as appendix material.

adaptable criteria on school sites as related to market data during the period under study, and to equate the usefulness of these variables in predicting certain economic value relationships of sites to neighborhoods.

# CHAPTER II

## REVIEW OF RELEVANT LITERATURE

A nationwide interest exists in the problems associated with the deterioration of our environment, the preservation of open space in urban settlements, and the reordering of priorities in the financing and distribution of tax revenues for public education; however, little attention has been given to determining methods of financing open space associated with public school sites.

A search of the doctoral dissertations within universities of the United States from 1938 through 1972 using the Datrix Computer Locating System of the Xerox Corporation, University Microfilms, yielded no direct studies relating to the financing of open space for elementary school sites. Further investigation of the Doctoral Dissertations Accepted by American Universities, Dissertation Abstracts, Education Abstracts, The Education Index, Master's Theses in Education, and Research Studies in Education also yielded negative results.

On the other hand, two recent doctoral research studies have been undertaken which deal directly with market sale price trends of residential housing surrounding

elementary school sites. These research efforts, William L. Hafner's "The Economic Feasibility of School Sites As Sources of Urban Open Space," and Richard L. Philipson's "The Market Price Impact of Elementary School Site Development Practices Upon Nearby Residential Real Estate," were originally initiated by Dr. Russell E. Wilson, School of Education, The University of Michigan, and lecturer at The University of Wisconsin, Milwaukee, and will be reviewed in detail.

Since the general purposes of neighborhood parks and urban open space acquisition approximates many purposes of the public elementary school site, i.e., acreage size, location, utilization, development, the researcher offers a literature review associated with these disciplines. Accordingly, the literature review is divided into three specific sections: Economic Influences of School Sites on Neighborhood Property Values; Economic Influences of Parks, Open Space, and Recreation on Property Values; and Economic Values of Site Design Features.

## Economic Influences of School Sites on Neighborhood Property Values

Historically, most public elementary schools have been located to accommodate a school population derived

from urban, residential neighborhoods. The actual location of the elementary school reflects convenience to its young patrons at a minimum of public and private transportation necessary to reach the site.

The elementary school site, the only public land resource within walking distance of most neighborhood residents, undoubtedly has been a focal point of neighborhood interaction over the years and has contributed to the enhancement of American culture. The public school site, whether a school-park land resource or a small, limited space site has undoubtedly affected the economic decisions of prospective buyers to locate within a certain neighborhood area. The essence of this study is to document certain fiscal influences of elementary school sites upon the market sale price trends of residential properties located within these neighborhood school service areas.

A unique economic phenomenon of large, open space elementary school sites, i.e., public school-park sites, is their apparent ability to exhibit a "ripple effect" in appreciating the residential market sale prices of real property surrounding the site. In essence, well-developed public land sites appear to exert a positive market influence upon demand factors of prospective home buyers to be located close to the beneficial land development. It is

worth noting the increased market prices of raw land associated with newly developed neighborhood parks, elementary school-park combinations, water reservior projects, botanical preserves, and/or similar "green islands." According to June S. Brown and Russell E. Wilson in an article entitled "Schools Can Be 'Green Islands'":

> Premium prices are paid for homes and apartments near 'green islands', which may consist of good school sites as well as golf courses, parks, rivers, clean lakes, and great trees.[1]

The market sale price appreciation of real estate values which appears to result in the expansion of the surrounding property tax base of large, open space elementary school sites has potentially eventful fiscal implications for various governmental units, i.e., boards of education, which rely upon the property tax revenues as a major source for the support of public services. In support of this premise, good sites expand the property tax base, previous research was conducted by Russell E. Wilson which measured the fiscal influences of a fifteen acre school-park combination (Burns Park, Ann Arbor, Michigan). In the words of Wilson:

> Ann Arbor's Burns Park has demonstrated that

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[1]June S. Brown and Russell E. Wilson, "Schools Can Be Green Islands." Michigan Education Journal, XLII (April 1965), 20.

> "open spaces" in conjunction with adequate school sites coupled with public recreational facilities causes marked increases in assessed property valuations for several blocks surrounding the school site. This effect resulting in raising nearby property values has been termed the "ripple effect." Usually purchase prices of such "open space" sites are recoverable through increased property tax revenues from remaining nearby parcels within thirty years. For proof, check the rising tax revenues from properties close to newly cleared "open spaces" in a high density urban area.[1]

A doctoral dissertation by William L. Hafner investigated the market value appreciation rates of residential housing surrounding two elementary school sites in Ann Arbor, Michigan. The subject school sites were Thurston Elementary, a twenty-two acre site including ten acres devoted to a nature preserve and Lawton Elementary, a 7.7 acre site. The investigation tested the following hypotheses:

1. The rate of value change for houses located in open space school site neighborhoods diminishes as houses lie further from the open space site.

2. The rate of value change for houses located in standard school site neighborhoods diminishes as houses lie further from the standard site.

3. Houses differing only as to their location in an open space or standard school site neighborhood and adjusted for the independent variables of living area, number of rooms, and lot size, differ in annual rate of value change.

4. Houses differing only as to their location in an

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[1]Interview with Dr. Russell E. Wilson, University of Michigan, March 9, 1972.

> open space or a standard school site, and adjusted for the independent variables of living area, number of rooms and lot size, differ in proportional rates of assessed valuation relative to sale price.[1]

Based upon the data results, Hafner reached the following conclusions:

1. Distance from the school site had no clear relationship upon the rate at which houses increased in value for houses located in either type of neighborhood.

2. The school system's investment in the open space site was partially negated since houses surrounding the open space were under-assessed relative to those in the standard site neighborhood.

3. If the open space houses had been assessed at the same relative rate as the standard site houses, approximately $182,700 more tax base would have been available for school revenue purposes.

. . . . . .

4. Houses located in the open space neighborhood appeared to increase in value more than twice as fast as the houses located in the standard site neighborhood.[2]

The major finding of this research study was the higher market value appreciation rates of residential housing surrounding the open space school site. The underassessment of residential housing associated with both school

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[1]William L. Hafner, "The Economic Feasibility of School Sites as Sources of Urban Open Space" (unpublished Ph.D. dissertation, The University of Michigan, 1972) pp. 26-27.

[2]Ibid., pp. 91-92.

site neighborhoods is inherently a major problem associated with our property tax system. It was also noted that no clear linear relationship developed between market value appreciation rates and the location of residential housing of the subject site neighborhoods. This finding may refer to other variables within the elementary school service area, i.e., future plans for open space designation of land areas within the elementary school service area.

In a doctoral dissertation in progress at The University of Wisconsin, Madison, significant evidence has been documented by Richard ~~L. Philips~~son regarding the economic impact of elementary school site development practices upon the market prices of nearby residential real estate. The study was conducted in the city of Milwaukee and measured the market price trends of residential housing from 1957 through 1967. Six elementary school site neighborhoods formed the population sample, three open space site neighborhoods and three comparably matched traditional school site neighborhoods. The study investigated market sales data of residential housing of Clement Avenue School, 19.5 acres - Burdick School, 3.8 acres; 82nd Street School, 14.6 acres - 81st Street School, 3.82 acres; and 78th Street School, 12.76 acres - 55th Street School, 5.91 acres.

The study tested the following hypotheses, using an analysis of covariance model for statistical treatment.

1. There is no significant difference in the market price trends of residential property located nearby open space elementary school sites and the market price trends of residential property located nearby traditional elementary school sites.

2. Market price trends of residential property are directly related to the proximity of residential property to the elementary school site.

    a. Proximity to an open space elementary school site will have a positive affect upon the market price trends of residential property.

    b. Proximity to a traditional elementary school site will have a negative impact upon the market price trends of residential property.[1]

Philipson's data indicated the following results:

1. The three Milwaukee open space elementary school sites exerted a positive influence upon market prices of nearby residential real estate; the property tax base of the open space neighborhoods were positively affected; and a stabilizing influence appeared to be exerted in the residential housing marketplace.

2. The market price trends of residential property are directly related to the proximity to the site. Residential properties located close to open space school sites were selling for higher market prices than similar housing located further from the site. Residential housing located close to traditional school sites were selling for lower

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[1]Richard L. Philipson, "The Market Price Impact of Elementary School Site Development Practices upon Nearby Residential Real Estate," Department of Education, The University of Wisconsin, Madison, 1973, p. 22-23 (Mimeographed).

market prices than similar housing located farther from the site.

3. The linear distance that the elementary school site affects property values is nearly equivalent to the elementary school service area boundaries. The impact of the site upon residential housing price trends was most pronounced, i.e., Clement Avenue School housing increased $217.- per year as compared to Burdick School housing which only increased $115.- per year. The 82nd Street School housing increased residential housing values more than double that of the comparable 81st Street School as measured over a ten year duration. The 78th Street School yielded $1,363.- per house over a ten year period as compared to 55th Street School housing increases of only $542.- net gain.

4. Analysis of data from the Milwaukee property tax assessment rolls indicated that the property tax base of open space elementary school site neighborhoods was nearly double that of the matched traditional school site neighborhoods.

5. The potential for enlargement of the traditional, big-city "asphalt jungle" school sites to a greensward "open space" is not only feasible by urban land values and tax revenue economics, but it is encouraged by the indications of these data.[1]

In the words of Professor George E. Uhlig, Director of Educational Research, The University of Wisconsin, Milwaukee, regarding the results of the Philipson doctoral dissertation:

> Not only are the results of this investigation of significant national scope, but it should be pointed

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[1]Interview with Richard L. Philipson, Milwaukee, Wisconsin, December 28, 1972.

> out that this study measured 926 market sales of residential real estate which, statistically speaking is a significant sample to conclude that additional research is immediately desirable in this area of land economics.[1]

Appearing in Appendix A of this study is the summary of Philipson's data which provides comparisons of the subject site neighborhoods.

The Sociological and Economic Impact of Urban Parks in Dallas, Texas, 1966, a study conducted by the Park Administration faculty of Texas Technical College, measured certain social and economic influences of thirteen urban parks as related to adjoining residential neighborhoods. Of particular importance is the economic contribution of school-park combinations upon the market values of surrounding neighborhood real estate. The economic portion of the study was designed to measure the following hypotheses:

1. The distance that the park affects the property value is approximately equivalent to the service area of the park.

2. In the case of a park which is associated with a school (which typically reduces the value of near or adjacent residential properties), the park may reduce the detrimental effect of the school on surrounding property values.[2]

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[1]Interview with Professor George E. Uhlig, Director of Educational Research, The University of Wisconsin - Milwaukee, January 20, 1973.

[2]Department of Park Administration, School of Agricultural Sciences, Texas Technical College, The Economic and Sociological Impact of Urban Parks in Dallas, Texas, 1966 (Lubbock: Texas Technical Press, 1967), p. 1:14.

The research study supported the two hypotheses and presented additional fiscal implications in the form of primary and secondary economic benefits. The data pertaining to the sociological impact of urban parks were considered inconclusive by the investigators; thus, the following summary of conclusions as related to economic benefits are presented. Primary economic benefits are based upon the actual use of the park site. The study reported the following general conclusions as related to primary benefits.

1. Playground parks were general economic assets to the community.

2. Relative to cost factors, large playfields were generally marginal in economic benefits.

3. Failure to generate significant benefits were attributable to two principal causes: (a) high capital cost for the playfields, and (b) limited access to the parks.

4. Large parks are economic liabilities for a community unless their use by adults is increased.

5. Increased use of automobiles will reduce the net benefits of small parks for neighborhood users.

6. The ideal size of the park, playground, or neighborhood park should range between ten and fifteen acres.

7. Expansion of activities for adults, improved maintenance, increased shade, and well-trained supervisory personnel

are positive factors for increasing park use.

Secondary economic benefits are direct fiscal implications of urban parks upon the surrounding residential neighborhoods. The study recorded the following general conclusions as associated with secondary economic benefits.

1. Normally, parks exert either a positive or negative affect upon the property values of parcels close to the park.

2. The positive affect appears to be from five to twenty per cent higher; properties within 500 feet of the park are proportionally higher in value than properties over 500 feet from the park.

3. The negative affect appears to range from ten to twenty per cent; properties within 500 feet are proportionally lower in value than properties over 500 feet from the park.

4. Positive and negative affects are reflected in surrounding land values.

5. Positive and negative affects are seen in the value of improvements to the sites. Aesthetically pleasing and well-designed parks stimulate better quality and maintenance of housing units close to the parks. If the park is not well-maintained, property values adjoining the park will depreciate.

6. The distance the park affects the property value is equivalent to the service area of the park, except in the case of large parks.

7. Redevelopment of the park, planting of trees, shrubbery, general landscaping, will increase development of the neighborhood assuming that the neighborhood is not in a blighted condition.

8. The time of development and acquisition are significant to the impact of the park upon surrounding subsequent property values. Accordingly, the acquisition of land, the development of land, and the completion of the park, are all interrelated with the time of development of the neighborhood. Therefore, the development of a park prior to the final development of the neighborhood would have the greatest subsequent positive impact upon property values. From a property value standpoint, the park should be developed immediately after the development is initiated. The extent of this development is conditioned by the expected use of the park. Therefore, the park design should attempt to balance the use and property impact. This can be accomplished by the timing of the development relative to the neighborhood development.

9. The impact of the park on land values is relatively more significant as compared to the impact on the total value of properties.

10. The impact of the park on property values is greatest in residential areas.

11. The relative impact of the park on property values is different among various economic groups; thus, the impact appears to be greatest on high valued residential properties and lowest on property of lesser value.

12. The economic influence of a park upon commercial property is presently not known.

13. The economic influence of a given park affects the total property of a city in a negligible way.

14. Parks can have a stabilizing influence on property values, thereby creating a type of stabilizing force for prices of real estate in the area.

15. A well-integrated school-park combination will generate the most significant economic impact upon surrounding property values, both in total assessed value and land value correlations.

A follow-up study of The Sociological and Economic Impact of Urban Parks in Dallas, Texas, 1966, was conducted by park administration researchers in the city of Ft. Worth, Texas. The 1969 research project measured certain social and economic influences of three urban parks as related to adjoining residential neighborhood housing. A portion of the study was designed to supply answers to the following questions which are stated in the form of hypotheses.

1. The distance that the park affects the property value is approximately equivalent to the service area of the park.

2. In the case of a park which is associated with a school (which typically reduces the value of near or adjacent residential properties), the park may reduce the detrimental affect of the school on surrounding property values.

3. Parks in Fort Worth affect property values in the same manner as do parks in Dallas.[1]

The study accepted the three stated hypotheses and verified the primary and secondary economic results of the Dallas research. Significantly, the research effort did measure the fiscal implication of urban parks which contained elementary school buildings; thus, a summary of the economic and social findings of the study is offered.

1. School-park combinations exert positive economic influences upon surrounding residential property values.

2. School-park combinations, aesthetically developed and well-designed, will stimulate better quality and maintenance in nearby residences.

3. School-park combinations favorably affect land values when the park is the major portion of the site.

4. In school-park combinations, the park reduces the detrimental affect of the school on surrounding

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[1]Department of Park Administration, School of Agricultural Sciences, Texas Technical College, A Parks Appraisal ... Regional Facilities (Lubbock: Texas Technical Press, 1969), p. 5.

residential property values.

5. The distance the school-park affects property values is nearly equivalent to the service area of the school-park site.

6. Generally, higher property values are a direct function of the amount of use of the school-park combination.

7. The social attitudes and behavior of residents coincide with the impact factors which the school-park combination has on property values.

8. The social attitudes and behavior of residents are a function of perceived benefits of the school-park combination.

9. Aesthetically developed and well-designed school-park combinations were perceived by residents as positive assets of their neighborhoods.

## Economic Influences of Parks, Open Space, and Recreation Land on Property Values

### Economic Contribution of Parkland

Various research efforts have been made over the years to establish an economic rationale for the preservation of open space within our urban cities. In reviewing the literature, a prominent theme emerges, developed parkland extends positive economic benefits to surrounding lands.

For instance, Charles E. Little reported a study undertaken by the Union County, New Jersey Park Commission covering the time span from 1922 through 1939:

> . . . 631.7 per cent increase in the assessed valuation of properties within a quarter mile of their Warinanco Park, while the assessments in the city as a whole, Elizabeth, New Jersey, averaged 256.7 per cent increase.[1]

In a similar time span, Charles M. Herrick in an article entitled "The Effect of Parks Upon Land and Real Estate Values," developed a general land economic formula in attempting to determine the beneficial affects of Washington, D.C. parkland to economic value of other lands. Herrick said:

> The hypothesis was that a relationship between real estate value and percentage area of a city in park land appeared when cities were grouped according to the population density. . . . A general equation was worked out and applied to Washington, D.C., proving that the presence of park land in the city did indeed increase real estate value to the point where the increase in tax revenue more than paid for the cost of the parks.[2]

In a study concluded in 1958 by the National Association of Home Builders, a measurement was undertaken to determine the economic impact of parkland on surrounding residential real estate values. The study employed market sales data

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[1]Little, Challenge, p. 87.

[2]Charles M. Herrick, "The Effect of Parks Upon Land and Real Estate Values," The Planners Journal, V (October-November, 1939), 89.

throughout the United States and derived several major conclusions. The Association stated:

> It should be pointed out that where land is developed for park purposes, the highest increment of value is usually developed in properties immediately contiguous. This is not necessarily the case with playgrounds, where activity and noise of field sports and the like may be objectional to adjacent homes. It is important that playground areas be properly screened and buffered from adjacent residential use if this objection is to be avoided.[1]

In a 1961 study for the Coro Foundation, Robert Wonder sought to determine the extent that parkland affected the property tax assessment rolls. Wonder assumed that well-designed parkland in the metropolitan area of San Francisco would create higher assessments upon bordering residential housing than similar housing without access to parkland. Charles E. Little discussed the technique and results of the Coro Foundation Study:

> Wonder searched out two parks in Oakland whose neighborhoods were more or less unaffected by wayward influences.
>
> . . . mean assessment adjacent to the park was $3,416 and a block or two away considerably less. For tier two it was $2,300 and for tier three $2,355. . . . [The San Antonio Park neighborhood yielded] mean assessment was $1,489 for adjacent blocks and for two and three blocks away $940 and $1,006, respectively.
>
> He divided the control area into three tiers, just like the San Antonio Park area, except that tier one was fronting on other houses rather than a park.

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[1]Home Builders, Manual, p. 194.

> Here, he found much smaller differences in the mean valuation of each tier, and of course no pattern. One tier was $876, another $932, and another $1,195, the greatest difference being 24%, and the overall value of the control area significantly less than the overall value of the San Antonio Park neighborhood.[1]

In researching the economic concept that parkland positively affects surrounding market price appreciations of residential properties, William S. Hendon and James W. Kitchen tested the hypothesis that as "real estate properties lie further from a neighborhood park, their value diminishes."[2] Hendon and Kitchen selected the A. B. Davis neighborhood park, consisting of ten acres, play equipment for all ages, well-landscaped areas and a shelter as the subject site. The park is located in the geographical center of Lubbock, Texas, and has homogeneous neighborhood characteristics as reflected by similar housing types and price ranges. Hendon and Kitchen concluded the study with these appropriate comments:

> This study demonstrated that the distance of a property from a park might affect its value to this extent: land values tend to be influenced by among other things the distance of the property from a neighborhood park. Within the zone of influence of the park, as a parcel of land is more distant from the park, its value decreases. Although sale prices

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[1]Little, Challenge, pp. 88-89.

[2]William S. Hendon, and James W. Kitchen, "Land Values Adjacent to an Urban Neighborhood Park," Journal of Land Economics, XLIII (August, 1967), 368.

> of properties did not relate to distance from the park, the fact that land value did is highly significant because land valuations in the community made wide use of sale figures of comparable land. Thus the relationship between land values and park proximity is in fact indicative of a demonstrable market relationship.[1]

## Economic Contribution of Open Space

Land development companies often have realized the positive economic impact of preserving open space, and have incorporated open land into the total design. In surveying the activities of developers, Carl Norcross stated:

> If a developer creates an outstanding environment, saves trees, has a good street pattern, and then adds a pool and a modest recreation area, he might easily get $500 or $1000 more per house than he would for the same house in an ordinary subdivision.
>
> Proof that developers who tried open space and better land planning believe in them, is that in their next developments they have gone even further to provide more open space, more recreation and better community facilities.[2]

The Urban Land Institute conducted a study of twenty-eight open space subdivision developments in 1966 as reported by Norcross. The projects covered all socio-economic levels, with low income market prices of $11,500 per single-family dwelling to $60,000 per residence for

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[1]Hendon and Kitchen, "Land Values," p. 359.

[2]Carl Norcross, Open Space Communities in the Market Place - A Survey of Public Acceptance (Washington, D.C.: The Urban Land Institute, 1966), p. 33.

high income neighborhoods. The opinion of the Urban Land Institute, as reported by Norcross, regarding the preservation of developmental acreage for open space park, swimming pool, and other recreational usage was:

> The basic questions this investigation set out to answer are: Are open space communities successful? Do open space, cluster planning, parks, a good street plan, and community features such as recreation help the sale of new homes and apartments?
>
> The answer is yes - but only if the home or apartment has real value in that particular market.
>
> When a house or apartment is considered a "good buy," then open space and related community features are of real value in selling. The people who live there say so. The developers, builders, sales staff and lenders say so![1]

A basic conclusion of this study was that open spaces, landscaped and developed for recreational purposes do indeed add market value to single-family residences. The implication for public school districts is clear; increased property value yields higher property tax revenues.

## Economic Contribution of Recreation

The development of sites for recreational purposes is significant in producing positive economic affects upon the price of surrounding lands. The documentation of

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[1]Ibid., p. 39.

public and private development dedicated to recreational usage is a common theme of the literature. For example, Kenneth D. Daane in studying the economic implications of regional park systems indicated:

> Public recreational facilities have significant effects upon the surrounding land and property values. In many cases the development of park facilities has increased the values of surrounding realty to the point where the increase in tax revenue more than paid for the cost of the parks.[1]

The city government of Prescott, Arizona decided to develop a parcel of city-owned land into a golf course. The economic results of the project have had a profound affect upon surrounding land values and the revenues collected from them. According to Charles E. Little:

> In the city of Prescott, Arizona, Crabtree reports, the city built a golf course on land valued at $25 an acre. After that, city officials turned around and sold adjacent land to subdividers for an average of $2,277 per acre. "It is anticipated that the development of this land will add over $3,000,000 to the city's taxable values in the next ten years," according to the city officials.[2]

The positive economic impact of recreationally developed sites was documented by Professor Raymond D. Thomas for the Outdoor Recreation Resources Commission in a series of reservoir studies in Oklahoma and Arkansas.

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[1]Kenneth D. Daane, The Economic Implications of The Regional Park System in Maricopa County (Flagstaff, Arizona: Arizona State University Press, 1964), p. 46.

[2]Little, Challenge, p. 86.

Professor Thomas measured the property tax revenues generated before and after the completion of the reservoir projects. He stated:

> In terms of dollar volume, the increase in county revenues flows from a rise in the value of taxable property is the most important result of the coming of recreation. The increase could be even larger if counties could be induced to undertake a general reassessment of property to reflect the rise in value that occurs near the reservoirs.[1]

The results of Thomas' reservoir studies indicated that positive economic benefits; increased property tax revenues were accrued when recreation was applied to the reservoir areas. Accordingly, it could be ascertained that recreationally developed open space school sites could also have positive economic influences upon surrounding residential property values.

Real estate companies have often recognized the wisdom of developing water-oriented recreational areas in conjunction with residential properties. Jack L. Knetsch studied the affect of a water reservoir project upon the values of land. Knetsch's assumption was that a significant difference would exist between the original price of land and the final developed price. He measured the difference in land prices

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[1]Outdoor Recreation Resources Commission, Economic Studies of Outdoor Recreation (Washington, D.C.: Government Printing Office, 1962), p. 149.

before and after the sales; employed an inflation index to adjust the prices and noted the differences. Knetsch observed that "the increased sales prices of land adjacent to the reservoir project reflected values due entirely to their proximity to the reservoir project."[1]

A study prepared by the National Park Service indicated that reservoir projects have positive economic consequence in returning property tax revenues to local school districts. The Service indicated:

> The gain in revenues for school districts is not matched by a proportionate increase in schoolage children, so the affect on the quality of education should, in the long run, be marked. The example of the Grove School District at Grove (Okla.) was cited, where assessed valuations rose from $1,150,000 to $1,750,000 in five years due to the construction of cabins, camps, cafes, and the like along Grand Lake. During the same period, the number of children in the district school rose by only 37 on an average daily attendance basis.[2]

## Economic Contribution of Open Space Planning

A prominent trend in suburban development has been

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[1]Jack L. Knetsch, "Influence of Reservoir Projects on Land Values," Journal of Farm Economics, XLVI (February, 1964), 241.

[2]Institute of Community Development, An Analysis of the Tourist Industry in Selected Counties of the Ozark Area, Report for the National Park Service (Washington, D.C.: Government Printing Office, 1953), p. 152.

the preservation of large tracts of land, dedicated to public purpose, because these lands are felt to increase municipal income potentials. Charles E. Little reported:

> . . . Wallace-McHarg, Philadelphia planners, showed a significant difference in development value in a comparison of optimum development versus a forecast of development patterns if present trends continued in the Green Spring and Worthington Valleys outside Baltimore. In their Plan for the Valleys, calling for preservation of 3,000 acres of meadowland, they state: "It has been calculated that uncontrolled residential growth develops approximately $33.5 million (in land value) by 1980, and Optimum Land Use residential development produces $40.5 million in the same period. The additional $7 million resulting from concentration would be adequate to pay in excess of $2,300 per acre for title to the 3,000 acres exempted from development."[1]

The significance of increased income for school purposes is of prime importance in considering the financing of public education. A major problem for public education, especially city school systems is the high density of population, concentrated upon small land acreages. If a more random distribution of our urban population could be accomplished, i.e., creation of more open space with less density per square mile, a more equitable distribution of property tax wealth might be the result. According to a survey in the city of Milwaukee by Richard L. Philipson:

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[1]Little, Challenge, p. 86.

> In surveying several blocks in Milwaukee, Wisconsin's inner residential core (pre-1930, one to four family houses where some 40' by 100' lots have two structures housing a total of four or more families) the author ascertained at least an average of sixty family dwelling units in a city block comprising less than three acres. If each one of these families sent only one child to public schools . . . annual education expenditures per block are a minimum of $38,460 (or $641 per child for 60 children). Does such a block produce that much school property tax revenue to support schools? Seldom - if ever![1]

Accordingly, the preservation of open space, whether private or public designation, can produce revenue for public services in three significant ways - open space can reduce municipal expenditures by costing less to service; it apparently yields additional tax revenue by increasing the market prices of surrounding real estate properties; and it may generate income directly through user fees or because a parcel of open space, privately owned, is subject to property tax assessment procedures.

It is perhaps useful in terms of perspective, to review the literature concerned with the economic contributions of parks, open space, recreation, and planning; however, it provides limited methodology or criteria for the evaluation of the economic impact that elementary school sites have upon the market sale price trends of residential

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[1]Richard L. Philipson, "The School Site - Asphalt Jungle or Open Space?" The Michigan School Board Journal, XIV (January, 1968), 6.

real estate. Thus, a review of pertinent literature pertaining to the economic values of educational, community, and landscape development practices is offered to provide additional overview for the establishment of evaluative criteria for use in the measurement of the fiscal affects of elementary school sites upon surrounding residential real estate.

## Economic Values of Site Design Features

### Educational Development Factors of the Site

In 1972, public school sites in the State of Michigan averaged 10.13 acres; elementary school sites had a mean size of 5.37 acres and a median size of 3.14 acres.[1] In considering the space requirements for the elementary school plant, a building housing 500 pupils with two acres devoted to a sealed surface playground, there is limited acreage available for the educational development of the pupil. Donald A. Jones commented upon the size requirements as related to modern elementary school construction needs:

> The proper size of the site has been considered only in recent years. Many buildings built 50 years ago were built on sites adequate for only the building

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[1]Michigan Department of Education, School Plant Planning Section, Calculations based upon Computer Program SO316, February 10, 1972.

> itself. Only a generation ago, a city block was considered adequate for a grade school. . . . Modern one story grade school buildings generally occupy twice the space that was covered by the old two and three story buildings.[1]

Unfortunately, most Michigan elementary school sites are too small in terms of educational space to provide adequate outdoor programs. Recognition should be accorded to public school lands as an integral portion of a child's learning process and developmental growth rather than a mere parcel of real estate to situate a building. The school site is a fundamental part of the educational plant and more especially provides the medium for the educational program. The Council of Educational Facility Planners stated that "the enhancement or curtailment of the total school program is directly related to the size and quality of the public school site."[2]

The recognition by the Michigan State Legislature in 1912 that public schools of Michigan be required to teach the economy of nature (ecological relationships of the land) is a well-established precedent; however, todays' three to five acre elementary school sites offer limited potential

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[1]Jones, "School Site Selection," p. 75.

[2]Facility Planners, NCSC Guide, p. 23.

for complete implementation of this statute.[1] The statute reads:

> In every public school within this state, a portion of the time shall be devoted to teaching the pupils thereof kindness and justice to, and humane treatment and protection of, animals and birds, and the important part they fulfill in the economy of nature. It shall be optional with each teacher whether such teaching shall be through reading, stories, narratives of daily incidents or illustrations taken from personal experience. This instruction shall be a part of the curriculum of study in all the public schools of the State of Michigan.[2]

If the enlightenment of our young citizens regarding their environment is to be fully realized, a fundamental land resource for the teaching of these environmental constructs is an adequate sized, and well-developed elementary school site. If the elementary school site size standards of the Council of Educational Facility Planners[3] were translated into state mandates, this would allow for a minimum site of twelve acres for each residential neighborhood in America.

## Community Development Factors of the Site

The emergence of the elementary school in the community is well-illustrated by a national trend toward

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[1] General School Laws of Michigan, (254) 340.365, Section 365, Humane Treatment and Protection of Animals, Birds, Economy of Nature.

[2] Ibid.

[3] Facility Planners, NCSC Guide, p. 23.

community educational programs, focusing upon the elementary school facility and site to implement these programs. A major contributor to the enhancement or failure of community educational programs is the size and quality of development associated with the public school site. In relating the importance of building and site utilization in a community educational program, William G. Carr remarked:

> The lights ought to burn later in the school buildings, and the school grounds and other facilities ought to be available for public use more hours per day, more days a week, and more weeks a year.[1]

In considering the potential community use of public school buildings and sites, a national study was prepared by the National League of Cities for the Department of the Interior, Bureau of Outdoor Recreation. The study surveyed the recreational needs and existing programs and facilities of fifteen urban cities. A major recommendation of the study was:

> School facilities in particular, even in jurisdictions having city-school recreation agreements, are not being utilized effectively. To meet the rising demand for recreation, in spite of the declining availability of open space, cities must expand the multiple use of facilities, establish park-school

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[1]William G. Carr, "A Sense of Indignation," in The School and Community Reader: Education in Perspective, ed. by Edward G. Olsen (New York: The MacMillan Company, 1963), p. 190.

> complexes and employ imaginative designs and new construction techniques.[1]

Most authorities in the field of recreation agree that the optimum utilization of potential recreation resources is not being achieved in most of our nation's cities. On the other hand, some urban cities are making significant efforts to utilize underdeveloped land resources for recreational purposes. It is appropriate to cite a joint school-park project in the city of Flint, Michigan. The project, a development of fourteen school-park sites, was initiated in 1964 with the cooperative efforts of the Mott Foundation, the Flint Board of Education, the Flint Recreation and Park Board, and the school community with ten of the fourteen school-park sites being completed at this present time. Mr. Charles Towar, Chief Construction Engineer for the Flint Board of Education, indicated certain social and economic benefits of the multimillion dollar enterprise. He said:

> For years much of this land was undeveloped and unused. Many acres contain mature deciduous trees. All of it is owned by the Flint Recreation and Park Board and the Flint Board of Education. Most of it is located in living areas, where great

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[1]National League of Cities, Department of Urban Studies, Recreation in the Nations Cities - Problems and Approaches (Washington, D.C.: Government Printing Office, 1968), p. 1.

> numbers of children could benefit from enlarged outdoor recreation facilities. The capital outlay expenditures of several million dollars should be capitalized in the form of an expanded property tax base. It has been our experience in previous school-park developments in the city of Flint that school-park combinations are significant economic as well as community assets.[1]

School sites and public parks should be in close proximity to each other. Unfortunately, many communities have not accepted this planning approach to community organization. Russell A. Holy indicated:

> Public playgrounds, parks and school buildings have only too often been located without reference to one another.
>
> .....
>
> Proper cooperation between boards of education and park departments will facilitate greater recreational accommodations for both children and adults. School grounds should be large enough to provide sufficient recreation area, and also, to meet the needs of the people living in the school district.[2]

In order for public school sites to become genuine community assets, boards of education must work more cooperatively with complementary governmental agencies, i.e., parks and recreation boards. This joint cooperation

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[1]Interview conducted with Mr. Charles Towar, Chief Construction Engineer for the Flint Board of Education, March 28, 1972.

[2]Russell A. Holy, "Cities and School Plant Planning Go Hand in Hand," School Executive, LXXV (July, 1956), 75.

as noted most recently in Flint, Michigan can produce significant community results. In reflecting upon the research associated with the measurement of community school site features as related to expanded property tax base, no authorative investigations have been conducted which would substantiate the fiscal contributions of community-oriented school sites upon the market sale prices of surrounding residential housing.

## Landscape Development Factors of the Site

Historically, most public school systems have given limited consideration to the natural landscape features or the creation of manmade landscape amenities on school sites. The Michigan Natural Areas Council School Site Committee stated:

> For this reason many of the educational features of school sites are lost during the construction stage. The site is leveled, natural vegetation is stripped from the land, and natural water courses are altered and put under asphalt. This approach to school site development results in reduction of the "educational potential" of the site and degradation of its aesthetic appeal.[1]

Undoubtedly, the degradation of the natural landscape

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[1]Michigan Natural Areas Council, School Site Committee, The Establishment of Outdoor Classrooms on School Sites as Public Policy, Report prepared for MNAC (Ann Arbor, Michigan: The Council, 1972), (Mimeographed) p. 1.

elements of our school sites has had an adverse affect upon surrounding residential real estate values. In discussing the negative influences of poor, undersized school sites, Donald W. Bush and S. Herbert Hare indicated:

> Often the site was inadequate in size, almost completely ungraded and without any trees or other plantings to relieve the bareness. Such a development was naturally a blot on the community, usually reducing property values around it.[1]

Richard Tonigan in an article entitled "Keeping the School Site an Asset," alluded to the economic influence that school sites have upon the surrounding property tax base. In the words of Tonigan:

> The owners of property in the school neighborhood are visibly influenced by the day to day appearance of school grounds. Nearby homes and businesses will tend to be more neatly maintained if school grounds set the pace. More yards will be kept in attractive condition and more homes will be kept in good repair. And, in the end, these properties will attain their maximum tax value.[2]

Other than in stated opinions, it is assumed that no valid research is available regarding the contribution of

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[1]Donald W. Bush and S. Herbert Hare, "The Landscape Architect's Part In the Development of an Adequate School Ground Program," The American School and University, XIII, (September, 1941), 86.

[2]Richard Tonigan, "Keeping the School Site an Asset," School Management, XIV (June, 1970), 34.

microclimate-oriented school sites upon the market price trends of surrounding residential homes.

On the other hand, indirect studies are available which have attempted to measure the contribution of landscape amenities to the market prices of residential housing. For example, a recently concluded study by Brian R. Payne, Forest Research economist, Northeastern Forest Experiment Station, Amherst, Massachusetts indicated that mature urban shade trees associated with residential lots in the city of Amherst add between three and ten per cent to the market sale prices of residential property as compared to similar residential housing without trees.[1]

Assistant Professor of Forestry, Michigan State University, J. James Kielbaso cited numerous reports which seem to indicate that trees do contribute to marked appreciation of property values. He stated:

> In most cases we find that the street trees are one of the most valuable assets of a community. . . . In many cities these values are carried on the city books as city assets. As you notice the values for individual trees, they may be from $70 to $500 per tree. We are certainly not discussing an exact science. At the present time most people would agree

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[1]Brian R. Payne, The Contribution of Trees to Property Values in Residential Neighborhoods of Amherst, Massachusetts, Report to the Northeastern Forest Experiment Station (Amherst, Mass.: The Service, 1972), (Mimeographed), pp. 18-20.

that street trees should be valued at between $200 and $400 each.[1]

According to the eminent forester Karl Dressel:

> Street trees represent one of the half dozen most valuable assets the city has in improvements and it is not far below in dollar value the investment in schools, streets, sewers, and water supply.[2]

In a study of the relationship of forests and open space to property values E. Gould reported:

> . . . that property values in the Northeast seem to vary with the amount of forest and open space. The best of the suburbs have approximately 90 acres of forest or open space per 1,000 people, which is very close to . . . 100 acres once dreamt up as a desirable aesthetic goal.[3]

Also, national realty authorities are credited with adding between $500.- - $1,000.- increased valuation per house in areas beautified by a sound tree planting, as reported by Irving Johnson.[4]

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[1]J. James Kielbaso, Economic Values of Trees in the Urban Locale, Report to a Symposium on the Role of Trees in the South's Urban Environment, Athens, Georgia, February 2, 1971 (Athens, Georgia: The Symposium, 1971), p. 85.

[2]Karl Dressel, Street and Park Tree Evaluation, Report to the International Shade Tree Conference, Toronto, Canada, August 6, 1963 (The Conference, 1963), p. 105.

[3]E. Gould, Values, Trees and the Urban Realm, Report to a Symposium on Trees and Forests in an Urbanizing Environment, Amherst, Mass., August 19, 1970 (Amherst, Mass.: The Symposium, 1970), p. 22.

[4]Irving Johnson, Planning and Implementing a Municipal Street Tree Program, Report to the International Shade Tree Conference, Toronto, Canada, August 22, 1956 (Toronto, Canada: The Conference, 1956), p. 220.

Further, the Los Angeles Beautification Committee, as reported by Virginia Baldwin, was instrumental in planting grass and trees rather than parking meters on the center road right-of-way. Seven years later, in 1958, values were $1000.- per front foot, increased twenty times in seven years. This was far beyond other increases in the area.[1]

When considering the economic values of school sites one can refer to open space and amenity values as contributing factors to the general rise in the market price levels of surrounding residential real estates, i.e., significant variety of mature shade trees. However, as stated by J. James Kielbaso:

> . . . firm values are difficult to obtain. Most people admit tree values but are not certain as to the amount. How can you assign value to intangibles, amenities, or the ability to sell a property with trees much faster than without?[2]

It will be a function of this research investigation to indicate the natural or manmade amenities located on the subject school sites but not by placing actual dollar values on these amenities. Instead, the economic influences of

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[1]Virginia Baldwin, Should Trees Be Planted In Business Areas?, Report to the Western Shade Tree Conference, Anaheim, Calif., May 23, 1958 (Anaheim, California: The Conference, 1958), p. 240.

[2]Kielbaso, Economic Values of Trees, p. 86.

site amenities will be measured in housing price data.

## Conclusions Derived From the Literature

To summarize the direct and indirect writings in the field of school site research, it is assumed that, public elementary school sites exert both positive and negative influences upon the market sale price trends of surrounding residential housing. In addition, it also appears that a limited literature is available concerning the economic influences of school sites upon adjacent market prices of residential properties. Therefore, certain procedures were instituted which will be discussed in Chapter III of this study.

# CHAPTER III

## DESIGN COMPONENTS AND RESEARCH PROCEDURES USED IN THIS STUDY

The previous chapters have been devoted to the nature and purpose of the investigation and to the relevant literature pertaining to the economic aspects of the study. This chapter is divided into three operational phases: (1) a presentation of the general schematic design of the study; (2) a discussion of the specific procedures performed in carrying out the objectives of the study; and, (3) a delineation of the descriptive data relating to individual subject school sites, their elementary school buildings, and their respective neighborhood profile factors.

### Design of Study

This investigation of certain economic values of school sites in two urban school districts was designed to measure the fiscal influences of elementary school sites upon the market price levels of surrounding neighborhood residential real estate. The factors in a maturing school population, changing transportation patterns of pupils,

the implementation of newly devised curricula, or the political recall of board of education members at a level which affects public education, introduce considerations beyond the scope of this study. On the other hand, specific aspects of site development criteria, methodology of data collection, data processing and computer techniques may be applicable to future public school site selection and to related developmental practices.

A major objective of this investigation is to determine certain economic value relationships that elementary school sites impart to the market sale and resale prices of surrounding residential real estate. The study population selected was from the school districts of Dearborn and Lansing, Michigan. The boundaries of the city of Dearborn are nearly coterminus with the boundaries of the Dearborn School District, whereas the boundaries of the Lansing School District extend beyond the city limits of this urban community; however, tax assessment policies, municipal services, utilities availability, school organization and curriculum are uniform throughout the sample populations of this study.

Many factors influence the market sale and resale price of residential housing units. The potential purchaser's selection of housing in the school districts of Dearborn and Lansing offers a wide choice of many types of neighborhoods in which to locate. Predominant throughout

these cities are single-family residences which are recorded plat subdivisions. This investigation was concerned with the home purchaser who had decided to locate within one of the school districts, especially within the subject population during the past two decades. Once the home purchaser has decided to locate within one of the school districts, there remains the choice of neighborhood. Neighborhoods vary in their attractiveness to all home buyers. This attractiveness of particular neighborhoods is due to numerous factors, both intangible and tangible.

Intangible factors include: the desire to locate near friends and relatives; the pride of home ownership; the improvement of credit ratings; desire to live in a former neighborhood; to purchase a home from a friend or relative; or the association with similar socio-economic considerations, i.e., religion, race, culture, income level. Therefore, it is difficult, if not impossible to evaluate and quantify the likelihood of settlement and the motivations for purchase of a new house in a particular neighborhood. It is a contention of the writer that these intangible types of decisions relating to a buyer's selection of a house in a particular neighborhood are randomly distributed within the total study population.

In the light of the previous discussion, there are quantifiable and measurable factors of a neighborhood as represented by house location, dwelling units per residence, lot size, number of square feet per dwelling, property tax assessment per dwelling and social composition of the residents.[1] It was essential in this investigation that upon examination and data collection of residential housing prices in two comparable neighborhoods that the tangible neighborhood characteristics be assessed and evaluated for congruity or symmetrical distribution.

Neighborhoods, separated geographically, may have symmetrical neighborhood profiles which can be assessed and evaluated. Therefore, data collection of the market sale and resales, housing characteristics and other tangible factors of neighborhoods are of prime importance to validate the compatibility of numerous neighborhood profile factors. If neighborhood profiles are congruent, then valid price comparisons of residential real estate can be obtained. Edith J. Friedman remarked:

> The properties need not be in the same neighborhood, but they should be in neighborhoods which offer the same advantages and have, in general,

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[1]Society of Real Estate Appraisers, The Appraisal Guide: Research Guide #4 (Chicago, Illinois: The Society, 1962), pp. 16-17.

the same social and economic status.[1]

She continued to say that "The study of the neighborhood is the beginning point in the gathering of factual information."[2]

## Procedural Design Approach

In order to compare the market price appreciation of similar residential housing surrounding large, open space elementary school sites with small, limited space elementary school sites, a procedural design approach was initiated to insure the validity of market sale price comparisons. The following general procedures were followed in implementing this investigation.

1. Identification of all large, open space elementary school sites within the public school districts of Dearborn and Lansing, Michigan.
2. Assessment and evaluation of the neighborhood profile factors that affect the large, open space elementary school sites in the school districts of Dearborn and Lansing, Michigan.
3. Identification of all small, limited space elementary school sites in the school districts of Dearborn and Lansing, Michigan.

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[1]Edith J. Friedman, ed. Encyclopedia of Real Estate Appraising (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1959), p. 174.

[2]Ibid., p. 34.

4. Assessment and evaluation of the neighborhood profile factors that affect the small, limited space elementary school sites of the school districts of Dearborn and Lansing, Michigan.
5. Selection of at least one small, limited space elementary school site neighborhood profile which matched the neighborhood profile factors of a large, open space elementary neighborhood in the two school districts.
6. Tabulation and recording of residential sales and resales according to the linear distance from the school site including: first sale price; last sale price; first sale year; last sale year; and the number of street crossings from the residence to the site. This price tabulation was translated into a price index line for the years of 1952 through 1971. Market sale prices were adjusted to the 1967 Consumer Price Index Cost of Living for Homeownership to eliminate the influence of the changes in the value of the dollar. A further correction was made using the Detroit Metropolitan Standard Statistical Area Consumer Price Index for Homeownership which reports regional differences in homeowners costs of housing.

7. Application of the statistical method of analysis of covariance to determine the influence of the independent variables (covariates) upon the dependent variable.
8. Application of the statistical formula of the Sign of the Difference Between Two Correlations in testing two null hypotheses which relate the adjusted mean sale prices of residential housing to the linear distance of these houses to the two types of elementary school sites.
9. Construction of six predictive regression trend line graphs which depict the mean values of the first sale price, the last sale price, the first sale year, and the last sale year for the ten sample school sites used in this study.
10. Computation of the potential additional property tax revenue yields from the residential housing units in the neighborhoods surrounding the sample school sites by application of the actual millage rates levied by the local units of government. Further, these estimates are based upon the legal requirements for property tax assessment in Michigan which is fifty per cent of true cash value.

## Statistical Design Components

### Format of Computer Program and Data Processing

The investigation is essentially a measurement of the market sale price trends of residential housing surrounding large, open space and small, limited space elementary school sites. Market sale price data, including first sale price, last sale price, first sale year, last sale year and the number of streets crossed from the residences to the site were tabulated and were transferred to control and data cards for computer processing. The market sale price data, first and last market sale prices of houses, were corrected for inflation and homeownership cost differences by using the Consumer Price Index for Homeownership of 1967. A further correction was made to the raw sales data to compensate for regional differences in the costs associated with homeownership. The Detroit S.M.S.A. Regional Consumer Price Index was used to correct the market sale price data. A chart of the Sample Computer Data Card Format for Code Control and Data Listing appears in Appendix B. The data were adapted to fit the Jeremy D. Finn Multivariance-Univariance and Multivariance Analysis of Variance and Covariance: A Fortran IV Program, Version 4.

## Market Sale Prices of Residential Housing

In measuring the market sale price trends of residential housing surrounding the subject school sites, the primary factor of the study was the type of school site, large, open space or small, limited space. The dependent variable was the last sale price of the house whereas the covariates for the study were the first sale price of housing, the number of years between sales of houses and the number of streets crossed from these houses to reach the school site.

The statistical method of Primary One-Factor Covariance Analysis is a process which establishes mean values of the data associated with the covariates as these mean values relate to the dependent variable. The results of this computation for the subject site housing allow a plotting of mean market sale prices and a projecting of these price values to measure the contribution of the covariates to the dependent variable as related to the error of random chance selection of data. It allows further for inter- as well as intra-school district analysis of the contribution of the type of school site to market price trends.

Linear Distance of Residential Housing

A useful statistical method of determining the difference between two correlations of comparable samples is the Sign of the Difference Between Two Correlations. The formula, a test of significance of null hypotheses, for this study is as follows:

$$\text{Critical Ratio} = \frac{r_{2_1} - r_{2_2}}{\sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}}$$

In testing Null Hypothesis Two, this method employed the correlation coefficient (r) values of the adjusted mean first sale price to the number of streets crossed for large, open space and small, limited space elementary school site housing. The number (N) of samples is represented by the total number of market sales of residential housing surrounding large, open space and small, limited space elementary school sites.

In testing Null Hypothesis Three, the mathematical process is repeated, but using the correlation coefficient values for the adjusted mean last sale price and the number of streets crossed for large, open space and small, limited

space elementary school site housing. The total number (N) of samples is the same for both tests of significance.

Since the sample is statistically large, 1,224 (one thousand two hundred twenty-four) double sales of residential property, a critical ratio of 1.96 is necessary at the .05 level ($p < .05$) and 2.58 is required at the .01 level ($p < .01$).

## Projected Potential Additional Residential Property Tax Revenue Yields

After the establishment of the adjusted means for the last sale prices of residential housing adjacent to each school site, potential property tax revenues were computed as equal to fifty per cent of the actual market mean sale price. These computations summarize the projected potential additional residential property tax revenue which could have been collected from residential properties surrounding the subject school sites. Additional charts and tables were constructed to allow for inter-governmental unit comparisons, and are presented in Chapters IV and V.

Figure 3-1 presents a conceptual view of the statistical procedures utilized in this study in making analyses of the raw data collected during the field investigations.

FIGURE 3-1

A CONCEPTUAL VIEW OF THE APPLIED STATISTICAL ANALYSES

SAMPLE SITES

Large, Open Space Sites

1. Joshua Howard School
   Dearborn Sample #1
2. Woodworth School
   Dearborn Sample #2
3. Wm. Ford School
   Dearborn Sample #3
4. Elmhurst School
   Lansing Sample #4
5. Kendon School
   Lansing Sample #5

SAMPLE SITES

Small, Limited Space Sites

1. Charles A. Lindbergh School
   Dearborn Sample #1
2. Oakman School
   Dearborn Sample #2
3. Maples School
   Dearborn Sample #3
4. Mt. Hope Avenue School
   Lansing Sample #4
5. Maple Hill School
   Lansing Sample #5

DATA ITEMS IN THE
COLLECTION BANK

1. Residence Sales Data
2. Homeownership Cost Adjustments
   Consumer Price Index 1967 = 100
3. Symmetrical Neighborhood Profile Data
4. Site Design Characteristics
5. School Building Criteria

APPLICATION OF STATISTICAL ANALYSES

1. Standard Errors of Least Square Estimates
2. Analysis of Variance
3. Raw Regression Analysis
4. Canonical Correlation Analysis
5. Step-Wise Regression to Analyze the
   Contribution of each Independent Variable
6. Analysis of Covariance - fiscal affects of type of
   site upon surrounding residential housing
7. Univariate Analysis of Variance for Last Sale Price -
   contribution of factors to market price appreciation
   of residential housing
8. Application of the Sign of Difference Formula for
   Two Correlations - testing of the linear relationships
   of residential housing to individual subject sites
9. Computation and Estimation of the Projected Potential
   Additional Property Tax Revenue Yields for Individual Sub-
   ject Neighborhoods

## Procedures Used in the Identification of Comparable Samples of Elementary School Sites, and Buildings, and Neighborhoods

Initially, public elementary school district boundary maps were obtained from the boards of education representing the seventy-five largest in enrollment of the school districts in the State of Michigan. These seventy-five public school districts were analyzed for both types of school sites, large, open space and small, limited space, using the Michigan Department of Education School Site and Facilities Inventory.

A preliminary analysis indicated that twelve major urban school systems, Ann Arbor, Battle Creek, Dearborn, Detroit, Flint, Grand Rapids, Kalamazoo, Lansing, Midland, Plymouth, Pontiac, and Saginaw, have constructed similar school plants on large, open space and on small, limited space elementary school sites. Upon examining 1970 United States Census Data, it was determined that socio-economic indicators of the neighborhoods surrounding both types of school sites in the above mentioned cities were relatively congruent or symmetrical in profile factors. Accordingly, this investigation did examine in some detail elementary school neighborhoods in several large school districts in Michigan in an effort to identify comparable

samples. The following paragraphs present some of the sorting processes and evaluations utilized.

A major reason for rejecting many urban elementary school sites, both large, open space and small, limited space, were the types of variables encountered in examining compatible neighborhood profiles. For instance, commercial zones were located too close to the site; some elementary neighborhoods were undergoing urban renewal housing programs; ethnic differences appeared in several school site neighborhoods; railroad facilities and utility power lines eliminated several sites; different types of housing construction occurred; and spot-zoning, the location of various types of small businesses in areas zoned for residential property had occurred and thus nullified some cases.

A pilot study was conducted in the school district of Flint, Michigan which indicated that a significant variable in market price determination of residential housing now exists - the construction of interstate freeways into the urban core. In essense, the market sale and resale data for a ten year period, 1962-1971, as obtained from the official records of the Flint city assessor's office, indicated that the advent of expanded freeways, the widening of secondary arteries, and the increased number of vehicles using these roadways are significant contributing factors

in depressing the market resale prices of residential real estate in this urban school district. According to a comprehensive land use-transportation planning study, fifty-three per cent of the total land surface of the city of Flint, Michigan (5.26 square miles) is presently being used as a roadway system.[1]

Finally, ten sample elementary school sites and buildings and their surrounding neighborhoods were identified and selected for detailed analyses in the conduct of this study. Six of the subject neighborhoods are located in the school district of Dearborn and four are within the school district of Lansing. In all ten of these stable neighborhoods, single-family residences predominate and are occupied by families classified as middle-class on a socio-economic scale. The five large, open space elementary schools and their corresponding small, limited space elementary schools are shown in Figure 3-1.

In examining the neighborhoods of the Dearborn and Lansing schools, the large, open space elementary school sites were established by listing neighborhood character-

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[1]Genesee County Metropolitan Planning Commission, Genesee County 1990 Land Use-Transportation Plan, Report of the Commission (Washington, D.C.: Clearinghouse for Federal Scientific and Technical Information, 1971).

istics which represent home buyer decision variables such as lot size, house size, house construction types, street patterns, block sizes, income levels of residents, ethnic characteristics, accessibility to churches and shopping, availability of parks and similar market value determiners.

A corresponding small, limited space school site neighborhood was selected to match the large, open space school site neighborhood, the differing factors being the size and state of development of the school sites. The small, limited space elementary school site neighborhood selected was either adjacent to, or, one elementary attendance district away from the large, open space elementary school site neighborhood. By applying this matching technique, the variables influencing market sale prices and resales of residential housing are reduced to the site size, the site development factors, and site amenities of the neighborhood elementary school.

## Descriptive Data - Sources and Kinds

### Symmetrical Neighborhood Profile Factors

Large, open space and small, limited space elementary school site neighborhoods were established on the

basis of neighborhood profile factors and residential building criteria as defined in The Appraisal of Real Estate. The criteria are:

PHYSICAL CONSIDERATIONS INCLUDE:

1. Relation to the rest of the city.
2. Street patterns and width of streets.
3. Convenience to public transportation.
4. Quality of and convenience to schools.
5. Quality of and convenience to stores and service establishments.
6. Convenience to parks, recreation areas, and churches.
7. Pattern of land use, shape and size of lots.
8. Visual aspects, geographical and topographical features, and climate.
9. Availability and quality of utilities.
10. Nuisances and hazards such as fog, smoke, smog, and industrial noises and vibrations.

SOCIAL CONSIDERATIONS INCLUDE:

1. Homogeneity of social and economic characteristics.
2. Social prestige.
3. Attitudes toward law and order.
4. Family sizes and age groups.

ECONOMIC CONSIDERATIONS INCLUDE:

1. Degree of thriftiness and homeownership.
2. Rent and income levels.
3. Vacancy of living units.
4. New construction and vacant land.
5. Attitude of financial institutions.
6. Growth of the neighborhood.
7. Changing use.

GOVERNMENTAL CONSIDERATIONS INCLUDE:

1. Special assessments.
2. Tax burden.

3. Zoning and building codes.[1]

Subject neighborhoods were equated through the study of city engineering maps, 1970 United States Census Data, property tax descriptions from the office of city assessors, interviews with boards of education and administrators, and from the photographs which appear on the listing cards of the Dearborn and Lansing Boards of Realtors. Further, it was necessary to make a careful, visual inspection of each neighborhood selected for the sample population to determine accurate comparability. In the analysis of neighborhood characteristics, visual inspection and examination of photographs listing the various residences for sale, was of prime importance in determining the accuracy of profile data. According to the Society of Real Estate Appraisers, "Much information about a residential neighborhood can be obtained from an 'on the spot' inspection."[2]

## School Building Criteria
## Data Collection

An important aspect of the research technique of this investigation involved the physical compatibility

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[1]Special Technical Committee of the Education Committee, American Institute of Real Estate Appraisers, The Appraisal of Real Estate (Chicago, Illinois: R. R. Donnelley & Sons, 1967), p. 85.

[2]Real Estate Appraisers, Appraisal Guide, p. 17.

components of elementary school buildings. Once the neighborhood profile factors had been established as constituting symmetrical neighborhood profiles between large, open space and small, limited space elementary school sites, school building data was collected to insure that compatibility existed between the buildings located in the matched pairs of neighborhoods.

The primary source of building data collected for the subject population was obtained from the Michigan Department of Education School Facilities Inventory. Additional building data was gathered from interviews with the school plant planners for the Dearborn and Lansing Public Schools. The following list of building criteria derived from the Michigan Department of Education School Facilities Inventory was used in the evaluation of school buildings to insure their compatibility. The elementary school building criteria are:

1. Year of original construction
2. Year(s) of addition(s)
3. Grades building now designed for
4. Grades building now contains
5. Types of supporting services
6. Ownership of building
7. Primary use of building
8. Gross floor area of building
9. Number of floors occupied
10. Pupil capacity of building
11. Estimated membership of building

12. Portable classroom instructional
13. Portable classrooms non-instructional
14. Teacher pupil ratio
15. Number and types of administrative areas
16. Number and types of classrooms
17. Number and types of teacher facilities
18. Type and source of heating system
19. Source and type of water system
20. Number and types of specialized rooms[1]

School Site Criteria
Data Collection

An objective of this investigation is to document school site development practices which contributed to the appreciation of the market sale prices of surrounding residential real estate. Accordingly, of prime importance to this study was the assessment and thorough inventorying of the specific features of the subject school sites. Several sources of tangible data were utilized. First, site data was collected using the Michigan Department of Education School Facilities and Site Inventory, 1972. These data were useful in establishing the general characteristics of the site, such as site acreage; year of purchase; selected resources located on the site; and dollar expenditures for site development. Secondly, site data were collected

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[1]The Michigan Department of Education School Facilities Inventory is an annual collection of building and site data by the Department of Education. All data has been transferred to computers which allows for indepth analysis of building and site needs (inter- as well as intra-school district comparisons).

from the Dearborn and Lansing Parks and Recreation Departments which have cooperative school-park site agreements with the boards of education of the two school districts. The type of park site data included outdoor learning areas on the site for environmental studies, park site development expenditures, size of park site, and physical components of the park portion of the site. A third source of data for site evaluation was obtained from administrative officials of the two school districts. The types of data collected included such aspects as: school site expenditures for development; type of sealed surface playground area; multi-use of parking lot areas; inblock housing and related site features; basic site plan; and site development master plan.

Finally, the research devised additional site evaluative criteria which were applied by on-site visual inspection to insure adequate inventory of the site amenities and components. These amenities included geological significance, natural landscape features, natural planning perimeters, unique environmental qualities and related micro-climate components of a site.

The following categories were selected for the inventorying and the evaluating of the subject school sites. The categories constitute data collected from the previously

discussed sources of school site data collection.

Measures of School Site
Development Quality

1. Use of the site
2. Use of site supporting services
3. Ownership of land
4. Acreage of land
5. Nearby acres used for school purposes
6. Site accessible by sidewalks
7. Site located on state or county highway
8. Trees on site for instructional purposes
9. Water resources on school site
10. Estimated dollar value of site
11. Estimated dollar value of park site
12. Year site was acquired
13. Shape of site
14. Significant topographical relief
15. Natural vehicular patterns, ingress, egress
16. Unique environmental qualities
17. Significant landscaping
18. Ecological significance
19. Zoological significance
20. Geological significance
21. Natural landscape features

22. Structures, types, quality, historical significance
23. Basic site plan
24. Site development master plan
25. Standard or creative play equipment
26. Natural planning perimeters, inblock housing
27. Parks and recreational development expenditures
28. Sealed surface playground area(s)
29. On site vehicle parking with multiple use of parking area
30. Outdoor learning areas for environmental studies

## Residential Housing Sale Price Data Collection

Major sources for the collection of residential market sale price data were the Dearborn and Lansing Boards of Realtors.[1] The data collected from these agencies included: first sale price; last sale price; first year sold; last year sold; and housing characteristics. The

[1]The listing of a property by a realtor who is a member of the board of realtors demands that a notice be sent to this agency. Once the property is sold, fees 2.5 per cent of the commission, are paid to the board of realtors. This selling price of a parcel of property represents an accurate recording process of market sale prices of residential housing.

housing characteristics such as: lot size; number of rooms; linear distance from the site as determined by the street address were recorded on city engineering survey maps. This technique allowed for a visual contrast of the subject housing locations within the elementary service areas in supplying needed data for the neighborhood profile indicators.

Secondary sources of market sale price data were the offices of City Assessor in Dearborn and Lansing. The assessors keep monthly records of deed transfers, including market sales transactions, for purposes of providing base data for assessment practices. No attempt was made to correlate assessment values with market prices. Assessment standards appear to vary with assessment jurisdiction. Assessments usually fall behind market sale prices as a result of increasing inflation or lack of adequate staff to insure proper reassessment of residential properties. Many assessors attempt to distinguish between land values and improvement values of a parcel of residential property which provides additional fuel for disagreement between homeowners and assessors. The significance of under-assessment of residential real estate has plagued local units of government for numerous years. In the words of Ann Arbor News feature writer, Lee Wilkins:

> Despite protests from Ypsilanti Township, the county's Budget and Taxation Committee Friday unanimously agreed to recommend an equalization factor for the township for the ownership of property which would increase taxes by almost 50 per cent.
>
> . . . . . .
>
> Roy Smith, Saline city manager and former state representative who sold a two-acre lakefront property in the township last year for $22,000 but which was assessed in 1973 at $3,000, said assessments within the township are not uniform and that poor assessment practices had a long history in the township.[1]

After a thorough review of the erratic assessment practices and procedures revealed in an exploratory phase of data-gathering, the use of assessment values was ruled out of this study because of varying standards, infrequency of assessment, and the opinion factors which were not objective in pure appraisal terms.

## Description and Analyses of Selected Elementary School Neighborhoods

The descriptive paragraphs which follow will identify in some detail the specific characteristics of each of the sample sites and its surrounding residential neighborhood. First the sample sites in Dearborn will be presented, followed by the sample sites in Lansing. Later sections

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[1]Lee Wilkins, "Officials' Levies Listed as Low," Ann Arbor News, April 27, 1973, p. 1.

of this study will utilize this basic information for the more complicated statistical analyses which follow. The descriptive information may be useful in establishing the comparability of the selected samples. The building and site inventory form used in this study is found in Appendix C.

## Joshua Howard Elementary School
## Large, Open Space Site - Dearborn Sample #1

### Building Design and Site Characteristics

The Joshua Howard Elementary School, a large, open space elementary school-park site, is located in the northwest section of the school district of Dearborn. The site, rectangular in shape and consisting of 12.2 acres of school site and 3.77 acres of parkland, is characterized by a stand of mature deciduous trees which form the focal point of the park portion of the site. Significant landscaping characterizes the entire site, especially around the building proper and in the park area.

The site was purchased in 1944 in joint cooperation with the Dearborn Board of Education and the Dearborn Parks and Recreation Department. Site expenditures occurred in joint cooperation with both governmental units. The site has facilities for baseball, pre-school

and elementary play areas, picnic grounds, and forms a focal point for summer parks and recreational programs for this neighborhood.

The elementary school plant was constructed in 1944-45 with additions occurring in 1949 and 1953. The one-story building contains 36,630 square feet and houses 364 elementary (K-6) pupils. The building is set back into the site which adds to its neighborhood attractiveness and allows an additional margin of safety by being away from automobile traffic.

Neighborhood Profile Factors

The Joshua Howard Elementary School service area is a single-family residential neighborhood. Residential housing in this neighborhood are three- and four-bedroom Cape Cod design with an average of 5.6 rooms per house. There are a few two-family residences, primarily two-storied houses which have been converted for additional family income.

According to the 1970 United States Census Data, ninety-eight per cent of the housing in this area was in sound condition with one per cent in partial deterioration. The homeownership is high with ninety-five per cent of the neighborhood in this category with four per cent in single-family rentals. Housing turnover rate in terms of sales

and resales is low as compared to national figures, which is an indication of housing stability or staying power. Census data indicates that a white, upper-middle income class structure is predominant with socio-economic characteristics similar to the Lindbergh Elementary School neighborhood area. Housing has been kept in excellent repair and lawns and yards are highly maintained.

### Charles A. Lindbergh Elementary School
### Small, Limited Space Site - Dearborn Sample #1

Building Design and Site Characteristics

The Charles A. Lindbergh Elementary School, a small, limited space elementary school site, is located in the northwest section of the school district of Dearborn. The site, rectangular in shape and 6.3 acres in size, was purchased in 1928. Originally, the site consisted of 3.5 acres. Later, in 1955, the closing off of a city street and the moving of thirty homes to other vacant lots in the area, brought the site to its present size. This site expansion appeared to be of prime significance in influencing positively the market sale prices of housing in this neighborhood and is discussed in detail in Chapter IV.

The site has significant landscaping around the building: shade trees line the site perimeters; tennis court facilities, standard play equipment, ball diamonds are

also located on the site; and a few inblock housing units are adjacent to the site proper.

The two-storied elementary school building, 38,100 square feet, was constructed in 1928 with additions to the original structure occurring in 1938 and 1955. The building provides space for 534 students (K-6).

## Neighborhood Profile Factors

The Lindbergh Elementary School service area is a neighborhood of single-family residential dwellings. The houses are two-storied, three- and four-bedroom Cape Cod construction style. The average number of rooms per house is 5.7. The neighborhood does have some two-family, two-storied houses which are in a rental form for one of the units.

According to the 1970 United States Census Data, ninety-nine per cent of the housing in this area of Dearborn was considered in sound condition with one per cent in partial deterioration. The neighborhood has a ninety-four per cent homeownership rate, a relatively low sales turnover rate, with approximately five per cent of the single-family residences in rental form. Census data indicated that a white, middle, upper-middle class structure with homogeneous characteristics similar to the Howard Elementary School

service area occupy the houses. A visible characteristic of the neighborhood is well-maintained yards and houses kept in excellent repair.

### Woodworth Elementary School
### Large, Open Space Site - Dearborn Sample #2

Building Design and Site Characteristics

The Woodworth Elementary School, a large, open space elementary school site, is located in the eastern portion of the school district of Dearborn. The site, 12.7 acres in size, and rectangular in shape, was purchased in 1928. Characteristic of the site are standard play equipment, ball fields, and limited site development. However, the grounds do include formal landscaping around the building proper. The site does have natural planning perimeters in the respect that streets bound the property and there are no inblock housing units. Cyclone fencing enclosed the school land, and, in addition, it is screened in several places with shrubbery.

The two-storied elementary school plant, 69,700 square feet, was constructed in 1928 with additions occurring in 1937, 1955 and 1963. The building has a capacity for 405 pupils with present enrollment estimated at 399. A K-9 instructional program is offered in this building.

## Neighborhood Profile Factors

The Woodworth Elementary School service area is an older neighborhood which dates housing, original construction, during the 1930's. Relatively few housing starts have been recorded during the last two decades. Residential housing is of the two- and three-bedroom bungalow style with an average of 4.5 rooms. The neighborhood does have some mixed two-family units, primarily consisting of converted two-storied houses for the purpose of additional family income.

According to the United States 1970 Census Data, ninety-six per cent of the housing in this area of Dearborn was considered in sound condition with three per cent in partial deterioration. The homeownership rate is high at eighty-nine per cent with a low turnover rate of residential housing. Approximately eight per cent of the total residential housing is in rental form. Further, census data show a white, middle-class socio-economic structure in this neighborhood with homogeneous characteristics compatible with the Oakman Elementary School neighborhood.

### Oakman Elementary School
### Small, Limited Space Site - Dearborn Sample #2

## Building Design and Site Characteristics

The Oakman Elementary School, a small, limited space

elementary school site is located in the northeast section of the school district of Dearborn. The site consists of 3.5 acres, rectangular in shape with no nearby acres such as parkland for use by neighborhood residents. The site was purchased in 1926: contains standard play equipment; has no topographical relief; is completely enclosed by cyclone fencing; and contains no inblock housing units. This school site, as is characteristic of all school sites in the school district of Dearborn, reflects well-landscaped grounds.

Schoolhouse construction occurred in 1926 for a K-6 school plant with no additions nor major expansions since the original plant construction. The plant, two-storied construction, has a pupil capacity of 308 and presently houses 295 elementary school youngsters. The total square feet of the building is 37,100 with the major allocation of space devoted to regular classrooms.

Neighborhood Profile Factors

The Oakman Elementary School service area is an established single-family residential neighborhood. Residential housing is primarily two- and three-bedroom bungalow construction with some mixed two-storied, two-family residential dwellings. Housing construction for this neighbor-

hood occurred during the 1930's and 40's with relatively few housing starts during the last two decades.

The 1970 United States Census Data indicated that ninety-five per cent of the residential housing is in sound condition with three per cent in partial deteriorating condition and one per cent in a blighted condition. Home-ownership is high at ninety-two per cent with approximately seven per cent in rental of the single-family residences. The neighborhood is a white, middle-class community with related socio-economic characteristics. Residential housing has been kept in good repair with house landscaping occurring on practically every residential site. A sociological characteristic of this neighborhood, as well as most of east Dearborn, is the predominance of elderly residents within ethnic-oriented neighborhoods. Accordingly, this neighborhood is highly stable with relatively few resales of housing. In fact, school enrollment in the eastern service areas of the school district of Dearborn is dropping at greater rates than comparable national figures of similar districts.[1]

William Ford Elementary School
Large, Open Space Site - Dearborn Sample #3

Building Design and Site Characteristics

[1]School enrollment in the school district of Dearborn has decreased by 5,500 pupils since 1965. Present enrollment is 19,450 pupils.

The William Ford Elementary School, a large, open space community school-park complex, is located in the northeast section of the school district of Dearborn. The site, rectangular in shape and consisting of 6.3 acres is connected to 38.35 acres of developed parkland. The school-park land is administered by a joint agreement between the Dearborn Board of Education and the Dearborn Parks and Recreation Department.

The school site was purchased in 1922, which predates the development of housing in this neighborhood. The site is divided by cyclone fencing separating the parkland and school site proper. Asphalt has been applied extensively for parking areas and play areas. The school site is complemented by formal landscaping.

The parkland is a well-designed community-wide park with facilities for youth as well as adults; in fact, the park portion of this school site originally was donated by the Henry Ford estate as part of a park development project in Dearborn.

The elementary school building was constructed in 1922 and provides space for 450 pupils on a K-6 instructional basis. The school contains an area of 33,687 square feet. The two-storied building is a protruding physical structure and is characterized by its limited recessment from major street arteries.

## Neighborhood Profile Factors

The William Ford Elementary School service area is a single-family residential neighborhood. Residential housing, two- and three-bedroom bungalows, were constructed during the 1920's and 30's. The neighborhood has some mixed two-family housing as evidenced by conversion of two-storied housing units.

According to the 1970 United States Census Data, ninety-eight per cent of the residential housing surrounding the school site was considered in sound condition with two per cent in partial decay. The neighborhood is characterized by ninety per cent homeownership with approximately nine per cent in rental house units. The census data show a white, middle-class socio-economic structure in this neighborhood with homogeneous characteristics compatible with the Maples Elementary School neighborhood. A significant characteristic of this neighborhood, and found in other comparable Dearborn neighborhoods is the stability of residential housing sales, i.e., sales and resales of housing in this neighborhood approximate one-fourth of the turnover rates of the national average in housing. Residential housing with well-maintained yards are a characteristic of this neighborhood.

## Maples Elementary School
## Small, Limited Space Site - Dearborn Sample #3

### Building Design and Site Characteristics

The Maples Elementary School, a small, limited space elementary school site, is located in the northeast section of the school district of Dearborn. The site, rectangular in shape with no topographical relief, consists of 2.5 acres. Characteristic of this site is the protruding building which covers a major portion of the site. The Dearborn Parks and Recreation Department has a small 2.3 acre mini-park for use of residents within this neighborhood.

The site was acquired in 1930 and is characterized by a small playground area which included standard play equipment. Of importance is the extensive landscaping of the site which adds aesthetic value to this small, limited space elementary school site. Cyclone fencing encloses a portion of the site which obstructs access by residents to the site.

The three-storied schoolhouse was constructed in 1930 with a total of 60,500 square feet. The building is used to support a K-9 educational program and enrolls 463 pupils. Building additions occurred in 1936 which are compatible building characteristics to the William Ford Elementary School.

Neighborhood Profile Factors

The Maples Elementary School service area is a single-family residential neighborhood and contains two and three-bedroom bungalow housing units. The present housing was constructed during the 1930's with few housing units being constructed beyond the 1950's. The neighborhood has some mixed two-family housing which were converted two-storied houses for the purpose of additional family rental income.

According to the 1970 United States Census Data, ninety-seven per cent of the residential housing in this neighborhood was considered sound with two per cent in partial deteriorating condition. The neighborhood is characterized by ninety-two per cent homeownership with approximately seven per cent in rental income family housing. Census data further indicates a white, middle-class structure, homogeneous in income and ethnically matched with the William Ford Elementary service area. Turnover of housing, sales and resales of residential housing units, is considerably below the national average. This indicates a high stability of homeownership within the neighborhood.

Elmhurst Elementary School
Large, Open Space Site - Lansing Sample #4

Building Design and Site Characteristics

The Elmhurst Elementary School, a large open space school-park site, is located in the southwest section of the school district of Lansing. The site, rectangular in shape with slight topographical relief, consists of 16.6 acres. The school-park site is a joint cooperative effort between the Lansing Board of Education and the Lansing Department of Parks and Recreation.

The site was purchased in 1946 and contains 6.6 acres which have been developed for neighborhood park use. The park portion of the site contains standard play equipment for pre-school and school-age elementary youngsters; mature deciduous trees form the focal point of the park; picnic tables and manmade park amenities are characteristic of this site. Significant landscaping occurs throughout the site.

The elementary school plant is set back two city blocks from a secondary traffic artery, and was constructed during the years 1950-51. The schoolhouse enrolls 510 pupils K-6 plan, and has 39,900 square feet of floor space.

Neighborhood Profile Factors

The Elmhurst Elementary School service area is a single-family residential neighborhood. The neighborhood has no multi-family dwelling units, commercial zones, over-

head power lines, major highway arteries nor inblock housing. The residential housing styles are bungalow and Cape Cod types with an average of 4.7 rooms per house. Residential housing surrounding the school site was constructed between the years of 1946 and 1950 as a platted subdivision of the city of Lansing.

Based upon the 1970 United States Census Data, ninety-seven per cent of the residential housing in the area was considered sound with three per cent in partial deterioration. The neighborhood is characterized by ninety per cent homeownership with approximately nine per cent of the single-family residential housing in rental form. The census data show a white, middle-class structure, homogeneous in income and ethnic characteristics. Approximately 11.82 per cent of the total elementary school population in the service area attend parochial schools. Nearly identical neighborhood profile characteristics are contained in the Mt. Hope Avenue Elementary School service area, the major difference being the size and state of development of the school sites.

Mt. Hope Avenue Elementary School
Small, Limited Space Site - Lansing Sample #4

Building Design and Site Characteristics

The Mt. Hope Avenue Elementary School, a small,

limited space elementary school site, is situated in the southeast section of the school district of Lansing. The school is located one elementary service area from the Elmhurst Elementary School. The site, rectangular in shape, has 4.37 acres; however, Potter Park, a small 2.9 acre neighborhood park is within walking distance of the Mt. Hope Avenue neighborhood residents.

The Mt. Hope Avenue site was acquired in 1925 in anticipation of residential development in this area of Lansing. Based upon 1920 school site standards, this site constituted a reasonably large elementary site when one considers that bordering lands were still in undeveloped open space. The site has significant mature deciduous trees which line portions of its boundaries. Characteristic of this site is the evidence of significant landscaped school grounds.

The two-storied elementary school plant, constructed between the years of 1948 through 1953, includes a pupil enrollment of 485, and contains 37,400 square feet of floor space. During the past two decades, automobile traffic has increased in this area of Lansing to the extent that an overhead footbridge was constructed to service the site.

## Neighborhood Profile Factors

The Mt. Hope Avenue Elementary School service area

is characterized by single-family residential houses. A few one-bedroom apartments have been constructed in the past five years which are located on the fringe of the service area boundaries. The neighborhood does not contain multi-family living units, nor major traffic arteries, nor other related market value depressants. The residential housing units in the area are of the Cape Cod and bungalow styles with three- and four-bedroom homes predominating. Platting of the subdivision surrounding the school was completed in the late 1940's.

According to the 1970 United States Census Data, ninety-five per cent of the residential housing in the area is sound and five per cent is beginning to deteriorate. Ninety-one per cent of the residents own their houses and eight per cent of the remaining residential houses are in family rental. The census data show a white, middle-class structure, homogeneous in income and ethnic characteristics comparable to the Elmhurst Elementary School site service area profile. Approximately 5.49 per cent of the elementary age children of this area attend parochial schools.

## Kendon Elementary School
## Large, Open Space Site - Lansing Sample #5

### Building Design and Site Characteristics

The Kendon Elementary School, a large, open space

elementary school site, is located in the southeast section of the school district of Lansing. The site, rectangular and open space in nature, is surrounded by a 1950 subdivision and is located between the major roadways of Jolly Road on the east-west axis and Pennsylvania Avenue on the north-south side. The site consists of 9.5 acres of school land and 2.8 acres of contiguous parkland. A significant site feature is its semi-rolling topography. The site contains natural planning perimeters as denoted by the residential street patterns in the formation of its boundaries.

This site is open land with a limited number of mature deciduous trees. These trees form a portion of the parkland on the east side of the site. Significant landscaping is characteristic of the area surrounding the school building.

The site was acquired in 1951 with schoolhouse construction being completed in 1958. Twelve regular classrooms were originally constructed with four more regular classrooms being added in a renovation and addition project in 1962. The plant, K-6 plan, enrolls 360 pupils with a total capacity for 430. The building has 32,000 square feet of floor space.

Neighborhood Profile Factors

The residential housing surrounding the Kendon Elementary School site is two- and three-bedroom, bungalow and Cape Cod houses. The average number of rooms per house is 4.7. The subdivision was platted in 1950.

According to the 1970 United States Census Data, homeownership rate was eighty-nine per cent with ten per cent of the houses in family rental units. The census data further indicated that ninety per cent of the total housing in the area was considered sound, 8.5 per cent was deteriorating, and .5 per cent was dilapidated or severely blighted. Further, the neighborhood can be classified as white, middle-class with a medium income. Also, 10.63 per cent of the school age elementary youngsters of the service area attend parochial schools.

Maple Hill Elementary School
Small, Limited Space Site - Lansing Sample #5

Building Design and Site Characteristics

The Maple Hill Elementary School, a small, limited space elementary school site of .8 acres is located in the southwest section of the school district of Lansing. The school site service area is contiguous to the Kendon

Elementary School service area.

The school site was purchased in 1945 as a proposed K-4 instruction unit. Located adjacent to the site is .5 acres of land that is presently being used as a mini-park site for the neighborhood. The site is characterized by the lack of space, inblock housing protruding into the site, no provision for faculty nor community parking, and the lack of site amenities, such as trees, water potential, natural vehicular patterns, poor to inadequate landscaping, absence of topographical relief and safety features.

The elementary school plant, a one-story building was originally designed as a K-4 instruction unit; however, the present use is for K-6 grade span. The plant was constructed in 1951 with additions in 1953 and 1960. The enrollment in the building is 295 with a total floor space of 19,100 square feet.

## Neighborhood Profile Factors

The Maple Hill Elementary School service area has single-family residential housing and contains two- and three-bedroom bungalow and Cape Cod housing. The average number of rooms per house is 4.5 with the housing being constructed between 1930 and 1940.

The 1970 United States Census Data indicates that ninety per cent of the housing in this service area was

considered in sound condition, nine per cent was deteriorating and one per cent dilapidated. Visual observation reveals that the deteriorating housing was primarily located in the first tier adjacent to the small, limited space elementary school site. Eighty-eight per cent of the residential housing of this neighborhood was owner occupied with ten per cent of the housing in the rental form. According to further census data, the neighborhood can be classified as white, middle-class with a medium income and similar socio-economic strata. Finally, 13.3 per cent of the children living in this neighborhood are attending local parochial schools.

## Summary

The preceding sections of this chapter have presented in considerable detail both the data which describes the selected school sites and buildings and also the census characteristics of the surrounding neighborhood housing units and the socio-economic characteristics of the residents. The similarities, as presented and examined by this writer, are considered adequate to establish comparability for the purposes of this study.

# CHAPTER IV

## PRESENTATION AND STATISTICAL ANALYSES OF DATA

The preceding chapters have discussed the nature and importance of the problem, reviewed relevant literature, discussed pertinent descriptive information and data of the elementary school sites, buildings, and neighborhoods, and have presented the general schematic design for the investigation. This chapter will be divided into two parts; the first part being the presentation of the basic data and the second part being the statistical methodology utilized in the study. The data collected for this study encompasses the time period from 1952 through 1971 and the final sample cases subjected to analyses are located in the school districts of Dearborn and Lansing, Michigan.

### Basic Data on School Site Housing Costs

The basic data on the market sale prices, sale years, number of streets crossed, and property tax millage rates for the residential housing surrounding the ten elementary school sites were obtained from the records of the Dearborn Board of Realtors, the Lansing Board of Realtors, the offices of the City Assessor, the offices of the City

Treasurer, the Boards of Education in the school districts of Dearborn and Lansing, Michigan. Market sale prices of residential housing are rounded off to the nearest dollar and the number of years are rounded off to the nearest year.

The basic data were regrouped by individual school sites and were summarized for later computations. The regrouped data and summarized data are shown in Tables 4-2 and 4-3 and in graphic form in Figures 4-1 through 4-5.

## Correction Factors for Market Sale Prices of Houses

This investigation of the economic values of residential housing units surrounding elementary school sites measured the change in market sale prices during the time span from 1952 through 1971. In order to establish constant dollar figures for the market sale prices of residences, all residential housing market sales were converted to the 1967 Consumer Price Index of Homeownership of the United States Department of Labor, Bureau of Labor Statistics Standards.

Since the study investigated residential housing market sales in the school districts of Dearborn and Lansing, Michigan a further correction factor was employed relating to the market sale data, that factor being the Detroit

Standard Metropolitan Statistical Area Consumer Price Index (1967 = 100). This factor corrects for regional differences in house purchases, mortgage interest rates, property and associated house taxes, maintenance and repair costs.

The market sales data, first sale prices and last sale prices for residential housing for the subject school site neighborhoods were converted to constant dollars by application of the Detroit Standard Metropolitan Statistical Area (S.M.S.A.) Consumer Price Index (1967 = 100) for homeownership. The mathematical computations for constant dollars (1967 = 100) were performed on a standard calculator. These adjusted market sale data prices were then recorded on computer data cards for later statistical analyses. The Consumer Price Index for the Detroit Metropolitan Statistical Area (S.M.S.A.) Homeownership for the years 1952 through 1971 is shown in Table 4-1.

Descriptive Analyses of Market Sale Price Data for Matched Pairs of Elementary School Site Neighborhoods

In order to further illustrate the economic difference in the market sale prices of similar residential housing surrounding the five matched pairs of elementary

school site neighborhoods, Figures 4-1 through 4-5 were constructed. Each figure depicts the economic relationship of projected market sale price trends, 1952 through 1971, for the residential housing sales associated with five matched pairs of elementary school site neighborhoods. Further, the figures plot the actual market sale prices and years sold in terms of adjusted mean values for the first and last sale prices and the first and last sale years.

The mean variation between the last average selling year and the last actual market sale price for the matched pairs of subject sites residential housing is of prime importance for it shows that large, open space elementary school site residential housing is selling for higher market prices than similar residential housing surrounding small, limited space school sites. A discussion of the market sale price data pertaining to the five matched pairs of elementary school site neighborhoods ensues.

| | | |
|---|---|---|
| Joshua Howard Elementary School Large, Open Space Site | - | Charles A. Lindbergh Elementary School Small, Limited Space Site |
| Dearborn Sample #1 | - | Dearborn Sample #1 |

The mean market sale price appreciation rate for residential housing of the Charles A. Lindbergh Elementary School site neighborhood, a small, limited space site,

TABLE 4-1

HOMEOWNERSHIP COSTS OF PURCHASES, MORTGAGE INTEREST, TAXES, MAINTENANCE AND REPAIR

CONSUMER PRICE INDEX
DETROIT S.M.S.A.
1952-1971

Index 1967 = 100

| Year | Percentage of 1967 Value |
|---|---|
| 1952 | 81.7 |
| 1953 | 85.6 |
| 1954 | 87.4 |
| 1955 | 87.5 |
| 1956 | 89.1 |
| 1957 | 91.9 |
| 1958 | 91.5 |
| 1959 | 91.0 |
| 1960 | 91.0 |
| 1961 | 90.2 |
| 1962 | 89.4 |
| 1963 | 89.7 |
| 1964 | 90.1 |
| 1965 | 91.3 |
| 1966 | 95.7 |
| 1967 | 100.0 |
| 1968 | 104.9 |
| 1969 | 113.7 |
| 1970 | 124.2 |
| 1971 | 128.3 |

Source: U. S. Department of Labor, Bureau of Labor Statistics, Handbook of Labor Statistics Bulletin No. 1705 (Washington, D.C.: Government Printing Office, 1972).

indicated a 4.69 per cent annual yield per house. This figure exceeds the percentage mean appreciation rate of 4.64 per cent per year for similar residential housing of the Joshua Howard Elementary School site neighborhood, a large, open space site. Further, the Lindbergh Elementary School residential housing was increasing at a mean annual dollar rate of $938.- per house as contrasted to a mean annual dollar increase of $930.- per house for similar housing surrounding the Joshua Howard Elementary School.

The regression lines for the two subject school site neighborhoods merge between 1967-68 with the Lindbergh Elementary School residential housing asserting slightly higher market sale prices thereafter. The Lindbergh Elementary School residential housing mean sale price increased $5,628.- over a seven-year period, 1960 through 1966, whereas the same time span indicated a $5,581.- mean sale price increase for similar residential housing surrounding the Joshua Howard Elementary School.

The graphic results of the regression lines indicate a unique market phenomenon. Accordingly, these nearly identical regression lines are indicative of similar market functions for sale price levels of residential housing attributed to certain market variables associated with the Lindbergh Elementary School site. Accordingly, in 1957,

TABLE 4-2

SUMMARY OF MARKET SALES DATA FOR MATCHED PAIRS OF ELEMENTARY SCHOOL SITE NEIGHBORHOOD RESIDENTIAL HOUSING UNITS DEARBORN PUBLIC SCHOOLS, 1952-1971

| Elementary School Neighborhoods | $\bar{X}$ First Sale Price in $ | $\bar{X}$ Last Sale Price in $ | $\bar{X}$ First Sale Year | $\bar{X}$ Last Sale Year | Price Increase per year in $ | Price Increase per year percentage | Number of Market Sales |
|---|---|---|---|---|---|---|---|
| Joshua Howard Large, Open Space Dearborn Sample #1 | $20,053.- | $25,634.- | 1960 | 1966 | $930.- | 4.64% | 114 |
| Charles A. Lindbergh Small, Limited Space Dearborn Sample #1 | $19,944.- | $25,572.- | 1960 | 1966 | $938.- | 4.69% | 88 |
| Woodworth Large, Open Space Dearborn Sample #2 | $14,417.- | $18,750.- | 1959 | 1965 | $722.- | 5.01% | 80 |
| Oakman Small, Limited Space Dearborn Sample #2 | $14,009.- | $17,351.- | 1960 | 1966 | $577.- | 3.98% | 68 |
| William Ford Large, Open Space Dearborn Sample #3 | $14,910.- | $19,270.- | 1959 | 1965 | $727.- | 4.87% | 88 |
| Maples Small, Limited Space Dearborn Sample #3 | $13,963.- | $18,127.- | 1958 | 1965 | $595.- | 4.26% | 62 |

Source: Madison Academic Computing Center Program, Descriptive Statistics, Version 7.04, Program No.2, Crosstabulations No.2, January, 1973. Additional calculations by writer.

TABLE 4-3

SUMMARY OF MARKET SALES DATA FOR MATCHED PAIRS OF ELEMENTARY SCHOOL SITE NEIGHBORHOOD RESIDENTIAL HOUSING UNITS LANSING PUBLIC SCHOOLS, 1952-1971

| Elementary School Neighborhoods | $\bar{X}$ First Sale Price in $ | $\bar{X}$ Last Sale Price in $ | $\bar{X}$ First Sale Year | $\bar{X}$ Last Sale Year | Price Increase per year in $ | Price Increase per year percentage | Number of Market Sales |
|---|---|---|---|---|---|---|---|
| Elmhurst<br>Large, Open Space<br>Lansing Sample #4 | $11,936.- | $14,628.- | 1959 | 1965 | $449.- | 3.76% | 255 |
| Mt. Hope Avenue<br>Small, Limited Space<br>Lansing Sample #4 | $12,364.- | $14,414.- | 1957 | 1966 | $228.- | 1.84% | 180 |
| Kendon<br>Large, Open Space<br>Lansing Sample #5 | $10,215.- | $12,810.- | 1959 | 1965 | $433.- | 4.23% | 158 |
| Maple Hill<br>Small, Limited Space<br>Lansing Sample #5 | $10,291.- | $12,472.- | 1953 | 1965 | $182.- | 1.77% | 131 |

Source: Madison Academic Computing Center Program, Descriptive Statistics, Version 7.04, Program No.2, Crosstabulations No.2, January, 1973. Additional calculations by writer.

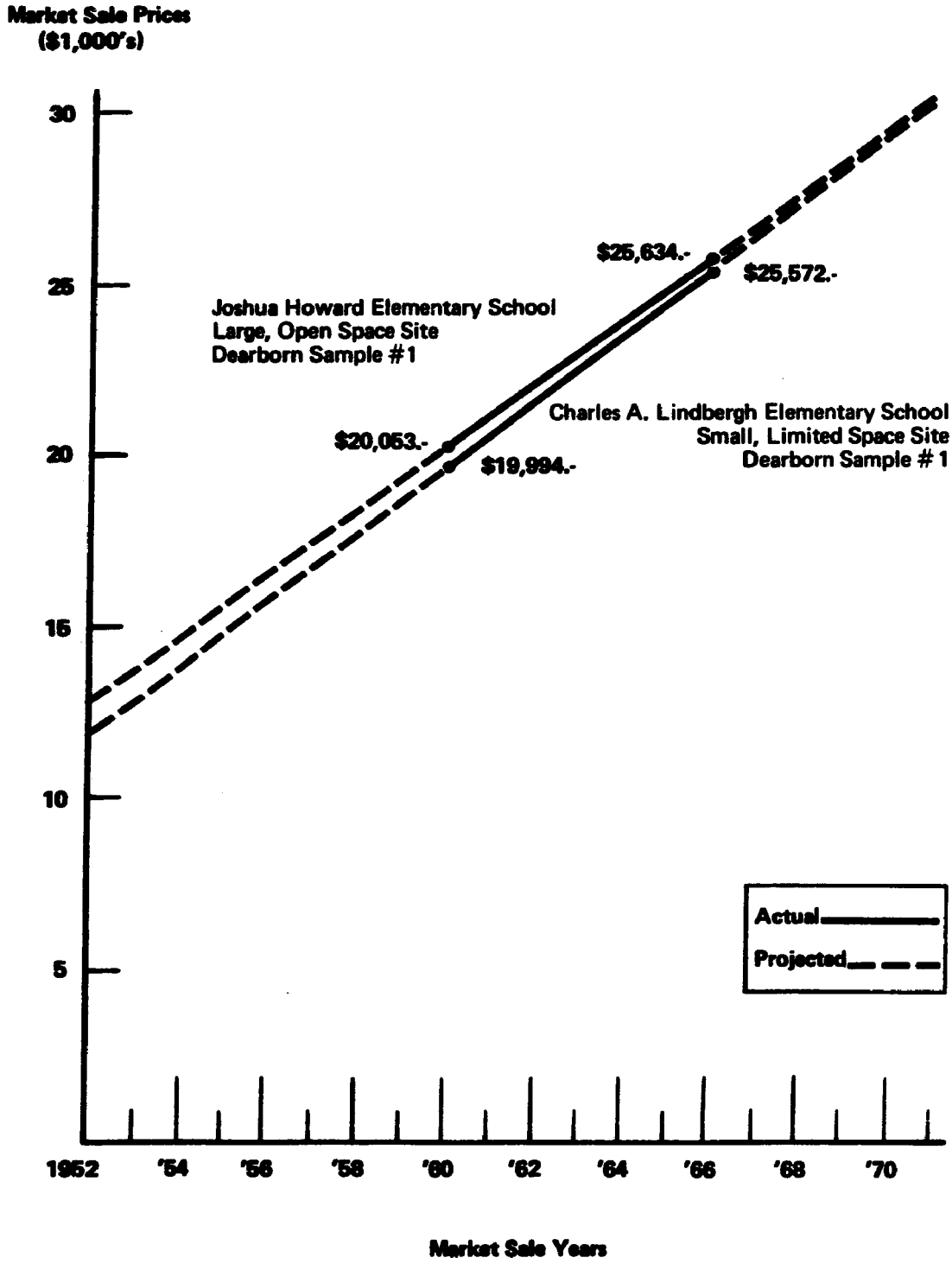



**FIGURE 4-1** GRAPH SHOWING THE MEANS ($\bar{X}$'S) FOR THE LAST SALE PRICE AND THE FIRST SALE PRICE IN DOLLARS AND THE LAST SALE YEAR AND THE FIRST SALE YEAR FOR RESIDENTIAL HOUSING UNITS SOLD AND RESOLD IN THE SUBJECT NEIGHBORHOODS BETWEEN THE YEARS OF 1952 THROUGH 1971.

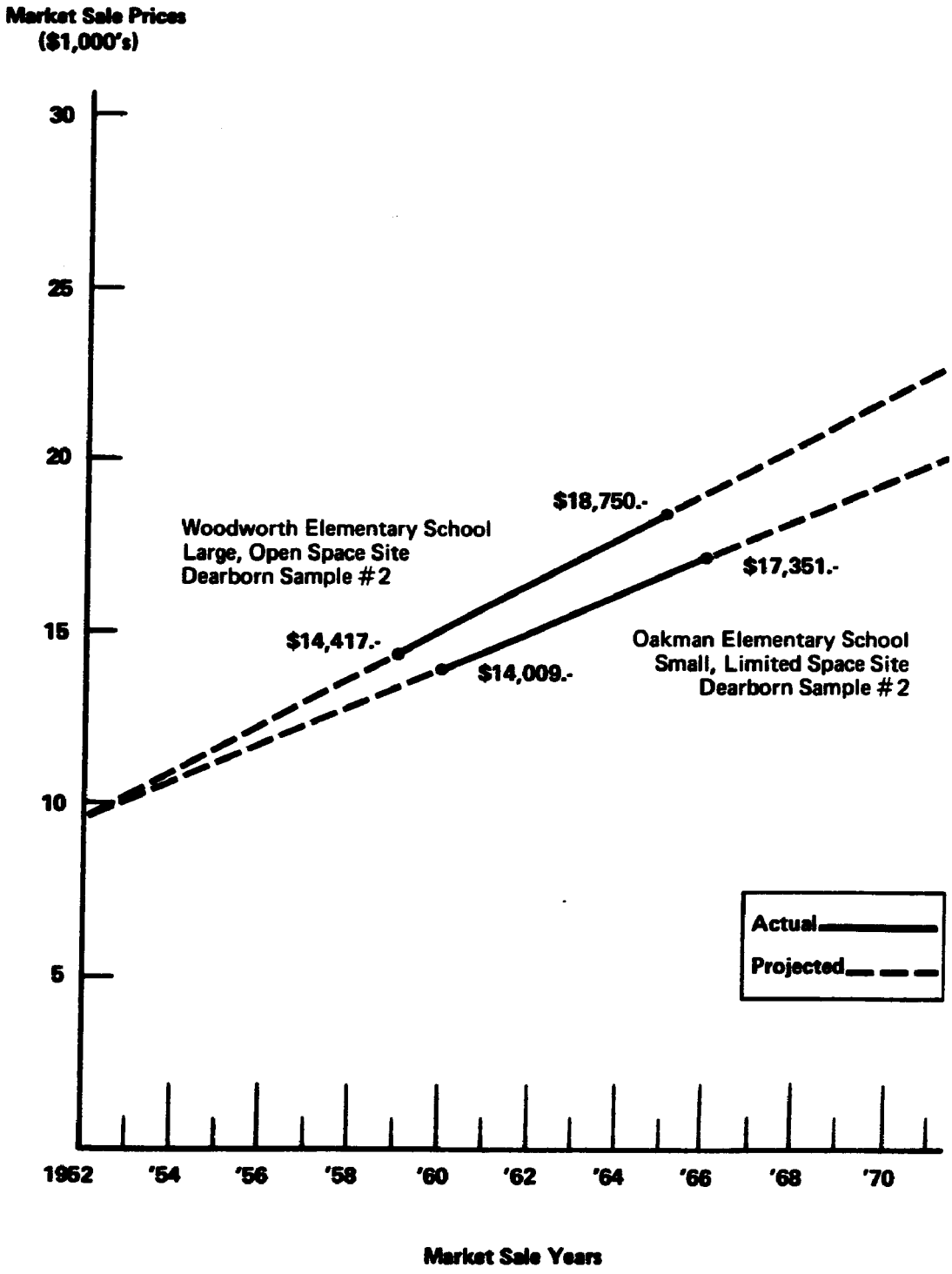



FIGURE 4-2 GRAPH SHOWING THE MEANS ($\bar{X}$'S) FOR THE LAST SALE PRICE AND THE FIRST SALE PRICE IN DOLLARS AND THE LAST SALE YEAR AND THE FIRST SALE YEAR FOR RESIDENTIAL HOUSING UNITS SOLD AND RESOLD IN THE SUBJECT NEIGHBORHOODS BETWEEN THE YEARS OF 1952 THROUGH 1971.

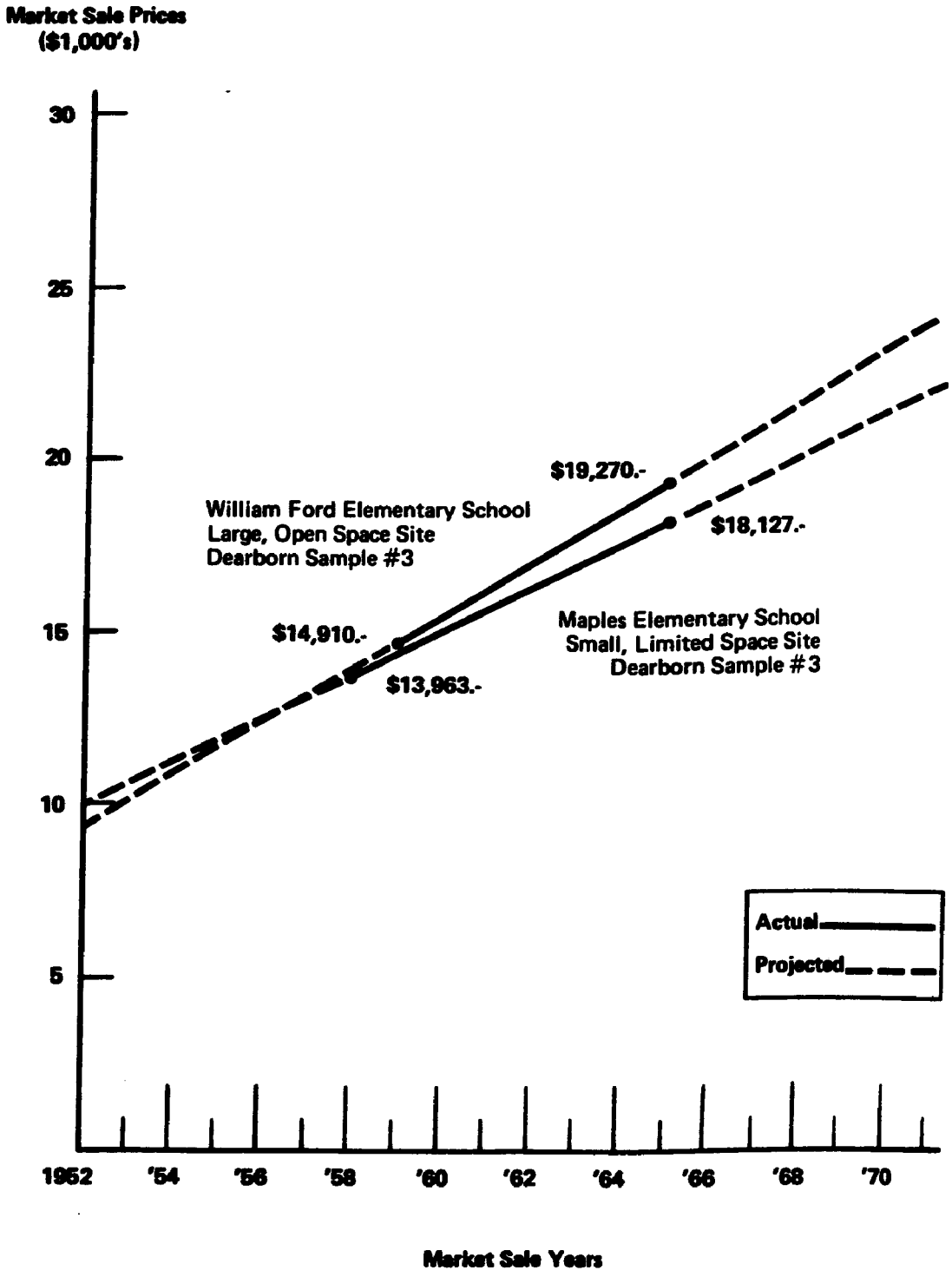



**FIGURE 4-3** GRAPH SHOWING THE MEANS ($\bar{X}$'S) FOR THE LAST SALE PRICE AND THE FIRST SALE PRICE IN DOLLARS AND THE LAST SALE YEAR AND THE FIRST SALE YEAR FOR RESIDENTIAL HOUSING UNITS SOLD AND RESOLD IN THE SUBJECT NEIGHBORHOODS BETWEEN THE YEARS OF 1952 THROUGH 1971.

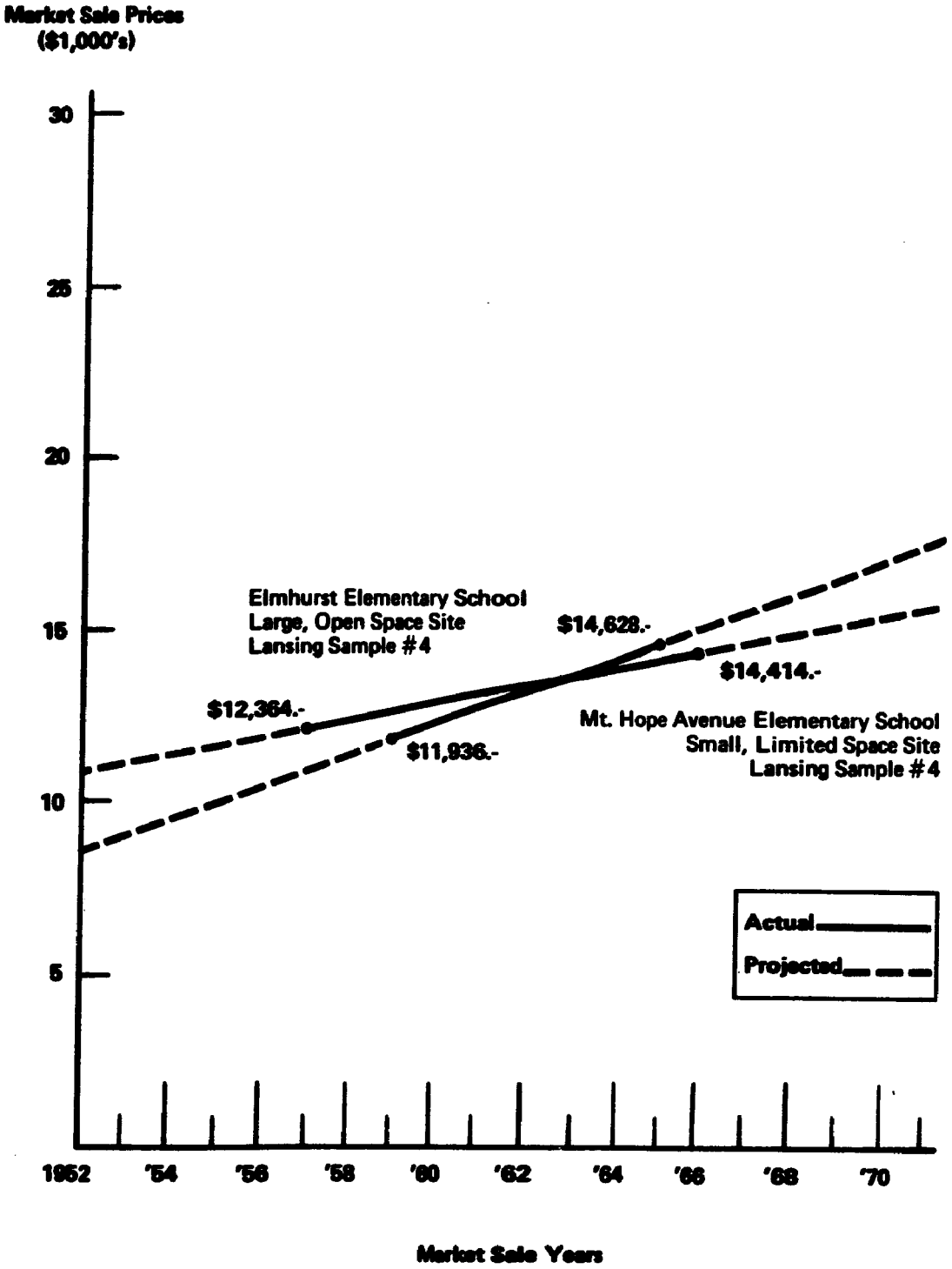



**FIGURE 4-4** GRAPH SHOWING THE MEANS ($\bar{X}$'S) FOR THE LAST SALE PRICE AND THE FIRST SALE PRICE IN DOLLARS AND THE LAST SALE YEAR AND THE FIRST SALE YEAR FOR RESIDENTIAL HOUSING UNITS SOLD AND RESOLD IN THE SUBJECT NEIGHBORHOODS BETWEEN THE YEARS OF 1952 THROUGH 1971.

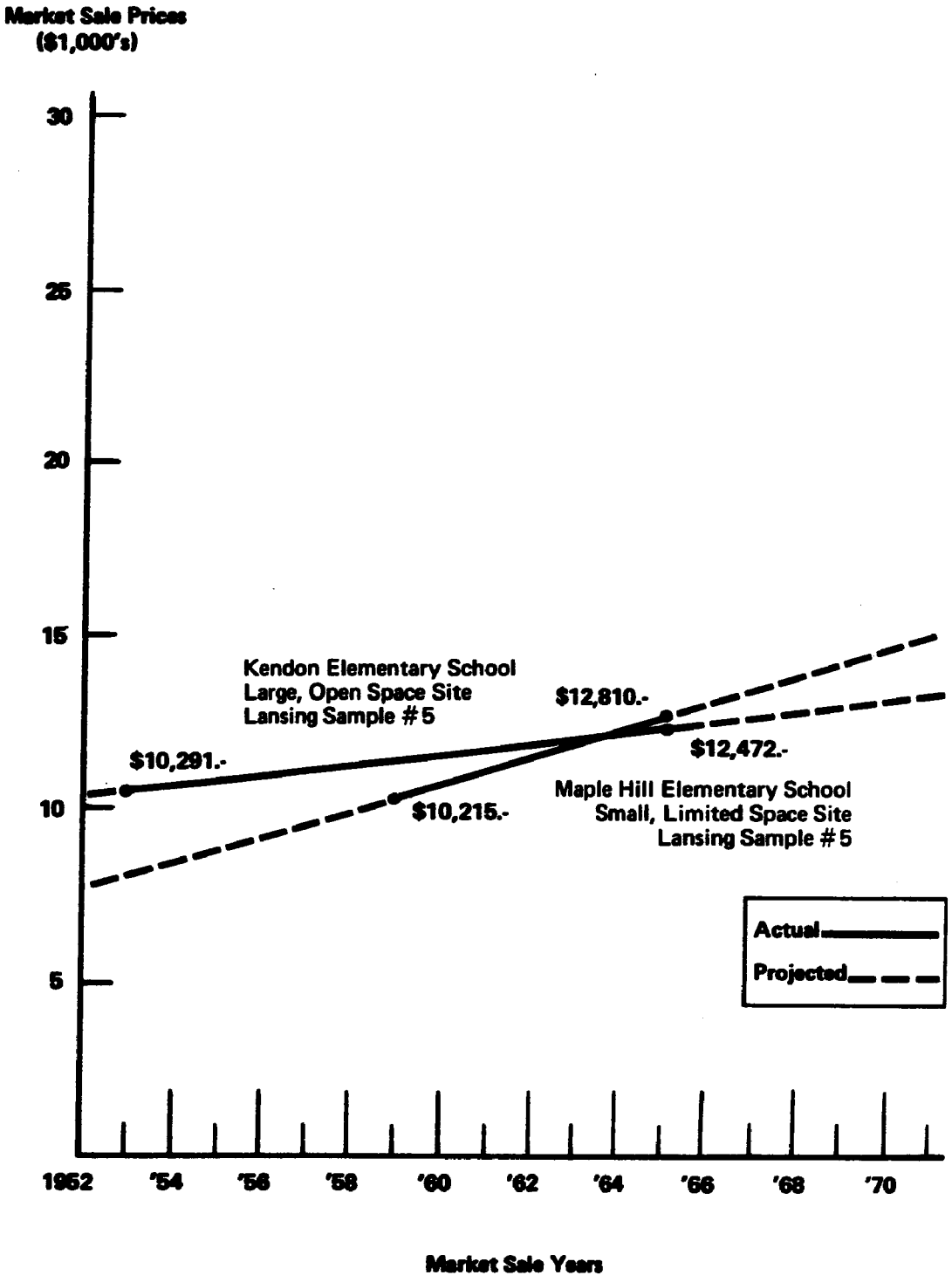



**FIGURE 4-5** GRAPH SHOWING THE MEANS ($\bar{X}$'S) FOR THE LAST SALE PRICE AND THE FIRST SALE PRICE IN DOLLARS AND THE LAST SALE YEAR AND THE FIRST SALE YEAR FOR RESIDENTIAL HOUSING UNITS SOLD AND RESOLD IN THE SUBJECT NEIGHBORHOODS BETWEEN THE YEARS OF 1952 THROUGH 1971.

the Lindbergh Elementary School site was expanded in size from 3.5 to 6.3 acres with substantial public tax revenues being provided for site development. Apparently, this site expansion in unison with the extensive site development has positively influenced the market price trends (actual adjusted mean values for first and last sale price of residential housing) to the extent that adjusted mean market sale prices of residential housing are nearly identical from the period of 1957 through 1971.

| | | |
|---|---|---|
| Woodworth Elementary School | - | Oakman Elementary School |
| Large, Open Space Site | - | Small, Limited Space Site |
| Dearborn Sample #2 | - | Dearborn Sample #2 |

Woodworth Elementary School neighborhood residential housing data indicated a 5.01 annual percentage rate increase as compared to 3.98 per cent for similar residential housing surrounding the Oakman Elementary School site. Woodworth Elementary School residential housing was increasing at a mean sale price of $722.- per year, per house as compared to the mean sale price increase per year, per house of $557.- for the residential housing surrounding the Oakman Elementary School.

After the plotting of the adjusted means for the residential housing of the last sale prices for both elementary school site neighborhoods, the regression lines show

the mean variation between the last market sale prices as $1,399.- in the mean sale years of 1965-66 in favor of the large, open space elementary school site neighborhood.

The dollar difference of the last sale price data and the first sale price data indicated that a mean sale price gain of $4,333.- during the six year period, 1959 through 1965, whereas Oakman Elementary School residential housing showed a $3,342.- mean sale price gain for the seven-year period, 1960 through 1966.

| | |
|---|---|
| William Ford Elementary School | - Maples Elementary School |
| Large, Open Space Site | - Small, Limited Space Site |
| Dearborn Sample #3 | - Dearborn Sample #3 |

The residential housing mean sale prices surrounding the William Ford Elementary School site, a large, open space site, were appreciating at a yearly percentage rate of 4.87 per cent. This figure is contrasted to a yearly percentage gain of 4.26 per cent for similar residential housing surrounding the Maples Elementary School site. William Ford Elementary School residential housing mean sale prices increased $4,360.- over the six-year period, 1959 through 1965, as compared to a mean sale price increase of $4,164.- over a seven-year period, 1958 through 1965, for the Maples Elementary School residential housing.

Further, the mean sale price for William Ford Elementary School residential housing was increasing at an annual rate of $132.- per house more than similar housing surrounding the comparable small, limited space elementary school site. Of significance is the apparent affect of the park portion of the school site upon the total residential housing property values of the two elementary school neighborhoods. The percentage difference for the housing of these two elementary school site neighborhoods is 4.87 per cent compared to 4.26 per cent which is not nearly so pronounced as compared to other results in this study; thus, this may be indicative that the community park influence of the William Ford Elementary School site was favorable upon residential housing values of both elementary school site neighborhoods (William Ford Park does service the residents of the Maples Elementary School neighborhood).

| | | |
|---|---|---|
| Elmhurst Elementary School | - | Mt. Hope Avenue Elementary School |
| Large, Open Space Site | - | Small, Limited Space Site |
| Lansing Sample #4 | - | Lansing Sample #4 |

As measured yearly, the residential housing mean market sale price appreciation rates for the Elmhurst Elementary School neighborhood, a large, open space elementary school site, showed a 3.76 per cent yield whereas the mean

market sale price appreciation rates for matched residential housing surrounding the Mt. Hope Avenue Elementary School site was 1.84 per cent. These percentages translate into an annual dollar increase in mean sale prices of $449.- for Elmhurst Elementary School neighborhood residential housing and a $228.- annual increase for the Mt. Hope Avenue Elementary School residential housing.

The mean first sale price of residential housing of the Elmhurst Elementary School neighborhood indicated that this residential housing was selling for smaller market sale prices than were similar residential housing surrounding the Mt. Hope Avenue Elementary School site; thus, the actual dollar gain in mean sale prices for the residential housing in this large, open space elementary school site is most pronounced, i.e., Elmhurst Elementary School: $11,936.-; Mt. Hope Avenue Elementary School: $12,364.-.

The regression lines cross in 1963-64 with a marked change occurring in market sale prices in favor of the large, open space elementary school site in the 1967 through 1971 time span. The total mean market sale price appreciation for the mean first sale year and the mean last sale year was $2,692.- for Elmhurst Elementary School residential housing as compared to a mean sale price dollar gain of $2,050.- for the Mt. Hope Avenue Elementary School residential housing

which indicated that the large, open space elementary school site residential housing was selling with pronounced market sale price increases as compared to the comparable residential housing located around the small, limited space elementary school site.

| | | |
|---|---|---|
| Kendon Elementary School | - | Maple Hill Elementary School |
| Large, Open Space Site | - | Small, Limited Space Site |
| Lansing Sample #5 | - | Lansing Sample #5 |

The residential housing surrounding the Kendon Elementary School, a large, open space elementary school site, was appreciating at annual mean market sale price rate of 4.23 per cent. This yearly appreciation rate was more than double the increase reported for similar residential housing surrounding the Maple Hill Elementary School, a small, limited space site, i.e., 1.77 per cent per year.

Residential housing surrounding the Kendon Elementary School showed a $433.- increase per year in mean sale prices as contrasted to a dollar gain of $182.- per year for similar residential housing surrounding the Maple Hill Elementary School. The regression lines begin to merge in 1963-64 with pronounced dollar differences appearing in the 1970-71 market sale years in favor of the large, open space elementary school site.

## Statistical Analyses of Data

This section presents the statistical analyses of the data which related to certain economic value relationships of elementary school sites and residential housing in the school districts of Dearborn and Lansing, Michigan. The study is a measurement of the market sale price changes of residential real estate in ten selected urban neighborhoods and records the market sale history of 1,224 (one thousand two hundred twenty-four) double market sales from 1952 through 1971. The statistical analyses of the summarized and regrouped data are described in the following sections.

### Primary One-Factor Covariance Analysis

The computer program utilized to analyze the data for this study was the Jeremy D. Finn Multivariance - Univariance and Multivariate Analysis of Variance and Covariance; A Fortran IV Program, Version 4, June, 1971. The program was further adapted to the UNIVAC 1108 of the University of Wisconsin Computer Center and was conducted at the University of Wisconsin, Milwaukee Branch, Milwaukee, Wisconsin.

The statistical method of Primary One-Factor Covariance Analysis allows for the selection of data in a consistent form and measures the affect of each covariate upon

the dependent variable. This process tests the significance of the difference of the means of the dependent variable for the two types of school sites (two levels of the factor) after eliminating the affects of the covariates on the dependent variable. This statistical method, Primary One-Factor Covariance Analysis, was used to test Null Hypothesis One. A discussion, including appropriate summary tables, of the Analysis of Covariance Model used in this study ensues.

The factor of the study was the type of elementary school site, large, open space or small, limited space. The dependent variable was the last sale price of residential housing surrounding the subject school sites. The covariates (independent variables) of the study were the first sale price, the number of years between sales, and the number of streets crossed to reach the site.

The number of observed samples for large, open space elementary school sites was 695 sales and for small, limited space elementary school sites was 529 sales. The total number of double market sales for the study was 1,224 (one thousand two hundred twenty-four).

The computer program organized the data into cell means and standard deviations for the first sale price, the last sale price, the number of streets crossed and the number of years between sales. The difference in the calculation

results of large, open space and small, limited space elementary school sites residential housing supports the concept that the variance within the total population is not related to errors of random chance. Tables 4-4 and 4-5 show these results.

A major aspect of this study was to determine if residential housing surrounding large, open space elementary school sites was selling for higher market sale prices than comparable residential housing surrounding small, limited space elementary school sites. The analytical computations for the market sale price data as indicated in Table 4-6 (Analysis of Covariance) reveals an F score of 36.3251 which is statistically significant at the .0001 level of confidence ($p < .0001$).

It can be stated that the mean variation between the last sale price of residential housing of the comparable subject sites is statistically significant in favor of the large, open space elementary school sites and is not associated with errors of random chance due to sampling.

Therefore, it can be concluded that for the population studied, large, open space elementary school site residential housing units are selling for higher market sale prices than similar residential housing units surrounding the small,

TABLE 4-4

OBSERVED CELL MEANS

| Type of Site | Streets | First Price | Last Price | Years |
|---|---|---|---|---|
| Large, Open Space | 2.70 | $13,538.44 | $17,082.11 | 6.26 |
| Small, Limited Space | 3.03 | $13,508.61 | $16,601.91 | 7.95 |

Source: Jeremy D. Finn, Multivariance - Univariance and Multivariate Analysis of Variance and Covariance. Adapted to the UNIVAC 1108 of the University of Wisconsin Computer Center (Milwaukee,Wisconsin) January, 1973.

TABLE 4-5

OBSERVED CELL STANDARD DEVIATIONS

| Type of Site | Streets | First Price | Last Price | Years |
|---|---|---|---|---|
| Large, Open Space | 1.338 | 4761.280 | 6173.403 | 4.217 |
| Small, Limited Space | 1.391 | 4791.067 | 6279.671 | 5.042 |

Source: Jeremy D. Finn, Multivariance - Univariance and Multivariate Analysis of Variance and Covariance. Adapted to the UNIVAC 1108 of the University of Wisconsin Computer Center (Milwaukee, Wisconsin) January, 1973.

TABLE 4-6

SUMMARY OF ANALYSIS OF COVARIANCE FOR THE LAST SALE PRICE, AS ADJUSTED FOR THE COVARIATES OF THE FIRST SALE PRICE, THE NUMBER OF YEARS BETWEEN SALES, AND THE NUMBER OF STREETS CROSSED FOR LARGE, OPEN SPACE AND FOR SMALL, LIMITED SPACE ELEMENTARY SCHOOL SITE RESIDENTIAL HOUSING

| Source | SS | df | MS | F |
|---|---|---|---|---|
| Between Groups | 297349120.00 | 1 | 297349120.00 | 36.32351* |
| Within Groups | 9978895212.75 | 1219 | 8186132.25 | |

*p < .0001

Source: Jeremy D. Finn, Multivariance - Univariance and Multivariate Analysis of Variance and Covariance. Adapted to the UNIVAC 1108 of the University of Wisconsin Computer Center (Milwaukee, Wisconsin) January, 1973.

limited space elementary school sites. For complete discussion of the variations of the means in market sale price data for large, open space and small, limited space elementary school site residential housing units, see Null Hypothesis One, Chapter V.

## Linear Distance Relationships of Residential Housing

A major tenet of this study is to determine the economic market price trends of residential housing surrounding elementary school sites as related to their proximity to the site. This measurement, change in the market sale prices of housing, was correlated to the linear distance of the houses to the site as measured by the number of street crossings to the school site.

In order to test statistically the data of market sale price changes, the formula for the Sign of Difference Between Two Correlations was employed. Henry E. Garrett in Statistics in Psychology and Education stated:

> A useful and mathematically exact method of determining the SE of the difference between two r's is that we first convert the r's into Fisher's z function. The significance of the difference is then determined. . . . We may feel sure that if the r's are positively correlated in our group, and the CR is determined as significant, that the CR would be even more significant if the correlation between the r's were known. The z transformation can be usefully employed when r's

which differ widely in size are to be averaged or combined.[1]

The correlation values (r) for the last sale price and the number of streets crossed and the first sale price and the number of streets crossed are presented in Tables 4-7 and 4-8. These tables present a correlation matrix for all of the market sale price data and are employed in the computation of the critical ratios in statistically testing Null Hypothesis Two and Null Hypothesis Three. Following the presentation of the Formula for the Sign of Difference Between Two Correlations is a discussion of the mathematical computations used to determine the critical ratios for the two null hypotheses.

Formula for the Sign of Difference Between Two Correlations

$$\text{C. R. (Critical Ratio)} = \frac{r_{2_1} - r_{2_2}}{\sqrt{\frac{1}{N_1-3} + \frac{1}{N_2-3}}}$$

First Sale Price Data and Number of Streets Crossed

The correlation coefficients for the first sale price

[1]Henry E. Garrett, Statistics in Psychology and Education (New York: David McKay Company, 1958), pp. 241-242.

TABLE 4-7

CORRELATION MATRIX FOR LARGE, OPEN SPACE ELEMENTARY SCHOOL SITES

| Variable # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Name | Type of Site | School | Streets | First Sale | First Price | Last Sale | Last Price | Years |
| 1 | Type of Site | 1.000 | | | | | | | |
| 2 | School | .000 | 1.000 | | | | | | |
| 3 | Streets | .000 | .082 | 1.000 | | | | | |
| 4 | First Sale | .000 | -.000 | -.000 | 1.000 | | | | |
| 5 | First Price | .000 | -.489 | -.110* | .000 | 1.000 | | | |
| 6 | Last Sale | .000 | -.000 | .000 | .000 | .000 | 1.000 | | |
| 7 | Last Price | .000 | -.533 | -.096* | .000 | .856 | .000 | 1.000 | |
| 8 | Years | .000 | .024 | .046 | .000 | -.234 | .000 | .062 | 1.000 |

Source: Madison Academic Computing Center Program, Descriptive Statistics, Version 7.04, Program 2, Crosstabulations No.2, January 1973.

TABLE 4-8

CORRELATION MATRIX FOR SMALL, LIMITED SPACE ELEMENTARY SCHOOL SITES

| Variable # / Variable Name | 1 Type of Site | 2 School | 3 Streets | 4 First Sale | 5 First Price | 6 Last Sale | 7 Last Price | 8 Years |
|---|---|---|---|---|---|---|---|---|
| 1 Type of Site | 1.000 | | | | | | | |
| 2 School | .000 | 1.000 | | | | | | |
| 3 Streets | .000 | .082 | 1.000 | | | | | |
| 4 First Sale | .000 | -.065 | .009 | 1.000 | | | | |
| 5 First Price | .000 | -.407 | .044* | .093 | 1.000 | | | |
| 6 Last Sale | .000 | .000 | .000 | .000 | .000 | 1.000 | | |
| 7 Last Price | .000 | -.469 | .044* | .088 | .851 | .000 | 1.000 | |
| 8 Years | .000 | .260 | .013 | -.138 | -.244 | .000 | .007 | 1.000 |

Source: Madison Academic Computing Center Program, Descriptive Statistics, Version 7.04, Program No.2, Crosstabulations No.2, January 1973.

of residential housing to the number of streets crossed for large, open space elementary school sites were -.110 and +.044 for small, limited space elementary school sites. The study measured 695 double sales transactions of houses surrounding large, open space elementary school sites and 529 double sales for the small, limited space elementary school sites. The formula for the Sign of Difference Between Two Correlations was applied (see Tables 4-7 and 4-8 for correlation values):

$$C.R. = \frac{-.110 - +.044}{\sqrt{\frac{1}{692} + \frac{1}{526}}}$$

$$C.R. = \frac{0.154000}{0.057846}$$

$$C.R. = 2.662214$$

A Critical Ratio of 1.96 is required at the .05 level of significance and 2.58 at the .01 level of significance. Therefore: p is < .01.

From the preceding statistical computation of the Sign of Difference Between Two Correlations, there are significant indications that residential housing located close to large, open space elementary school sites is selling

for significantly higher market sale prices than is similar housing surrounding small, limited space elementary school sites. Further, there are indications that residential housing that is located one, two and three street crossings from large, open space elementary school sites as related to the first time housing was sold; however, it should be noted that proximity of housing to well-developed open space elementary school sites does not exhibit a pronounced pattern of gradation of market sale prices receding from the elementary school site. For example, market sale prices of residential housing, first mean year sold, that are four street crossings from large, open space elementary school sites are not selling for less value than similar housing located two street crossings from the same elementary school site. For further discussion on this aspect, see Null Hypothesis Two in Chapter V.

Last Sale Price Data and
Number of Streets Crossed

The correlation coefficients for the last sale price of residential housing as related to the number of streets crossed surrounding large, open space elementary school sites was -.096 and for small, limited space elementary school sites was +.044 (see Tables 4-7 and 4-8). The sample

total of double market sales was 1224 with 695 double sales transactions for large, open space elementary school sites and 529 double sales transactions for small, limited space elementary sites. Applying the formula for the Sign of Difference Between Two Correlations, the following is the mathematical computation yields for the Critical Ratio.

$$C.R. = \frac{-.096 - +.044}{\sqrt{\frac{1}{692} + \frac{1}{526}}}$$

$$C.R. = \frac{0.140000}{0.057846}$$

$$C.R. = 2.420194$$

A Critical Ratio of 1.96 is required at .05 level of significance and 2.58 at the .01 level of significance. Therefore: p is < .05.

The data computations of the relationship of the last sale price of residential housing surrounding large, open space elementary school sites, and the number of streets crossed to the site shows that the proximity of the house to the site was statistically significant. Residential housing that was located one, two or three street crossings from the large, open space elementary school sites was selling for higher market prices than similar residential

housing located at the same linear distance from small, limited space elementary school sites; however, it should be noted that the market sale price trend of proximity to the site is statistically significant not yet markedly pronounced. For further discussion of the linear relationships of the last sale price, see Null Hypothesis Four, Chapter V.

## Projected Potential Additional Property Tax Revenue Yields

The revenue derived from property tax levies in the State of Michigan is established by state law which mandates that real property taxes are to be levied on the State Equalized Valuation of Real Property.[1] Further, the Michigan Constitution provides that real property is to be assessed at not more than 50% of real cash value for tax purposes.[2] Accordingly, property tax millage levies (the rate of mills per $1000 S.E.V.) are then applied to the state equalized assessed value to obtain the property tax yield.

The writer postulated that the difference in the market prices of residential housing surrounding large,

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[1]Michigan, General Property Tax Act, Michigan Statutes Annotated.

[2]Michigan, Constitution, art. 9, sec. 3.

open space elementary school sites could be significant in providing an expanded property tax base as compared to similar residential housing surrounding small, limited space elementary school sites. If large, open space elementary school sites add dollar value to the property tax base, then additional property tax revenue could be collected for use by local units of government. This additional property tax revenue would be in the form of unearned land rent and could be considered as a source of additional revenue for the operation of local governmental units including programs of school site development, expansion, and maintenance.

The following mathematical process was used in computing the potential additional property tax yields for the governmental units with property taxing jurisdiction in the school districts of Dearborn and Lansing, Michigan. This mathematical process was employed for the five matched pairs of elementary school site residential housing data to project the potential revenue that could be collected over a five decade period.

The writer divided by two the adjusted mean of the last market sale price of residential housing to ascertain a value equivalent to the fifty per cent state equalized assessed value for each of the ten subject school sites, i.e., William Ford Elementary School site residential

housing adjusted mean last sale was $19,270.-. The $19,270.- divided by two yields $9,635.- which indicates that potentially this figure is the dollar value used for calculating the total property tax revenues for the various governmental property tax jurisdictions. The 1972 property tax millage rates are then applied to the $9,635.- figure to obtain appropriate tax revenues for support of public services. The school district of Dearborn levies 25.09 mills per $1,000.- state equalized assessed real market value. Applying this millage rate to the $9,635.- figure yields property tax revenue of $250.-. Similar calculations were performed to determine the property tax revenue for city government operation and county government operation, but using appropriate millage rates.

In computing the projected potential additional property tax revenue yields, the total potential additional property tax revenue yield is multiplied by 250 residential houses to obtain the additional potential property tax revenue yields of each elementary school site neighborhood. Two hundred fifty houses is considered a mean for residential housing surrounding the ten subject school sites. For example, William Ford Elementary School, $521.- total property tax revenue yield per house multiplied by 250 yields $130,250.- per year. This figure, $130,250.-, is then

multiplied by the number of years to obtain projections of potential property tax revenue yields for the next five decades, i.e., $130,250.- x 50 years = $6,512,500.- total projected potential additional property tax revenue.

The same process was performed for the remaining nine subject school site residential market sale price data. The difference between the large, open space elementary school site residential housing revenue and the potential revenue of the small, limited space elementary school site housing constitutes the potential additional property tax revenue yield, i.e., William Ford Elementary School, large, open space elementary school site and Maples Elementary School, small, limited space elementary school site: William Ford Elementary School, $521.- total property tax yield per house, minus Maples Elementary School, $490.- total property tax yield per house, equals a difference of $31.-, the potential additional property tax revenue yield. For complete summary projections of potential additional property tax revenue yields,see Tables 4-9 and 4-10.

A discussion and interpretation of the property tax projections with additional calculations are provided in Chapter V in the discussion relating to Null Hypothesis Four. It should be noted that the calculations associated with the market sale price data are projections and are

TABLE 4-9

SUMMARY OF PROJECTED POTENTIAL ADDITIONAL PROPERTY TAX YIELDS
FOR ELEMENTARY SCHOOL NEIGHBORHOODS
DEARBORN, MICHIGAN

| School | SEV 50% | School Property Tax 25.09/1000 | City Gov't Property Tax 21.00/1000 | County Property Tax 7.12/1000 | Total Property Tax/House 54.04/1000 | Total Revenue/Year X 250 Houses |
|---|---|---|---|---|---|---|
| Wm. Ford | $9,635.- | $250.- | $202.- | $69.- | $521.- | $130,250.- |
| Maples | $9,064.- | $235.- | $190.- | $65.- | $490.- | $122,500.- |
| Difference | $571.- | $15.- | $12.- | $4.- | $31.- | $7,750.- |
| Howard | $12,817.- | $332.- | $269.- | $91.- | $692.- | $173,000.- |
| Lindbergh | $12,786.- | $331.- | $269.- | $91.- | $691.- | $172,750.- |
| Difference | $31.- | $1.- | $0.- | $0.- | $1.- | $250.- |
| Woodworth | $9,375.- | $243.- | $197.- | $67.- | $507.- | $126,750.- |
| Oakman | $8,676.- | $225.- | $183.- | $62.- | $470.- | $117,500.- |
| Difference | $699.- | $18.- | $14.- | $5.- | $37.- | $9,250.- |

TABLE 4-9 (cont.)

SUMMARY OF PROJECTED POTENTIAL ADDITIONAL PROPERTY TAX YIELDS
FOR ELEMENTARY SCHOOL NEIGHBORHOODS
DEARBORN, MICHIGAN

| School | Total 10 Year Revenue Yield | Total 20 Year Revenue Yield | Total 30 Year Revenue Yield | Total 40 Year Revenue Yield | Total 50 Year Revenue Yield |
|---|---|---|---|---|---|
| Wm. Ford | $1,302,500.- | $2,605,000.- | $3,907,500.- | $5,210,000.- | $6,512,500.- |
| Maples | $1,225,000.- | $2,450,000.- | $3,675,000.- | $4,900,000.- | $6,125,000.- |
| Difference | $77,500.- | $155,000.- | $232,500.- | $310,000.- | $387,500.- |
| Howard | $1,730,000.- | $3,460,000.- | $5,190,000.- | $6,920,000.- | $8,650,000.- |
| Lindbergh | $1,727,500.- | $3,455,000.- | $5,182,500.- | $6,910,000.- | $8,637,500.- |
| Difference | $2,500.- | $5,000.- | $7,500.- | $10,000.- | $12,500.- |
| Woodworth | $1,267,500.- | $2,535,000.- | $3,802,500.- | $5,070,000.- | $6,337,500.- |
| Oakman | $1,175,000.- | $2,350,000.- | $3,525,000.- | $4,700,000.- | $5,875,000.- |
| Difference | $92,500.- | $185,000.- | $277,500.- | $370,000.- | $462,500.- |

Source: Calculations by writer.

TABLE 4-10

SUMMARY OF PROJECTED POTENTIAL ADDITIONAL PROPERTY TAX YIELDS
FOR ELEMENTARY SCHOOL NEIGHBORHOODS
LANSING, MICHIGAN

| School | SEV 50% | School Property Tax 35.00/1000 | City Gov't Property Tax 12.71/1000 | County Property Tax 10.10/1000 | Total Property Tax/House 57.81/1000 | Total Revenue/Year X 250 Houses |
|---|---|---|---|---|---|---|
| Kendon | $6,405.- | $224.- | $81.- | $65.- | $370.- | $92,500.- |
| Maple Hill | $6,236.- | $218.- | $79.- | $63.- | $360.- | $90,000.- |
| Difference | $169.- | $6.- | $2.- | $2.- | $10.- | $2,500.- |
| Elmhurst | $7,314.- | $256.- | $93.- | $74.- | $423.- | $105,750.- |
| Mt. Hope Avenue | $7,207.- | $252.- | $92.- | $73.- | $417.- | $104,250.- |
| Difference | $107.- | $4.- | $1.- | $1.- | $6.- | $1,500.- |

TABLE 4-10 (cont.)

SUMMARY OF PROJECTED POTENTIAL ADDITIONAL PROPERTY TAX YIELDS
FOR ELEMENTARY SCHOOL NEIGHBORHOODS
LANSING, MICHIGAN

| School | Total 10 Year Revenue Yield | Total 20 Year Revenue Yield | Total 30 Year Revenue Yield | Total 40 Year Revenue Yield | Total 50 Year Revenue Yield |
|---|---|---|---|---|---|
| Kendon | $925,000.- | $1,850,000.- | $2,775,000.- | $3,700,000.- | $4,625,000.- |
| Maple Hill | $900,000.- | $1,800,000.- | $2,700,000.- | $3,600,000.- | $4,500,000.- |
| Difference | $25,000.- | $50,000.- | $75,000.- | $100,000.- | $125,000.- |
| Elmhurst | $1,057,500.- | $2,115,000.- | $3,172,500.- | $4,230,000.- | $5,287,500.- |
| Mt. Hope Avenue | $1,042,500.- | $2,085,000.- | $3,127,500.- | $4,170,000.- | $5,212,500.- |
| Difference | $15,000.- | $30,000.- | $45,000.- | $60,000.- | $75,000.- |

Source: Calculations by writer.

symbolic for illustrative purposes only, and should not be construed as actual dollar revenues collected by official governmental tax jurisdictions.

# CHAPTER V

# FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

## Findings

The findings of this investigation were utilized to construct a conceptual framework for establishing certain economic value relationships between elementary school sites and market sale prices of surrounding residential housing. The economic value relationships investigated in the study are stated in the null hypothesis form.

### Market Sale Price Increases For Residential Housing

### Null Hypothesis One

$H_o$ = There is no significant difference in the last sale price of residential housing as adjusted for the covariates of the first sale price, the number of years between sales, and the number of streets crossed for large, open space and for small, limited space elementary school sites.

## Results

The market sale price data of residential housing were adjusted to reflect constant dollar values by application of the 1967 Consumer Price Index for Standard Metropolitan Statistical Areas Homeownership (Detroit S.M.S.A.: 1967 Index = 100). The study reported the market sale price appreciation of housing from 1952 through 1971.

The data indicated that the market sale prices of residential housing surrounding large, open space elementary school sites were increasing at significantly greater price rates than were selling prices of similar housing surrounding small, limited space elementary school sites. Annual market sale prices of residential housing surrounding large, open space elementary school sites were found to be increasing at dollar value rates which ranged from $433.- to $806.- per house as contrasted to appreciation rates of $168.- to $804.- for similar housing surrounding small, limited space elementary school sites. When the dollar value increases for residential housing were transformed into percentage yields per year, the housing surrounding large, open space elementary school sites indicated appreciation rates ranging from 3.76 per cent to 5.01 per cent. In contrast, the percentage increases were significantly

smaller for similar housing associated with small, limited space elementary school sites which yielded annual rates of 1.77 per cent to 4.69 per cent.

In 1958, the mean first sale price, $13,538.- for all residences surrounding large, open space elementary school sites was slightly greater in dollar value than was the mean first sale price, $13,510.- for similar housing associated with small, limited space elementary school sites. By 1965, housing surrounding large, open space school sites had risen to a mean market price of $17,082.- as contrasted to similar housing located around small, limited space elementary school sites which reflected a smaller mean last sale price of $16,602.-. Table 5-1 and Figure 5-1 depict the summary results for all sales records of residential housing around both large, open space and small, limited space elementary school sites.

Since the data indicated a significant difference in the last mean sale price in favor of the large, open space elementary school sites, Null Hypothesis One is rejected.

## Linear Distance Relationships of Residential Housing

### Null Hypothesis Two

$H_o$ = There is no significant difference between

TABLE 5-1

SUMMARY OF MARKET SALE PRICES OF RESIDENTIAL HOUSING UNITS IN URBAN NEIGHBORHOODS AROUND SELECTED ELEMENTARY SCHOOL SITES, LARGE AND SMALL, 1952-1971

| Neighborhood School Site All Records | $\bar{X}$ First Sale Price | $\bar{X}$ Last Sale Price | $\bar{X}$ First Sale Year | $\bar{X}$ Last Sale Year | Market Sales Count | $\bar{X}$ Per Cent Price One Year | $\bar{X}$ Dollar Gain |
|---|---|---|---|---|---|---|---|
| Large, Open Space Sites | $13,538.- | $17,082.- | 1959 | 1965 | 695 | 4.36 | $3,544.- |
| Small, Limited Space Sites | $13,510.- | $16,602.- | 1957 | 1966 | 529 | 2.54 | $3,092.- |

Source: Madison Academic Computing Center Program, Descriptive Statistics, Version 7.04. Program No. 2, Crosstabulations No. 2, January, 1973. Additional calculations by writer.

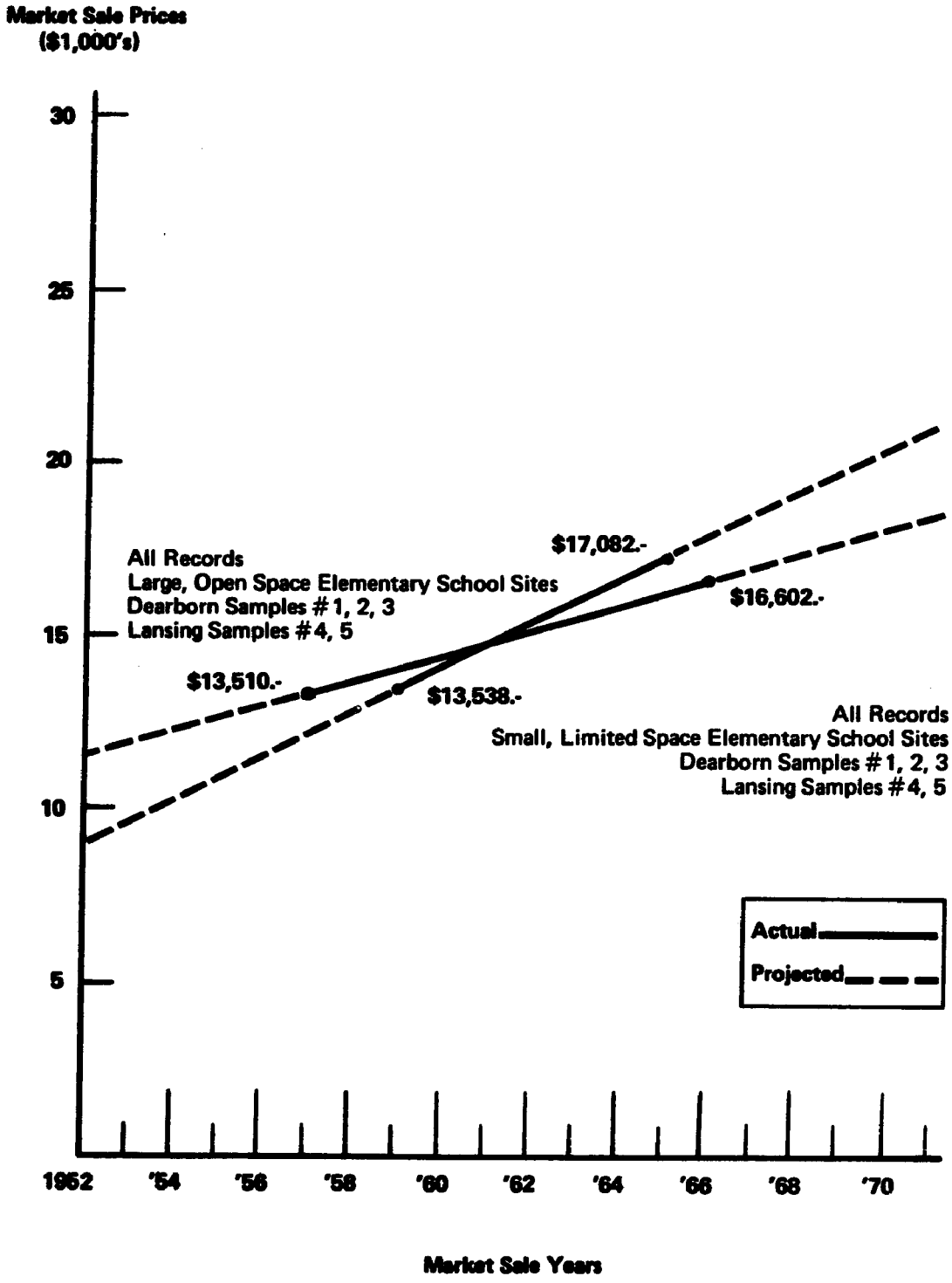



**FIGURE 5-1** GRAPH SHOWING THE MEANS ($\bar{X}$'S) FOR THE LAST SALE PRICE AND THE FIRST SALE PRICE IN DOLLARS AND THE LAST SALE YEAR AND THE FIRST SALE YEAR FOR RESIDENTIAL HOUSING UNITS SOLD AND RESOLD IN THE SUBJECT NEIGHBORHOODS BETWEEN THE YEARS OF 1952 THROUGH 1971.

the relationship of the number of streets crossed and the first sale price for large, open space and for small, limited space elementary school sites.

## Results

The market sale price data for the ten elementary school neighborhoods investigated indicated that a linear distance relationship exists between the first sale price of a residential housing unit and its proximity to the site as measured by the number of streets crossed to the site. The sample of 695 first sale prices of large, open space elementary school sites resulted in a correlation coefficient between first sale prices and proximity of -.110. Using the total sample of 529 first sale prices for small, limited space elementary school sites yielded a correlation coefficient between first sale prices and proximity of +.096. Even though the correlations were small numbers, a test of significance for the null hypothesis was performed using the formula for the Sign of Difference Between Two Correlations. Since the total number (N) for the study was large, 1224 (one thousand two hundred twenty-four) samples, a critical ratio of 1.96 was required at the .05 level of significance and a ratio of 2.58 was required at the .01

level of significance. The results of the formula computation resulted in a Critical Ratio of 2.662214 which indicates that $p < .01$, and this value is statistically significant.

Therefore, residential housing which was one, two and three street crossings away from the site was selling for higher market prices around large, open space elementary school sites than was similar housing located at the same proximity to small, limited space elementary school sites. Based upon the results of these computations, Null Hypothesis Two is rejected.

Null Hypothesis Three

$H_o$ = There is no significant difference between the relationship of the number of streets crossed and the last sale price for large, open space and for small, limited space elementary school sites.

Results

A comparison of the last sale prices, 695 in number, for large, open space elementary school sites resulted in a correlation coefficient between last sale prices and proximity of -.096 as related to the number of streets crossed to reach the site. Using the total number of 529

last sale prices for small, limited space elementary school sites yielded a correlation coefficient between last sale prices and proximity of +.044 as related to the number of streets crossed to reach the site. By applying a test of significance to the null hypothesis, the Sign of Difference Between Two Correlations, a Critical Ratio of 2.420194 was established which was indicative that $p < .05$ for the two differences. Once again, residential housing that was in close linear distance to large, open space elementary school sites (one, two, and three street crossings was selling for higher market prices than was similar housing located at the same proximity to small, limited space elementary school sites. Based upon the analyses of the data, Null Hypothesis Three is rejected.

## Projected Potential Additional Property Tax Revenue Yield

### Null Hypothesis Four

$H_o$ = There is no significant difference between the relationship of the projected potential additional property tax revenue yield and the last sale price of residential housing as adjusted for the covariates of the first sale price, the number of years between sales, and the number of streets crossed for large, open space and for small, limited space elementary school sites.

## Results

A major objective of this investigation was to compute the projected potential additional property tax revenue yield for residential housing surrounding elementary school sites. If the residential housing surrounding large, open space elementary school sites generates additional property tax revenues adequate to equalize the difference in the investments for site development, site maintenance and the additional acreage between large, open space and small, limited space elementary school sites; then, fiscal justification can be established for public investments in open space elementary school site projects.

The following process was used to calculate the projected potential additional property tax revenue yields for the governmental units utilizing the property tax as a source of funding public services.

**Projected Potential Additional Property Tax Revenue Calculations Dearborn, Michigan Property Tax Rate (54.04 mills/$1000.- S.E.V., 1972)**

1. The difference between the adjusted mean values of the last sale prices of residential housing for all large, open space and for small, limited space elementary school site housing units in the school district of

Dearborn was $2,602.- (see Table 4-1). This figure, $2,602.-, represents the mean market selling price difference for the neighborhood housing units surrounding the subject elementary school sites, previously denoted as Dearborn Samples #1, #2, and #3.

2. The $2,602.- difference was then divided by two to obtain fifty per cent of the mean state equalized assessed value (S.E.V.) of $1,301.- to which millage rates were applied. Since the $1,301.- figure represents the additional difference between three matched school site neighborhoods, this figure was divided by three which is the number of subject pairs of the elementary school sites in the school district of Dearborn; thus, $1,301.- divided by 3 = $433.67.

3. This figure, $433.67 represents the mean difference in state equalized assessed value (S.E.V.) between housing units surrounding large, open space and small, limited space elementary school sites in the school district of Dearborn.

4. The $433.67 was then multiplied by the total millage rate for all governmental units which have property tax jurisdiction. That is, $433.67 x 54.04 (1972) mills/ $1000.- S.E.V. = $23.44. The $23.44 figure represents the potential additional property tax revenue generated for each housing unit surrounding large, open space elementary

school sites in the school district of Dearborn.

5. The five tier study area surrounding the three large, open space subject elementary school sites, included a total of about 750 housing units, with 250 housing units per sample site. The $23.44 additional revenue per house can then be multiplied by 750 to compute the total annual potential property tax revenue for all of tax collecting governmental units. That is, $23.44 x 750 houses = $17,580.- of potential additional property tax revenue yield per year.

6. The annual $17,580.- was then multiplied by the corresponding number of years to obtain the projected potential additional property tax revenue yields (unearned additional land rent) per decade for the next five decades, (see Table 5-3 for these values).

Projected Potential Additional Property
Tax Yield Revenue Calculations
Lansing, Michigan Property Tax Rate
(57.81 mills/$1000.- S.E.V. 1972)

1. The difference between the adjusted mean values of the last sale price of residential housing for all large, open space and small, limited space elementary school site housing units in the school district of Lansing was $522.- (see Table 4-2). This figure was then divided by two which was the number of subject pairs of school sites in

the school district of Lansing. That is, $522.- divided by 2 = $276.-.

2. The $276.- figure was then divided by two to obtain the mean difference of state equalized assessed value (S.E.V.) between large, open space and small, limited space elementary school site housing in the school district of Lansing. That is, $276.- divided by 2 = $138.-.

3. The $138.- figure was then multiplied by the total millage rate for all governmental units which have property tax jurisdiction. That is, $138.- x 57.81 (1972) mills/ $1000.- S.E.V. = $7.98. This figure, $7.98, represents the potential additional property tax revenue generated for each housing unit surrounding large, open space elementary school sites in the school district of Lansing.

4. The five tier study area surrounding the sample sites included a total of about 500 residential housing units. The $7.98 figure was then multiplied by 500 to obtain the potential additional annual property tax revenue yield for all governmental units. That is, $7.98 multiplied by 500 houses = $3,990.- potential annual additional property tax revenue yield.

5. The annual $3,990.- figure was then multiplied by the number of years to obtain the projected potential additional property tax revenue yields (unearned additional

TABLE 5-2

SUMMARY OF ADDITIONAL TAX REVENUES COMPUTED ON MEAN LAST SALE PRICE DIFFERENTIALS ON HOUSES AT 50% OF DOLLAR DIFFERENCES (ASSESSED VALUES) MULTIPLIED BY ACTUAL LOCAL MILLAGE RATES IN THE YEAR 1972 (ECONOMIC CONCEPT OF UNEARNED LAND RENT)

| Governmental Taxing District | $\bar{X}$ Mean Last Sale Price Difference | Potential S.E.V. Assessed Value as 50% of Sale Price | 1972 Local Tax Rate m/$1000 S.E.V. | Potential Additional Tax Revenue in dollars Per House Per Year |
|---|---|---|---|---|
| Dearborn | $1,301.00 | $433.67 | 54.04 | $23.44 |
| Lansing | $ 276.00 | $138.00 | 57.81 | $ 7.98 |

Source: Calculations by writer.

TABLE 5-3

SUMMARY OF EXTRAPOLATED POTENTIAL ADDITIONAL TAX YIELDS BASED ON THE MEAN LAST SALE PRICE OF HOUSING UNITS INCLUDED IN THE SUBJECT NEIGHBORHOODS IN DEARBORN AND LANSING, MICHIGAN FOR FIVE DECADES (ECONOMIC CONCEPT OF UNEARNED LAND RENT)

| Governmental Taxing District | Potential Additional Tax Revenue Yields Per Year | Potential Additional Tax Revenue Yields by Decades | | | | |
|---|---|---|---|---|---|---|
| | | 10 Years | 20 Years | 30 Years | 40 Years | 50 Years |
| Dearborn | $17,580.- | $175,800.- | $351,600.- | $527,400.- | $703,200.- | $879,000.- |
| Lansing | $ 3,990.- | $ 39,900.- | $ 79,800.- | $119,700.- | $159,600.- | $199,500.- |

Source: Calculations by writer.

land rent) per decade for the next five decades, (see Table 5-3 for these data).

The writer did not attempt to utilize existing bank interest rates nor conventional interest compounding schedules to extrapolate the projected potential additional property tax revenue totals beyond anticipated projected potential additional property tax revenue yields. However, if governmental units, i.e., boards of education, were to invest these additional property tax revenues derived from residential housing surrounding large, open space elementary school sites at conventional interest rates, property tax revenue yields could be even greater than indicated in Tables 5-2 and 5-3.

Further, the figures for the unearned additional land rent in this study were computed at fifty per cent of the mean sale price of housing applied to the mean last sale price year. In reality, local assessors are legally required to update the real market value on all real property each year in the State of Michigan. In actual practice, reassessment of residential properties, for instance, occurs approximately every three years. Accordingly, if accurate assessment of residential real estate occurred each year and were based on fifty per cent of the true cash value; the actual property tax revenue collected from large, open space elementary school site housing would

be significantly greater than the projected potential additional property tax revenue as presented in Tables 5-2 and 5-3 for unearned additional land rent.

The summaries of potential tax revenues indicated that large, open space elementary school sites in the school districts of Dearborn and Lansing, Michigan could generate significant amounts of additional property tax as evident in the unearned additional land rent computations. For instance, the potential additional property tax revenue yield per house, computed for 1972, in the school district of Dearborn was $23.44. In the school district of Lansing, additional revenue, computed for 1972, showed a potential additional property tax revenue yield per house of $7.98.[1] These potential additional tax revenue figures per house for Dearborn (1972) of $23.44 and for Lansing (1972) of $7.98 invite further comments. For example, the school districts of both Dearborn and Lansing contain several thousand houses upon which taxes are collected annually. In turn, each of these school districts is divided into

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[1]These figures, $23.44 and $7.98, translate into additional total property tax revenue return of $17,580.- for Dearborn and $3,990.- for Lansing per annum for each neighborhood surrounding a large, open space elementary school site included in the studied population.

several elementary school neighborhoods. Therefore, it appears reasonable to conclude that these rather small per housing unit additional tax yields could be multiplied thousands of times to extrapolate grand totals of tax revenue potentials. However, the margin of error in such extrapolations would invalidate these computations, for in reality the majority of the housing units in both Dearborn and Lansing are not favorably located near a large, open space elementary school site. Therefore, the further calculations that follow regarding projected potential additional tax revenue yields have been very precisely limited to or by those favored housing units which are served by large, open space elementary school sites. If it were assumed that the residential housing units surrounding large, open space elementary school sites were held constant at 250 units per school, Dearborn housing properties would produce $351,600.-, and Lansing residential housing would return, for example, $119,700.- over a thirty year period. Tables 5-2 and 5-3 summarize the raw data on which the calculations were based which relate to projected potential additional property tax revenue.

The economic investments required for more increased site development, site maintenance, and site acquisition (additional acreage) to enlarge the small, limited space

elementary school sites in the school districts of Dearborn and Lansing, Michigan could be more than compensated for by using the thirty, forty, or fifty year unearned additional land rent revenue yields. Based upon the calculations of results from the data and upon additional projections of property tax revenue, Null Hypothesis Four is rejected.

## Conclusions

The conclusions of this investigation are based on the collected data, computations performed, and on projections made as related to the actual sales of residential housing units surrounding the subject school sites in the school districts of Dearborn and Lansing, Michigan from 1952 through 1971. The following conclusions are offered:

### Market Sale Price Appreciation of Residential Housing

1. According to the statistics employed in this study the larger land acreage size of large, open space elementary school sites is related significantly to the higher market sale prices recorded on residential housing units sold in the subject neighborhoods.

2. According to the statistics employed in this study,

the smaller land acreage size of small, limited space elementary school sites is related significantly to the lower market sale prices recorded on the residential housing units sold in the subject neighborhoods.

3. The enlargement and conversion of a formerly small, limited space elementary school site into the site criteria standards of a large, open space elementary school site increased the market sale prices dramatically (one sample site); thus, the most recent market sale prices in this neighborhood equaled those recorded around the comparable large, open space elementary school site.

4. The presence of: educational, community, and landscape features of natural or manmade amenities; significant landscaping; and good site maintenance are all contributing elements to higher market sale prices of residential housing surrounding small, limited space elementary school sites.

5. The combination of: land acreage expansion; implementation of a master site development plan; and, significant landscape maintenance, are all positive economic factors in higher market sale prices of residential housing even surrounding small, limited space elementary school sites.

6. The combination of: educational, community, and landscape developed acreage; natural or manmade amenities; good site development practices; good site design; and, site maintenance, are all influencial in contributing to higher market sale prices of residential housing surrounding large, open space elementary school sites.

7. When developed parkland acreage is the major portion of an elementary school site, these parklands influence positively the market sale prices of nearby residential housing.

8. High turnover rate (sale-resale ratio) of residential housing units adversely affects the market sale prices of residential housing units around small, limited space elementary school sites.

## Linear Distance Relationships of Residential Housing

1. The residential housing units located in close proximity to large, open space elementary school sites produced higher market sale prices than did comparable residential housing located at the same proximity to small, limited space elementary school sites.

2. The residential housing units that are located one, two, and three street crossings away from large,

open space elementary school sites are selling for higher market sale prices than similar residential housing units located farther from the site.

3. It was stated above in conclusions (1) and (2) that the highest market sale prices were found around large, open space elementary school sites. However, even around well-developed small, limited space elementary school sites, market sale prices on housing units near these sites were higher than were those located four or more street crossings away from the same sites.

4. The presence of: landscape development features, both natural and manmade amenities; significant plantings; and good site maintenance on small, limited space elementary school sites positively influenced the market sale prices of nearby residential housing units.

5. The market sale price percentage appreciation rates on residential housing units surrounding small, limited space elementary school sites are increased by the proximity of neighborhood parkland.

6. Both the size and the kinds of school site developments of the elementary school sites surveyed in this investigation did exert positive and negative influences on the recorded market sale prices of residential housing units as far away as five street crossings from the site.

## Projected Potential Additional Property Tax Revenue Yields

1. The projected potential additional property tax revenue yields from residential housing units surrounding large, open space elementary school sites could be sufficient to pay the additional investment for open space acreage, site development, and site maintenance when collected over a thirty year period.

2. The projected potential additional property tax revenue yields from residential housing units located within three street crossings of the elementary school site are significantly greater around large, open space elementary school sites than are potential yields around small, limited space elementary school sites.

3. The highest projected potential additional property tax revenue yield of residential housing units of small, limited space elementary school sites is related to close proximity of the residence to the site.

## Recommendations

The results obtained from the analyses of the data performed in this study provide the basis for two major categories of school site recommendations. The first series of economic recommendations are directed toward

public school site policy formation. The second series contains implications for future school site research.

## Economic Recommendations Regarding the Formation of Public School Site Policies

1. The selection of future school sites and the acreage expansion of small, limited space elementary school sites should be a cooperative effort of boards of education, local and regional planning agencies, related governmental departments and services, and interested community organizations in order that master land use plans can be developed in a sound and comprehensive manner.

2. The school sites should no longer be developed in traditional patterns; but, instead in the future the land and its natural features should be respected and evaluated by multidisciplinary resource personnel so that the key components of master plans take full advantage of the existing natural assets.

3. The board of education should allocate sufficient public tax revenues for enhancing the use and development of school sites, always putting the first priority on naturalness and respect for the land.

4. Since elementary school sites and buildings are fundamentally important in the market sale price determi-

nations of residential housing units, the board of education should conduct economic benefit cost analyses studies pertaining to elementary school sites and their respective neighborhoods.

5. The board of education should initiate and establish a permanent record of the resources inventory of each school site including the following components, in order to formulate sound fiscal decisions relating to school site development.

a. Topography, slope, drainage

b. Soil, character, type

c. Vegetation, type, quality

d. Zoological significance

e. Geological characteristics

f. Structures, type, quality, historical reference

g. Natural vehicular patterns, ingress, egress

h. Natural pedestrian patterns

i. Climatology

j. Ecological significance

k. Orientation

l. Unique environmental qualities

m. Curriculum inferences

n. Water type and quality

o. Natural features

6. The board of education should prepare a series of related school site plans to insure the maximum economic benefit from site development.

a. Resource Inventory Site Plan

b. Site Development Plan

c. On-Site Technical Assistance Plan

d. Follow-up Assistance Plan

e. Comprehensive Master Plan

7. The board of education should provide sufficient public tax revenues and personnel for the implementation of the plan upon the completion of the Comprehensive Master Plan for school sites.

8. School site design and development should be entrusted to those who are competent in this field - the professional landscape architect or professional site design consultant - just as the economic aspects of building design and construction are entrusted to competent professional architects.

9. The board of education should continue annual review of the economic market conditions for surrounding residential real estate after the initial establishment of a new school site and building, and should be based upon:

a. Economic data collection of market sale prices and property tax revenue yields of

housing surrounding the school site.

b. Economic data collection and visual inspection of the physical life span of housing surrounding the school site.

c. Economic data collection of new residential buildings, home improvements, density of population within the service area, building permits issued, and related market data items.

10. The board of education should develop well-defined school site policies based upon realistic economic concepts and real economic data analyses for sites and surrounding residential housing.

11. The board of education should formulate permanent school-park commissions to utilize, develop, plan and maintain school-park complexes within communities.

12. The board of education should conduct economic feasibility studies of its small, limited space school sites to determine the fiscal investment of site expansion, the costs of site maintenance, the cost of site development based upon a master plan in order to insure the fiscal stability of surrounding residential housing and to increase the potential tax revenue from real property.

## Implications for Future School Site Research

1. Research should be focused upon school sites as related to the residential property owner.
    a. Sociological Research - attitude formation regarding public education, as related to well-developed school sites.
    b. Political Research - the political voting patterns assessment of homeowners living around school sites.
    c. Physiological Research - the muscle development of youngsters having the access to different types of school sites and activities.
    d. Psychological Research - the influence of population density and the type of housing in the school site service areas.
    e. Cultural Research - the integration impact of school sites upon human value systems.
2. Research should be conducted on small, limited space school sites to determine appropriate site development practices to improve the economic climate for surrounding residential housing.

3. Research should be conducted to measure the fiscal influences that the microclimate of school sites has upon the residential housing values within school site service areas. This would include study of the energy input and output level by natural elements such as plants, sun, trees, and bogs.

4. Research should be conducted to develop appropriate models for the measurement of the economic influences of middle school sites, senior high school sites, community college sites, college sites, and university sites.

5. A replication of this study should be conducted to measure the economic influences that parochial elementary school sites have upon the market price trends of surrounding residential real estate.

6. A replication of the methodology of this study should be applied to determine the economic influences of school sites in other parts of North America.

7. Research should be conducted to determine the affects of positive and negative factors within elementary school site service areas and their relationships to the market sale prices of residential housing. With this fifth chapter, the study on "The Economic Influences of Elementary School Sites on Residential Property Tax Revenue in Selected Urban Neighborhoods" is concluded.

# SELECTED REFERENCES

## SELECTED REFERENCES

### Books


American Association of School Administrators. American School Buildings. Washington, D.C.: The Association, 1949.

American Institute of Real Estate Appraisers. Appraisal Terminology and Handbook. 4th ed., Chicago: Author, 1962.

Banfield, Edward C., and Wilson, James Q. "Voting Behavior On Municipal Public Expenditures: A Study in Rationality and Self-Interest." The Public Economy of Urban Communities. Edited by Julius Margolis. Washington, D.C.: Resources for the Future, 1965.

Carr, William G. "A Sense of Indignation." The School and Community Reader: Education in Perspective. Edited by Edward G. Olsen. New York: The MacMillan Company, 1963.

Council of Educational Facility Planners. NCSC Guide For Planning School Plants. Columbus, Ohio: The Council, 1964.

Friedman, Edith J., ed., Encyclopedia of Real Estate Appraising. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1959.

Garrett, Henry E., Statistics In Psychology and Education. New York: David McKay Company, 1958.

Little, Charles E., Challenge of the Land. New York: Pergamon Press, 1969.

Mouly, George J., The Science of Educational Research. New York: American Book Company, 1963.

National Association of Home Builders of the United States. Home Builder's Manual for Land Development. 2nd rev. ed., Washington, D.C.: National Association of Home Builders, 1961.

Norcross, Carl., Open Space Communities in the Market Place, A Survey of Public Acceptance. Washington, D.C.: The Urban Land Institute, 1966.

Simonds, John Ormsbee. Landscape Architecture, An Ecological Approach to Environmental Planning. New York: McGraw-Hill Book Company, 1961.

Society of Real Estate Appraisers. The Appraisal Guide: Research Guide No. 4. Chicago: The Society, 1962.

Special Technical Committee of the Education Committee. American Institute of Real Estate Appraisers. The Appraisal of Real Estate. Chicago: R. R. Donnelley & Sons Company, 1967.

Stapp, William B. "Outdoor Laboratories." Manual of Outdoor Interpretation. Edited by Joseph J. Shomon. New York: National Audubon Society, 1968.

## Public Documents

Citizens Committee for the Outdoor Recreation Resources Review Commission Report. Action for Outdoor Recreation for America. Washington, D.C.: Government Printing Office, 1963.

Collins, George. National Inventory of School Facilities and Personnel. Washington, D.C.: Government Printing Office, 1964.

Daane, Kenneth D. The Economic Implications of the Regional Park System in Maricopa County. Flagstaff, Arizona: Arizona State University Press, 1964.

Department of Park Administration. School of Agricultural Sciences. Texas Technical College. The Economic and Sociological Impact of Urban Parks in Dallas, Texas, 1966. Lubbock: Texas Technical Press, 1967.

Department of Park Administration. School of Agricultural Sciences. Texas Technical College. A Parks Appraisal. . . Regional Facilities. Lubbock: Texas Technical Press, 1969.

Michigan. Constitution.

Michigan. General Property Tax Act, Michigan Statutes Annotated.

Michigan. General School Laws. 1966, Revisions through 1973.

Michigan Department of Education. School Plant Planning Section. Computer Program SO316. Lansing, Michigan. 1972.

National League of Cities. Department of Urban Studies. Recreation in the Nation's Cities - Problems and Approaches. Washington, D.C.: Government Printing Office, 1968.

Outdoor Recreation Resources Commission. Economic Studies of Outdoor Recreation. Washington, D.C.: Government Printing Office, 1962.

President's Council on Recreation and Natural Beauty. From Sea To Shining Sea. Washington, D.C.: Government Printing Office, 1968.

Smith, Roy, et. al., Michigan Property Tax Assessment Study, 1971. Michigan Legislature. House. Lansing, Michigan, 1971.

U.S. Department of Agriculture. Economic Research Service. Open Space - Its Use and Preservation. Misc. Publication No. 1121. Washington, D.C.: Government Printing Office, 1968.

U.S. Department of Agriculture. Soil Conservation Service. Outdoor Classrooms On School Sites. Washington, D.C.: Government Printing Office, 1972.

U.S. Department of Commerce. Bureau of the Census. Statistical Abstract of the United States 1972. Washington, D.C.: Government Printing Office, 1972.

U.S. Department of Labor. Bureau of Labor Statistics. Handbook of Labor Statistics. Bulletin No. 1705. Washington, D.C.: Government Printing Office, 1972.

U.S. Department of Interior. Conservation Yearbook No. 4 of Interior, 1968. Washington, D.C.: Government Printing Office, 1968.

## Reports

Baldwin, Virginia. Should Trees Be Planted In Business Areas? Report to the Western Shade Tree Conference, Anaheim, Calif., May 23, 1958. Anaheim, Calif.: The Conference, 1958.

Dressel, Karl. Street and Park Tree Evaluation. Report to the International Shade Tree Conference, Toronto, Canada, August 6, 1963. Toronto, Canada: The Conference, 1963.

Educational Facilities Laboratories. The Cost of a Schoolhouse. Report prepared by EFL. New York: Educational Facilities Laboratories, Inc., 1960.

Genessee County Metropolitan Planning Commission. Genesee County 1990 Land Use-Transportation Plan. Report of the Commission. Washington, D.C.: Clearinghouse for Federal Scientific and Technical Information, 1971.

Gould, E. Values, Trees and the Urban Realm. Report to a Symposium on Trees and Forests in An Urbanizing Environment, Amherst, Mass., August 19, 1970. Amherst, Mass.: The Symposium, 1970.

Michigan Natural Areas Council. School Site Committee. The Establishment of Outdoor Classrooms On School Sites As Public Policy. Report prepared for MNAC. Ann Arbor, Michigan: The Council, 1972 (Mimeographed.)

Johnson, Irving. Planning and Implementing a Municipal Street Tree Program. Report to the International Shade Tree Conference, Toronto, Canada, August 22, 1956. Toronto, Canada: The Conference, 1956.

Kielbaso, J. James. Economic Values of Trees In the Urban Locale. Report to the Symposium on the Role of Trees in the South's Urban Environment, Athens, Georgia, February 2, 1971. Athens, Georgia: The Symposium, 1971.

National Education Association. High School Buildings and Grounds. Report of the Committee on the Reorganization of Secondary Schools. Washington, D.C.: Government Printing Office, 1924.

Institute of Community Development. An Analysis of the Tourist Industry in Selected Counties of the Ozark Area. Report for the National Park Service. Washington, D.C.: Government Printing Office, 1953.

Payne, Brian R. The Contribution of Trees to Property Values In Residential Neighborhoods of Amherst Massachusetts. Report to the Northeastern Forest Experiment Station. Amherst, Mass.: The Service, 1972. (Mimeographed.)

Report of the Ann Arbor Schools Site Development and Selection - Advisory Committee. (Opportunities for Environmental Education on School Sites). Russell E. Wilson, chairman. Ann Arbor, Michigan: Ann Arbor Public Schools, 1971. (Mimeographed.)

Srivastava, R. D. School Sites and Spaces In High Density Habitations. Report to the Central Building Research Institute. Roorkee, India: The Institute, 1968.

## Articles and Periodicals

Brown, June S., and Wilson, Russell E. "Schools Can Be Green Islands." Michigan Education Journal, XLII (April, 1965).

Bush, Donald W., and Hare, S. Herbert. "The Landscape Architect's Part in the Development of an Adequate School Ground Program." The American School and University, XIII (September, 1941).

DeRemer, Richard W., and Lauda, Billy G. "The Need For Large School Sites." American School Board Journal, CXLVIII (April, 1964).

Flieger, Howard. "Buying the Future." U.S. News & World Report, May 28, 1973.

Gardner, Dwayne E. "Land-Rich or Poor Schools." American Education, III (November, 1967).

Hendon, William S., and Kitchen, James W. "Land Values Adjacent to an Urban Neighborhood Park." Journal of Land Economics, XLIII (August, 1967).

Herrick, Charles M. "The Effect of Parks Upon Land and Real Estate Values." The Planners Journal, V (October - November, 1939).

Holy, Russell A. "Cities and School Plant Planning Go Hand in Hand." School Executive, LXXV (July, 1956).

Jones, Donald A. "School Site Selection: Methods, Policies, and Procedures in Acquisition and Purchase." Journal of the Association of Business Officials of the United States and Canada, LVI (1956).

Knetsch, Jack L. "Influence of Reservoir Projects on Land Values." Journal of Farm Economics, XLVI (February, 1964).

Messner, Clarence J. "Places Within Ann Arbor and Nearby Where One May Take Nature Walks." 24th Annual Conservation Report, XXIV (December, 1972).

Philipson, Richard L. "The School Site - Asphalt Jungle or Open Space?" The Michigan School Board Journal, XIV (January, 1968).

"Question and Comment" Parks and Property Values." American Society of Planning Officials Newsletter, XXIII (March, 1963).

Tonigan, Richard. "Keeping the School Site An Asset." School Management, XIV (June, 1970).

Wilkins, Lee. "Officials' Levies Listed as Low." Ann Arbor News, April 27, 1973.

## Unpublished Materials

Hafner, William L. "The Economic Feasibility of School Sites As Sources of Urban Open Space." Unpublished Ph.D. dissertation, The University of Michigan, 1972.

Philipson, Richard L. "The Market Price Impact of Elementary School Site Development Practices Upon Nearby Residential Real Estate." Department of Education, The University of Wisconsin, Madison, 1973. (Mimeographed.)

Schultze, Robert R. "The Utilization of Building Sites of the Elementary Schools of the Omaha Public Schools." Unpublished Ed.D. dissertation, University of Nebraska Teachers College, 1966.

Tankard, George Granville Jr. "Site Requirements for Outdoor Instruction for Virginia Elementary Schools." Unpublished Ed.D. dissertation, George Peabody College for Teachers, 1956.

## Other Sources

Administrative Offices of the Flint Board of Education. Personal interview with Charles Towar, Chief Engineer for the Flint Board of Education, March 28, 1972

Milwaukee, Wisconsin. Personal interview with Richard L. Philipson, Director of Business Services for the Menomonee Falls Public Schools. December 28, 1972 and January 20, 1973.

University of Michigan. Personal interview with Dr. Russell E. Wilson, Associate Professor of Education, March 9, 1972

University of Wisconsin, Milwaukee. Personal interview with Professor George E. Uhlig, Director of Educational Research. January 20, 1973.

# APPENDIX A

# HOME SALE PRICE COMPARISON

# 1957 TO 1967

# MILWAUKEE, WISCONSIN

HOME SALE PRICE COMPARISON
1957 to 1967
Milwaukee, Wisconsin

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## Open Space Schools

Clement Avenue (1951; 19.5 Acres)

1. Home Distance from School
   a. Inblock
      1) Net Gain = $6,000.00
      2) Number of Sales = 2
      3) Average Gain = #3,000.00
   b. 250 feet: plus or minus
      1) Net Gain = $160,300.00
      2) Number of Sales = 61
      3) Average Gain = $2,627.87
   c. 650 feet: plus or minus
      1) Net Gain = $125,550.00
      2) Number of Sales = 64
      3) Average Gain = $1,961.72
   d. 1000 feet: plus or minus
      1) Net Gain = $48,900.00
      2) Number of Sales = 30
      3) Average Gain = $1,630.60
2. Mean Average Sale Year
   a. First = 1953.4
   b. Last = 1963.0
3. Total Sales = 157
4. Home Value Increase
   a. Total Amount = $340,750.00
   b. Mean Average Increase = $2,170.38

## Traditional Space Schools

Burdick (1936; 3.8 Acres)

1. Home Distance From School
   a. Inblock
      1) Net Gain = $8,500.00
      2) Number of Sales = 10
      3) Average Gain = $850.00
   b. 250 feet: plus or minus
      1) Net Gain = $44,500.00
      2) Number of Sales = 30
      3) Average Gain = $1,483.33
   c. 650 feet: plus or minus
      1) Net Gain = $57,573.00
      2) Number of Sales = 60
      3) Average Gain = $959.55
   d. 1000 feet: plus or minus
      1) Net Gain = $35,000.00
      2) Number of Sales = 26
      3) Average Gain = $1,346.15
2. Mean Average Sale Year
   a. First = 1955.2
   b. Last = 1963.2
3. Total Sales = 126
4. Home Value Increase
   a. Total Amount = $145,573.00
   b. Mean Average Increase = $1,155.34

HOME SALE PRICE COMPARISON
1957 to 1967
Milwaukee, Wisconsin
Continued

## Open Space Schools

82nd Street (1955: 14.6 Acres)

1. Home Distance From School
   a. Inblock
      1) Net Gain = $ none
      2) Number of Sales = none
      3) Average Gain = $ none
   b. 250 feet: plus or minus
      1) Net Gain = $87,125.00
      2) Number of Sales = 60
      3) Average Gain = $1,452.08
   c. 650 feet: plus or minus
      1) Net Gain = $179,365.00
      2) Number of Sales = 109
      3) Average Gain = $1,645.55
   d. 1000 feet: plus or minus
      1) Net Gain = $91,871.00
      2) Number of Sales = 74
      3) Average Gain = $1,241.50
2. Mean Average Sale Year
   a. First = 1955.7
   b. Last = 1963.0
3. Total Sales = 243
4. Home Value Increase
   a. Total Amount = $358.361.00
   b. Mean Average Increase = $1,474.74

## Traditional Space Schools

81st Street (1948: 3.82 Acres)

1. Home Distance From School
   a. Inblock
      1) Net Gain = $ none
      2) Number of Sales = none
      3) Average Gain = $ none
   b. 250 feet: plus or minus
      1) Net Gain = $60,000.00
      2) Number of Sales = 43
      3) Average Gain = $1,406.98
   c. 650 Feet: plus or minus
      1) Net Gain = $50,100.00
      2) Number of Sales = 51
      3) Average Gain = $982.35
   d. 1000 feet: plus or minus
      1) Net Gain = $64,000.00
      2) Number of Sales = 61
      3) Average Gain = $1,060.66
2. Mean Average Sale Year
   a. First = 1954.7
   b. Last = 1962.5
3. Total Sales = 155
4. Home Value Increase
   a. Total Amount = $174,800.00
   b. Mean Average Increase = $1,127.74

HOME SALE PRICE COMPARISON
1957 to 1967
Milwaukee, Wisconsin
Continued

| Open Space Schools | Traditional Space Schools |
|---|---|
| 78th Street (1956: 12.76 Acres) | 55th Street (1952: 5.91 Acres) |
| 1. Home Distance From School | 1. Home Distance From School |
| a. Inblock | a. Inblock |
| 1) Net Gain = $ none | 1) Net Gain = $7,000.00 |
| 2) Number of Sales = none | 2) Number of Sales = 9 |
| 3) Average Gain = $ none | 3) Average Gain = $777.77 |
| b. 250 feet: plus or minus | b. 250 feet: plus or minus |
| 1) Net Gain = $37,500.00 | 1) Net Gain = $19,500.00 |
| 2) Number of Sales = 22 | 2) Number of Sales = 26 |
| 3) Average Gain = $1,704.55 | 3) Average Gain = $750.00 |
| c. 650 feet: plus or minus | c. 650 feet: plus or minus |
| 1) Net Gain = $58,200.00 | 1) Net Gain = $12,750.00 |
| 2) Number of Sales = 32 | 2) Number of Sales = 55 |
| 3) Average Gain = $1,818.75 | 3) Average Gain = $231.82 |
| d. 1000 feet: plus or minus | d. 1000 feet: plus or minus |
| 1) Net Gain = $89,800.00 | 1) Net Gain = $38,900.00 |
| 2) Number of Sales = 82 | 2) Number of Sales = 54 |
| 3) Average Gain = $1,095.12 | 3) Average Gain = $720.37 |
| 2. Mean Average Sale Year | 2. Mean Average Sale Year |
| a. First = 1958.4 | a. First = 1955.8 |
| b. Last = 1964.0 | b. Last = 1963.6 |
| 3. Total Sales = 136 | 3. Total Sales = 144 |
| 4. Home Value Increase | 4. Home Value Increase |
| a. Total Amount = $185,500.00 | a. Total Amount = $78,150.00 |
| b. Mean Average Increase = $1,363.97 | b. Mean Average Increase = $542.71 |

Source: Philipson, "Market Price Impact," p. 48.

# APPENDIX B

# SAMPLE COMPUTER DATA CARD

SAMPLE COMPUTER DATA CARD

Format for Code Control and Data Listing[1]

| Columns | Data |
|---|---|
| 1 - 4 | ID 001 - N |
| 5 - 6 | School Code:<br>10 = William Ford School<br>11 = Joshua Howard School<br>12 = Woodworth School<br>13 = Kendon School<br>14 = Elmhurst School<br>25 = Oakman School<br>26 = Charles A. Lindbergh School<br>27 = Maples School<br>28 = Maple Hill School<br>29 = Mount Hope Avenue School |
| 7 | Number of Streets Crossed |
| 8 | Blank |
| 9 - 12 | First Sale Year |
| 13 | Blank |
| 14 - 18 | First Sale Price |
| 19 | Blank |
| 20 - 23 | Last Sale Year |
| 24 | Blank |
| 25 - 29 | Last Sale Price |
| 30 | Blank |
| 31 - 32 | Number of Years Between Last Sale Year and First Sale Year |

[1]The actual format for computer analyses was Analysis of Covariance Model with Dependent Variable being the last sale price. The factor was the type of elementary school site, large, open space or small, limited space. The covariates were the first sale price, the number of streets crossed, and the number of years between sales. A description of individual school sites, (ONEWAY 1 / CROSTQAB 2), was also computed.

# APPENDIX C

# DATA COLLECTION FORM

MICHIGAN DEPARTMENT OF EDUCATION
SCHOOL PLANT PLANNING SECTION
ELEMENTARY SCHOOL SITE AND BUILDING INVENTORY
DATA COLLECTION FORM
(1972)

## School Code Data

School District _____ School _____

School District Number _____ County _____

## School Site Criteria Data

1. Use of site _____
2. Use of site supporting services _____
3. Ownership of land _____
4. Acreage of land _____
5. Nearby acres used for school purposes _____
6. Site accessible by sidewalks _____
7. Site located on state or country highway _____
8. Trees on site for instructional purposes _____
9. Water resources on school site _____
10. Estimated dollar value of site _____
11. Estimated dollar value of park site _____
12. Year site was acquired _____
13. Shape of site _____
14. Significant topographical relief _____
15. Natural vehicular patterns, ingress, egress _____

16. Unique environmental qualities_____

_____

17. Significant landscaping_____

_____

18. Ecological significance_____

_____

19. Zoological significance_____

_____

20. Geological significance_____

_____

21. Natural landscape features_____

_____

22. Structures, types, quality, historical significance

_____

_____

23. Basic site plan_____

_____

24. Site development master plan_____

_____

25. Standard or creative play equipment_____

_____

26. Natural planning perimeters, inblock housing _____

_____

27. Parks and Recreational development expenditures_____

_____

28. Sealed surface playground area(s)_____

_____

29. On site vehicle parking with multiple use of parking area_____

30. Outdoor learning areas for environment studies_____

_____

_____

## Building Criteria Data

1. Year of original construction _____
2. Year(s) of addition(s) _____
3. Grades building now designed for _____
4. Grades building now contains _____
5. Types of supporting services _____
6. Ownership of building _____
7. Primary use of building _____
8. Gross floor area of building _____
9. Number of floors occupied _____
10. Pupil capacity of building _____
11. Estimated membership of building _____
12. Portable classroom instructional _____
13. Portable classrooms non-instructional _____
14. Teacher pupil ratio _____
15. Number and types of administrative areas _____
16. Number and types of classrooms _____
17. Number and types of teacher facilities _____
18. Type and source of heating system _____
19. Source and type of water system _____
20. Number and types of specialized rooms _____

Source: Michigan Department of Education, School Plant Planning Section, Computer Program SO316, 1972. Additional school site categories devised by writer.