RESIDENT ATTITUDES TOWARD HIGHER RESIDENTIAL DENSITIES IN COLUMBUS, OHIO:
PRIVATISM VERSUS PUBLIC ADVANTAGE AND THE ACCEPTANCE OF URBAN MEGASTRUCTURES

A Thesis
Presented in Partial Fulfillment of the Requirements for the Degree Master of City and Regional Planning

by

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Approved by

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In September 1980, the Columbus Energy Council was appointed by Mayor Moody to compose the Columbus Energy Plan. The Plan was adopted by City Council in November 1981, with one of its primary recommendations: to "encourage increased densities in city development." (Columbus Energy Plan, p. 40). The Columbus Department of Energy and Telecommunication partially funded this study in an attempt to explore this recommendation.

High density urban development is not readily accepted by the American public, yet it has recently become a more popular option because of its energy-saving and cost-saving opportunities. The results of this study, mail questionnaire responses from 132 Columbus residents, verify that people commonly associate high density residential development with potentially negative effects such as crowding. Negativism toward high density is explained by a societal value: the desire for private conveniences, which will not be sacrificed for public conveniences. Regardless of negativism, high density development is growing. The key to its success lies in good design which can be partially achieved through mixed-use development. A style of self-contained high density, mixed-use development may give rise to a rebirth of urban megastructures.
ACKNOWLEDGEMENTS

I extend special thanks to Dr. Jack Leon Nasar, my primary thesis advisor. I am also grateful to Dr. Steve Gordon, Rich Davis, Bill Hoyt, and Sandra McCabe.
My inspiration for undertaking this study comes from numerous sources. My interest in feasibility of high density development genuinely began as I participated in a workshop seminar at Arcosanti, Arizona in summer 1979. Intrigued by the concept of urban megastructural environments, and challenged by the "radical" nature of the idea, I sought to develop a Master's Thesis proposal during late summer and autumn 1981 to study the subject directly. Frustrated by the vastness of the subject and the inability to empirically study the effects of authentic megastructural environments that integrate nearly all urban activities in one structure, I altered my study design to address the high density issue in a more conventional, directly applicable manner.

I have been interested in local energy planning for over 3 years and have done some research in the area as well, both in class and for the Ohio Department of Energy. In an attempt to tap some of my enthusiasm about the subject, I gained an appointment to the Community Involvement Task Force of the Columbus Energy Council in November 1980. As member of this, one of the nine Task Forces contributing to the formulation of the Columbus Energy Plan, I was exposed to many of the issues to be discussed by the Energy
Council and eventually to be presented to City Council, including the issue of increasing living densities as a strategy to increase energy efficiency.

I completed a summer study program during July and August 1981 at New College, Oxford University, England. In addition to coursework, I undertook an independent study of energy efficient planning in Britain and, whenever possible, explored opinions and research about high density. I visited the Scottish New Town of Cumbernauld which was built around a high density core that supports mixed urban functions and is a working example of the megastructure principle. While in London, I obtained a copy of Living At Higher Densities, which is a survey report compiled by the Westminster Planning Department about citizens' perceptions of high density living conditions in Westminster. The first survey questionnaire draft to be used in this study in Columbus was modelled after the survey used in the Westminster study.

A personal goal I am pursuing by completing this study is to contribute to the general understanding of the issue: How closely do people want to live together in an urban setting? Ultimately, this research contributes to the body of knowledge about and perceptions of the feasibility of urban megastructures as viable options for the future.
Chapter I

THE DENSITY ISSUE IN COLUMBUS AND THE U.S.

Initiated by a City Council resolution passed September 15, 1980, the City of Columbus, directed by the Department of Energy and Telecommunication and the Columbus Energy Council, undertook the formulation of the Columbus Energy Plan. The main goal of the plan was to devise a set of feasible strategies for the City of Columbus to help increase efficient management of energy resources, to contribute to the reduction of "our nation's unsettling dependence on foreign energy sources," (Columbus City Council Resolution No. 186X-80, September 15, 1980) and to reduce the city's expenditures on fuel and energy related items. The Columbus Energy Plan has since been completed, approved by the Columbus Energy Council, and formally accepted by the Columbus City Council in November 1981. Included in the plan is a list of strategies to enable the city to achieve the above stated goals. A total of 28 strategies that were proposed by Task Forces were considered by the Energy Council. The options were ranked in order of feasibility and preference. The strategy receiving first ranking is to increase densities, including residential densities, in city-wide development in order to increase energy efficiency.
The Columbus Department of Development would, in practice, carry out the implementation of this policy.

Though high density development may offer some solutions to the problem of inefficient energy use proliferated by current urban development patterns, it is not clearly understood as a policy, nor is it widely accepted in the U.S. (Insel and Lindgren, 1978). The American dreams of success, prestige, and freedom are linked with land ownership and private open space. Consequently, we have witnessed the growth of suburban development, much of it characterized by large lots and single-family, detached residences (See Tuan, 1974, Chapter 14). The mention of high density seems to be taken as a threat to this established, comfortable lifestyle. The concept is too often equated with overcrowding (which has, in some cases, been shown to have detrimental effects) (Insel and Lindgren, 1978)—thus, a negative reaction.

1.1 **High Density and Energy**

High density development, especially multi-family and attached structures, has been linked to energy savings (Hittman, 1972; Snell, Achenback, and Peterson, 1976; and Erley, et al., 1979) though low density residential areas can also be built to save energy (Harrison and Shapiro, 1979, p. 16; Argonne, 1979). However, lower density development is a less efficient use of urban land, and it is typ-
ically a more expensive option--less accessible to lower socio-economic strata than multi-family attached housing. The Columbus Energy Plan does not elaborate on the meaning of its chosen policy of encouraging "... increased densities in city development." (Columbus Energy Plan, p. 40). Thus, it is not clear what type of development is being promoted. Presumably, the policy means a mix of housing types--from low rise to high rise, and even some energy efficient low density development would be tolerable. This study identifies whether higher development densities are acceptable to local citizenry, and what kind of lower density development, if any, is desirable.

Given that high density development is a proven means of increasing energy efficiency, cities face the challenge of implementation of such a policy. Even though cities have the power to control development via zoning ordinances and other means, many communities, suburban communities in particular, "... are traditionally unreactive to changes that encourage (for example) apartment or even townhouse construction." (Harrison and Shapiro, 1979; see also Babcock, 1966).

Nevertheless, many communities have developed more flexible zoning policies and have used PUD (Planned Unit Development) and cluster zoning ordinances effectively ... to increase overall densities. (Harrison and Shapiro, 1979, p. 17).

It remains uncertain, however, whether "... energy considerations per se ..." are a variable affecting peoples'
willingness to accept more high density development and whether they are a significant influence on suburban development patterns (Harrison and Shapiro, 1979, p. 17).

1.1.1 High Density and Public Acceptance

Judging from historical patterns, it appears that American opposition to higher density development patterns is deep rooted (Tuan, 1974), and that the future trend will be consistent, unless intervening forces bring change.

... Americans will continue to escape urban conditions so long as it is socially, politically, and economically possible to do so. If the future requires more compact and dense living patterns, most citizens will probably grudgingly accept it. (Stone and Whelan, 1979, p. 17).

The realization that resources, especially energy, are limited and must be preserved (Meadows et al., 1974) has sparked a growing conservation ethic which prevails in our social and political spheres. A declining economic status reinforces this ethic. Thus, conditions are ripe for a "grudging acceptance" of more condensed living patterns.

The policy of promotion of higher densities in Columbus is expected to draw criticism and opposition, even though community leaders, who theoretically represent the interest and attitudes of the population, regard this option as desirable, (and have demonstrated support by formally adopting it as City Council Policy). As the Columbus Energy Plan states,

Opposition to modifications in existing zoning patterns is inevitable. Political consensus to
support increased densities does not yet exist. (Columbus Energy Plan, p. 41).

Presumably, the policy will be more readily accepted once its merits are fully understood and political consensus is reached. First, it is essential for the city to have an accurate understanding of citizen attitude in order to implement the policy. Judging from my experiences as a member of the Community Involvement Task Force of the Columbus Energy Council, density of development is not a concept properly understood by Columbus residents, nor is the case any different for the public-at-large (Insel and Lindgren, 1978, p. 5, 37). Residents' satisfaction with their housing arrangement is linked to numerous factors such as aesthetics, proximity to services and employment, convenience, et cetera. Acceptance of higher density living arrangements is, in turn, linked to residential satisfaction (Westminster Planning Department, 1980). It is still unlikely that higher densities will be accepted primarily out of regard for energy conservation (Los Angeles Energy Management Advisory Board, 1981). But other advantages stemming from high density development may make this option more attractive. This study identifies the features that are most important to Columbus residents' perceptions about high density. It compares citizens' degree of satisfaction in their current residential arrangements with higher density living arrangements. And, it determines the desirability of certain characteristics and housing types associated with high
density. Conclusions of the study contribute to the implementation of the Columbus Energy Plan by partially answering the question: "How can we increase the density of development in keeping with citizens' desires and objections?"

1.2 **HIGH DENSITY AND THE URBAN MEGASTRUCTURE**

Increased urban density is a prerequisite for a related concept: the feasibility of urban megastructures. The key to functional high density settings is good design, and integration of urban functions, (mixed-use development), is one means to improve urban design. An extension of this concept is the urban megastructure, a self-contained, mixed-use development. Currently only a futuristic dream considered as wholly impractical by some, the concept of megastructural development may offer an answer to the problem of inefficient urban form. The viability of such an option is explored in this study, drawing from the results of the survey questionnaire.
Chapter II

REVIEW OF LITERATURE, RESEARCH, AND EMPIRICAL EVIDENCE

Why do people seem to be opposed to high density residential development? Why is it "plagued by numerous myths?" (Lynch, 1981, p. 265). Presumably, it is because high density is associated with crowding and its negative effects. However, studies show that high density does not always cause a feeling of being crowded, and furthermore, that neither high density nor crowding are inherently bad. Market trends show that higher density development is becoming an increasingly popular option in the U.S. even though an attitude of opposition prevails.

This review first defines high density and crowding. It then traces the causes of American anti-high density bias, stating, that along with social trends, political influence, and historical patterns, the phenomenon is partially explained by the findings of early psychological research. The claim that a high density environment is necessarily detrimental has not been fully substantiated. Next, a philosophy that promotes high density development is summarized, demonstrating that all popular argument is not in opposition to high density. Further, this review presents research evidence that suggests that high density de-
velopment can be acceptable to urban citizens, as it is many other cultures. Then, some examples of successful high density design schemes are presented. Current development trends in Columbus, Ohio and the U.S. are next summarized, which establishes that high density is indeed an increasingly popular development policy. The means of implementing this policy is then explained, as well as some of its attractive characteristics. Next, speculation is offered about future development patterns. Finally, an overview of the quality and nature of the research previously done in this area leads into a listing of the hypotheses about peoples' attitudes that are tested in this study. This review, in sum, provides a background on characteristics of high density and crowding that would affect one's perception about the two concepts, setting the scene for explaining results of the questionnaire (Chapter IV).

2.0.1 Density Defined

To begin with, the terms "high density" and "crowding" are defined such that they are clear and distinct from one another. However, we find that definitions vary from author to author, and the concepts are often confused in everyday discussion and in the literature.

As referred to in this study, density is simply "... the number of people ... occupying a given unit of space," (Heimstra and McFarling, 1974, p. 154), where space
refers to a definable section of an urban environment (Ibid.). Density is thus "... a measure of physical concentration (of bodies in space) and is an environmental condition ..." (Edney, 1977, p. 1228). High or low density refers to varying degrees of physical concentration.

Density, the physical measure, can itself be partitioned into (a) spatial density varied by changing the size of the container around a constant number, and (b) social density varied by changing the number of people (Loo, 1973). Zlutenick and Altman (1972) further distinguish between inside density and outside density when referring to a living unit and the surrounding community, respectively. (Edney, 1977, p. 1228).

Yueng, (1977, p. 590), refers to these same concepts as internal density, the number of persons per room, and external density, the number of persons per area of land. In this study, the concept of social density is being explored, focusing on external density. That is, the city policy of increasing density of development pertains to raising the number of residents per unit of land area, not necessarily increasing the number of people per housing unit.

2.0.2 Crowding Defined

Crowding, on the other hand, is based on personal feelings in a given environment. In relation to its use in this study, it is best defined by Desor (1972) who states that

... crowding is essentially receiving excess stimulation from social sources ... a phenomenon mediated by interpersonal perception. (Desor, 1972, in Edney, 1977, p. 1222).
Whereas density is a physical measure, crowding is a perceived condition, a psychological reaction (Esser, 1973, in Edney, 1977; Edney, 1977, p. 1228) evidently closely tied with social density (Insel and Lindgren, 1978, p. 16). Thus, the feeling of being crowded is a reaction to social environmental stimuli.

Stokols (1972) defines crowding with an emphasis mainly on personal feelings, (See Stokols, 1972, p. 276 in Edney, 1977, p. 1220) while Altman (1975) and Schopler and Stockdale (1977) (in Edney, 1977, p. 1224) explain crowding in terms of one's preconceived privacy goals (See Altman, 1975, in Insel and Lindgren, 1978, p. 26). Though this research treats crowding mainly according to Desor's (1972) definition, elements of other definitions of crowding intervene. The definition of the term is not clear-cut.

Types of crowding have also been distinguished (Stokols, 1972 in Insel and Lindgren, 1978, pp. 19-20): Nonsocial crowding is "... being cooped up alone in a small space ..." (Stokols, 1972, in Insel and Lindgren, 1978, pp. 19-20), whereas social crowding is simply "... a condition resulting from the presence of too many people ..." (Ibid.). Molecular crowding is "... crowding in a relatively small area, such as a home ..." (Ibid.) And finally, molar crowding, is defined as "... large-area crowding, as in an urban setting." (Ibid.). Most relevant in this study is the concept of social crowding (too many
people) at an urban scale (molar crowding), because of its relevance to urban planning.

Just as "high density" and "crowding" are often confused, the terms "crowding" and "overcrowding" are often incorrectly interchanged. Crowding has thus far been discussed as a psychological perception of receiving a high level of stimulation. "Overcrowding" is an extreme degree of crowding that is judged unpleasant (Edney, 1977, p. 1228). A look at the etymology of the word "crowding" partially explains why it is used synonymously with "overcrowding," and further, why both terms are associated with high density:

... the English word crowding has no real equivalent in other European languages. The word derives from the Anglo-Saxon cridan --to thrust or shove... European languages have words for crowds of people or things, as well as words for pushing or shoving, but they lack a portmanteau word that includes the concepts of losing freedom of movement, being hemmed in, having one's privacy invaded, and running the risk of being elbowed aside. The fact that only an English word, crowding, implies all these things, suggests that British are more likely to worry about such matters than are people in other cultures. Americans have of course taken crowding over from the British, together with its load of special meanings. (Insel and Lindgren, 1978, p. 8).

The word "crowding" conjures up visions of being hemmed in, thwarted, elbowed out of the way--perhaps even trampled in a surging crowd. (Insel and Lindgren, 1978, pp. 8-9).

When ... (a) ..., population density reaches a high level, it is common to say that overcrowding has taken place. Thus, at some point along the population density continuum, the condition of overcrowding is assumed to occur. (Heimsstra, 1974, p. 155).
Commonly, we refer to crowding as though it means overcrowding. Hence, the negative connotation is proliferated. Technically, crowding is not necessarily linked to a negative perception. For example, at a sporting event, masses of people help create an exciting environment, thus people perceive the atmosphere as favorable. Overcrowding, properly, describes a negative perception. In this study, crowdiness is taken to be an undesirable condition, in keeping with its common interpretation. Though properly, crowding and overcrowding should not be interchanged. Further, it is frequently implied that high density is naturally linked to these negative perceptions of crowding, when this is not necessarily accurate.

2.0.3 Does High Density Cause Crowding?

High density is often equated with crowding since it is assumed that a causal relationship exists between the two. In fact, high density may be a necessary condition for the perception of crowding to result, but it is not the sole determinant. Freedman (1975) contends that density is central to determining whether crowding exists, (in Edney, 1977, p. 1224), but Stokols (1972) and Edney (1977) qualify this claim, stating that it is only one of the essential conditions that is necessary to produce the feeling of being crowded (Stokols, 1972, in Insel and Lindgren, 1978, p. 19; Edney, 1977, p. 1226).
Crowding can be explained by numerous theories. Thus, it is simplistic to automatically link it to high density, as seems to be the case with popular opinion. Wicker (1973) argues that density is not even a factor in crowding. Rather, he claims, crowding is activity dependent (in Edney, 1977, p. 1225). Thus, 25 people on a baseball field may feel crowded, but they would not on a 60-person bus. Regardless of density levels,

... it is the perception (italics mine) of crowding that seems to be important, and not such factors as the restriction of personal space and the physical event of living and working in congested quarters. (Insel and Lindgren, 1978, p. 57).

Thibaut and Kelley (1959) concluded that crowding is "... a density that is greater than our comparison level," (in Insel and Lindgren, 1978, pp. 31, 36), where the comparison level is simply the "... standard against which we evaluate a relationship." (Insel and Lindgren, 1978, p. 31).

Fisher (1974) found that

... when we are physically close to the kind of people we like, we are inclined to feel less crowded than when we find ourselves in the midst of people who do not attract us .. ." (In Insel and Lindgren, 1978, p. 20).

which reinforces the notion that crowding in relation to density is wholly dependent upon personal perception.
2.0.4 Distinction Between Crowding and High Density

"Equating crowding with density . . . has (italics mine) logical appeal . . . ," (Insel and Lindgren, 1978, pp. 16-17) and the two have been positively linked according to research evidence, but the terms are not interchangeable. Freedman (1975) uses high density and crowding interchangeably which directly contradicts Stokol's (1972) distinction (Edney, 1977, p. 1225). Insel and Lindgren (1978) go so far as to forthrightly avoid the issue of defining the concept of crowding. They "... talk about crowding as though everyone understands what it means" instead of trying to assign a definition that inevitably would satisfy no one (Insel and Lindgren, 1978, p. 16). This, they claim, is justified by precedent: In the 1920's psychologists defined the imprecise term "intelligence" as: What is measured when intelligence tests are administered (Ibid.). It is doubtful whether nondefinition is acceptable in the case of crowding research, though it does appear that the meaning of the term is more abstract than density. In this research, we can treat density as a physical measure and crowding as a psychological concept.
2.1 SOURCES OF ANTI-HIGH DENSITY BIAS

Americans' dislike of high density is a consequence of a long-standing anti-urban bias that first gained a stronghold with Thomas Jefferson's preachings about the agrarian ideal in the late eighteenth century (Tuan, 1974, p. 108; Gerckens, 1980, pp. 1-2):

Those who labour in the earth are the chosen people of God, if ever he had a chosen people, whose breasts he has made his peculiar deposit for substantial and genuine virtue. . . . The ills of great cities add just as much to the support of pure government as sores do to the strength of the human body. (Jefferson, "Notes on the State of Virginia," 1785).

Cities in the U.S. grew under the guise of being "necessary evils" which, along with their characteristically dense and concentrated style of development, assumedly brought urban ills such as pollution, filth, and crowded housing.

The pervasive American ideal is consistent with some cross-cultural attitudes toward urban (typically dense) development through history (Tuan, 1974). Some evidence in ancient Chinese literature demonstrates a high regard for the beauty of the earth and countryside, (Tuan, 1974, p. 103), and veins of reverence for natural beauty and rustic lifestyles run through Greek and Roman attitudes as well. In a later era, in the Russian classic War and Peace, "... Tolstoy equates life in the country with the good life." (Tuan, 1974, p. 49). A Biblical reference continues this theme: "A town is a prison, the desert loneliness a paradise." (St. Jerome in Tuan, 1974, p. 52). Finally, Ebenez-
er Howard's garden city concept typified the popular English desire to create expansive urban environments that offered access to pristine nature for all residents while avoiding the threats of urbanism.

Though examples of anti-urban bias are plentiful through history, evidence of peoples' attitudes also show fear and dislike of the wilderness and countryside, and even a contrasting feeling: enjoyment of the urban place (Tuan, 1974, p. 248). The Chinese, though appreciative of nature, tried to avoid the "... vast expanses of wild nature that provided little security and gave no delight." (Ibid., p. 103). Dostoevsky, in contrast to Tolstoy, was "... wholly immersed in the city..." (Tuan, 1974, p. 49) in his writings, as he conceived of the city as the only place "... in which meaningful human acts can take place." (Tuan, 1974, p. 50). The Bible in some places speaks of wilderness as a peaceful haven of contemplation (Revelations 1:9, 17:3, in Tuan, 1974, p. 110), but it also portrays wilderness as a source of evil and place of condemnation. "Christ was tempted by the devil in the wilderness," (Tuan, 1974, p. 110) and "Adam and Eve were driven from the Garden to the 'cursed ground,' overgrown with thorns and thistles." (Ibid.). Thus, the non-urban place is not always seen as the ideal human environment.

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1 See also G. Steiner, Tolstoy or Dostoevsky: An Essay in Old Criticism, New York: Vintage Books, 1961, pp. 74-75.
The unsettled wilderness and the more orderly countryside are both options to civilization, though all three environments have been regarded as good and bad by different peoples. The Bible, in particular, "... is a rich source of conflicting environmental attitudes." (Tuan, 1974, p. 51). Across cultures, ambivalence toward urban (more densely settled) and non-urban environments has persisted "... from the beginning." (Tuan, 1974, p. 248). The Western world, particularly, the U.S., has begun to lean more toward anti-urban bias, especially since the Industrial Revolution.

2.1.1 Social Science Research and American Anti-High Density Bias

Findings of early psychological and sociological research that demonstrated potential ill effects of high density or crowded environments explain one source of American anti-high density bias, however more recent evidence and professional opinion contradicts previous conclusions.

Most of the original research on density and crowding was based on observed animal behavior. Rodents were popularly used, and in at least one instance, a deer population was observed (Christian, 1950's; see also Michelson, 1970, p. 6). Calhoun's documentation (1962) of pathologies among rat populations became all too well known. We commonly refer today to the fear of being "trapped like rats," (a colloquial expression), possibly as a result of this re-
search. Calhoun observed abnormal mating patterns and a marked increase in aggression among the experimental subjects. Findings were, and still are by some, assumed transferrable to man. However, this research has been questioned for its implications about human behavior, since human reactions, adaptations, and attitudes cannot be fully simulated in animal studies (Edney, 1977, p. 1217; Yeung, 1977, p. 591; Heimstra and McFarling, 1974, p. 156).

Animal crowding should . . . be treated as an analog to human crowding and caution should be exercised in generalizing to avoid oversimplifying the human phenomenon. (Edney, 1977, p. 1217).

Probably there is nothing pathological in crowding per se that produces the symptoms (that surfaced in Calhoun's experiments). (Hall, 1966, p. 29).

High density is still readily equated with crowding and its negative connotations. It is associated with psychological pathologies and deleterious effects on emotional health "... as to have become almost a medical axiom." (Gutman, 1972, p. 250). Though disease can potentially spread more rapidly in high density arrangements, the most recent evidence is not substantial that high density living is bad for one's physical well being, and more conclusively, it is not always detrimental to one's mental health (Cassel in Gutman, 1972; Insel and Lindgren, 1978, p. 129; Yeung, 1977; Lynch, 1981; and Srole, 1972, in Heimstra and McFarling, 1974). Nor does it necessarily increase crime (Nasar, 1977) or create an unsafe residential environment, as was advanced by Newman (1972).
FIGURE 1. Safety in the City

"The nice thing about living in the city is..."

Though unsafe living conditions and crime are often associated with urban living, research does not conclusively explain these problems as being caused solely by either high density or crowding.

"...you can pick up a quart of milk in the middle of the night."

SOURCE: New Yorker.

... Experimental psychological literature concerning human responses to crowding produced early evidence (Freedman, Levansky, and Earlich, 1971) that high density does not necessarily have negative effects. Since, a considerable body of literature demonstrates that under certain circumstances high density can be interpreted as the cause of a large catalog of human ills (e.g. poor health, poor grades, withdrawal from social contact, decrements in task performance, and disruption of social relations), while under different conditions, high density will in and of itself have no negative effects (Lawrence, 1974; Freedman, 1975; Sundstrom, 1978). (Shiffenbauer, 1979, p. 229).

What can we conclude from the existing evidence on the relationship between residential density and sociopathological behavior in humans? Lawrence (1974) has examined the "meager body of data on human response to density, and judged that "... the only certain conclusion that can be drawn at this time is that there is no clear demonstrable linear relationship between high density and aberrant human behaviors, or between the social crowding of the individual and aggression." Similar conclusions have been reached by others (Zilutnick and Altman, 1972; Stokols, 1972; and Freedman, 1975). (Marans, 1975).

Freedman (1975) argues that, while "... high density by itself has neither good nor bad effects on people..."
(Edney, 1977, p. 1224) it "...serves to intensify the individual's typical reactions to ... (a) situation." (Freedman, 1975, p. 90, in Edney, 1977, p. 1224). And finally, to dispel all unjustly negative connotations about high density, Freedman (1975) tells us: "People who experience high density are just as healthy, happy, and productive as those who experience lower density." (in Insel and Lindgren, 1978, p. 59). Is the popular American attitude that opposes high density development well founded? It appears not.

Actually, there is some evidence that high density may be beneficial to one's health (Gutman, 1972, p. 249; Cassel in Gutman, 1972, p. 250). Potentially positive effects of close-quarter residential arrangements are social cohesion and greater community identity. Michelson (1970) finds that high density is more functional among a socially cohesive, homogeneous, and especially family related group, as in Boston's West End (see also Gans, 1962). Sommer (1974, p. 122) and Milgram (1970) have disputed the theory that high density can improve social cohesion, claiming that concentration of people alone does not appear to promote social cohesion or increase interaction since persons are able to selectively ignore their company or any stimulus overload. It has been established that dense working environments do tend to promote social cohesion (Ittleson, 1974). And Cassel (in Gutman, 1972, p. 250) maintains that people living in denser, more cohesive communities are healthier.
Though research findings about this theory are mixed, the possibility that high density may indeed be beneficial has not been dispelled.

2.2 **Philosophies Promoting High Development Density**

People may desire lower density development, but this is in direct opposition to some philosophies about the matter. Previous theory on high density, based on animal studies, (for example Calhoun, 1962) purported that

... populations function as homeostatic systems regulating themselves around an optimal density level. ... (and that) high density or numbers have deleterious effects on individuals. (Calhoun, 1966; Wynne- Edwards, 1965).

Philosophers such as Paolo Soleri (1973), Teilhard DeChardin (1964), and Marilyn Ferguson (1980), contend that the very essence of social balance, human homeostasis, is the unification of people. Soleri's concept of arcology, introduced in the late 1950's, (including Arcosanti, Arizona), is an attempt to create a dense, self-sustaining urban environment that will cause a coming together of people, both physically and spiritually (Soleri, 1973). Soleri envisions this type of community to be a dynamic, animated, and socially cohesive environment.

Philosophically and theologically, Soleri, (basing his thesis on the works of Jesuit Priest Teilhard DeChardin), argues that man, a collective and social creature, must concentrate development in order to conserve resources, energy included. Soleri purports that simultaneously, man's
physical closeness in an active community setting will promote the eventual universal unity of all men, the Omega point, our ultimate destiny (Soleri, 1973; Teilhard DeChardin, 1964). R. Buckminster Fuller's Triton City (1960's), and Moshe Safdie's Habitat, Montreal (1967) are other examples of environments that thrive on a philosophy of promotion of high density. Jane Jacobs (1961) also argues in favor of exciting, dynamic, high density urban settings, basing her philosophy on observations within the most dense American city, New York. The school of thought advocating urban concentration does have some popular support, but it is by no means a majority following.

2.3 ACCEPTABLE RESIDENTIAL DENSITY ACROSS CULTURES

Anti-high density bias is probably strongest in the United States. Schmitt (1963), Hall (1966), Yeung (1977), and Insel and Lindgren (1978), confirm that the conception of comfortable, livable densities varies across cultures as different ethnic values, family heritage, societal prescriptions, economic conditions, and even languages affect the accepted norm. In most other countries, this norm allows for higher development densities than in the U.S.

Jephcott (1971) (p. 48, in Yeung, 1977, p. 588) found a high percentage of residents of Glasgow, Scotland to be satisfied in a high density residential setting, while Yeh (1975) found similar results in Singapore, and Yeung (1977) claims consistent findings in Canada and throughout
the United Kingdom. Schmitt (1963) states that conditions in Hong Kong prove

... that an urban population can survive and even flourish under conditions of density and overcrowding that ... seem unthinkable to many Americans. (Yeung, 1977, p. 590).

In keeping with the difference between Anglo-Saxon and other's acceptance of high density living, it follows from the earlier discussions of the Anglo-Saxon history of the word "crowding" that the word "privacy" has no precise translation in the Japanese, Greek, Italian, Spanish, or other Mediterranean languages. (Hall, 1966, p. 142; Pol- lis, 1965, in Insel and Lindgren, 1978, p. 52; Insel and Lindgren, 1978, p. 52). However, it should not be exaggerated that many non-U.S. citizens are comfortable living at higher residential densities. Even in Japan, Lynch (1981) reminds us, the demand for a "... single-family house remains insistent." (p. 261). Thus, it is evident that an internationally accepted, optimal living density level does not exist (Lynch, 1981; Hall, 1966, p. 162), but it also seems evident that the American conception of an acceptable density living level is probably lower than that of most other cultures.

Since it is true that high density residential environments are functional in at least some cultures, it cannot be argued that high density, in itself, is bad. In fact, high density living offers advantages that would lead one to believe that it may become a more acceptable option, even in the U.S.
2.4 DESIGN SCHEMES AND DENSITY

Though popular opinion may favor a lower density environment, this is not the only development pattern that is functional. Designs of urban development that promote dispersion and deconcentration have worked as well, and have been accepted as widely, as designs advocating high density and concentration. (See Table 1)

Some of the earlier, more popular design schemes that promoted deconcentration and dispersion include such works as Frank Lloyd Wright's Broadacre City (1935), or Frederick Law Olmsted Sr.'s plan for Riverside, Illinois (1869). The latter became the model for most suburban development in the U.S. that followed—characteristically low density (Gerckens, 1980, p. 7). What came to be known as an optimal development scheme, especially in England but influential in the U.S. well into the 1900's, was the Garden City concept proposed by Ebenezer Howard in 1898 (Gerckens, 1980, p. 16; Howard, (Osborn, ed.), 1946). This marriage of the urban and rural prescribed a moderate density of 8-12 dwelling units per acre, lower than a density we would refer to today as high density.

High density schemes such as LeCorbusier's LaVille Radieuse (Radiant City, 1929/1971) and the Goodmans' Communías (1947) advocate concentration in excess of 200 persons per acre. Projects such as LeCorbusier's Unite D'Habitation (1945) and Moshe Safdie's Habitat, Montreal (1967), are self-contained urban environments functional today that of-
<table>
<thead>
<tr>
<th>Year</th>
<th>Proposed By</th>
<th>Area Involved</th>
<th>Proposal</th>
<th>Density Per Gross Acre</th>
<th>Optimum Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1898</td>
<td>Ebenezer Howard</td>
<td>City</td>
<td>Book—Garden Cities</td>
<td>8-12 dwelling units</td>
<td>32,000 persons</td>
</tr>
<tr>
<td>1924</td>
<td>Le Corbusier</td>
<td>City</td>
<td>La Ville Contemporaine</td>
<td>1,200 persons</td>
<td>3,000,000 persons</td>
</tr>
<tr>
<td>1929</td>
<td>Clarence Perry</td>
<td>Neighborhood Unit</td>
<td>Neighborhood Unit Concept</td>
<td>5 dwelling unit</td>
<td>5-9,000 persons</td>
</tr>
<tr>
<td>1932</td>
<td>Frank Lloyd Wright</td>
<td>City</td>
<td>Broadacre City</td>
<td>1 dwelling unit</td>
<td>no limit</td>
</tr>
<tr>
<td>1944</td>
<td>Jose L. Sert</td>
<td>Residential Unit</td>
<td>Book—Human Scale in City Planning</td>
<td>3-5 dwelling units</td>
<td>5-10,000 persons</td>
</tr>
<tr>
<td>1945</td>
<td>Walter Gropius and M. Wagner</td>
<td>Residential Unit</td>
<td>Book—A Program for City Reconstruction</td>
<td>4-10 dwelling units</td>
<td>5,000 persons</td>
</tr>
<tr>
<td>1946</td>
<td>L. Justement</td>
<td>City</td>
<td>Book—New Cities of Old</td>
<td>10-35 dwelling units</td>
<td>1,000,000 persons</td>
</tr>
<tr>
<td>1947</td>
<td>Goodmans</td>
<td>City</td>
<td>Book—Communals</td>
<td>100 dwelling units</td>
<td>6-8 million persons</td>
</tr>
</tbody>
</table>

Source: DeChiara and Koppleman, urban Planning and Design Criteria, p. 516.
fer all the amenities of a residential neighborhood, with many urban services close at hand, at densities in excess of 150 persons per acre.

Reston, Virginia (1964) is a U.S. New Town based on cluster development, where a high density character (60 persons per acre) is achieved through a mix of highrises and townhouses. Of course, high density developments have also failed. Pruitt-Igoe, St. Louis (1955) was a housing project with a density of 45 units per acre (90-135 persons per acre, roughly) that became a famous failure. The people it was built for did not support it, it was crime ridden, and many refused to live in it. Newman (1972) points out that its main downfall was not simply that it was a high density environment, but it was a poorly designed housing arrangement. Examples of successful high density developments, both in the U.S. and abroad, are plentiful. One cannot argue that high density development simply does not work. In fact, it is becoming an increasingly popular urban development style.

2.5 CURRENT DEVELOPMENT TRENDS

The goal of increasing residential densities in urban development has become a particularly attractive option for the whole western world, U.S. included, in the light of increasing energy costs and declining economic status (Mara, 1975; Carver, 1982). The policy has been gaining acceptance and it is being actively implemented.
Trends of settlement in the U.S. from the mid-1800's through the mid-1900's were "to urbanize." (Kirmeyer, 1978, p. 247). America grew from a predominantly agrarian, rural country, with roughly 23 percent of the nation living in cities of 5000 or more in 1870, to an urban nation, with approximately 69 percent of the population in cities of 5000 or more by 1970 (Kirmeyer, 1978, p. 247). However, suburban flight was beginning to become the norm by mid-century, as population densities within Standard Metropolitan Statistical Areas from 1950 to 1970 showed a decline (Abott, 1981, p. 62). (See Table 2). The typical attitude of this time is reflected in Hall's statement, "... in the major cities of the U.S., people of very different cultures are now in contact with each other in dangerously high concentrations..." (Hall, 1966 p. 156). As if people were not intended to mix, and, as if high densities necessarily meant problems, popular sentiment was against high density.
<table>
<thead>
<tr>
<th></th>
<th>1950</th>
<th>1960</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Western SMSA's</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median population density per square mile for urbanized areas</td>
<td>4.106</td>
<td>3.008</td>
<td>2.818</td>
</tr>
<tr>
<td>Median percentage of one-unit dwellings</td>
<td>71.2</td>
<td>84.4</td>
<td>73.7</td>
</tr>
<tr>
<td><strong>Southeastern SMSA's</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median population density per square mile for urbanized areas</td>
<td>4.782</td>
<td>3.296</td>
<td>2.567</td>
</tr>
<tr>
<td>Median percentage of one-unit dwellings</td>
<td>64.1</td>
<td>80.3</td>
<td>72.2</td>
</tr>
<tr>
<td><strong>Mid-South SMSA's</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median population density per square mile for urbanized areas</td>
<td>4.588</td>
<td>3.096</td>
<td>2.236</td>
</tr>
<tr>
<td>Median percentage of one-unit dwellings</td>
<td>62.7</td>
<td>83.1</td>
<td>76.0</td>
</tr>
<tr>
<td><strong>All SMSA's</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall population density per square mile for urbanized areas</td>
<td>5.438</td>
<td>3.837</td>
<td>3.376</td>
</tr>
<tr>
<td><strong>All U.S.A.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median percentage of one-unit dwellings</td>
<td>64.0</td>
<td>76.3</td>
<td>69.1</td>
</tr>
</tbody>
</table>

However, more recently, in the late 1970's and early 1980's, higher density has become more acceptable. "For (at least) some people, the advantages of the city, such as proximity to work and cultural attractions, outweigh the drawbacks . . . ." (U.S. News and World Report, p. 47). Some argue that this trend is only temporary, but it is nevertheless established (Lynch, 1981; see also Stone, et al., 1979).

Successful, functioning high density environments are not new to the United States. We are reminded of sections of Manhattan and Chicago where residential and employment district densities exceed 10,000 persons per acre (Wheaton in Ewald, 1967). Chicago's Near North Side or Boston's West End are other examples of favorable high density neighborhoods (Shiffenbauer, 1976, p. 229; Michelson, 1970, pp. 67-71). University communities throughout the U.S. are also examples of functioning mixed-use, high density development (Sommer, 1974).²

A popular option to achieve higher residential densities was once to build highrises though this is not the dominant trend today, and it is not the only way to intensify land use. (Yeung, 1977, p. 588). Instead, the construction of moderate density and attached single family homes is

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² The Ohio State University area is the most densely settled residential section in Columbus according to the 1980 U.S. Census and the Columbus Department of Development. This area is recognized as one of the most lively and efficiently operating communities within the city.
dominating the housing market. (Zehner and Harris, 1973, p. 247).

Some balk over this trend of increasing urban density, claiming that we are already overcrowded.

... About 75 percent of our population have opted, or felt compelled, to bunch together on a mere 1.5 percent of America's vast expanse. It is predicted that this metropolitan population will climb to 85 percent by the end of the century. (Insel and Lindgren, 1978, p. 80).

Strangely enough however,

... overcrowding (measured as people per household) remains at higher levels in rural areas than in the metropolitan areas or central cities. Thus, the higher densities of urban areas can not be attributed to higher household density, but rather to a greater number of dwelling units per square mile. (Carnahan et al., 1974, in Kirmeyer, 1978, p. 249).

Thus, it is highly likely that we can live at higher urban densities while still enjoying personal privacy and avoiding the ills of overcrowding.

Trends in Columbus are in keeping with the national pattern.

In 1977, multi-family units represented 50 percent of the dwellings authorized by building permit in Columbus. In 1981, that figure jumped to 72 percent. (Meister, 1982).

An accepted prediction is that

... the City (Columbus) of the future will have a greater population density with smaller single-family homes and more apartments ... (Briener, 1982).
2.5.1 How is Higher Density Development Being Implemented?

Cities are affecting density of development by using zoning controls, subdivision standards, and city ordinances appropriately (Harrison and Shapiro, 1979, p. 17). King County, Washington is among the innovators, establishing an ordinance that promotes townhouse development, and justifies it in the text of the law as contributing to energy conservation. (Though the rule also requires that established maximum densities not be exceeded, and that appropriate acreage of open space be maintained.) (Erley and Mosea, 1980, pp. 48-49.) The community of Davis, California is a municipality that has successfully developed complete neighborhoods characterized by reduced lot and house size, shared wall area (zero lot lines), and narrower streets; all sanctioned by ordinance.

A similar idea is to offer density bonuses to developers, an arrangement that allows more intensive land use if certain conditions are met by the developer. Los Angeles, in seeking to adopt density bonuses as a city ordinance in their city energy plan, sampled public opinion via mail-in survey, and found that only 35 percent of the respondents favored the policy of offering density increase bonuses to developers if strict energy efficiency standards of construction were met in new housing complexes. (Los Angeles Energy Management Advisory Board, 1981, p. 48, 106-107) Though this degree of support is not overwhelming in terms
of concern for energy efficiency, the policy was seen to have merit in other areas and has since been adopted. Current Columbus policy is reflected in the following: Zoning and building requirements should continue to protect against unwanted types of housing but should not

\[ \ldots \text{prevent developers from meeting market demands for well-designed affordable, higher density residential development in appropriate locations.} \]

(Meister, 1982).

The above examples illustrate cities' initiative in using their legislative powers to control development densities.

2.5.2 Why is Higher Density Development More Acceptable Today?

Surely the main reason for the current increase in higher density development is purely economic. Not only is higher density housing cheaper to build or buy, it also reduces the cost of public services necessary for residential areas (Meister, 1982) and can reduce energy bills (Erley, Mosena, and Gil, 1979).

A much smaller percentage of the population is now able to afford single family detached housing than ten years ago, since the price of this housing has skyrocketed relative to increases in personal income (Meister, 1982). (See Figure 2).
FIGURE 2.
INCREASE IN HOUSING COST COMPARED TO INCREASE IN MEDIAN FAMILY INCOME, 1970-1978

\[ \text{ANNUAL HOUSING EXPENSES FOR NEW MEDIAN PRICED 1-FAMILY HOME} \]
\[ \text{MEDIAN FAMILY INCOME} \]

\[ \begin{array}{c|cccccccc}
   \hline
   \text{PERCENT INCREASE OVER} 1970 & 0 & 10 & 20 & 30 & 40 & 50 & 60 & 70 & 80 \\
   \hline
\end{array} \]

\[ \text{U.S. Bureau of the Census, Current Population Reports, series P-60, no. 123, June 1980.} \]

The average purchase price of a single-family home has nearly doubled since 1973 (current dollars) (Meister, 1982). The trend in Columbus approximates the national pattern: the current average housing price increase from 1973 to 1981 is 95.0 percent, and the constant price increase during the same period is 13.0 percent. (See Table 3).
TABLE 3
Columbus Single-Family Average Housing
Prices, 1973 and 1981, (Current and Constant Dollars)

<table>
<thead>
<tr>
<th></th>
<th>1973</th>
<th>1981</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Dollars</td>
<td>38,200</td>
<td>74,300</td>
<td>94.5</td>
</tr>
<tr>
<td>Constant Dollarsa (1972=100)</td>
<td>36,485</td>
<td>41,232</td>
<td>13.0</td>
</tr>
</tbody>
</table>

aPrices were deflated using implicit price deflators for housing.


The construction cost and purchase price of multi-family housing compared to single-family housing, on today's market, is substantially cheaper and thus, more attractive (Ibid.). Lower-priced housing is logically linked to lower rents and mortgages, thus complimenting the economic attractiveness of this housing option.

As costs of energy continue to rise, (particularly the cost of natural gas which is the primary fuel used for residential heating), the need for energy conservation is reinforced. This strategy is regarded as the most fruitful, better than attempting to develop new resources or increasing reliance on other fuels (Stoubaugh and Vergin, 1979, p. 216). Higher density development policy serves the goal of

3 The primary source of home-heating fuel in Ohio is utility gas, used in more than 70 percent of the occupied housing units in Ohio, according to the 1980 U.S. Census of Population and Housing.
conservation by offering reduced heating and cooling expenses due to more shared wall area among residential structures (Erley, et al., 1979; Mason and Jennings, 1982, p. 37; Stokes, 1982).

Higher gasoline prices have also helped make higher density a cost-effective policy. More concentrated development can reduce overall auto trip length and the necessity of auto use due to closer services (Peterson and Bateman; Harrison and Shapiro, 1979; Rickaby, 1979; Steadman, 1979). Suburban residents who face long commuting distances to work or to the inner city are facing much of the impact of higher gasoline prices. This tends to encourage residential development closer to the city core where living expenses might be lessened. Clearly, higher density offers a partial solution to the problem of higher-priced petroleum-powered transportation.

Other reasons high density is more readily acceptable today are:

1. So-called clean industries, such as electronics firms, are growing. Land use associated with these industries is reasonably compatible with residential land use, so it is possible to build neighborhoods closer to these industries, and vice versa. The result is a more intensive use of land, with higher overall densities (Harrison and Shapiro, 1979, p. 25).

2. Multi-family developments are being designed and built "... to preserve lower density ambience..." (Ibid.) which is more in keeping with popular preference.
Unfortunately, energy issues are generally treated as low priority items on local communities' agendas—at least not "... on par with (such problems as) housing, crime, education, etc." (Erley and Hosena, 1980, p. vi). Expect that the policy of higher development densities will be implemented on the sole premise that it stands to conserve energy, but this, combined with other merits, does make it a sensible policy.

2.6 Future Development Patterns

For various reasons, it appears that development densities will be increasing. Urban centers cannot maintain their once well-established, lively and animated character by promoting a policy of dispersion, nor can they maintain a large enough tax base to support city services. We are certain that "suburbs... lack the vivid sense of place that dense cities have." (Lynch, 1981, p. 263). Even Corbee (1981), who points out the threats and ills of dense urban centers, argues that the sensible future option is to build moderate density urban centers (more dense than current development) while maintaining sufficient amounts of green open space (pp. 34-37). In his scheme, 7-8 units per acre (roughly 17-20 persons per acre) is regarded acceptable and sufficiently safe from the threats of overcrowding. Corbee (1981) also argues, and he is not alone in his argument, that
... (the auto) has created vast cities and megalopolises of uniform medium density, having neither the advantages of the true compact city nor those of the country." (p. 32)

Soleri (1973) and Safdie (1967) claim that the auto-influenced, two dimensional pattern of city development (detached buildings) is obsolete. They see the city evolving into three dimensional system in which all land uses are integrated. In the eyes of some, urban crowding is not a serious problem that cannot be overcome.

For moderate and low density cities, Whyte (1980) also recommends concentration:

What such cities need to do is to compress, to concentrate. Many of them were very low density to begin with; in some, most of the buildings are only two or three stories high. Spread over many downtown blocks are activities and people that might have come together in a critical mass had they been compressed into two or three." (p. 92).

2.7 THE QUALITY OF RESEARCH ON HIGH DENSITY AND CROWDING

If the goal of concentrating urban development is to be achieved, research on both high density and crowding will have to be improved and expanded, since it is currently neither coordinated nor standardized.

Psychological research has only begun to identify appropriate methods of study of density and crowding. Many different aspects of the two have been explored by means of numerous methodologies, all difficult to devise (Insel and Lindgren, 1978, p. 20). Studies are classified as either attitudinal or behavioral in nature. Research that examines
perceptions and behavior in both long and short-term crowding situations is termed "comprehensive." (Edney, 1977, p. 1220). This research inquiry would be classified as attitudinal, concerned with opinions about high density in Columbus over a long term.

Initially, we might expect investigations on people's attitudes toward crowding and high density to be somewhat straightforward: One either likes or dislikes a crowded setting and he should know which is better (Insel and Lindgren, 1978, p. 37). But, it is evident that people have the ability to adapt to many types of environments, and they may even describe favorably an environment that has negative effects on them (Insel and Lindgren, 1978, p. 37). For example, a person may say that they like a job that is actually stressful, while the job is having detrimental physical effects on them. Thus, the complicated nature of research design in this area can be appreciated.

Numerous approaches have been tried by researchers. Calhoun (1962), Zlutnick and Altman (1972), and others (see Edney, 1977) have devised mathematical models to explain behavioral patterns in high density and crowded settings. Throughout the various studies on density and crowding, attention is brought to different independent variables. For example, Mandershied (1975) gives special attention to "...cultural factors and the role played by social interaction in crowding." Zlutnick and Altman (1972) include both interpersonal and environmental determinants in their model on
high density (Edney, 1977, p. 1220). The researcher's approach and chosen methodology regarding the study of high density or crowding is essential to the validity of the resulting outcome and its agreement with previous research. The research design of this study is based on people's subjective attitudes toward conditions in residential environments of varying densities.

Past research findings cannot be treated as undisputable, as we are warned by Kirmeyer (1978) that studies on high density and "... crowding (are) fraught with methodological shortcomings." (p. 248). Also, few theories have "... been in existence long enough to see how they stand up to empirical testing ..." (Edney, 1977, p. 1226). The call for more research is clear:

Though we are concerned with the potential impacts of high density living ... we are convinced that our understanding of the ways in which density may lead to problems is very rudimentary and in need of extensive research. (Marans, 1975).

2.8 THE COLUMBUS INQUIRY: EXPECTATIONS OF SURVEY RESULTS

In light of research findings on crowding and high density, the current housing market, the goals of the Columbus Energy Plan, and the Columbus Department of Development's policy on future city growth, it is evident that this study, which identifies Columbus citizens' perceptions about high density residential living, is wholly appropriate at this time. The study can be classified as a market analysis of what residents prefer in a residential setting in regards
to the concentration of development. Though one of the goals of the Columbus Energy Plan is to increase densities, the main hypothesis of this study is based on the expectation that local citizens will not favor a pro-high density policy.

Main Hypothesis:

Columbus residents recognize the disadvantages commonly associated with high density residential development, (i.e. less private space, crowded conditions, etc.), but they do not readily associate high density with its potential advantages (i.e. energy savings, closer proximity to services and work, etc.). Thus, residents are unwilling to support a city-wide policy of increasing residential densities.

The corollaries and related issues associated with this hypothesis that are tested or answered in this study are as follows:

2.8.0.1 Corollaries

1. Corollary A. Though high density development may offer an energy savings advantage, this is not an attribute that significantly reduces peoples' negative feelings toward the policy.

2. Corollary B. Density is equated with crowding and its negative effects, especially deprivation of privacy.
3. Corollary C. Lower income groups are more likely to accept and support a high density development policy.

4. Corollary D. Homeowners are more likely to oppose high density development in their own neighborhoods than are renters.

5. Corollary E. High density development is more readily accepted by the young and the elderly than by other age groups.

6. Corollary F. Residents will agree to the construction of low rise multi-unit complexes before highrises.

7. Corollary G. If citizens are to accept high density as a development option, they will not want to sacrifice personal auto conveniences (i.e. off-street parking and standard width streets).

2.8.0.2 Issues

1. Issue A. While opposed to high density development, residents may be more favorable toward certain types of moderate to high density housing than to others (as listed in Appendix A, Part B of the questionnaire).

2. Issue B. Among the listed advantages and disadvantages, such as greater bus convenience or less private yard space, respectively, (see Table 4, p.46), which do people feel more strongly about (relative to the other choices) and thus,
have most importance to their satisfaction with a living environment?

3. Issue C. What conveniences/advantages do citizens like most about their current living arrangements and how would their satisfaction with these elements be changed in a higher density environment?

4. Issue D. Are residents satisfied with their current living arrangements and if not, would they prefer an increase or decrease in density?

2.9 SUMMARY

Though the popular sentiment in the U.S. is one that opposes high density development, the feeling is somewhat unfounded. Psychological research and designs in many parts of the world help establish the argument that high density urban environments are workable, and may even be appealing. Current trends show that this cheaper and more energy-efficient development pattern is gaining in popularity, and it may be the most desirable course for future development. Research on high density and crowding is lacking, which justifies the need for this study. The core components of this research inquiry are itemized in a series of hypotheses about attitudes toward high density which are tested in the survey questionnaire.
Chapter III

INVESTIGATING ATTITUDES TOWARD HIGH DENSITY IN COLUMBUS: METHODOLOGY

A survey questionnaire was mailed through Mayor Tom Moody's office; funding was provided by the Columbus Department of Energy and Telecommunication. The questionnaire was designed to assess people's perceptions of high density residential arrangements. It was mailed to a sample of Columbus residents during one week in October 1982. It was anticipated that a good response rate would be induced by a) including a pre-addressed, stamped return envelope with the mailing, and b) mailing the questionnaire through the Mayor's office, with the Mayor's signature on the cover letter. Responses were analyzed using the Statistical Analysis System (SAS) computer program package.

3.1 QUESTIONNAIRE DESIGN

The mail questionnaire consists of 3 main sections (See Appendix A, Survey Questionnaire):

1. Part A: A series of 7-point bipolar rated scales were employed to assess comparison of respondents' satisfaction in their current living arrangements (No. 1) and their expectations of conditions in a perceived high density setting (No. 2).
2. Part B: 7-point bipolar scales of desirability of various high density settings were used. These included an assessment of reactions to various housing options such as duplex housing or townhouses, and the desirability of expected consequences linked to high density development such as less off-street parking or less private yard space.

3. Part C: Relevant socio-economic data and type of current housing arrangement of each respondent was elicited to allow a description of the sample and comparison of group responses.

The first section emphasized citizens' perceptions about high density. It is based on the belief that crowding and density are abstract and subjective concepts. Most of the choices that make up the bipolar scales have been tested as logical and understandable descriptors (Kasmer, 1970).

The second section identifies citizens' attitudes according to selected types of housing. According to the literature, research efforts in crowding and high density have had "... few implications for design." (Kirmeyer, 1978, p. 164). Even though researchers have been able to

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* Research such as that of Miller (1956) has established that people can make up to 7 distinctions, as on a survey questionnaire, reliably. See George Miller, "The Magical Number Seven, Plus or Minus Two," Psychological Review 63 (1956): 81-97.
identify attitudes and preferences regarding density, there remains a gap to be filled between research findings and actual buildings. Thus, this section offers respondents choices of actual building types. Though it was not possible in this research inquiry to fully describe each housing option, (i.e. showing a respondent a complete floor plan and conceptual sketch of a building), it was anticipated that respondents would have much more consistent, identifiable conceptions of popular types of housing (e.g. townhouses) than if they were only asked to describe living conditions in what they perceive to be a high density setting (Davis, 1982). The results are intended to give city policy makers and planners definite answers as to what types of housing units are more preferred by residents.

The 5 types of housing units offered as choices in the questionnaire (Part B) are standard, moderate and high density styles as well as the highrise, as defined by Dornbusch and Gelb (1977), over 14 stories high. Conceptual sketches, in addition to the verbal descriptions, were included to ensure consistent responses to these items.

Certain assumptions regarding advantages and disadvantages of high density were made in designing the survey questionnaire. These assumptions are listed in Table 4. Attitudes toward the assumed pros and cons are tested throughout Parts A and B of the survey.
TABLE 4.
Assumptions About Perceived Advantages and Disadvantages Associated With High Density

<table>
<thead>
<tr>
<th>Assumed Advantages</th>
<th>Assumed Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exciting environment</td>
<td>1. A public/busy environment (less privacy)</td>
</tr>
<tr>
<td>2. Lower rents</td>
<td>2. Unsafe environment</td>
</tr>
<tr>
<td>3. Closer work/services</td>
<td>3. Unpleasant (in general)</td>
</tr>
<tr>
<td>-heating and cooling</td>
<td>5. Run down neighborhood character</td>
</tr>
<tr>
<td>-transportation</td>
<td>6. Less private open space (yards)</td>
</tr>
<tr>
<td>5. Cheaper heating and cooling bills</td>
<td>7. Narrower streets</td>
</tr>
<tr>
<td>6. More convenient bus service</td>
<td>8. Less off-street parking</td>
</tr>
<tr>
<td>7. Greater potential for district heating system that</td>
<td>9. More interaction with neighbors (less privacy)</td>
</tr>
<tr>
<td>would reduce utility bills</td>
<td></td>
</tr>
<tr>
<td>8. More public open space</td>
<td></td>
</tr>
</tbody>
</table>

The survey and survey sampling were designed to maintain anonymity of respondents. Given this confidentiality and, given the nature of the questionnaire, the research was approved by the Ohio State University Human Subjects Review Committee.

3.1.2 **Questionnaire Shortcomings**

Any survey instrument used in social science research is likely to have some flaws, as it is almost impossible to completely guarantee consistent interpretation of a questionnaire. Weaknesses of this survey, particularly those stemming from the use of semantic differentials and factor analysis, should be pointed out in order to qualify survey results.

The semantic differential, which "... is the most widely use instrument in the study of subject responses to architectural stimuli" (Bechtel in Lang, 1974), is used to
elicit respondents' descriptions of their current neighborhood and a perceived higher density neighborhood (Part A.1 and A.2). We cannot be certain that all respondents interpret the scaled descriptors in the same way. For example, the descriptor "safe/unsafe" was intended to determine one's feelings about criminal activity, but it might also be interpreted as a question about perceived traffic safety in relation to children's neighborhood play environment. In addition, we cannot guarantee that all of the listed descriptors are completely relevant to attitudes about high density, thus the most important descriptors may have been omitted. Even though this may be the case, we are certain that the descriptors most relevant to the main hypothesis and corollaries of this study were included in the questionnaire. Finally, we cannot be sure that the adjectives used in each pair are opposites, though most of those used in this questionnaire have been research tested (Kasmer, 1970). Each of the potential flaws has implications as to the validity of the factor analysis.

Just as a chain is only as strong as its weakest link, generalizations about attitudes derived from factor analysis are only as believable as the accuracy of the descriptors that identify components of attitudes. Though factor analysis in itself has statistical shortcomings (Kim, 1978), the identified factors themselves cannot be regarded as valid if most of the differentials used to build factors were misinterpreted.
3.2 **Survey Sampling**

A sample population of 600 households* was selected through a stratified random sampling technique. First, 18 contiguous residential areas of the city were identified, encompassing all of the primarily residential neighborhoods. From the 18, 6 study areas were chosen as a representative mix of varying densities, geographic locations, and age of housing stock throughout metropolitan Columbus (see Appendix B - map of study areas). For each study area, a proportion of households was selected from the sample size of 600 that is equal to the proportion of households in the particular area as compared to the total number of households in Columbus. (See Appendix C, Proportion of Households Sampled in Study Areas). In order to obtain the desired sample number from each area, streets were randomly chosen according to the size of each area. Thus, 25 streets were chosen from the largest area, area 3, (25 was chosen as a workable, upper bound), and 14, 24, 19, 24, and 7 streets were chosen from areas 7, 9, 11, 16, and 17, respectively. (With 25 as the highest choice, the number of streets picked in the other 5 areas was based on the same population as households in that area.) Finally, a list of household ad-

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* Budgetary constraints limited the mailing to this number of households.

* Steve Gallanis and Bill Hoyt, planners with the Columbus Department of Development, were consulted when selecting study areas.
dresses corresponding to the chosen street in each area was compiled, and survey participants were selected randomly, with replacement, using a random number generator (a Texas Instrument 58-C hand calculator).

3.2.1 Response Validity

Numerous factors contribute to the credibility of any conclusions drawn from survey questionnaire results. A questionnaire that is interpreted consistently, a good response rate, and a high degree of sampling reliability are critical characteristics that contribute to accuracy.

3.2.1.1 Interpretation of Questionnaire

Judging from the number of respondents who answered the entire questionnaire and the absence of comments conveying any misunderstanding about the survey, it appears that the questionnaire was not misinterpreted. However, there is some evidence of misunderstanding of the section dealing with description of a higher density neighborhood (Part A.2.). And some survey items had significantly low response rates. Finally, we are reminded of particular limitations affecting the validity of any mail questionnaire.

It appears that respondents had more difficulty describing their feelings toward a perceived higher density neighborhood (Part A.2.), probably because of the abstractness of the concept. This was evidenced by the lower number
of responses to all but one item describing higher density (Part A.2.) as compared to items describing current neighborhood (Part A.1.) (See Appendix A). An average of 126.6 persons completed every item describing their current neighborhood (Part A.1.) whereas an average of 120.8 persons responded to every item describing higher density (Part A.2.). This 4.5 percent lower average implies a less precise understanding of the concept of high density, which was expected at the outset of this study. As one respondent commented, "I'm not too sure what 'high density' development means" which is clearly supportive of the whole claim that people do not plainly understand the concepts of high density, nor the related issue of crowdedness. In fact, the abstractness of the concept was the main reason for including Part A of the questionnaire, which gives each respondent an

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7 An equal number of responses were received for the item dealing with perception of public/privateness in the case of both current neighborhood and higher density neighborhood. (Responses totalled 125 for both A.1.f. and A.2.f.).

8 The most extreme variation occurs with the item regarding energy efficiency (item 2.1. compared with item 1.1.). Eleven less respondents were able to describe the degree of energy efficiency in heating and cooling anticipated in a higher density setting as compared to describing the degree of energy efficiency in their current neighborhood. Thus, the comparison of these two rated scales is the least valid of the 12 scales used in Part A.

9 Incidentally, this respondent's answers for Part A.2., which asked respondents to subjectively describe their notion of a high density environment using the listed descriptors, were deleted from the data used in final analysis, since the respondent indicated that he had no clear notion of the meaning of "high density."
opportunity to describe their interpretation of high density.

Other problems with response rates occurred with regard to district heating (item B.1.m.) and socio-demographic information (Part C). A particularly low response (31.8 percent) on the district heating item indicates that most respondents do not know what a district heating system is, since non-response was part of the question's design; this item was deleted from statistical comparison analyses. The non-responses in Part C might have resulted from people's reluctance to divulge what they consider private information (especially income and race). Many of the non-respondents commented to this effect on the questionnaire. The level of non-response in Part C, the highest being 5.3 percent (regarding income), is regarded as acceptable.

Aside from peculiarities of this survey sample, limitations of any survey's accuracy are affected by possible biases induced by the questionnaire itself, and responses that may differ from actual feelings about an issue.

It is possible that a respondent will answer survey questions in a manner that parallels the rest of the survey. For example, we find that many of the open-ended responses received on this questionnaire repeat issues, feelings, and even adjectives that appear elsewhere in the survey. Thus, (for example), since the survey asked respondents to describe high density in terms of crowding in one section of
the questionnaire, they may have been inclined to describe their likes or dislikes about high density also in terms of crowding.

Besides this caveat, we cannot be certain that the survey instrument properly describes the feelings of the subject under consideration. Though this questionnaire includes descriptors such as pleasantness, safety, privacy, etc., it may very well be that persons' genuine feelings involve descriptors not included in the survey. One way to address this problem would be to conduct personal interviews with subjects to learn what their original responses would be in regards to describing feelings about high density. Intuitively, we anticipate that this answer to the problem is much too costly.

3.2.1.2 Response Rate

Surveys were mailed on October 4 and 5, and the return deadline stated in the cover letter was October 15. By October 22, returns had diminished to 1 or 2 per day, thus analysis commenced.

Of the 600 items sent, 132 responses were received, and 46 were returned as wrong addresses or undeliverable, yielding an overall response rate of 23.8 percent. The timing of the mailing may have helped the response rate, since the surveys were received by respondents right before a holiday weekend (October 7 or 8), which meant an extra day off for many—extra time to complete the 10-minute question-
naire. Nevertheless, this mailing elicited a lower than average response rate,\(^{10}\) lower than expected.

3.2.1.3 Sampling Reliability

The calculation of sampling error is normally a straightforward computation when a sample is chosen by simple random sampling. In this study, which uses a stratified random sampling design, sampling error can best be estimated by evaluating the calculated sampling error according to questionnaire returns by strata. That is, if the data includes a good mix of returns from each of the chosen strata, sampling error is minimized.

Calculated sampling error, or sampling reliability, is estimated at ±6-7 percent with 95 percent confidence, (see Hill et al., 1962, in Arkin and Colton, 1963),\(^{11}\) given that the study group is the entire Columbus metropolitan population. This estimate is based on a simple random sampling technique.

The sampling reliability range of ±6-7 percent provides an estimate of the accuracy of conclusions drawn from

\(^{10}\) According to the Ohio State University Polimetrics Laboratory, the typical response rate for mail questionnaires is in the 25-40 percent range, dependent upon type of survey, degree of follow-up, and other variables.

\(^{11}\) This range was estimated, based on Table 20, p. 145 in Arkin and Colton, 1963. The Table lists sample sizes corresponding to a maximum ±5 percent only. Given the sample size, sampling fraction, and response rate of this survey, ±6-7 percent is a reasonable estimate of sampling reliability.
survey results as they apply to the entire city. For example, if a frequency count shows that 44 percent of respondents are strongly opposed to higher density in their neighborhood, we may infer that between 37 and 51 percent of Columbus residents share this attitude.

The 6 study areas sampled were selected because they represent a cross-section of Columbus population. The sample population also represents a reasonably good mix of residential densities, income ranges, races, renters and owners, and geographic locales throughout the city, (see Appendix D), according to city and census data. Having established this, we may accept the estimated sampling reliability range of ±6-7 percent as reasonably accurate.

Though a mathematically sound method of survey sampling was used in this study, and sampling reliability is relatively high, other possible biases in the results must be kept in mind. For example, responses could be biased in favor of those more vehemently opposed to high density development, since these subjects might be the first ones to volunteer their negative opinions. Also, it is possible that a particular age group, socio-economic class, etc. may have more time to answer mail questionnaires. In fact, this sample group includes a large number of elderly respondents. (See Appendix D). Theoretically, countless criticisms can be made against survey research, however these do not totally invalidate survey results.
3.3 Method of Analysis of Survey Returns

Quantitative analysis of questionnaire responses was carried out by using the Statistical Analysis System (SAS) program package.

3.3.1 Coding

Responses on each of the 7-point bipolar scales and sociodemographic information were coded directly from questionnaires. Any items that were answered vaguely were deleted from the response data. (No more than 10 deletions were made.)

In addition to coding responses, the location of each responding household was recorded (facilitated by precoding). Questionnaires were coded by census tract, by study area, and by two measures of density of the respondent's neighborhood:

1. The density of each census tract, calculated as dwelling units per acre (total acreage in census tract), derived from 1982 U.S. Census information.

2. The density of each traffic zone, calculated as households per residential acre (total acreage used for residential purposes), derived from the Mid-Ohio Regional Planning Commission (MORPC) Land Use Survey, 1980. Development density ranges were categorized as follows:
Density measures derived from the MORPC survey are regarded as the more accurate of the two density data sources for use in this study, since concentration of housing in residential neighborhoods is being examined.

Open-ended responses to the last two optional questions on the survey were not coded for computer analysis, but were instead categorized or listed with summary survey results (see Appendix A). Density measures derived from the MORPC survey are regarded as the more accurate of the two density data sources for use in this study, since concentration of housing in residential neighborhoods is being examined.

Open-ended responses to the last two optional questions on the survey were not coded for computer analysis, but were instead categorized or listed with summary survey results (see Appendix A).
3.3.2 **Statistical Analyses**

In summary, 7 main statistical analyses were run on the data. (Results of analyses are discussed in the next chapter.)

First, a simple tabulation of frequency of occurrence of all responses, including modes, and second, calculation of means, revealed typical answers for all items (presented in Appendix A). Frequency counts also help describe the sample population (see Appendix A). Inspection of mean scores enables a generalized evaluation of: the intensity of feelings in terms of listed descriptors that describe current or high density neighborhoods, and how much opposition exists toward stated high density housing types (i.e. townhouses) and residential conditions associated with higher density (i.e. less private yard space).

The third main test that was run was a non-parametric correlation test used for ordinal data, Spearman's rank order. This test was used to identify any significant relationships among pairs of variables. For example, if people perceive a high density environment as particularly unpleasant, are they also strongly opposed to losing personal auto conveniences? Do they also strongly oppose building highrises? Most of the inferences revealed by the Spearman correlation test were summarized by the factor analysis (described below), though examination of individual pairs of interrelationships also helped in understanding attitudes.
Fourth, the differences in means of respondents' description of current neighborhood, (Part A.1.), compared to respondents' description of a higher density neighborhood, (Part A.2.), were examined by one-way analysis of variance tests. This showed how peoples' perception of high density differs from perception of their current living environment. Selected items in Part B, (which asked about particular housing types and environmental conditions associated with high density), and all sociodemographic groups identified in Part C were also analyzed for differences in responses by means of analysis of variance. Since data for all variables was unbalanced, (different response totals), the SAS General Linear Models (GLM) procedure, Type IV Sum of Squares, was used to perform analyses of variances (SAS, 1979).

Fifth, the least squares means test was used to compare mean responses of the different income, age, and density groups of survey subjects. A significant difference among means revealed any difference in attitude about current or higher density residential environments that can be explained by the selected sociodemographic strata.

Sixth, differences among favorability scores for the 5 listed moderate to high density housing types were compared using the non-parametric Wilcoxon rank-sum test (equivalent to the Mann-Whitney U-test). Due to the right-tailed skewness of the responses (most of the respondents showed opposition to all of the housing types), this test
was employed to verify any attitude variation that might be explained by the degree of housing density.

Seventh, factor analysis of the sections describing current neighborhood (Part A.1.), and a perceived higher density neighborhood (Part A.2.), was used to condense responses into naturally grouped factors (descriptors). The resulting factors were compared through analysis of variance to determine how respondents' attitudes toward each of the conditions changed in terms of the listed descriptors. Though factor analysis has been heavily criticized for inaccuracy and inadequate statistical validity (Comrey, 1973), the process is recognized as useful in condensing a large number of variables into a smaller set of factors for additional analyses. The results of the factor analysis were weighed against other statistical tests, thus testing their validity.

3.4 SUMMARY

The data gathered from the survey questionnaire can be considered credible within reasonable confidence limits. Limitations of accuracy of the statistical analyses of this data are imposed by shortcomings of the questionnaire, sampling technique, and response validity.
Chapter IV
SURVEY FINDINGS

(Refer to Questionnaire with responses, Appendix A.)

The main survey finding is anything but a new revelation: Columbus citizens feel clearly negative about high density residential development, largely because it is equated with crowding, which is in keeping with the prevailing historical anti-urban bias in the U.S. (Insel and Lindgren, 1978). For example, when asked about what they like about high density development, (an optional open-ended question), roughly one-fourth of all respondents replied: "Nothing," "Very Little," or "Not Much" (see complete listing of comments in response to questionnaire, Appendix A). Responses to bipolar scales throughout the survey also showed a consistently negative attitude. This result was predictable, though the examination of the components of the attitude is the real crux of this study.

4.1 CRUCIAL FACTORS THAT EXPLAIN ATTITUDES TOWARD HIGH DENSITY: EXPLAINING THE FACTOR ANALYSIS

The results of the factor analysis of the sections of the survey dealing with description of current and higher density neighborhoods combined indicate that 4 main factors emerge to explain attitudes (See Table 6). The first of these is labelled crowdedness, comprised of significant
<table>
<thead>
<tr>
<th>Descriptor (Scale 1 - 7)</th>
<th>Current and Higher Density Environments Combined</th>
<th>Current Neighborhood</th>
<th>Higher Density Neighborhood</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>Crowdedness</td>
<td>-0.902</td>
<td>-0.034</td>
<td>0.059</td>
</tr>
<tr>
<td>Convenience/Expense</td>
<td>-0.872</td>
<td>-0.109</td>
<td>0.094</td>
</tr>
<tr>
<td>Convenience/Expense</td>
<td>0.849</td>
<td>0.128</td>
<td>-0.032</td>
</tr>
<tr>
<td>Expense (fuel)</td>
<td>-0.841</td>
<td>-0.070</td>
<td>0.071</td>
</tr>
<tr>
<td>Unsafe/Safe</td>
<td>0.791</td>
<td>0.046</td>
<td>-0.102</td>
</tr>
<tr>
<td>Private/Public</td>
<td>0.767</td>
<td>0.267</td>
<td>0.071</td>
</tr>
<tr>
<td>Housing Quality</td>
<td>0.700</td>
<td>-0.134</td>
<td>-0.031</td>
</tr>
<tr>
<td>Calm/Exciting</td>
<td>-0.035</td>
<td>0.719</td>
<td>0.159</td>
</tr>
<tr>
<td>Shopping Close/ Far</td>
<td>0.218</td>
<td>0.714</td>
<td>-0.181</td>
</tr>
<tr>
<td>Energy Efficient/Efficient</td>
<td>-0.136</td>
<td>0.158</td>
<td>0.823</td>
</tr>
<tr>
<td>Work Close/Work Far</td>
<td>0.022</td>
<td>0.353</td>
<td>-0.667</td>
</tr>
<tr>
<td>Transport/Transport</td>
<td>-0.186</td>
<td>0.075</td>
<td>0.058</td>
</tr>
<tr>
<td>Portion of Variance (before rotation)</td>
<td>0.43</td>
<td>0.11</td>
<td>0.09</td>
</tr>
</tbody>
</table>

* Significant scores underlined.

NOTE: The correlation matrix upon which the factor analysis in this study was based is available from the author.
variables with factor scores greater than 0.50: pleasantness, upkeep, spaciousness, safety, private ness, housing quality, and calmness. The second and third factors are concerned with convenience in terms of expense. The significant variables that comprise these factors are proximity to shopping and energy efficiency in heating and cooling (factor II), and rent or mortgage payment and proximity to work (factor III). Finally, factor IV is labelled expense (in regards to fuel use), and it is comprised of one variable, energy efficiency of road network. Together these four factors explain 71 percent of the variation in attitude.

Factor scores were derived for the four factors by selecting the variable with the highest loading on each—pleasant/unpleasant for factor I, shopping close/far for factor II, low/high rent for factor III, and fuel efficiency (transportation) for factor IV. Comparing the mean scores for each of these variables on the four factors for current neighborhoods versus higher density neighborhood, we find that two significant differences exist (see Table 7). First, in regards to factor I, we find that a higher density environment is considered to be less pleasant ($\bar{x}=2.90$) than respondents' current neighborhoods ($\bar{x}=5.70$, $F=210.2$, $p<0.0001$).
<table>
<thead>
<tr>
<th>Questionnaire Description (Scale 1 - 7)</th>
<th>Part A.1. Current Neighborhood (Mean)</th>
<th>Part A.2. Higher Density Neighborhood (Mean)</th>
<th>Analysis of Variance Statistics (ldf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm/Exciting</td>
<td>2.8</td>
<td>4.5</td>
<td>F=96.62,*</td>
</tr>
<tr>
<td>Run Down/Well Kept</td>
<td>5.6</td>
<td>3.3</td>
<td>F=161.9,*</td>
</tr>
<tr>
<td>Spacious/Crowded</td>
<td>3.8</td>
<td>5.6</td>
<td>F=87.30,*</td>
</tr>
<tr>
<td>Unpleasant/Pleasant</td>
<td>5.7</td>
<td>2.9</td>
<td>F=210.20,*</td>
</tr>
<tr>
<td>Unsafe/Safe</td>
<td>5.1</td>
<td>2.9</td>
<td>F=127.56,*</td>
</tr>
<tr>
<td>Private/Busy</td>
<td>4.1</td>
<td>5.6</td>
<td>F=61.37,*</td>
</tr>
<tr>
<td>High Quality Housing / Low Quality Housing</td>
<td>2.5</td>
<td>4.6</td>
<td>F=68.32,*</td>
</tr>
<tr>
<td>Roads Energy Wasteful / Roads Energy Efficient</td>
<td>4.6</td>
<td>4.1</td>
<td>F=7.84,*</td>
</tr>
<tr>
<td>Low Rent or Mortgage / High Rent or Mortgage</td>
<td>4.1</td>
<td>4.0</td>
<td>F=0.23, p 0.6296</td>
</tr>
<tr>
<td>Shopping Closeby / Shopping Far</td>
<td>2.8</td>
<td>2.8</td>
<td>F=0.06, p 0.8052</td>
</tr>
<tr>
<td>Workplace Closeby / Workplace Far</td>
<td>4.7</td>
<td>4.6</td>
<td>F=0.17, p 0.6770</td>
</tr>
<tr>
<td>Energy Efficient heating/cooling / Energy Wasted heating/cooling</td>
<td>3.9</td>
<td>3.8</td>
<td>F=0.18, p 0.6760</td>
</tr>
</tbody>
</table>

* p < 0.01
The second significant difference among means representing factors occurs with factor IV involving energy efficiency of road network. The transportation network in a perceived higher density environment is considered less fuel efficient ($\bar{X}=4.10$) than current transportation networks ($\bar{X}=4.60$, $F=7.84$, $p<0.0055$). This finding contradicts an expectation, since the potential for greater energy efficiency in transportation among high density development has been proven, (Peterson and Bateman; Harrison and Shapiro, 1979; Rickaby, 1979), and we might expect people to perceive this advantage.

For factors II and III, we find no significant differences in mean scores for the corresponding variable: shopping proximity or level or rent/mortgage. This indicates that, although people may commonly describe their environments in terms of these convenience/expense factors, they are not among the most important elements describing environments differing in density.

The examination and comparison of the separate factor analyses for current and higher density neighborhoods is also revealing (See Table 6).

Respondents describe their current neighborhoods in terms of aesthetics and cleanliness (whether it is run down or well kept), degree of safety, pleasantness, housing quality, and energy efficiency in heating and cooling. These components, which comprise factor I for the description of
current neighborhood, represent features of a neighborhood that are essential in explaining residential satisfaction. Factor I is summarized as a measure of aesthetics and quality of living environment. Since factor I picked up the highest portion of variance (0.043), it implies that the descriptors included in this factor are more important than the others in explaining variation in attitudes.

Factor II and factor IV, which include cost of rent and proximity to work, proximity to shopping and energy efficiency of the transportation system, respectively, are grouped together as a convenience/cost factor. Factor III, which includes spaciousness, calmness, and privacy descriptors, deals with the psychological feeling of crowding. The findings of the factor analysis for current neighborhood (Part A.1.) may be regarded as a type of control group for this study, as they can be used as a standard of comparison with the results of the factor analysis of the survey section concerning higher density (Part A.2.).

For the perceived high density environment, the semantic differential "spacious/crowded" has the highest factor score, followed in descending order by "unsafe/safe," "rundown/well kept," "unpleasant/pleasant," "private/public," "high or low quality housing," and last "energy efficient or wasteful." This factor, factor I, groups descriptors dealing with crowdedness and aesthetic quality. The second of 3 factors includes shopping and work proximity de-
scriptors, which suggests that convenience is the next important criterion used to describe high density. The third factor links housing quality and energy efficiency of transportation, which might be summarized explained as a cost variable that is essential in explaining attitude toward density.

By inspecting the 3 factors and corresponding factor scores describing higher density with those that describe current neighborhood, we note a definite shift of emphasis toward perception of crowding. Not only does crowdedness become the most important factor describing a higher density environment, but factor scores of the corresponding descriptors are, on the average, higher than those used to describe respondents' current neighborhoods.

As explained in Chapter II, there is properly a clear distinction between high density and crowding, yet the data reconfirms the idea that high density is misunderstood as crowding, and vice versa. The factor analysis verifies that high density is described as crowding, and responses to the open-ended questions in the survey agree. The most frequent response to the question asking about what people dislike in high density development is: "the feeling of crowding" (30 responses). (See Appendix A, questionnaire comments). Some respondents replied negatively even though they admitted they had never lived in a high density setting, and they listed reasons typically associated with neg-
ative aspects of crowding (i.e., noise, lack of privacy, etc.) that reflect what they would expect in a high density setting, not what they had experienced. Thus, peoples' subjective, open-ended responses reinforce the conclusion arrived at through factor analysis that high density is equated with crowding.

4.2 EXAMINING THE MAIN HYPOTHESIS

As was hypothesized, citizens are clearly aware of the disadvantages commonly associated with high density, (especially crowding), but they do not recognize the advantages assumed to be a result of higher density development, including the potential increase in energy efficiency. Referring back to the assumed advantages and disadvantages (Table 4, p. 46), we find that mean scores and analysis of variance in the corresponding survey items support this claim. Comparing the responses for neighborhood (Part A.1.), with a perceived higher density neighborhood (Part A.2.), statistics show that respondents evaluated their current residential environment as significantly more calm, well kept, spacious, pleasant, safe, and private (F=96.62, p<0.01; F=161.90, p<0.01; F=87.30, p<0.01; F=210.20, p<0.01; F=127.56, p<0.01; F=61.37, p<0.01; respectively). They also regard the housing in their current neighborhood as higher quality than that of a higher density area. Table 7 (p. 63), displays the means and analysis of variance statistics for each of these comparisons.
There are four variables in Part A (also displayed in Table 7) that showed no significant change in mean responses (Part A.1, current, compared to Part A.2, higher density). These include cost of rent or mortgage, proximity to work, proximity to a shopping center, and energy efficiency (heating and cooling). This confirms the claim that cheaper rent or mortgage, closer proximity to work or shopping, or greater energy efficiency are not advantages readily associated with higher density environments.

One of these findings should be explained further. A higher density environment is seen as more exciting, which agrees with one of the assumed advantages of high density (Table 4, p.46), though a higher density environment is also seen as less pleasant than current living arrangements. Thus, this added excitement is evidently not seen as desirable. In fact the Spearman Correlation between pleasantness and excitement is significant and inverse (C=-0.27, p<0.01).

Also, it should be noted that among respondents who perceive higher density to be less safe, lower income citizens (less than $15,000 household income per year), regard higher density as more unsafe (X=2.20, n=25) than do higher income citizens (X=3.08, n=94) (least squares means statistics: standard error=0.43, p<0.015). All of the significant relationships between variables describing current and higher density environment support the main hypothe-
sis that Columbus residents recognize the disadvantages commonly associated with high density residential development, but they do not readily associate high density with its potential advantages.

Evidence about attitudes toward assumed advantages and disadvantages also appears in responses to Part B of the questionnaire, dealing with conditions associated with high density neighborhoods. (See Appendix A, p. 116). Judging from mean scores, we can see that respondents clearly oppose sacrificing private yard space ($\bar{x}=5.3$, $n=131$), or giving up wide streets ($\bar{x}=6.0$, $n=131$) and off-street parking ($\bar{x}=5.3$, $n=131$) in order to accommodate higher densities. In addition to supporting the main hypothesis, this evidence also supports the assumption that residents are not willing to give up auto conveniences for higher density. Means also show indifference toward the question dealing with increased interaction with neighbors ($\bar{x}=3.9$, $n=130$), slight opposition to living closer to a shopping center ($\bar{x}=4.7$, $n=131$), and slight support for greater bus convenience ($\bar{x}=3.3$, $n=126$). Indifference toward increased neighbor interaction suggests that respondents are not clearly opposed to this possible consequence of higher density, they do not regard it as an advantage either. The support of greater bus convenience is one of two items that shows some departure from the main hypothesis. Bus convenience was regarded as a convenience people would enjoy in a higher density setting, and these
results suggest that they do recognize this condition as an advantage. Older aged respondents, 60 or older, are particularly more in favor of high density if better bus convenience is ensured ($\bar{x}=2.41$, $n=27$) than respondents in the two lowest age groups, younger than 30 and 30-44 ($\bar{x}=3.46$, $n=24$ and $\bar{x}=4.14$, $n=36$, respectively) (least squares means statistics: standard error = 0.43 and 0.32, respectively; $p<0.01$ in both cases). Finally, it is clear from the mean response that people would support high density if it could guarantee cheaper heating and cooling bills ($\bar{x}=2.4$, $n=129$). And older aged respondents, older than 60, show particular concern for utility bills, as they are significantly more supportive of a high density policy that could lower energy expenses ($\bar{x}=1.69$, $n=29$) than respondents in the two lowest age groups, younger than 30 and 30-44 ($\bar{x}=2.75$, $n=24$ and $\bar{x}=2.89$, $n=37$, respectively) (least squares means statistics: standard error = 0.49 and 0.36, respectively; $p<0.01$ in both cases). However, we cannot claim that respondents, including the elderly, perceive this as an advantage linked to high density, simply that they would be more inclined to live with high density conditions if this could guarantee a lesser burden on their utility bill budgets. Finally, it was assumed that the increased feasibility for a district heating system is an advantage associated with higher density residential development. An answer to this claim is not discernible from the results to this study, as too few re-
responses to this item (Part B.1.m.) were received (n=42, 68.2 percent non-response), indicating that most of the citizens are uneducated about the concept.

Increased energy efficiency, one of the primary concerns of this study, is not readily associated with high density. This conclusion is supported throughout the survey. Not only are citizens not informed about a district heating system, they do not regard energy as an important issue in explaining high density, as evidenced by the factor analysis. The factor scores for energy-related differentials in Part A of the questionnaire (see Table 6, items 8-12) are not significant compared to the other descriptors. Only the "energy/wastefulness" item is grouped with factor I components (for current and for higher density neighborhoods). At least some recognition of this attribute is evident, as 4 open-ended responses acknowledge some potential for energy efficiency (see Appendix A, comments). If higher density is to be promoted, it cannot be "sold" on the sole premise that it stands to increase efficiency of energy use.

Three corollaries tested in this study must also be addressed. First, it was expected that renters would be more likely to support high density development than would homeowners (Corollary D). No conclusive evidence to this effect can be found in the data. Only one relationship was found that would begin to support this claim. This relationship approached significance: Renters perceive a high
density environment as more exciting (\(\bar{X}=5.0\)), than do owners (\(\bar{X}=4.29\)) (\(F=3.70, df=1, p<0.057\)).

Second, it was expected that high density would be more readily accepted by the young and the elderly (Corollary E). The elderly (older than 60) more strongly favor a high density development policy if heating and cooling bills are kept lower, and if greater bus convenience is ensured (as presented above), but no statistically significant differences for younger age groups exist. And, the elderly (older than 60) perceive shopping to be less convenient (farther away) in a higher density setting (\(\bar{X}=3.08, n=26\)) than respondents in a lower age group, 45-60 years old (\(\bar{X}=2.30, n=30\)) (least squares means statistics: standard error=0.36, p<0.01). This might be seen as non-supportive of a high density policy. No evidence in the data strongly supports Corollary E.

Third, Corollary C purports that lower income groups are more likely to accept and support a high density development policy. An examination of lower income groups' pleasantness scores for high density compared to higher income groups' scores shows no significant differences, and no other data throughout the survey supports this corollary.

Perception of whether an environment is run down or well kept differs according to income group. Respondents with higher incomes (household incomes $35,000 or more) are those who regard both their current and a perceived higher
density neighborhood as more well kept ($\bar{x}=6.03$, $n=38$; $\bar{x}=3.42$, $n=36$; respectively) than lower income respondents ($\bar{z}=5.31$, $n=26$; $\bar{x}=3.29$, $n=82$) (least squares means statistics: standard error=0.27, 0.39; $p<0.059$ and $p<0.017$, respectively). The data shows no other definite attitudinal relationships that can be explained by income differences.

Overall, it has been shown that high density is not readily associated with the advantages that supporters use to promote it. To the contrary, the disadvantages are readily perceived. It is inferred from these and other negative findings that citizens are not willing to support a policy of increasing residential densities in Columbus as hypothesized.

4.3 **Desirable Higher Density Housing Types**

As for desirable high density housing types, response frequencies show that the majority of respondents are at least moderately opposed to all of the choices given (see Appendix A, questionnaire, Part B, items 1.a.-1.e.), and the modal response in every case is "strongly against." The most appealing of the housing choices given is the lowest density option, single-family attached. The data also shows that opposition to high density housing is a function of the

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12 Survey age ranges were re-grouped for analysis purposes. Age groups were condensed into 4 ranges: younger than 29 ($n=24$), 30-44 ($n=41$), 45-59 ($n=35$), and 60 or older ($n=30$). Re-categorized in this manner, each group contains an approximately equal and large enough number of observations to enable valid statistical comparison.
external density of one's current living arrangement, and it may be linked to personal income level.

For analysis, the housing types tested in the questionnaire were ranked from lowest to highest density as follows:

TABLE 8.
Ranking of Housing Types by Density

1. Single-Family Attached  
2. Duplex  
3. Townhouse  
4. Lowrise Apartment  
5. Highrise

Lowest Density

Considering this ranking, mean scores show that respondents' opposition to high density increases with each successively higher density housing type. Mean scores increase sequentially, showing more opposition, in each case, for single-family attached, duplex, townhouse, lowrise apartment, and highrise housing, respectively. The Wilcoxon rank-sum test was used to test for significant differences in favorability scores for the 5 housing types. The results, displayed in Table 9, show that attitudes toward each of the housing types are distinct, (since nearly all of the favorability scores differ significantly), and thus, that opposition to the listed housing types increases with density.
<table>
<thead>
<tr>
<th>Housing Type</th>
<th>Mean</th>
<th>n</th>
<th>Wilcoxon Rank-Sum Test Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Higher mean indicates stronger opposition)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. S-F Attached</td>
<td>5.15</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>2. Duplex</td>
<td>5.37</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>3. Townhouse</td>
<td>5.74</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>4. Lowrise Apartment</td>
<td>6.39</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>5. Highrise</td>
<td>6.47</td>
<td>131</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Housing Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. S-F Attached</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Duplex</td>
<td>Z=-0.891</td>
<td>p&lt;0.373</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Townhouse</td>
<td>Z=-2.453</td>
<td>*</td>
<td>Z=-1.567</td>
<td>p&lt;0.118</td>
<td>-</td>
</tr>
<tr>
<td>4. Lowrise Apartment</td>
<td>Z=-5.790</td>
<td>***</td>
<td>Z=-4.945</td>
<td>***</td>
<td>Z=-3.712</td>
</tr>
<tr>
<td>5. Highrise</td>
<td>Z=-6.471</td>
<td>***</td>
<td>Z=-5.666</td>
<td>***</td>
<td>Z=-4.627</td>
</tr>
</tbody>
</table>

* p<0.05  
** p<0.01  
*** p<0.001
Responses also show that the lowest density housing option presented in the survey, single-family attached housing, is the most desirable, (though even it is generally opposed). We can conclude that Corollary F, which hypothesized that citizens favor low rise housing types before highrisers, is supported by these data.

Responses also suggest that opposition to the listed higher density housing types is a function of personal income. Respondents' combined income ranges were re-grouped into 3 categories for analysis: less than $15,000 (n=24; $15,000-34,999 (n=62); and $35,000 or more (n=39). A simple inspection of means in Table 10 shows that respondents in the higher income group showed the most opposition to all of the housing types.

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Housing Type (Mean Response)</th>
<th>Single-Family Attached</th>
<th>Duplex</th>
<th>Townhouse</th>
<th>Lowrise Apartment</th>
<th>Highrise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $15,000</td>
<td></td>
<td>4.86</td>
<td>5.11</td>
<td>5.96</td>
<td>6.21</td>
<td>6.50</td>
</tr>
<tr>
<td>$15,000-$34,999</td>
<td></td>
<td>5.94</td>
<td>5.05</td>
<td>5.55</td>
<td>6.40</td>
<td>6.29</td>
</tr>
<tr>
<td>$35,000 or more</td>
<td></td>
<td>5.73</td>
<td>5.86</td>
<td>6.15</td>
<td>6.51</td>
<td>6.65</td>
</tr>
</tbody>
</table>
However, a least squares means test revealed that two significant differences occurred in mean responses about preferred housing types by income: The mean responses for the highest income group compared with the middle income group for townhouse and duplex housing ($\bar{x} = 6.16, n=37; \bar{x} = 5.86, n=37$; and $\bar{x} = 5.55, n=58; \bar{x} = 5.05, n=57$; respectively) differed significantly (least squares means statistics: standard error = 0.32, 0.38, respectively; $p < 0.05$ for both).

The evidence of opposition to high density housing is in keeping with the general negativism toward high density development shown throughout this survey.

4.4 **ATTITUDES TOWARD HIGH DENSITY BY DENSITY OF CURRENT LIVING ARRANGEMENT**

The previous sections examined attitudes of citizens: in this section, effects of living under different density conditions are examined. The data was classified according to the density of a respondent's current living arrangement. This allowed a comparison of attitudes about high density of those living in both high and low density settings. Responses show that residential satisfaction is significantly linked to the density of one's current neighborhood: people who live in lower density areas as compared to higher density areas are more strongly opposed to high density.
Before presenting statistical evidence about attitudes of respondents living in areas with similar residential densities, it is crucial to understand the method of classification of survey subjects by density. As explained in the survey coding section (see Table 5, p. 56), survey responses were pre-coded according to density levels as calculated from census data and from the 1980 MORPC Land Use survey. Conclusions presented here are based primarily on densities as derived from the MORPC survey, which is in keeping with the design of the study and with previous researchers' prescriptions, since the MORPC density data is based on population density per residential acre, a more precise measure of the density of living area than simply population per acre (which includes acreage used for purposes other than residential). Conclusions founded on this density measure are based on the assumption that one's attitudes about density are most affected by the degree of concentration of one's immediate neighborhood, not so much the overall density of a larger region, the census tract.

Keeping this distinction between density measures in mind, consider the results of the questionnaire: after re-grouping data into only 2 density levels, high and low, significant differences in responses emerged, but mainly for those classified according to the MORPC survey. For further clarification, see Table 11.
### TABLE 11.
**Significant Differences in Mean Responses by Density Classification**

<table>
<thead>
<tr>
<th>Density Re-classification</th>
<th>Number of Measures Which Showed Significant Differences in Means&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>MORPC (Households per residential acre)</td>
<td></td>
</tr>
<tr>
<td>High 8+</td>
<td>18</td>
</tr>
<tr>
<td>n=51</td>
<td></td>
</tr>
<tr>
<td>Low 0-7.99</td>
<td></td>
</tr>
<tr>
<td>n=81</td>
<td></td>
</tr>
<tr>
<td>Census (Dwelling units per acre)</td>
<td>5</td>
</tr>
<tr>
<td>High 10+</td>
<td></td>
</tr>
<tr>
<td>n=67</td>
<td></td>
</tr>
<tr>
<td>Low 0-9.99</td>
<td></td>
</tr>
<tr>
<td>n=65</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Significant differences as determined by analysis of variance statistics.

Among the statistically significant differences that emerged for both density measures in relation to the same variable, 2 of the inferred conclusions were in agreement, while 2 were contradictory. The findings of these significant relationships are presented below. This study treats the conclusions based on MORPC survey data as reliable, while significant findings based on census data are included for comparison purposes.

Primarily, we find that residents of lower density areas show more opposition to high density. Either the lowest or the lower density respondent group (0-3.99 or 0-7.99 households per residential acre, respectively) showed a.) significantly greater satisfaction with their current living arrangement; or b.) significantly more opposition to residential conditions associated with higher density.

To begin with, we find that persons living at lower densities as classified by both MORPC and census data tend
to be paying more rent or mortgage, but they are also more satisfied with their current neighborhoods. Lower density residents are paying roughly $400.00 per month rent or mortgage, while the higher density group is paying closer to $300.00 per month (F=3.63, p<0.059; and F=4.34, p<0.039, for M0kPC and census data, respectively). Evidence of greater neighborhood satisfaction is shown by comparing mean scores of the 2 density groups on survey items dealing with description of current living environment. Lower density respondents (0-7.99 households/residential acre) perceive their neighborhoods as more safe, spacious, pleasant, well kept, calm, and private than do respondents living at higher densities (8 or more households/residential acre). Means and statistics that prove this conclusions are displayed in Table 12.
TABLE 12.
Significant Differences in Description of Current Neighborhood:
Low Density Compared to High Density Respondents

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Lower Density&lt;sup&gt;a&lt;/sup&gt; Mean Response (n=81)</th>
<th>Higher Density&lt;sup&gt;b&lt;/sup&gt; Mean Response (n=51)</th>
<th>Analysis of Variance Statistics (1 df)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe/Safe</td>
<td>5.32</td>
<td>4.66</td>
<td>F = 8.52 **</td>
</tr>
<tr>
<td>Spacious/Crowded</td>
<td>3.39</td>
<td>4.41</td>
<td>F = 9.78 **</td>
</tr>
<tr>
<td>Unpleasant/Pleasant</td>
<td>6.04</td>
<td>5.14</td>
<td>F = 13.09 **</td>
</tr>
<tr>
<td>Run down/Well kept</td>
<td>4.94</td>
<td>5.94</td>
<td>F = 20.70 **</td>
</tr>
<tr>
<td>Calm/Exciting</td>
<td>2.34</td>
<td>3.46</td>
<td>F = 20.62 **</td>
</tr>
<tr>
<td>Private/Busy</td>
<td>3.68&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.48&lt;sup&gt;d&lt;/sup&gt;</td>
<td>F = 3.97 *</td>
</tr>
</tbody>
</table>

**<sup>p < 0.01</sup>  
*<sup>p < 0.05</sup>

<sup>a</sup> Based on MORPC survey density calculation, 0-7.99 households/residential acre.

<sup>b</sup> Based on MORPC survey density calculation, 8 or more households/residential acre.

<sup>c</sup> Based on census density calculation, 0-9.99 dwelling units/acre, n=65.

<sup>d</sup> Based on census density calculation, 10 or more dwelling units/acre, n=67.
These data provide a partial answer to Issue D, which this study set out to answer, which asks "Are residents satisfied with their current living arrangements and if not, are they more willing to move to a higher or lower density area?" The survey shows that the majority of the whole sample group (73.7 percent) regard their current neighborhood as pleasant, scoring either a "6" or "7" on the "Unpleasant/Pleasant" differential (see Appendix A, Part A, item 1.d.). Within this group, it has been shown that the lower density respondents are even more content with their neighborhoods than the higher density subjects. It is inferred that lower density is preferred, though we cannot conclude that respondents living in higher density areas necessarily want to move to lower density areas.

It has already been shown that respondents are opposed to high density housing options. Lower density respondents also showed significantly stronger opposition to both higher density housing types and to losing private yard space. Means and test statistics based on both MORPC and census density classifications are displayed in Table 13.
<table>
<thead>
<tr>
<th>Lower Density Group Opposition To:</th>
<th>Lower Density Mean Response</th>
<th>Higher Density Mean Response</th>
<th>Least Squares Means or Analysis of Variance Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>highrises</td>
<td>6.67&lt;sup&gt;b&lt;/sup&gt; 6.93&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.42&lt;sup&gt;b&lt;/sup&gt; 6.40&lt;sup&gt;c&lt;/sup&gt;</td>
<td>*&lt;sup&gt;b&lt;/sup&gt; *&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>townhouses</td>
<td>6.27</td>
<td>5.66</td>
<td>*&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>duplexes</td>
<td>5.64</td>
<td>4.94</td>
<td>F = 4.11 *</td>
</tr>
<tr>
<td>low-rise apartments</td>
<td>6.59&lt;sup&gt;e&lt;/sup&gt;</td>
<td>6.19&lt;sup&gt;e&lt;/sup&gt;</td>
<td>F = 4.48 *</td>
</tr>
<tr>
<td>single-family attached</td>
<td>6.07&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5.03&lt;sup&gt;c&lt;/sup&gt;</td>
<td>*</td>
</tr>
<tr>
<td>loss of private yard space</td>
<td>5.60&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5.26&lt;sup&gt;c&lt;/sup&gt;</td>
<td>*&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**p < 0.01  
*a p < 0.05  

<sup>a</sup> Computed based on MORPC density classifications and ANOVA test for significance unless otherwise noted.  
<sup>b</sup> Based on census density calculation of lowest density group, 1-4.99 d.u./acre. Higher density group = 5 or more d.u./acre. p obtained from least squares means test.  
<sup>c</sup> Based on MORPC density calculation of lowest density group, 0-3.99 households/residential acre. Higher density group = 4 or more households/residential acre. p obtained from least squares means test.  
<sup>d</sup> p obtained from least squares means test.  
<sup>e</sup> Based on census density calculation of density groups, low = 0-5.99 d.u./acre, high = 10 or more d.u./acre.
These data show consistently stronger opposition to higher density options from the lower density sample group. Though these data demonstrate that lower density residents are generally more opposed to high density, this is not wholly in keeping with the overall negativism of the survey results. We might expect higher density residents to be more opposed to high density, since they are theoretically being exposed to its supposed ills. This hypothesis and supportive results lend some validity to the claim that high density per se is not deleterious or undesirable.

Two other differences among the responses from lower and higher density area residents must be noted. Mean responses indicate that higher density residents perceive their current neighborhoods to be more energy efficient ($\bar{X}=4.31$), and they also perceive a higher density environment to be more exciting ($\bar{X}=4.84$, than do the lower density group ($\bar{X}=3.63$, $F=6.57$, $p<0.012$, and $\bar{X}=4.25$, $F=3.99$, $p<0.048$, respectively). These findings are contrary to the general survey results and to the proof of the main hypothesis, showing that there is some recognition of the assumed attributes associated with higher density, namely energy efficiency in heating and cooling and excitement of environment.
4.4.1. **Validity of Density Classification System**

Three inconsistent relationships and two contradictory findings cast some uncertainty on all conclusions about high and low density residents' attitudes, and thus casts some uncertainty on the validity of the density classification system used in this study.

4.4.1.1 **Inconsistencies**

First, we would expect higher density residents to live in poorer quality housing if the assumption is correct that higher density usually means poorer quality construction. However, mean responses show that higher density residents perceive their current housing to be of better quality (X̄=3.33) than lower density residents (X̄=2.58, F=6.44, p<0.012).

Second, we would expect higher density residents to favor improved bus convenience, since they are theoretically the ones who are already enjoying the conveniences of mass transit and would recognize an opportunity for more benefit. Yet means show that higher density residents are more opposed to an increase in densities if it means better bus service (X̄=3.69) than lower density residents (X̄=3.12, F=5.52, p<0.020).

Third, it was expected that lower density residents would judge their workplace to be closer to their residence in a higher density setting. But the results show the oppo-
site: Lower density residents perceive proximity to workplace to be worse in a higher density setting (i.e., home would be farther from workplace) (\(\bar{x}=4.06\)) than higher density residents (\(\bar{x}=4.20\), \(F=5.05\), \(p<0.027\)).

4.4.1.2 Contradictions

First, the lower density group, as classified by MORPC data, showed stronger support for a high density development policy (\(\bar{x}=2.23\)) if it meant lower utility bills than the higher density group (\(\bar{x}=2.59\), \(F=4.36\), \(p<0.039\)). To the contrary, the higher density group, as classified by census data, also showed stronger support for a high density development policy (\(\bar{x}=2.17\)) if it meant lower utility bills than the lower density group (\(\bar{x}=2.57\), \(F=4.77\), \(p<0.031\)).

Second, the higher density group, classified by MORPC data, more strongly opposes the loss of off-street parking linked with higher density development (\(\bar{x}=5.64\)), than the lower density group (\(\bar{x}=5.10\), \(F=6.19\), \(p<0.014\)). But the lower density group, as classified by census data, more strongly opposes the loss of off-street parking (\(\bar{x}=5.45\)), as compared to the higher density group (\(\bar{x}=5.17\), \(F=4.01\), \(p<0.048\)).

According to statistical probability, all of the inconsistencies and contradictions noted above are at least marginally significant. However, the conclusions based on these data are ambiguous, suggesting that the density classification system used in this study is imprecise.
4.5 **HIGH DENSITY ATTITUDE BY HOUSEHOLD (INTERNAL) DENSITY**

Differences in attitude among respondents living at different internal densities are evident, but only for 2 variables. There is some evidence to support the claim that residents tend to regard their neighborhood as more exciting as internal density increases (as more people are added to a household). The number of persons living in each household was recorded from Part C, item 5, and then re-grouped for analysis into 3 groups: 1, 2, and 3 or more persons per household. Among these groups, statistics suggest that the most dense group perceives their current environment as more exciting ($\bar{x}=2.85$, n=52) than the least dense (1 person households) ($\bar{x}=2.36$, n=21) (least squares means statistics: standard error=0.287, p<0.056). Also, we find that respondents from one person households regard a higher density setting to be more crowded ($\bar{x}=6.13$, n=24) than respondents in 3 or more person households ($\bar{x}=5.17$, n=36) (least squares means statistics: standard error=0.395, p<0.040). Though this study does not focus on internal densities, it is relevant to note the interrelationship between external and internal densities, as has emerged in these 2 cases.
4.6 **Summary**

The purpose of this chapter is to present questionnaire findings in numerical form in order to offer conclusions to answer the questions raised by the main hypothesis, corollaries, and issues (listed in Chapter II). Briefly, we find that consistent evidence of negativism toward high density proves the main hypothesis, showing that citizens of Columbus oppose city policy of attempting to increase residential density. The concluding chapter offers explanations about these findings, discusses the concept of higher residential density in the context of political theory, and speculates about trends of increasing density despite popular attitude.
Chapter V

INTERPRETING ATTITUDES TOWARD HIGHER DENSITY: CAN WE INCREASE URBAN DENSITY AGAINST POPULAR DESIRE?

How can the city of Columbus expect to promote a policy of increasing densities amidst such widespread opposition? And, how can the City Energy Department expect to "sell" the policy on the grounds that it stands to conserve energy? First, we must recognize that this development option cannot be regarded only as a policy advocated by public officials, but it is a natural answer to free market forces as well. As the belt of economic prosperity tightens, the composition of urban form is being affected: efficiency and intensity of land use is necessitated. Energy efficiency goes hand-in-hand with this movement, as construction costs, maintenance and heating and cooling requirements, and transportation needs can all be satisfied more economically in a condensed urban form. 13 Optimizing energy use logically results in economic advantage, which is especially recognizable in these times of soaring utility bills.

13 However, as explained earlier, high density should not be regarded as a "cure all" for economic hardship and energy wastefulness. Luxurious highrises are sometimes accessible only to the wealthy. And energy efficiency is sometimes facilitated by a lowrise, dispersed development form, such as that suitable for solar access. (See also Harrison and Shapiro, 1979; Argonne, 1979).
However, economic attractiveness may not be sufficient impetus for acceptance in the American culture in regards to an issue such as higher development densities. The "carrot" of higher development density includes economic advantages, and public, or commonly shared advantages such as public open space, better bus service, or a more lively, animated living atmosphere—amenities that require communal cooperation and offer benefits for the majority. The "stick" of this development policy is that it threatens private luxuries such as personal auto conveniences or privately-owned land, and it is readily linked with overcrowded, low quality residential environments. Stone, et al. (1979) warns us, based on historical precedence regarding urban planning:

... let a land-use plan ... (emerge in an American city that threatens) ... privacy and a political battle will ensue that knows no boundaries ... land-use controversies are not rooted just in economics; sometimes ... (societal values are the commanding influence). (p. 267).

This chapter offers explanations for the findings of the survey which revolve around one underlying dichotomous theme: Acceptance of a high density policy is contingent upon perception of public versus private advantage. It delves further into the societal and political inferences of popular attitude and identifies crucial areas to be addressed if the policy is to become more acceptable. Also, areas in need of further research are named, and an urban environment is explored that might result from universal acceptance of higher density: the urban megastructure.
5.1 **EXPLAINING QUESTIONNAIRE FINDINGS**

The prevailing negativism toward high density development in Columbus is grounded in American societal values tied to fear of deprivation of private conveniences. These values lead to perceptions about high density that are explained by outdated research findings and historical anti-urban bias; but the real crux of the explanation is imbedded in sociopolitical ideology.

The findings of this questionnaire verify that people commonly perceive high density to be overcrowded, unsafe, overly busy, run down, less private, and less convenient for auto use as compared to a more dispersed style of development. This envisioned "rabbit warren existence" (as one respondent put it) is also still linked by some to pathologies such as "... an increase in blood pressure and mental fatigue" (respondent comment), and increased drug use (see comments, Appendix A). Thus, we find that, among Columbus residents, many problems are still associated with high density and crowding, as has traditionally been the case.

Earlier, findings of research such as Calhoun's (1962) and later sociological studies were cited as major reasons for much of today's fear of high density (see Chapter II). Aggression and pathology were once convincingly linked to high density, but we must be reminded that these conclusions were based primarily on animal studies, thus
limiting the transferability of conclusions to man because of human adaptability. Since the seminal works, more recent professional psychological opinion and research verifies that high density in itself is not the cause of problems typical of crowded environments (Lawrence, 1974; Stokols, 1972; Freedman, 1975; Marans, 1975).

Of course the majority of the public-at-large would probably not cite past research as the reason for their negativism. Rather, a long history of anti-urban and thus, anti-high density bias pervades American societal values. From Jefferson's agrarian ideal to Reagan's renewal of the Great American Dream, the goal of the average American has been to own a private home with adjoining yard. This goal has been supported by Federal subsidies in the form of Veteran's Administration and Federal Housing Authority loans, tax deductions, and mortgage and banking laws to the extent that makes us wonder whether values or federal dollars proliferate a low density development pattern. It appears that values are the primary cause, since the American society obviously supports the expenditure of public finds and the provision of public assistance to these ends.
5.1.1 **American Sociopolitical Ideology and High Density**

Privatism. Americans are said to possess a "... passion for privatism ... " (Stone, et al., 1979). Given this disposition, opposition to high density is understandable. The attractive features of high density (presented in Table 3 as "Assumed Advantages") primarily involve public advantages. In a free market, capitalistic, private society, personal sacrifice for the common good often goes no further than personal income tax write-offs for charitable contributions. The "every man for himself" philosophy is proliferated by promoting competition, and comfort is sought in residential environments through homogeneity and an "... insistence to choose one's neighbors ... " (Stone, et al., 1979).

The listed advantages (Table 4) offer conveniences for individuals, but they require a collective commitment: the acceptance of high density. All can share in the convenience of better mass transit, parks, or the potential financial advantage of lower rents (Meister, 1982; U.S. Department of Housing and Urban Development, 1981), but these may require the sacrifice of private yard space or an actual commitment to be an understanding and supportive neighbor--sacrifices that are seemingly seen as overly burdensome by most. Respondents in this survey were clearly opposed to high density if it would mean substituting public open space for their private land. People also feel that their privacy
is threatened by having to interact and cooperate more with neighbors in order to make high density environments livable. Indeed, Americans pride in strong community consciousness and public service. How willing are people, really, to give of themselves to these ends?

Of course, the elements referred to throughout this study as advantages are not absolute conveniences. Most, such as improved energy efficiency in transportation or heating and cooling, or closer proximity to employment and services have been research tested as advantageous (Peterson and Bateman; Harrison and Shapiro, 1979; Rickaby, 1979; Steadman, 1979). And logically, we can argue that the compact city is the more efficient city (see also Dantzig and Saaty, 1973), making many functions such as face-to-face communications more economical and convenient in addition to those advantages considered above.14 But, we must realize that these named advantages are not universally recognized as such. Concentration of development can mean congestion or confusion that could also be tied, for example, to more costly construction or more energy intensive heating or cooling requirements, in addition to the listed disadvantages that deprive private luxuries. And, as identified by lower density respondents in the survey, proximity to work could be worsened

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14 Dantzig and Saaty also argue that the compact city makes efficient use of space (building in a 3-dimensional style and thus getting optimal use out of each square foot of land) and of time (constant activity would smooth out peak urban rush periods, thus making full use of the 24-hour day).
if consistent planning policy were not observed under a high density scheme. That is, the density of certain residential areas may be high, but they may be inconveniently located, distant from employment and services. Regardless of potential flaws, the policy of increasing densities is being more frequently adopted by urban areas, evidently on the grounds that public advantage at the expense of some private liberties is worthwhile. The history of zoning policy exemplifies this trend, as land use is nearly always upgraded or intensified by zoning amendment; rarely is it downgraded (Stone, et al., 1979).

Wouldn't this mean that the public interest is beginning to prevail over individual rights? Doesn't this appeal to the masses even smack of socialist thought? Two respondents clearly recognize this interpretation, one pointing out that

The theoretical rationale (behind high density development) appears to be based on "community advantage" . . . at the expense of individual freedom and space,

and another even calling the survey " . . . communist (emphasis mine) in concept." Evidence here is clear that acceptance of high density development borders on one's whole political/ ideological outlook, not only the supposed merits of the policy.

Political implications of increasing densities might be overlooked in favor of good sense: maximizing benefit
through collective cooperation defines synergism. R. Buckminster Fuller, an advocate and originator of this philosophy as a school of thought that can provide answers to contemporary problems, might argue in favor of high density development in an apolitical manner: "It creates an atmosphere of an 'everybody wins situation.'"

Fuller may argue in his self-proclaimed apolitical manner, though the issue itself is political and value laden by its very nature. High density housing has historically been treated as a development policy reserved for the poor, and normally has been an inadequate answer to these housing needs. Pruitt Igoe, as mentioned earlier, and countless other low income "projects" during the 1960's provided very visible evidence that high density housing seemed to be an inherent failure labelled as a slum. Evidence that this image has lingered appears in this survey. One respondent observes that high density housing is "... usually provided for low income with tax dollars, therefore pride and concern (for upkeep) are absent." Another respondent comments that high density is "... mostly developed by the wealthy people, and done most often to very poor standards for the lower classes of people--lower middle class on down." Finally, a respondent attests to the class-differentiated style of urban development that currently exists: "... All Black and poor to middle income White neighborhoods are too dense right NOW! (sic)" Class distinctions as defined in indus-
trialized societies are at least as old as Marxist theory. As this survey showed, higher income groups are typically more opposed to higher density. Advocacy of the policy of promoting higher development densities must involve appeasement of negativism from the higher socioeconomic classes.

Evidence in this survey of attitudinal differences about high density by socioeconomic class was not clear-cut, but some findings are in agreement with this theory. Higher income respondents are incrementally more opposed to each higher density housing choice, though they also perceive a higher density environment to be more well kept than the lower income group. The lower income sample group perceives high density to be less safe, and there is no significant statistical evidence that shows lower income persons to be more accepting of a higher density environment than higher income respondents. Higher income persons evidently have higher expectations of a higher density environment than do lower income respondents, though neither group is particularly partial toward high density.

Housing renters, (typically of a lower socioeconomic class than housing owners), were expected to more readily accept a high density housing policy. No supportive statistics emerged to support this hypothesis.

Those currently living at lower external densities, primarily the higher income group paying more rent or mortgage, are significantly more satisfied with their current
living arrangement and they are more opposed to a higher density environment than those living at higher densities. Attitudes of those living at lower *internal* densities are in agreement, as this group anticipates higher density to be more crowded than do higher density respondents. These findings are contrary to expectations. We might expect that higher density residents would be more opposed to increasing densities, since they are supposedly being exposed to its ills. Two explanations might be offered for the above findings. First, we can hypothesize that higher density residents are not being subjected to the problems supposedly linked to crowding, and are thus not as opposed to increasing densities as the lower density sample. Second, we may surmise that lower density respondents (higher income) have higher expectations of a high density environment than higher density, envisioning, for example, a plush highrise apartment or condominium instead of a low rent public housing apartment project.

Actually, higher density respondents show some recognition of potential advantages of higher densities. Respondents living at higher external densities perceive their current environment to be more energy efficient than those living at lower densities. The fact that higher density residents are not significantly more opposed to increasing densities offers some encouragement for the successful implementation of this policy.
Attitudes toward high density may be related to broader values, such as political leanings. Though this study does not delve into conclusions about political partisanship relative to attitude toward higher density, it is very likely that the political composition of Columbus area residents contributes to negative feelings about an increase in density. Without trying to label the Columbus areas as typically liberal or typically conservative, we can speculate that partisan sociopolitical values would affect a group's acceptance of higher development density. Examination of this theory calls for further research.

5.1.2 High Density and Age Groups

The young are typically unmarried and desire social interaction. The elderly may desire social interaction, but also are usually more dependent upon community services because of their fixed income. Thus, we expect the young, less than 25, and the elderly, older than 60, would be more accepting of high density. Only meager support of this theory emerged in the data. The elderly were more supportive of a high density policy if it could guarantee lower utility bills and better bus service, but they also perceived shopping as being farther away in a higher density setting. These attitudes demonstrate concern for personal economic security and convenience. If high density can ac-
tually offer these advantages, it will be easily accepted, especially among the elderly.

5.2 PROMOTION OF HIGH DENSITY POLICY: DEMAND FOR FUNCTIONAL DESIGN

A study entitled The Affordable Community, initiated by the U.S. Department of Housing and Urban Development and organized in March 1980 by the Urban Land Institute recommends "... that expanding suburbs, central cities, and small towns be developed in more compact forms." (p. 31). This policy study compiled by the Council on Development Choices for the '80's, (co-chaired by Columbus Mayor Tom Moody), represents bi-partisan agreement among public and private sector leaders across the U.S. The study concludes:

Compact housing does not mean crowding or discomfort; well-designed, (emphasis mine) it offers privacy, ample room, open spaces, and amenities. Above all, greater compactness offers more choices of living arrangements, and the opportunity for cost savings.

The acceptance of this policy is contingent on good design of compact urban form, an immense challenge. The attitudes and preferences of Columbus citizens help determine crucial issues to be addressed by designers.

Even some respondents recognize the necessity of good planning and design for cities in general and high density areas in particular. One citizen observes that there is "little planning" in the Ohio State University area of Columbus, while another, more cynical respondent claims,
"usually there isn't planning for needs of the greater population (sic)." (See comments, Appendix A).

Better urban design must be accomplished, but the cost factor cannot be overlooked. One respondent even conceded that high density could be appealing but

To build in the "extras" that could make it attractive would price it out of (their) reach—as well as (out of) the reach of most of (their) neighbors.

Good design, by definition, is both functional and affordable: accessible to its users.

Philosophies of designers sometimes vary widely, but one approach particularly relevant in this discussion is that of Paolo Soleri. The essence of this strategy is to involve the community in the design of facilities for its own use. Shifferbauer (1976) reminds us that designers seem to often forget that people have to live in the buildings they create (p. 230). The "ivory tower architect" doesn't really know the world of the person who's supposed to live in a highrise housing project (Ibid.). Community-based architecture and design is the key, wherein local residents have a direct say in the final outcome. Shifferbauer (1976) also found that people tend to feel less crowded in an environment they have more control over. Contributing to the design of a dense community might result in people avoiding the feeling of crowding.

Urban design that "works," works functionally and aesthetically. Aesthetic quality surfaced in this study as
a crucial determinant of satisfaction and perception of pleasantness in a high density environment (see factor analysis, Chapter IV). As one respondent commented, a strong dislike in regards to high density is that there are "no yards or trees to see from windows--(It's) like living in a hotel." Aesthetic quality in an urban environment need not be abstract or hidden. Crucial qualities such as visual organization, (such as nodes for personal orientation, understandable signage, etc.) and adequate green space creating a feeling of spaciousness are simple, but often overlooked attributes of a well-designed dense urban environment.

5.2.1 Designing for Spaciousness

Faced with potential problems resulting from perceived crowding, at least two other physical design options are possible. We may reduce the experience of crowding in people by reducing density or number, or by increasing space (Edney, 1977, p. 1217). However, these solutions are elementary to the designer, and do not creatively treat the problem. Rosenblatt and Budd (1975) verify that we can control or avoid crowding and social density problems by reorganizing territorial arrangements (in Insel and Lindgren, 1978, p. 30). Also, we can create an image of internal roominess with appropriate floor or room layouts, lighting, and decorative graphics (Mandel, et al., 1980). We can design to maintain the feeling of external roominess, as in a spa-
cious neighborhood, by effectively using open space or by providing for panoramic views from highrise dwellings or elevated terrain (Mandel, et al., 1980; Hayward, et al., 1974; see also Shiffenbauer, et al., 1977). Thus, a space can be used more efficiently to house more people, and an overall higher density level achieved. The planner and architect (social and physical designer, respectively) can work together to create livable, attractive high density residential environments.

FIGURE 2. Housing Advertisement

An example of an advertising appeal in the Columbus area. Townhouse living is a higher density environment than most suburban areas, and is an increasingly popular housing choice. This ad attempts to assure the prospective tenant that a person can live in a properly designed high density setting without being crowded.


5.2.2 Designing For Safety and Cohesion

Also, the issue of a private versus public environmental atmosphere must be properly answered in workable high density design. This survey verifies the strong desire for privacy, in keeping with societal values, yet the lively atmosphere of dense urban cores is also appealing to many and
it may offer an advantage of safety. Though research has generally found that closer proximity of unacquainted people does not necessarily lead to more interpersonal interaction or cohesion (Sommer, 1974; Milgram, 1970), it is a chosen strategy of many designers and city planners to encourage the gathering of people, constant activity, and general excitement in parts of the city. Attractive to many, this design strategy can have an effect of promoting social cohesiveness among acquainted community members (Jacobs, 1961; Gans, 1962; Michelson, 1970). It may also contribute to safety in an urban environment, as communal "self-policing" is far more effective than the police services a city force can provide. We can classify crime as both a public and a private disadvantage, as referred to in this study's framework, which has a strong potential for communal solution. The Columbus Crimesolvers Anonymous program is an example of the reliance on community cohesiveness to combat crime.\textsuperscript{15} Newman (1972) provides numerous design strategies, in addition to those relying on community cohesion, in order to create safer, "defensible," urban environments.

\textsuperscript{15} The program consists of an anonymous call-in arrangement to respond to evidence on unsolved criminal cases that is published regularly in major newspapers and elsewhere.
5.2.3 **Transportation System Design**

Continuing with the discussion of design strategies that would help make higher density more attractive, it is necessary to mention the importance of transportation network design, coordinated with close proximity of essential services. Shopping, recreation, restaurants, etc. must be readily accessible, preferably via public transit systems, and especially for the elderly. In fact, two respondents commented that higher density is particularly suitable for senior citizens, and this is possibly one of its only applications.

5.2.4 **Other Design Considerations**

Naturally, practical considerations must be included in the design of high density residential housing. The threat of fire and annoyance of noise are two particularly crucial issues to be addressed. Noise problems are also closely related to designing for a feeling of privacy, as spaciousness alone serves to soften the intensity of a neighbor’s noise. Quality construction, evacuation plans, and good alarm systems are fire safety features that must not be overlooked.
5.2.5 **Summary of Design Criteria**

The following list presents some of the design criteria that might be observed in designing a popularly accepted high density residential environment or housing complex:

1. **Adequate visual and auditory privacy.** Residents should be able to screen out unwanted noise or views. The privacy and calmness of one's personal place of residence must be maintained.

2. **Ease of maintenance.** Designs facilitating easy upkeep should be promoted.

3. **Defensibility.** Building and neighborhood arrangements must incorporate crime prevention considerations. Adequate lighting and views of public areas are crucial components (see Newman, 1972).

5. **Energy efficiency.** Though shared wall area and compactness of form offer potential energy-saving advantages, dense housing must also be built with adequate insulation and weather-stripping, proper orientation to the sun and prevailing winds, etc.

6. **Spaciousness.** Green open space should be integrated with dense housing structures.
7. Proximity to services. All crucial services (i.e. shopping, groceries, recreation, etc.) should be within walking distance of one's residence.

5.2.6 Ensuring Good Design

We are certain that good design is a necessity if high density is to be accepted and characteristics of good design have been identified. But how is good design encouraged, and how else might high density be encouraged?

The city might pursue some of the following suggestions, augmenting those already being implemented in some communities:

1. Establish high quality design standards via strict building codes and demanding architectural review boards to encourage adherence to the design strategies listed above. (However, this strategy should not be seen as a means to drive up the cost of construction or rent of a more compact style of housing.)

2. Discourage transience by (possibly) promoting longer-term leases, and the sale or partial ownership of housing units as opposed to shorter-term rent (e.g. condominiums are owned high density housing options).
3. "... Compactness might be achieved by raising permissible densities, allowing a greater variety of housing types and encouraging contiguous development." (Affordable Community, p. 36, 1980).

4. Institute a community-wide public education program that informs citizens of the costs and benefits of a high development density style.

Strategies for implementation of a high density development policy are numerous, though political and societal acceptance of the idea once again emerge as essential. We must remember that the policy does work in other cultures, and the recurrent theme of public versus private support explains a large part of this acceptance. Though other cultures are faced with different constraints that help shape their societies (e.g. land, income, natural resources), societal values still play a major role in accepting a new lifestyle. In the U.S., the creation of a more community-minded culture would help the idea of compact development catch on. The creation of the Environmental Protection Agency, the Department of Energy, and the Occupational Safety and Health Administration are examples of responses to changes in societal and political values in the Federal government. Strategies to promote the acceptance of a high density development policy must be based on education and other elements of American socialization and politicization in order to be successful.
5.3 **HIGH DENSITY, MIXED-USE DEVELOPMENT, AND URBAN MEGASTRUCTURES**

Re-examining the previous section on design features of a functional high density setting, we find that, taken as a whole, these features describe not only high density residential development. High density residential development characteristically includes close proximity to services, work, recreation: All of the amenities and components of the urban place. The promotion of this type of environment bears a striking resemblance to the promotion of "mixed-use development," a movement that is also endorsed by the Council on Development Choices for the '80s, as well as by many planners. Taken to an extreme, higher densities and mixed-use development could mean the development of urban megastructures—self-contained urban environments that integrate all essential urban functions with residential units within a single, continuous structure.

"The market for mixed use projects is growing..." *(Affordable Community, 1980, p. 50)* the Council assures us. It describes these projects as dense, efficient, diverse, balanced, "full service," communities that integrate non-residential and residential uses *(Ibid., pp. 50, 97)*. The single difference between the mixed-use development, as described here, and the urban megastructure, is that megastructures are typically self-contained, single structures which make use of three dimensional space as opposed to the two dimensional character of present urban form.
For successful mixed-use development, the Council reminds us, "... the key to market success ... (is once again) design (emphasis mine)." (Affordable Community, 1980, p. 33). In the case of the urban megastructure, which would necessitate the creation of a successful mixed-use development, the design challenge is even more pronounced, as a workable scheme must be devised to "fit" within a self-contained structure.

Rough examples of this concept are already constructed and functioning today, (Wheaton in Ewald, 1967, p. 167) though few were actually built with this specific idea in mind. The Constitution Plaza, Penn Center; Water Tower Place, Chicago; Peachtree Center, Atlanta; and the Shinjuku district of Tokyo, (Wheaton in Ewald, 1967, p. 168), along with Cumbernauld, Scotland, (particularly the city centre), demonstrate the megastructural concept. As presented earlier, LeCorbusier's Unite D'Habitation and Safdie's Habitat are also examples of the integration of urban functions into a single structure. Wheaton describes a block length of 6th Avenue in New York City consisting of 8 skyscraper office buildings and numerous other buildings and hotels that begins to resemble a small scale megastructure (Wheaton in Ewald, 1967, p. 168; see also Erley et al., 1979, p. 9). Thus, the idea is feasible and may even be gaining in popularity.
Banham (1976) observes that the megastructure movement was an appealing urban option that was gaining popularity through the 1950's and early 1960's, though it ceased in the late 1960's after facing, among other criticisms, the failure of the public housing projects. Could the timing be right to regenerate this philosophy of development today?

Though objections to megastructures may be as strong as arguments against high density urban development (Corbee, 1981), the urban megastructural concept can still be regarded as viable. If designed properly, to reduce any perception of crowdedness, to guarantee privacy, and to achieve cohereliness instead of concentrated bedlam, the urban megastructure could become a popular and economically acceptable development scheme.

5.4 Extensions of this study

Hall (1966), with regards to the urban megastructure concept, recommends that as designers: "... city planners and architects should welcome opportunities to experiment with radically new, integrated forms that will hold an entire community (p. 167)." Though it is not particularly popular nor celebrated, experimentation with this concept is underway, both in the U.S. and abroad. Pivotal problems will have to be overcome to make the idea viable, such as design for human scale (Hall, 1966, pp. 158-160), transportation of large quantities of waste products, and design to
combat noise and pollution (Corbee, 1981, p. 35). Prototypical communities currently under construction that are exploring these many design constraints include Soleri's Arcosanti, Arizona (construction began 1970) and a Saudi Arabia-commissioned megastructure (see Wedin, 1981; see also Banham, 1979). Closely related is Dantzig and Saaty's comprehensive design study entitled Compact City (1973), which incorporates moderate to high density living arrangements, high ecological regard, and a 24-hour time cycle of constant activity, among other features into a self-contained community.

Any further development of the megastructure, mixed-use, or high density urban planning principles is contingent on advancement in the field of research on high density and crowding (Estes, 1980; Wedin, 1981). This study verifies negative attitude toward high density, though a better understanding of actual human behavior in high density settings is also necessary in order to determine, more conclusively, the affect of this type of environment on people.

5.5 Closing

A history of dispersion of urban development in the U.S. is slowing, necessitated by economic conditions. The current trend is to bring people back to urban centers, intensify land use, and create more dense, multiple-use urban environments—possibly even megastructures. Evidence of
this option as a decided choice appears in the Columbus Energy Plan, in agreement with recent planning literature and the development policies of many American cities. The goal of this strategy can be justified economically, especially in terms of energy efficiency, though an underlying objective goes beyond economics—it is an effort to rebuild community cohesiveness, in keeping with man's inherently collective nature (Soleri, et al.) and human need for social interaction (Harlow, 1971).

Can this goal be accomplished among prevailing opposition? One Columbus citizen comments: "I want my private yard space AND parks . . .," yet it appears we cannot satisfy both a desire for privacy and private amenities, while serving the needs of the majority of urban dwellers and keeping in mind a strong regard for maintenance of environment (conservation of land). Safdie (1967) sizes up a dilemma brought to light by this study and the Columbus Energy Plan that is fundamental to the urban planner's challenge to create a desirable residential setting:

We want to live in a small intimate community; yet we want to have all the amenities of the great metropolis. We want a dwelling with privacy, identity; yet we want the setting of a rich social life. We want to be near open country; yet we let the city spread endlessly. We want all the things suburbia has to offer; but we also want the amenities of the downtown area. What we really want is Utopia, but we are not clear about what Utopia is (p. 253).
The problem is a classic one. Proponents of high density claim that we can enjoy a rich community life while maintaining privacy and intimacy in a more concentrated environment.

One perceptive and cynical survey respondent sizes up prevailing negativism:

"... high density residential is potential slum—regardless of cost or best intentions of developer and city planners. European experiences notwithstanding, will take generations to change American dream (sic)."

Opposition to high density is founded on societal values and personal preferences, while in itself, high density is not inherently bad.
APPENDIX A
SURVEY QUESTIONNAIRE SUMMARY RESULTS

KEY
(values rounded to the nearest tenth)

N = Number of responses to item

NR = (Non-responses) Percentage of total surveys received - 132

◯ = Mode (Most frequent response)

x = Mean

(x)y% = (Number of responses) Percentage of responses to that item
Dear Columbus Resident:

You have been selected to participate in a survey on an issue important to the City of Columbus. The enclosed questionnaire is part of a study being sponsored by the Department of Energy and Telecommunication and carried out by Mr. James Karas, a graduate student at the Ohio State University's Department of City and Regional Planning. We are interested in citizens' opinions toward patterns of neighborhood development. Your answers will provide information important to us all, as we look toward the future and try to understand the needs and preferences of Columbus citizens.

Please take a moment to give us your views by filling out this survey. We estimate it will take about ten minutes to complete. Then return it to us in the enclosed envelope by October 15, 1982. If you are interested, enclose your name and address and we will send you a copy of the survey results.

Thanks for helping us to serve you better.

Sincerely,

[Tom Moody]
Mayor

Enclosure
APPENDIX A
SURVEY QUESTIONNAIRE SUMMARY RESULTS

SURVEY QUESTIONNAIRE

Complete the items in Parts A and B by circling the appropriate number that best reflects your opinion.

EXAMPLE: A. RIDING A BUS IS:

Inconvenient          Convenient

(A "*" indicates that you perceive it to be relatively inconvenient.)

PART A
TOTAL NUMBER OF RESPONSES=132 (23.8% response rate)

I. USING THE FOLLOWING DESCRIPTORS, GENERALLY DESCRIBE YOUR NEIGHBORHOOD:

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
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<td>2</td>
<td></td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Run Down</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Spectious</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Unpleasant</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
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<td>5</td>
</tr>
<tr>
<td>Unsafe</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Private/Secluded</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>High quality, well-built housing</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Mostly low monthly rents or mortgages($)</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Mostly high monthly rents or mortgages($)</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>A neighborhood shopping center is relatively close (miles)</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Most residents are close to their workplace (miles)</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>The transportation scheme (road network) is energy wasteful</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Energy is used efficiently in heating and/or cooling</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Average Number Responses (No. 1) = 126.6
APPENDIX A (continued)

2. USING THE FOLLOWING DESCRIPTORS, GENERALLY DESCRIBE THE ENVIRONMENT YOU WOULD EXPECT IF THE DENSITY OF DEVELOPMENT IN YOUR NEIGHBORHOOD WERE INCREASED:

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>1</th>
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<td>3</td>
<td>2</td>
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<tr>
<td>NR=15 11.4%</td>
<td>(34) 29.1%</td>
<td>(36) 30.8%</td>
<td>(18) 15.4%</td>
<td>(7) 6.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N=124 Run Down</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NR=8 6.1%</td>
<td>(14) 11.3%</td>
<td>(28) 22.6%</td>
<td>(29) 23.4%</td>
<td>(29) 23.4%</td>
<td>(10) 8.1%</td>
<td>(7) 5.6%</td>
</tr>
<tr>
<td>N=121 Spectious</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NR=11 8.3%</td>
<td>(21) 17.4%</td>
<td>(24) 19.4%</td>
<td>(44) 35.4%</td>
<td>(44) 35.4%</td>
<td>(44) 35.4%</td>
<td>(44) 35.4%</td>
</tr>
<tr>
<td>N=125 Unpleasant</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NR=7 5.3%</td>
<td>(33) 26.2%</td>
<td>(27) 21.6%</td>
<td>(26) 23.6%</td>
<td>(19) 15.1%</td>
<td>(7) 5.6%</td>
<td>(6) 4.8%</td>
</tr>
<tr>
<td>N=125 Public/Secluded</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>NR=7 5.3%</td>
<td>(2) 1.6%</td>
<td>(7) 5.6%</td>
<td>(5) 4.0%</td>
<td>(12) 9.6%</td>
<td>(17) 13.6%</td>
<td>(39) 31.2%</td>
</tr>
<tr>
<td>N=123 High quality, built housing</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>NR=9 5.2%</td>
<td>(18) 14.8%</td>
<td>(12) 9.8%</td>
<td>(6) 4.9%</td>
<td>(21) 17.1%</td>
<td>(27) 22%</td>
<td>(19) 15.4%</td>
</tr>
<tr>
<td>N=117 Mostly low monthly rents or mortgage($)</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>NR=15 11.4%</td>
<td>(31) 25.4%</td>
<td>(30) 23.8%</td>
<td>(38) 32.5%</td>
<td>(15) 12.3%</td>
<td>(17) 13.6%</td>
<td>(7) 6.0%</td>
</tr>
<tr>
<td>N=122 Neighborhood shopping center be relatively close. (miles)</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>NR=10 7.4%</td>
<td>(4) 32.8%</td>
<td>(4) 32.8%</td>
<td>(4) 32.8%</td>
<td>(4) 32.8%</td>
<td>(4) 32.8%</td>
<td>(4) 32.8%</td>
</tr>
<tr>
<td>N=116 Most residents would be close to their workplace. (miles)</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>NR=16 12.7%</td>
<td>(5) 39.5%</td>
<td>(11) 8.9%</td>
<td>(11) 8.9%</td>
<td>(39) 35.8%</td>
<td>(32) 27.6%</td>
<td>(18) 15.5%</td>
</tr>
<tr>
<td>N=118 The transportation scheme (road network) would be energy efficient.</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
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<tr>
<td>NR=14 10.6%</td>
<td>(17) 17.3%</td>
<td>(12) 10.2%</td>
<td>(14) 11.9%</td>
<td>(36) 30.5%</td>
<td>(21) 17.4%</td>
<td>(16) 13.6%</td>
</tr>
<tr>
<td>N=116 Energy would be wasted through heating and/or cooling.</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>NR=16 12.7%</td>
<td>(12) 10.3%</td>
<td>(12) 10.3%</td>
<td>(20) 17.2%</td>
<td>(47) 35.3%</td>
<td>(27) 18.1%</td>
<td>(8) 6.9%</td>
</tr>
</tbody>
</table>

Average Number Responses (No. 2)=120.8
APPENDIX A (continued)

### PART A

1. **Would you favor the policy of promoting Denver City Development if it meant...**

#### a. Building Townhouses in your neighborhood?
- N = 130
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(0.0%)</td>
<td>(5.3%)</td>
<td>(7.5%)</td>
<td>(9.6%)</td>
<td>(25.1%)</td>
<td>(34.2%)</td>
</tr>
</tbody>
</table>

#### b. Building single-family attached housing in your neighborhood?
- N = 130
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
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<tbody>
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<td>1</td>
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<td>4</td>
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<td>6</td>
</tr>
<tr>
<td>(4.3%)</td>
<td>(10.7%)</td>
<td>(17.1%)</td>
<td>(14.10%)</td>
<td>(12.2%)</td>
<td>(23.4%)</td>
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</tbody>
</table>

#### c. Building a lowrise apartment complex (20-30 units, 2-3 stories high) in your neighborhood?
- N = 131
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
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</thead>
<tbody>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(0.0%)</td>
<td>(0.0%)</td>
<td>(11.0%)</td>
<td>(4.3%)</td>
<td>(17.1%)</td>
<td>(34.8%)</td>
</tr>
</tbody>
</table>

#### d. Building duplex housing in your neighborhood?
- N = 130
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(21.5%)</td>
<td>(31.2%)</td>
<td>(18.1%)</td>
<td>(17.13%)</td>
<td>(17.13%)</td>
<td>(28.15%)</td>
</tr>
</tbody>
</table>

#### e. Building a highrise apartment complex (greater than 14 stories high) in your neighborhood?
- N = 131
- **NR = (1)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(0.0%)</td>
<td>(10.8%)</td>
<td>(3.9%)</td>
<td>(12.17%)</td>
<td>(10.76%)</td>
<td>(27.28%)</td>
</tr>
</tbody>
</table>

#### f. Less private yard space, but more public open space, such as parks, in your neighborhood?
- N = 131
- **NR = (1)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(4.3%)</td>
<td>(8.8%)</td>
<td>(10.1%)</td>
<td>(17.12%)</td>
<td>(13.9%)</td>
<td>(45.5%)</td>
</tr>
</tbody>
</table>

#### g. Cheaper heating and cooling bills?
- N = 129
- **NR = (3)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(55.42.6%)</td>
<td>(37.28%)</td>
<td>(8.6%)</td>
<td>(9.7%)</td>
<td>(8.16%)</td>
<td>(8.16%)</td>
</tr>
</tbody>
</table>

#### h. Narrower streets in and around your neighborhood?
- N = 131
- **NR = (1)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(11.0%)</td>
<td>(4.3%)</td>
<td>(19.1%)</td>
<td>(7.14%)</td>
<td>(46.35%)</td>
<td>(55.40.5%)</td>
</tr>
</tbody>
</table>

#### i. Living closer to a neighborhood shopping center?
- N = 130
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(6.1%)</td>
<td>(11.8%)</td>
<td>(17.16.49)</td>
<td>(10.50.5%)</td>
<td>(18.15.7%)</td>
<td>(20.15.3%)</td>
</tr>
</tbody>
</table>

#### j. Less off-street parking areas in your neighborhood?
- N = 130
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
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<td>6</td>
</tr>
<tr>
<td>(6.2%)</td>
<td>(7.5%)</td>
<td>(11.8%)</td>
<td>(4.0%)</td>
<td>(40.30.8%)</td>
<td>(39.30.0%)</td>
</tr>
</tbody>
</table>

#### k. More contact and interaction with your neighbors?
- N = 130
- **NR = (2)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
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<tr>
<td>(5.1%)</td>
<td>(25.19.25)</td>
<td>(25.19.2)</td>
<td>(37.24.58)</td>
<td>(13.10.0%)</td>
<td>(11.8.5%)</td>
</tr>
</tbody>
</table>

#### l. More convenient bus service?
- N = 126
- **NR = (6)**

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
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<th>Moderately against</th>
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<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(6.12.7%)</td>
<td>(31.24.6%)</td>
<td>(17.15.5%)</td>
<td>(42.33.3%)</td>
<td>(43.25.2%)</td>
<td>(9.17.1%)</td>
</tr>
</tbody>
</table>

#### m. Installing a district heating system in your neighborhood?
- (Disagreed if you do not have city climate control.)

<table>
<thead>
<tr>
<th>Strongly in favor</th>
<th>In favor</th>
<th>Moderately in favor</th>
<th>No feeling</th>
<th>Moderately against</th>
<th>Strongly against</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>(4.19.5%)</td>
<td>(4.19.5%)</td>
<td>(31.7.1%)</td>
<td>(10.23.8%)</td>
<td>(31.7.1%)</td>
<td>(4.19%)</td>
</tr>
</tbody>
</table>
APPENDIX A (continued)

PART C

(Most frequent response) UNDERLINED.

1. DO YOU OWN OR RENT YOUR CURRENT PLACE OF RESIDENCE?

A. OWN (96) 73.8%  B. RENT (34) 26.2%

2. IF YOU OWN, INDICATE THE TYPE OF RESIDENCE:

A. SINGLE-FAMILY DETACHED HOUSE (43) 32.8%
B. SINGLE-FAMILY ATTACHED (24) 18.8%
C. MOBILE HOME (11) 8.8%
D. OTHER: (describe) (11) 8.8%

3. WHAT IS THE CURRENT COMBINED INCOME LEVEL IN YOUR HOUSEHOLD? (Per Year)

A. Less than $5,000 (1) 0.8%
B. $5,000 to $9,999 (4) 3.2%
C. $10,000 to $14,999 (4) 3.2%
D. $15,000 to $19,999 (2) 1.6%
E. $20,000 to $24,999 (3) 2.4%
F. $25,000 to $29,999 (2) 1.6%
G. $30,000 to $34,999 (4) 3.2%
H. $35,000 to $39,999 (3) 2.4%
I. $40,000 or greater (5) 3.9%

4. WHAT IS YOUR AGE?

A. Younger than 15 (4) 3.1%
B. 15-19 (2) 1.6%
C. 20-24 (7) 5.5%
D. 25-29 (7) 5.5%
E. 30-34 (7) 5.5%
F. 35-39 (7) 5.5%
G. 40-44 (1) 0.8%
H. 45-49 (2) 1.6%
I. 50-54 (2) 1.6%
J. 55-59 (1) 0.8%
K. 60-64 (1) 0.8%
L. 65 or older (2) 1.6%

5. HOW MANY PEOPLE LIVE IN YOUR HOUSEHOLD?

A. 1 (4) 3.1%
B. 2 (10) 7.9%
C. 3 (10) 7.9%
D. 4 (10) 7.9%
E. 5 or more (10) 7.9%

6. WHAT IS YOUR ETHNIC BACKGROUND?

A. Spanish/Hispanic (1) 0.8%
B. Black (5) 4.0%
C. Caucasian (12) 9.4%
D. Other: (describe) (6) 4.5%

ADDITIONAL COMMENTS (Optional)

1. WHAT DO YOU LIKE ABOUT HIGH DENSITY DEVELOPMENT?

2. WHAT DO YOU DISLIKE ABOUT HIGH DENSITY DEVELOPMENT?

THANK YOU FOR YOUR TIME! PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENVELOPE PROVIDED PROMPTLY.
APPENDIX A (continued)

Additional Comments (Optional):

1. WHAT DO YOU LIKE ABOUT HIGH DENSITY DEVELOPMENT?

(Similar responses grouped together.)

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. &quot;Nothing,&quot; &quot;Not Much,&quot; or &quot;Very Little&quot; (clear dislike).</td>
<td>34</td>
</tr>
<tr>
<td>B. Restaurants, shopping, services are more convenient.</td>
<td>7</td>
</tr>
<tr>
<td>C. Cheaper cost of living, or provides housing for lower income persons.</td>
<td>6</td>
</tr>
<tr>
<td>D. Potentially more energy efficient.</td>
<td>4</td>
</tr>
<tr>
<td>E. Good, efficient use of land.</td>
<td>4</td>
</tr>
<tr>
<td>F. O.K. for senior citizens.</td>
<td>2</td>
</tr>
</tbody>
</table>

Selected Comments:

1. "By design, I don't live too close to one!!"

2. "Not much, viewed from a personal standpoint."

3. "Interaction with other people - but on my terms."

4. "If developed for working class, employed with the ability to obtain and maintain the project I would be in favor of higher density development. I believe it would be more cost efficient and acceptable to the area involved."

5. "I only favor this type housing for Sr. Citizens' dwellings."

6. "All aspects."

7. "It is usually close to shopping centers or downtown. It is usually closer to transportation. The rents could be lower."

8. "Convenience of stores, restaurants, and other places of recreation."

9. "Can somewhat restore parts of the city."

10. "Uses land to good advantage."

11. "It can provide better residences for those individuals not capable of caring for home and yard areas within an affordable range of cost."

12. "It's more efficient - especially when you have enough vacant land to appropriately plan for such density . . i.e. RUD's. That doesn't work so well in an older, built up neighborhood such as southern Clintonville where (for the most part) space is a premium and "spot zoning" is the only way to provide higher density uses."
APPENDIX A (continued)

13. "Better use of space. New higher density development should theoretically be built using the newest energy efficient ideas and still try to keep costs down."

14. "Can be very energy efficient and cost savings to city and owners/renters if done to the limits of our current technologies - but for the most part this honestly is lost soon after the beginning market studies are made i.e.: like this one."

15. "Never thought about it - but would take up less ground space. Am not much for 'community' party houses, etc."

16. "For an older person I like the feeling of being completely alone since I am a widow - Also do not have the worry of taking care of grass cutting - and maintenance for plumbing and other maintenance."

17. "Great in a fancy place in downtown Chicago."

18. "I love giant cities like London, Madrid, San Francisco (in which I have lived in the past) because of their parks, museums, music, theatre, and especially opera. But those amenities are found only in cities over 2 million in population. An increase in Columbus' population to 1.2 million, or so, would not be enough, and increased 'redevelopment' of pleasant suburbs could ruin some of the positive assets of Columbus. Redevelop the decaying and deserted portions of the inner city, and don't screw up the suburbs."

19. "I like the feeling of having people closeby and being able to have someone to do something with at all times as friends in general."

20. "It adds income into the general area and aids in small businesses."

21. "High density housing can be very desirable for some individuals, if properly designed. Highrise housing best fits an intercity environment."

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2. WHAT DO YOU DISLIKE ABOUT HIGH DENSITY DEVELOPMENT? (Similar responses grouped together.)

<table>
<thead>
<tr>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Feeling of crowding.</td>
</tr>
<tr>
<td>B. Traffic/parking congestion.</td>
</tr>
<tr>
<td>C. More crime, less safe.</td>
</tr>
<tr>
<td>D. Must sacrifice personal privacy.</td>
</tr>
<tr>
<td>E. Noise problem.</td>
</tr>
<tr>
<td>F. Upkeep, cleanliness, general maintenance problem.</td>
</tr>
<tr>
<td>G. &quot;Everything.&quot;</td>
</tr>
<tr>
<td>H. Decreases property value.</td>
</tr>
</tbody>
</table>
Selected Comments:

1. "No yards or trees to see from windows - like living in a hotel."


3. "... increase (in) fire hazards ..."

4. "They are built where transportation is limited. Too far from work and shopping areas. Many times residents must have own transportation and increased traffic in residential areas. If not maintained well by owners will cause the area to go down hill even faster."

5. "Our biggest problem in our high density neighborhood is parking. Most residents park on the street with access to Clinton Park. We have many speeders & many children - bad combination. We are a close knit neighborhood - Don't worry too much about crime - but the alleys are worrisome."

6. "Too many times it soon creates a run down area - it creates an imbalance, usually of home owners vs. renters - it also would seem that in time it would lend to a fall in property value."

7. "Enjoy present urban situation; would hate to see more crowded housing in my immediate domain."

8. "I believe with the amount of twin singles in our neighborhood, the last thing we need is high density development. Our neighborhood is very over crowded and all of the car racing makes it unsafe for our children."

9. "Value differences may result in negative feelings - I value a neat, quiet, clean neighborhood. With a greater number of people around, these values may not hold with all the residents. In high density areas I've seen - OSU, high rises (for rich and poor) the privacy element is lost or harder to obtain - rabbit Warren existence not to my liking - regimented, fragmented, dependent on an organization, not private ownership.

10. "... more people more trouble."

11. "Too many people you really don't get to know neighbors. A cold place to live."

12. "Large numbers of people I wouldn't know undesirables coming & going ..."

13. "Everything is too congested - too many lines at stores, banks. Too much traffic and too many creeps that might harm our children."

14. "Too many people in too small an area. You lose your identity ... All Black and poor to middle income White neighborhoods are too dense right NOW!"

15. "Population density. If children are allowed, not enough supervision & recreation provided & they roam the neighborhood ... If rentals, tenants are often less protective of property than most property owners, causing rapid deterioration of rental property which affects whole neighborhood."

16. "I believe high density developments will lead to an increase in crime, problems in neighbors, relatives and a general lowering of quality of living in a neighborhood. A cramped, closed-in feeling leads to an increase in blood pressure & mental fatigue, neither of which do we need more of!"

17. "It (high density development) becomes a maintenance problem, drug problem, and a tax problem for all."
18. "1. High noise levels - regardless of time or day.  
2. Litter/clutter accumulation.  
3. Crowded conditions promote domestic disturbances.  
4. Congested parking/abandoned automobiles.  
5. Unsupervised children playing in streets.  
6. Gatherings of residents outside (often unruly) due to lack of personal space/privacy in living quarters."

19. "The increased chances of too many low income units and the increased probability of criminal activity and development decay. This doesn't necessarily have to happen, but history has shown that in many instances this becomes the case."

20. "It's disgusting, discommoding & generally disagreeable. It lacks privacy, disrupts peacefulness, attracts undesirable people."

21. ". . . dogs, trash containers, junk cars, people who shack-up, etc."

22. "Having to deal with the anything goes type of person. Less space, more noise and just basic bullshit!"

23. "Residents have little regard for neighborhood environment. Would be a shambles fast."

24. "Increase in relatively transient population lowers commitment to maintenance of property, leading to decline. Possible increase of crime."

25. "More transient people (strangers) too many rentals, apts., etc."

26. "High noise level including lawn mowers, loud music, screeching cars & parties."

27. "People, noise level, lack of private space - However, we've never experienced living like this."

28. "Disturbed about the increase of vandalism in a quiet, family oriented neighborhood. Car thefts, tires being slashed, drag racing on increase. Public housing apartments nearby are suspect."

29. "Nothing - high density residential is potential slum - regardless of cost or best intentions of developer and city planners. European experiences notwithstanding. Will take generations to change American dream."

30. "Usually provided for low income with tax dollars, therefore pride and concern are absent. Examples in all sections of the city. Once present there seems to be consistent deterioration and value loss with the constant increase in crime rate. Therefore the area is adversely affected."

31. ". . . I don't want to share the walls of my living space with another tenant for a ridiculous amount of money each month just going to line some capitalist's pockets, while I bust my ass to get by."

32. "Mostly developed by the wealthy people, and done most often to very poor standards for the lower classes of people - lower middle class on down. Only in recreation area as in Virginia Beach, etc. do you see some 'higher' quality work being done but for the rich people again."

33. "Everything, but then I have never lived in a high density development, have only impressions from T.V. and movies to compare. I like traditional neighborhoods, have always lived in mine, grew up nearby my current home."

34. "High density housing does not belong in residential (low to moderate density) areas."
1. "Nothing - (high density development) epitomizes the problems of today in that it is cheaply built, temporary housing which in 10 years becomes a nuisance, and in 15 years becomes an eyesore. What we need is well built small single family structures where the residents can feel pride in his/her domicile, and therefore keep it up nicely, for years and years. In Ghana where I used to live, the high density housing is falling apart, the residents don’t care about it, or the surrounding area, so its trashy. I’m not trying to discriminate against the poor, I just think everyone must have their "own place" in which they can feel happy, secure and take pride that it’s his. Let’s just make them small houses - but well built."

2. "If it (high density development) benefits seniors and low income families fine, but must be well kept and maintained and not add additional levels of crime in area."

3. "I want my private yard space AND parks, (not less yard and more park nor more yard and less park). Keep the green spaces - too much blacktop already."

4. "Our neighborhood would be a good study on high density working well! We basically have high density living on W. Weber & the surrounding streets. Many duplexes & 3 families, a few small apts. & townhouses & many apts. right on Clinton Park. We have very few single family houses, very little yard space, but much public land - it is working well here, but I can’t imagine an increase in population."

5. "I prefer my neighborhood just as it is."

6. "As a senior citizen I can see advantages to living in an apartment or housing project but for the present I enjoy living in a neighborhood with some wide open space and single privately owned homes where there is great stability. There are not frequent changes and neighbors are friendly & helpful."

7. "I'm not too sure what 'high density' development means - "

8. "To build in the 'extras' that could make it (high density development) attractive would price it out of my reach - as well as the reach of most of my neighbors."

9. "Less private space. With little planning as in the university area - can lead to congestion, deterioration, etc. In a predominantly single family/two family neighborhood high density housing must be carefully reviewed and planned for. All the benefits of denser housing (as listed in survey) mean nothing when inappropriately placed in an inner city single family/double neighborhood. We (living in a higher density area) have mass transit and neighborhood shopping at our fingertips."

10. "I don't like it (high density development) for the suburbs of the city where there are a lot of single family homes, but in a newer area, a nice, high rise apartment building could be a positive factor."

11. "Survey (is) communistic in concept."

12. "The theoretical rationale appears to be based on 'community advantage' (i.e. increased tax revenues, space utilization, etc.), at the expense of individual freedom and space. The advantage of the Clintonville community now is abundant space, parks, a calm, safe environment yet relatively convenient access to other areas of Columbus."

13. "... Large apartment complexes should not be close to single family units because it is not fair to those who have bought the single family homes."

14. "Usually there isn't planning for needs of the greater population, in terms of parking availability and the roads in the area. Example Bethel Road is a mess, constantly. Also, extra police & fire aren't planned for - when the need is desperate, finally, the rest of the city gets stuck for increased taxes to pay for some rich developer's profit."
APPENDIX B
Survey Questionnaire Distribution

<table>
<thead>
<tr>
<th>AREA</th>
<th>POPULATION</th>
<th>HOUSING UNITS</th>
<th>HOUSEHOLDS</th>
<th>No. of Surveys Distributed (based on No. of Households)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area Total</td>
<td>Percent of Total</td>
<td>Area Total</td>
<td>Percent of Total</td>
</tr>
<tr>
<td>3</td>
<td>38685</td>
<td>23.9</td>
<td>15451</td>
<td>22.5</td>
</tr>
<tr>
<td>7</td>
<td>17659</td>
<td>10.9</td>
<td>8391</td>
<td>12.2</td>
</tr>
<tr>
<td>9</td>
<td>31167</td>
<td>19.0</td>
<td>14275</td>
<td>20.7</td>
</tr>
<tr>
<td>11</td>
<td>27669</td>
<td>17.0</td>
<td>11731</td>
<td>17.0</td>
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<tr>
<td>16</td>
<td>34324</td>
<td>21.0</td>
<td>14467</td>
<td>21.0</td>
</tr>
<tr>
<td>17</td>
<td>12267</td>
<td>7.6</td>
<td>4339</td>
<td>6.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>161771</td>
<td>100.0</td>
<td>68654</td>
<td>100.0</td>
</tr>
<tr>
<td>Columbus Total</td>
<td>564871</td>
<td>236708</td>
<td>279136</td>
<td></td>
</tr>
<tr>
<td>Percentage of Total Sampled</td>
<td>28.6</td>
<td>29.0</td>
<td>23.3</td>
<td></td>
</tr>
</tbody>
</table>

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\(^a\) U.S. Department of Commerce, 1980 Census of Population and Housing.

\(^b\) National Planning Data Corporation, 1974 Census Tract Update File.
### APPENDIX D

Characteristics of Sample Group Compared to Characteristics of Columbus Population

#### Geographical

<table>
<thead>
<tr>
<th>Survey Sample</th>
<th>Columbus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Census Tracts</strong></td>
<td>35</td>
</tr>
</tbody>
</table>

#### Sociodemographic

<table>
<thead>
<tr>
<th>Survey Sample</th>
<th>Columbus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td>% of total</td>
</tr>
<tr>
<td>Black</td>
<td>11</td>
</tr>
<tr>
<td>White</td>
<td>115</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>132</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Income</strong></th>
<th>$28,280/household</th>
<th>$17,353/person</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Rent/Own</strong></th>
<th>% of total</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>34</td>
<td>25.8</td>
</tr>
<tr>
<td>Own</td>
<td>96</td>
<td>72.7</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>132</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Age</strong></th>
<th>44.9&lt;sup&gt;c&lt;/sup&gt;</th>
<th>28.4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Housing Types</strong></th>
<th>% of total</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-F Homes</td>
<td>93</td>
<td>73.2</td>
</tr>
<tr>
<td>Mobile</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>132</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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**NOTE:** Source of all Columbus data (metropolitan area) is the 1980 U.S. Census unless otherwise noted.

<sup>a</sup> Total census tracts in Franklin County.

<sup>b</sup> Assumes an average of 2 people per household.

<sup>c</sup> The survey sample group is considerably older than the average Columbus resident, especially since 17.7 percent of respondents were 65 or older.

<sup>d</sup> Based on dwelling units per acre as calculated from MORPC survey data.
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