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4-15-77

CL re: an analysis of the "Allen-Jones" Model of fair share housing calculations (by Ps)

pgs. 13

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April 15, 1977

Mr. Alan Mallach
Alan Mallach Associates
108 West State Street
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Re: Allen-JORD Model

Dear Alan:

I asked Martin Kahn, a paralegal employed by this office, to read over the various materials on the Allen-JORD Model and try to pull his objections to it together.

I would appreciate it if you would read the enclosed analysis prepared by him and give me your thoughts on it.

Martin recently graduated from the University of Pennsylvania where he majored in Economics and therefore, has some background in the area.

Very truly yours,

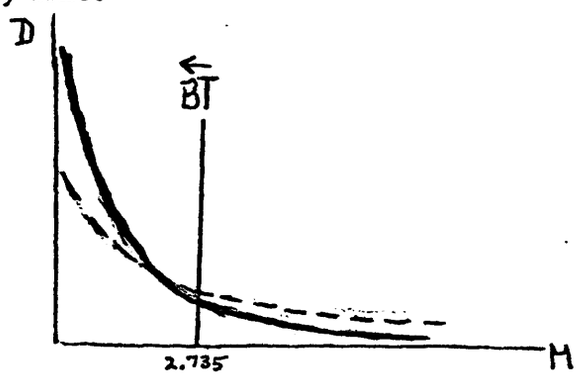
Henry A. Hill, Jr.

HAH:jca
Enclosure

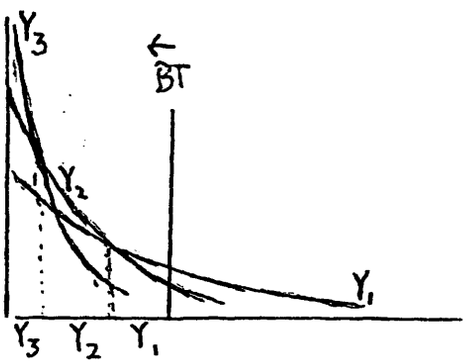
To HAH / FROM MARTIN KAHN

OVER VIEW

I. Section One argues that the JORD Model (with R50=10, E=1.4) leads to a pattern of general overdispersal across most income groups, reflecting past suburban zoning practices. Depicted graphically the JORD is represented by the dotted line, while a different formula generates the heavy line:



II. Section II argues that the characteristics of the population differ by income groups, and that it is not only desirable, but moreover historical, that those with lower incomes should have lower commutes. Graphically depicted where Y1, is high income, Y2 is moderate, and Y3 is low:



Since zoning is only to regulate and not prohibit market solutions, near employment sites the proportion of L&M income groups should exceed the areas overall proportion of L&M.

III. Section three argues that Allen has not sufficiently included the characteristics of lower income counties such as Essex or Union.

IV. Section IV argues that Allen has underestimated present need by discounting present housing needs based on financial need, claiming that this is not a zoning problem when it in fact usually is.

I

RECOURSE to observed travel times in order to estimate statistically the length (by the mean or median travel time) of a reasonable commute, or the portion of workers who found housing within that commute, necessarily involves the use of current work and residence patterns which are already seriously distorted by past exclusionary zoning practice.

Edward M. Bergman:
Eliminating exclusionary zoning:
Reconciling Workplace and Residence
in Suburban Areas p. 38

I

In a general sense what Allen has done is to derive a formula which would have substantially aided developing municipalities in the past (when BT was not developing) to provide sufficient housing, had the development followed the JORD* formula (which it did not), and apply it to the future now that BT is developing---i.e. shifting the housing burden to others. Thus, had JORD been followed from day one there would be 31,000** residents in BT today, "about double the present number." Apparently recognizing that BT's housing "debit" (16,000) is somebody elses "credit", Allen however maintains that it is not necessary to account for municipalities that presently house more than their fair share (as derived by JORD) in determining future fair share since again according to Allen there is no obligation to redress alleged past sins. Whether or not BT has any responsibility to redress the results of past exclusionary zoning will not be treated here, since it is an area calling for a legal conclusion. What is treated here is the reliability of the Allen Methodology---

Section I of this critique implicitly maintains that only part of the 16,000 people who according to JORD should hypothetically live in BT (but don't) may be attributed to "the great planner in the sky and his assistants down here", and that a large part will be seen as due to Allen's oversubscribing housing responsibilities (esp. L&M, sec. II) to non-developing communities. While many criteria are available such as aggregate personal income wealth, land availability, fiscal suitability (where the greater the non-residentional ratable growth (eg AT&T) the greater is the ability to absorb new housing growth) the sole suitability factor used by Allen is employment growth. But since the Allen choice of values for JORD were derived from an RCA facility top heavy***in high paid professionals, located in suburban Bridgewater Township (w/restricted central housing densities) the median commute of 10 air miles, is larger and the household dispersal, due to the low E value, is sparser than the average values (absent exclusionary zoning) in the region and especially in those areas which historically have harbored the preponderance of the areas employment sites.

UNLESS otherwise noted the parameters of
*The JORD formula $F=\frac{1}{BR50}$ E are R50=10, E=1.4

**This does not reflect Lyons Hospital employees, otherwise it would be still higher.

***"The headquarters is top heavy with the division management financial people". Allen's dep.

That these chosen values are incompatible with respect to explaining the past development, i.e., the regions present characteristics, has already been noted. When these values (R50=10, E=1.4)* are substituted for the JORD variables a residential pattern is determined whereby a municipality need only house a small portion of those who in the future will work within it while the surrounding municipalities must absorb the preponderant share--eg the municipalities in the region surrounding BT are responsible for housing 89.41% of those working in BT. Thus when applied to BT's future fair share as a developing municipality the resulting allocation is a serious understatement running contrary to the belief that people prefer to live closer rather than farther from where they work.

Below is a table describing 10 concentric rings in which each provides housing for 10% of employees living (M) miles away from the employment site as derived by Allen's Fig. I.

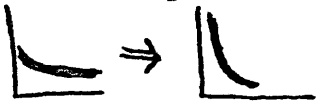
TABLE I

FRACTION OF POP	WITHIN A RADIUS OF (M) MILES
.1	2.5
.2	4.5
.3	6.5
.4	8
.5	10
.6	12
.7	15
.8	18
.9	24

The progression in Column II is almost linear for the 60% living within 12 miles (452 square miles). The relatively flat slope reflects an affluent suburban growth pattern where central densities are restricted by zoning and thus lead to a large dispersal and a high median commute. For L&M groups this is neither an appropriate or historically natural dispersal pattern. (see Sec. II)

TRANSLATING Allen's "concentric ring" figures into densities/mile for 1000 employees has been done to form Column II of Table II and the dotted line in Fig. I. Column III is taken from the curve marked Y_1, in Figure I,

*In reference to the ten mile commute, while Allen allows that "There was also some evidence that this median value would be less if population density increased," his median commute is not a function of a changing pop. density, which will be increasing in BT in the future.
i.e. as the slope of the density gradient becomes steeper



the R50 value falls while the E value rises.

which was derived using a standard density function relating to previously developed areas in a non-suburban context; population density decreases exponentially as distance increases. "Exponential functions have been used in many applied studies of urban population growth and have been found to fit data very well.* The density function used to generate the three curves Y1, Y2, Y3, of median commutes 10, 5, 3, respectively is:

$D(M) = D_o e^{-BM}$ where $D(M) = D_o e^{-\beta M}$

M = Miles
e = Base of In. l_n
B = % rate of decrease in density
Do = a constant equal to max. density.

To contrast the models in Table II I have conformed with Allen and used 1000 employees and taken R50=10 to derive Y1, For lower R50 choices, see Fig. I. (For R50 = 5, see column IV)

TABLE II

I	II	III	IV
M	JORD (R50=10, E=1.4)	Y1 R50=10	Y2, R50=5
1	M=1.4 4.8	M=1 20.58	38.401
2	3.76	4.8	8.3592
2.735	2.975	2.4395	4.0371
3	2.8	1.9908	3.234
4	2.2	1.0448	1.583
8	1.05	.1979	.2274
12	.58	.0669	.0580
16	.3	.02843	.01876
20	.15	.01379	.00689

*Edwin Mills

Since BT's population is in the process of soaring (by Allen's est, (which is a gross understatement since it excludes both multipliers and normal trend growth), it will grow 308% between '76 and '82) the JORD formula produces an advantageous allocation of future housing responsibilities. From the geographic center of BT its radius in miles is 2.735 (using the simplifying assumption that its boundaries are circular). From Allen's calculations this ring of 2.735 miles (23.5 sq. miles) need only accommodate 10.67% of the BT future employment. Using an exponential density function, and depending on the choice of R50, the BT share could easily become a multiple of this amount. If this new formula was then applied from day one, the BT present population would still fall somewhat short of the hypothetical result, but this difference (far less than 16,000) would be primarily due to past zoning practices, and at least future growth would be relatively free of artificial and self serving restraints. In essence JORD in its present form is clearly invalid--when applied to the past it assumes a large number of people are already located in a particular area (which they are not) and thereby when projected into the future precludes their arrival from ever becoming a reality.

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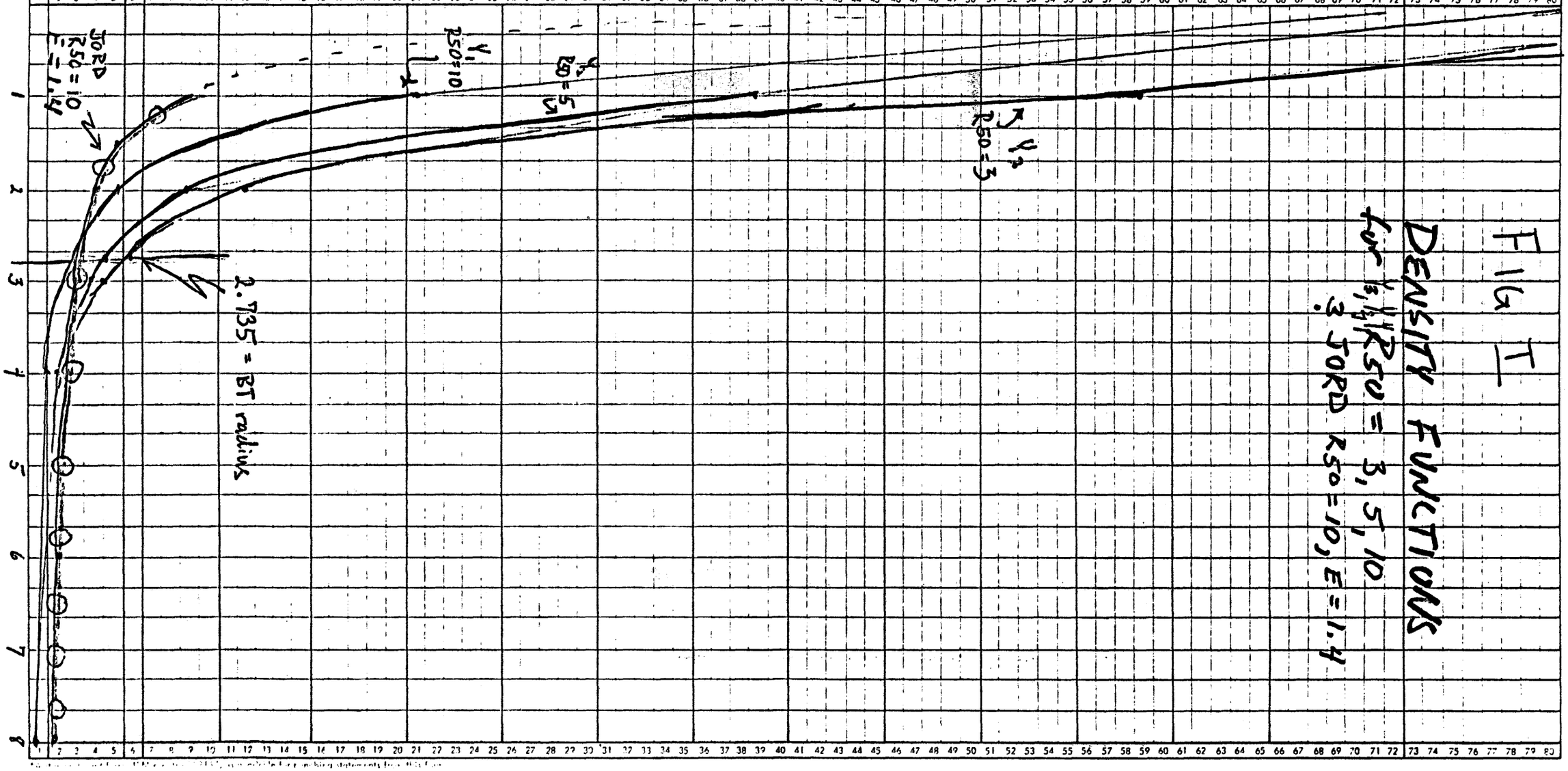

FIG 1

DENSITY FUNCTIONS for Y1, Y2 R50 = 3, 5, 10 & JORD R50 = 10, E = 1.4

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II

"I don't believe there is a consensus in our society to reduce the commute."

William Allen

"In any case, a family should have the choice of living as close as possible to the breadwinner's place of employment."

Presidents Commitee on
URBAN HOUSING " A Decent House"

For all N.J. residents in 1973, 57.2% of those living in single family homes commuted over 10 miles to work while for Garden Apartments the figure is only 32.2%, absent exclusionary zoning found in many suburban communities which have recently attracted industries the difference would be greater.

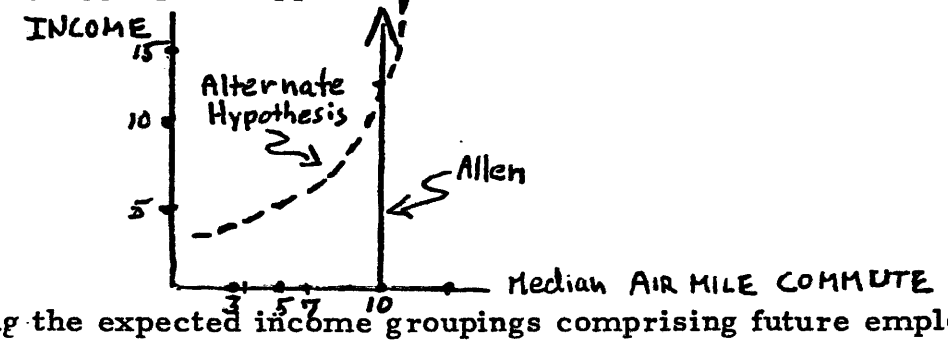
Figures from George Steinlieb
Housing Development and Municipal Costs. P.74

"Even if there is an arbitrary large number of income groups, if all satisfy the conditions of the thereom,* their residences will be ranked by distance from the city center inversely to their rank by income. That is, the lowest income group will be closest in, the next lowest will be next closest, and so on. This is a remarkably realistic result, and it mirrors closely the predominant pattern in U.S. urban areas."

Edwin Mills.

*This is the Wicksteed-Wicksell thereom --
In essence the remuneration to land must equal the value of its marginal product for all uses.

Unlike the JORD which viewed the composition of the regions population to be virtually as homogeneous as is the townships presently, here income ~~lived~~ level in conjunction with distance from the center is treated as a determining factor in revealing natural residential location s. As distances become longer they are more burdensome to lower wage earners because travel costs rise more quickly relative to earnings and because travel times and costs increase more precipitously due to a greater likelihood of time consuming transfers or larger capital outlays (eg an automobile). Thus what is a reasonable or proper commute for one income group is not necessarily appropriate for another; by condensing all income groups into a single R50=10 and E=1.4 grouping JORD effectively aggregates apples, oranges, banannas etc.



By determining the expected income groupings comprising future employment growth one can more equitably determine what housing regulations must allow and provide the opportunity for.

Example of a Hypothetical Distribution:

eg. Y3 .2.....$R50_3$=3
Y2 .4.....$R50_2$=5
Y1 .4.....$R50_1$=10

Then assuming .81345* households per job, sufficient land must be zoned at appropriate densities/acre to enable the market solution to occur. As implied in Fig. II, high density zoning to accomodate low and moderate income households should be centrally located, and Allen's concentric rings should reflect a diminishing proportion of L&M households for each succeeding ring as distance increases. Again, as argued in Sec. I, using Bridgewater Township or similar statistical bases will yield commuting distances which are far from appropriate for any study purporting to determine fair share. As observed by Mallach the median commute for blacks working at RCA was 14.2 miles as opposed to the overall median of 10.2. Assuming these blacks were somewhat representative of black income groups, this is contrary to the belief (shared by Agle) that those with the least resources should not be forced to expend the greatest amount (even in relative, let alone in absolute amounts) in commuting costs. That the lower paid employees at RCA must live further away is a direct result of the exclusionary zoning in Bridgewater Township and the surrounding municipalities

*Richard Reading & Associates

(eg BT) which forbid lower cost higher density accomodations. That application of data from RCA is preverse, is made clear in this context where applying this status quo distribution of commuting ~~by income level~~ would assure that many of the poor would be located furthest from employment sites. The JORD while implicitly accounting for most L&M households (see Section III) allocates them in line with pre-existing densities, while a better fair share method would allocate them inversely to the densities of L&M housing already provided, (One of four criteria used in the N.J. State Study).
Thus BT should not force LM households to disperse at a higher rate than upper income households (by not permitting high density) but rather must provide for them in accordance with the Mt. Laural mandate, "Certainly when a municipality zones for industry and commerce for local tax benefit purposes, it without question must zone to permit adequate housing within the means of the employees involved in such uses".* This will serve to increase BT fair share of LM housing employees substantially (especially when multiplier effects are included in employment growth) from the 10% it presently concedes to perhaps 50% or more.

*NJSA 40:55-30 to 51; Const. 1947 Art I, Par. I.

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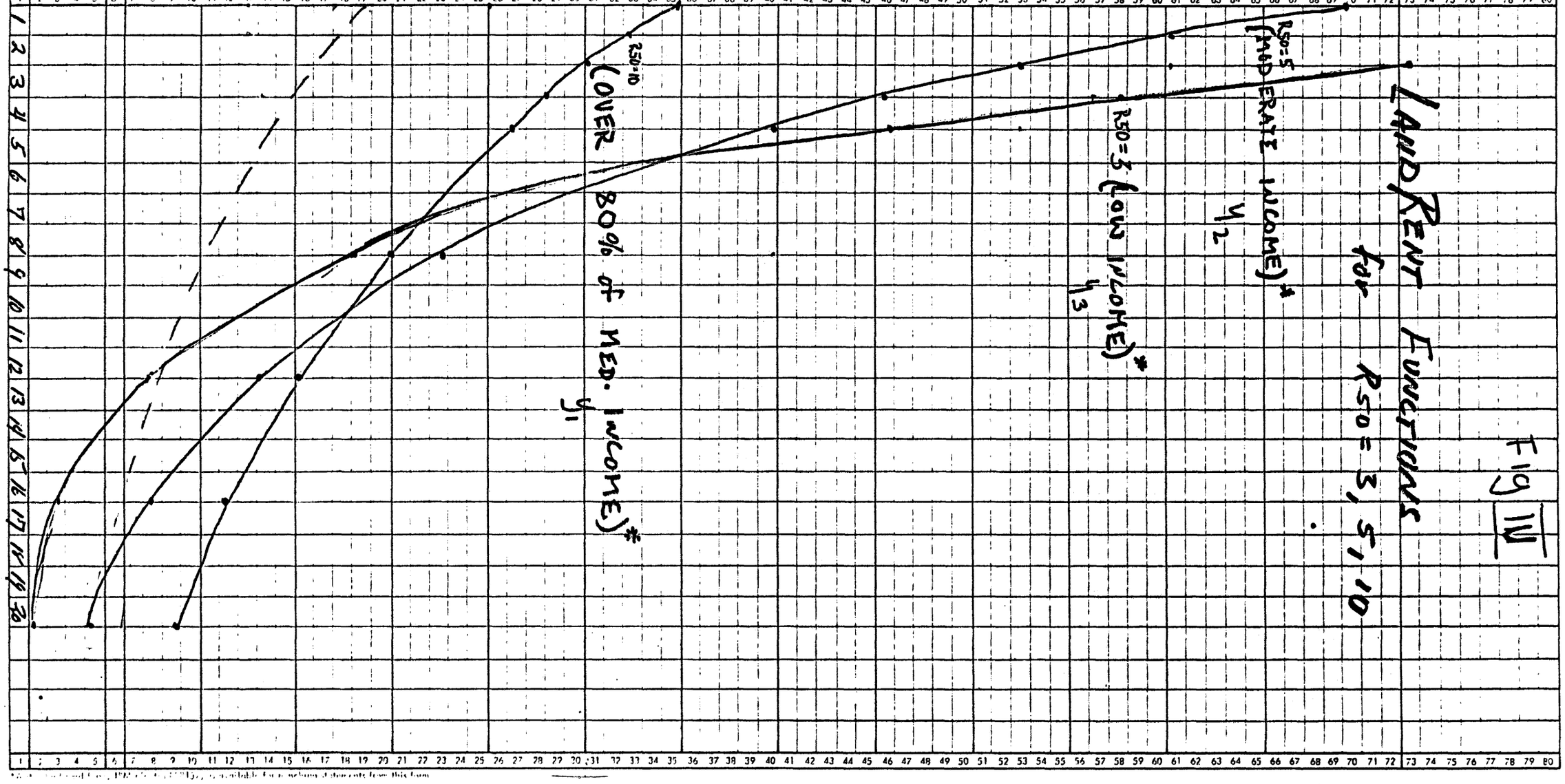

* INCOME GROUPS ARE ESTIMATES

**Number of forms per pad may vary slightly

III

"The cost of housing will (also) restrict mobility in household relocation which will tend to lengthen commutation with changes in employment."

Somerset County
Housing and Employment Survey
1970

It does not make sense to designate a fair share region containing only affluent communities which is what the Allen Methodology leads to by placing preponderant weight on the present population distribution of BT's neighboring developing communities and little or zero weight on nearby urban areas experiencing employment decline and presently housing people who will soon be forced to relocate elsewhere to find employment. Rather, what must be done for a legitimate allocation, proper weight should be placed on the population characteristics of the sending areas, i.e. those containing heavy concentration of low and moderate income residents to be housed and employed by developing communities.

As jobs fall by 30,808 (as projected by Allen) in Essex, Allen is correct in reducing BT's obligation to house people living in the 23.5 sq. miles of BT and working in Essex, by 10.59% based on the JORD density function. It is however clear that as jobs fall in Essex unemployment will ensue and those numbers of the labor force unemployed must search elsewhere for a livelihood, and the most socially desirable and natural (absent exclusionary zoning) of all movements is to areas of expanding employment opportunities. The movement of large employers such as AT&T from areas such as Newark in Essex to suburban communities such as BT in Somerset (which rezoned to make AT &T's more possible) has far from only diminished such suburban communities responsibilities to the urban unemployed as Allen would have us believe. By claiming it is not necessary to weigh the Essex population comprised of 43% of LM households in BT's future fair share due to erosion of employment in Essex, Allen has in effect suggested that this portion (10.59%) of Essex's present population will either vanish or assume through metamorphosis the characteristics pertaining predominantly to Morris and Somerset--i.e. a distribution of only 25.8% LM households. Admittedly some leakage from the housing region will occur while the rest of the displaced 10.59% are presumably to be found in Allen's various employment projections for growing municipalities such as BT or neighboring Bedminster--- suburban localities which have lured ratables away from urban areas such as Newark. Of these Essex County emigrants one may safely as sume that at least 43% will be LM income households. In short the Allen Methodology is again blatently one sided--deducting obligations and neglecting to subsequently add in the new responsibilities incurred when these deductions occur.

To correct this particular deficiency (as pertains to Essex) it is first necessary to determine what percent of the displaced population of Essex will find employment in each municipality within the BT housing region. Since these units have been implicitly included in the numerical employment projecti ons, there will be no net increment in the regions absolute level of employment, but since at least 43% (vs. 25.8%) will be LM income, there will be a significant increase in the future need for LM housing units--- especially in communities with large primary and secondary employment potential such as BT. As was discussed in Sec II these LM workers should have the possibility of locating so as to allow for a minimal commute and not be spread randomly over the count ryside. (eg. R50=5)