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REGULATION OF MOBILE HOME SUBDIVISIONS

In 1960, mobile homes made up about 10% of the supply of new non-farm single-family dwellings. In 1955, the figure was less than 7%. In the future, the proportion of mobile homes, or dwellings built like mobile homes but without wheels, promises to continue to rise.

The mobile home is a notable example of the type of thing we glorify in theory but are slow to adjust to in practice. Born of Yankee ingenuity as the covered wagon and adapted through casual design and do-it-yourself construction with materials at hand to meet the unexacting needs of depression-driven migrants in automobiles, in the last twenty years it underwent a major metamorphosis in function, design, materials, and construction methods.

At present, the mobile home is designed and built as permanent and relatively fixed[1] housing by modern industrial methods. It makes the most of new design, materials and fabrication techniques. Its wheels remain, but are increasingly vestigial remnants. It arrives at the site fully equipped with furniture and appliances, ready for occupancy as soon as water, sewer and electrical connections are made.

It does not look like a conventional house. It is not built like a conventional house, but by methods more closely akin to those used in construction of planes or automobiles. It is not sold like the conventional house. Its financing, unlike that of the conventional house, includes furniture and all appliances. It frequently does not have the same relationship to the land on which it is located as does the conventional house. And it has not stopped changing.

It continues to get bigger as it moves toward the time when the wheels will come off. Already individual units are moving toward a 600 sq. ft. average, and combinations of elements side by side or in T-shapes, or telescoping additions to individual units, with or without prefabricated "Florida rooms," make possible sizes ranging to 1,400 sq. ft. and beyond.

[1]This and subsequent footnotes are listed at end of report.

Prepared by Frederick H. Bair, Jr.

The mobile home is popular with a growing number of customers. They find it efficient, economical and comfortable. Many of them choose it over conventional housing. Retirees often leave conventional housing in favor of mobile homes, and the mobile home is frequently the first house of the new family.

As something new on the housing scene, the mobile home cuts across a broad spectrum of comfortable customs, and affects many interest groups. It is about as popular with conventional home builders as was the automobile with buggy manufacturers. The realtor seldom gets a cut of mobile home deals. On a lot in a conventional residential neighborhood, the mobile home still creates alarm, shock and lowered property values. The neighbors may have pushed for no-look-alike zoning, but this is too much of a good thing.

The municipality provides the usual range of services and facilities to mobile home dwellers, but has been slow to find means for equitable collection of costs. Local tax officials are faced with a licensed vehicle which is usually an owner-occupied permanent home on a lot (usually rented) from which it may move.

Customary real estate tax procedures don't fit, and it takes considerable effort to devise other means to insure that the mobile home pays its way.

The building official has several problems. Should local building, plumbing, electrical and heating codes be applied to a vehicle constructed elsewhere which is a residence but may or may not be a structure according to the definition in his book, even though the construction methods are closer to those for an air frame than for a conventional house? Should housing codes designed without consideration of the mobile home be applied? In zoning, what should he do when the definition of single-family residence obviously fits the mobile home, but the mobile home equally obviously may create a riot if permitted like any other house in conventional single-family districts?

So the mobile home presents many challenges which can't be met by routine application of familiar tools in the administrative kit.

Good beginnings, at least, have been made on solutions to many of the special problems presented by mobile homes. Mobile Home Parks and Comprehensive Community Planning, by Bartley and Bair,[2] contains suggestions on a wide range of approaches. The Law of Mobile Homes, by Hodes and Roberson,[3] provides legal background material on methods for regulation of mobile homes as dwellings, mobile home parks, taxation and zoning.

The New York State Division of Housing has developed a model housing code for mobile homes and mobile home parks.[4] The California State Division of Housing has developed and adopted "Rules and Regulations for Plumbing, Heating, and Electrical Equipment in Trailer Coaches,"[5] requiring a seal of approval indicating compliance, and the Mobile Home Manufacturers Association and Trailer Coach Association, working with other professional organizations, societies and associations, developed a similar code[6] to which member-builders must conform, thus easing the strain on shortage of local codes in this field. Here again, a seal on the unit indicates compliance. A general construction code for mobile homes is in the making.

The Federal Housing Administration has developed Minimum Property Requirements for Mobile Home Courts,[7] giving a basis for detailed local regulation of design

and development of mobile home parks, and providing valuable leads for mobile home subdivision regulations. The U.S. Department of Health, Education and Welfare has prepared Mobile Home Park Sanitation,[8] a publication which goes farther than its title indicates and includes information and standards on site provisions, service buildings, water supply, sewage and refuse disposal, insect and rodent control, electricity, exterior lighting, fuel, fire protection and other matters.

The National Fire Protection Association has produced Standards for Fire Prevention and Fire Protection in Trailer Coaches and Trailer Courts.[9]

These and other new or adapted tools provide means for fitting the mobile home into the administrative framework. It remains for the planner to fit it into the urban scene. Since the mobile home is not yet acceptable mixed indiscriminately with conventional single-family housing, appropriate means for segregation are needed. Mobile home parks, usually suitable for multiple family residence districts, are one solution, discussed at length in Mobile Home Parks and Comprehensive Community Planning.[2]

But now comes another rapidly-growing development, the mobile home subdivision. At present (1960) there are about 50 of these operating in the U.S., of which a small part are very good and most are not. The number is growing fast now, and will grow faster. Whether this represents a gain in good housing or a gain in slum housing depends considerably on whether appropriate specialized controls are enacted in time.

For the planner, the most important of these controls are zoning and subdivision regulation.

DEFINITIONS

As a first step in setting up planning controls, it is necessary to arrive at some basic definitions. With the mobile home evolving, this must be done in a manner which avoids obsolescence in the definitions almost before the regulations are adopted.

The mobile home subdivision should be specifically designed for mobile homes and the kind of housing likely to grow out of mobile homes. The definition of "mobile home" requires considerable care in circumstances where the mobility is disappearing before the wheels and the wheels themselves are likely to disappear soon.

Part of the problem is that the present name of the dwelling unit emphasizes a feature of diminishing importance, and a new name needs to be coined. In Puerto Rico, where dwellings built by mobile home methods but without wheels may meet a demand for housing in the price class involved, the Spanish term "casa completa" seems likely to take hold. This makes sense, since the house is delivered completely furnished and equipped, but "complete house" lacks something as an English equivalent and certainly falls short of telling the whole story in either language.

"Prefabricated housing" won't do now that the term has been preempted by a form of housing in which the elements are built elsewhere and assembled at the site. We are talking about "ready-to-wear" housing, but still don't know what to call it. The idea is contained in the words "package home" or "package housing," but these terms leave something to be desired for the merchandiser, however true it may be that the unit is housing which often looks like a box. Or taking a tip from the automobile industry, the term "compact homes" might be a step in the direction of more descriptive language.

For the moment, "mobile home" may have to do. Whether we call the thing being defined a mobile home or something else, the elements involved in defining it are these:

1. It is a dwelling which almost never provides housing for more than one family

2. It is almost completely factory-built and factory-assembled. Only minor and incidental operations are necessary after it reaches the site - unpacking and arranging objects protected during shipping, running out telescoping sections or fastening two completed subunits together in the larger models, and connecting to utilities.

3. In addition to structural completeness at time of delivery, it arrives completely equipped with furniture and major appliances. In a modern unit there will be, built in, one or more complete bathrooms, a kitchen with sink, stove and refrigerator, water heating equipment, space heating equipment, and quite possibly air conditioning equipment, washing and drying machines, TV, radio and stereophonic sound.

4. The unit is built to transport on highways after completion on wheels of its own or (in the future) on flatbeds or other trailers. It is designed for delivery to the site from a street without requiring the kind of special permit required for moving a conventional dwelling.

Putting these elements together into a definition, we come up with something like this:

Mobile Home

A mobile home is a single-family dwelling designed for transportation after fabrication on streets and highways on its own wheels or on flatbed or other trailers, and arriving at the site where it is to be occupied as a dwelling complete and ready for occupancy, except for minor and incidental unpacking and assembly operations, location on jacks or permanent foundations, connection to utilities and the like.

It is possible, of course, to build qualitative standards into the definition by including phrases like "meeting the requirements of Sec._____, Housing Code of the City of_____," or other phrases including applicable regulations by reference. Little is added by including such language in the definition. The regulations apply anyway. As a general rule, it is better to let the definitions define and the regulations regulate. As stated in Planning Advisory Service Information Report No. 72,10 "Definitions are in themselves a type of regulation, but they should not be loaded with standards, measurements, or

other regulations."

The only other definition which appears essential covers mobile home subdivisions. Here the crux of the matter is a statement of exclusive segregation, making it clear that the subdivision is for residential use by mobile homes only.

Mobile Home Subdivisions

A mobile home subdivision is a subdivision designed and intended for residential use where residence is in mobile homes exclusively.

Both these definitions should go into the zoning ordinance, and depending on the makeup of local subdivision regulations, the mobile home subdivision definition might be needed there also. If subdivision regulations are similar to those in Suggested Land Subdivision Regulations,[11] developed by the Housing and Home Finance Agency, and handle the matter of lot sizes in subdivisions by stating that they shall conform to the requirements of the zoning ordinance, insertion of special wording relating to mobile home subdivisions is unnecessary. If however there is a statement that minimum residential lot size in areas served by public sewer shall be 6,000 sq. ft. and minimum lot width shall be 60 ft., some tinkering will be necessary for reasons discussed later, and it will be desirable to include the mobile home subdivision definition to facilitate the tinkering.

Some other definitions may be needed. These will be discussed in context later.

LOCATION OF SUBDIVISIONS AND PARKS

The mobile home park has apartment house characteristics including rental of lots and provision of facilities and services to tenants by management. Although population density is not as high in parks meeting FHA minimum standards for financing as in many apartment houses, there is considerable justification for calling the mobile home park a multiple-family use for zoning purposes.

The mobile home subdivision is an entirely different arrangement. Lots are not rented, but sold. The purchaser is not a tenant, but a land owner. Density is likely to be somewhat higher than for most single-family areas, but the use is clearly a single-family use.

Considering the relative newness of the mobile home, its characteristically different appearance, and the feeling that individual units should not be mixed in among conventional dwellings, it is discreet if not entirely logical to segregate mobile homes in either parks or subdivisions. If this is to be done, the zoning ordinance should indicate the residential district in which mobile home parks are to be permitted and those in which mobile home subdivisions are to be permitted, and should also state that mobile homes will not be permitted in such districts except in mobile home parks and subdivisions. If there are to be districts where individual mobile homes are to be permitted to mix with conventional dwellings, this fact should be made clear.

Normally, neither conventional housing nor mobile homes occupied for residential purposes should be permitted in commercial or industrial districts except after very careful examination of local circumstances. In and around central business districts in major cities, apartments will probably be justified. Economics will probably bar mobile home parks in such areas. But residences (mobile home, conventional, single or multiple-family) mixed with businesses in strip commercial or outlying shopping center areas contribute to each others blight. Mobile home sales lots, of course, belong in appropriate commercial areas.

Zoning Control of Location

Zoning regulation of the location of mobile home parks and mobile home subdivisions may be handled in several ways. Such uses may be 1) permitted outright in appropriate residential districts; 2) established as "floating" zones, to be "anchored" in appropriate residential districts when applications meet specified requirements; 3) permissible as special exceptions in appropriate residential districts after specified requirements have been met; or 4) provided for in special mobile home districts.

Generally speaking, it is better to have the use permitted outright in specified districts, subject to clearly specified requirements. The applicant knows what he can and cannot do without lengthy negotiations which may involve the planning commission and staff, the board of adjustment and the governing body. If it can be said that "Mobile home parks (or subdivisions) meeting the following requirements will be permitted in district X," this is by far the best way to handle the matter.

The "floating zone" technique establishes conditions under which district boundaries will be drawn on the map after stated requirements have been met. It may provide a relatively narrow range of uses, since the applicant for the district designation will have those uses in mind before applying. If the requirements are met, there is no excuse for refusing the zoning.

The special exception is a maybe-so, maybe-not device involving what may be an excessive amount of red tape. Here again, the specifications should be stated. If they can be stated with sufficent clarity and completeness to protect public interest and policy (as set forth in the comprehensive plan or otherwise), there seems no reason why the board of adjustment should become involved. (In most jurisdictions, the board of adjustment is the only body legally authorized to handle special exceptions, and efforts to provide for special permits by the planning board or the governing body skate on thin legal ice.)

The special exception should be used only where the situation is so complex that inclusive rules cannot be stated. If this is the case, and if the planning board has a professional staff and the board of adjustment does not, it is advisable to require favorable recommendation from the planning board before the board of adjustment may grant the special exception. It solves nothing to say that a matter so technically complex that the specifications cannot be stated should be decided by a body which normally has no technical planning advice.

The special district for mobile homes in parks or subdivisions involves another

kind of problem. In this case, areas for mobile home parks or subdivisions (or both) are fixed on the zoning map. Owners of land in the district are then limited in the use of their land to mobile home parks or subdivisions, a rather narrow choice. If the district is the only one in which parks or subdivisions may be developed, they also have a monopoly on such uses.

As a "floating zone," there can be little objection to a highly specialized district on grounds of special privilege or of undue restriction. Anyone may have the special zone "anchored" anywhere within those residential areas found appropriate for mobile home subdivisions if the proposal meets the requirements of the ordinance. "Anchored" by edict in advance of the request of interested parties, the special district can cause a lot of trouble.

It should be made clear that if the so-called special mobile home district for parks or subdivisions or both is not limited to such uses, but also permits single and multiple-family housing, it is not a special mobile home district, but a single or multiple-family district in which mobile home parks or subdivisions are permitted along with other residential uses. The same thing is true of a district in which mobile homes and conventional dwellings are permitted to mingle without the requirement that mobile homes shall be segregated in parks and subdivisions.

Appendix A of this report gives a sample of deed restrictions. Appendix B contains a checklist on "what to regulate where."

AREA OF SUBDIVISIONS

If zoning ordinance provisions are included by reference in subdivision regulations (as is usually the case whether the subdivision regulations include a statement to that effect or not) the matter of minimum area of mobile home subdivisions can be handled entirely in the zoning ordinance. In some cases, it may be necessary also to make special provision in the subdivision regulations.

Good management and sound economics set a minimum size for mobile home parks. If there are not enough units to provide financial support for management services, the park will fail or become substandard. The minimum number of units necessary, combined with minimum standards on area per unit, sets the minimum size of the park.

In the case of mobile home subdivisions, a different set of considerations are involved. Although there are mobile home subdivisions with club-type operations where ownership in the subdivision entitles occupants to the use of facilities not available to the general public, it may be assumed that most subdivisions for mobile homes will be like conventional subdivisions. Thus the factor of management economics is not a determinant of minimum area.

But some minimum should be set. Suggested Land Subdivision Regulations[11] and many local subdivision regulations define subdivision as the division of a parcel of land into two or more lots or parcels. Division of a large lot in a residential neighborhood into two smaller ones meeting minimum requirements

poses no problems if the lots are for conventional residential use. Creation of a two-lot mobile home subdivision in the midst of a conventional residential neighborhood would be something else again, particularly if lots smaller than those required for conventional dwellings are to be permitted in mobile home subdivisions.

If mobile homes are to be segregated from conventional housing (whether the decision to do so is based on discretion rather than logic or not) they should be well and truly segregated, not scattered around in twos and threes, nor yet in fours or fives. The answer, for the peace of mind of mobile home dwellers and the community at large, lies in mobile home subdivisions large enough to constitute at least small neighborhoods. (The word neighborhood is used here in its original sense.)

What constitutes enough lots to make up a small neighborhood is a matter for local determination. As a starting point for local refinement, if lot size and density controls discussed later are used there will be 5-8 units per acre in sewered subdivisions. If it is felt that 50-100 homes are enough to make up a small neighborhood, about ten acres will do for the minimum. If it is felt that a larger number is desirable, the acreage should be increased.

DESIGN

Sources of Information

There are many sources of guidance on design and standards for conventional residential subdivisions. Among books and manuals published in the past ten years are FHA's Suggested Land Subdivision Regulations,[11] the International City Managers Association's Local Planning Administration,[12] the Senate of the State of California's Subdivision Manual,[13] the National Association of Home Builders' Home Builders Manual for Land Development,[14] the Community Planning Association of Canada's How to Subdivide,[15] the Canadian Central Mortgage and Housing Corporation's Principles of Small House Grouping[16] and Housing Design (Parts I and II),[17] V. Joseph Kostka's Neighborhood Planning,[18] FHA's Neighborhood Standards,[19] and Clarence Stein's Toward New Towns for America.[20]

Planning Advisory Service has had several Information Reports with pertinent information. No. 27, Zoning for Group Housing Development,[21] published in 1951, was a sound early treatment covering what is now called "cluster subdivisions," and the recent No. 135, Cluster Subdivisions,[22] deals with some of the same subject matter. Between these two, a considerable number of Planning Advisory Service Information Reports have been published bearing on subdivision design, standards, and control measures.

The Urban Land Institute, in the monthly newsletter Urban Land,[23] frequently contains helpful material, for example: "Developing Golf Course Subdivisions," by G. H. Crabtree, Jr. in the September 1958 issue; "Zoning for the Planned Community," by Fred W. Tuemmler in April 1954; and "Notes on Street Cross-Sections in Residential Subdivisions," by Allen Benjamin in May 1960. And there have been helpful Technical Bulletins from the Urban Land Institute, as for example No. 36, published in December 1959, Securing Open Space for Urban

America: Conservation Easements,[24] by William H. Whyte, Jr., and No. 40, January 1961, New Approaches to Residential Land Development.[25]

The Journal of the American Institute of Planners, in the Fall 1952 issue, had an article "New Planning and Subdivision Methods"[26] by Alexander Klein which contained suggestions on original approaches. The American City,[27] House and Home,[28] Landscape Architecture,[29] and Architectural Forum,[30] are among periodicals which frequently carry material likely to be helpful.

There is no shortage of material on subdivision design and design standards. There are two problems about using such information, one general, the other specific, as relates to mobile home subdivisions. The general problem is common to all planning - an acceptance of ideas or standards without understanding how they came to be or whether they should still apply. The specific problem is to adapt sound ideas and standards for conventional subdivisions to the requirements of the mobile home subdivision.

Starting with the Unit

Design of the mobile home subdivision should start with an understanding of the design of the mobile home. Some mobile home floor plans, ranging from small units to large, are shown in Figures 1 and 2.

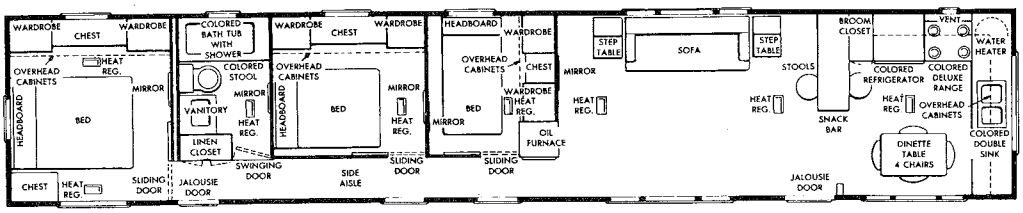
The units and their component parts are not all that should be considered. In many cases, prefabricated or conventionally-built covered patios, "Florida rooms," car ports or garages, utility rooms, and other additions will be made. But the shape of the basic unit is such that even with these additions it is likely to run lengthwise with the lot, rather than across it, and custom in this matter is now well established. Additions will usually be on the same axis.

The main entrance is usually at the right side toward the front of the unit, and living-room orientation is usually toward the same side, although mobile home living areas always have windows on two sides, and frequently (unless the kitchen and dining areas are toward the front) on three sides.

Master bedrooms, at the rear of the unit, usually have windows on three sides, almost always on two. If there are additional bedrooms, they are usually located at the side of the unit away from the front entrance, are accessible from a hall along the front-entrance side, and have windows with only one exposure.

Figure 1

SAMPLE MOBILE HOME FLOOR PLAN

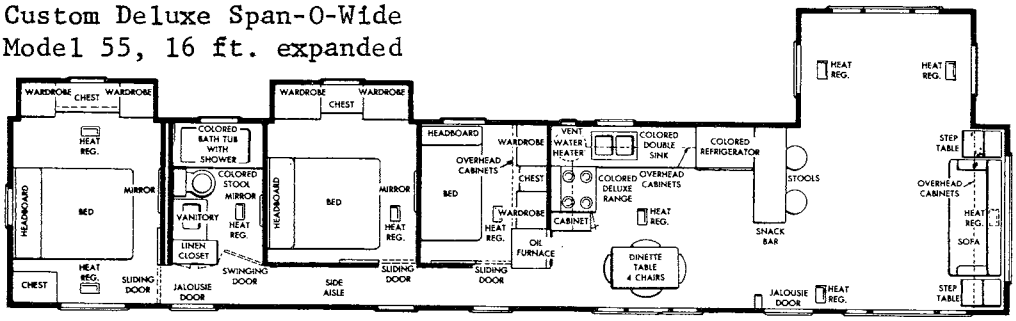


Custom Deluxe Model 55, 10'-wide, Detroiter Mobile Homes, Inc.

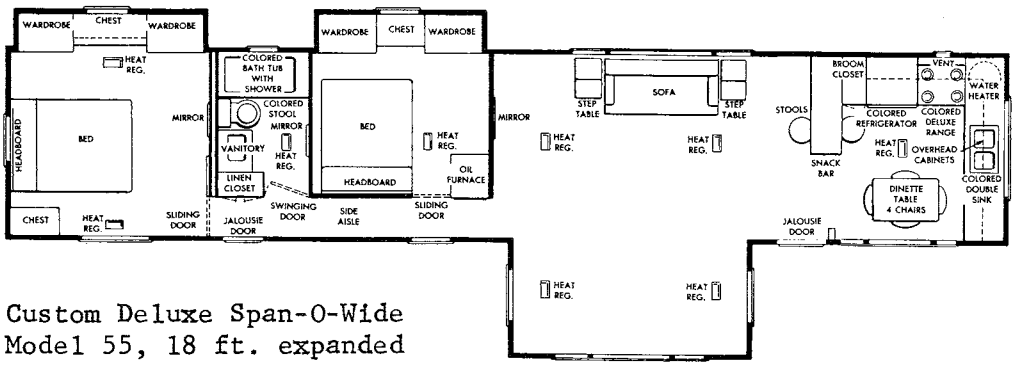
Figure 2

SAMPLE MOBILE HOME FLOOR PLANS

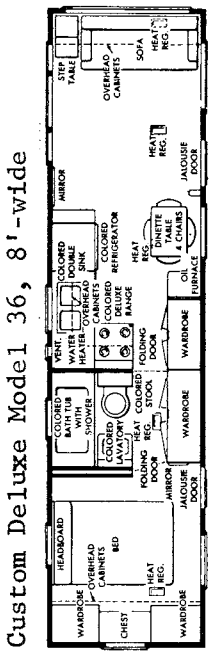
Custom Deluxe Span-O-Wide
Model 55, 16 ft. expanded



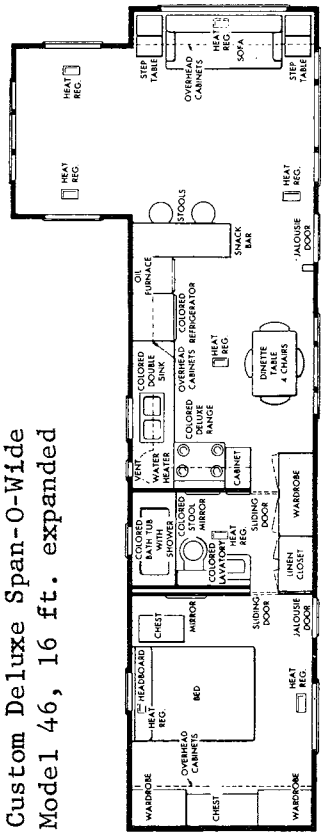
Custom Deluxe Span-O-Wide
Model 55, 18 ft. expanded



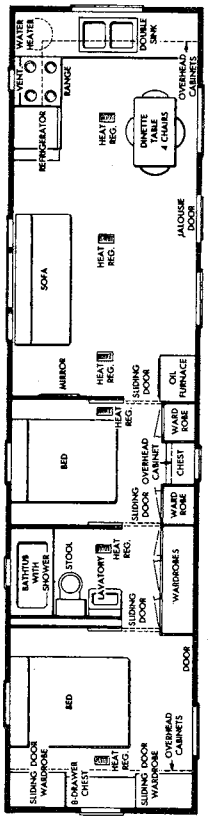
Custom Deluxe Model 36, 8'-wide



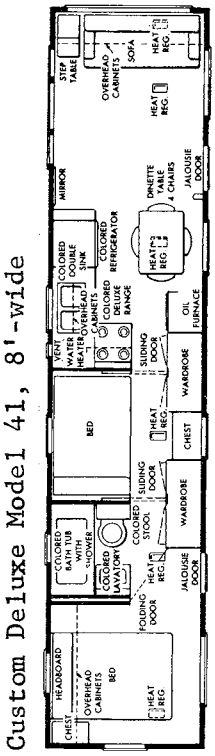
Custom Deluxe Span-O-Wide
Model 46, 16 ft. expanded



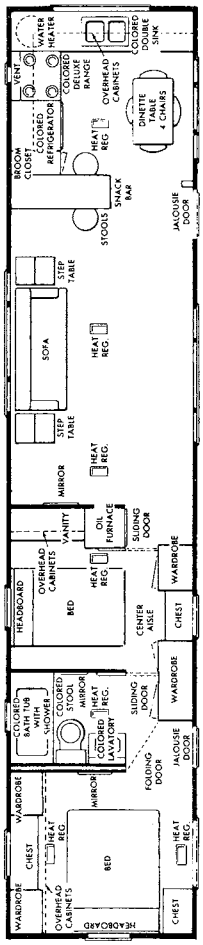
Pontiac Chief Model 45, 10'-wide



Custom Deluxe Model 41, 8'-wide



Custom Deluxe Model 51, 10'-wide



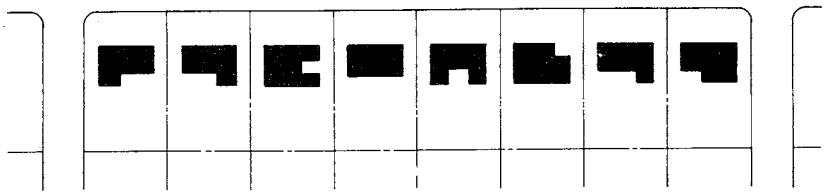
All samples from Detroiter Mobile Homes, Inc.

Lot Shape, Orientation and Dimensions

A study of mobile home living unit plans makes it clear that the layout for subdivisions for conventional housing will not fit mobile homes.

Some adaptation is desirable even in the most prosaic design. For example, in a rectangular block, lots for conventional residences often look like Figure 3.

Figure 3

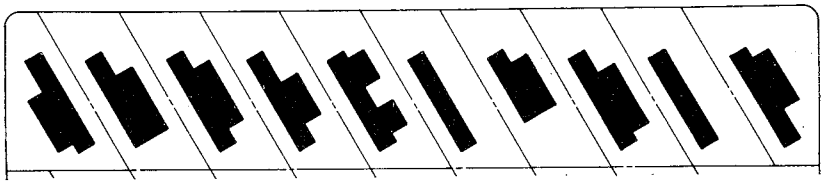


The residences run across the lot, with the front living room windows facing the street, and with bedrooms usually next to the neighbor's carport. If mobile homes are forced into the same subdivision pattern, the result is something like Figure 4.

Figure 4

The units run lenghtwise on the lots, most of the windows face adjacent units, and the master bedrooms, at the rear of the units, are likely to be side by side. Analysis of floor plans indicates why this sort of arrangement is not well adapted to the usual mobile home. But if the lots are diagonal to the street (at an angle of 30 degrees from perpendicular) the picture changes, as seen in Figure 5.

Figure 5



The orientation of principal windows is now toward the street, and the relation of the other functional areas in adjacent units is much improved.

Obviously, if mobile homes are to be laid out in rectangular blocks, diagonal lots are far better than perpendicular ones. It goes without saying that the front and rear lot lines should be straight and continuous in such cases, rather than in a saw-tooth pattern.

In establishing lot sizes and widths in unsewered areas, where septic tanks are to be used in mobile home subdivisions (and the technique might well be applied to conventional subdivisions), a departure from common practice is suggested. Many current subdivision regulations contain something like the following language: "Residential lots to be served by septic tanks shall be not less than__feet wide, nor less than__feet in area."

This may facilitate administration and processing, but if satisfactory operation of septic tanks is the primary objective, it doesn't make much sense. In most areas there is wide variation in subsoil conditions and groundwater

levels. If a flat standard is to protect public health throughout the jurisdictional area, it should be geared to the worst conditions in the area. It is thus unnecessarily high for all but the worst conditions, and raises development and municipal costs, wastes land, and adds to urban sprawl. On the other hand, a flat standard based on "average" soil and groundwater conditions falls short of needed protection for many properties.

So far subdivisions (mobile home or otherwise) to be served with individual septic tanks, it would be better to state "Residential lots to be served by septic tanks shall be of a width and area meeting the approval of_____ (the city or county health authority)." This would mean that determination of lot widths and areas in a particular subdivision where septic tanks were to be used would be on the basis of authoritative determinations as to what it would take to make a septic tank work. Trained health officials are available in most jurisdictions, and should be consulted at the pre-application stage in subdividing.

Where such determinations call for larger or wider lots than are required by the zoning ordinance for the district involved, they would override the zoning ordinance. Normally this would be taken care of automatically. Most zoning ordinances contain a statement to the effect that "Wherever the requirements of this ordinance are at variance with the requirements of any other lawfully adopted rules, regulations, ordinances, deed restrictions or covenants, the most restrictive or that imposing the higher standards, shall govern."

In any subdivision to be served by septic tanks, if there is prospect of public sewerage in the future, it is common sense to get the septic tanks located where they can be tied in with public sewerage with minimum strain. A toilet flushed in a mobile home is the same as a toilet flushed in a conventional house, and the size and shape of the mobile home is not grounds for permitting inadequate lot shape or area so far as septic tank operation is concerned. Here again, the health authorities are in the best position to judge.

In establishing lot sizes and widths in sewered areas, as in establishing lot shape, mobile home subdivision requirements vary from requirements for subdivisions of conventional homes.

For conventional subdivisions, Suggested Land Subdivision Regulations[11] indicates in a footnote that where zoning does not set higher standards, lots served by public sewers should not be less than 60 feet wide and not less than 6,000 sq. ft. in area.

These figures have been enshrined by widespread application as standards rather than minimums. Why they were selected is not altogether clear, but mile after mile of conventional development follows a pattern in which rectangular lots are exactly 60 feet wide and exactly 6,000 square feet in area, or as little above these figures as possible.

The 60-foot minimum lot width may have been set and maintained for conventional residences because development housing (from the Cape Cod to the ranch-type and spilt-level) has customarily been laid out with the long axis across the lot. The dimension of the basic house, and the need for garages or car ports, driveways, side yards, and other ancillary features, make it apparent that less than 60 feet would hardly be practicable.

The mobile home is different. It is customarily sited along the long axis of the lot, and the unit is usually long and narrow. Thus lots can be narrower than the revered 60 feet and still provide greater separation between units than is customary with conventional housing.

The predominant current form is the 10'-wide, but the 12'-wide seems to be emerging fast, and a 12-foot minimum width for the mobile home itself is probably a sound bottom figure from which to start planning. A 12'-wide with two 10-foot side yards, (and without any additional structures increasing its width) would require a 32-foot minimum lot width. (If it were 50 feet long it would provide 600 square feet of floor area.)

Moving into the upper range, combination of two 12-foot subunits to form a 24-foot mobile home with 10-foot side yards makes minimum lot width needed 44 feet. This width would also allow for a variety of 10- or 12-foot units with additions. (Maximum floor space could exceed 1,500 square feet.)

Thus, if 10-foot side yards are specified as minimums (and they probably should be) the range of lot widths likely to be required runs from 32 to 44 feet. This would provide 20-foot minimum clearance between structures on adjacent lots, substantially more than is usually found in high-density subdivisions of conventional single-family houses.

The diagonal layout provides open area in front of principal living room windows, if located in the forward part of the unit, and there is adequate spacial separation between other functional areas in adjacent units. But the use of the diagonal lot introduces complications in terminology and measurement. On rectangular lots, width is measured parallel to the street, depth is measured perpendicular. On diagonal lots, this doesn't make sense in terms of the intended functions of lot width and depth. Hence some new terms are necessary:

Effective width of a diagonal lot is the width necessary to allow for a mobile home sited on the diagonal, together with structural additions and required side yards. On interior lots, it is measured at right angles across the lot from one diagonal side line to the other. Since these lots are parallelograms, it doesn't make any difference where the measurement is made. But since variations of the pattern and corner lots may complicate things, it is advisable to specify that the measurement shall be made at right angles from the diagonal having the greatest divergence from perpendicular to the street, through the midpoint of the rear line of the required front yard, to the opposite side lot line or an extension thereof. Special treatment will be necessary on corner lots. One set of corner lots will not require as much effective width as interior lots, the other will require considerably more.

Effective depth of a diagonal lot is the depth necessary to provide for a mobile home sited on the diagonal plus required front and rear yards. On lots which are diagonal parallelograms, it may be measured down either side lot line. On other lots involving diagonal side lot lines, or on corner lots, the longest diagonal lot line should be used.

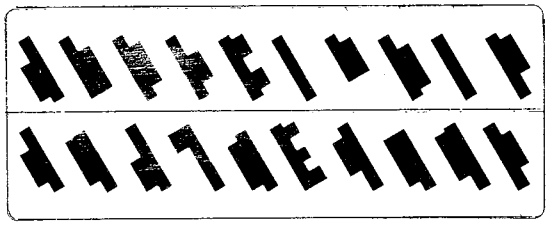
Block Design

The diagrams and tables which follow deal with lots which are parallelograms at 30 degrees from perpendicular to the street. This is apparently destined

to be a common form in mobile home subdivisions, and detailed exercises in its use help to establish some theory and standards which may be helpful in other kinds of mobile home subdivision design.

Figure 6 indicates the kind of lot pattern which might be expected on a rectangular block with diagonal lots, and indicates how mobile home units with various shapes and additions might fit such lots.

Figure 6

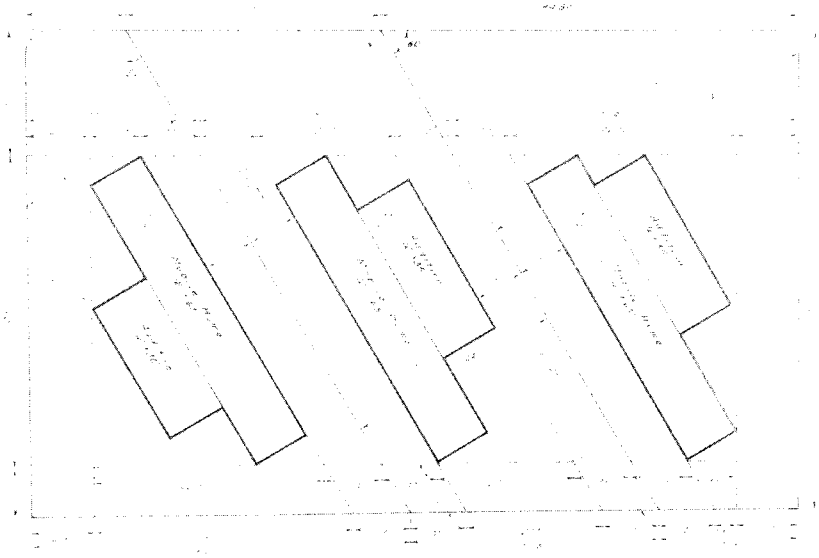


The tables provide a theoretical basis for quick computations. These assume a 5-acre rectangular block in which the length and depth can be varied at will. None of the blocks exceed a maximum length of 1100 feet. On all four sides of the block, it is assumed that 30-foot half streets have been provided. Front yards are assumed to be 25 feet deep, rear yards 10 feet deep, both measured perpendicular to front and rear lot lines. Effective side yards (measured perpendicular to the diagonal side lot lines) are each 10 feet wide. On corner lots, 12.5-foot front yards (half the full depth) are required adjacent to the side street.

These tables represent theoretical maximums on number of lots and density per acre. Aside from street right of way, no land is considered outside the area of the lots themselves. All utilities needed are assumed to be located in the street right of way. No land other than streets is provided for public or quasi-public purposes.

It is strongly emphasized that the layout discussed in detail at this point is not recommended as the ultimate in mobile home subdivision design. The prosaic diagonal lots marching in echelon in rectangular blocks along straight streets represent the mobile home subdivision equivalent of many conventional housing developments. There seems to be no justification for forbidding it. It insures a monotonous and efficient use of space and provides a minimum of protection for the users.

Figure 7



The purpose of the diagrams and tables is to provide a floor for standards, a point of departure for desirable improvements.

In Figure 7, corner lots I and III and interior lot II illustrate the three basic patterns for 30^{o} parallelogram lots in rectangular blocks. Normally, of course, there would be many interior lots between the corners.

The interior lot shown provides a 24-foot effective width for a 65-foot 12'-wide mobile home and additions, plus side yards with effective widths of 10 feet. Total area of the lot is 4,943 square feet, "buildable" area 1,726 square feet.

Corner lots I and III as illustrated are also designed to take 65 foot 12'-wides, and have side yards with 10 foot effective widths toward the center of the block, continuing the pattern on interior lots. Their "buildable" areas are identical in size - 1,768 sq. ft. - but reversed in orientation. Total areas of I and III are 4,680 and 5,522 square feet.

Lot I presents a minor problem in use. Unless the unit is reversed on the lot, with access from the side street, a door would have to be provided on the "off" side of the living room to give direct access to the accessory structure.

In this pattern, lots located like I have a curious characteristic. Regardless of the length of the 12'-wide unit used in determining depth of the lots in the block face, the minimum street frontage required for corner lots in this position remains 20.01 feet if the mobile home is set at the rear line of the required front yard. Street frontage required for corner lots in the location of III varies according to the length of the 12'-wide unit planned for.

The tables are based on 30° parallelogram lots with yards as shown on page 14.

Table 1

LOT WIDTHS
INTERIOR LOTS

Lot Widths (feet)	
Effective	Conventional
32	36.95
33	38.11
34	39.26
35	40.41
36	41.57
37	42.72
38	43.88
39	45.03
40	46.19
41	47.34
42	48.50
43	49.65
44	50.81
45	51.96
46	53.12
47	54.27
48	55.43
49	56.58
50	57.74

Table 2

STREET FRONTAGE - CORNER LOTS

Maximum Length of 12' wide Mobile Home	Corner Lot Frontage (feet)		
	Type I	Type III	Total
30	20.01	67.34	87.35
32	20.01	68.34	88.35
34	20.01	69.34	89.35
35	20.01	69.84	89.85
36	20.01	70.34	90.35
38	20.01	71.34	91.35
40	20.01	72.34	92.35
42	20.01	73.34	93.35
44	20.01	74.34	94.35
45	20.01	74.84	94.85
46	20.01	75.34	95.35
48	20.01	76.34	96.35
50	20.01	77.34	97.35
52	20.01	78.34	98.35
54	20.01	79.34	99.35
55	20.01	79.84	99.85
56	20.01	80.34	100.35
58	20.01	81.34	101.35
60	20.01	82.34	102.35
65	20.01	84.84	104.85

Table 3 summarizes details on the layout of a 5-acre block. Here it is assumed that required yard sizes will be as indicated previously, and that the block depth and length can be varied at will, so long as depth times length (including streets) comes out at 217,800 square feet (5 acres).

Table 3

LOT DEPTH AND BLOCK DIMENSIONS*

Maximum Length of 12'-Wide Mobile Home	Lot Depth		Block Depth		Block Length	
	Effective	Conventional	Conventional	+60' Street	Conventional	+60' Street
30	77.35	66.99	133.98	193.98	1,062.80	1,122.80
32	79.35	68.72	137.44	197.44	1,043.12	1,103.12
34	81.35	70.45	140.90	200.90	1,024.12	1,084.12
35	82.35	71.32	142.64	202.64	1,014.81	1,074.81
36	83.35	72.18	144.36	204.36	1,005.77	1,065.77
38	85.35	73.92	147.84	207.84	987.92	1,047.92
40	87.35	75.65	151.30	211.30	970.76	1,030.76
42	89.35	77.38	154.76	214.76	954.16	1,014.16
44	91.35	79.11	158.22	218.22	938.08	998.08
45	92.35	79.98	159.96	219.96	930.18	990.18
46	93.35	80.84	161.68	221.68	922.50	982.50
48	95.35	82.58	165.16	225.16	907.31	967.31
50	97.35	84.31	168.62	228.62	892.67	952.67
52	99.35	86.04	172.08	232.08	878.47	938.47
54	101.35	87.77	175.54	235.54	864.68	924.68
55	102.35	88.64	177.28	237.28	857.90	917.90
56	103.35	89.50	179.00	239.00	851.30	911.30
58	105.35	91.24	182.48	242.48	838.22	898.22
60	107.35	92.97	185.94	244.94	829.20	889.20
65	112.35	97.30	194.60	254.60	795.46	855.46

*5-Acre Block

Table 4 indicates total number of lots per block and per gross acre (including streets) which could be derived from blocks with dimensions as indicated above, subject to the yard requirements stated. In deriving the figures on number of lots per block, portions remaining were added to whole lots only if the portion amounted to .90 of a lot or more. Existence of remaining fractions less than .90 are indicated by +, shortages less than .10 by -.

The blocks lengths and depths indicated in Table 3 were used in the computations for Table 4.

"Design" of subdivisions made up of such blocks is easy to visualize. Fortunately, there are alternatives. Their use should be encouraged.

Appendix C gives the formulas necessary to derive the various dimensions of 30° parallelogram lots, with any given mobile home and yard measurements. The examples illustrating the use of the formulas are taken from the current example, showing the derivation of Tables 1 through 6.

Table 4

LOTS PER BLOCK AND PER GROSS ACRE*

Maximum Length of 12'-wide Mobile Home	Number of Lots per Block (1) and per Acre (2) at Conventional and Effective ( ) Lot Widths Shown																			
	36.95		39.26		41.57		43.88		46.19		48.50		50.81		53.12		55.43		57.74	
	(32)		(34)		(36)		(38)		(40)		(42)		(44)		(46)		(48)		(50)	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
30	56+	11.2	52+	10.4	50+	10.0	48+	9.6	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2
32	54+	10.8	52+	10.4	50-	10.0	46+	9.2	44+	8.8	42+	8.4	40+	8.0	40-	8.0	38+	7.6	36+	7.2
34	54+	10.8	50+	10.0	48+	9.6	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	36+	7.2
35	54+	10.8	50+	10.0	48+	9.6	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	36+	7.2
36	52+	10.4	50+	10.0	48+	9.6	44+	8.8	42+	8.4	40+	8.0	40+	8.0	38+	7.6	36+	7.2	34+	6.8
38	52+	10.4	48+	9.6	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	36+	7.2	34+	6.8
40	50+	10.0	48+	9.6	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34+	6.8
42	50+	10.0	48-	9.6	44+	8.8	42+	8.4	40+	8.0	38+	7.6	38-	7.6	36+	7.2	34+	6.8	34-	6.8
44	50+	10.0	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34+	6.8	32+	6.4
45	48+	9.6	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34+	6.8	32+	6.4
46	48+	9.6	46+	9.2	44-	8.8	40+	8.0	40-	8.0	38+	7.6	36+	7.2	34+	6.8	34-	6.8	32+	6.4
48	48-	9.6	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	36-	7.2	34+	6.8	32+	6.4	32+	6.4
50	46+	9.2	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34-	6.8	32+	6.4	30+	6.0
52	46+	9.2	42+	8.4	40+	8.0	38+	7.6	36+	7.2	36+	7.2	34+	6.8	32+	6.4	32+	6.4	30+	6.0
54	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34+	6.8	32+	6.4	30+	6.0	30+	6.0
55	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34-	6.8	32+	6.4	30+	6.0	30+	6.0
56	44+	8.8	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	32+	6.4	32+	6.4	30+	6.0	30+	6.0
58	44-	8.8	40+	8.0	38+	7.6	36+	7.2	36-	7.2	34+	6.8	32+	6.4	30+	6.0	30+	6.0	28+	5.6
60	42+	8.4	40+	8.0	38+	7.6	36+	7.2	34+	6.8	34-	6.8	32+	6.4	30+	6.0	30+	6.0	28+	5.6
65	40+	8.0	38+	7.6	38+	7.2	34+	6.8	34-	6.8	32+	6.4	30+	6.0	30+	6.0	28+	5.6	28-	5.6

*5-Acre Block, including streets.

Fractions remaining were added to number of whole lots if .90 or over. Shortages (-) should be subtracted from frontage of widest corner lot, reducing length of unit which could be accommodated and "buildable" area. Overage (-) should be added to frontage of narrowest corner lot, increasing "buildable" area.

Table 5

LOT AREA REQUIRED
INTERIOR LOTS

Effective Lot Width									
32	34	36	38	40	42	44	46	48	50
2,475	2,630	2,785	2,939	3,094	3,249	3,403	3,558	3,713	3,868
2,539	2,698	2,857	3,015	3,174	3,333	3,491	3,650	3,809	3,968
2,603	2,766	2,929	3,091	3,254	3,417	3,579	3,742	3,905	4,068
2,635	2,800	2,965	3,129	3,294	3,459	3,623	3,788	3,953	4,118
2,667	2,834	3,001	3,167	3,334	3,501	3,667	3,834	4,001	4,168
2,731	2,902	3,073	3,243	3,414	3,585	3,755	3,926	4,097	4,268
2,795	2,970	3,145	3,319	3,494	3,669	3,843	4,018	4,193	4,368
2,859	3,038	3,217	3,395	3,574	3,753	3,931	4,110	4,289	4,468
2,923	3,106	3,289	3,471	3,654	3,837	4,019	4,202	4,385	4,568
2,955	3,140	3,325	3,509	3,694	3,879	4,063	4,248	4,433	4,618
2,987	3,174	3,361	3,547	3,734	3,921	4,107	4,294	4,481	4,668
3,051	3,242	3,433	3,623	3,814	4,005	4,195	4,386	4,577	4,768
3,115	3,310	3,505	3,699	3,894	4,089	4,283	4,478	4,673	4,868
3,179	3,378	3,577	3,775	3,974	4,173	4,371	4,570	4,769	4,968
3,243	3,446	3,649	3,851	4,054	4,257	4,459	4,662	4,865	5,068
3,275	3,480	3,685	3,889	4,094	4,299	4,503	4,708	4,913	5,118
3,307	3,514	3,721	3,927	4,134	4,341	4,547	4,754	4,961	5,168
3,371	3,582	3,793	4,003	4,214	4,425	4,635	4,846	5,057	5,268
3,435	3,650	3,865	4,079	4,294	4,509	4,723	4,938	5,153	5,368
3,595	3,820	4,045	4,269	4,494	4,719	4,943	5,168	5,393	5,618

Table 6

LOT AREA REQUIRED
CORNER LOTS

Maximum Length of 12'-wide Mobile Home	Type I	Type III
30	2,636	3,216
32	2,739	3,333
34	2,842	3,452
35	2,896	3,513
36	2,948	3,573
38	3,057	3,696
40	3,166	3,820
42	3,277	3,946
44	3,390	4,074
45	3,447	4,139
46	3,504	4,203
48	3,621	4,335
50	3,739	4,468
52	3,859	4,603
54	3,980	4,739
55	4,042	4,809
56	4,103	4,877
58	4,229	5,018
60	4,356	5,160
65	4,680	5,522

Subdivision Design

Good design in mobile home subdivisions has the same characteristics as good design in conventional subdivisions.

First there must be a satisfactory house. For the house, adapted to it and forming an outer part of it, there must be a satisfactory lot. The house and lot, as the basic living unit, must fit well among other houses and lots, having appropriate aspects of both privacy and neighborliness. The grouping of houses and lots, with perhaps some common open space, should form neighborhoods. Neighborhoods, in the sense that the word is used here, are areas so laid out and developed as to encourage people to become and remain friendly neighbors. (There never was, and never will be, a neighborhood half a mile square.)

It has been noted that mobile home parks are neighborly to a degree not found in most conventional residential areas. Whether this is a passing phase remains to be seen, but certainly any tendency in this direction deserves to be preserved and promoted.

To this end, the cluster, the cul de sac, the loop, the court, the block, and groupings as yet unthought of and unnamed should grow out of the houses and lots, merging parts of them kindly to provide areas where friends may meet and children may play, yet keeping quiet areas apart. When a man wants to sit in the yard with his shirt off, or a woman has a mind to cry outdoors, there should be a spot for it.

This kind of a neighborhood should be designed for homes, not automobiles. The car should be as disciplined as the dog. It should not jump at people, bowl children over, dig up the flower beds, make riotous noises, or commit other nuisances. It has its place, and its place should be planned for it, and it should be taught to stay in it. It should have a place to move around - slowly and without barking - and a place to lie down. In the neighborhood, cars must all be friendly. Cars with hostile tendencies should be encouraged to break their springs or wrap themselves around trees.

And the trees should be there, not only to discourage hot-rodding adolescents of all ages, but as part of a carefully preserved (if possible) and carefully planted (if not) general landscaping. Nothing builds more character into a subdivision than trees, and nothing about a subdivision grows more slowly. A good subdivision should have a general landscaping plan as well as a plan for streets and lots, and the landscaping plan should start early, making the most of the native vegetation and the natural topography. Move the subdivision in gently and wrap it in the landscape. Good design for houses and lots and clusters and road patterns may produce a good subdivision, but it takes landscaping to make a neighborhood of homes.

In mobile home subdivisions, as in all subdivisions, it is a tragic mistake to relate planning and development to the capabilities of the bulldozer. Of course the land can be levelled, the topsoil buried, the trees pushed down. The results of this kind of development can be seen almost anywhere - orderly rows of houses lying in the mud, waiting for the land to heal - and it heals slowly. In many cases a little plastic surgery may be indicated, but it is usually not necessary to begin building neighborhoods by amputating Nature.

The little neighborhoods - the clusters of homes and lots - should fit well together, yet each should have a separateness about it. Here the commons, the stream, the lake, the patch of woods, the pathway becomes both binder and boundary-marker, bringing people together or setting them apart as they choose.

If the subdivision is large enough, churches, schools, shopping centers, playfields, community buildings, offices, and even (as we become wiser) carefully selected manufacturing plants may need to be fitted in. Like cars, they should be fitted in, not allowed to dominate the pattern and make nuisances of themselves. If it is to be a residential subdivision, let it be a subdivision for residences, not a street pattern with houses hung on it, nor yet an appendage to a shopping center.

There are of course many practical considerations - utility easements suited to utilities must be provided. This means that if electricity is to come in by pole lines, the easements should be so laid out so that it is not necessary to add a jumble of guy-wires to get lines around tortuous corners. Gas, sanitary sewers, water and telephone lines (the latter increasingly laid underground) must have places to go. Storm sewers, or some satisfactory kind of surface-water drainage, must be provided.

As to sidewalks, the curb-side walk is usually not desirable. If walks are provided, an interior pedestrian network, running through the middle of the block, will probably be preferable in most cases, to serve as a paved play area for children and perhaps as a rarely - used means of access for emergency vehicles if utility easements are at the rear of the lots, as well as for pedestrian traffic.

Minor streets within neighborhoods need not, and probably should not, be wide. Depending on utility requirements, the handling of storm drainage, parking requirements and other specific needs, minor street right of ways may be 35 feet wide or even less, with paved area as narrow as 18 feet. Right-of-way and paved street width should meet demonstrable requirements, and not be fitted to a rigid figure selected arbitrarily.

It is important, of course, that when cars get out of residential neighborhoods they should be able to move freely, safely and fast. For this reason, collector streets and arteries - neither of which should have residences facing directly on them - should be close enough to residential areas so that in-and-out time is reasonably short.

There is nothing new about any of these ideas, but many of them certainly haven't been worn out by use. Mobile home subdivisions are something relatively new, and design habits haven't become ingrained. There is a good chance for rapid advance in quality of design and development. There is also a good chance for more of what we have too much of already, unless both planners and developers can be broken of bad habits transferred from conventional subdivisions.

One more thing - there is no point in odd-ball lot, street, or subdivision patterns merely for the sake of odd-ball lot, street, or subdivision patterns. There is solid purpose in lot shapes which fit well together and give room for a variety of spaces and sizes of homes and outdoor areas, in residential street systems which are quiet and safe, in subdivision patterns which fit topography and landscaping and lots and little neighborhoods and utilities and streets and

open areas and public and quasi-public and commercial and other areas together in a pleasant and functional pattern. "Can-of-worms" subdivisions are chiefly evidence of drafting dexterity, and create more problems than they solve. Unless the design accomplishes significant purposes, it doesn't accomplish much except to create headaches for those subjected to it.

If the design job can be done simply and well, it should be done simply and well. Complex convolutions are not a useful end in themselves.

These generalities deserve some detailed consideration.

DESIGN STANDARDS

Performance Standards for Design

Performance standards for subdivision design, starting with the unit and the lot and working outward to the subdivision, develop as follows:

Relation of mobile home to lot:

1. There should be private areas and open areas on the lot, related appropriately to functional areas in the mobile home.

2. The lot should be so shaped and scaled as to provide for a reasonable variety of mobile homes and additions.

3. Moving the mobile home onto the lot must of course be possible, but in mobile home subdivisions the amount of movement will be limited. In subdivisions, provisions for positioning the unit on the lot and for moving it out need only minor and incidental attention in lot design. Hence units may be positioned on the lot in any way which makes for good orientation, including location with the front away from the street. For some designs, this is an important advantage.

4. Location of drives, parking areas, carports and garages should be subordinate to use of other areas of the lot. It should be easy and safe to enter the lot with a car, and convenient to get from the car to the entrance of the mobile home by sheltered walkways. Drives, parking areas and car shelters should not be located to interfere with desirable views from important windows in the unit or open areas on the site, nor should they break up important use areas on the lot.

Relation of mobile homes and lots to each other - little neighborhoods:

1. The mobile homes and functional areas on individual lots should complement and supplement those on adjacent lots. Open areas should flow into open areas, enhancing primary views. Areas on one lot which it is desirable to enclose by structures, vegetative screening or fences should adjoin similar areas on neighboring lots.

2. "Fronting" to the inside of the block has definite advantages. The block

interior has more "view potential," and is a better play area for children. Facing the groupings inward improves view, supervision of children from areas of the home in which mothers are likely to be working during the day, ties in with interior pedestrian ways, and relates street, drives, car storage, utility rooms, and garbage and trash storage and pickup conveniently out of the way of other functions. In contrast, conventional fronting toward the street gives a view largely of parked cars and traffic. What might otherwise be a neighborly arrangement is split by the street, and a considerable amount of space in relatively unused front yards is wasted by unnecessarily long driveways to get the car off the street to the garage or carport, which is quite likely to be in the wrong place so far as intelligent use of space on the lot is concerned. The street side of the lot should be used for purposes related to the street, and the interior-block side for purposes not related to the street.

3. Interior areas within the little neighborhoods should be designed to encourage neighborliness. Inner-block arrangement should include easy mutual access from the entrances of mobile homes in the grouping.

General subdivision pattern - relation of elements:

1. Building from little neighborhoods, the general subdivision pattern should fit topography, requirements for circulation, and requirements for provision of community facilities and utilities. Areas for churches, schools, major parks, community facilities and other uses not falling within the little neighborhoods should be located appropriately with respect to the population to be served and the street and walkway nets. As appropriate, residential areas should merge into or be insulated from areas devoted to other purposes. They should be insulated from heavy traffic, concentrations of parking, noise, lights, commercial and industrial activities. They should merge with parks and other suitable open areas.

2. The street pattern should serve, not shape, the lots in their small neighborhood groupings. Land devoted to streets should be held to a minimum compatible with performance of street-related functions. Minor streets should discourage use by through traffic, and no single minor street should serve so many homes that local traffic is likely to become a problem. Minor streets should feed at well-spaced intervals and well-designed intersections into collector streets and arteries for fast-moving traffic, and neither collector nor arterial streets should have direct entrances from residential lots.

3. Blocks should be oriented generally with the long axis in the direction of principal automotive and pedestrian movement. Blocks should be large enough to include substantial numbers of units, wide enough to provide desirable lot depths plus interior walkways, commons, and easements for such utilities as are to be located within the block. Small blocks are usually evidence of poor planning, involve undue amounts of street with relation to lots, have a tendency to break up desirable continuity in interior-block areas, and may not make room for enough neighbors to form a neighborhood (in the sense that the word is being used here).

4. The mobile home subdivision should be set in its own frame, rather than merely running into surrounding uses. It is desirable that it be bordered in a manner which insulates it from surrounding uses and sets it apart as a community.

Application of Subdivision Design Standards

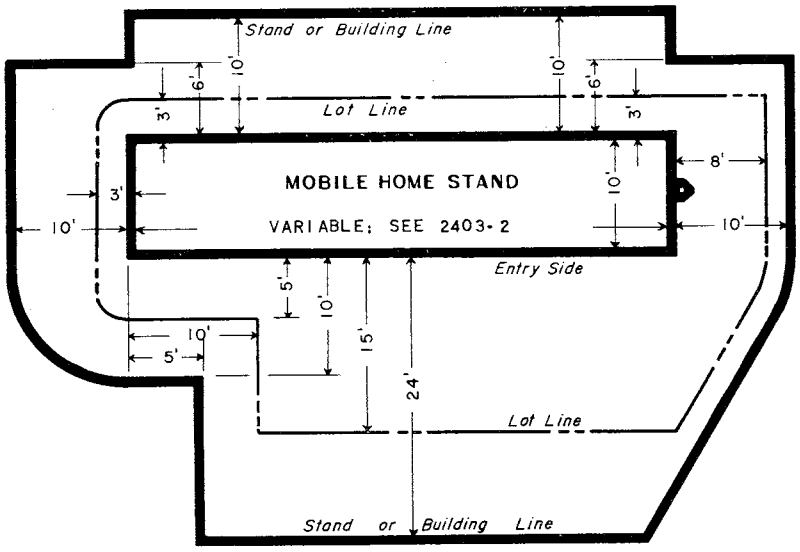
The illustrations which follow are taken from designs for both mobile home subdivisions and mobile home parks. They serve to stimulate thinking, and are a means for testing the performance standards proposed against actual designs, and actual designs against performance standards.

FHA's Minimum Property Requirements for Mobile Home Courts[7] was prepared in 1957 and is already out of date in some respects. Certainly the kind of mobile home parks developed in conformity with these restrictions would be far better than many existing mobile home parks. Equally certainly, it is devoutly to be wished that mobile home parks developed now and in the future will do more than merely meet these requirements. But the FHA document does provide some design features, and detailed specifications for construction.

Starting with the unit in relation to the lot, FHA's Figure 2404.6 (Figure 8) provides a stand with room for a patio on the entry side, and requires minimum clearance from the mobile home to its lot line and to adjacent mobile homes or buildings.

Figure 8

REQUIRED MINIMUM DISTANCES FROM A MOBILE HOME STAND TO ITS LOT LINES AND TO OTHER STANDS AND BUILDINGS



The mobile home stands required by Section 2403.2 (noted in the diagram) may vary in size according to the following formula: 5% are to be 10'x 50' or larger, another 5% 10'x 40' or larger, and the remaining 90% 10'x 45' or larger. These maximums are rather low when it is considered that the average mobile home produced in 1960 was 50 feet long, and that the number of 12'-wide units and expandable units is increasing fast. Parks with only 5% of stands 50' or more in length, and with no provision for 12'-wide units, or for units which expand for part of their lengths to widths up to 20 feet, will obviously be shutting out an increasing part of their potential customers, or crowding them onto facilities not designed for them.

The patio, "to provide an appropriate outdoor living space to supplement the limited interior space of a mobile home," is to be paved. Car storage, tenant storage lockers, laundry and recreation facilities are provided off the lot.

Even for mobile home parks, the clearances provided between the stand and the lot line, and between the stand and adjacent stands or buildings, are very small. And the apparent intent to permit a unit parallel to, and ten feet from, the stand shown would result in a rather crowded situation, with the living-room end of each unit adjacent to the bedroom end of the other.

Thus the FHA home-and-lot module, Figure 9, is a very minimum sort of minimum. But in the mobile home park design given as an example by FHA, it is apparent that the module was fortunately not used in the design.

Figure 9

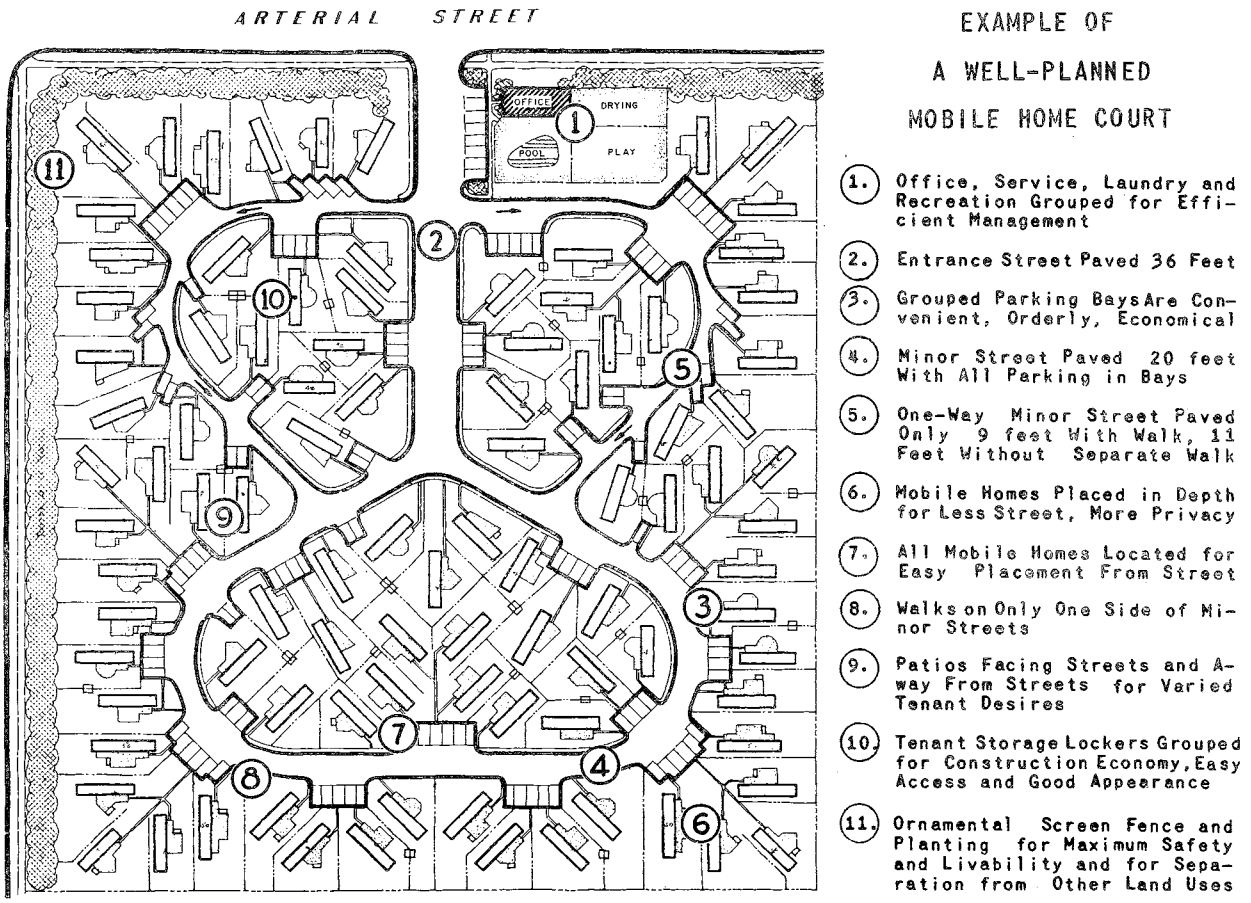


Figure 10 relates the mobile home unit to the lot, with the street playing a subordinate role. In this "town house" layout, the mobile home faces away from the street. In the area normally occupied by a non-functional front yard the carport and utility room, close to the street, provides a sheltered entrance, serves as a buffer against street noises, and with fencing and vegetative screening closes off the entire width of the lot from the street.

Additional fencing encloses the patio completely. On the other side of the unit, enclosed except toward the interior of the block (or completely enclosed if desired) is a second private yard, available for drying clothes or other purposes.

The "front" yard - toward the interior of the block with its walkway - is open, inviting visits not only from the neighbors on either side but also from those across the block. If neighborliness is a virtue, this should encourage it. The interior "front" yards provide a play area away from the street for children, under the eyes of their mothers, and a far more usable open area than is formed by conventional front yards on the street side. Figure 11 shows variations on this theme for a group of units. Differences in driveway, carport,

and utility room arrangements provide alternative solutions to the street-side problem, with never less than two off-street parking spaces. Different unit shapes and patio arrangements are also demonstrated.

From this diagram, the shape of the inner-block neighborhood begins to emerge. The next row of lots is offset, and a similar orientation of mobile homes there would produce a maximum of openness down the center of the block.

Figure 10

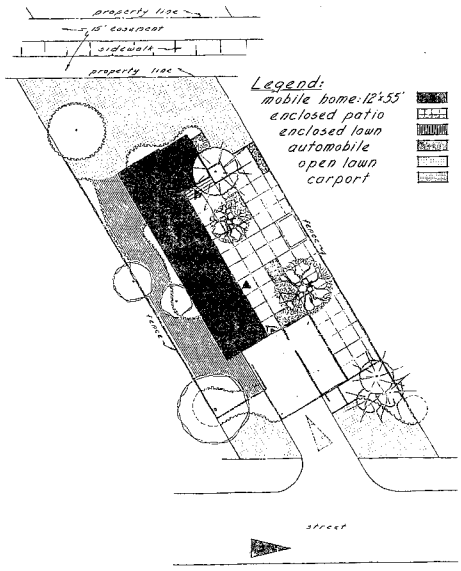
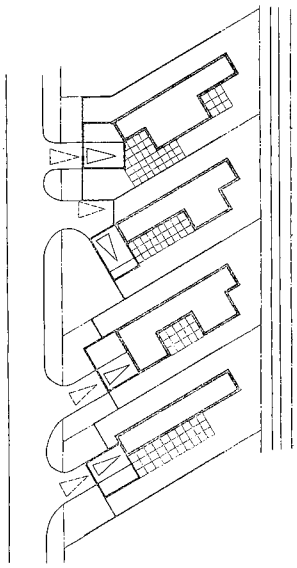


Figure 11



In cul de sac arrangements, the same principles can be made to apply and increased variation is possible. Figure 12 is a detail on one use of an irregular lot. Figure 13 is a cul de sac merging into rows of straight lots. The cul de sac diagram indicates that for mobile home lots, at least, there is no overpowering reason why side lot lines should be radial to a curve.

Figure 12

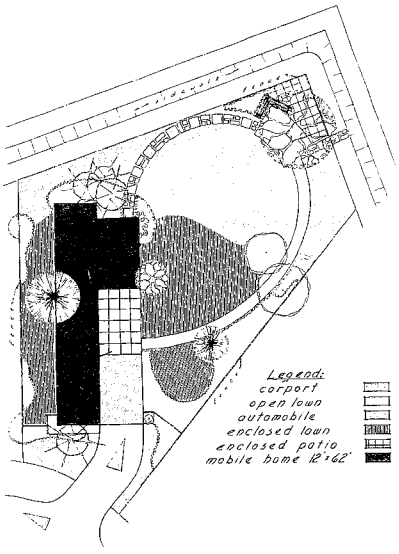


Figure 13

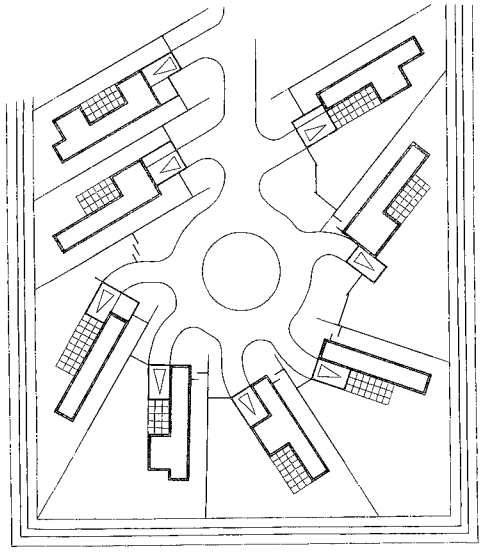
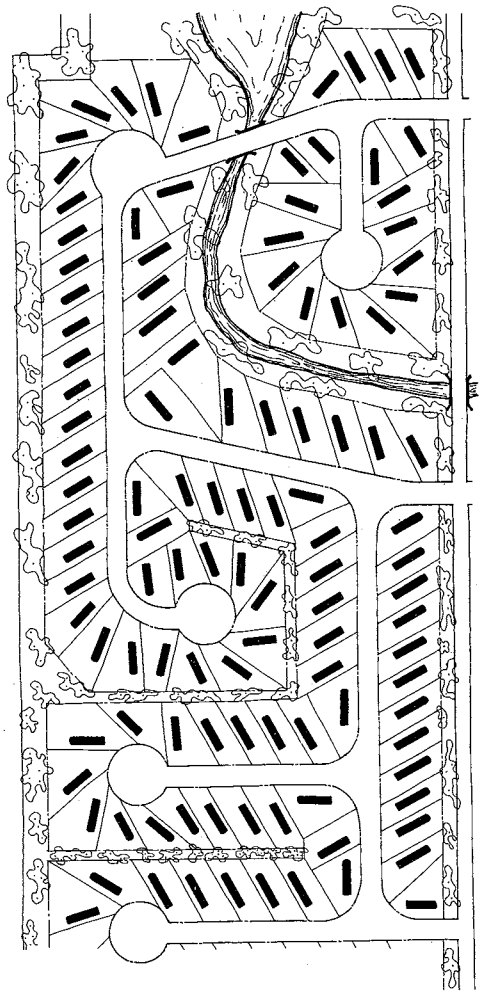


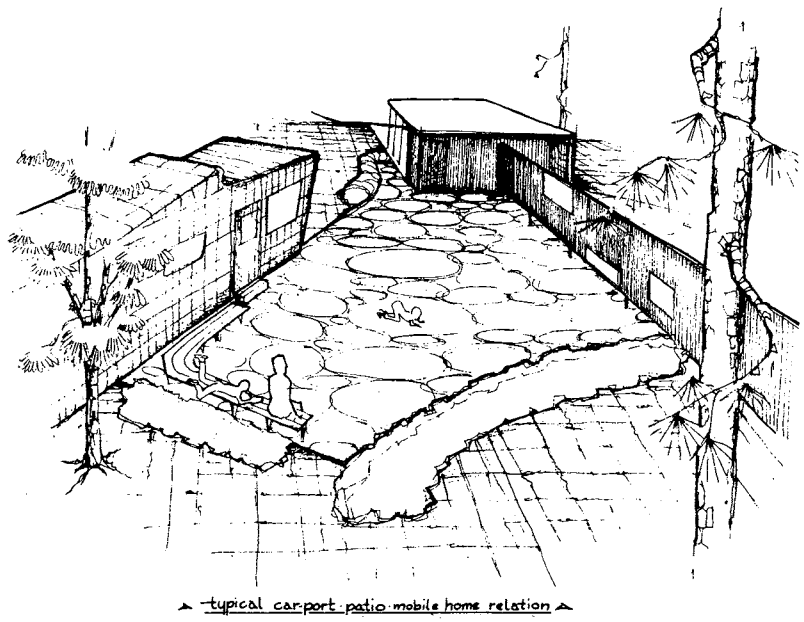
Figure 14



To extend the ideas indicated from individual lots and small groups of lots to a subdivision, the layout in Figure 14, adapted from the site used in How to Subdivide,[15] shows a portion of a mobile home subdivision. The main road runs north and south at the right. No lots have direct access to this artery - it is separated from lots by a landscaped strip which would serve as insulation, for easements, and on its inner margin as a pedestrian way. Interior traffic would not be through traffic, and would be slow. A variety of lot sizes and shapes are available. The plan would be improved if the walkways converged on the streamside parkway, which leads to a community center to the north, outside the area shown.

The illustrations thus far were prepared especially for this report. Figures 15 and 16 show a part of the prize-winning entry of Arthur G. Foster, Jr. in the Mobile Home Manufacturers Association's student contest.

Figure 15



typical carport patio mobile home relation

Again, the lot arrangement is oriented away from the street and the patio is enclosed. The joint carport might be difficult in a mobile home subdivision.

In Figure 16, the general plan emphasizes landscaping, commons, and an interior walkway system, with streets subordinate to the primary residential purpose.

Figure 16

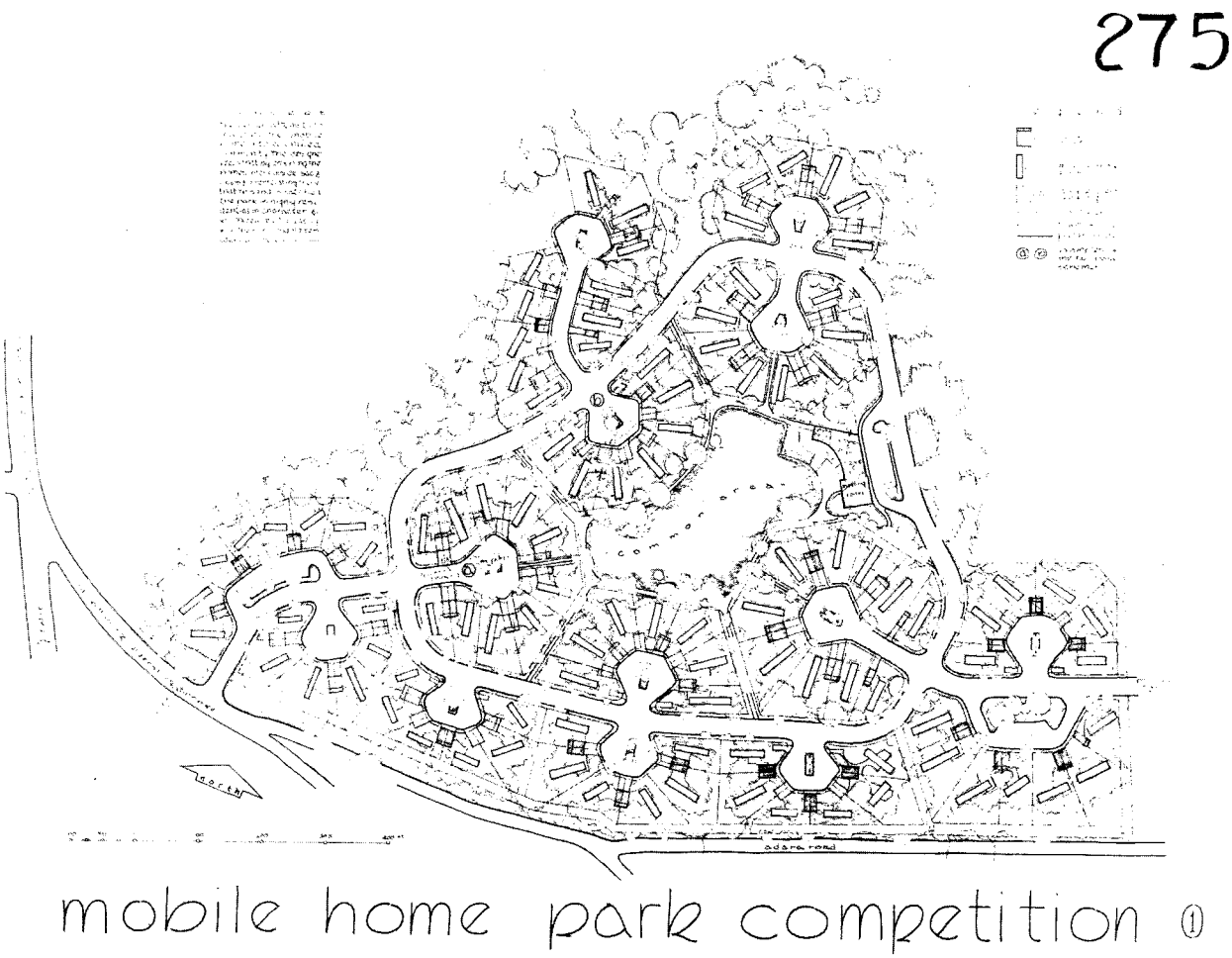
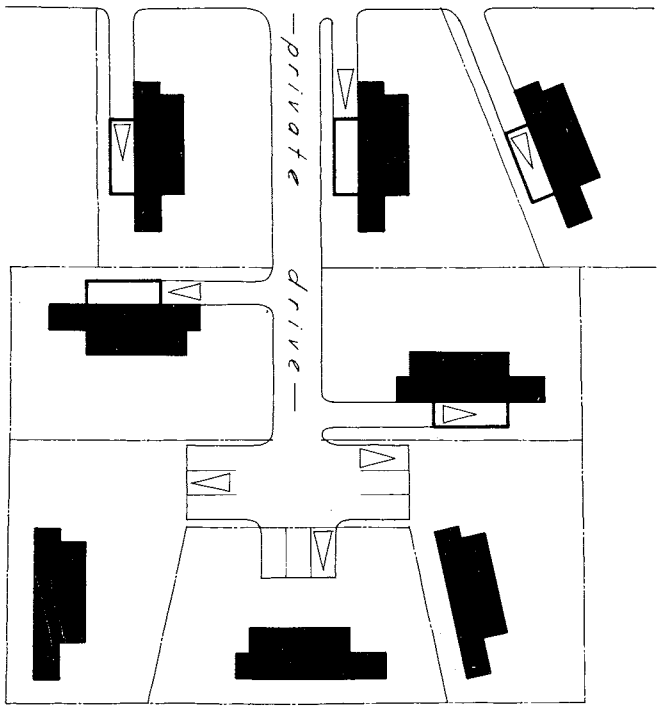


Figure 17

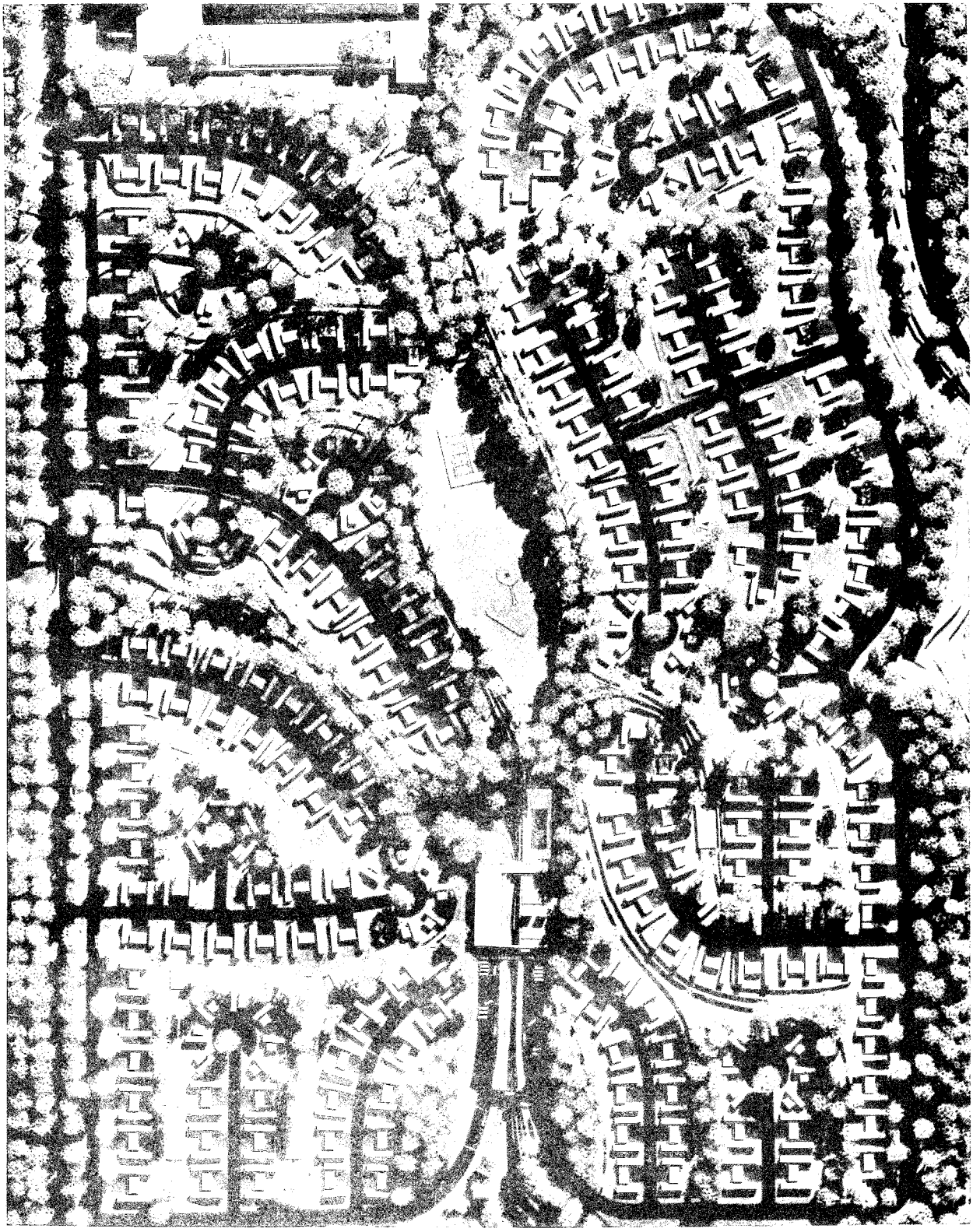


This detail (Figure 17) from a design for a mobile home subdivision is sketched from a plan prepared by the Mobile Home Manufacturers Association. It provides for development in depth, and as a module can be repeated.

As indicated by the scale of the units, the lots are large. In many jurisdictions, the use of the private street might present legal problems - entry of public vehicles onto private property - and except in "managed" subdivisions, maintenance responsibility would have to be carefully allocated.

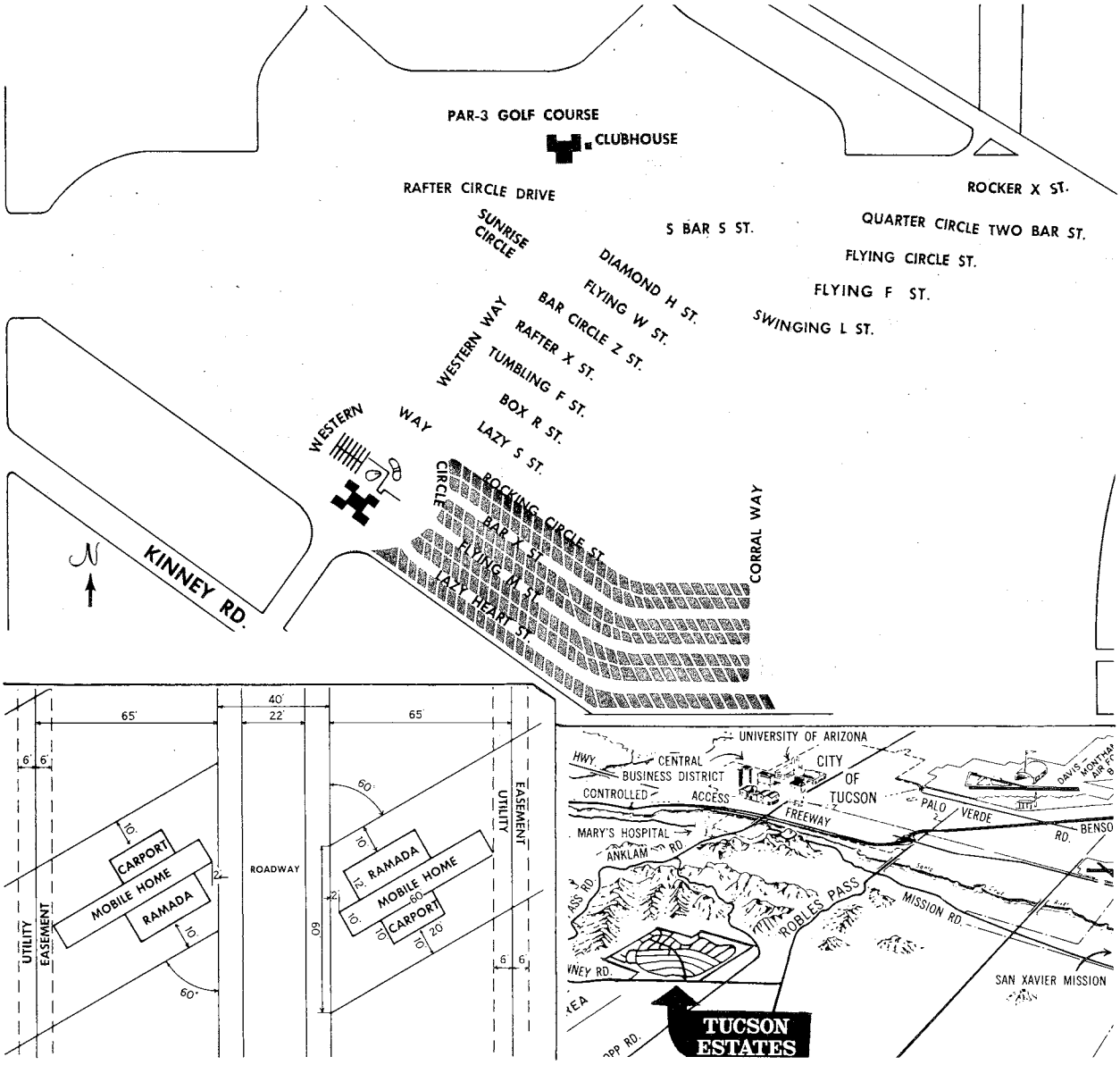
Below is the first prize winner from the professional entries in MHMA's mobile home park competition. This was submitted by Ralph T. Bergsma, Farmington, Michigan.

Figure 18



Below is a plan being developed by the largest mobile home subdivision operator in the country, Mobilife Corporation, headed by Sydney Adler.

Figure 19



APPENDIX A

DEED RESTRICTIONS
TRI-PAR ESTATES

DEED RESTRICTIONS FOR TRI-PAR ESTATES SUBDIVISION, SARASOTA, FLORIDA RECORDED IN PLAT BOOK 13, PAGE 9, PUBLIC RECORDS OF SARASOTA COUNTY AS RECORDED IN OFFICIAL RECORDS BOOK 258, PAGE 445, IN THE PUBLIC RECORDS OF SARASOTA COUNTY, FLORIDA.

This indenture made the sixth day of October, 1960 by MOBILIFE CORP., hereinafter called Company, a Delaware corporation organized and existing under the laws of the State of Delaware and authorized to do business in the State of Florida, having title to a tract of ground designated as TRI-PAR ESTATES Subdivision, whereas the Company intends to develop and improve said tract of land and open up and lay out the streets shown on said plat and offer for sale the lots and other parcels of land included in said tract and is desirous of subjecting all of said tracts of lands, and the lots and parcels shown on said plat to certain covenants, agreements, easements, restrictions, conditions and charges as hereinafter set out;

NOW, THEREFORE, THIS INDENTURE WITNESSETH, that the Company does hereby impose and charge lots, blocks or parcels of TRI-PAR ESTATES Subdivision for itself, its successors or assigns with certain exceptions and covenants, agreements, easements, restrictions, conditions and charges hereinafter set out lying, being and situated in Sarasota County, Florida:

1. No building (addition or accessory), mobilehome, fence, wall or other structure shall be commenced, erected or maintained, nor shall any addition to or change or alteration therein be made until the plans and specifications showing the nature, kind, shape, height, floor plan, materials, location and approximate cost of such structure have been submitted to and approved in writing by the Company. The Company's failure to give notice of its disapproval of such plans and specifications within thirty days after receipt thereof by Company shall be deemed to constitute its approval thereof.

2. There shall be a minimum set back of 5 feet from all property lines for all permanent or temporary structures or mobilehomes on Lots 1 through 123, both inclusive, in said subdivision. Company may, in its discretion, release any lot, block or parcel from the restrictions contained in this paragraph.

3. No well or septic tank shall be constructed in said subdivision without the prior written approval of Company.

4. Lots 1 through 123, both inclusive, in this subdivision shall be used exclusively for residential purposes, except as designated by Company.

5. No signs or advertisements shall be displayed on Lots 1 through 123, both inclusive, in said subdivision or right of ways, except as designated by Company.

6. No boat, boat trailer, travel trailer or any similar property shall be stored in said subdivision without the prior written approval of Company.

7. Company reserves the right to enter upon all lots, blocks or parcels to care for, cut grass, remove rubbish and keep all lots, blocks or parcels from creating an unsightly appearance and to charge the owner of said lot, block or parcel for the actual cost plus 10% for service performed in alleviating said unsightly appearance. Any such charge shall constitute a lien against the property and be enforceable as provided in the Mechanic's Lien Law of the State of Florida.

8. All mobilehomes must have a minimum of 320 feet of floor area in the primary unit (not counting cabanas). They must have complete sanitary facilities, including, among others, a lavatory, wash basin, tub or shower, kitchen sink, and

must be connected to sewerage outlets in conformity with state health requirements.

9. All drying wash must be hung in an area provided for that purpose as designated by the Company, except that a folding drying rack not more than 4 feet in height may be placed on the back of any lot.

10. No television or radio antennae or towers may be erected in said subdivision except as designated by Company.

11. No household pets will be kept in said subdivision except in such areas as shall be designated in writing by the Company.

12. Not more than one Mobilehome shall be placed on each lot.

13. No children under 12 years of age shall reside in said subdivision.

14. No lot or part of lot in said subdivision shall be regraded without written consent of the Company.

15. In the event of any violation or threatened violation of any of the covenants herein, the Company or any owner of any lot, block or parcel in the subdivision may bring action at law or in equity, either for injunction, action for damages or other such remedy as may be available.

16. The failure by any land owner or the Company to enforce any restrictions, conditions, covenant or agreement herein contained shall in no event be deemed a waiver of the right to do so thereafter as to the same breach or as to one occurring prior or subsequent thereto, nor shall such failure give rise to any claim or cause of action against the Company or such land owner.

17. The covenants herein contained run with the land and, unless otherwise terminated by the Company in accordance with the provisions herein contained, shall bind all persons in interest, all owners of lots, blocks or subdivisions and their heirs, legal representatives, successors and assigns until January 1, 2000, at which time said covenants shall be automatically extended for successive periods of ten years each unless, by mutual agreement between the Company and owners, of a majority in number, of lots at or prior to the end of the initial term or any successive period of ten years, said covenants shall be amended, changed or terminated in whole or in part. Such amendments, changes or terminations shall be effected by instruments in recordable form executed by the Company and filed in the proper office of record.

18. If any provision of this indenture or the application of such provision to any person or circumstances shall be held invalid, the remainder of this indenture or the application of such provision to persons or circumstances other than those as to which it is held invalid, shall not be affected thereby.

19. Mobilife Corp. shall have the right to transfer to any other corporation, person or partnership all of its rights and obligations hereunder; upon such transfer and the assumption of such obligations by the transferee, Mobilife Corp. shall have no further obligations hereunder.

MOBILIFE CORP.

APPENDIX B

Check List: What . . . . . to regulate . . . . . Where

Mobile Home Units

Value, appearance, age	Restrictive covenants
Size	Restrictive covenants, housing code
Construction	Special building, plumbing, heating, electrical codes (manufacturer's seal of compliance)
Facilities, livability	Housing code, sanitary regulations
Location	Zoning ordinance
Additions	Zoning ordinance, building code
Fire safety	Fire prevention and protection regulations

Mobile Home Lot

Location, width, area, yards, coverage by unit and additions, off-street parking	Zoning ordinance
Access to street	Zoning ordinance, subdivision regulations
Design	Subdivision regulations
Drainage, water supply, sewerage	Subdivision regulations, sanitary regulations
Gas, electricity, phone, other utilities supplied	Subdivision regulations
Fences, walls	Zoning ordinance
Property numbering	Subdivision regulations

Mobile Home Subdivision

Location, area, minimum number of spaces	Zoning ordinance, subdivision regulations
Streets, layout, width, construction, lighting, naming, marking, etc.	Subdivision regulations
Drainage	Subdivision regulations, zoning (flood plain)
Water supply, sewerage	Subdivision regulations, sanitary regulations
Landscaping	Subdivision regulations, zoning ordinance (buffer plantings may be required)
Sidewalks	Subdivision regulations
Open areas	Subdivision regulations, zoning ordinance (smaller lots may be permitted subject to provision of compensating open area)
Sites for public and quasi-public buildings and uses	Subdivision regulations (provisions as appropriate for churches, schools, municipal buildings, parks, playgrounds, playfields)
Commercial facilities	Zoning ordinance, subdivision regulations
Building construction	Building, plumbing, heating and electrical codes
Electric, gas, phone and other utilities	Subdivision regulations (easements)
General design	Subdivision regulations

APPENDIX C

FORMULAS FOR 30° PARALLELOGRAM LOTS

These formulas are based on the geometric analysis of 30° right triangles. The numbers are the trigonometric functions of 30° angles.

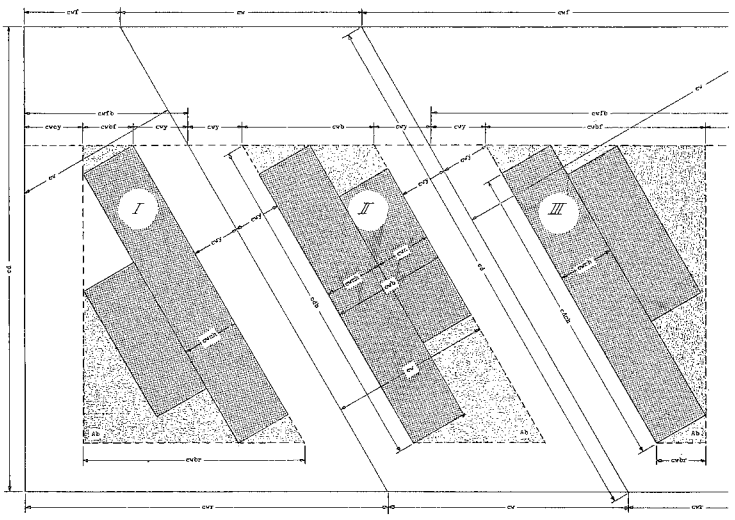
Definitions of abbreviations, and their application to types of lots:

Ab Buildable area of lot (shaded area) (all types)
At Total area of lot (all types)
cd Conventional depth of lot (all types)
cdb Conventional depth of buildable area (all types)
cdfy Conventional depth of front yard (all types)
cdry Conventional depth of rear yard (all types)
cdy Conventional depth of front and rear yards (all types)
cw Conventional width of lot (type II)
cwb Conventional width of buildable area (type II)
cwbf Conventional width of buildable area at front (types I and III)
cwbr Conventional width of buildable area at rear (types I and III)
cwcy Conventional width of corner yard (types I and III)
cwf Conventional width of lot at front line (types I and III)
cwfb Conventional width of lot at front of buildable area (types I and III)
cwr Conventional width of lot at rear line (types I and III)
cwy Conventional width of side yard (all types)
ed Effective depth of lot (all types)
edb Effective depth of buildable area (all types)
edmh Effective depth (length) of mobile home (all types)
ew Effective width of lot (all types)
ewa Effective width of mobile home additions (wings, patio, etc.)
ewb Effective width of buildable area (type II)
ewmh Effective width of mobile home (all types)
ewy Effective width of side yard (all types)

Formulas:

Ab (I and III) = (½(cwbf + cwbr)) x cdb
Ab (II) = ewb x edb = cwb x cdb
At (I and III) = (½(cwf + cwr)) x cd
At (II) = ew x ed = cw x cd
cd = ed x .8660 = cdy + cdb
cdb = cd - cdy =
(edmh + (ewmh x .57735)) x .8660
cdfy = predetermined
cdry = predetermined
cdy = cdfy + cdry
cw = ew x 1.1547
cwb = ewb x 1.1547
cwbf (I) = ewmh x .8660 = cwbr (III)
cwbf (III) = (ewmh x 1.1547) + ½edmh =
cwbr (I)
cwbr (I) = (ewmh x 1.1547) + ½edmh =
cwbf (III)

Figure 20



cwbr (III) = ewmh x .8660 = cwbf (I)
cwcy = predetermined
cwf (I) =
  cwy + cwbf + cwcy - (cdfy x .57735)
cwf (III) =
  cwy + cwbf + cwcy + (cdfy x .57735)
cwfb (I) = cwf + (cdfy x .57735)
cwfb (III) = cwf - (cdfy x .57735)
cwr (I) =
  cwy + cwbr + cwcy + (cdry x .57735)
cwr (III) =
  cwy + cwbr + cwcy - (cdry x .57735)

cwy = ewy x 1.1547
ed = cd x 1.1547
edb = cdb x 1.1547
edmh = predetermined
ew (I and III) =
  (½cwfb x .8660) + (½ cwfb x 1.1547)
ew (II) = cw x .8660 =
  ewmh + ewa + 2ewy
ewa = predetermined
ewb (II) = ewmh + ewa = ew - 2ewy
ewmh = predetermined
ewy = predetermined

Examples of the application of these formulas to the tables shown in this report are as follows:

Table 1: Lot Widths - Interior Lots
cw = ew x 1.1547 For 32' effective width, cw = 32' x 1.1547 = 36.95'

Table 2: Street Frontage - Corner Lots
Type I: cwf = cwy + cwbf + cwcy - (cdfy x .57735)
Type III: cwf = cwy + cwbf + cwcy + (cdfy x .57735)
Total = cwf (I) + cwf (III)
For a 30' mobile home on a type III lot,
cwf = (ewy x 1.1547) + ((ewmh x 1.1547) + ½edmh) + cwcy + (cdfy x .57735)
= (10' x 1.1547) + ((12' x 1.1547) + ½ 30') + 12.5' + (25' x .57735)
= 11.55' + (13.86' + 15') + 12.5' + 14.43' = 67.34'

Table 3: Lot Depth and Block Dimensions
ed = cd x 1.1547
cd = cdy + cdb = (cdfy + cdry) + ((edmh + (ewmh x .57735)) x .8660)
column 3 = 2 x column 2 column 4 = column 3 + 60'
column 5 = (217,800 sq. ft. - (60' x column 4)) ÷ column 4
column 6 = 217,800 sq. ft. ÷ column 4

Table 4: Lots Per Block and Per Gross Acre
Lots per block = (((conventional block length - total corner lot frontage) ÷ conventional width per lot) + 2 (corner lots)) x 2 lots deep
(each of these factors is taken from the previous tables)
Lots per acre = lots per block ÷ 5 acres per block

Table 5: Lot Area Required - Interior Lots
At = ew x ed = (ewmh + ewa + 2ewy) x ed (ed is shown in table 3)

Table 6: Lot Area Required - Corner Lots
At (I and III) = (½(cwf + cwr)) x cd (cd = table 3, column 2)
(cwf (I) = table 2, column 1) (cwf (III) = table 2, column 2)
cwr (I) = cwy + ((ewmh x 1.1547) + ½edmh) + cwcy + (cdry x .57735)
cwr (III) = cwy + (ewmh x .8660) + cwcy - (cdry x .57735)

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